PRELIMINARY DRAFT FOR REVIEW

SAND86-1135

CONTAINMENT EVENT ANALYSIS FOR POSTULATED SEVERE ACCIDENTS AT THE PEACH BOTTOM ATOMIC POWER STATION

C.N. Amos
Technadyne Engineering Consultants, Inc.

J. M. Griesmeyer
Sandia National Laboratories

A. M. Kolaczkowski
Science Applications International Corporation

May 12, 1986

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C. N. AMOS, J.M. GRIESMEYER, and A.M. KOLACZKOWSKI
Sandia National Laboratories, SAND 86-1135

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1. INTRODUCTION

This report documents analyses performed under the Severe Accident Risk Reduction Program (SARRP) to investigate the response of containments at commercial nuclear power plants to severe accidents (beyond the design basis). These analyses focus on identifying the various pathways that could lead to the release of fission products beyond the containment boundary and on estimating their frequencies of occurrence. The analyses are part of an up-to-date characterization of nuclear plant risk which will serve as a principle input to a forthcoming report by the U.S. Nuclear Regulatory Commission (NRC) Staff, NUREG-1150. It is anticipated that NUREG-1150 will provide a technical basis upon which to consider future decisions regarding changes to regulations and regulatory practices.

The analyses described in this report represent an updated and broader perspective on the significance of the fission product source terms estimated in BMI-2104 (Ref. 1) and subsequent analyses performed for NUREG-1150 by examining the ways in which containment failures leading to source terms of different magnitudes can occur.

One might ask, "Why is there a need for such an update perspective on the various accident pathways that are possible?" To answer this question, we must first consider the fact that a limited number of analyses were performed as part of the BMI-2104 work. The analyses were selected on the basis of previous knowledge of possible large risk contributors and included a transient with loss of long term heat removal (TW sequence), a large loss of coolant accident (LOCA) with loss of injection (AE sequence), and an anticipated transient without scram (ATWS) scenario. However, plants such as Peach Bottom have recently made a number of both design and operational changes. In addition, probabilistic risk assessment (PRA) and containment analysis methodology and investigations have further evolved providing newer insights. These two factors, in combination, have been reflected in the accident sequence and containment analysis update as part of the NUREG-1150 work. The resulting insights show that instead of TW or AE type sequences, variations of a total loss of all AC power (station blackout) and to a lesser extent, ATWS, dominate the core damage frequency and risk for Peach Bottom. With a change in focus to a number of station blackout scenarios, an update of the most important accident pathways is necessary. Questions regarding containment venting and late recovery of AC power are examples of analysis areas requiring investigation for their effect on containment failure, release pathways, and ultimately the magnitude of the source term.

These questions raise the need for a systematic identification of the various pathways that the accident can take and assessment of the likelihood, or probability, of each. Such an analysis provides a basis for evaluating whether the source terms developed for a particular fission product release pathway cover the range of risk-significant source terms that could result from that accident sequence.

The overall objectives of this study are (1) to identify accident pathways (i.e., combinations of accident sequences and containment events) that delineate source terms which may be important to risk, (2) to estimate the frequencies of those pathways and hence the frequencies of the source terms they attend, and (3) to identify accident pathways for which additional source term calculations are needed. These objectives are implemented through assessment of five reference plants: Surry (PWR subatmospheric containment), Peach Bottom (BWR Mark I), Sequoyah (PWR ice condenser), Grand Gulf (BWR Mark III), and LaSalle (BWR Mark II). This report describes the analyses for the Peach Bottom plant. Each of the other plants is treated in a separate report.

With regard to the nature of the sequences considered, two aspects should be noted. In the current analysis, accidents initiated by external events (e.g., earthquakes, fires, flooding, etc) are not explicitly treated since no analyses of the frequencies of these events or of the capabilities of plant systems and structures to withstand them have been performed. In addition, an in-depth evaluation of operator actions that might be taken to respond to core melt accidents to mitigate their consequences has not been performed. Plants such as Peach Bottom have procedures which provide only a limited set of instructions to the operators past the onset of melting of the core; it is beyond the scope of the present analysis to devise more detailed procedures and to evaluate their effects.

In Section 2, the method used to achieve the objectives stated above is described. First a general description of the containment event tree is provided which also addresses how the branches are quantified. Some special considerations and observations are also discussed as well as the interface between the updated accident sequence analyses and this work. In Section 3, the results are presented in terms of frequencies of containment failure modes and accident pathways for the various accidents that were assessed to be potential contributors to risk for Peach Bottom. In Section 4 the results are summarized along with a discussion of those that are particularly significant.

Appendix A provides the detailed description of the Peach Bottom containment event tree. This includes the justification for the evaluation of the probability of each event considered in the tree. A sample problem to facilitate the explanation of the manner in which the input for the event tree is structured is given in Appendix C. Appendix D includes the actual computer code input which forms the Peach Bottom containment event tree.

It is important to differentiate between the objectives stated above and those of a risk assessment. This report does not present a calculation of risk; only the frequencies of accident pathways that lead to fission product source terms. Evaluation of risk requires two additional steps: (1) estimation of source terms for all important

sequences and accident pathways, and (2) determination of the mean consequences associated with each source term. These objectives are also part of the SARRP, which will use the results reported here to calculate risk for the reference plants. That analysis will be documented in a separate report.

2. METHOD

2.1 General Description and Observations

In traditional PRAs, the accident pathways that contribute to risk are described by two types of event trees. "System event trees" are used to define the spectrum of accident sequences (i.e., the combinations of accident initiators and subsequent system failures) that can lead to core melting. "Containment event trees" are used to define the containment failure modes which lead to fission product releases beyond the containment boundary.

This analysis is based upon the core-melt sequences that were identified and whose frequencies were estimated through the Accident Sequence Evaluation Program (ASEP). For each of the reference plants, a PRA has been performed previously.* The Peach Bottom plant was the BWR investigated in the Reactor Safety Study (RSS, Ref.2). The sequence frequency analysis from that study is being updated by ASEP to reflect the current plant configuration, accounting for changes that have been made to the plant since completion of the original study, and to incorporate improved risk assessment methods and data bases. A few planned, but not yet completely installed, plant modifications have been considered. These are modifications that have a specific time period by which they will be implemented by the utility and in some way are responsive to either recent rulemaking or safety concerns.

Coordination between the sequence and accident progression analysis was through careful definition of cut set groups. The cut set groups combine cut sets that would be expected to have similar effects on the plant conditions during core degradation. The cut set groups reflect explicit consideration of the sequence conditions that could produce unique effects on the likelihood of various containment failure modes (e.g., the status of containment safety features). They also provide a systematic mechanism for combining sequences that were distinguished for convenience in estimating their frequencies, but that need not be subjected to separate evaluation in the containment event tree. For ease in understanding, the cut set groups are discussed in this report. The definitions of the cut set groups for Peach Bottom are provided in Section 2.3.

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* An exception to this is the LaSalle plant, for which a detailed, plant-specific PRA is being conducted by Sandia for the NRC under the Risk Methods Integration and Evaluation Program.

The containment event tree developed by SARRP for Peach Bottom is considerably more complex than those considered in previous PRAs. It is in fact the most detailed of all the reference plant containment event trees. This is because BWRs typically have a significant level of system and phenomenological interactions between the containment and core cooling systems. In addition, the Peach Bottom plant has been chosen for study in the Probabilistic Risk Assessment Uncertainty Evaluation Program (PRUEP). This NRC-sponsored study will evaluate the source and level of uncertainties associated with plant risk. In order to properly evaluate these uncertainties, a detailed state-of-the-art analysis is called for in order to support the goals of the PRUEP. Therefore, the containment event tree for Peach Bottom is of sufficient detail to support both the objectives of this work and that of the PRUEP.

The following types of questions are in the Peach Bottom containment event tree:

(1) ENTRY STATES. What are the conditions in the reactor pressure vessel and containment prior to melting of the core that could influence the accident progression? These are provided primarily by the cut set group definitions which are discussed later.

(2) PHENOMENOLOGICAL EVENTS. What are the phenomena that could affect the progression of severe accidents, at what points during the accident timeline do they occur, and what are their subsequent effects on the accident progression?

(3) REACTOR VESSEL BREACH CONSIDERATIONS. What is the size and location of the reactor vessel breach (if any) and the pressure in the system at the time of breach?

(4) CONTAINMENT SYSTEM SURVIVABILITY. Does the pressure suppression system survive the conditions occurring during severe accidents which exceed their design bases?

(5) CONTAINMENT FAILURE MODES (including the reactor building). What are the loads that challenge containment, does containment survive these loads, what is the nature of the failure (approximate size and location), and what is the subsequent pathway for fission product release to the environment?

The questions in the containment event tree are posed in ways that require the answers to be expressed in terms of likelihoods. For a station blackout accident in a BWR, for example, the likelihood that core degradation occurs under high vs. low pressure conditions in the primary system is considered. This has an effect on the energy released at vessel breach which could affect the likely containment failure modes. Answers to such questions require information about the reactor design, the accident progression, the phenomenology of reactor accidents, and the capabilities of containment.

A single containment event tree has been developed to analyze the accident progression given many different initial conditions. The differences among the cut set groups are addressed by the first 16 questions in the tree which set the initial conditions peculiar to each cut set group. Questions 17 through 101 are then used to investigate the specific possible accident progression pathways for each cut set group supplied by the ASEP analyses.

We have utilized a large number of sources to obtain the needed information in order to construct and evaluate the containment event tree. These sources include references 1 and 3 through 29.

The NRC provided relatively specific guidance with respect to the priorities to place upon the use of this variety of sources in evaluating the probabilities of the events considered in the containment event tree. Source term code package (STCP) calculations (Ref 28), to the extent possible, form the basis of the evaluations. The information developed by the Containment Loads and Performance Working Groups was also considered. Where additional information was required, other analyses performed or sponsored by NRC were used. These sources were not sufficient to provide full treatment of some issues raised in the containment event tree. Other information sources including the opinions of the SARRP expert review group (Ref 29) and analyses sponsored by the utility industry, were used. In addition, simple calculations were performed by the SARRP investigators. These are documented in Appendix B.

In quantifying the containment event tree, three separate evaluations optimistic, central, and pessimistic, were propagated. These are intended to reflect the ranges both of possibility and of opinion among experts in the field of severe accident investigation. Thus, three sets of accident outcome probabilities were derived for each cut set group. The one labeled "pessimistic" tends to provide higher probabilities for the pathways that lead to higher source terms and lower probabilities for the lower source term pathways. The ones labeled "central" and "optimistic" are analogously interpreted. In this report weighting factors or distributions for these estimates are not proposed nor should it be assumed that one is better than another. In this assessment, the central estimate analysis is presented in detail. The results of the optimistic and pessimistic estimates are only qualitatively discussed.

The central estimate is intended to represent the median of opinions in the reactor safety community on any particular issue. That is, if a large number of experts were to be polled with regard to their views, a substantial fraction would respond that the actual situation would be better than that indicated by the central estimate, and an approximately equal number would respond that it is worse. Of those who responded that the situation is actually better than that represented by the central estimate, it is expected that a substantial number would view the optimistic estimate as an appropriate representation of the issue.

Likewise, those who viewed the situation as being worse than the central estimate implies, would agree that reality is, or could be, as unfavorable as that reflected by the pessimistic estimate. It should be pointed out that these principles were not rigorously applied in assessing some questions because, for some issues, there is a very small community of experts.

The development of optimistic, central, and pessimistic pathways through the containment event tree provides a first step toward the evaluation of uncertainties in risk, although the subject of risk and its uncertainties will be treated in another report. The procedure used for evaluating risk uncertainties relies on a sampling of key issues over their ranges of belief using Latin Hypercube sampling methodology. The quantification of optimistic and pessimistic pathways in this report helps to establish the ranges of belief for the risk uncertainty evaluation.

The containment event analysis is based for the most part on the plant configuration that currently exists. There has been no attempt to account for plant changes that are planned but not yet implemented, with the exception that changes generally in response to recent rulemaking are included even if they have not yet been completely installed. For example, the symptomatic emergency procedures that include containment venting at 60 psig, alternate injection sources, and an automatic depressurization system (ADS) bypass switch soon to be installed to improve operator response in ATWS events have been included in this analysis.

2.2 Specific Example: Peach Bottom TB

The containment event tree for the Peach Bottom Mark I containment design includes a total of 101 questions. These questions cover all the accident sequences which were identified by ASEP as having frequencies of occurrence greater than 1x10-8 per year. A list of the questions together with reference to prior questions upon which the answers depend is provided in Table 2.1. The computer code input in Apppendix D is specific to the "TB" cut set group (questions 1-16). This group is characterized by a long term station blackout in which high pressure core cooling is provided by steam turbine driven systems for a period of about 6 hours, until battery depletion occurs. Failure of the steam driven systems is then anticipated and without power recovery, core melt begins about 3 hours later. This example is thoroughly treated in Appendices A through D.

2.3 Summary of Accident Sequences

In this section , specific plant features are discussed which significantly impact the nature of the expected response of the Peach Bottom Mark I containment to the accidents of interest. These features, in part, affect the form of the containment event tree. Also included in this section are descriptions of the various accident sequences which have been quantified for Peach Bottom.

Table 2.1
Event Descriptions for Peach Bottom BWR Mark I Containment

QUESTIONS ASKED IN THE EVENT TREE	PRIOR QUESTION DEPENDENCIES
1. What is the initiating event?	None
2. What is the initial break location?	None
3. What is the level of pre-existing leakage or isolation failure?	None
4. Is there a loss of offsite power?	None
5. Is there a Station Blackout (Diesel generators fail)?	None
6. Is DC power not available?	None
7. For TC, does SLC fail to inject?	None
8. Does a S/RV stick open early?	None
9. Do the HPCI and RCIC systems fail to inject?	None
10. Does the CRD hydraulic system inject?	None
11. Do the LPCS and LPCI systems fail?	None
12. Do the RHR systems fail?	None
13. Does the condensate system fail?	None
14. Does HPSW fail in a mode which would preclude injection?	None

Table 2.1
Event Descriptions for Peach Bottom BWR Mark I Containment (Continued)

QUESTIONS ASKED IN THE EVENT TREE	PRIOR QUESTION DEPENDENCIES
15. Is there a failure which precludes drywell cooler operation?	None
16. Is ADS blocked or not called upon?	None
17. Does the RPV remain pressurized?	1, 5, 6, 8, 9, 10, 11, 12, 16
18. For TC is inadequate level maintained with LPI?	1, 7, 16, 17
19. What type of sequence is this (summary of plant damage)?	1, 5, 9, 10, 11, 12, 14, 17, 18
20. Is there an LP system break induced by power cycling (ATWS)?	1, 16, 19
21. Do low pressure ECC systems continue/begin to inject?	11, 17, 19
22. Do containment sprays fail before core degradation?	1, 11, 12, 14, 19, 21
23. Is the containment vented before core degradation?	1, 19, 20
24. Does the RPV repressurize before core damage?	8, 17, 19, 20, 23
25. Does (do) any S/RV-tailpipe vacuum breaker(s) stick open?	8, 17, 19, 24
26. Is there a repressurization break of low pressure systems?	24
27. Does containment fail before core degradation?	10, 19, 20, 23, 26

Table 2.1
Event Descriptions for Peach Bottom BWR Mark I Containment (Continued)

QUESTIONS ASKED IN THE EVENT TREE	PRIOR QUESTION DEPENDENCIES
28. What is location of early containment leakage?	20, 23, 26, 27
29. For Drywell failures, is the failure at the head seal?	20, 26, 28
30. What is the containment leakage level before core degradation?	1, 20, 23, 26, 27, 28, 29
31. Is the suppression pool drained before CD?	27, 28, 30
32. Does AC power remain lost during core degradation?	5, 9
33. What is the status of CRD?	5, 10, 23, 30, 32
34. What is the status of HPSW?	5, 14, 23, 30, 32
35. Does the core melt?	13, 17, 19, 24, 26, 30, 33, 34
36. What is containment pressure before core degradation?	1, 10, 12, 19, 20, 22, 26, 30
37. What is the status of containment sprays?	21, 22, 30, 32, 34
38. What is the H2 generation and pressure rise during CD?	1, 5, 17, 20, 23, 25, 26, 27, 32, 33
39. What is the level of suppression pool bypass during CD?	1, 17, 20, 24, 25, 26, 28, 31

Table 2.1
Event Descriptions for Peach Bottom BWR Mark I Containment (Continued)

QUESTIONS ASKED IN THE EVENT TREE	PRIOR QUESTION DEPENDENCIES
40. Does at least one drywell vacuum breaker stick open?	1, 17, 19, 20, 24, 25, 26, 38
41. Does H2 discharge lead to SP bypass?	17, 24, 38
42. Does H2 discharge to SP induce WW failure?	17, 24, 41
43. Is the vent threshold reached during core degradation?	42
44. Does containment venting not occur during core degradation?	5, 19, 30, 32, 43
45. Does the RPV repressurize during core degradation?	1, 8, 17, 24, 42, 44
46. Is there a repressurization break during core degradation?	45
47. Does the containment fail by pressure during core degradation?	42, 44, 46
48. What is location of containment leakage prior to vessel breach?	28, 42, 44, 46, 47
49. For Drywell failures, is the failure at the head seal?	29, 48
50. What is the level of containment leakage before VB?	30, 42, 44, 46, 47, 48, 49
51. Is the RPV depressurized before vessel breach?	17, 19, 20, 24, 26, 32, 45, 46, 50
52. What is the status of CRD?	5, 23, 32, 33, 47, 50

Table 2.1
Event Descriptions for Peach Bottom BWR Mark I Containment (Continued)

QUESTIONS ASKED IN THE EVENT TREE	PRIOR QUESTION DEPENDENCIES
53. What is the status of HPSW?	5, 23, 32, 34, 47, 50
54. Is MSIV leakage control or condenser vacuum maintained?	32
55. Is the suppression pool drained before VB?	27, 28, 30, 31, 42, 47, 48, 50
56. Will the SP flash following containment vent or rupture?	1, 8, 9, 12, 19, 21, 24
57. What is the level of suppression pool bypass at VB?	20, 26, 40, 41, 46, 48, 50, 55
58. What is level of RB breach/bypass before VB without burn?	5, 20, 23, 26, 32, 44, 46, 49, 50
59. Are fire systems actuated before VB without burn?	50, 56, 57, 58
60. Does SGTS fail before VB without burn?	23, 32, 44, 59
61. Does hydrogen burn in RB before VB?	20, 26, 38, 46, 50, 58, 60
62. What is level of reactor building (RB) breach/bypass before VB?	49, 58, 61
63. Are fire systems actuated before VB?	49, 59, 61
64. Does SGTS operate until VB?	60, 61, 63

Table 2.1
Event Descriptions for Peach Bottom BWR Mark I Containment (Continued)

QUESTIONS ASKED IN THE EVENT TREE	PRIOR QUESTION DEPENDENCIES
65. What is containment pressure after CF or vent during meltdown?	50
66. Is there injection during core degradation?	13, 21, 32, 33, 50, 51, 53, 56
67. What is the nature of meltdown?	19, 35, 66
68. What is the mode of vessel breach?	35, 66, 67
69. Is the RPV blowndown before vessel breach?	51, 67, 68
70. Does direct heating occur?	51, 67, 69
71. Does an ex-vessel steam explosion occur?	67
72. What is pressure rise due to blowdown (effective VS and RCdry)?	51, 70
73. What is the pressure rise due to debris quenching?	1, 13, 21, 32, 37, 50, 53, 56
74. Is SP bypassed or vents not cleared at VB (effect. VS)? -- DPfVS	50, 51, 56, 57, 70, 71, 73
75. Does pressurization fail containment at VB?	42, 44, 47, 68
76. Does direct melt-structure attack fail containment at VB?	51, 67, 68, 69, 73
77. What is the location of containment failure after VB?	48, 68, 74, 75, 76

Table 2.1
Event Descriptions for Peach Bottom BWR Mark I Containment (Continued)

QUESTIONS ASKED IN THE EVENT TREE	PRIOR QUESTION DEPENDENCIES
78. For Drywell failures, is the failure at the head seal?	49, 76, 77
79. What is the containment leakage level after VB?	50, 68, 74, 75, 76, 77, 78
80. Is AC power not available late?	19, 32
81. Is RHR not operating late?	12, 55, 56, 79, 80
82. Do containment sprays not operate late?	21, 22, 53, 55, 56, 79, 80
83. Is water not supplied to the debris late?	13, 52, 53, 68, 75, 80, 81, 82
84. Is the debris not coolable without water?	68, 70, 71
85. Is the debris coolable with water?	67, 68, 70, 71, 84
86. Is the debris not cooled?	68, 83, 84, 85
87. Is the containment not vented late?	68, 79, 80, 81, 86
88. Does the containment fail late due to temperature?	68, 79, 83, 84, 87
89. Does the containment fail late?	68, 79, 81, 83, 86, 87, 88

Table 2.1
Event Descriptions for Peach Bottom BWR Mark I Containment (Concluded)

QUESTIONS ASKED IN THE EVENT TREE	PRIOR QUESTION DEPENDENCIES
90. What is the location of late containment leakage?	41, 55, 77, 79, 83, 87, 88, 89
91. For Drywell failures, is the failure at the head seal?	78, 89, 90
92. What is the level of late containment leakage?	79, 87, 89, 90, 91
93. Is the suppression pool drained late?	55, 75, 77, 89, 90, 92
94. What is the level of late suppression pool bypass?	20, 25, 26, 39, 46, 51, 57, 68, 90, 93
95. What is the level of late RB bypass without a burn?	62, 68, 91, 92
96. Are fire systems operating late without a late HB?	56, 59, 91, 92, 94, 95
97. Does standby gas treatment not work late without late HB?	60, 79, 96
98. Does H2 burn in the reactor building after vessel breach?	86, 92, 95, 97
99. What is the level of late RB bypass?	95, 98
100. Are fire systems operating late?	91, 96, 98
101. Does standby gas treatment work late?	97, 100

2.3.1 Plant Features Important to Containment Response

There are several features of the reactor and containment designs in the Peach Bottom plant which tend to drive the containment response to severe accidents. Perhaps one of the most important factors is that the Mark I containment is a low volume design since it uses a pressure suppression concept. The suppression pool contained in the torus volume, is designed to condense the steam release in a large break LOCA. Under some severe accident conditions, however, the addition of non-condensibles due to the core degradation process or bypassing of the suppression pool may cause containment pressure rises beyond the design basis due to its low volume feature.

Another feature of Peach Bottom's containment is the fact that the containment is normally inerted. This eliminates any significant chance for hydrogen burns within the containment.

The BWR core support design (which provides individual support for each group of four fuel bundles from the vessel bottom head) is judged to minimize the probabiity of the pressurized ejection of core debris into the containment. Slumping of relatively small quantities of core debris (due to localized failure of the support) is anticipated to result in the depressurization of the vessel (due to local melt-through) before large quantities of molten corium have collected in the bottom head. Direct heating is thus not a prominent cause of containment failure.

The drywell floor design is such that a water level no higher than 18 inches can be collected before water drains into the suppression pool. This relatively small amount of water significantly reduces the probability of large ex-vessel steam explosions. Associated with the drywell floor and pedestal design is the fact that radial flow of the core debris along the drywell floor would be unimpeded. This allows for attack of the drywell wall and liner by the hot core debris thereby creating a possible containment failure that bypasses the suppression pool.

Peach Bottom emergency procedures include containment venting procedures which make use of a series of possible vent paths for mitigating containment overpressure scenarios. The current procedures call for overriding containment isolation and venting at 60 psia. It is preferable to vent using a pathway through the suppression pool for fission product scrubbing. Since some vent paths could cause a release to the reactor building, particularly if the standby gas treatment system ductwork fails, the effects on the response of the reactor building are examined.

One particularly important containment-mitigating system interaction is the modeled failure of the residual heat removal (RHR) system pumps when near-boiling conditions occur in the suppression pool. It is judged that these pumps at Peach Bottom, which provide suppression pool cooling

or containment spray as well as other functions, will not function under saturated pool conditions (the pool serves as the suction source for the RHR pumps) due to insufficient net positive suction head (NPSH) for the pumps. While the high pressure service water system (HPSWS) pumps could be used through the RHR spray lines in an open-loop configuration, the ability to cool the containment atmosphere does not exist using this method for containment spray. Overpressure failure of the containment could therefore be delayed but not necessarily eliminated.

One other important feature is the relatively large pressure capability of the containment. The central estimate for this pressure failure point is 132 psia based on an analysis performed by Ames Laboratory (Ref.19). This pressure allows for an increased likelihood of successful venting in accident sequences characterized by a slow rise in containment pressure provided all other sufficient conditions exist for venting. On the other hand, this relatively high failure pressure hampers the ability to keep the primary system safety relief valves (SRVs) open against the containment backpressure. This interaction is important for an accident scenario in which the SRVs are required to be open to maintain low pressure cooling of the core under conditions of very high containment pressures (e.g., such as when venting fails).

2.3.2 Description of Peach Bottom Accident Sequences

The accident sequences assessed to be important for Peach Bottom are most easily described in the context of the cut set groups used for the interface between the accident sequence analyses and the containment analyses. The frequency associated with each cut set group is presented in the ASEP accident sequence analysis report for Peach Bottom listed as Reference 30. After some preliminary analyses and review it was determined that the cut set groups with frequencies greater than 1E-7/year dominate the risk from accidents at Peach Bottom. Therefore, only those cut set groups were examined rigorously in the containment event tree work. The following paragraphs provide a general description of each of the eight cut set groups analyzed.

TBUX:

This cut set group is characterized by transients leading to station blackout (loss of all AC power) as a result of coincident DC power failures. The loss of DC power causes failure of the diesels and the turbine driven high pressure cooling systems which results in the loss of all core and containment cooling. Without the restoration of AC/DC power in 30-40 minutes, primary system inventory boils off and core damage results. The core degradation process occurs under high pressure conditions in the reactor vessel since the loss of DC power also disables operation of the ADS and SRVs.

TBUXP (labeled as TBUP in Reference 30):

This cut set group is characterized by transients leading to a station blackout as a result of a variety of AC/DC power failures as well as failures of the turbine driven cooling systems. An SRV sticks open thereby reducing primary system pressure. Without restoration of power in about 30 minutes, core damage results since all coolant injection has been lost. Core degradation occurs under low pressure conditions because of the stuck-open SRV. In general, this cut set group is similar to cut set group TBUX except for the stuck-open valve and the resulting low pressure in the reactor vessel.

TBU:

This cut set group is very similar to TBUX and TBUXP except that there is no stuck-open SRV as in TBUXP and there are no DC common mode failures. This latter distinction allows for vessel depressurization and thus core damage is likely to occur under depressurized conditions in the reactor vessel. This cut set group along with TBUX and TBUXP collectively make up all the dominant short-term core damage scenarios due to station blackout.

TB:

This cut set group is characterized by transients leading to a long-term station blackout (loss of all AC power). Core cooling is successful with turbine driven high pressure cooling systems providing coolant injection until about 6 hours into the scenario. At that time, the batteries deplete affecting the ability to continue operation of these systems. Without AC power recovery within 3 hours of battery depletion, core damage results. While the primary system may be initially at relatively low pressures, depletion of the batteries causes loss of ADS/SRV control. The vessel will therefore repressurize with core damage progressing under high pressure conditions.

TBP:

This cut set group is virtually identical to the TB cut set group except there exists a stuck open relief valve. Core damage, following battery depletion, will occur under low pressure conditions in the vessel because of the stuck-open relief valve.

TCSX/TCUX:

The TCSX cut set group is characterized by an ATWS with either main steam isolation valve (MSIV) closure or with MSIVs initially open but then they subsequently close. This isolates the primary system under high power conditions thereby rapidly increasing the pressure and temperature conditions within containment since RHR cooling under these circumstances

is inadequate. Timely start of the standby liquid control system (SLCS) is not performed or it is assumed to fail due to being left in an inappropriate configuration after the last test of the system. Core cooling is maintained for a short time (~1/4 hour) before high pressure coolant injection (HPCI) fails due to high pool temperature. The operator then fails to rapidly depressurize (so that low pressure systems can be used) which leads to core damage. The TCUX cut set group is also characterized by an ATWS with either MSIV closure or with the MSIVs initially open but then they subsequently close. This isolates the primary system thereby rapidly increasing the pressure and temperature conditions within containment since RHR cooling under these circumstances is inadequate. The SLC system is started by ~4 minutes into the accident but initial high pressure coolant injection (HPCI) failure under high power conditions and operator failure to rapidly depressurize the vessel (so that low pressure systems can be used immediately) leads to a quick core damage event. Since both of these cut set groups involve relatively quick failures of HPCI followed by failure to depressurize, they have been combined for purposes of the accident progression and containment analyses.

TCSRX2:

This cut set group is characterized by an ATWS with either MSIV closure or with MSIVs initially open but then they subsequently close. This isolates the primary system under high power conditions thereby rapidly increasing the pressure and temperature conditions within containment since RHR cooling under these circumstances is inadequate. Timely SLC system start is not performed or it fails due to being left in an inappropriate configuration after the last test of the system. Core cooling is maintained first by HPCI and then by low pressure cooling systems after HPCI failure due to a high pool temperature in ~15 minutes.

Venting of the containment is not successful initially leading to a possible containment leak failure. Such a failure precludes continued operation of the low pressure cooling systems. This is because maximum air pressure to the SRVs is ~100-125 psi which is under the estimated 130 + psi pressure for containment failure. Therefore the vessel repressurizes and all core cooling is lost.

More detailed information on the accident progression for all of the above cut set groups can be found in Appendix A.

3. RESULTS

The results of the accident progression analysis are presented in this section. A summary of the central estimate containment failure mode/accident progression pathway probabilities for the eight dominant cut set groups is presented in Table 3.1. Tables 3.2 and 3.3 provide the corresponding results for the optimistic and pessimistic evaluations. More specific observations concerning the central estimate results are provided below.

3.1 Cut Set Groups TBUX, TBUXP, and TBU

These three cut set groups collectively represent all of the dominant short term station blackout scenarios with early loss of all core cooling as well as containment cooling. The primary difference among the three cut set groups is that the reactor vessel is at high pressure during the beginning of core degradation in TBUX (TB = transient leading to station blackout, U = early loss of high pressure cooling, X = failure to depressurize) due to DC as well as AC power failures. TBUXP (P = stuck open SRV) is characterized by a stuck-open safety relief valve which depressurizes the vessel and TBU allows for controlled depressurization depending on operator response.

The central conditional probabilities for the containment failure modes and resulting accident progression pathways are nearly identical for all three cut set groups as shown in Table 3.1 and Figure 3.1 Table 3.4 provides a key for understanding the numerical nomenclature for Figure 3.1. In each case, the largest single containment failure mode probability involves drywell wall melt-through at vessel breach which is estimated to occur with a probability of approximately 0.35 for all three cut set groups. The specific pathway most likely to occur involving this mode of failure of the containment is a drywell wall melt-through with no venting and no recovery or injection to assist in mitigating the accident. Such a pathway is estimated at approximately a 0.2 probability for all three cut set groups.

Successful venting of the containment before or during core melt makes up the next single most important containment response characteristic. This is expected to occur with a probability of approximately 0.3 for all three cut set groups with the two most important pathways being no vessel breach due to eventual recovery of power and cooling systems (~0.15 probability) and drywell wall melt-through at vessel breach (~0.11 probability).

There is approximately a 0.08 probability in all three cut set groups that the accident will be mitigated due to recovery actions with no containment leak or vessel breach. The remaining probability (~0.27) is made up primarily of drywell ruptures early or at vessel breach or early drywell leaks. In this remaining probability, there is approximately an additional 0.08 probability that recovery prevents vessel breach even though the containment does experience some form of failure.

TABLE 3.1

CONTAINMENT LEAKAGE PATHWAY SUMMARY FOR PEACH BOTTOM

Central conditional probability of accident progression pathways

PROGRESSION PATHWAY	TBUX	TBUXP	TBU	TB	TBP	TCSX/TCUX	TCSRX2
Early wetwell leak, and no vessel breach.	0.001	0.001				0.002	
Early wetwell leak, injection during melt, and drywell rupture at vessel breach.			0.002			0.002	
Early wetwell leak, and drywell rupture at vessel breach.						0.003	0.048
Early wetwell leak, and wetwell rupture at vessel breach.						0.001	0.020
Early drywell leak, and no vessel breach.	0.027	0.027			0.014	0.046	
Early drywell leak, injection during melt, and drywell rupture at vessel breach.	0.020	0.020	0.040	0.020	0.010	0.034	
Early drywell leak, injection during melt, and late vent.						0.001	
Early drywell leak, injection during melt.	0.007	0.007	0.013	0.007	0.003	0.011	
Early drywell leak, direct heating, and drywell rupture at vessel breach.							0.002
Early drywell leak, and drywell rupture at vessel breach.						0.067	0.275
Early drywell leak, and late vent.						0.002	0.004
Early drywell leak.						0.021	0.043
Vent before/during core melt, and no vessel breach.	0.148	0.148	0.148	0.074	0.074	0.124	0.247
Vent before/during core melt, injection during melt, and drywell wall melt at vessel breach.	0.106	0.106	0.106	0.053	0.053	0.088	0.035
Vent before/during core melt, injection during melt, and late drywell thermal failure.	0.004	0.004	0.004	0.002	0.002	0.004	
Vent before/during core melt, injection during melt.	0.041	0.041	0.041	0.020	0.020	0.034	0.216
Vent before/during core melt, late recovery (blackout), and drywell wall melt at vessel breach.				0.013	0.013		
Vent before/during core melt, late recovery (blackout).				0.001	0.001		
Vent before/during core melt, and drywell wall melt at vessel breach.				0.045	0.044	0.174	
Vent before/during core melt, and late drywell thermal failure.						0.007	
Vent before/during core melt.				0.004	0.004	0.067	
Early wetwell rupture, and no vessel breach.	0.013	0.013	0.013	0.007	0.007	0.022	0.015
Early wetwell rupture, injection during melt, and drywell wall melt at vessel breach.	0.009	0.009	0.009	0.005	0.005	0.016	0.011
Early wetwell rupture, injection during melt.	0.004	0.004	0.004	0.002	0.002	0.006	0.004
Early wetwell rupture, late recovery (blackout), direct heating, and drywell rupture at vessel breach.				0.001			
Early wetwell rupture, direct heating, and drywell rupture at vessel breach.				0.004		0.002	
Early wetwell rupture, and drywell wall melt at vessel breach.						0.031	
Early wetwell rupture.						0.013	
Early drywell rupture, and no vessel breach.	0.032	0.032	0.032	0.016	0.016	0.053	0.037
Early drywell rupture, injection during melt.	0.032	0.032	0.032	0.016	0.016	0.054	0.038
Early drywell rupture.						0.107	
Drywell leak at vessel breach, injection during melt.	0.005	0.005	0.006	0.007	0.003		
Wetwell rupture at vessel breach, injection during melt.	0.003	0.003	0.003	0.004	0.002		
Drywell rupture at vessel breach, injection during melt.	0.051	0.051	0.052	0.063	0.032		
Drywell rupture at vessel breach, late recovery (blackout), direct heating.	0.011	0.001		0.011	0.001		
Drywell rupture at vessel breach, direct heating.	0.020	0.002		0.038	0.004		
Drywell rupture at vessel breach.	0.001			0.002			
Drywell wall melt at vessel breach, injection during melt.	0.011	0.011	0.011				
Drywell wall melt at vessel breach, late recovery (blackout).	0.119	0.128	0.129	0.119	0.130		
Drywell wall melt at vessel breach.	0.211	0.228	0.230	0.400	0.437		
Late drywell leak, injection during melt.	0.001	0.002	0.002				
Late drywell leak, late recovery (blackout).	0.004	0.005	0.005	0.004	0.005		
Late drywell leak.	0.015	0.016	0.016	0.028	0.031		
Late drywell rupture, late recovery (blackout).		0.001	0.001		0.001		
Late drywell rupture.	0.002	0.002	0.002	0.004	0.004		
Late drywell thermal failure.	0.006	0.006	0.006	0.011	0.012		
No containment leak, and no vessel breach.	0.075	0.075	0.074		0.037		
No containment leak, injection during melt.	0.002	0.002	0.002				
No containment leak, late recovery (blackout).	0.006	0.006	0.006	0.006	0.006		
TOTALS:	0.989	0.992	0.992	0.987	0.992	0.994	0.997

TABLE 3.2

CONTAINMENT LEAKAGE PATHWAY SUMMARY FOR PEACH BOTTOM

Optimistic conditional probability of accident progression pathways

PROGRESSION PATHWAY	TBUX	TBUXP	TBU	TB	TBP	TCSX/TCUX	TCSRX
Early wetwell leak, and wetwell rupture at vessel breach.							0.041
Early wetwell leak, and late vent.							0.004
Early wetwell leak.							0.004
Early drywell leak, and drywell rupture at vessel breach.							0.037
Early drywell leak, and late vent.							0.006
Early drywell leak.							0.006
Vent before/during core melt, and no vessel breach.	0.364	0.364	0.364	0.182	0.182	0.729	0.810
Vent before/during core melt, injection during melt.	0.040	0.040	0.040	0.020	0.020	0.080	0.090
Vent before/during core melt.						0.089	
Wetwell rupture at vessel breach.						0.001	
Drywell wall melt at vessel breach, late recovery (blackout).	0.006	0.006	0.006	0.019	0.019		
Drywell wall melt at vessel breach.	0.004	0.004	0.004	0.036	0.036		
Late wetwell leak, injection during melt.	0.001	0.001	0.001	0.005			
Late wetwell leak, late recovery (blackout).	0.001	0.001	0.001	0.004	0.004		
Late wetwell leak.	0.011	0.011	0.011	0.104	0.104		
Late wetwell vent, injection during melt.	0.003	0.003	0.003	0.011	0.001		
Late wetwell vent, late recovery (blackout).	0.003	0.003	0.003	0.009	0.009		
Late wetwell rupture.	0.001	0.001	0.001	0.012	0.012		
Late drywell leak, injection during melt.	0.001	0.001	0.001	0.005			
Late drywell leak, late recovery (blackout).	0.001	0.001	0.001	0.004	0.004		
Late drywell leak.	0.020	0.020	0.020	0.190	0.190		
Late drywell rupture.	0.002	0.002	0.002	0.016	0.016		
No containment leak, and no vessel breach.	0.445	0.445	0.445	0.045	0.223	0.081	
No containment leak, injection during melt.	0.044	0.044	0.044	0.181	0.022	0.007	
No containment leak, late recovery (blackout).	0.050	0.050	0.050	0.154	0.154		
No containment leak.						0.007	
TOTALS:	0.999	0.999	0.999	0.997	0.997	0.994	0.998

TABLE 3.3

CONTAINMENT LEAKAGE PATHWAY SUMMARY FOR PEACH BOTTOM

Pessimistic conditional probability of accident progression pathways

PROGRESSION PATHWAY	TBUX	TBUXP	TBU	TB	TBP	TCSX/TCUX	TCSRX2
Early drywell leak, and no vessel breach.	0.018	0.018		0.001	0.011	0.007	
Early drywell leak, injection during melt, direct heating, and drywell rupture at vessel breach.			0.020	0.010			
Early drywell leak, injection during melt, and drywell rupture at vessel breach.	0.158	0.153	0.180	0.106	0.090	0.071	
Early drywell leak, injection during melt, and drywell wall melt at vessel breach.	0.024	0.029			0.017	0.002	
Early drywell leak, late recovery (blackout), direct heating, and drywell rupture at vessel breach.	0.009		0.004	0.027	0.002		
Early drywell leak, late recovery (blackout), and drywell rupture at vessel breach.	0.009	0.002	0.004	0.028	0.010		
Early drywell leak, late recovery (blackout), and drywell wall melt at vessel breach.		0.002			0.008		
Early drywell leak, direct heating, and drywell rupture at vessel breach.	0.082	0.002	0.032	0.218	0.015	0.072	0.089
Early drywell leak, direct heating, and late drywell thermal failure.	0.001			0.003			
Early drywell leak, and drywell rupture at vessel breach.	0.085	0.018	0.033	0.225	0.082	0.657	0.809
Early drywell leak, and drywell wall melt at vessel breach.		0.016			0.067		
Early drywell leak, and late drywell thermal failure.					0.001		
Vent before/during core melt, and no vessel breach.	0.003	0.003	0.003	0.001	0.001		0.009
Vent before/during core melt, injection during melt, and drywell wall melt at vessel breach.	0.027	0.027	0.027	0.013	0.013	0.009	
Vent before/during core melt, injection during melt.							0.091
Vent before/during core melt, direct heating, and drywell wall melt at vessel breach.						0.003	
Vent before/during core melt, and drywell wall melt at vessel breach.						0.045	
Early wetwell rupture, direct heating, and drywell rupture at vessel breach.						0.006	
Early wetwell rupture, and drywell rupture at vessel breach.						0.036	
Early drywell rupture, and no vessel breach.	0.002	0.002	0.002	0.001	0.001		
Early drywell rupture, injection during melt.	0.020	0.020	0.020	0.012	0.012	0.008	0.001
Early drywell rupture, late recovery (blackout), direct heating.	0.001			0.003			
Early drywell rupture, late recovery (blackout).	0.001			0.003	0.002		
Early drywell rupture, direct heating.	0.009		0.004	0.024	0.002	0.008	
Early drywell rupture.	0.009	0.004	0.004	0.025	0.017	0.073	
Drywell leak at vessel breach, direct heating, and late drywell thermal failure.	0.003	0.002	0.003	0.002	0.002		
Drywell leak at vessel breach, and late drywell thermal failure.		0.002			0.002		
Drywell rupture at vessel breach, injection during melt, direct heating.			0.005				
Drywell rupture at vessel breach, injection during melt.	0.043	0.043	0.043	0.004	0.004		
Drywell rupture at vessel breach, late recovery (blackout), direct heating.	0.024	0.017	0.030	0.016	0.021		
Drywell rupture at vessel breach, late recovery (blackout).	0.025	0.042	0.031	0.016	0.048		
Drywell rupture at vessel breach, direct heating.	0.217	0.152	0.273	0.128	0.168		
Drywell rupture at vessel breach.	0.223	0.380	0.281	0.131	0.391		
Drywell wall melt at vessel breach, late recovery (blackout).		0.006			0.001		
Drywell wall melt at vessel breach.		0.053			0.009		
No containment leak, and no vessel breach.	0.004	0.004					
TOTALS:	0.998	0.996	0.997	0.997	0.997	0.998	1.000

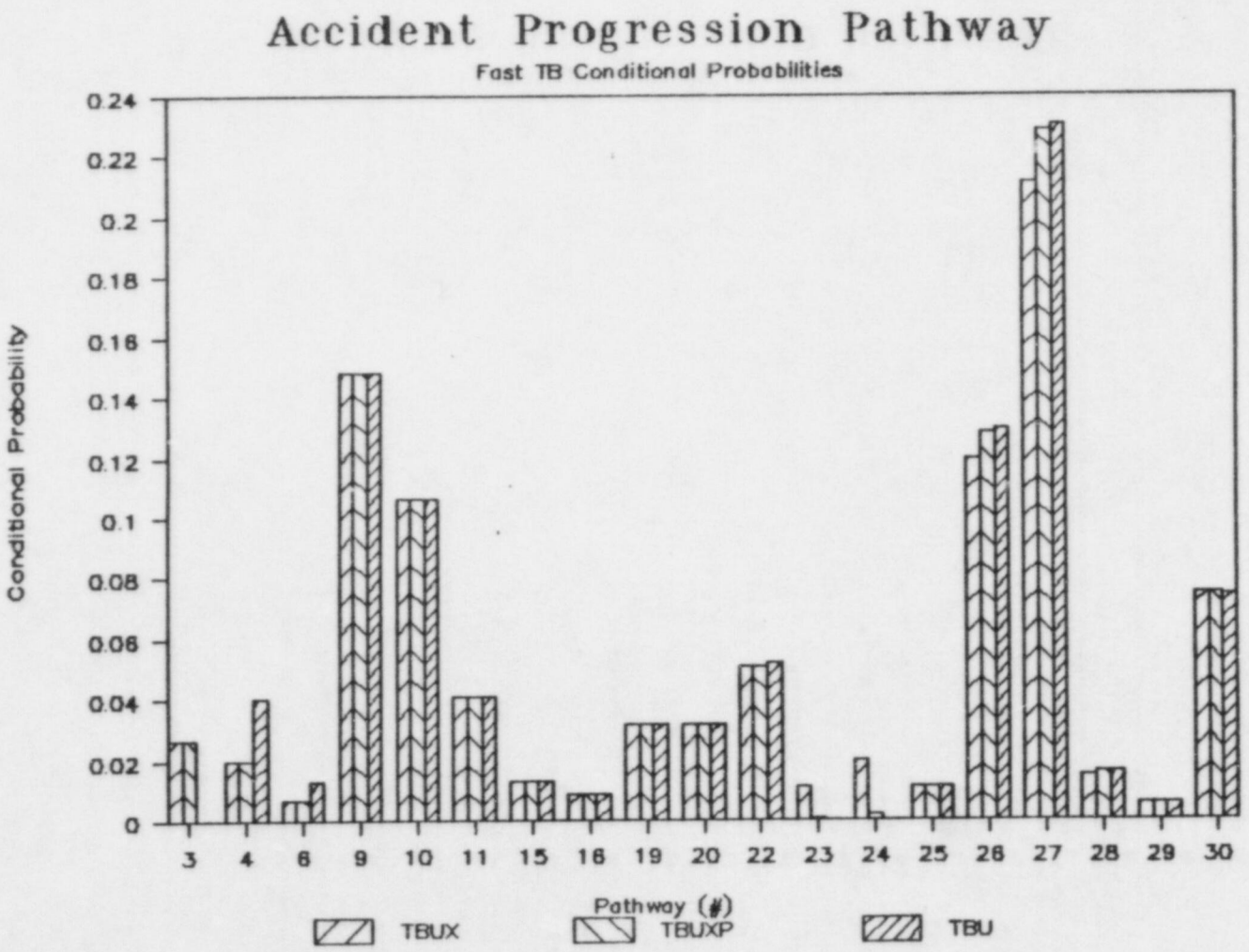

FIGURE 3.1 Conditional Accident Progression Pathway Probabilities for Fast TB Sequences

Table 3.4

Key to Accident Progression Pathways (Figures 3.1 - 3.3)

Path #	Pathway Description
1.	Early wetwell leak, and drywell rupture at vessel breach.
2.	Early wetwell leak, and wetwell rupture at vessel breach.
3.	Early drywell leak, and no vessel breach.
4.	Early drywell leak, injection during melt, and drywell rupture at vessel breach.
5.	Early drywell leak, injection during melt, and late vent.
6.	Early drywell leak, injection during melt.
7.	Early drywell leak, and drywell rupture at vessel breach.
8.	Early drywell leak.
9.	Vent before/during core melt, and no vessel breach.
10.	Vent before/during core melt, injection during melt, and drywell wall melt at vessel breach.
11.	Vent before/during core melt, injection during melt.
12.	Vent before/during core melt, late recovery (blackout), and drywell wall melt at vessel breach.
13.	Vent before/during core melt, and drywell wall melt at vessel breach.
14.	Vent before/during core melt.
15.	Early wetwell rupture, and no vessel breach.
16.	Early wetwell rupture, injection during melt, and drywell wall melt at vessel breach.
17.	Early wetwell rupture, and drywell wall melt at vessel breach.
18.	Early wetwell rupture.
19.	Early drywell rupture, and no vessel breach.
20.	Early drywell rupture, injection during melt.
21.	Early drywell rupture.
22.	Drywell rupture at vessel breach, injection during melt.
23.	Drywell rupture at vessel breach, late recovery (blackout), direct heating.
24.	Drywell rupture at vessel breach, direct heating.
25.	Drywell wall melt at vessel breach, injection during melt.
26.	Drywell wall melt at vessel breach, late recovery (blackout).
27.	Drywell wall melt at vessel breach.
28.	Late drywell leak.
29.	Late drywell thermal failure.
30.	No containment leak, and no vessel breach.

Not shown in Table 3.1 but indicated by the complete results is that there is approximately a 0.65 probability that eventually the opening of the blowout panels will provide the primary reactor building release pathway for all three cut set groups. An early or late major failure of the reactor building is expected in about 20% of the scenarios. Early failures contribute 50% of these major failures (i.e., little fission product retention).

Significant core - concrete interactions are not expected approximately 50% of the time (as a result of quenching of the core debris) for all three cut set groups while a dry interaction is expected in about 25% of the cases. A wet interaction due to recovery of power and drywell sprays is estimated to occur with a probability of about 0.2.

If one considers the optimistic evaluation shown in Table 3.2, the tendency is for no containment leak or failure and no vessel breach to be the most prominent outcome. The conditional probability for this outcome is about 0.45 for all three cut set groups. Successful venting with no vessel breach is the next most dominant outcome estimated at approximately a 0.36 probability for all three cut set groups.

If one considers the pessimistic evaluation shown in Table 3.3, outcomes involving drywell rupture at vessel breach with or without direct heating are estimated at probabilities of 0.44, 0.53, and 0.55 for TBUX, TBUXP,and TBU respectively. An early drywell leak with insufficient injection during melt and drywell rupture at vessel breach is the second most dominant outcome estimated to occur with about a 15-20% chance for all three cut set groups.

Table 3.5 provides a key for understanding the central estimate detailed accident progression results for each cut set group which are presented in Tables 3.6 through 3.8. In each case, the conditional probability for each accident progression outcome is shown (represented by the column labeled "FREQUENCY").

3.2 Cut Set Groups TB and TBP

These two cut set groups collectively represent all of the dominant long term station blackout scenarios with initial core cooling until battery power depletes about six hours into the event. The primary difference between the two cut set groups is the stuck-open SRV in TBP which keeps the reactor vessel depressurized. In TB, the vessel repressurizes leading to core degradation under high pressure conditions unless power recovery is successful.

The central conditional probabilities for the containment failure modes and resulting accident progression pathways are generally the same for both cut set groups as shown in Table 3.1 and Figure 3.2 using the key provided in Table 3.4. Similar to the previous discussion, the largest single containment failure mode probability involves drywell wall

Table 3.5
Key to Nomenclature Used in Detailed Results Presentations

Seq = Sequence
- TB-S-ER = Station blackout, slow melt sequence, early recovery
- TB-S-LR = as above except late recovery
- TB-S-nR = as above except no recovery
- TB-F-ER = station blackout, fast melt sequence, early recovery
- TB-F-LR = as above except late recovery
- TB-F-nR = as above except no recovery
- TC-V = ATWS with core vulnerable due to possible containment failure affecting continuation of core cooling
- TC-F = ATWS, fast melt sequence
- TC-S = ATWS, slow melt sequence

CF-Dyn = Containment failure dynamics (large failure)
- CFD-ID = Steam explosion
- CFD-IP = Overpressure failure at vessel breach
- CFD-E4P = Overpressure during core degradation
- CFD-E4D = Suppression pool lift induced failure
- CFD-E4V = Venting during core degradation
- CFD-E3P = Overpressure before core melt
- CFD-E3V = Venting before core melt
- CFD-IM = Drywell wall melt-through at vessel breach
- CFD-LP = Late overpressure failure
- CFD-LT = Late thermal failure
- CFD-LV = Late venting
- CFD-n = No large failure

CL-Loc = Containment leak location

CLC-xyz
x = early; y = at vessel breach; z = late
- n = None
- D = Drywell
- W = Wetwell

CL-Lev = Containment leak level

CLV-xyz
x = early; y = at vessel breach; z = late
- 0 = insignificant
- 2 = a leak but insufficient to depressurize containment
- 3 = large leak or failure

Degr = Conditions during core degradation
- CD-nIHH = No injection, high vessel pressure, high amounts of hydrogen
- CD-nIHM = as above except moderate amount of hydrogen
- CD-nIHL = as above except low amounts of hydrogen
- CD-nILH = No injection, low vessel pressure, high amounts of hydrogen
- CD-nILM = as above except moderate amounts of hydrogen

Table 3.5 (Concluded)

CD-nILL	= as above except low amounts of hydrogen
CD-IHH	= Some injection; high vessel pressure, high amounts of hydrogen
CD-IHM	= as above except moderate amounts of hydrogen
CD-IHL	= as above except low amounts of hydrogen
CD-ILH	= Some injection, low vessel pressure, high amount of hydrogen
CD-ILM	= as above except moderate amounts of hydrogen
CD-ILL	= as above except low amounts of hydrogen
VBD	= Vessel breach dynamics
VBD-nB	= No vessel breach
VBD-F	= Flow type melt
VBD-F-B	= Flow type melt with suppression pool bypass at vessel breach
VBD-DH	= Direct heating
VBD-DH-B	= Direct heating with suppression pool bypass at vessel breach
VBD-SE	= Ex-vessel steam explosion
VBD-SE-B	= Ex-vessel steam explosion with suppression pool bypass at vessel breach
VBD-S	= Slump melt
VBD-S-B	= Slump melt and suppression pool bypass at vessel breach
SPB	= Suppression pool bypass
SPB-xy	x = early; y = late
	n = No
	v = SRV vacuum breaker stuck open
	y = yes
RBB-Lev	= Reactor building bypass failure level
RBB-xy	x = early; y = late
	n = Through standby gas treatment system (no bypass)
	2 = Blowout panels
	3 = Path through refueling bay
	4 = Large failure
CII	= Core-concrete interaction conditions
nCII-S	= No interaction with sprays
nCCInS	= No interaction and no sprays
WCCI-S	= Wet interaction with sprays
WCCInS	= Wet interaction and no sprays
DCCI	= Dry interaction

PEACH BOTTOM EVENT TREE TBUX

PEACH BOTTOM ACCIDENT PROGRESSION

TABLE 3.6 (1 of 15)

THESE RESULTS ARE FOR THE TBUX-cen WALKTHROUGH

FREQUENCY	Seq	CF-Dyn	CL-Loc	CL-Lev	Degr	VbD	SPB	RBB-Lev	CCI
2.7325E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
3.0329E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VbD-nB	SPB-ny	RBB-44	nCCInS
8.6534E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
9.6107E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
4.0988E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-44	nCCI-S
4.5493E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-44	nCCInS
1.2981E-02	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCCI-S
1.4422E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCCInS
1.3655E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.4931E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.3655E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	wCCI-S
1.4931E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	wCCSnS
1.0805E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	wCCI-S
1.1787E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	wCCSnS
4.3261E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
4.7531E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
3.2445E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	wCCI-S
3.5611E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	wCCSnS
2.0487E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCI-S
2.2463E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCInS
2.0487E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	wCCI-S
2.2463E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	wCCSnS
1.6216E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	wCCI-S
1.7775E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	wCCSnS
6.4897E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCI-S
7.1311E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCInS
4.8673E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	wCCI-S
5.3483E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	wCCSnS
1.0098E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	DCCI
4.8721E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	wCCI-S
3.8012E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-24	wCCI-S
1.6266E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	nCCI-S
1.1571E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	wCCI-S
1.1995E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	wCCSnS
7.3082E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-44	wCCI-S
5.7856E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-24	wCCI-S
2.5270E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	nCCI-S
1.7450E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	wCCI-S
1.8763E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	wCCSnS
1.9620E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
2.1490E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
1.9620E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	wCCI-S
2.1490E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	wCCSnS
1.5546E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	wCCI-S
1.7013E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	wCCSnS
6.2182E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
6.8051E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
4.6637E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	wCCI-S
5.1038E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	wCCSnS
2.9429E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	nCCI-S
3.2235E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	nCCInS

2.9429E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	WCC1-S
3.2235E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	WCCSNS
2.3318E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-24	WCC1-S
2.5519E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-24	WCCSNS
9.3274E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	NCC1-S
1.0208E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	NCCINS
6.9955E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	WCC1-S
7.6557E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	WCCSNS
2.1925E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	NCCINS
2.1925E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSNS
1.7357E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSNS
6.9429E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	NCCINS
5.2072E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSNS
1.0069E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	DCC1
3.2887E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	NCCINS
3.2887E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	WCCSNS
2.6036E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	WCCSNS
1.3169E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	NCC1-S
1.0423E-03	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	NCCINS
7.8108E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	WCCSNS
1.5104E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	DCC1
1.6702E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCC1-S
1.0034E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-44	WCC1-S
2.5053E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-22	WCC1-S
1.8631E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCSNS
1.1767E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-44	WCCSNS
2.7947E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	WCCSNS
5.5969E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-44	NCC1-S
1.7771E-04	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-22	NCC1-S
1.9693E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-22	NCCINS
8.3953E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-NB	SPB-vn	RBB-44	NCC1-S
2.6657E-04	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-NB	SPB-vn	RBB-22	NCC1-S
2.9539E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-NB	SPB-vn	RBB-22	NCCINS
2.6585E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	NCC1-S
1.9939E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCC1-S
1.2593E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	NCC1-S
1.2593E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	WCC1-S
3.9878E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	NCC1-S
2.9908E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	WCC1-S
5.0459E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-44	NCC1-S
5.5969E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-44	NCCINS
1.6003E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-22	NCC1-S
1.7771E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-22	NCCINS
6.3276E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-ny	RBB-44	NCCINS
2.2671E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-ny	RBB-22	NCC1-S
2.0056E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-ny	RBB-22	NCCINS
7.5689E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-vn	RBB-44	NCC1-S
8.3953E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-vn	RBB-44	NCCINS
2.4005E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-vn	RBB-22	NCC1-S
2.6657E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-vn	RBB-22	NCCINS
1.0449E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-vy	RBB-44	NCC1-S
9.4949E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-vy	RBB-44	NCCINS
3.4007E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-vy	RBB-22	NCC1-S
3.0084E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-vy	RBB-22	NCCINS
7.5558E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	NCC1-S
7.5558E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCC1-S
5.9817E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCC1-S
2.3991E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	NCC1-S
2.6319E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	NCCINS
1.7993E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCC1-S

TABLE 3.6
(2 of 15)

1.9739E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCSnS
1.1345E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	nCC1-S
1.2467E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	nCCInS
1.1345E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	WCC1-S
1.2467E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	WCCSnS
8.9725E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-24	WCC1-S
3.5987E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	nCC1-S
3.9479E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	nCCInS
2.6990E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	WCC1-S
2.9609E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	WCCSnS
9.3718E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
9.3718E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
7.3941E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS
2.9755E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
2.2317E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.4095E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCInS
1.4095E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	WCCSnS
1.1150E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	WCCSnS
4.4633E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCInS
3.3475E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	WCCSnS
1.1977E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	WCCSnS
2.2120E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCC1-S
2.4314E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
2.2120E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCC1-S
2.4314E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
1.7518E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCC1-S
1.9179E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCSnS
7.0111E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCC1-S
7.7078E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
5.2583E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCC1-S
5.7808E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
1.1057E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	DCC1
3.3190E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	nCC1-S
3.6495E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	nCCInS
3.3190E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	WCC1-S
3.6495E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	WCCSnS
2.6204E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-24	WCC1-S
2.8885E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-24	WCCSnS
1.0517E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	nCC1-S
1.1562E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	nCCInS
7.8875E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	WCC1-S
8.6712E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	WCCSnS
1.6585E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	DCC1
3.1287E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCC1-S
3.1287E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCC1-S
2.4769E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCC1-S
9.9075E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCC1-S
1.0367E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
7.4306E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCC1-S
4.6930E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCC1-S
4.6930E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	WCC1-S
3.7153E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	WCC1-S
1.4915E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCC1-S
1.6347E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCInS
1.1186E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	WCC1-S
1.1662E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	WCCSnS
7.9278E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCC1-S
6.2762E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	WCC1-S
2.7894E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	nCC1-S
1.8829E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCC1-S

TABLE 3.6
(3 of 15)

1.9701E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCSnS
1.2568E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-44	nCC1-S
1.1892E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-44	WCC1-S
1.2443E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-44	WCCSnS
9.4143E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-24	WCC1-S
4.1841E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-22	nCC1-S
2.8357E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-22	WCC1-S
3.1067E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-22	WCCSnS
2.2322E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCC1-S
2.4536E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
2.2322E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCC1-S
2.4536E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
1.7678E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCC1-S
1.9354E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS
7.0751E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCC1-S
7.7781E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
5.3063E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCC1-S
5.8336E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.1158E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	DCC1
3.3493E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCC1-S
3.6828E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCInS
3.3493E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	WCC1-S
3.6828E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	WCCSnS
2.6524E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	WCC1-S
2.9149E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	WCCSnS
1.0613E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCC1-S
1.1667E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCInS
7.9595E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCC1-S
8.7504E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCSnS
1.6736E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	DCC1
1.0629E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCC1-S
1.0629E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCC1-S
3.5384E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCC1-S
2.6538E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCC1-S
1.6761E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-44	nCC1-S
1.6761E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-44	WCC1-S
1.3269E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-24	WCC1-S
5.3076E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	nCC1-S
3.9807E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	WCC1-S
8.0002E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	WCC1-S
6.3335E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	WCC1-S
2.8149E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCC1-S
1.9000E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCC1-S
1.9881E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCSnS
1.2683E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-44	nCC1-S
1.2000E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-44	WCC1-S
1.2556E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-44	WCCSnS
9.5002E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-24	WCC1-S
4.2223E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	nCC1-S
2.8616E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	WCC1-S
3.1351E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	WCCSnS
6.3205E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCC1-S
7.0107E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
2.0028E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCC1-S
2.2233E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
2.8384E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCC1-S
9.4808E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-44	nCC1-S
1.0516E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-44	nCCInS
3.0049E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCC1-S
3.3374E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCCInS

TABLE 3.6
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1.3445E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-44	nCC1-S
4.2576E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCC1-S
9.4644E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCC1-S
1.0129E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
9.4644E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCC1-S
1.0129E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
7.4926E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCC1-S
3.0037E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCC1-S
3.2966E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
2.2511E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCC1-S
2.4726E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
1.4197E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	nCC1-S
1.5194E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	nCCInS
1.4197E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	WCC1-S
1.5194E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	WCCSnS
1.1239E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-24	WCC1-S
1.2029E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-24	WCCSnS
4.5055E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	nCC1-S
4.9451E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	nCCInS
3.3791E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	WCC1-S
3.7089E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	WCCSnS
1.1809E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-22	WCC1-S
6.3782E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCC1-S
7.0746E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
2.0211E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCC1-S
2.2436E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
9.5673E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCC1-S
1.0612E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCInS
3.0323E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCC1-S
3.3679E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCInS
1.5206E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCC1-S
9.5508E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCC1-S
1.0222E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
9.5508E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCC1-S
1.0222E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
7.5610E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCC1-S
3.0311E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCC1-S
3.3269E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
2.2717E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCC1-S
2.4951E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.4326E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCC1-S
1.5333E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCInS
1.4326E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	WCC1-S
1.5333E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	WCCSnS
1.1342E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	WCC1-S
1.2139E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	WCCSnS
4.5466E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCC1-S
4.9903E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCInS
3.4100E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCC1-S
3.7427E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCSnS
1.1917E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	WCC1-S
5.6898E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCC1-S
6.3205E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
1.8030E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCC1-S
2.0028E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
8.0670E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCC1-S
2.5590E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCC1-S
2.8384E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
8.5348E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-44	nCC1-S
9.4808E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-44	nCCInS

TABLE 3.6
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2.7045E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCCI-S
3.0049E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCCInS
1.2113E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-44	nCCI-S
1.3445E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-44	nCCInS
3.8385E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCCI-S
4.2576E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCCInS
8.5327E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCI-S
9.3697E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCInS
8.5327E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	*CCI-S
9.3697E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	*CCSnS
6.7583E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	*CCI-S
7.4177E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	*CCSnS
2.7044E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
2.9736E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCInS
2.0278E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	*CCI-S
2.2286E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	*CCSnS
1.2799E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	nCCI-S
1.4055E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	nCCInS
1.2799E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	*CCI-S
1.4055E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	*CCSnS
1.0137E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-24	*CCI-S
1.1127E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-24	*CCSnS
4.0566E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	nCCI-S
4.4605E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	nCCInS
3.0425E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	*CCI-S
3.3454E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	*CCSnS
1.2100E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.2100E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCI-S
3.8318E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
2.8739E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCI-S
1.8151E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCI-S
1.8151E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	*CCI-S
1.4369E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	*CCI-S
5.7477E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCI-S
4.3108E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	*CCI-S
3.0662E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-44	*CCI-S
2.4274E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-24	*CCI-S
1.0497E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	nCCI-S
7.2821E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	*CCI-S
4.5992E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-vn	RBB-44	*CCI-S
3.6411E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-vn	RBB-24	*CCI-S
1.5745E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-vn	RBB-22	nCCI-S
1.0923E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-vn	RBB-22	*CCI-S
1.1691E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-vn	RBB-22	*CCSnS
5.7418E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
6.3782E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
1.8194E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.0211E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
2.8811E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
9.1234E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
8.6127E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCI-S
9.5673E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCInS
2.7292E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCI-S
3.0323E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCInS
4.3216E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-44	nCCI-S
1.3699E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCI-S
1.5206E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCInS
8.6106E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCI-S
9.4553E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCInS
8.6106E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	*CCI-S

TABLE 3.6
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9.4553E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCSnS
6.8200E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCC1-S
7.4854E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCSnS
2.7291E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCC1-S
3.0008E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCInS
2.0463E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCC1-S
2.2490E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCSnS
1.2916E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-44	nCC1-S
1.4183E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-44	nCCInS
1.2916E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-44	WCC1-S
1.4183E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-44	WCCSnS
1.0230E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-24	WCC1-S
1.1228E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-24	WCCSnS
4.0936E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-22	nCC1-S
4.5012E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-22	nCCInS
3.0702E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-22	WCC1-S
3.3759E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-yn	RBB-22	WCCSnS
1.3685E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCC1-S
2.0528E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-yy	RBB-22	nCC1-S
1.5396E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-yy	RBB-22	WCC1-S
3.0941E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-44	WCC1-S
2.4495E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-24	WCC1-S
1.0593E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	nCC1-S
7.3486E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	WCC1-S
4.6412E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-yn	RBB-44	WCC1-S
3.6743E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-yn	RBB-24	WCC1-S
1.5889E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-yn	RBB-22	nCC1-S
1.1023E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-yn	RBB-22	WCC1-S
1.1797E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-yn	RBB-22	WCCSnS
3.8157E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCC1-S
1.5437E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
1.6789E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS
1.1543E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCC1-S
1.2078E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
5.7236E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCC1-S
2.3168E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-yy	RBB-n2	nCC1-S
2.5184E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-yy	RBB-n2	nCCInS
1.7367E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-yy	RBB-n2	WCC1-S
1.8888E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-yy	RBB-n2	WCCSnS
2.2112E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCC1-S
2.4298E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
8.8454E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
9.7261E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS
6.6337E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCC1-S
7.2938E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.3225E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	DCC1
3.3168E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n4	WCC1-S
3.6447E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n4	WCCSnS
1.3268E-02	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCC1-S
1.4590E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCCInS
9.9511E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	WCC1-S
1.0942E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	WCCSnS
2.0937E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	DCC1
1.3349E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-ny	RBB-n4	WCC1-S
5.5668E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-ny	RBB-n2	nCC1-S
4.1751E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-ny	RBB-n2	WCC1-S
2.0876E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-vy	RBB-n4	WCC1-S
8.4203E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-vy	RBB-n2	nCC1-S
6.2627E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-vy	RBB-n2	WCC1-S
7.9231E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCC1-S

TABLE 3.6
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3.4921E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	nCC1-S
2.3854E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	*CC1-S
2.5929E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	*CCSnS
1.1885E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-033	CD-ILM	VBD-S	SPB-vy	RBB-n4	*CC1-S
1.2435E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-033	CD-ILM	VBD-S	SPB-vy	RBB-n4	*CCSnS
5.2381E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-033	CD-ILM	VBD-S	SPB-vy	RBB-n2	nCC1-S
3.5780E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-033	CD-ILM	VBD-S	SPB-vy	RBB-n2	*CC1-S
3.8893E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-033	CD-ILM	VBD-S	SPB-vy	RBB-n2	*CCSnS
1.5266E-05	TB-F-ER	CFD-IP	CLC-DWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
6.2760E-05	TB-F-ER	CFD-IP	CLC-DWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
4.7070E-05	TB-F-ER	CFD-IP	CLC-DWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
2.3535E-05	TB-F-ER	CFD-IP	CLC-DWD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CC1-S
9.4139E-05	TB-F-ER	CFD-IP	CLC-DWD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCC1-S
1.0075E-05	TB-F-ER	CFD-IP	CLC-DWD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCCInS
7.0605E-05	TB-F-ER	CFD-IP	CLC-DWD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CC1-S
7.0605E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n4	*CC1-S
2.8291E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCC1-S
3.1066E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCCInS
2.1218E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CC1-S
2.3300E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CCSnS
7.0605E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
2.8291E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
3.1066E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS
2.1218E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
2.3300E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
1.0601E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vn	RBB-n4	*CC1-S
1.1650E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vn	RBB-n4	*CCSnS
4.2436E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vn	RBB-n2	nCC1-S
4.6599E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vn	RBB-n2	nCCInS
3.1827E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vn	RBB-n2	*CC1-S
3.4949E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vn	RBB-n2	*CCSnS
1.0601E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CC1-S
1.1650E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCSnS
4.2436E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCC1-S
4.6599E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCCInS
3.1827E-04	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CC1-S
3.4949E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CCSnS
1.1437E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-S	SPB-vn	RBB-n2	*CC1-S
1.1437E-05	TB-F-ER	CFD-IP	CLC-DWW	CLV-033	CD-ILM	VBD-S	SPB-vy	RBB-n2	*CC1-S
4.1577E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCC1-S
4.4540E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
4.1577E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CC1-S
4.4540E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCSnS
2.4173E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-34	*CC1-S
2.6545E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-34	*CCSnS
1.1906E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CC1-S
1.2342E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CCSnS
2.6859E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCC1-S
2.9495E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCInS
2.6813E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	*CC1-S
2.9160E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	*CCSnS
4.7901E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCC1-S
5.1480E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
3.5910E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CC1-S
3.8610E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCSnS
6.2365E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCC1-S
6.6810E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCInS
6.2365E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-44	*CC1-S
6.6810E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-44	*CCSnS
3.6259E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-34	*CC1-S

TABLE 3.6
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3.9818E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-34	*CCSnS
1.7859E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-24	*CC1-S
1.8513E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-24	*CCSnS
4.0288E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-33	nCC1-S
4.4242E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-33	nCC1nS
4.0220E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-33	*CC1-S
4.3740E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-33	*CCSnS
7.1940E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCC1-S
7.7439E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCC1nS
5.3889E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-22	*CC1-S
5.7915E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-vy	RBB-22	*CCSnS
1.3559E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-44	*CC1-S
8.5880E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-34	*CC1-S
1.2116E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-22	*CC1-S
2.1156E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-vy	RBB-44	*CC1-S
1.3022E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-vy	RBB-34	*CC1-S
1.4170E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-vy	RBB-34	*CCSnS
1.5904E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-vy	RBB-33	nCC1-S
1.4313E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-vy	RBB-33	*CC1-S
1.8175E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-vy	RBB-22	*CC1-S
2.3643E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-24	*CC1-S
2.0370E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n4	*CC1-S
9.4572E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	nCC1-S
7.0929E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	*CC1-S
8.1482E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCC1-S
6.1111E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	*CC1-S
3.5465E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-24	*CC1-S
3.0556E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-n4	*CC1-S
1.4230E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-22	nCC1-S
1.4940E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-22	nCC1nS
1.0639E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-22	*CC1-S
1.0713E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-22	*CCSnS
1.2266E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-n2	nCC1-S
1.3445E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-n2	nCC1nS
9.1667E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-n2	*CC1-S
1.8346E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-22	nCC1-S
1.3274E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-22	*CC1-S
1.5757E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-n2	nCC1-S
1.1818E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-n2	*CC1-S
1.8346E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	nCC1-S
1.3274E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	*CC1-S
1.5757E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCC1-S
1.1818E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	*CC1-S
2.7519E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-vn	RBB-22	nCC1-S
2.0639E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-vn	RBB-22	*CC1-S
2.3635E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-vn	RBB-n2	nCC1-S
1.7727E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-vn	RBB-n2	*CC1-S
2.7519E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-22	nCC1-S
2.0639E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-22	*CC1-S
2.3635E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-n2	nCC1-S
1.7727E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-vy	RBB-n2	*CC1-S
4.9281E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
5.3978E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
1.9720E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
2.1684E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1nS
1.4790E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
1.6263E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
7.3921E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CC1-S
8.0967E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCSnS
2.9580E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCC1-S

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2.2185E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCCInS
2.4394E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CCI-S
1.7664E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CCSnS
5.2991E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n4	*CCI-S
2.6496E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	*CCI-S
1.1201E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-vy	RBB-n4	*CCI-S
7.9487E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-vy	RBB-n2	nCCI-S
2.8088E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-S	SPB-vy	RBB-n2	*CCI-S
1.1247E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCI-S
8.4265E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
4.2133E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CCI-S
1.6870E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCI-S
1.2652E-04	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCCI-S
1.3904E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CCI-S
2.8468E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CCSnS
2.8468E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CCI-S
1.4234E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CCI-S
4.2702E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-vn	RBB-n4	*CCI-S
1.4234E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-vn	RBB-n2	*CCI-S
4.2702E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCI-S
1.8979E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CCI-S
5.6936E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n4	*CCI-S
2.8468E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CCI-S
1.1399E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-vn	RBB-n4	*CCI-S
8.5404E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-vn	RBB-n2	nCCI-S
8.1336E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-vn	RBB-n2	*CCI-S
1.2213E-04	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCI-S
1.3421E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCI-S
1.3570E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCSnS
1.3550E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-vy	RBB-n3	nCCI-S
9.2750E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-vy	RBB-n3	*CCI-S
1.0211E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-34	*CCI-S
1.5283E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCI-S
1.3963E-04	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-vy	RB9-44	*CCI-S
1.5252E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-vy	RBB-34	*CCI-S
1.5452E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-vy	RBB-34	*CCSnS
1.5406E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-vy	RBB-33	nCCI-S
3.6634E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-F-B	SPB-vy	RBB-33	*CCI-S
4.0634E-05	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCI-S
5.4950E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCInS
6.0950E-05	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-vn	RBB-nn	nCCI-S
2.6596E-02	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-vn	RBB-nn	nCCInS
2.9551E-03	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCI-S
1.3352E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCInS
1.4820E-05	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-ny	RBB-nn	nCCI-S
3.9894E-02	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-ny	RBB-nn	nCCInS
4.4326E-03	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-vn	RBB-nn	nCCI-S
2.0042E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-vn	RBB-nn	nCCInS
2.2230E-05	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-vy	RBB-nn	nCCI-S
7.6052E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-vy	RBB-nn	nCCInS
6.3590E-05	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-F	SPB-nn	RBB-nn	nCCI-S
1.1410E-03	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-F	SPB-nn	RBB-nn	nCCInS
1.2549E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-F	SPB-vn	RBB-nn	nCCI-S
3.7380E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-F	SPB-vn	RBB-nn	nCCInS
4.0885E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCI-S
3.8299E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
3.8261E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
8.7343E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	*CCI-S
5.6071E-04	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CCI-S
							SPB-vy	RBB-n4	*CCI-S

TABLE 3.6
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5.7449E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCSnS
5.7392E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-vy	RBB-n3	nCCI-S
1.3101E-04	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-vy	RBB-n3	*CCI-S
1.3909E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CCI-S
1.3133E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-vy	RBB-n2	*CCSnS
1.9700E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-S	SPB-ny	RBB-n4	*CCI-S
1.8466E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-S	SPB-vy	RBB-n4	*CCI-S
5.6936E-05	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-nn	RBB-n4	*CCI-S
2.8468E-05	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CCI-S
8.5406E-05	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-vn	RBB-n4	*CCI-S
1.4218E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vn	RBB-n2	*CCI-S
1.7380E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCI-S
2.1328E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-[illegible]y	RBB-n3	nCCI-S
2.6070E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCI-S
6.1569E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vy	RBB-n3	nCCI-S
8.9470E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCI-S
9.9584E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
1.0936E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
9.0374E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCInS
1.2235E-03	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	*CCI-S
1.3434E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCI-S
1.4941E-03	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vy	RBB-n4	*CCSnS
1.6431E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vy	RBB-n3	nCCI-S
1.3570E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vy	RBB-n3	nCCInS
1.4912E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vy	RBB-n3	*CCI-S
2.9278E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-vy	RBB-n3	*CCSnS
4.3917E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-S	SPB-ny	RBB-n4	*CCI-S
1.0621E-03	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-S	SPB-vy	RBB-n4	*CCI-S
1.1740E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
7.6748E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCInS
8.5219E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-33	nCCI-S
9.6091E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-33	nCCInS
1.0622E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.5935E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
1.7666E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-44	nCCI-S
1.1513E-02	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-44	nCCInS
1.2791E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-33	nCCI-S
1.4414E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-33	nCCInS
1.5933E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCI-S
1.1258E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCInS
1.2131E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.0275E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.0908E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-44	*CCI-S
9.3688E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-44	*CCSnS
1.0243E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-34	*CCI-S
1.1399E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-34	*CCSnS
1.2505E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
1.0357E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCInS
1.0908E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-33	*CCI-S
1.6899E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-33	*CCSnS
1.8497E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-44	nCCI-S
1.5423E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-44	nCCInS
1.6812E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-44	*CCI-S
1.4061E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-44	*CCSnS
1.5431E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-34	*CCI-S
1.7102E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-34	*CCSnS
1.8787E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-33	nCCI-S
1.5587E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-33	nCCInS
1.6947E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-33	*CCI-S
									*CCSnS

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3.3406E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-S-B	SPB-ny	RBB-34	*CC1-S
5.0109E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-S-B	SPB-vy	RBB-34	*CC1-S
1.2113E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCC1-S
2.7327E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCC1-S
3.0200E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCC1nS
1.1684E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-n2	nCC1-S
1.2969E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-n2	nCC1nS
1.1684E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCC1-S
1.2969E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCC1nS
1.8170E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-vn	RBB-44	nCC1-S
4.0990E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCC1-S
4.5299E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCC1nS
1.7538E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-vn	RBB-n2	nCC1-S
1.9453E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-vn	RBB-n2	nCC1nS
1.7538E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-vn	RBB-nn	nCC1-S
1.9453E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-vn	RBB-nn	nCC1nS
2.5778E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n4	*CC1-S
1.0446E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	nCC1-S
1.1277E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	nCC1nS
7.8347E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	*CC1-S
4.1287E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n4	*CC1-S
1.6575E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	nCC1-S
1.7997E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	nCC1nS
1.2431E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	*CC1-S
1.3420E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	*CCSnS
5.1407E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	*CC1-S
5.6211E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	*CCSnS
2.0385E-03	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCC1-S
2.2336E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCC1nS
1.5260E-03	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	*CC1-S
1.6730E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	*CCSnS
7.7110E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	*CC1-S
8.4445E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	*CCSnS
3.0583E-03	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	nCC1-S
3.3593E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	nCC1nS
2.2894E-03	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	*CC1-S
2.5161E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	*CCSnS
1.5217E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-vy	RBB-n2	nCC1-S
1.1322E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-vy	RBB-n2	*CC1-S
1.1713E-05	TB-F-LR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vn	RBB-n2	nCC1-S
1.1713E-05	TB-F-LR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	nCC1-S
5.2226E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	*CC1-S
5.7448E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	*CCSnS
1.1490E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
2.0890E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCC1-S
2.2979E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCC1nS
1.5668E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	*CC1-S
1.7234E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	*CCSnS
3.4678E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
7.8338E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n4	*CC1-S
8.6172E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n4	*CCSnS
1.7234E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
3.1335E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	nCC1-S
3.4469E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	nCC1nS
2.3502E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CC1-S
2.5852E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CCSnS
5.2226E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
2.0162E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n4	*CC1-S
2.2178E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n4	*CCSnS
8.9610E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	nCC1-S

TABLE 3.6
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6.0467E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	WCC1-S
6.6535E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	WCCSnS
3.0243E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n4	WCC1-S
3.3268E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n4	WCCSnS
1.3442E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n2	nCC1-S
1.4638E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n2	nCCInS
9.0730E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n2	WCC1-S
9.9803E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n2	WCCSnS
7.7294E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCC1-S
3.0918E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCC1-S
2.3188E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCC1-S
2.5507E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.1594E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	WCC1-S
1.2753E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	WCCSnS
4.6376E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	nCC1-S
3.4782E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	WCC1-S
3.8260E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	WCCSnS
2.6113E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n4	WCC1-S
1.0445E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	nCC1-S
7.8338E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCC1-S
2.6113E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCC1-S
1.0445E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCC1-S
7.8338E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCC1-S
3.9169E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n4	WCC1-S
1.5668E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	nCC1-S
1.1751E-04	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	WCC1-S
1.2926E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	WCCSnS
3.9169E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	WCC1-S
1.5668E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	nCC1-S
1.1751E-04	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	WCC1-S
1.2926E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	WCCSnS
1.3056E-05	TB-F-LR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	WCC1-S
5.2226E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n4	WCC1-S
2.0890E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	nCC1-S
1.5668E-04	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCC1-S
1.7234E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCCSnS
7.8338E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n4	WCC1-S
3.1335E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	nCC1-S
2.3502E-04	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	WCC1-S
2.5852E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	WCCSnS
2.0890E-03	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCC1-S
2.2979E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCCInS
3.1335E-03	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-vn	RBB-nn	nCC1-S
3.4469E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-vn	RBB-nn	nCCInS
1.0275E-03	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCC1-S
1.1274E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCSnS
1.0529E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	nCC1-S
1.1582E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	nCCInS
1.0529E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	WCC1-S
1.1582E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	WCCSnS
1.6039E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCC1-S
2.4059E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCC1-S
2.6369E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.6039E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-nn	nCC1-S
1.5415E-03	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n4	WCC1-S
1.6936E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n4	WCCSnS
1.5793E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	nCC1-S
1.7372E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	nCCInS
1.5793E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	WCC1-S
1.7372E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	WCCSnS

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2.4059E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n2	nCC1-S
3.6088E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CC1-S
3.9553E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CCSnS
2.4059E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-nn	nCC1-S
2.9199E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n4	*CC1-S
4.4029E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n4	*CC1-S
1.0218E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n2	*CC1-S
5.2226E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n4	*CC1-S
1.0445E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	nCC1-S
1.5668E-04	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	*CC1-S
1.7234E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	*CCSnS
1.0445E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCC1-S
7.8338E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n4	*CC1-S
1.5668E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n2	nCC1-S
2.3502E-04	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n2	*CC1-S
2.5852E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n2	*CCSnS
1.5668E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-nn	nCC1-S
2.2611E-05	TB-F-LR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	*CC1-S
2.7638E-05	TB-F-LR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n3	nCC1-S
3.3917E-05	TB-F-LR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	*CC1-S
4.1457E-05	TB-F-LR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RBB-n3	nCC1-S
1.0322E-04	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n4	DCC1
3.0968E-04	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	DCC1
1.6379E-04	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n4	DCC1
4.9136E-04	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	DCC1
1.0127E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-S-B	SPB-vy	RBB-n2	DCC1
2.0318E-03	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	DCC1
6.0300E-03	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCC1
3.0477E-03	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	DCC1
1.1869E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	nCC1nS
9.0450E-03	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	DCC1
3.0151E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-ny	RBB-n2	DCC1
1.4943E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-vy	RBB-n4	DCC1
4.5227E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-vy	RBB-n2	DCC1
1.3235E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-SE	SPB-ny	RBB-n2	DCC1
2.0649E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-SE	SPB-vy	RBB-n2	DCC1
2.3138E-05	TB-F-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-nn	RBB-n2	DCC1
2.3138E-05	TB-F-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCC1
1.1569E-05	TB-F-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vn	RBB-n4	DCC1
3.4915E-05	TB-F-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vn	RBB-n2	DCC1
1.1569E-05	TB-F-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	DCC1
3.4915E-05	TB-F-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	DCC1
2.0632E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
6.1897E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
3.0948E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
9.2845E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
1.7045E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	DCC1
4.4252E-04	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCC1
1.3276E-03	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCC1
6.6378E-04	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n4	DCC1
1.9913E-03	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n2	DCC1
2.0357E-04	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
6.1072E-04	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
3.0536E-04	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
9.1608E-04	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
1.4610E-05	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-vy	RBB-n2	DCC1
1.1462E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n4	DCC1
3.4387E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	DCC1
1.1462E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
3.4387E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1

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1.7194E-03	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
8.5968E-04	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
2.5790E-03	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
2.7421E-05	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCC1
1.3711E-05	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-vy	RBB-n4	DCC1
4.1132E-05	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-vy	RBB-n2	DCC1
2.0567E-05	TB-F-nR	CFD-LT	CLC-nDD	CLV-023	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCC1
1.0283E-05	TB-F-nR	CFD-LT	CLC-nDD	CLV-023	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	DCC1
3.0850E-05	TB-F-nR	CFD-LT	CLC-nDD	CLV-023	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	DCC1
3.2724E-03	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
2.7730E-04	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	DCC1
2.3301E-03	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
4.9086E-03	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
4.1595E-04	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	DCC1
3.4951E-03	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
5.2088E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCC1
3.7161E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCC1
7.8133E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n4	DCC1
5.5742E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n2	DCC1
2.2925E-05	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n4	DCC1
6.8774E-05	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	DCC1
3.4387E-05	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n4	DCC1
1.0316E-04	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n2	DCC1
1.1334E-05	TB-F-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-F-B	SPB-vy	RBB-n4	DCC1
5.6513E-05	TB-F-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	DCC1
2.0567E-05	TB-F-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCC1
8.4769E-05	TB-F-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	DCC1
3.0850E-05	TB-F-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	DCC1

TABLE 3.6
(15 of 15)

9.9655E-01 TOTAL FREQUENCY OF BINS PRINTED

TOTAL FREQUENCY IN ALL BINS = 1.0000E+00
TOTAL FREQUENCY LOST DUE TO TERMINATION OF BRANCHES 6.0210E-04
TOTAL FREQUENCY FOR THIS SEQUENCE/WALKTHROUGH = 1.0006E+00

PEACH BOTTOM EVENT TREE IBUXP

PEACH BOTTOM ACCIDENT PROGRESSION

TABLE 3.7 (1 of 10)

THESE RESULTS ARE FOR THE TBUXP-cen WALKTHROUGH

FREQUENCY	Seq	CF-Dyn	CL-Loc	CL-Lev	Degr	VBD	SPB	RBB-Lev	CCI
6.8303E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
7.5763E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCInS
2.1634E-02	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
2.4033E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
3.4144E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
3.7406E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
3.4144E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
3.7406E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
2.7027E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCI-S
2.9605E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.0815E-02	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.1880E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
8.1110E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S
8.9069E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.6497E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	DCCI
1.2501E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	nCCI-S
1.2151E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	WCCI-S
1.2376E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	WCCSnS
9.6114E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-24	WCCI-S
4.1779E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	nCCI-S
2.9063E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCI-S
3.1021E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCSnS
4.9565E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
5.4051E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
4.9565E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
5.4051E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
3.9270E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
4.2790E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCSnS
1.5727E-03	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
1.7279E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
1.1791E-03	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
1.2951E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
5.4727E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
5.4727E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.0450E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	DCCI
4.3326E-04	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.7354E-03	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.3012E-03	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS
2.6086E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	DCCI
1.7688E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCI-S
1.4003E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	WCCI-S
4.2008E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCI-S
1.9571E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	WCCSnS
1.5494E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-24	WCCSnS
4.6481E-05	TB-F-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCSnS
1.4158E-04	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
1.5675E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
4.4903E-04	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
4.9638E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
2.1161E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
2.1161E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S

Data Documents 10-92815

TABLE 3.7
(2 of 10)

1.6753E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
6.7011E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
5.0258E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
1.2752E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
1.4158E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
4.0444E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
4.4903E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
1.5816E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCInS
1.2605E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
5.0084E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
1.9126E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCI-S
2.0950E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCInS
1.9126E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCI-S
2.0950E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCSnS
1.5145E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCI-S
1.6585E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCSnS
6.0619E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
6.6341E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCInS
4.5464E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCI-S
4.9756E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCSnS
2.3455E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
2.3455E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.8568E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS
7.4305E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
5.5705E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.0637E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	DCCI
1.6282E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	WCCI-S
1.9920E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCSnS
5.5920E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
6.1465E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
5.5920E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
6.1465E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
1.1408E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	DCCI
4.4297E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
4.8679E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCSnS
1.7719E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
1.9471E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
1.3289E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
1.4604E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
2.7094E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	DCCI
1.7006E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.7006E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.3463E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCI-S
5.6614E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
4.2461E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S
2.0532E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	nCCI-S
1.9940E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCI-S
2.0327E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCSnS
1.5786E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	WCCI-S
1.6092E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	WCCSnS
7.0159E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	nCCI-S
4.7789E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCI-S
5.2093E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCSnS
5.5971E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
6.1520E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
5.5971E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
6.1520E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
1.1415E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	DCCI
4.4337E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
4.8722E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS

Data Descriptions 10-8045-15

1.7735E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.9489E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
1.3301E-07	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
1.4617E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
2.7111E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	DCCI
1.2223E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.2223E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
4.0260E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
3.0195E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
2.0546E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	nCCI-S
1.9957E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	WCCI-S
2.0340E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	WCCSnS
1.5799E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	WCCI-S
1.6103E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	WCCSnS
7.0219E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCCI-S
4.7832E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
5.2138E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCSnS
1.5972E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
1.7671E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
5.0628E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
5.6221E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.5781E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
2.3942E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
2.6242E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
2.3942E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.6242E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
1.8886E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.9766E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS
7.5898E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
8.3099E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
5.6924E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
6.2324E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.9405E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
1.5986E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
1.7687E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
5.0674E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
5.6271E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.1343E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
2.3963E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
2.6265E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
2.3963E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.6265E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
1.8903E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.9780E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS
7.5966E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
8.3172E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
5.6975E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
6.2379E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.9418E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
1.4380E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
1.5972E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
4.5569E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
5.0628E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
4.6097E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
1.4597E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.5781E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
2.1564E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCI-S
2.3702E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCInS
2.1564E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCI-S
2.3702E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCSnS

TABLE 3.7
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1.7077E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCI-S
1.8697E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCSnS
6.8348E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
7.5139E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCInS
5.1261E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCI-S
5.6354E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCSnS
1.0782E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	DCCI
2.1637E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.5978E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S
7.7286E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-44	WCCI-S
6.1185E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-24	WCCI-S
2.7193E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	nCCI-S
1.8355E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	WCCI-S
1.9211E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	WCCSnS
1.4393E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
1.5986E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
4.5610E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
5.0674E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
3.2938E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
1.0492E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.1343E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
2.1583E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCI-S
2.3724E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCInS
2.1583E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCI-S
2.3724E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCSnS
1.7092E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCI-S
1.8714E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCSnS
6.8410E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCI-S
7.5207E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCInS
5.1307E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCI-S
5.6405E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCSnS
1.0789E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	DCCI
1.5645E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.1484E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
7.7354E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-44	WCCI-S
6.1239E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-24	WCCI-S
2.7217E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	nCCI-S
1.8372E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	WCCI-S
1.9224E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	WCCSnS
9.6778E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n4	WCCI-S
3.8991E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCI-S
4.2050E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCInS
2.9243E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	WCCI-S
3.1537E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	WCCSnS
5.5424E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
6.0837E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
1.0617E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	DCCI
2.2174E-02	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
2.4387E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS
1.6631E-02	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.8285E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
3.6146E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	DCCI
1.5176E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-ny	RBB-n4	WCCI-S
6.3451E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-ny	RBB-n2	nCCI-S
4.7588E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-ny	RBB-n2	WCCI-S
1.9899E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
2.1469E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCCSnS
8.7844E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	nCCI-S
5.9725E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
6.4407E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	WCCSnS

TABLE 3.7
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3.9225E-05	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.5690E-04	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
1.6418E-05	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS
1.1768E-04	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.2314E-05	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.2444E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCCI-S
1.2444E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
1.7727E-04	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
1.9416E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n4	WCCSnS
7.0907E-04	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCCI-S
7.7666E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCCInS
5.3180E-04	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
5.8249E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCSnS
1.7727E-04	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.9416E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
7.0907E-04	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
7.7666E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS
5.3180E-04	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
5.8249E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.9062E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-S	SPB-nn	RBB-n2	WCCI-S
1.9062E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.0404E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.1246E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.0404E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.1246E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
6.0421E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCI-S
6.6298E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCSnS
1.2155E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-34	DCCI
2.9693E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCI-S
3.0244E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS
6.7134E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCI-S
7.3665E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCInS
6.6968E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCI-S
7.2618E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCSnS
1.1996E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.3054E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
8.9953E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S
9.7904E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS
3.6108E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-44	WCCI-S
2.1695E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-34	WCCI-S
2.3526E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-34	WCCSnS
2.6404E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-33	nCCI-S
2.3763E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-33	WCCI-S
2.9691E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCI-S
1.0130E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
1.0130E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
5.9255E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
5.1236E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n4	WCCI-S
2.4134E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
2.6072E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
1.7901E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
1.8610E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
2.0673E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCI-S
2.2544E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCInS
1.5496E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.6908E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.0553E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCI-S
4.6100E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
3.4575E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCI-S
3.9717E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-n2	nCCI-S

TABLE 3.7
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2.9788E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-n2	WCCI-S
1.0553E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
4.6100E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
3.4575E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
3.9717E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCI-S
2.9788E-05	TB-F-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.2354E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.3575E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
4.9432E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
5.4333E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS
3.7074E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
4.0750E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
4.4064E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
1.9584E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	nCCI-S
1.3327E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.4541E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	WCCSnS
7.0222E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
2.8165E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
2.1156E-04	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
2.3173E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
2.3724E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
7.1171E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
2.3724E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
7.1171E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.2710E-05	TB-F-ER	CFD-LT	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCI-S
4.7447E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
1.9030E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCCI-S
1.4286E-04	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
1.5658E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCSnS
2.0421E-04	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
2.2368E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.2655E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
2.2594E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n3	WCCI-S
2.5419E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
2.3270E-04	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCI-S
2.5349E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCSnS
2.5694E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCI-S
2.5605E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCI-S
9.2571E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCI-S
1.0242E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCInS
6.6671E-02	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-nn	RBB-nn	nCCI-S
7.4075E-03	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-nn	RBB-nn	nCCInS
1.5351E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-ny	RBB-nn	nCCI-S
1.6943E-05	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-ny	RBB-nn	nCCInS
1.9068E-03	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-F	SPB-nn	RBB-nn	nCCI-S
2.0969E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-F	SPB-nn	RBB-nn	nCCInS
9.3651E-04	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.0205E-04	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
9.5912E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
1.0266E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCInS
9.5654E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	WCCI-S
1.0009E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	WCCSnS
1.4468E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
2.1819E-04	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
2.2617E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.4468E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-nn	nCCI-S
3.2654E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
4.7447E-05	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
1.4234E-04	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
1.4895E-05	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCSnS

TABLE 3.7
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2.0459E-03	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILH	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.2486E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.4969E-03	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
2.7455E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCInS
2.2690E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	WCCI-S
2.4853E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	WCCSnS
7.3196E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
2.6557E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
2.9428E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCInS
1.9188E-02	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-33	nCCI-S
2.1316E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-33	nCCInS
2.4028E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
2.6657E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
2.8157E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
3.0765E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
2.5721E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
2.8063E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
2.3436E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCI-S
2.5730E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCSnS
2.8503E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCI-S
3.1298E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCInS
2.5990E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCI-S
2.8268E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCSnS
8.3364E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-S-B	SPB-ny	RBB-34	WCCI-S
1.0665E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-S-B	SPB-ny	RBB-33	nCCI-S
3.1382E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
6.9028E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
7.5884E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
2.9545E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-n2	nCCI-S
3.2689E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-n2	nCCInS
2.9545E-04	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCI-S
3.2689E-05	TB-F-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCInS
2.5778E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	nCCI-S
1.9334E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	WCCI-S
1.2808E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	WCCI-S
1.3835E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	WCCSnS
5.0936E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCCI-S
5.5680E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCCInS
3.8134E-04	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	WCCI-S
4.1606E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	WCCSnS
2.7994E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	nCCI-S
2.0917E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	WCCI-S
1.3056E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.4362E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCSnS
5.2226E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCCI-S
5.7448E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCCInS
3.9169E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCI-S
4.3086E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCSnS
5.0406E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n4	WCCI-S
2.2403E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	nCCI-S
1.5122E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.6468E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	WCCSnS
1.1786E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.2965E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.6192E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI
4.7145E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
5.1859E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCInS
3.5359E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
3.8894E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS

TABLE 3.7
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7.8575E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
2.3620E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
9.4478E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	WCCI-S
1.0393E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	nCCI-S
7.0859E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	nCCInS
2.3334E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	WCCI-S
2.5668E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
1.0371E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCSnS
1.1408E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	nCCI-S
7.0003E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	nCCInS
7.7003E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.4029E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCSnS
2.6145E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n2	WCCI-S
1.9609E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	nCCI-S
1.9323E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-SE	SPB-ny	RBB-n2	WCCI-S
5.7970E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.7444E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.9188E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
6.9774E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
5.2331E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
5.7564E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
3.4535E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.0360E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
1.1396E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.9585E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCSnS
1.9585E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCCI-S
5.8931E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCI-S
2.3572E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
1.7679E-04	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCCI-S
1.9447E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
5.8931E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCSnS
2.3572E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.7679E-04	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
1.9447E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.1667E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
3.5001E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n4	WCCI-S
1.1667E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n2	WCCI-S
3.5001E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
1.9644E-05	TB-F-LR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.3056E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
3.9169E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n4	WCCI-S
1.1786E-04	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCCI-S
1.2965E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
4.7145E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCSnS
3.5359E-04	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCCI-S
3.8894E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
2.3334E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCSnS
7.0003E-05	TB-F-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n4	WCCI-S
5.2226E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-S	SPB-nn	RBB-n2	WCCI-S
5.7448E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCCI-S
4.7145E-03	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCCInS
5.1859E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCCI-S
1.0371E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCCInS
1.1408E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-S	SPB-nn	RBB-nn	nCCI-S
2.5687E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-nn	RBB-nn	nCCInS
2.7971E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCI-S
2.6327E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.6322E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	nCCI-S
5.9929E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	WCCI-S
							SPB-ny	RBB-n2	WCCI-S

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2.3195E-03	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
2.5507E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.3761E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
2.6137E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	nCCInS
2.3761E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	WCCI-S
2.6137E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	WCCSnS
3.6197E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
5.4295E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
5.9725E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
3.6197E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-nn	nCCI-S
4.5908E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
5.0370E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCSnS
4.7042E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n3	WCCI-S
1.0749E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.1781E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCSnS
1.3056E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n4	WCCI-S
3.9169E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCCI-S
1.1786E-04	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
1.2965E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCSnS
2.3572E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCCI-S
3.5359E-04	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
3.8894E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCSnS
2.3572E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCCI-S
2.3334E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n4	WCCI-S
7.0003E-05	TB-F-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n2	WCCI-S
2.5676E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n4	DCCI
7.7262E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	DCCI
5.0750E-04	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	DCCI
1.5073E-03	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCCI
3.1111E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n4	DCCI
8.3032E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	DCCI
5.1581E-03	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCCI
1.5474E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI
1.1063E-04	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCCI
3.3189E-04	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCCI
4.6563E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI
1.3969E-01	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
9.3312E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	DCCI
2.7994E-04	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	DCCI
5.1214E-03	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCCI
1.5364E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCCI
1.0263E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n4	DCCI
3.0790E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n2	DCCI
2.5822E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n4	DCCI
7.7466E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	DCCI
5.0893E-05	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCCI
1.5268E-04	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI
4.5942E-04	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI
1.3783E-03	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
5.0531E-05	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCCI
1.5159E-04	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCCI
2.5868E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	DCCI
7.7604E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	DCCI
2.5868E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI
7.7604E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
1.4328E-04	TB-F-nR	CFD-LI	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCCI
4.2984E-04	TB-F-nR	CFD-LI	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI
1.2934E-03	TB-F-nR	CFD-LI	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI
3.8802E-03	TB-F-nR	CFD-LI	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
1.4226E-04	TB-F-nR	CFD-LI	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCCI

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1.2738E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCCI
7.3850E-03	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI
6.2580E-04	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	DCCI
5.2585E-03	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
1.4800E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	DCCI
1.0538E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	DCCI
8.1227E-04	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCCI
6.8831E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n3	DCCI
5.7837E-04	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCCI
1.7194E-05	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	DCCI
5.1736E-05	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	DCCI
1.5521E-04	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	DCCI
1.7071E-05	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n2	DCCI
1.4054E-05	TB-F-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	DCCI

TABLE 3.7
(10 of 10)

9.9787E-01 TOTAL FREQUENCY OF BINS PRINTED

TOTAL FREQUENCY IN ALL BINS = 1.0000E+00
TOTAL FREQUENCY LOST DUE TO TERMINATION OF BRANCHES 5.2632E-04
TOTAL FREQUENCY FOR THIS SEQUENCE/WALKTHROUGH = 1.0005E+00

PEACH BOTTOM EVENT TREE TBU

PEACH BOTTOM ACCIDENT PROGRESSION

TABLE 3.8 (1 of 9)

THESE RESULTS ARE FOR THE TBU -cen WALKTHROUGH

FREQUENCY	Seq	CF-Dyn	CL-Loc	CL-Lev	Degr	VbD	SPB	RBB-Lev	CCI
6.8317E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VbD-nB	SPB-ny	RBB-44	nCCI-S
7.5870E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VbD-nB	SPB-ny	RBB-44	nCCInS
2.1635E-02	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
2.4035E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
3.4152E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
3.7527E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
3.4152E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCI-S
3.7527E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCSnS
2.7036E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CCI-S
2.9677E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CCSnS
1.0816E-02	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.1891E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
8.1118E-03	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCI-S
8.9143E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCSnS
1.7035E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	DCCI
1.2909E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	nCCI-S
1.2226E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	*CCI-S
1.2780E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	*CCSnS
9.6697E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-24	*CCI-S
1.0119E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-24	*CCSnS
4.2976E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	nCCI-S
2.9134E-04	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	*CCI-S
3.1443E-05	TB-F-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	*CCSnS
4.9646E-04	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
5.4378E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
4.9646E-04	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	*CCI-S
5.4378E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	*CCSnS
3.9337E-04	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	*CCI-S
4.3049E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	*CCSnS
1.5747E-03	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
1.7308E-04	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
1.1807E-03	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	*CCI-S
1.2973E-04	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	*CCSnS
5.4754E-04	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
5.4754E-04	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCSnS
1.0728E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	DCCI
4.3347E-04	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CCSnS
1.7354E-03	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.3015E-03	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCSnS
2.6187E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	DCCI
1.7795E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	*CCI-S
1.4087E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	*CCI-S
4.2262E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	*CCI-S
1.9647E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	*CCSnS
1.5554E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-24	*CCSnS
4.6661E-05	TB-F-ER	CLD-E4P	CLC-*DD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	*CCSnS
1.4187E-04	TB-F-ER	CLD-E4P	CLC-**D	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
1.5736E-05	TB-F-ER	CLD-E4P	CLC-**D	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
4.4969E-04	TB-F-ER	CLD-E4P	CLC-**D	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
4.9831E-05	TB-F-ER	CLD-E4P	CLC-**D	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
2.1244E-05	TB-F-ER	CLD-E4P	CLC-**D	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S

2.1244E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
1.6818E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
6.7272E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	NCCI-S
5.0454E-05	TB-F-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
1.2771E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-44	NCCI-S
1.4187E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-44	NCCINS
4.0495E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-22	NCCI-S
4.4969E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-nn	RBB-22	NCCINS
1.5816E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-ny	RBB-44	NCCINS
5.0083E-03	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-NB	SPB-ny	RBB-22	NCCINS
1.9152E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	NCCI-S
2.1031E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	NCCINS
1.9152E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCI-S
2.1031E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCSNS
1.5177E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCI-S
1.6650E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCSNS
6.0708E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	NCCI-S
6.6599E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	NCCINS
4.5531E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCI-S
4.9949E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCSNS
2.3466E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	NCCINS
2.3466E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSNS
1.8577E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSNS
7.4346E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	NCCINS
5.5732E-04	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSNS
1.0920E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	DCCI
1.6345E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	WCCI-S
1.9998E-05	TB-F-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCSNS
5.5990E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	NCCI-S
6.1565E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	NCCINS
5.5990E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
6.1565E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSNS
1.1780E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	DCCI
4.4353E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
4.8760E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCSNS
1.7741E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	NCCI-S
1.9504E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	NCCINS
1.3306E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
1.4628E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSNS
2.7978E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	DCCI
1.0629E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	NCCI-S
1.0629E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
3.5384E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	NCCI-S
2.6538E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S
2.1202E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	NCCI-S
2.0061E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCI-S
2.0990E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCSNS
1.5881E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	WCCI-S
1.6617E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	WCCSNS
7.0584E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	NCCI-S
4.7868E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCI-S
5.2409E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCSNS
5.5990E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	NCCI-S
6.1565E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	NCCINS
5.5990E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
6.1565E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSNS
1.1780E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	DCCI
4.4353E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
4.8760E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSNS
1.7741E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	NCCI-S

TABLE 3.8
(2 of 9)

1.3306E-02	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
1.4628E-03	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	*CCI-S
2.7978E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	*CCSnS
1.0629E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	DCCI
1.0629E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
3.5384E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	*CCI-S
2.6538E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
2.1202E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	*CCI-S
2.0061E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	nCCI-S
2.0990E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	*CCI-S
1.5881E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	*CCSnS
1.6617E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	*CCI-S
7.0584E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	*CCSnS
4.7868E-04	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCCI-S
5.2409E-05	TB-F-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	*CCI-S
1.5994E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	*CCSnS
1.7740E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
5.0691E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
5.6301E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.3973E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
2.6344E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
2.3973E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
2.6344E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	*CCI-S
1.8960E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	*CCSnS
2.0292E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	*CCI-S
7.6006E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	*CCSnS
8.3422E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
5.7004E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
6.2567E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	*CCI-S
1.9921E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	*CCSnS
1.5994E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	*CCI-S
1.7740E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
5.0691E-03	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
5.6301E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.3973E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
2.6344E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
2.3973E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
2.6344E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	*CCI-S
1.8960E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	*CCSnS
2.0292E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	*CCI-S
7.6006E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	*CCSnS
8.3422E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
5.7004E-04	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
6.2567E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	*CCI-S
1.9921E-05	TB-F-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	*CCSnS
1.4398E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	*CCI-S
1.5994E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
4.5624E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
5.0691E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.8811E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
9.1234E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
2.1591E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
2.3733E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCI-S
2.1591E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCInS
2.3733E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	*CCI-S
1.7101E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	*CCSnS
1.8770E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	*CCI-S
6.8433E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	*CCSnS
7.5246E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCI-S
								RBB-22	nCCInS

TABLE 3.8
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5.1325E-03	TB-F-ER	CFD-E4V	CLC-***W	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	*CC1-S
5.6434E-04	TB-F-ER	CFD-E4V	CLC-***W	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	*CCSnS
1.1068E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	DCC1
1.3685E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCC1-S
7.7587E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-44	*CC1-S
6.1423E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-24	*CC1-S
2.7299E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	nCC1-S
1.8427E-04	TB-F-ER	CFD-E4V	CLC-***W	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	*CC1-S
1.9722E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	*CCSnS
1.4398E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCC1-S
1.5994E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
4.5624E-02	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCC1-S
5.0691E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
2.8811E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCC1-S
9.1234E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCC1-S
2.1591E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCC1-S
2.3733E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCInS
2.1591E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	*CC1-S
2.3733E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	*CCSnS
1.7101E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	*CC1-S
1.8770E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	*CCSnS
6.8433E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCC1-S
7.5246E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCInS
5.1325E-03	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	*CC1-S
5.6434E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	*CCSnS
1.1068E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	DCC1
1.3685E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCC1-S
7.7587E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-44	*CC1-S
6.1423E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-24	*CC1-S
2.7299E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	nCC1-S
1.8427E-04	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	*CC1-S
1.9722E-05	TB-F-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	*CCSnS
1.9473E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHH	VBD-F	SPB-ny	RBB-n4	*CC1-S
2.0375E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHH	VBD-F	SPB-ny	RBB-n4	*CCSnS
7.8167E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHH	VBD-F	SPB-ny	RBB-n2	nCC1-S
8.4967E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHH	VBD-F	SPB-ny	RBB-n2	nCCInS
5.8625E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHH	VBD-F	SPB-ny	RBB-n2	*CC1-S
6.3725E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHH	VBD-F	SPB-ny	RBB-n2	*CCSnS
5.5447E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n4	*CC1-S
6.0927E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n4	*CCSnS
1.1054E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n4	DCC1
2.2181E-02	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCC1-S
2.4397E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCInS
1.6636E-02	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	*CC1-S
1.8297E-03	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	*CCSnS
3.6489E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	DCC1
1.3349E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F-B	SPB-ny	RBB-n4	*CC1-S
5.5668E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F-B	SPB-ny	RBB-n2	nCC1-S
4.1751E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-F-B	SPB-ny	RBB-n2	*CC1-S
1.9938E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-S	SPB-ny	RBB-n4	*CC1-S
2.1672E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-S	SPB-ny	RBB-n4	*CCSnS
8.8300E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-S	SPB-ny	RBB-n2	nCC1-S
5.9814E-04	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-S	SPB-ny	RBB-n2	*CC1-S
6.5017E-05	TB-F-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILH	VBD-S	SPB-ny	RBB-n2	*CCSnS
3.9343E-05	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n4	*CC1-S
1.5737E-04	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCC1-S
1.6843E-05	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCInS
1.1803E-04	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	*CC1-S
1.2632E-05	TB-F-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	*CCSnS
2.4715E-05	TB-F-ER	CFD-IP	CLC-nWW	CLV-033	CD-IHH	VBD-F	SPB-nn	RBB-n2	nCC1-S

TABLE 3.8
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1.8536E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-IHH	VBD-F	SPB-nn	RBB-n2	wCC1-S
2.4715E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-IHH	VBD-F	SPB-ny	RBB-n2	nCC1-S
1.8536E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-IHH	VBD-F	SPB-ny	RBB-n2	wCC1-S
1.7735E-04	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-nn	RBB-n4	wCC1-S
1.9475E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-nn	RBB-n4	wCCSnS
7.0940E-04	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-nn	RBB-n2	nCC1-S
7.7899E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-nn	RBB-n2	nCCInS
5.3205E-04	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-nn	RBB-n2	wCC1-S
5.8424E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-nn	RBB-n2	wCCSnS
1.7735E-04	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n4	wCC1-S
1.9475E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n4	wCCSnS
7.0940E-04	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCC1-S
7.7899E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCInS
5.3205E-04	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	wCC1-S
5.8424E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-F	SPB-ny	RBB-n2	wCCSnS
1.9119E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-S	SPB-nn	RBB-n2	wCC1-S
1.9119E-05	TB-F-ER	CFD-IP	CLC-nww	CLV-033	CD-ILH	VBD-S	SPB-ny	RBB-n2	wCC1-S
2.0835E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-44	nCC1-S
2.2587E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-44	nCCInS
2.0835E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-44	wCC1-S
2.2587E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-44	wCCSnS
1.2087E-02	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-34	wCC1-S
1.3280E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-34	wCCSnS
2.5104E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-34	DCC1
5.9841E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-24	wCC1-S
6.3807E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-24	wCCSnS
1.3430E-02	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-33	nCC1-S
1.4755E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-33	nCCInS
1.3414E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-33	wCC1-S
1.4633E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-33	wCCSnS
2.4010E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-22	nCC1-S
2.6266E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.8000E-03	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-22	wCC1-S
1.9584E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-22	wCCSnS
4.0910E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-S-B	SPB-ny	RBB-34	wCC1-S
1.5513E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-44	nCC1-S
1.5513E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-44	wCC1-S
1.0397E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-34	wCC1-S
1.0532E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-34	wCCSnS
1.1564E-04	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-33	nCC1-S
1.1702E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-33	nCCInS
1.0638E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-33	wCC1-S
1.7473E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-22	nCC1-S
1.3105E-05	TB-F-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-22	wCC1-S
2.0920E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-44	nCC1-S
2.0920E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-44	wCC1-S
1.1965E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-24	wCC1-S
1.2048E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-24	wCCSnS
1.0309E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n4	wCC1-S
1.0787E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n4	wCCSnS
4.8377E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	nCC1-S
5.2648E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	nCCInS
3.6173E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	wCC1-S
3.8813E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	wCCSnS
4.1413E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	nCC1-S
4.5361E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	nCCInS
3.1052E-04	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	wCC1-S
3.4020E-05	TB-F-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	wCCSnS
1.9426E-05	TB-F-ER	CFD-IP	CLC-WWD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	nCC1-S
1.4569E-05	TB-F-ER	CFD-IP	CLC-WWD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	wCC1-S

1.7242E-05	TB-F-ER	CFD-IP	CLC-**D	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	nCC1-S
1.2931E-05	TB-F-ER	CFD-IP	CLC-**D	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	*CC1-S
2.2177E-05	TB-F-ER	CFD-IP	CLC-***	CLV-233	CD-IHH	VBD-F	SPB-nn	RBB-24	*CC1-S
1.9720E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-nn	RBB-n4	*CC1-S
9.2848E-05	TB-F-ER	CFD-IP	CLC-**WW	CLV-233	CD-IHH	VBD-F	SPB-nn	RBB-22	nCC1-S
6.9636E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-nn	RBB-22	*CC1-S
7.9744E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-nn	RBB-n2	nCC1-S
5.9808E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-nn	RBB-n2	*CC1-S
2.2177E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-24	*CC1-S
1.9720E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n4	*CC1-S
9.2848E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	nCC1-S
6.9636E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	*CC1-S
7.9744E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	nCC1-S
5.9808E-05	TB-F-ER	CFD-IP	CLC-***W	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	*CC1-S
1.2359E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
1.3584E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
4.9449E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
5.4372E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS
3.7086E-03	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
4.0779E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
4.4293E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n4	*CC1-S
1.9686E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	nCC1-S
1.3336E-04	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	*CC1-S
1.4617E-05	TB-F-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	*CCSnS
7.0433E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
2.8201E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
2.1166E-04	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
2.3243E-05	TB-F-ER	CFD-LP	CLC-nnD	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
2.3795E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n4	*CC1-S
7.1385E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CC1-S
2.3795E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
7.1385E-05	TB-F-ER	CFD-LP	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
2.5366E-05	TB-F-ER	CFD-LT	CLC-DDD	CLC-223	CD-IHH	VBD-F-B	SPB-ny	RBB-34	*CC1-S
4.7590E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n4	*CC1-S
1.9055E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCC1-S
1.4302E-04	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CC1-S
1.5705E-05	TB-F-ER	CFD-LV	CLC-nnW	CLV-003	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CCSnS
2.0431E-04	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
2.2435E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
2.2684E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCC1-S
2.2662E-05	TB-F-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n3	*CC1-S
5.1036E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-IHH	VBD-F-B	SPB-ny	RBB-44	*CC1-S
4.6576E-04	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-IHH	VBD-F-B	SPB-ny	RBB-34	*CC1-S
5.0935E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-IHH	VBD-F-B	SPB-ny	RBB-34	*CCSnS
5.1547E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-IHH	VBD-F-B	SPB-ny	RBB-33	nCC1-S
5.1450E-05	TB-F-ER	CFD-LV	CLC-DDD	CLC-223	CD-IHH	VBD-F-B	SPB-ny	RBB-33	*CC1-S
6.6691E-02	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-nn	RBB-nn	nCC1-S
7.4099E-03	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-nn	RBB-nn	nCCInS
1.3352E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-ny	RBB-nn	nCC1-S
1.4820E-05	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-ny	RBB-nn	nCCInS
1.9074E-03	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-F	SPB-nn	RBB-nn	nCC1-S
2.0977E-04	TB-F-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-F	SPB-nn	RBB-nn	nCCInS
9.3797E-04	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
1.0273E-04	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
9.6037E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCC1-S
1.0564E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCInS
9.5941E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	*CC1-S
1.0268E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n3	*CCSnS
1.4529E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
2.1923E-04	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CC1-S

TABLE 3.8
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2.3880E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
1.4529E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-nn	nCC1-S
3.3549E-05	TB-F-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-S	SPB-ny	RBB-n4	*CC1-S
4.7590E-05	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-nn	RBB-n4	*CC1-S
1.4277E-04	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CC1-S
1.5280E-05	TB-F-ER	CFD-n	CLC-nnW	CLV-002	CD-ILM	VBD-F	SPB-nn	RBB-n2	*CCSnS
7.1958E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-IHH	VBD-F	SPB-ny	RBB-n4	*CC1-S
8.7956E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-IHH	VBD-F	SPB-ny	RBB-n3	nCC1-S
2.0466E-03	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
2.2499E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
2.4977E-03	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCC1-S
2.7468E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCC1nS
2.2701E-04	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	*CC1-S
2.4928E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	*CCSnS
7.3416E-05	TB-F-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-S	SPB-ny	RBB-n4	*CC1-S
5.6334E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-44	nCC1-S
6.1759E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-44	nCC1nS
5.1447E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-44	*CC1-S
5.6276E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-44	*CCSnS
4.6877E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-34	*CC1-S
5.1479E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-34	*CCSnS
5.7012E-03	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-33	nCC1-S
6.2646E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-33	nCC1nS
5.1999E-04	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-33	*CC1-S
5.6731E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-ny	RBB-33	*CCSnS
1.5283E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-S-B	SPB-ny	RBB-34	*CC1-S
3.1735E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-DH-B	SPB-ny	RBB-34	*CC1-S
3.8640E-05	TB-F-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-DH-B	SPB-ny	RBB-33	nCC1-S
3.1105E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	nCC1-S
2.3241E-05	TB-F-LR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	*CC1-S
1.3096E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
1.4405E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
2.9102E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCC1
5.2383E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
5.7621E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCC1nS
3.9287E-02	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
4.3216E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
8.7305E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCC1
2.6244E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	*CC1-S
1.0498E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	nCC1-S
1.1547E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	nCC1nS
7.8732E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	*CC1-S
2.5927E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	*CC1-S
2.8520E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	*CCSnS
1.1523E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	nCC1-S
1.2675E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	nCC1nS
7.7781E-03	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	*CC1-S
8.5559E-04	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	*CCSnS
1.5587E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n2	*CC1-S
2.9050E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	nCC1-S
2.1787E-05	TB-F-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	*CC1-S
1.9382E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
2.1320E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
7.7527E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
5.8145E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
6.3960E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
3.8372E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	*CC1-S
1.1512E-04	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	*CC1-S
1.2663E-05	TB-F-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	*CCSnS
6.5479E-05	TB-F-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	*CC1-S

TABLE 3.8
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4.6192E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCC1-S
1.9644E-04	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	*CC1-S
2.1608E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	*CCSnS
6.5479E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
2.6192E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
1.9644E-04	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
2.1608E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
1.2964E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n4	*CC1-S
3.8891E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n2	*CC1-S
1.2964E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	*CC1-S
3.8891E-05	TB-F-LR	CFD-LP	CLC-nnn	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	*CC1-S
2.1626E-05	TB-F-LR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
1.3096E-04	TB-F-LR	CFD-LV	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	*CC1-S
1.4405E-05	TB-F-LR	CFD-LV	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	*CCSnS
5.2383E-05	TB-F-LR	CFD-LV	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCC1-S
3.9287E-04	TB-F-LR	CFD-LV	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	*CC1-S
4.3216E-05	TB-F-LR	CFD-LV	CLC-nnn	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	*CCSnS
2.5927E-05	TB-F-LR	CFD-LV	CLC-nnn	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n4	*CC1-S
7.7781E-05	TB-F-LR	CFD-LV	CLC-nnn	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n2	*CC1-S
5.2383E-03	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCC1-S
5.7621E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCCInS
1.0498E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-F-B	SPB-ny	RBB-nn	nCC1-S
1.1523E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-S	SPB-nn	RBB-nn	nCC1-S
1.2675E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-S	SPB-nn	RBB-nn	nCCInS
2.5772E-03	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
2.8341E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	*CCSnS
2.6401E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	nCC1-S
2.9041E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	nCCInS
2.6401E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	*CC1-S
2.9041E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	*CCSnS
4.0219E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCC1-S
6.0328E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CC1-S
6.6361E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CCSnS
4.0219E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-nn	nCC1-S
5.1009E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	*CC1-S
5.5967E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	*CCSnS
5.2269E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n3	*CC1-S
1.1944E-04	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	*CC1-S
1.3091E-05	TB-F-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	*CCSnS
1.3096E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	*CC1-S
1.4405E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	*CCSnS
2.6192E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCC1-S
3.9287E-04	TB-F-LR	CFD-n	CLC-nnn	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	*CC1-S
4.3216E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	*CCSnS
2.6192E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCC1-S
2.5927E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n4	*CC1-S
7.7781E-05	TB-F-LR	CFD-n	CLC-nnn	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n2	*CC1-S
3.4568E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n4	DCC1
9.2257E-05	TB-F-nR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	DCC1
5.1736E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCC1
1.5521E-01	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCC1
1.0368E-04	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	DCC1
3.1104E-04	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	DCC1
5.6904E-03	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCC1
1.7071E-02	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCC1
1.1404E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n4	DCC1
3.4211E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n2	DCC1
2.8691E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n4	DCC1
8.6073E-05	TB-F-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	DCC1
5.1047E-04	TB-F-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCC1

TABLE 3.8
(8 of 9)

2.8742E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPb-nn	RBB-n2	DCC1
8.6227E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPb-ny	RBB-n4	DCC1
2.8742E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPb-ny	RBB-n2	DCC1
8.6227E-05	TB-F-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPb-ny	RBB-n4	DCC1
1.4371E-03	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPb-ny	RBB-n2	DCC1
4.3114E-03	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPb-ny	RBB-n4	DCC1
1.5807E-04	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCC1
4.7420E-04	TB-F-nR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCC1
8.2056E-03	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCC1
5.9534E-04	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	DCC1
5.8428E-03	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCC1
1.6444E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	DCC1
1.1709E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	DCC1
9.0253E-04	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCC1
7.6479E-05	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n3	DCC1
6.4264E-04	TB-F-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCC1
5.7485E-05	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	DCC1
1.7245E-04	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	DCC1
1.8968E-05	TB-F-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n2	DCC1

TABLE 3.8
(9 of 9)

9.9819E-01 TOTAL FREQUENCY OF BINS PRINTED

TOTAL FREQUENCY IN ALL BINS = 1.0000E+00
TOTAL FREQUENCY LOST DUE TO TERMINATION OF BRANCHES 4.0404E-04
TOTAL FREQUENCY FOR THIS SEQUENCE/WALKTHROUGH = 1.0004E+00

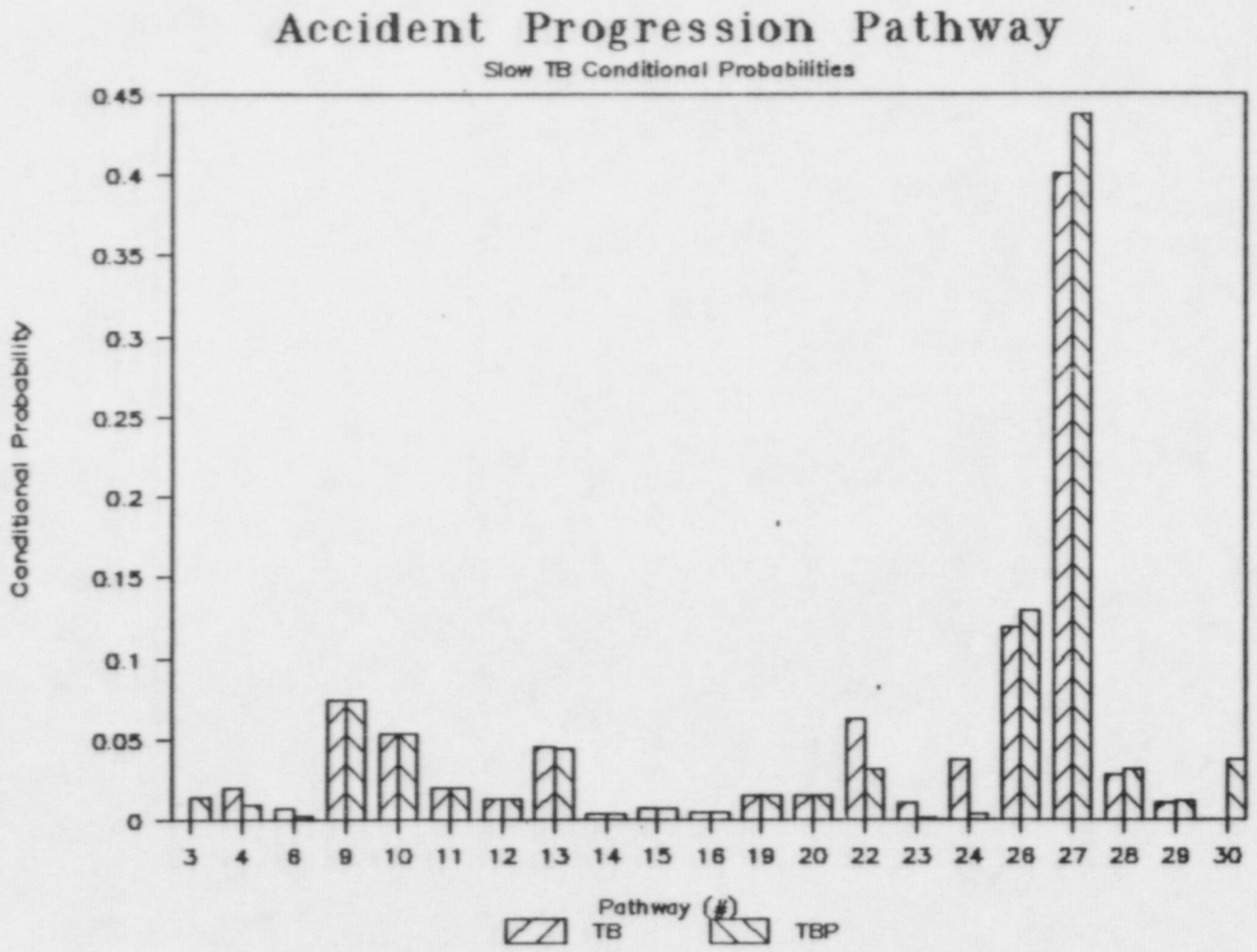

FIGURE 3.2 Conditional Accident Progression Pathway Probabilities for Slow TB Sequences

melt-through at vessel breach which is estimated to occur with a probability of approximately 0.5 for TB and TBP. The specific pathway most likely to occur involving this mode of failure of the containment is a drywell wall melt-through with no venting and no recovery or injection to assist in mitigating the accident. Such a pathway is estimated at approximately 0.4 for for both cut set groups.

As also for the previous cut set groups, successful venting of the containment before or during core melt makes up the next single most important containment response characteristic. This is expected to occur with a probability of approximately 0.2 for both TB and TBP. The two most important pathways associated with successful venting are no vessel breach due to recovery of power and cooling systems (~0.07 probability) and drywell wall melt-through at vessel breach (~0.05 probability) for both cut set groups.

While there is approximately a 0.04 probability associated with no containment leak or vessel breach due to successful recovery actions for TBP, a negligible probability is estimated for this scenario in the TB case. The remaining probability in both groups is made up primarily of drywell ruptures early or at vessel breach or late drywell leaks. Of this remaining probability, there is approximately an additional 3-5% chance of no vessel breach due to successful recovery even through containment does experience some form of failure.

Not shown in Table 3.1 but indicated by the complete results is the fact that the reactor building response for TB and TBP is similar to that indicated by the other cut set groups. An approximately 65% chance exists that only the blowout panels will be opened, about a 10% chance exists that an early major failure of the reactor building will occur, and about a 25-30% chance exists that an early or late major failure will occur.

Significant core-concrete interactions are expected in these longer term sequences approximately 70% of the time for both cut set groups. For about three-fourths of the accident progression bins involving core-concrete interactions, these are expected to occur under dry conditions.

If one considers the optimistic evaluation shown in Table 3.2, the tendency is for no containment leak in about 40% of the cases for both cut set groups with vessel breach still possible in a significant fraction of the TB cases. Venting with no vessel breach or just late leaks of the drywell or wetwell collectively contribute nearly 50% to the possible outcomes for both TB and TBP.

If one considers the pessimistic evaluation shown in Table 3.3, outcomes involving drywell rupture at vessel breach with or without direct heating are estimated at probabilities of about 0.3 for TB and 0.6 for TBP. Early drywell leaks with subsequent larger failures of the drywell (due to drywell wall melt-through or rupture failures) also increase to probabilities of approximately 0.25 for TB and 0.3 for TBP.

Table 3.5 provides a key for understanding the central estimate detailed accident progression results for each cut set group presented in Tables 3.9 and 3.10. In each case, the conditional probability for each accident progression outcome is shown (represented by the column labeled "FREQUENCY").

3.3 Cut Set Groups TCSX/TCUX

As explained earlier, these two cut set groups have been combined into one group for purposes of the analysis due to similar characteristics. They both involve an ATWS with relatively early failure of HPCI, followed by failure of timely depressurization.

From Table 3.1 and Figure 3.3 using the key in Table 3.4, the largest single containment response characteristic involves a nearly 0.5 probability of successful venting before or during core melt. Among the successful venting scenarios, the two most dominant pathways include drywell wall melt-through at vessel breach (~0.17 probability) and no vessel breach due to recovery of the accident (~0.12 probability) by performing late depressurization followed by successful low pressure cooling.

Early drywell ruptures occur approximately 20% of the time and early drywell leaks about 15% of the time. About two-thirds of the drywell leak scenarios lead to drywell ruptures at vessel breach.

The remaining probability is made up primarily of early wetwell ruptures. In total, it is estimated that vessel breach can be avoided due to recovery of core cooling with about a 25% chance.

Not shown in the table but indicated by the complete results is the fact that there is nearly a 60% chance that only the blowout panels of the reactor building are affected. There is an estimated 20% chance of an early large failure of the building and a greater than 30% chance that an early or late major failure of the reactor building will occur.

There is an approximate 60% chance of no significant core-concrete interaction and a greater than 30% chance of a wet interaction due to high likelihood of successful spray operation.

If one considers the optimistic evaluation shown in Table 3.2, the tendency is for successful venting and core cooling recovery leading to no vessel breach with a greater than 0.7 probability. No containment leak and no vessel breach is estimated at a probability of about 0.08.

The pessimistic evaluation shown in Table 3.3 shows a high tendency (~0.8 probability) for an early drywell leak followed by drywell rupture at vessel breach.

PEACH BOTTOM EVENT TREE TB

PEACH BOTTOM ACCIDENT PROGRESSION

TABLE 3.9 (1 of 13)

THESE RESULTS ARE FOR THE TB -cen WALKTHROUGH

FREQUENCY	Seq	CF-Dyn	CL-Loc	CL-Lev	Degr	VBD	SPB	RBB-Lev	CCI
1.0665E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
1.1399E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCInS
3.3793E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
3.6119E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
2.4004E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-44	nCCI-S
2.6614E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-44	nCCInS
7.6013E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCCI-S
8.4279E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCCInS
5.3258E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
5.5993E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
5.3258E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCI-S
5.5993E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCSnS
4.2124E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CCI-S
4.4328E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CCSnS
1.6885E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.7627E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.2655E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCI-S
1.3298E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCSnS
1.1956E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCI-S
1.3085E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCInS
1.1986E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	*CCI-S
1.3065E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	*CCSnS
9.4890E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	*CCI-S
1.0343E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	*CCSnS
3.8003E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCI-S
4.1710E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCInS
2.8494E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	*CCI-S
3.1211E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	*CCSnS
1.8509E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	*CCI-S
1.4069E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-24	*CCI-S
4.4712E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	*CCI-S
4.2754E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-44	*CCI-S
3.3262E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-24	*CCI-S
1.4177E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	nCCI-S
1.0154E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	*CCI-S
1.0526E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	*CCSnS
7.6189E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
7.6189E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	*CCI-S
6.0316E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	*CCI-S
2.4265E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
2.5593E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
1.8199E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	*CCI-S
1.9194E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	*CCSnS
1.7231E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	nCCI-S
1.8858E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	nCCInS
1.7231E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	*CCI-S
1.8858E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-44	*CCSnS
1.3644E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-24	*CCI-S
1.4929E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-24	*CCSnS
5.4611E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	nCCI-S
5.9716E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	nCCInS

4.0958E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	*CCI-S
4.4787E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	*CCSnS
8.4649E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
8.4649E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCSnS
6.7014E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CCSnS
2.6982E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
2.0236E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCSnS
1.9254E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCInS
1.9254E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	*CCSnS
1.5242E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	*CCSnS
6.0970E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCInS
4.5727E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	*CCSnS
1.4656E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-vy	RBB-22	*CCI-S
1.6349E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S-B	SPB-vy	RBB-22	*CCSnS
2.1696E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
6.9158E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
4.9114E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-44	nCCI-S
1.5609E-04	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCCI-S
1.7281E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCCInS
1.0035E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
2.3329E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	nCCI-S
1.7497E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-vy	RBB-22	*CCI-S
1.9706E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
2.1049E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
6.2481E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
6.6054E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
2.4590E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCInS
7.7937E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
4.4319E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-44	nCCI-S
4.9114E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-44	nCCInS
1.4059E-03	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCCI-S
1.5595E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vn	RBB-22	nCCInS
5.5566E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-44	nCCInS
1.9895E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCCI-S
1.7616E-03	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-vy	RBB-22	nCCInS
2.9289E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCI-S
2.9289E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	*CCI-S
2.3187E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	*CCI-S
9.3364E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
7.0023E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	*CCI-S
6.6304E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	nCCI-S
6.6304E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-44	*CCI-S
5.2490E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-24	*CCI-S
2.1072E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	nCCI-S
2.3096E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	nCCInS
1.5804E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	*CCI-S
1.7322E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-vn	RBB-22	*CCSnS
3.5990E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
3.5990E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	*CCSnS
2.8492E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	*CCSnS
1.1547E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
8.6161E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	*CCSnS
6.1959E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	nCCInS
8.1959E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-44	*CCSnS
6.4884E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-24	*CCSnS
2.6130E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	nCCInS
1.9597E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-vy	RBB-22	*CCSnS
8.5201E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
8.9850E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
8.5201E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	*CCI-S

TABLE 3.9
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8.9850E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	*CCSnS
6.7479E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	*CCI-S
7.1131E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	*CCSnS
2.7006E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
2.8568E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
2.0249E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	*CCI-S
2.1339E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	*CCSnS
1.9161E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCI-S
2.0965E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCInS
1.9161E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	*CCI-S
2.0965E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	*CCSnS
1.5176E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	*CCI-S
1.6597E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	*CCSnS
6.0739E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCI-S
6.6702E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCInS
4.5555E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	*CCI-S
5.0026E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	*CCSnS
1.1038E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.1038E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	*CCI-S
3.6889E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
2.7666E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	*CCI-S
2.7075E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-44	nCCI-S
2.7075E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-44	*CCI-S
2.1434E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-24	*CCI-S
6.5738E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	nCCI-S
6.4303E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	*CCI-S
3.0218E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	*CCI-S
2.2787E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	*CCI-S
1.0127E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCCI-S
7.2412E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	*CCI-S
6.8606E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-44	*CCI-S
5.4313E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-24	*CCI-S
2.2962E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	nCCI-S
1.6307E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	*CCI-S
1.7049E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	*CCSnS
6.5950E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
9.0670E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
6.5950E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	*CCI-S
9.0670E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	*CCSnS
6.8072E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	*CCI-S
7.1781E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	*CCSnS
2.7244E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
2.8828E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
2.0427E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	*CCI-S
2.1534E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	*CCSnS
1.9336E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCI-S
2.1156E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCInS
1.9336E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	*CCI-S
2.1156E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	*CCSnS
1.5315E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	*CCI-S
1.6749E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	*CCSnS
6.1294E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCI-S
6.7310E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCInS
4.5970E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	*CCI-S
5.0483E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	*CCSnS
1.3267E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
3.0621E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	nCCI-S
2.2966E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	*CCI-S
3.0486E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	*CCI-S
2.2989E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	*CCI-S

TABLE 3.9
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1.0217E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCCI-S
7.3049E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
6.9232E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-44	WCCI-S
5.4809E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-24	WCCI-S
2.3171E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	nCCI-S
1.6456E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	WCCI-S
1.7205E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-vy	RBB-22	WCCSnS
2.4324E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
2.6001E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
7.7145E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
8.2337E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.0242E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
5.4746E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCI-S
6.0669E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCInS
1.7348E-03	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCI-S
1.9212E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCInS
2.4563E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCI-S
3.6419E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
3.6419E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.8642E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.1543E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.1897E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
6.6496E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
8.1903E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCI-S
8.1903E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	WCCI-S
6.4840E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	WCCI-S
2.5998E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCI-S
2.8530E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCInS
1.9470E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCI-S
2.0819E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCSnS
2.4538E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
2.6238E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
7.7823E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
8.3088E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
5.5246E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCI-S
6.1223E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCInS
1.7507E-03	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCI-S
1.9387E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCInS
3.6740E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
3.6740E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.8896E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.1644E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.2005E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
8.7257E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
8.2651E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCI-S
8.2651E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	WCCI-S
6.5432E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	WCCI-S
2.6235E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCI-S
2.8790E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCInS
1.9647E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCI-S
2.1009E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCSnS
2.1919E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
2.3424E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
6.9473E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
7.4267E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
3.0048E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
9.5153E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.0242E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
4.9294E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCI-S
5.4697E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCInS

TABLE 3.9
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1.5620E-02	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VN	RBB-22	NCCI-S
1.7329E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VN	RBB-22	NCCINS
6.9810E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VY	RBB-44	NCCI-S
2.2165E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VY	RBB-22	NCCI-S
2.4563E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VY	RBB-22	NCCINS
3.2873E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-44	NCCI-S
3.4750E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-44	NCCINS
3.2873E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-44	*CCI-S
3.4750E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-44	*CCSNS
2.6009E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-24	*CCI-S
2.7511E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-24	*CCSNS
1.0417E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-22	NCCI-S
1.1004E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-22	NCCINS
7.8109E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-22	*CCI-S
8.2532E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-22	*CCSNS
7.3908E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-44	NCCI-S
8.1084E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-44	NCCINS
7.3908E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-44	*CCI-S
8.1084E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-44	*CCSNS
5.8538E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-24	*CCI-S
6.4192E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-24	*CCSNS
2.3424E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-22	NCCI-S
2.5715E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-22	NCCINS
1.7565E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-22	*CCI-S
1.9257E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-22	*CCSNS
1.4211E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-NY	RBB-22	NCCI-S
1.0370E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-NY	RBB-22	*CCI-S
1.0189E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-VY	RBB-44	NCCI-S
1.0189E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-VY	RBB-44	*CCI-S
3.3160E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-VY	RBB-22	NCCI-S
2.4870E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-VY	RBB-22	*CCI-S
1.1414E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-NN	RBB-44	*CCI-S
2.7837E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-NN	RBB-22	*CCI-S
2.6534E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-VN	RBB-44	*CCI-S
2.0438E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-VN	RBB-24	*CCI-S
6.3018E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-VN	RBB-22	*CCI-S
2.2112E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-NN	RBB-44	NCCI-S
2.3638E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-NN	RBB-44	NCCINS
7.0084E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-NN	RBB-22	NCCI-S
7.4945E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-NN	RBB-22	NCCINS
1.0526E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-NY	RBB-44	NCCI-S
3.4247E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-NY	RBB-22	NCCI-S
4.9744E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VN	RBB-44	NCCI-S
5.5196E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VN	RBB-44	NCCINS
1.5762E-02	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VN	RBB-22	NCCI-S
1.7487E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VN	RBB-22	NCCINS
2.4932E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VY	RBB-44	NCCI-S
7.8952E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-NB	SPB-VY	RBB-22	NCCI-S
3.3162E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-44	NCCI-S
3.5068E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-44	NCCINS
3.3162E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-44	*CCI-S
3.5068E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-44	*CCSNS
2.6237E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-24	*CCI-S
2.7762E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-24	*CCSNS
1.0508E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-22	NCCI-S
1.1105E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-22	NCCINS
7.8796E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-22	*CCI-S
8.3285E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-NN	RBB-22	*CCSNS
7.4582E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-44	NCCI-S
8.1824E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-VN	RBB-44	NCCINS

TABLE 3.9
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SPB-vn	RBB-44	*CCSnS
8.1824E-05	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-24	*CCI-S
5.9073E-04	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-24	*CCSnS
6.4778E-05	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	nCCI-S
2.3638E-03	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	nCCInS
2.5949E-04	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	*CCI-S
1.7725E-03	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	*CCSnS
1.9433E-04	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	nCCI-S
1.1843E-05	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	*CCI-S
1.1515E-05	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-44	*CCI-S
2.8084E-05	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	*CCI-S
2.6776E-05	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-S	SPB-vn	RBB-44	*CCI-S
2.0625E-05	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-S	SPB-vn	RBB-24	*CCI-S
6.3593E-05	TB-S-ER	CFD-E4V	CLC-***	CLV-333	CD-ILM	VBD-S	SPB-vn	RBB-22	*CCI-S
2.1555E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n4	*CCI-S
2.2801E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n4	*CCSnS
8.6264E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	nCCI-S
9.1364E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	nCCInS
6.4696E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	*CCI-S
6.8523E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	*CCSnS
1.2432E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	DCCI
4.8502E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n4	*CCI-S
5.3296E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n4	*CCSnS
1.9402E-02	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	nCCI-S
2.1334E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	nCCInS
1.4551E-02	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	*CCI-S
1.5996E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	*CCSnS
2.9974E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	DCCI
4.1622E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F-B	SPB-ny	RBB-n2	nCCI-S
3.0712E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F-B	SPB-ny	RBB-n2	*CCI-S
2.3078E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F-B	SPB-vy	RBB-n4	*CCI-S
9.6237E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F-B	SPB-vy	RBB-n2	nCCI-S
7.2178E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-F-B	SPB-vy	RBB-n2	*CCI-S
2.0696E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-S	SPB-ny	RBB-n2	*CCI-S
1.5329E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-S	SPB-vy	RBB-n4	*CCI-S
4.9167E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-S	SPB-vy	RBB-n2	*CCI-S
1.7408E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-DH	SPB-ny	RBB-n4	*CCI-S
6.9176E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-DH	SPB-ny	RBB-n2	nCCI-S
5.1798E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-DH	SPB-ny	RBB-n2	*CCI-S
4.1415E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-DH	SPB-vy	RBB-n4	*CCI-S
1.5860E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-DH	SPB-vy	RBB-n2	nCCI-S
1.6306E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-DH	SPB-vy	RBB-n2	nCCInS
1.1876E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-DH	SPB-vy	RBB-n2	*CCI-S
1.2229E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-IHM	VBD-DH	SPB-vy	RBB-n2	*CCSnS
1.0592E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-vy	RBB-n2	nCCI-S
1.4620E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n4	*CCI-S
6.0792E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	nCCI-S
4.5116E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	*CCI-S
3.3485E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n4	*CCI-S
1.3766E-04	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	nCCI-S
1.4733E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	nCCInS
1.0325E-04	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	*CCI-S
1.1050E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	*CCSnS
6.8661E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-IHM	VBD-F	SPB-nn	RBB-n4	*CCI-S
2.7574E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-IHM	VBD-F	SPB-nn	RBB-n2	nCCI-S
2.9204E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-IHM	VBD-F	SPB-nn	RBB-n2	nCCInS
2.0664E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-IHM	VBD-F	SPB-nn	RBB-n2	*CCI-S
2.1666E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-IHM	VBD-F	SPB-nn	RBB-n2	*CCSnS
6.8661E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n4	*CCI-S
2.7574E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	nCCI-S

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2.9204E-05	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	nCCIns
2.0664E-04	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	*CCI-S
2.1066E-05	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-ny	RBB-n2	*CCSnS
1.5467E-04	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vn	RBB-n4	*CCI-S
1.6575E-05	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vn	RBB-n4	*CCSnS
6.2054E-04	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vn	RBB-n2	nCCI-S
6.8142E-05	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vn	RBB-n2	nCCInS
4.6541E-04	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vn	RBB-n2	*CCI-S
5.1106E-05	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vn	RBB-n2	*CCSnS
1.5487E-04	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n4	*CCI-S
1.6575E-05	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n4	*CCSnS
6.2054E-04	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	nCCI-S
6.8142E-05	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	nCCInS
4.6541E-04	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	*CCI-S
5.1106E-05	TB-S-ER	CFD-IP	CLC-nww	CLV-033	CD-IHM	VBD-F	SPB-vy	RBB-n2	*CCSnS
3.2006E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
3.1885E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-44	nCCInS
3.2006E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-44	*CCI-S
3.1885E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-44	*CCSnS
1.8817E-03	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-34	*CCI-S
1.9810E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-34	*CCSnS
9.0371E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-24	*CCI-S
2.0915E-03	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-33	nCCI-S
2.2053E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-33	nCCInS
2.0734E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-33	*CCI-S
2.1252E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-33	*CCSnS
3.6996E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
3.7096E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-22	nCCInS
2.7747E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-22	*CCI-S
2.7822E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-ny	RBB-22	*CCSnS
7.2896E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-44	nCCI-S
7.8091E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-44	nCCInS
7.2896E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-44	*CCI-S
7.8091E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-44	*CCSnS
4.2382E-03	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-34	*CCI-S
4.6541E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-34	*CCSnS
2.0874E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-24	*CCI-S
2.0840E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-24	*CCSnS
4.7091E-03	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-33	nCCI-S
5.1713E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-33	nCCInS
4.7012E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-33	*CCI-S
5.1125E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-33	*CCSnS
8.3970E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-22	nCCI-S
9.0260E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-22	nCCInS
6.2825E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-22	*CCI-S
6.6584E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-F-B	SPB-vy	RBB-22	*CCSnS
1.3397E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-S-B	SPB-vy	RBB-34	*CCI-S
1.4696E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-34	*CCI-S
1.6979E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-ny	RBB-33	nCCI-S
3.5975E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-vy	RBB-34	*CCI-S
3.9972E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-IHH	VBD-DH-B	SPB-vy	RBB-33	nCCI-S
1.6979E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-24	*CCI-S
1.4560E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n4	*CCI-S
7.3927E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	nCCI-S
5.5446E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-22	*CCI-S
6.1226E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	nCCI-S
4.5920E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-ny	RBB-n2	*CCI-S
4.0747E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-vy	RBB-24	*CCI-S
3.5715E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-vy	RBB-n4	*CCI-S
1.6581E-04	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-IHH	VBD-F	SPB-vy	RBB-22	nCCI-S

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2.1312E-05	TB-S-ER	CFD-n	CLC-[illegible]	[illegible]	[illegible]	[illegible]	SPB-vy	RBB-44	nCCInS
1.7983E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-vy	RBB-44	*CCI-S
1.9360E-05	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-vy	RBB-44	*CCSnS
1.6423E-03	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-vy	RBB-34	*CCI-S
1.7945E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-vy	RBB-34	*CCSnS
1.9980E-03	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-vy	RBB-33	nCCI-S
2.1884E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-vy	RBB-33	nCCInS
1.8126E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-vy	RBB-33	*CCI-S
1.9360E-05	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-F-B	SPB-vy	RBB-33	*CCSnS
1.0667E-05	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-DH-B	SPB-vy	RBB-34	*CCI-S
1.3506E-05	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-IHH	VBD-DH-B	SPB-vy	RBB-33	nCCI-S
1.7325E-03	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-ny	RBB-44	nCCI-S
1.9057E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-ny	RBB-44	nCCInS
1.7325E-03	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-ny	RBB-44	*CCI-S
1.9057E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-ny	RBB-44	*CCSnS
4.0446E-03	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-vy	RBB-44	nCCI-S
4.4683E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-vy	RBB-44	nCCInS
4.0446E-03	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-vy	RBB-44	*CCI-S
4.4683E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-vy	RBB-44	*CCSnS
2.0233E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F-B	SPB-vy	RBB-44	nCCI-S
2.0233E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F-B	SPB-vy	RBB-44	*CCI-S
6.6884E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-S	SPB-ny	RBB-44	*CCI-S
1.7167E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-S	SPB-vy	RBB-44	nCCI-S
1.5606E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-S	SPB-vy	RBB-44	*CCI-S
1.6995E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-S	SPB-vy	RBB-44	*CCSnS
3.2505E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	nCCI-S
3.2180E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	nCCInS
3.2505E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	*CCI-S
3.2180E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	*CCSnS
1.9250E-05	TB-S-LR	CFD-E4V	CLC-WWD	CLV-333	CD-nIHM	VBD-F	SPB-ny	RBB-44	nCCI-S
1.9250E-05	TB-S-LR	CFD-E4V	CLC-WWD	CLV-333	CD-nIHM	VBD-F	SPB-ny	RBB-44	*CCI-S
4.4916E-05	TB-S-LR	CFD-E4V	CLC-WWD	CLV-333	CD-nIHM	VBD-F	SPB-vy	RBB-44	nCCI-S
4.4916E-05	TB-S-LR	CFD-E4V	CLC-WWD	CLV-333	CD-nIHM	VBD-F	SPB-vy	RBB-44	*CCI-S
1.7325E-04	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-nn	RBB-44	nCCI-S
1.9057E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-nn	RBB-44	nCCInS
1.7325E-04	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-nn	RBB-44	*CCI-S
1.9057E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-nn	RBB-44	*CCSnS
4.0438E-04	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-vn	RBB-44	nCCI-S
4.4602E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-vn	RBB-44	nCCInS
4.0438E-04	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-vn	RBB-44	*CCI-S
4.4602E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-vn	RBB-44	*CCSnS
1.1605E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-S	SPB-vn	RBB-44	*CCI-S
2.1875E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCCI-S
1.6311E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	*CCI-S
2.0356E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n4	*CCI-S
8.2490E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	nCCI-S
6.1868E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	*CCI-S
4.7944E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n4	*CCI-S
1.9248E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	nCCI-S
2.0899E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	nCCInS
1.4436E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	*CCI-S
1.5584E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	*CCSnS
3.8379E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	*CCI-S
4.1972E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	*CCSnS
1.5223E-03	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCCI-S
1.6753E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCCInS
1.1395E-03	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	*CCI-S
1.2539E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	*CCSnS
8.9577E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	*CCI-S
9.8508E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	*CCSnS

TABLE 3.9
(9 of 13)

1.0656E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n3	nCCi-S
3.5528E-03	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VbD-DH	SPb-vy	RBB-n2	nCCi-S
3.9201E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VbD-DH	SPb-vy	Rbb-n2	nCCins
2.6595E-03	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VbD-DH	SPB-vy	RbB-n2	*CCi-S
2.9354E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VbD-DH	SPb-vy	RBB-n2	*CCSnS
1.7668E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-vy	RBB-n2	nCCi-S
1.3251E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VbD-DH-B	SPb-vy	RbB-n2	*CCi-S
1.3600E-05	TB-S-LR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vn	RBB-n2	nCCi-S
1.0200E-05	TB-S-LR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VbD-DH	SPb-vn	Rbb-n2	*CCi-S
1.3600E-05	TB-S-LR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VbD-DH	SPb-vy	Rbb-n2	nCCi-S
1.0200E-05	TB-S-LR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RbB-n2	*CCi-S
1.6542E-04	TB-S-LR	CFD-IP	CLC-*DD	CLV-333	CD-nIHM	VBD-DH	SPB-ny	RBB-44	nCCi-S
1.7875E-05	TB-S-LR	CFD-IP	CLC-*DD	CLV-333	CD-nIHM	VBD-DH	SPb-ny	RBB-44	nCCins
1.6520E-04	TB-S-LR	CFD-IP	CLC-*DD	CLV-333	CD-nIHM	VBD-DH	SPb-ny	RBB-44	*CCi-S
1.7875E-05	TB-S-LR	CFD-IP	CLC-*DD	CLV-333	CD-nIHM	VBD-DH	SPB-ny	RBB-44	*CCSnS
3.8742E-04	TB-S-LR	CFD-IP	CLC-*DD	CLV-333	CD-nIHM	VbD-DH	SPb-vy	Rbb-44	nCCi-S
4.2495E-05	TB-S-LR	CFD-IP	CLC-*DD	CLV-333	CD-nIHM	VBD-DH	SPB-vy	RBB-44	nCCins
3.8690E-04	TB-S-LR	CFD-IP	CLC-*DD	CLV-333	CD-nIHM	VBD-DH	SPB-vy	RBB-44	*CCi-S
4.2495E-05	TB-S-LR	CFD-IP	CLC-*DD	CLV-333	CD-nIHM	VbD-DH	SPb-vy	RbB-44	*CCSnS
3.8952E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-F	SPB-ny	Rbb-n4	*CCi-S
4.3052E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-F	SPB-ny	RBB-n4	*CCSnS
1.5581E-02	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-F	SPb-ny	RBB-n2	nCCi-S
1.7225E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPb-ny	Rbb-n2	nCCins
1.1686E-02	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPb-ny	Rbb-n2	*CCi-S
1.2919E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPb-ny	RBB-n2	*CCSnS
2.5693E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	bCCi
9.1000E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-F	SPB-vy	RBB-n4	*CCi-S
1.0055E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n4	*CCSnS
2.0006E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPb-vy	RBB-n4	bCCi
3.6400E-02	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-F	SPB-vy	RBB-n2	nCCi-S
4.0220E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-F	SPB-vy	RBB-n2	nCCins
2.7300E-02	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-F	SPb-vy	RBB-n2	*CCi-S
3.0165E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-F	SPb-vy	RBB-n2	*CCSnS
6.0632E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	bCCi
1.5029E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-S	SPb-ny	RBB-n4	*CCi-S
1.6366E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPb-ny	RBB-n4	*CCSnS
6.6794E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPb-ny	RBB-n2	nCCi-S
4.5111E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPb-ny	RBB-n2	*CCi-S
4.9846E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPb-ny	RBB-n2	*CCSnS
3.5112E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-S	SPB-vy	RbB-n4	*CCi-S
3.8623E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPb-vy	RbB-n4	*CCSnS
1.5605E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPb-vy	RbB-n2	nCCi-S
1.6994E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPb-vy	RBB-n2	nCCins
1.0539E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VbD-S	SPb-vy	RBB-n2	*CCi-S
1.1640E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPb-vy	RBB-n2	*CCSnS
7.3136E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VbD-F	SPb-ny	RBB-n4	*CCi-S
7.2404E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VbD-F	SPb-ny	RBB-n4	*CCSnS
2.9254E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VbD-F	SPb-ny	RBB-n2	nCCi-S
2.8962E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPb-ny	RBB-n2	nCCins
2.1941E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	*CCi-S
2.1721E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VbD-F	SPb-ny	RBB-n2	*CCSnS
1.4479E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VbD-S	SPB-ny	RBB-n4	*CCi-S
1.4335E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VbD-S	SPB-ny	RBB-n4	*CCSnS
4.3438E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPb-ny	RbB-n2	*CCi-S
4.3004E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VbD-S	SPB-ny	RBB-n2	*CCSnS
5.7614E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RbB-n4	*CCi-S
2.3045E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPb-ny	RbB-n2	nCCi-S
1.7295E-04	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VbD-F	SPB-ny	RbB-n2	*CCi-S
1.9013E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	*CCSnS
1.3460E-04	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPb-vy	RBB-n4	*CCi-S

5.3842E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-Vy	RBB-n2	nCC1-S
4.0418E-04	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-Vy	RBB-n2	*CC1-S
4.4419E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-Vy	RBB-n2	*CCSnS
1.1592E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-Vy	RBB-n2	*CC1-S
1.9464E-05	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n4	*CC1-S
5.6392E-05	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	*CC1-S
1.9464E-05	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	*CC1-S
5.6392E-05	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	*CC1-S
4.5474E-05	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n4	*CC1-S
1.8190E-05	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	nCC1-S
1.3642E-04	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	*CC1-S
1.5007E-05	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	*CCSnS
4.5474E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	*CC1-S
1.8190E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	nCC1-S
1.3642E-04	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CC1-S
1.5007E-05	TB-S-LR	CFD-LP	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CCSnS
1.5159E-05	TB-S-LR	CFD-LI	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CC1-S
3.8928E-05	TB-S-LR	CFD-LV	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n4	*CC1-S
1.5571E-05	TB-S-LR	CFD-LV	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	nCC1-S
1.1678E-04	TB-S-LR	CFD-LV	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	*CC1-S
1.2846E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	*CCSnS
9.0949E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n4	*CC1-S
1.0004E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n4	*CCSnS
3.6379E-05	TB-S-LR	CFD-LV	CLC-nn*	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	nCC1-S
2.7299E-04	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	*CC1-S
3.0013E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	*CCSnS
1.5589E-03	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCC1-S
1.7140E-04	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCC1nS
3.6416E-03	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-vn	RBB-nn	nCC1nS
4.0058E-04	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-S	SPB-vn	RBB-nn	nCC1-S
1.1604E-05	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCC1-S
5.2658E-05	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-ny	RBB-n4	*CC1-S
7.6659E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	*CCSnS
8.4032E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	nCC1-S
7.8479E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	*CC1-S
7.8479E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCC1-S
1.1955E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n2	*CC1-S
1.7933E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	*CCSnS
1.9655E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-nn	nCC1-S
1.1955E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n4	*CC1-S
1.7914E-03	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n4	*CCSnS
1.9683E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	nCC1-S
1.8346E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	nCC1nS
2.0169E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	*CC1-S
1.8345E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	*CCSnS
2.0169E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n2	nCC1-S
2.7931E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CC1-S
4.1919E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n2	*CCSnS
4.5920E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-nn	nCC1-S
2.7931E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n4	*CC1-S
2.1765E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n4	*CC1-S
5.1116E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n4	*CC1-S
1.1862E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n2	*CC1-S
2.5639E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	*CC1-S
3.8928E-05	TB-S-LR	CFD-n	CLC-nn*	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n4	*CC1-S
1.1678E-04	TB-S-LR	CFD-n	CLC-nn*	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	*CC1-S
1.2846E-05	TB-S-LR	CFD-n	CLC-nn*	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	*CCSnS
9.0949E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n4	*CC1-S
1.0004E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n4	*CCSnS

TABLE 3.9
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1.8190E-05	TB-S-LR	CFD-n	CLC-nnn	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n2	nCC1-S
2.7285E-04	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n2	WCC1-S
3.0013E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-n2	WCCSnS
1.8190E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-vn	RBB-nn	nCC1-S
1.6766E-05	TB-S-LR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	WCC1-S
2.0629E-05	TB-S-LR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n3	nCC1-S
3.9380E-05	TB-S-LR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	WCC1-S
4.8133E-05	TB-S-LR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RBB-n3	nCC1-S
1.2889E-02	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-ny	RBB-44	DCCI
3.0105E-02	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F	SPB-vy	RBB-44	DCCI
6.4769E-05	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F-B	SPB-ny	RBB-44	DCCI
1.5113E-04	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-F-B	SPB-vy	RBB-44	DCCI
2.7644E-04	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-S	SPB-ny	RBB-44	DCCI
6.4556E-04	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-S	SPB-vy	RBB-44	DCCI
1.4198E-05	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nIHM	VBD-DH-B	SPB-vy	RBB-44	DCCI
4.3528E-04	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	DCCI
4.7876E-05	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-S	SPB-ny	RBB-44	DCCI
1.4321E-04	TB-S-nR	CFD-E4V	CLC-WWD	CLV-333	CD-nIHM	VBD-F	SPB-ny	RBB-44	DCCI
3.3436E-04	TB-S-nR	CFD-E4V	CLC-WWD	CLV-333	CD-nIHM	VBD-F	SPB-vy	RBB-44	DCCI
1.2889E-03	TB-S-nR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-nn	RBB-44	DCCI
3.0105E-03	TB-S-nR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F	SPB-vn	RBB-44	DCCI
1.5113E-05	TB-S-nR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-F-B	SPB-vy	RBB-44	DCCI
2.0556E-05	TB-S-nR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-S	SPB-nn	RBB-44	DCCI
4.7964E-05	TB-S-nR	CFD-E4V	CLC-WWW	CLV-333	CD-nIHM	VBD-S	SPB-vn	RBB-44	DCCI
4.3528E-05	TB-S-nR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-F	SPB-nn	RBB-44	DCCI
4.1029E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCCI
1.2371E-04	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI
1.5394E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCCI
1.5350E-04	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n4	DCCI
4.6077E-04	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	DCCI
3.5817E-04	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n4	DCCI
1.0754E-03	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	DCCI
2.2582E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-S-B	SPB-vy	RBB-n2	DCCI
2.8589E-03	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	DCCI
1.1140E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCCInS
8.4846E-03	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCCI
6.6700E-03	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	DCCI
2.6380E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	nCCInS
1.9797E-02	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	DCCI
1.4002E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-ny	RBB-n4	DCCI
4.2380E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-ny	RBB-n2	DCCI
3.2962E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-vy	RBB-n4	DCCI
9.9128E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-vy	RBB-n2	DCCI
1.9351E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-SE	SPB-ny	RBB-n2	DCCI
1.5654E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-SE	SPB-vy	RBB-n4	DCCI
4.5699E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-SE	SPB-vy	RBB-n2	DCCI
1.6863E-05	TB-S-nR	CFD-IP	CLC-nWD	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	DCCI
2.0402E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-F-B	SPB-vy	RBB-n2	DCCI
1.0841E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-nn	RBB-n4	DCCI
3.2522E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-nn	RBB-n2	DCCI
1.0841E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	DCCI
3.2522E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCCI
2.5295E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vn	RBB-n4	DCCI
7.6340E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vn	RBB-n2	DCCI
2.5295E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	DCCI
7.6340E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	DCCI
1.2333E-03	TB-S-nR	CFD-IP	CLC-WDD	CLV-333	CD-nIHM	VBD-DH	SPB-ny	RBB-44	DCCI
2.8812E-03	TB-S-nR	CFD-IP	CLC-WDD	CLV-333	CD-nIHM	VBD-DH	SPB-vy	RBB-44	DCCI
1.2491E-05	TB-S-nR	CFD-IP	CLC-WWD	CLV-333	CD-nIHM	VBD-DH	SPB-vy	RBB-44	DCCI
2.4090E-05	TB-S-nR	CFD-IP	CLC-WWW	CLV-333	CD-nIHM	VBD-DH	SPB-nn	RBB-44	DCCI

TABLE 3.9
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2.4090E-05	TB-S-nR	CFD-IP	CLC-WWW	CLV-333	CD-nIHM	VBD-DH	SPB-ny	RBB-44	DCC1
5.6548E-05	TB-S-nR	CFD-IP	CLC-WWW	CLV-333	CD-nIHM	VBD-DH	SPB-vn	RBB-44	DCC1
5.6548E-05	TB-S-nR	CFD-IP	CLC-WWW	CLV-333	CD-nIHM	VBD-DH	SPB-vy	RBB-44	DCC1
2.8994E-02	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
8.6981E-02	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
6.7731E-02	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
2.0319E-01	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
6.2172E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCC1
1.8652E-03	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCC1
1.4524E-03	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n4	DCC1
4.3580E-03	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-vy	RBB-n2	DCC1
9.7938E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCC1
2.9381E-03	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCC1
1.0772E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCC1
3.2316E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCC1
2.8575E-04	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
8.5821E-04	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
6.6828E-04	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
2.0048E-03	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
1.3672E-05	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCC1
1.0647E-05	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-vy	RBB-n4	DCC1
3.1942E-05	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-vy	RBB-n2	DCC1
2.0990E-05	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCC1
1.6069E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n4	DCC1
4.8268E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	DCC1
1.6089E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
4.8268E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
3.7590E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n4	DCC1
1.1277E-04	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vn	RBB-n2	DCC1
3.7590E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
1.1277E-04	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
8.0538E-04	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
2.4161E-03	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
1.8814E-03	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
5.6442E-03	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
1.2830E-05	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCC1
3.8490E-05	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCC1
2.9975E-05	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-vy	RBB-n4	DCC1
8.9925E-05	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-vy	RBB-n2	DCC1
2.7205E-05	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCC1
8.1615E-05	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCC1
2.8908E-05	TB-S-nR	CFD-LT	CLC-nDD	CLV-023	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCC1
2.2484E-05	TB-S-nR	CFD-LT	CLC-nDD	CLV-023	CD-nIHM	VBD-DH	SPB-vy	RBB-n4	DCC1
6.7858E-05	TB-S-nR	CFD-LT	CLC-nDD	CLV-023	CD-nIHM	VBD-DH	SPB-vy	RBB-n2	DCC1
4.5978E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCC1
3.8950E-04	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	DCC1
3.2740E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCC1
1.0742E-02	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n4	DCC1
9.1030E-04	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n3	DCC1
7.6491E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-vy	RBB-n2	DCC1
7.3115E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCC1
5.2162E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCC1
1.7115E-04	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n4	DCC1
1.4503E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n3	DCC1
1.2187E-04	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-vy	RBB-n2	DCC1
1.5533E-04	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCC1
1.3163E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	DCC1
1.1060E-04	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCC1
1.6979E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCC1
1.2165E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCC1

TABLE 3.9
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2.4785E-05	TB-S-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-F-B	SPB-ny	RbB-n4	DCC1
7.9433E-05	TB-S-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RbB-n4	DCC1
2.8908E-05	TB-S-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RbB-n4	DCC1
1.8534E-04	TB-S-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RbB-n2	DCC1
1.7987E-05	TB-S-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RbB-n4	DCC1
6.7858E-05	TB-S-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-vy	RbB-n3	DCC1
							SPB-vy	RbB-n2	DCC1

TABLE 3.9
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9.9650E-01 TOTAL FREQUENCY OF BINS PRINTED

TOTAL FREQUENCY IN ALL BINS = 1.0000E+00
TOTAL FREQUENCY LOST DUE TO TERMINATION OF BRANCHES 8.0468E-04
TOTAL FREQUENCY FOR THIS SEQUENCE/WALKTHROUGH = 1.0008E+00

PEACH BOTTOM EVENT TREE IBP

PEACH BOTTOM ACCIDENT PROGRESSION

TABLE 3.10 (1 of 9)

THESE RESULTS ARE FOR THE TBP -can WALKTHROUGH

FREQUENCY	Seq	CF-Dyn	CL-Loc	CL-Lev	Degr	VBD	SPB	RBB-Lev	CCI
3.4631E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
3.8413E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCInS
1.0968E-02	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.2181E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
1.7302E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.8945E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.7302E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.8945E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.3690E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCI-S
1.4904E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS
5.4832E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
6.0212E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
4.1120E-03	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S
4.5151E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS
6.1555E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-44	WCCI-S
4.8731E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-24	WCCI-S
2.1182E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	nCCI-S
1.4632E-04	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCI-S
1.4903E-05	TB-S-ER	CLD-E4P	CLC-DDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCSnS
2.5130E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
2.7404E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
2.5130E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
2.7404E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
1.9910E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
2.1695E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCSnS
7.9641E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
8.6781E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
5.9731E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
6.5085E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
2.7747E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
2.7747E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
2.1967E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS
8.7916E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
6.5900E-04	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.2584E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	DCCI
2.1299E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCI-S
2.3566E-05	TB-S-ER	CLD-E4P	CLC-WDD	CLV-333	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCSnS
7.1528E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
2.2766E-04	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.5167E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
1.0208E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
1.0208E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
3.3976E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
2.5482E-05	TB-S-ER	CLD-E4P	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
6.4648E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
7.1528E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
2.0505E-03	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.2766E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
8.0114E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCInS
2.8393E-03	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
9.6562E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCI-S

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TABLE 3.10 (2 of 9)

1.0106E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCInS
9.6562E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCI-S
1.0106E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCSnS
7.6445E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCI-S
3.0734E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
3.3636E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCInS
2.3051E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCI-S
2.5227E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCSnS
1.1884E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.1884E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
9.3650E-05	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS
3.7657E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS
2.8243E-04	TB-S-ER	CLD-E4P	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS
2.7951E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
3.0714E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
2.7951E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
3.0714E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
2.2127E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
2.4120E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCSnS
8.8594E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
9.7357E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
6.6445E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
7.3018E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
1.3547E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	DCCI
2.8307E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	PBB-22	nCCI-S
2.0195E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S
1.0266E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	nCCI-S
9.9700E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCI-S
1.0164E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCSnS
7.8929E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	WCCI-S
3.5079E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	nCCI-S
2.3679E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCI-S
2.4138E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCSnS
2.7976E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
3.0742E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
2.7976E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
3.0742E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
2.2146E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
2.4140E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCSnS
8.8674E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
9.7445E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
6.6505E-03	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
7.3083E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
1.3556E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F	SPB-ny	PBB-22	DCCI
2.0130E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.4515E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S
1.0273E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	nCCI-S
9.9786E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCI-S
1.0170E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-44	WCCSnS
7.8997E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-24	WCCI-S
3.5110E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	nCCI-S
2.3699E-04	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCI-S
2.4154E-05	TB-S-ER	CFD-E4V	CLC-WDD	CLV-333	CD-ILH	VBD-S	SPB-ny	RBB-22	WCCSnS
7.9858E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
8.8356E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
2.5307E-03	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.8092E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
1.1928E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
1.2484E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
1.1928E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S

TABLE 3.10
(3 of 9)

1.2484E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
9.4431E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
3.7949E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
4.1550E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
2.8443E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
3.1162E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
7.9930E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
8.8434E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
2.5330E-03	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.8117E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
1.1939E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCI-S
1.2493E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	nCCInS
1.1939E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCI-S
1.2493E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-44	WCCSnS
9.4514E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S
3.7983E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
4.1586E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS
2.8469E-04	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
3.1190E-05	TB-S-ER	CFD-E4V	CLC-WWD	CLV-333	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCSnS
7.1900E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
7.9858E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
2.2783E-02	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.5307E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
2.2776E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
7.2987E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.0781E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCI-S
1.1809E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCInS
1.0781E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCI-S
1.1809E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCSnS
8.5385E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCI-S
9.3486E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCSnS
3.4174E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
3.7570E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCInS
2.5623E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCI-S
2.8159E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCSnS
1.0652E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S
3.8643E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-44	WCCI-S
3.0592E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-24	WCCI-S
1.2937E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	nCCI-S
9.1777E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	WCCI-S
7.1965E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
7.9930E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCInS
2.2804E-02	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
2.5330E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
1.6469E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
5.2459E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.0791E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCI-S
1.1819E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	nCCInS
1.0791E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCI-S
1.1819E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-44	WCCSnS
8.5462E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCI-S
9.3569E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-24	WCCSnS
3.4205E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
3.7603E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCInS
2.5646E-03	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCI-S
2.8184E-04	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCSnS
3.8677E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-44	WCCI-S
3.0619E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-24	WCCI-S
1.2946E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	nCCI-S
9.1858E-05	TB-S-ER	CFD-E4V	CLC-WWW	CLV-333	CD-ILH	VBD-S	SPB-nn	RBB-22	WCCI-S

3.4867E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S	
3.8273E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS	
1.3949E-02	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S	
1.5338E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS	
1.0462E-02	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S	
1.1499E-03	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS	
2.1337E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	DCCI	
3.1370E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-ny	RBB-n2	nCCI-S	
2.3527E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-F-B	SPB-ny	RBB-n2	WCCI-S	
1.2434E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCCI-S	
1.2673E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCCSnS	TABLE 3.10
5.4570E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	nCCI-S	(4 of 9)
3.7573E-04	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	WCCI-S	
4.0518E-05	TB-S-ER	CFD-IP	CLC-nDD	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	WCCSnS	
2.4677E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S	
9.8706E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S	
1.0329E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS	
7.4030E-05	TB-S-ER	CFD-IP	CLC-nWD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S	
1.1145E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n4	WCCI-S	
1.1620E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n4	WCCSnS	
4.4607E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCCI-S	
4.8860E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	nCCInS	
3.3455E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCI-S	
3.6645E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-nn	RBB-n2	WCCSnS	
1.1145E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S	
1.1620E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS	
4.4607E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S	
4.8860E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCInS	
3.3455E-04	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S	
3.6645E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCSnS	
1.1407E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-S	SPB-nn	RBB-n2	WCCI-S	
1.1407E-05	TB-S-ER	CFD-IP	CLC-nWW	CLV-033	CD-ILM	VBD-S	SPB-ny	RBB-n2	WCCI-S	
5.2612E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S	
5.5945E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS	
5.2612E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S	
5.5945E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS	
3.0634E-03	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCI-S	
3.3614E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCSnS	
1.5042E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCI-S	
1.5334E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-24	WCCSnS	
3.4038E-03	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCI-S	
3.7349E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCInS	
3.3954E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCI-S	
3.6818E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCSnS	
6.0646E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCI-S	
6.4730E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	nCCInS	
4.5450E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCI-S	
4.8548E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-F-B	SPB-ny	RBB-22	WCCSnS	
1.6753E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-44	WCCI-S	
1.0866E-04	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-34	WCCI-S	
1.0981E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-34	WCCSnS	
1.2325E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-33	nCCI-S	
1.1092E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-33	WCCI-S	
1.5054E-05	TB-S-ER	CFD-IP	CLC-DDD	CLV-233	CD-ILH	VBD-S-B	SPB-ny	RBB-22	WCCI-S	
3.0043E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-24	WCCI-S	
2.5977E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n4	WCCI-S	
1.2017E-04	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S	
1.1744E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCInS	
9.0129E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S	
1.0391E-04	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCI-S	

1.0593E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCInS
7.7931E-05	TB-S-ER	CFD-IP	CLC-WDD	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	WCCI-S
2.3373E-05	TB-S-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-22	nCCI-S
1.6785E-05	TB-S-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-22	WCCI-S
2.0137E-05	TB-S-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-n2	nCCI-S
1.5103E-05	TB-S-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-nn	RBB-n2	WCCI-S
2.3373E-05	TB-S-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	nCCI-S
1.6785E-05	TB-S-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-22	WCCI-S
2.0137E-05	TB-S-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	nCCI-S
1.5103E-05	TB-S-ER	CFD-IP	CLC-WWW	CLV-233	CD-ILH	VBD-F	SPB-ny	RBB-n2	WCCI-S
2.3679E-05	TB-S-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
9.4717E-05	TB-S-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
7.1038E-05	TB-S-ER	CFD-IM	CLC-nDD	CLV-033	CD-ILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.2838E-04	TB-S-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.4072E-05	TB-S-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
1.4252E-05	TB-S-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
1.4214E-05	TB-S-ER	CFD-LV	CLC-nDD	CLV-023	CD-ILM	VBD-F	SPB-ny	RBB-n3	WCCI-S
1.2888E-05	TB-S-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.1753E-04	TB-S-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCI-S
1.2759E-05	TB-S-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCSnS
1.3027E-05	TB-S-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCI-S
1.2888E-05	TB-S-ER	CFD-LV	CLC-DDD	CLC-223	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCI-S
3.3330E-02	TB-S-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-nn	RBB-nn	nCCI-S
3.7032E-03	TB-S-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-nn	RBB-nn	nCCInS
7.6683E-05	TB-S-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-nB	SPB-ny	RBB-nn	nCCI-S
3.6812E-05	TB-S-ER	CFD-n	CLC-nnn	CLV-000	CD-ILM	VBD-F	SPB-nn	RBB-nn	nCCI-S
1.7548E-05	TB-S-ER	CFD-n	CLC-nnD	CLV-002	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.2861E-03	TB-S-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.4122E-04	TB-S-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
1.5708E-03	TB-S-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
1.7272E-04	TB-S-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	nCCInS
1.4265E-04	TB-S-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	WCCI-S
1.5635E-05	TB-S-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-F	SPB-ny	RBB-n3	WCCSnS
4.6048E-05	TB-S-ER	CFD-n	CLC-nDD	CLV-022	CD-ILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
1.3461E-03	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCI-S
1.4875E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-44	nCCInS
9.7279E-03	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-33	nCCI-S
1.0799E-03	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-33	nCCInS
1.2172E-03	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.3436E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-nB	SPB-ny	RBB-22	nCCInS
1.4261E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.5598E-05	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.3012E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.4177E-05	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.1876E-03	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCI-S
1.3016E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-34	WCCSnS
1.4449E-03	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCI-S
1.5863E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-33	nCCInS
1.3148E-04	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCI-S
1.4280E-05	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-F-B	SPB-ny	RBB-33	WCCSnS
4.2211E-05	TB-S-ER	CFD-n	CLC-DDD	CLV-222	CD-ILH	VBD-S-B	SPB-ny	RBB-34	WCCI-S
1.5139E-05	TB-S-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-44	nCCI-S
3.4998E-04	TB-S-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCI-S
3.8474E-05	TB-S-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-22	nCCInS
1.4970E-04	TB-S-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-n2	nCCI-S
1.6574E-05	TB-S-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-n2	nCCInS
1.4970E-04	TB-S-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCI-S
1.6574E-05	TB-S-ER	CFD-n	CLC-WWW	CLV-222	CD-ILH	VBD-nB	SPB-nn	RBB-nn	nCCInS
5.2710E-03	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	nCCI-S
5.7981E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	nCCInS

TABLE 3.10
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5.2710E-03	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	WCCSnS
5.7981E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	DCCI
1.1596E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.0563E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.0563E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.1595E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-S	SPB-ny	RBB-44	nCCInS
1.2755E-05	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-S	SPB-ny	RBB-44	WCCI-S
1.0436E-03	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-S	SPB-ny	RBB-44	WCCSnS
1.1479E-04	TB-S-LR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-S	SPB-ny	RBB-44	nCCI-S
5.8567E-05	TB-S-LR	CFD-E4V	CLC-WWD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	WCCI-S
5.8567E-05	TB-S-LR	CFD-E4V	CLC-WWD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	WCCI-S
1.1595E-05	TB-S-LR	CFD-E4V	CLC-WWD	CLV-333	CD-nILM	VBD-S	SPB-ny	RBB-44	WCCI-S
5.2710E-04	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-F	SPB-nn	RBB-44	nCCI-S
5.7981E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-F	SPB-nn	RBB-44	nCCInS
5.2710E-04	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-F	SPB-nn	RBB-44	WCCI-S
5.7981E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-F	SPB-nn	RBB-44	WCCSnS
1.1595E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-S	SPB-nn	RBB-44	nCCI-S
1.0436E-04	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-S	SPB-nn	RBB-44	WCCI-S
1.1479E-05	TB-S-LR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-S	SPB-nn	RBB-44	WCCSnS
3.0589E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	nCCI-S
2.2854E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	WCCI-S
1.4320E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	WCCI-S
1.5469E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	WCCSnS
5.6949E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCCI-S
6.2254E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	nCCInS
4.2636E-04	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	WCCI-S
4.6518E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	WCCSnS
2.9597E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	nCCI-S
2.1924E-05	TB-S-LR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	WCCI-S
1.4598E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.6058E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCSnS
5.8391E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCCI-S
6.4230E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	nCCInS
4.3793E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCI-S
4.8173E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCSnS
5.6356E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n4	WCCI-S
2.5047E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	nCCI-S
1.6907E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.8412E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	WCCSnS
1.1860E-02	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.3046E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.6355E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI
4.7439E-02	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
5.2183E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCInS
3.5580E-02	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
3.9137E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
7.9066E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
2.3767E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	WCCI-S
9.5069E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	nCCI-S
1.0458E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	nCCInS
7.1302E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	WCCI-S
2.3480E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
2.5828E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCSnS
1.0436E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	nCCI-S
1.1479E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	nCCInS
7.0440E-03	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
7.7484E-04	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCSnS
1.4116E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n2	WCCI-S
2.4884E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	nCCI-S
1.8663E-05	TB-S-LR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	WCCI-S

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Data Documents

2.1605E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCI-S
6.4814E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.7553E-04	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
1.9308E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
7.0210E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
5.2658E-04	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
5.7923E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
3.4751E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
1.0425E-04	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.1468E-05	TB-S-LR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCSnS
2.1897E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCCI-S
2.1897E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCI-S
5.9299E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
2.3720E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCCI-S
1.7790E-04	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
1.9569E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCSnS
5.9299E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
2.3720E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
1.7790E-04	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.9569E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
1.1740E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n4	WCCI-S
3.5220E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n2	WCCI-S
1.1740E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
3.5220E-05	TB-S-LR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.9766E-05	TB-S-LR	CFD-LI	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
1.4598E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n4	WCCI-S
4.3793E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCCI-S
1.1860E-04	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCI-S
1.3046E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCSnS
4.7439E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCCI-S
3.8580E-04	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCI-S
3.9137E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCSnS
2.3480E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n4	WCCI-S
7.0440E-05	TB-S-LR	CFD-LV	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n2	WCCI-S
5.8391E-04	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCCI-S
6.4230E-05	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nIHM	VBD-F	SPB-nn	RBB-nn	nCCInS
4.7439E-03	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCCI-S
5.2183E-04	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCCInS
1.0436E-04	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-S	SPB-nn	RBB-nn	nCCI-S
1.1479E-05	TB-S-LR	CFD-n	CLC-nnn	CLV-000	CD-nILM	VBD-S	SPB-nn	RBB-nn	nCCInS
2.8720E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCI-S
3.1274E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.9429E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	nCCI-S
2.9429E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	WCCI-S
6.7004E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	WCCI-S
2.3340E-03	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCI-S
2.5666E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	WCCSnS
2.3909E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	nCCI-S
2.6300E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	nCCInS
2.3909E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	WCCI-S
2.6300E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	WCCSnS
3.6423E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	nCCI-S
5.4634E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCI-S
6.0098E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	WCCSnS
3.6423E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-nn	nCCI-S
4.6195E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCI-S
5.0685E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	WCCSnS
4.7336E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n3	WCCI-S
1.0817E-04	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCI-S
1.1855E-05	TB-S-LR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	WCCSnS

TABLE 3.10
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Data Document

1,4598E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n4	WCCI-S	
4,3793E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	WCCI-S	
1,1860E-04	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCI-S	
1,3046E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	WCCSnS	
2,3720E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	nCCI-S	
3,5580E-04	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCI-S	
3,9137E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	WCCSnS	
2,3720E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-nn	nCCI-S	
2,3480E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n4	WCCI-S	
7,0440E-05	TB-S-LR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n2	WCCI-S	TABLE 3.10
3,9215E-02	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	DCCI	(8 of 9)
7,8586E-05	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-F-B	SPB-ny	RBB-44	DCCI	
4,3132E-03	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-S	SPB-ny	RBB-44	DCCI	
2,7730E-05	TB-S-nR	CFD-E4V	CLC-WDD	CLV-333	CD-nILM	VBD-SE	SPB-ny	RBB-44	DCCI	
4,3572E-04	TB-S-nR	CFD-E4V	CLC-WWD	CLV-333	CD-nILM	VBD-F	SPB-ny	RBB-44	DCCI	
4,7924E-03	TB-S-nR	CFD-E4V	CLC-WWD	CLV-333	CD-nILM	VBD-S	SPB-ny	RBB-44	DCCI	
3,9215E-03	TB-S-nR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-F	SPB-nn	RBB-44	DCCI	
4,3132E-04	TB-S-nR	CFD-E4V	CLC-WWW	CLV-333	CD-nILM	VBD-S	SPB-nn	RBB-44	DCCI	
5,7154E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n4	DCCI	
1,7233E-04	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-F-B	SPB-ny	RBB-n2	DCCI	
1,0692E-03	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	DCCI	
3,1740E-03	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCCI	
1,5731E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nIHM	VBD-DH-B	SPB-ny	RBB-n2	DCCI	
6,2180E-05	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n4	DCCI	
1,6577E-04	TB-S-nR	CFD-IP	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	DCCI	
1,2179E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-nn	RBB-n2	DCCI	
1,2179E-05	TB-S-nR	CFD-IP	CLC-nWW	CLV-033	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCCI	
1,7373E-05	TB-S-nR	CFD-IP	CLC-WDD	CLV-333	CD-nILM	VBD-SE	SPB-ny	RBB-44	DCCI	
1,0860E-02	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCCI	
3,2581E-02	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI	
2,3293E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCCI	
6,9878E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCCI	
8,8233E-02	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI	
2,6470E-01	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI	
1,7682E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	DCCI	
5,3046E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	DCCI	
9,7046E-03	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCCI	
2,9114E-02	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCCI	
1,9448E-05	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n4	DCCI	
5,8344E-05	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-S-B	SPB-ny	RBB-n2	DCCI	
4,6281E-05	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n4	DCCI	
1,3884E-04	TB-S-nR	CFD-IM	CLC-nDD	CLV-033	CD-nILM	VBD-SE	SPB-ny	RBB-n2	DCCI	
1,0715E-04	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCCI	
3,2146E-04	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI	
8,7056E-04	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI	
2,6117E-03	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI	
9,5752E-05	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCCI	
2,8726E-04	TB-S-nR	CFD-LP	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCCI	
1,8100E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-nn	RBB-n2	DCCI	
1,8100E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI	
4,9018E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n4	DCCI	
1,4705E-04	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-nn	RBB-n2	DCCI	
4,9018E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI	
1,4705E-04	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI	
1,6174E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-nn	RBB-n2	DCCI	
1,6174E-05	TB-S-nR	CFD-LP	CLC-nnW	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCCI	
3,0167E-04	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCCI	
9,0501E-04	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI	
1,4434E-05	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCCI	
2,4509E-03	TB-S-nR	CFD-LT	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI	

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7.3527E-03	TB-S-nR	CFD-LI	CLC-nnD	CLV-003	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
1.4735E-05	TB-S-nR	CFD-LI	CLC-nnD	CLV-003	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	DCCI
2.6957E-04	TB-S-nR	CFD-LI	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCCI
6.0872E-04	TB-S-nR	CFD-LI	CLC-nnD	CLV-003	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCCI
1.0826E-05	TB-S-nR	CFD-LI	CLC-nDD	CLV-023	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCCI
1.7225E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n4	DCCI
1.4596E-04	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n3	DCCI
1.2265E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-F	SPB-ny	RBB-n2	DCCI
2.7150E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n4	DCCI
1.9401E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nIHM	VBD-S	SPB-ny	RBB-n2	DCCI
1.3994E-02	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n4	DCCI
1.1858E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n3	DCCI
9.9644E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F	SPB-ny	RBB-n2	DCCI
2.8044E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F-B	SPB-ny	RBB-n4	DCCI
1.9969E-05	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-F-B	SPB-ny	RBB-n2	DCCI
1.5392E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n4	DCCI
1.3043E-04	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n3	DCCI
1.0960E-03	TB-S-nR	CFD-n	CLC-nnD	CLV-002	CD-nILM	VBD-S	SPB-ny	RBB-n2	DCCI
1.2067E-05	TB-S-nR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n4	DCCI
3.6201E-05	TB-S-nR	CFD-n	CLC-nnW	CLV-002	CD-nIHM	VBD-F	SPB-nn	RBB-n2	DCCI
9.8036E-05	TB-S-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n4	DCCI
2.9411E-04	TB-S-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-F	SPB-nn	RBB-n2	DCCI
1.0783E-05	TB-S-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n4	DCCI
3.2349E-05	TB-S-nR	CFD-n	CLC-nnW	CLV-002	CD-nILM	VBD-S	SPB-nn	RBB-n2	DCCI
2.9590E-05	TB-S-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n4	DCCI
1.0826E-05	TB-S-nR	CFD-n	CLC-nDD	CLV-022	CD-nIHM	VBD-DH	SPB-ny	RBB-n2	DCCI

TABLE 3.10
(9 of 9)

9.9814E-01 TOTAL FREQUENCY OF BINS PRINTED

TOTAL FREQUENCY IN ALL BINS = 1.0000E+00
TOTAL FREQUENCY LOST DUE TO TERMINATION OF BRANCHES 4.3282E-04
TOTAL FREQUENCY FOR THIS SEQUENCE/WALKTHROUGH = 1.0004E+00

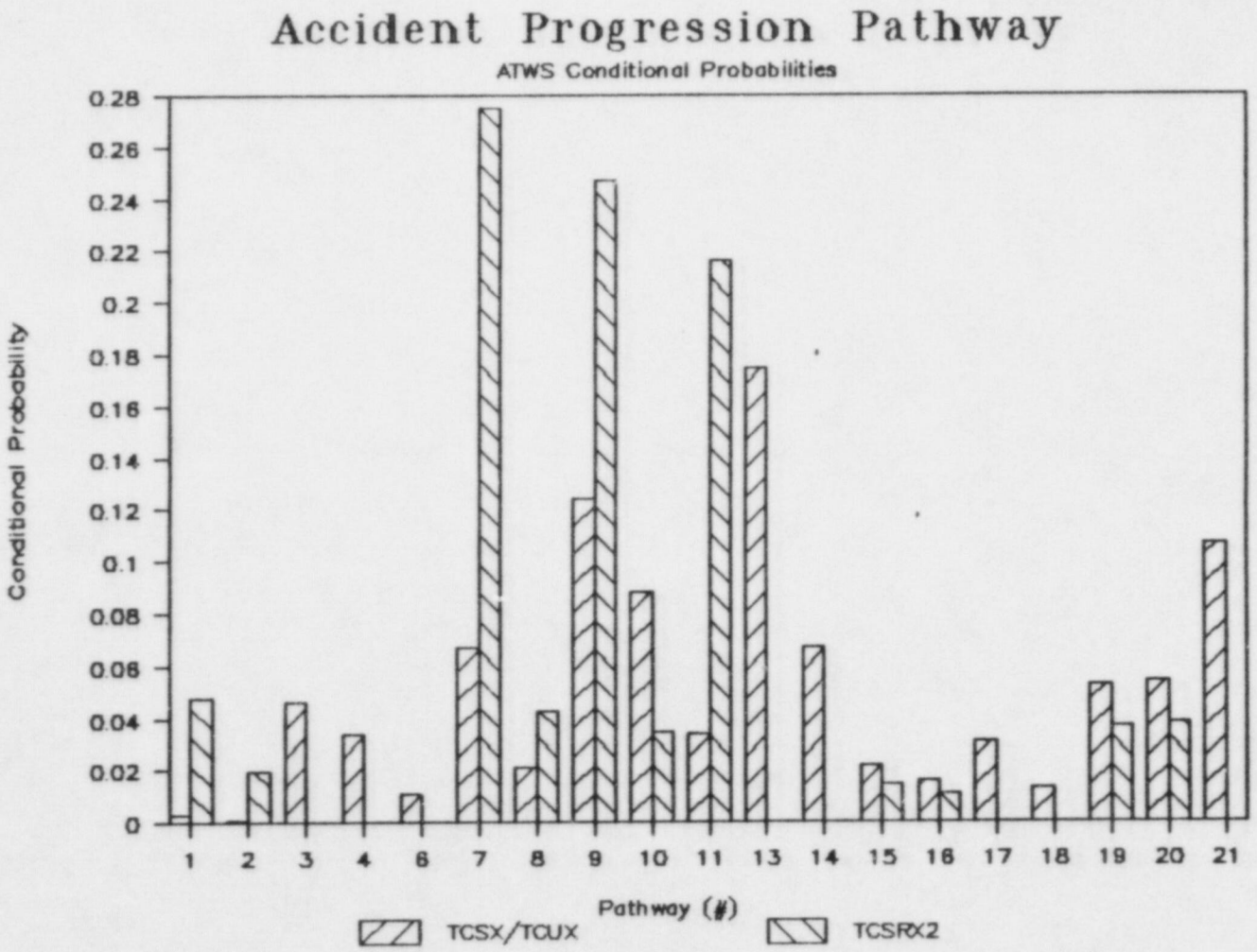

FIGURE 3.3 Conditional Accident Progression Pathway Probabilities for ATWS Sequences

Table 3.5 provides a key for understanding the central estimate detailed accident progression results for each cut set group which are presented in Table 3.11. In each case, the conditional probability for each accident progression outcome is shown (represented by the column labeled "FREQUENCY").

3.4 Cut Set Group TCSRX2

The last of the dominant cut set groups differs from all the others in that core cooling remains successful until containment pressure rises so as to jeopardize the ability to continue to cool the core. The concern is that the containment temperature and pressure could rise to the point that if the containment should fail or be vented, core cooling could be disrupted. This could happen due to the near-boiling conditions which could occur in the suppression pool. This can affect the low pressure emergency core cooling systems due to low NPSH. Continued successful core cooling is possible, however, using condensate or HPSWS.

From Table 3.1 and Figure 3.3, using the key provided in Table 3.4, there is about a 0.5 probability of successful venting before or during core melt as there was for the TCSX/TCUX group. Among the successful venting scenarios the two most dominant pathways include no vessel breach due to recovery by successfully venting containment and maintaining core cooling (~0.25 probability), and insufficient but some injection during melt (~0.2 probability).

An early drywell leak followed by drywell rupture at vessel breach is estimated with an approximate 0.28 probability. Early drywell ruptures or wetwell related failures make up the remaining probability for containment failure.

Not shown in the table but indicated by the complete results is the fact that the reactor building response is very similar to the TCSX/TCUX group except that there is a slightly greater chance of a major failure and a correspondingly less chance that only the blowout panels are affected.

Core-concrete interaction probabilities are very similar to those for TCSX/TCUX.

If one considers the optimistic evaluation shown in Table 3.2, there is greater than a 0.8 probability of successful venting and no vessel breach due to the successful continuation of core cooling after venting.

The pessimistic evaluation reflected in Table 3.3 shows a much higher tendency toward an early drywell leak followed by drywell rupture estimated at a probability of about 0.9.

Table 3.5 provides a key for understanding the central estimate detailed accident progression results for this cut set group presented in Table 3.12. In each case, the conditional probability for each accident progression outcome is shown (represented by the column labeled "FREQUENCY").

PEACH BOTTOM EVENT TREE IC(S/U)X

PEACH BOTTOM ACCIDENT PROGRESSION

TABLE 3.11 (1 of 11)

THESE RESULTS ARE FOR THE IC(S/U)X-con WALKTHROUGH

FREQUENCY	Seq	CF-Dyn	CL-Loc	CL-Lev	Degr	VBD	SPB	RBB-Lev	CCI
1.1431E-02	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.2569E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.1431E-02	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.2569E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
2.4749E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	DCCI
9.0495E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
9.9477E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.9593E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	DCCI
3.6200E-02	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
3.9811E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCInS
2.7150E-02	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
2.9857E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
5.9233E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	DCCI
1.1489E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-44	nCCI-S
1.2375E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-44	nCCInS
1.1489E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-44	WCCI-S
1.2375E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-44	WCCSnS
9.0864E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-24	WCCI-S
3.6465E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-22	nCCI-S
3.9600E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-22	nCCInS
2.7339E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-22	WCCI-S
2.9617E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-22	WCCSnS
3.8575E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-S-B	SPB-ny	RBB-44	WCCI-S
3.0364E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-S-B	SPB-ny	RBB-24	WCCI-S
1.3400E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-S-B	SPB-ny	RBB-22	nCCI-S
9.2375E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-S-B	SPB-ny	RBB-22	WCCI-S
9.2986E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	nCCI-S
9.2882E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	WCCI-S
7.3444E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-24	WCCI-S
2.9549E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCCI-S
3.1974E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCCInS
2.2127E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCCI-S
2.3981E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCCSnS
1.1432E-02	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
1.2701E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCInS
3.6201E-02	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
4.0222E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
1.1523E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-44	nCCI-S
1.2729E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-44	nCCInS
3.6552E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCI-S
4.0472E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCInS
5.7156E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
6.2833E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
5.7156E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
6.2833E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.2375E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	DCCI
4.5248E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
4.9743E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.8100E-02	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.9906E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.3575E-02	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCI-S

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1.4928E-03	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
2.9598E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCCI
5.7444E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-44	nCCI-S
5.7444E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-44	WCCI-S
4.5476E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-24	WCCI-S
1.8246E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	nCCI-S
1.9845E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	nCCInS
1.3659E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	WCCI-S
1.4799E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	WCCSnS
2.2559E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	nCCI-S
2.0533E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCI-S
2.2333E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCSnS
1.6246E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	WCCI-S
1.7680E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	WCCSnS
7.2027E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	nCCI-S
4.8834E-04	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCI-S
5.3480E-05	TC-S	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
1.6583E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCI-S
1.8194E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCInS
1.6583E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCI-S
1.8194E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCSnS
1.3128E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.4404E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCSnS
5.2528E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCI-S
5.7765E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
3.9396E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCI-S
4.3324E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.6406E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-44	nCCI-S
1.6406E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-44	WCCI-S
1.2988E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-24	WCCI-S
5.2906E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-22	nCCI-S
3.9679E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-22	WCCI-S
1.8332E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.8332E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
3.5437E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	DCCI
1.4513E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
2.8054E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	DCCI
2.6235E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
5.8096E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.9502E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
4.3567E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
8.7137E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	DCCI
1.7718E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-44	nCCInS
1.7718E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-44	WCCSnS
1.4027E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-24	WCCSnS
5.8218E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-22	nCCInS
4.3569E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-22	WCCSnS
1.3191E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-S	SPB-ny	RBB-22	WCCI-S
1.4246E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
1.4802E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	nCCInS
1.4802E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	WCCSnS
1.1548E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-24	WCCSnS
4.7042E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCCInS
3.5282E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCCSnS
8.2916E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
9.0970E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
8.2916E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
9.0970E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
6.5642E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
7.2018E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS

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2.6264E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
2.8882E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
1.9698E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
2.1662E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
2.6453E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCI-S
1.9840E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCI-S
9.1661E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
9.1661E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.7718E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	DCCI
7.2565E-04	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.4027E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	DCCI
1.3160E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
2.9048E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCInS
2.1781E-03	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
4.3569E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCCI
2.9152E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	nCCInS
2.1784E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	WCCSnS
2.9769E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	WCCI-S
2.3567E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	WCCI-S
1.0389E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCCI-S
7.0702E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
3.2806E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCSnS
2.5877E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	WCCSnS
1.1417E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	nCCInS
7.7914E-05	TC-S	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
7.0950E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCI-S
7.0950E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCI-S
5.6169E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCI-S
2.2493E-04	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCI-S
2.4625E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
1.6861E-04	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCI-S
1.8469E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
2.3695E-04	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
2.6278E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
7.5033E-04	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
8.3213E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
3.5475E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
3.5475E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.8084E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.1255E-04	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.2357E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
8.4253E-05	TC-S	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
6.3976E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	nCCI-S
7.0240E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	nCCInS
6.3976E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	WCCI-S
7.0240E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	WCCSnS
5.0648E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-24	WCCI-S
5.5607E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-24	WCCSnS
2.0260E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	nCCI-S
2.2268E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	nCCInS
1.5194E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	WCCI-S
1.6692E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	WCCSnS
2.0351E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-22	nCCI-S
1.5181E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-22	WCCI-S
7.8567E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
7.8567E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.5187E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	DCCI
6.2159E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.2023E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	DCCI
1.0070E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCI-S

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2.4887E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.8663E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
3.6671E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	DCCI
2.4556E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-22	nCCInS
1.8335E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-vy	RBB-22	WCCSnS
2.0088E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCCInS
1.5066E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCCSnS
2.1327E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
2.3695E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
6.7537E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
7.5033E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.0600E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
2.6472E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCInS
3.3871E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
8.3830E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
2.1500E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCI-S
6.8083E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCI-S
2.6471E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-44	nCCInS
8.4131E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCInS
3.1988E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCI-S
3.5120E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCInS
3.1988E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCI-S
3.5120E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCSnS
2.5324E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCI-S
2.7804E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCSnS
1.0131E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCI-S
1.1133E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCInS
7.5971E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCI-S
8.3411E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCSnS
1.0120E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	nCCI-S
3.9283E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
3.9283E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
3.1099E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.2443E-03	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCInS
9.3298E-04	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.8035E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCCI
1.2357E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-vy	RBB-22	nCCInS
1.1493E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-44	WCCI-S
2.7295E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	WCCI-S
1.4009E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCSnS
1.0732E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	WCCSnS
3.3392E-05	TC-S	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
1.8431E-02	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCI-S
2.0272E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCInS
1.8431E-02	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.0272E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCSnS
4.0346E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	DCCI
1.4591E-02	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.6046E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCSnS
3.1748E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-24	DCCI
5.8366E-02	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCI-S
6.4201E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
4.3774E-02	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCI-S
4.8151E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
9.6994E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	DCCI
1.8584E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-44	nCCI-S
2.0173E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-44	nCCInS
1.8584E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-44	WCCI-S
2.0173E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-44	WCCSnS
1.4696E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-24	WCCI-S

TABLE 3.11
(5 of 11)

1.5874E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-24	WCCSnS
5.8938E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-22	nCCI-S
6.4663E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-22	nCCInS
4.4203E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-22	WCCI-S
4.8497E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-22	WCCSnS
9.2351E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
9.2351E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
7.3111E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
2.9311E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
3.2169E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCInS
2.1968E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
2.3953E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
6.2846E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-S	SPB-ny	RBB-44	WCCI-S
4.9753E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-S	SPB-ny	RBB-24	WCCI-S
2.1933E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-S	SPB-ny	RBB-22	nCCI-S
1.4926E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-S	SPB-ny	RBB-22	WCCI-S
1.6122E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-IHM	VBD-S	SPB-ny	RBB-22	WCCSnS
9.2155E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
1.0135E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
9.2155E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
1.0135E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
2.0254E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	DCCI
7.2956E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
8.0229E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS
1.5874E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	DCCI
2.9183E-02	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
3.2100E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
2.1887E-02	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
2.4075E-03	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
4.8497E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	DCCI
9.2817E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCI-S
1.0127E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	nCCInS
9.2817E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	WCCI-S
1.0127E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-44	WCCSnS
7.3480E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-24	WCCI-S
2.9469E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCI-S
3.2331E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCInS
2.2102E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCI-S
2.4249E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	WCCSnS
4.6176E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
4.6176E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
3.6556E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
1.4660E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.6084E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.0967E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
1.1965E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
3.6752E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	nCCI-S
3.3163E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	WCCI-S
3.6385E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	WCCSnS
2.6254E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	WCCI-S
2.8804E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	WCCSnS
1.1659E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCCI-S
1.2802E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCCInS
7.8762E-04	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
8.6413E-05	TC-S	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCSnS
7.8983E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCI-S
8.6717E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCInS
7.8983E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCI-S
8.6717E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCSnS
6.2528E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCI-S

6.8651E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCSnS
2.5013E-03	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCI-S
2.7502E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
1.8759E-03	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCI-S
2.0619E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
2.5125E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-22	nCCI-S
1.8844E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F	SPB-vy	RBB-22	WCCI-S
1.2432E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
2.6330E-03	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
2.9253E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
8.3379E-03	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
9.2634E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.3205E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
4.1816E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
2.6543E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCI-S
8.4053E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCI-S
3.9491E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
4.3358E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
3.9491E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
4.3358E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
3.1264E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
3.4325E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS
1.2507E-03	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.3756E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
9.3792E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
1.0308E-04	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.2608E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-vy	RBB-22	nCCI-S
1.4189E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	WCCI-S
1.1233E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	WCCI-S
3.3698E-05	TC-S	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
7.1091E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	nCCI-S
7.8193E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	nCCInS
7.1091E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	WCCI-S
7.8193E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	WCCSnS
1.5625E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-44	DCCI
5.6281E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-24	WCCI-S
6.1903E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-24	WCCSnS
1.2369E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-24	DCCI
2.2512E-02	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	nCCI-S
2.4763E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	nCCInS
1.6884E-02	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	WCCI-S
1.8572E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	WCCSnS
3.7311E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-nn	RBB-22	DCCI
7.1667E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-44	nCCI-S
7.1667E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-44	WCCI-S
5.6736E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-24	WCCI-S
2.2720E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-22	nCCI-S
2.4874E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-22	nCCInS
1.7031E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-22	WCCI-S
1.8655E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F	SPB-vn	RBB-22	WCCSnS
3.5653E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
3.5653E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
2.6225E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
1.1290E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
1.2307E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCInS
8.4676E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
2.4262E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-S	SPB-nn	RBB-44	WCCI-S
1.9035E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-S	SPB-nn	RBB-24	WCCI-S
5.7623E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-IHM	VBD-S	SPB-nn	RBB-22	WCCI-S
2.3697E-02	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S

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TABLE 3.11
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2.6330E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
7.5042E-02	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
8.3379E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.1907E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
1.3205E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCInS
3.7705E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
4.1816E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
2.3934E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCI-S
2.6543E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-44	nCCInS
7.5791E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCI-S
8.4053E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCInS
3.5546E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCI-S
3.9096E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCInS
3.5546E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCI-S
3.9096E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCSnS
2.8140E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCI-S
3.0951E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCSnS
1.1256E-02	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCI-S
1.2382E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCInS
8.4421E-03	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCI-S
9.2854E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCSnS
1.8554E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	DCCI
3.5833E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-44	nCCI-S
3.5833E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-44	WCCI-S
2.8368E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-24	WCCI-S
1.1369E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	nCCI-S
1.2482E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	nCCInS
8.5104E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-vn	RBB-22	WCCI-S
1.7827E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.7827E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.4113E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
5.6451E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
4.2338E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
1.4189E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-44	nCCI-S
1.2794E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-44	WCCI-S
1.4047E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-44	WCCSnS
1.0119E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-24	WCCI-S
1.1120E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-24	WCCSnS
4.4930E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	nCCI-S
3.0385E-04	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	WCCI-S
3.3361E-05	TC-S	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	WCCSnS
3.4908E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
3.8250E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
3.4908E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
3.8250E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
2.0227E-02	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
2.2242E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
4.4025E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-34	DCCI
1.0035E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
1.0915E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
2.2475E-02	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
2.4714E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCInS
2.2467E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
2.4640E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCSnS
4.0207E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
4.4074E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCInS
3.0152E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
3.3040E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
3.4342E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-44	nCCI-S
3.4342E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-44	WCCI-S

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2.0354E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-34	WCCI-S
2.2012E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-34	WCCSnS
2.2626E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-33	nCCI-S
2.4458E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-33	nCCInS
2.2235E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-33	WCCI-S
3.9582E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-22	nCCI-S
2.9687E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-vy	RBB-22	WCCI-S
1.0868E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-44	WCCI-S
6.8754E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-34	WCCI-S
2.8715E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	nCCI-S
2.8715E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	WCCI-S
1.7580E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-34	WCCI-S
1.8936E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-34	WCCSnS
1.9568E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	nCCI-S
2.1040E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	nCCInS
1.9127E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	WCCI-S
3.1429E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCCI-S
2.3572E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCCI-S
1.7449E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.9114E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.7449E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.9114E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.0113E-02	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
1.1120E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
2.1874E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-34	DCCI
5.0175E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
5.4574E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.1237E-02	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
1.2359E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCInS
1.1233E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
1.2333E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-33	WCCSnS
2.0104E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
2.2037E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.5078E-03	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
1.6508E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.6957E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-44	nCCI-S
1.6957E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-44	WCCI-S
1.0154E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-34	WCCI-S
1.0937E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-34	WCCSnS
1.1325E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-33	nCCI-S
1.2262E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-33	nCCInS
1.1048E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-33	WCCI-S
1.9791E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-22	nCCI-S
1.4843E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-F-B	SPB-vy	RBB-22	WCCI-S
6.2125E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCI-S
3.6382E-04	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-S-B	SPB-ny	RBB-34	WCCI-S
3.9805E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-S-B	SPB-ny	RBB-34	WCCSnS
1.7632E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-S-B	SPB-ny	RBB-24	WCCI-S
4.4674E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-S-B	SPB-ny	RBB-33	nCCI-S
4.0207E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-S-B	SPB-ny	RBB-33	WCCI-S
5.3577E-05	TC-S	CFD-IP	CLC-DDD	CLV-233	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCI-S
3.6756E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCI-S
3.9943E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCInS
3.6756E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCI-S
3.9943E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCSnS
2.9098E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCI-S
3.1431E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCSnS
1.1670E-03	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.2803E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
8.7522E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCI-S

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9.6024E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.1545E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-vy	RBB-22	nCCI-S
1.8378E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
2.0052E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
1.8378E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.0052E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
1.4549E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.5715E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS
5.8348E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
6.4016E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
4.3761E-04	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
4.8012E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.5428E-05	TC-S	CFD-IP	CLC-WDD	CLV-233	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
1.7469E-04	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-44	nCCI-S
1.8614E-05	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-44	nCCInS
1.7449E-04	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-44	WCCI-S
1.8614E-05	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-44	WCCSnS
1.4611E-04	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-24	WCCI-S
1.5329E-05	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-24	WCCSnS
1.3000E-05	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-23	nCCI-S
5.4289E-04	TC-S	CFD-IP	CLC-WDD	CL[illegible]33	CD-IHM	VBD-DH	SPB-ny	RBB-22	nCCI-S
5.8885E-05	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-22	nCCInS
4.0643E-04	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-22	WCCI-S
4.4069E-05	TC-S	CFD-IP	CLC-WDD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-22	WCCSnS
1.5625E-05	TC-S	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCI-S
1.5625E-05	TC-S	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCI-S
1.2369E-05	TC-S	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCI-S
4.9478E-05	TC-S	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCI-S
3.7108E-05	TC-S	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCI-S
2.4739E-05	TC-S	CFD-IP	CLC-WWD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.8554E-05	TC-S	CFD-IP	CLC-WWD	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
1.8176E-05	TC-S	CFD-IP	CLC-WWD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-22	nCCI-S
1.3632E-05	TC-S	CFD-IP	CLC-WWD	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-22	WCCI-S
7.0950E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-44	nCCI-S
7.0950E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-44	WCCI-S
5.6169E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-24	WCCI-S
2.2467E-04	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-22	nCCI-S
2.4492E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-22	nCCInS
1.6851E-04	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-22	WCCI-S
1.8369E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-22	WCCSnS
7.0950E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCI-S
7.0950E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCI-S
5.6169E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCI-S
2.2467E-04	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCI-S
2.4492E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
1.6851E-04	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCI-S
1.8369E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
3.5475E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCI-S
3.5475E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCI-S
2.8084E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCI-S
1.1234E-04	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCI-S
1.2246E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCInS
8.4253E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCI-S
3.5475E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
3.5475E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.8084E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.1234E-04	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.2246E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
8.4253E-05	TC-S	CFD-IP	CLC-WWW	CLV-233	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
2.6390E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-nn	RBB-44	nCCI-S

TABLE 3.11
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Data Documents 10-8088-15

2,6390E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-nn	RBB-44	WCCI-S
2,0892E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-nn	RBB-24	WCCI-S
8,3706E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-nn	RBB-22	nCCI-S
6,2677E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-nn	RBB-22	WCCI-S
2,6390E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-44	nCCI-S
2,6390E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-44	WCCI-S
2,0892E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-24	WCCI-S
8,3706E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-22	nCCI-S
6,2677E-05	TC-S	CFD-IP	CLC-WWW	CLV-333	CD-IHM	VBD-DH	SPB-ny	RBB-22	WCCI-S
4,3106E-05	TC-S	CFD-LT	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
4,7896E-05	TC-S	CFD-LT	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
2,1496E-05	TC-S	CFD-LT	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
2,3990E-05	TC-S	CFD-LT	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
8,5522E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
8,5522E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
7,7996E-04	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
8,5502E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
8,6663E-04	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
9,5002E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCInS
8,6365E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
4,2761E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
4,2761E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
3,8998E-04	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
4,2751E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
4,3331E-04	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
4,7501E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCInS
4,3183E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-ILM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
1,3928E-05	TC-S	CFD-LV	CLC-DDD	CLC-223	CD-ILM	VBD-S-B	SPB-ny	RBB-34	WCCI-S
8,6194E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
9,4538E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
8,6194E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
9,4538E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
7,8450E-03	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
8,6260E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
1,2487E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-34	DCCI
8,7167E-03	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
9,5845E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCInS
8,7131E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
9,5466E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCSnS
7,8897E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-vy	RBB-34	WCCI-S
8,7664E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-vy	RBB-33	nCCI-S
2,6463E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-S-B	SPB-ny	RBB-34	WCCI-S
5,3410E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-34	WCCI-S
5,9448E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	nCCI-S
4,4455E-03	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
4,9355E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCInS
3,2108E-02	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-33	nCCI-S
3,5674E-03	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-33	nCCInS
4,0221E-03	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
4,4685E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
4,4621E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-44	nCCI-S
3,2421E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-33	nCCI-S
3,5900E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-33	nCCInS
4,0346E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-vy	RBB-22	nCCI-S
4,3097E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
4,7269E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
4,3097E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
4,7269E-05	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
3,9224E-03	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
4,3130E-04	TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCSnS

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Data Documents, 10-8058-15

4.3584E-03 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCInS
4.7922E-04 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
4.3566E-04 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-33	WCCSnS
4.7733E-05 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
3.9449E-05 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-F-B	SPB-vy	RBB-33	nCCI-S
4.3832E-05 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCI-S
1.5324E-05 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-S-B	SPB-ny	RBB-34	WCCI-S
1.4099E-04 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-S-B	SPB-ny	RBB-34	WCCSnS
1.5321E-05 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-S-B	SPB-ny	RBB-33	nCCI-S
1.7195E-05 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-S-B	SPB-ny	RBB-33	WCCI-S
1.5476E-05 TC-S	CFD-n	CLC-DDD	CLV-222	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
5.2655E-04 TC-S	CFD-n	CLC-WWW	CLV-222	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
5.8395E-05 TC-S	CFD-n	CLC-WWW	CLV-222	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
1.6674E-03 TC-S	CFD-n	CLC-WWW	CLV-222	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.8492E-04 TC-S	CFD-n	CLC-WWW	CLV-222	CD-ILM	VBD-nB	SPB-vn	RBB-22	nCCI-S
1.6659E-05 TC-S	CFD-n	CLC-WWW	CLV-222	CD-ILM				

TABLE 3.11
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9.9770E-01 TOTAL FREQUENCY OF BINS PRINTED

TOTAL FREQUENCY IN ALL BINS = 1.0000E+00
TOTAL FREQUENCY LOST DUE TO TERMINATION OF BRANCHES 4.1006E-04
TOTAL FREQUENCY FOR THIS SEQUENCE/WALKTHROUGH = 1.0004E+00

Data Documents 10-80815

PEACH BOTTOM EVENT TREE TCSRX2

PEACH BOTTOM ACCIDENT PROGRESSION

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THESE RESULTS ARE FOR THE TCSRX2-cen WALKTHROUGH

FREQUENCY	Seq	CF-Dyn	CL-Loc	CL-Lev	Degr	VBD	SPB	RBB-Lev	CCI
7.9578E-03	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCC1-S
8.8401E-04	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCC1nS
2.5200E-02	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCC1-S
2.7999E-03	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCC1nS
3.9785E-03	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCC1-S
4.3716E-04	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCC1nS
3.9785E-03	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	wCC1-S
4.3716E-04	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	wCCSnS
3.1493E-03	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	wCC1-S
3.4589E-04	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	wCCSnS
1.2600E-02	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCC1-S
1.3854E-03	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCC1nS
9.4498E-03	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	wCC1-S
1.0390E-03	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	wCCSnS
2.0686E-05	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCC1
1.5676E-05	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	nCC1-S
1.4284E-04	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	wCC1-S
1.5520E-05	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	wCCSnS
1.1308E-04	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	wCC1-S
1.2286E-05	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	wCCSnS
4.9993E-05	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	nCC1-S
3.3957E-04	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	wCC1-S
3.7120E-05	TC-V	CLD-E4P	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	wCCSnS
5.7784E-04	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCC1-S
6.3510E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCC1nS
5.7784E-04	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	wCC1-S
6.3510E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	wCCSnS
4.5745E-04	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	wCC1-S
5.0279E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	wCCSnS
1.8298E-03	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCC1-S
2.0112E-04	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCC1nS
1.3724E-03	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	wCC1-S
1.5084E-04	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	wCCSnS
6.3825E-04	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCC1nS
6.3825E-04	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	wCCSnS
1.2471E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	DCC1
5.0463E-04	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	wCCSnS
2.0211E-03	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCC1nS
1.5159E-03	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	wCCSnS
2.9619E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCC1
2.0783E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	wCC1-S
1.6289E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	wCC1-S
4.9360E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	wCC1-S
2.2839E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	wCCSnS
1.7592E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	wCCSnS
5.4242E-05	TC-V	CLD-E4P	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	wCCSnS
1.6496E-04	TC-V	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCC1-S
1.8329E-05	TC-V	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCC1nS
5.0285E-04	TC-V	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCC1-S
5.8042E-05	TC-V	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCC1nS
2.4744E-05	TC-V	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCC1-S

TABLE 3.12
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7.8357E-05 TC-V	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
5.8768E-05 TC-V	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
1.4866E-03 TC-V	CLD-E4P	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
1.6496E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
4.7061E-03 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
5.2285E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
1.8420E-03 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.8881E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCInS
5.8353E-03 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
2.2290E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
2.4497E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCI-S
2.2290E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCInS
2.4497E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCI-S
1.7630E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCSnS
1.9393E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCI-S
7.0585E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-24	WCCSnS
7.7573E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCI-S
5.2939E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCCInS
5.8180E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCI-S
2.7298E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCSnS
2.7298E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
2.1611E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
8.6620E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
6.4965E-04 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.2694E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.9039E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCCI
2.3246E-05 TC-V	CLD-E4P	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	WCCI-S
8.9748E-02 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
9.9715E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
7.1914E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCInS
7.9826E-04 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-33	nCCI-S
8.1259E-02 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-33	nCCInS
9.0287E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
4.4873E-02 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
4.9340E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
4.4873E-02 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
4.9340E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
9.8230E-05 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
3.2346E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	DCCI
3.5436E-04 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
1.0157E-02 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
1.1168E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCI-S
2.2235E-05 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
3.5939E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	DCCI
3.9374E-04 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
3.5794E-04 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-33	nCCInS
3.8579E-05 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
4.0629E-02 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-33	WCCSnS
4.4688E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
3.0472E-02 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCInS
3.3516E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
6.7176E-05 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.7805E-04 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCCI
1.8387E-05 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	nCCI-S
1.6134E-03 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	nCCInS
1.7627E-04 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCI-S
1.1508E-04 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCSnS
1.1817E-05 TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-34	WCCI-S
							RBB-34	WCCSnS

TABLE 3.12
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3.9898E-05	TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	WCCSnS
1.3262E-05	TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-33	nCCI-S
1.1936E-05	TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-33	WCCI-S
1.6206E-04	TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	nCCI-S
1.7608E-05	TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	nCCInS
1.0964E-03	TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCI-S
1.2033E-04	TC-V	CFD-E4V	CLC-DDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
1.8633E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
2.0479E-04	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCInS
1.8633E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
2.0479E-04	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCSnS
1.4751E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
1.6213E-04	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCSnS
5.9014E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
6.4904E-04	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
4.4260E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
4.8678E-04	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
2.0581E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCCInS
2.0581E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
4.0214E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	DCCI
1.6293E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
3.1836E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	DCCI
2.3677E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
6.5200E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCCInS
1.7580E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCI-S
4.8891E-03	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
9.8161E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCCI
6.7016E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-44	WCCI-S
5.3055E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-24	WCCI-S
2.3580E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	nCCI-S
1.5916E-04	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCI-S
1.7333E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S	SPB-ny	RBB-22	WCCSnS
7.3860E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCSnS
5.8302E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	WCCSnS
2.5912E-05	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	nCCInS
1.7542E-04	TC-V	CFD-E4V	CLC-WDD	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
5.3241E-04	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
5.9103E-05	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
1.6860E-03	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
1.8716E-04	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
7.9789E-05	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	nCCI-S
7.9789E-05	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-44	WCCI-S
6.3167E-05	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-24	WCCI-S
2.5289E-04	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCI-S
2.7793E-05	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	nCCInS
1.8950E-04	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCI-S
2.0845E-05	TC-V	CFD-E4V	CLC-WWD	CLV-333	CD-ILM	VBD-F	SPB-ny	RBB-22	WCCSnS
4.7922E-03	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCI-S
5.3241E-04	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-44	nCCInS
1.5175E-02	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCI-S
1.6860E-03	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-nn	RBB-22	nCCInS
1.9226E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCI-S
5.9419E-03	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-44	nCCInS
6.0883E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCI-S
1.8816E-02	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-nB	SPB-ny	RBB-22	nCCInS
7.1875E-04	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCI-S
7.8991E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	nCCInS
7.1875E-04	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCI-S
7.8991E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-44	WCCSnS

TABLE 3.12
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6.2535E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCC1-S
2.2763E-03	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	nCC1nS
2.5037E-04	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCC1-S
1.7070E-03	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F	SPB-nn	RBB-22	WCCSnS
1.8760E-04	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCC1nS
8.8204E-04	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
8.8204E-04	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	DCC1
1.7235E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
6.9828E-04	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-24	DCC1
1.3644E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	nCC1nS
2.7938E-03	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
2.0948E-03	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-22	DCC1
4.0932E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-44	WCC1-S
2.5849E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-24	WCC1-S
2.0464E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S	SPB-nn	RBB-22	WCC1-S
6.1392E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-44	WCCSnS
3.1562E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-24	WCCSnS
2.4986E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	nCC1nS
1.0805E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
7.5179E-05	TC-V	CFD-E4V	CLC-WWW	CLV-333	CD-ILM	VBD-F-B	SPB-ny	RBB-44	nCC1-S
2.2169E-02	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCC1nS
2.4372E-03	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCC1-S
2.2189E-02	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
2.4372E-03	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	DCC1
4.2851E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCC1-S
4.0863E-02	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
4.4934E-03	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-34	DCC1
8.8470E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCC1-S
1.4011E-02	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.5384E-03	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	DCC1
2.6073E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCC1-S
4.5404E-02	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCC1nS
4.9928E-03	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCC1-S
4.5387E-03	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCSnS
4.9753E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCC1-S
5.6056E-02	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCC1nS
6.1624E-03	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCC1-S
4.2041E-02	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
4.6215E-03	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	DCC1
9.0071E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-44	WCC1-S
7.3487E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-34	WCC1-S
1.3876E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-34	WCCSnS
1.4976E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-24	WCC1-S
4.6202E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-33	nCC1-S
1.6808E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-33	WCC1-S
1.5127E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-22	nCC1-S
1.8847E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-22	WCC1-S
1.4129E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
1.3994E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	nCC1-S
1.7777E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	nCC1nS
1.6684E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	WCC1-S
1.7777E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	WCCSnS
1.6684E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-34	WCC1-S
3.5414E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-34	WCCSnS
3.7066E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-24	WCC1-S
1.1110E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-24	WCCSnS
1.0799E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	nCC1-S
3.9403E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	nCC1nS
4.1403E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny		

TABLE 3.12
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3.7440E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	WCC1-S
4.5554E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCC1-S
4.7973E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCCInS
3.3912E-04	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCC1-S
3.4887E-05	TC-V	CFD-IP	CLC-DDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCCSnS
2.5707E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCC1-S
2.8242E-04	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCInS
2.5707E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCC1-S
2.8242E-04	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCSnS
2.0352E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-24	WCC1-S
2.2359E-04	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-24	WCCSnS
8.1415E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCC1-S
8.9475E-04	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
6.1055E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCC1-S
6.7076E-04	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.0433E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	DCC1
2.8374E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
2.8374E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
5.4793E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	DCC1
2.2463E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
4.2719E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	DCC1
3.2048E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCC1-S
8.9921E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCInS
2.3640E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCC1-S
6.7428E-03	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.3013E-04	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	DCC1
2.0067E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-S	SPB-ny	RBB-22	WCC1-S
2.1632E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-S-B	SPB-ny	RBB-22	WCCSnS
2.0783E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH	SPB-ny	RBB-44	nCC1-S
2.0783E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH	SPB-ny	RBB-44	WCC1-S
1.7356E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH	SPB-ny	RBB-24	WCC1-S
6.7176E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH	SPB-ny	RBB-22	nCC1-S
4.9668E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH	SPB-ny	RBB-22	WCC1-S
2.1945E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	nCCInS
2.1945E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	WCCSnS
1.7373E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-24	WCCSnS
7.1656E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCCInS
5.3512E-05	TC-V	CFD-IP	CLC-WDD	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCCSnS
1.0954E-04	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCC1-S
1.0355E-05	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCInS
1.0954E-04	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCC1-S
1.0355E-05	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCCSnS
8.6719E-05	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-24	WCC1-S
3.4792E-04	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCC1-S
3.7467E-05	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
2.6016E-04	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCC1-S
2.7324E-05	TC-V	CFD-IP	CLC-WWD	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
4.9541E-04	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-44	nCC1-S
5.4222E-05	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-44	nCCInS
4.9541E-04	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-44	WCC1-S
5.4222E-05	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-44	WCCSnS
3.9220E-04	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-24	WCC1-S
4.2926E-05	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-24	WCCSnS
1.5701E-03	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-22	nCC1-S
1.7222E-04	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-22	nCCInS
1.1776E-03	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-22	WCC1-S
1.2878E-04	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-nn	RBB-22	WCCSnS
4.9541E-04	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCC1-S
5.4222E-05	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	nCCInS
4.9541E-04	TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-44	WCC1-S

1.1776E-03 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	nCCInS
1.2878E-04 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCI-S
1.2132E-03 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F	SPB-ny	RBB-22	WCCSnS
1.2132E-03 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
2.0333E-05 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
9.5966E-04 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-44	DCCI
1.6097E-05 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	WCCSnS
1.0774E-05 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-24	DCCI
3.8515E-03 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCI-S
2.8876E-03 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	nCCInS
5.5771E-05 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	WCCSnS
1.0609E-05 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-F-B	SPB-ny	RBB-22	DCCI
1.0609E-05 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-DH	SPB-nn	RBB-22	nCCI-S
2.9782E-05 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-DH	SPB-ny	RBB-22	nCCI-S
2.2337E-05 TC-V	CFD-IP	CLC-WWW	CLV-233	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	nCCInS
8.6737E-05 TC-V	CFD-LT	CLC-DDD	CLC-223	CD-IHM	VBD-DH-B	SPB-ny	RBB-22	WCCSnS
9.6375E-05 TC-V	CFD-LT	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
1.0387E-05 TC-V	CFD-LT	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
1.7259E-04 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCInS
1.8958E-05 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.7259E-04 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.8958E-05 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.5754E-03 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.7257E-04 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
1.7507E-03 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
1.9174E-04 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
1.7431E-04 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCInS
1.8958E-05 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
1.0542E-05 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCSnS
1.1713E-05 TC-V	CFD-LV	CLC-DDD	CLC-223	CD-IHM	VBD-DH-B	SPB-ny	RBB-34	WCCI-S
1.7407E-03 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	nCCI-S
1.9047E-04 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCI-S
1.7407E-03 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-44	nCCInS
1.9047E-04 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCI-S
1.5848E-02 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-44	WCCSnS
1.7423E-03 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCI-S
2.4396E-05 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-34	WCCSnS
1.7609E-02 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-34	DCCI
1.9361E-03 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCI-S
1.7599E-03 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-33	nCCInS
1.9237E-04 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCI-S
5.3042E-05 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-F-B	SPB-ny	RBB-33	WCCSnS
1.1713E-05 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-S-B	SPB-ny	RBB-34	WCCI-S
1.1713E-05 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	nCCI-S
1.0749E-04 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-44	WCCI-S
1.1596E-05 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-34	WCCI-S
1.1986E-04 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-34	WCCSnS
1.2885E-05 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	nCCI-S
1.1713E-05 TC-V	CFD-n	CLC-DDD	CLV-222	CD-IHM	VBD-DH-B	SPB-ny	RBB-33	nCCInS
							RBB-33	WCCI-S

9.9875E-01 TOTAL FREQUENCY OF BINS PRINTED

TOTAL FREQUENCY IN ALL BINS = 1.0000E+00
TOTAL FREQUENCY LOST DUE TO TERMINATION OF BRANCHES 5.1219E-04

TABLE 3.12
(6 of 6)

4. SUMMARY AND CONCLUSIONS

To interpret the results in the most illuminating way, it is necessary to restate the meanings of the words "optimistic", "central", and "pessimistic". The central estimates are intended to provide a glimpse of the median of the reactor safety community. That is to say, there is a reasonable expectation that if the community were polled on the subjects treated in this document, a substantial fraction would respond that the reality of the situation is better than that depicted by our central estimates, and a comparably substantial fraction would respond that it is worse. Among those who think the reality is better (a group referred to as "optimists"), a substantial fraction would claim that the optimistic estimates apply. Similarly, many of the opposing group (the "pessimists") would claim that reality is or could be as unfavorable as the pessimistic estimates imply. Again, it should be pointed out that it was not possible to apply these guidelines rigorously as a consequence of the small number of experts whose views were available on particular issues.

Viewed in this context, the results of the containment event analysis indicate quite clearly that there are significant uncertainties in the reactor safety community's understanding of containment loading and response. The differences between the optimistic and pessimistic results attest that for many accident sequences, one cannot state the probabilities of the containment failure modes within narrow limits. However, one can identify the factors that drive the results and understand the reasons for the differences.

In the central estimate analyses, drywell wall melt-through and successful containment venting represent two dominant containment response characteristics for the accidents analyzed. In the ATWS sequences, a noticeable increase occurs in the possibility of drywell ruptures, particularly at vessel breach.

The probabilities associated with recovering offsite power and subsequent actions which ultimately arrest the accident progressions are in evidence among the dominant outcomes for most of the accidents analyzed. Typically a 15 - >25% chance is estimated for recovery actions to prevent vessel breach and any significant failure of containment. The longer term station blackout scenarios, however, are estimated to yield smaller probabilities for recovery since if power has been lost for many hours, its chance for recovery in an additional short time frame is considered small.

The optimistic evaluations yield greater than a 0.5 probability for recovery of the accident in all cases. The pessimistic evaluations estimate drywell ruptures at vessel breach to be a dominant containment failure mode.

In general, depending on the estimates for recovery, the three sets of results indicate either a high chance for no vessel breach or vessel breach and a containment failure that likely bypasses the suppression pool (by drywell wall melt-through or drywell rupture at vessel breach).

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APPENDIX A

Peach Bottom Containment Event Tree Description

C. N. Amos
(Technadyne Engineering Consultants, Inc.)

J. M. Griesmeyer
(Sandia National Laboratories)

May 9, 1986

INTRODUCTION

This appendix describes the computerized containment event tree for the Peach Bottom Atomic Power Station (PBAPS). This event tree was developed at Sandia National Laboratory in conjunction with the Severe Accident Risk Reduction Program (SARRP). The Surry CET report provides information which the reader may find useful as background to this report (Ref. 9).

Analysis of the CET is carried out by the EVNTRE computer code which was written to allow the construction of trees with sufficient complexity to adequately model accident progression. EVNTRE is essentially a bookkeeping program which keeps track of the numerous possible pathways through the tree and, given the probability for each possible branch, calculates the probability associated with each possible pathway. For a tree which is as complex as those developed for SARRP there are literally thousands of possible pathways through the tree (each representing a possible accident progression scenario). EVNTRE thus includes the capability to "bin" these outcomes; that is to group them according to certain key parameters selected by the user. In previous Probabilistic Risk Assessments (PRAs) binning could be as simple as early, intermediate and late containment failure. EVNTRE allows many more binning dimensions which allows both a careful evaluation of uncertainties and sensitivities as well as a powerful tool in evaluating risk reduction options. For the PBAPS tree we have used approximately twenty binning dimensions including: containment failure time, extent of suppression pool bypass, extent of reactor building bypass, timing of pool bypass, and whether or not a S/RV

tailpipe vacuum breaker sticks open.

The CET is composed of a large number of questions (101 for PBAPS). Each question represents a branch point of the tree which may have several (up to ten) alternate branches. (In this respect the CET differs from the typical front end event trees for plant systems). The majority of questions have only two branches. The probability of a given branch can be dependent on the path through the tree to that point. Thus, the probability that core debris will quench in the drywell following vessel breach depends on whether or not there is water on the drywell floor (and indeed, how much). To determine the appropriate set of probabilities, the path is compared against Boolean expressions involving the occurrence or absence of particular branches at previous questions on the tree. The probabilities associated with the first case for which there is a match are used. For most questions, the user supplies the case dependent branch point probabilities for each question. The code does, however, have the capability to internally calculate branch point probabilities. This capability is utilized, for example, in the calculation of containment failure probability. The code carries the values of "parameters", which are specified in a case dependent manner through the CET. Parameters, such as the pressure of containment at the start of core degradation, the pressure rise due to hydrogen generation, and the pressure rise at vessel breach, can be summed and compared to a user input containment fragility curve (which could also be case dependent -- reflecting temperature effects for example). This comparison determines the branch point probability for the question (such a question is limited to two branches).

The code proceeds through the CET and evaluates the probability of each possible pathway (combination of events). Typically, the user will specify a cut-off probability such that if the probability of a pathway drops below the cut-off after a given branch then further exploration of that pathway is abandoned. The cut-off probability (conditional on the initiating event) is typically specified at 1 E-8.

For SARRP the quantification of the containment event tree pathways has been done with three different evaluations of the branch point probabilities for each question. The probabilities have been evaluated based on an optimistic, a central, and a pessimistic estimate (termed the OCP approach). The central estimate reflects the authors' best estimate of the probability based on their understanding of current thinking among researchers in the LWR severe accident area. The optimistic evaluation gives what the authors judge to be the greatest reasonable probability to the branch of a given question which is expected to result in the lowest offsite consequences. The pessimistic evaluation gives what the authors judge to be the greatest reasonable probability to the

branch of a given question which is expected to result in the greatest offsite consequences. The tree is quantified three times: once assuming all the optimistic evaluations, once with all the central evaluations, and once with all the pessimistic evaluations. Each quantification has been termed a "walkthrough". This approach is intended to give a feel for the range of possible results. However, it has some recognized deficiencies which limit its usefulness.

Uncertainty in results will thus also be studied using a limited application of Latin Hypercube Sampling (a Monte-Carlo type of approach). This study will make use of the EVNTRE code capability to sample. Sampling involves simultaneously varying sets of individual (case dependent) branch probabilities, while leaving the structure of the tree untouched. For each sample observation, the values for the probabilities are randomly (but allowing only certain discrete values) selected from within their range. The resulting distributions of the outputs (source term bins) provides information regarding uncertainties, and exploration of the relationships between the inputs and those outputs provides sensitivity information.

The PBAPS CET consists of 101 questions with associated logic and quantification. This document provides a detailed desciption of the PBAPS CET. The description begins with a summary of the major sections of the tree. A question by question and case by case description of the structure and logic follows. The rationale used in the quantification of the branch point probabilities and code parameters is discussed. The CET considers many phenomenological issues which are not well understood at the current time. Quantifying the probability that such phenomena will (or will not) occur is thus a subjective process. The general rule of thumb which has been used is as follows: If a particular phenomenon is completely uncertain, that is there is no reason to belive one outcome more than another in the authors' opinion, each outcome is assigned a probability of 0.5 (these issues are always considered in a binary -- yes or no -- context) in the central walkthrough. A probability of 0.9 is assigned in the optimistic walkthrough to that outcome which would tend (in the authors'judgement) to reduce offsite consequences and a probability of 0.9 in the pessimistic walkthrough to the opposite outcome. On the otherhand, if an issue is uncertain but it is the authors' judgement that there is some reason to believe that a particular outcome is more likely, this outcome is given a 0.9 in the central walkthrough and the 0.5 probability is assigned to the optimistic or pessimistic walkthrough as appropriate. In the remaining walkthrough a probability between .99 and 1 is assigned depending upon our judgement as to the weight of the evidence suggesting that the particular outcome is more likely.

APPENDIX A
Peach Bottom Containment Event Tree Description

Questions #1 through #16 define the initial and boundary conditions for the accident progression analysis (i.e. the plant damage state). The branches taken for these questions are determined by inspection of the cut sets developed under the Accident Sequence Evaluation Program (ASEP) for the accident sequence under consideration. The ASEP cut sets for the various accident sequences are grouped according to the initial and boundary conditions that they imply for evaluation of the CET. These questions thus form the interface between the front end analysis and the CET.

The remaining questions on the tree (#17 through #101) have branch point probability evaluations which are dependent on the branches taken in previous questions and which normally do not change as a function of the cut set(s) being considered. Some are dependent on the cut sets for sequences in which the determination of whether the core melts depends on phenomena occurring during accident progression.

The questions which are asked after those used to establish initial and boundary conditions are divided into groups which cover distinct time regimes in the accident. Questions #17 through #24 complete the sequence definition by considering events and actions which are implied by the ASEP results but not specifically quantified. Questions #25 through #34 consider system availability and the integrity of the plant so as to determine if the accident can be recovered prior to core melt.

Recovery prior to core melt is considered in Question #35. Questions #36 through #66 determine the accident progression, system availability and plant integrity up until the time of vessel breach. Question #67 allows for accident recovery prior to vessel breach. The remaining questions determine accident progression at vessel breach (Questions #68 through #76) and after vessel breach (Questions #77 through #101).

What follows is a detailed discussion of the Containment Event Tree which has been developed for Peach Bottom. The discussion begins with the definition of some of the terms used in the document.

Definition of Question Types

The EVNTRE Code considers six types of questions (branch points). These are described as follows:

Type 1 : Branch point probabilities are input and are independent of the branches taken in previous questions.

Type 2 : Branch point probabilities are input and are dependent on branches taken in previous questions.

Type 3 : Which is used to input parameter values to the code. Branch point probabilities are also input.

Type 4 : Which is used to input parameter values to the code. Branch point probabilities are also input. They are dependent on the branches taken in previous questions, as are the parameter values.

Type 5 : Branch point probabilities are calculated by the code. The input is a list of parameters to be summed and values of reference parameters to which the sum is compared.

Type 6 : Branch point probabilities are calculated by the code. The input is a list of parameters to be summed and values of reference parameters to which the sum is compared. The list, the reference parameters, and the method of comparison is dependent on the branches taken in previous questions.

Probabilities

SARRP has adopted descriptive terms for the probabilities of occurrence which are assigned to various events and phenomena. Since many of these probability assignments are subjective, the verbal descriptions are generally more appropriate than the statement of numerical value. The range of numerical values associated with each descriptor is given below:

Certain :	Probability 1.0
Highly Likely :	1.0 > Probability > 0.995
Very Likely :	0.995 > Probability > 0.95
Likely :	0.95 > Probability > 0.7
Indeterminate :	0.7 > Probability > 0.3
Unlikely :	0.3 > Probability > 0.05
Very Unlikely :	0.05 > Probability > 0.005
Highly Unlikely :	0.005 > Probability > 0.0

Impossible : Probability 0.0 (Negligible)

A detailed description of the event tree structure (questions and cases) follows. Also provided, after each discription, are branch probabilities for quantifying the tree. The first 16 questions set the initial conditions and must be changed to evaluate the tree for any particular damage state. The probabilities given here for those questions to illustrate the tree, correspond to a station blackout with initial operation of high pressure injection. The remaining questions are generic in the sense that the cases cover all plant damage states of interest. Thus, the branch probabilities do not have to be changed to allow evaluation of any particular damage state.

Question # 1 : What is the initiating event?

Defines the initiating event. These events are those initiators identified by ASEP as being the most probable contributors to overall risk (i.e. frequency > 1E-8). The branch point probabilities will be zero or unity (for only one branch depending upon which sequence is to be analyzed by the tree).

This is a Type 1 question and there are 7 branches:

1 . A: Initiator is a large pipe break (loss of coolant accident).

2 . S1: Initiator is a small break which is in the size range such that High Pressure Coolant Injection (HPCI) cannot maintain level and therefore the Automatic Depressurization System (ADS) must be used to allow low pressure coolant injection.

3 . S2/3: Initiator is a break which is small enough that HPCI provides adequate injection to prevent loss of RPV level to the point that ADS is actuated. (ie level is maintained above Level 1). (ASEP frequency < 1 E-8)

4 . TLOSP: Initiator is a transient which is either induced by or results in the loss of offsite power.

5 . TPCS: Initiator is a transient induced by turbine trip or closure of the Main Steam Isolation Valve(s) (MSIV). The Power Conversion System is assumed to be isolated from the Reactor Pressure Vessel (RPV).

6 . TC: Initiator is some transient followed by a failure

of the Reactor Protection System (RPS) such that no scram occurs.

7 . IORV: The initiator is the Inadvertent Opening of a Relief Valve by the operator.

QUANTIFICATION

For this plant damage state:

Branch 4 : 100 % of the cut sets

Question # 2 : What is the initial break location?

Specifies the pathway of effluent steam (or hydrogen / fission products) from the RPV to the containment. This question is not referenced in the current tree. For some plants and for certain cut sets this question could be used in determining success criteria. It is included here for the sake of completeness.

This is a Type 1 question and there are 5 branches:

1 . RPV: Break is in piping connected to the RPV but not in the Recirculation Lines, Main Steam Lines (MSL) of Feedwater (FW) lines.

2 . Rcirc: Break is in the recirculation line.

3 . MSL: Break is in the Main Steam Line.

4 . FW: Break is in the Feedwater line.

5 . SRV: There is no break. Steam leaves the RPV only through the Safety/Relief Valves.

QUANTIFICATION

For this plant damage state:

Branch 5 : 100 % of the cut sets

Question # 3 : What is the level of pre-existing leakage or isolation failure?

BWR operating history indicates some instances where plants were operating with leakage to the environment or the reactor

building in excess of the technical specification limits. This excessive leakage was usually a result of a failure to properly close primary containment penetrations. It is believed, and recent data substantiates, that this is not a concern with inerted containments. Inerted containments carry an overpressure of nitrogen with respect to ambient pressure which would result in rapid detection of any large leakage. Leakage in excess of technical specifications is thus deemed impossible. This question is not referenced in the current version of the tree. This is equivalent to assuming that branch 5 (no excessive leakage) is always taken (probability of 1.000).

This is a Type 1 question and there are 5 branches:

1 . E1L2D: There is pre-existing leakage from the drywell large enough to remove decay heat from the containment ten minutes after shut-down.

2 . E1L1D: There is pre-existing leakage from the drywell in excess of technical specification limits but not sufficiently large to remove all the decay heat generated.

3 . E1L2W: There is pre-existing leakage from the wetwell large enough to remove decay heat from the containment ten minutes after shutdown.

4 . E1L1W: There is pre-existing leakage from the wetwell in excess of technical specification limits but not sufficiently large to remove all the decay heat generated.

5 . E1L0: There is no leakage from the containment in excess of technical specifications. (< 0.5% of the containment free volume per day).

QUANTIFICATION

For this plant damage state:

Branch 5 : 100 % of the cut sets

Question # 4 : Is there a loss of offsite power?

Determines if there is power available to AC powered equipment which is not connected to the emergency busses. Probability of LOSP is unity if the initiating event is TLOSP.

This is a Type 1 question and there are 2 branches:

1 . E1-LOP: There is a loss of offsite power.

2 . E1nLOP: Offsite power is available.

QUANTIFICATION

For this plant damage state:

Branch 1 : 100 % of the cut sets

Question # 5 : Is there a Station Blackout (Diesel generators fail)?

Determines if there is power on the emergency busses. A station blackout means that there is no offsite power and the diesel generators are not supplying power to the emergency busses (ie. neither of the two diesel generators is running). The branch taken is determined from the ASEP cut set (or sets) of interest.

This is a Type 1 question and there are 2 branches:

1 . SB: There is a station blackout. No AC power is available even on the emergency busses.

2 . nSB: There is not a station blackout. AC power is available at least from the emergency busses.

QUANTIFICATION

For this plant damage state:

Branch 1 : 100 % of the cut sets

Question # 6 : Is DC power not available?

This question determines the availability of the station battery. The station battery supplies DC power to the following critical equipment: 1) Vessel instrumentation (level, pressure, etc.), 2) Pilot valves on the Safety/Relief Valves (S/RVs) (allow automatic depressurization and relief function), 3) Vessel injection from the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems, and 4) Diesel-Generator starters. ASEP has identified common mode failure of the station batteries as being a significant contributor to the frequency of station blackout events. This question is thus highly

significant in the determination of the plant damage state.

This is a Type 1 question and there are 2 branches:

1 . E1fDC: The station batteries are failed. There is no DC power.

2 . E1-DC: Power is available on the DC busses.

QUANTIFICATION

For this plant damage state:

Branch 2 : 100 % of the cut sets

Question # 7 : For TC, does SLC fail to inject?

This question applies only to sequences involving failure of the Reactor Protection System (RPS) scram or Alternate Rod Insertion (ARI) functions (ie the initiator is an Anticipated Transient Without Scram -- ATWS). In such sequences, the Standby Liquid Control (SLC) provides a means to achieve plant shut-down. SLC is manually actuated and consists of two pumps (only one at a time may operate) which inject enriched boric acid into the RPV. The branch taken is determined by ASEP cut sets. It must be noted that these cut sets are for SLC operation within ten minutes of the initiating transient. The assumption that ten minutes is acceptable is based on calculations using the BWR-LTAS computer code. The emergency operating procedures (EOPs) would suggest starting the SLC pumps within two minutes. If injection were delayed beyond this time, core damage might still be prevented but additional actions on the part of the operator would be required. One may consider such delayed recovery by the operating staff as being accounted for in the event tree. Some fraction of the sequences identified by ASEP as being core- vulnerable are shown not to result in core damage (eventual SLC actuation, manual rod insertion, or scram recovery is assumed but is not explicit in the tree).

This is a Type 1 question and there are 3 branches:

1 . E1fSLC: SLC is not initiated within two minutes of the transient.

2 . E1-SLC: SLC is initiated within two minutes of the transient.

3 . na: The event is not a TC, the RPS performed

correctly.

QUANTIFICATION

For this plant damage state:

Branch 3 : 100 % of the cut sets

Question # 8 : Does a S/RV stick open early?

This question determines whether there is a failure of a least one Safety/Relief Valve (S/RV) to re-seat after operation. (P failure). Branch point probabilities are determined by ASEP and are dependent on the cut set (or sets) of interest.

This is a Type 1 question and there are 2 branches:

1 . E1-SORV: There is at least one stuck open relief valve.

2 . E1nSORV: There are no stuck open relief valves.

QUANTIFICATION

For this plant damage state:

Branch 2 : 100 % of the cut sets

Question # 9 : Do the HPCI and RCIC systems fail to inject?

Determines whether the High Pressure Coolant Injection (HPCI) and/or Reactor Core Isolation Cooling (RCIC) systems are operating initially. Both systems are driven by steam turbines which draw steam from the Main Steam Lines. Turbine exhaust is dumped to the suppression pool. Suction for both systems is initially from the Condensate Storage Tank (CST). Suction will switch to the suppression pool on a low CST level signal. Both systems require DC power to function. Both systems will isolate and stop injecting on high containment pressure (> 40 psig) or low RPV pressure (< 150 psig). The branch taken is dependent on the ASEP cut sets being considered.

This is a Type 1 question and there are 3 branches:

1 . E1fHPC: Both High Pressure Cooling systems (HPCI & RCIC) have failed.

2 . E1rHPC: Neither HPCI or RCIC is currently providing water injection to the RPV. However, at least one of these systems can be recovered.

3 . E1-HPC: Either HPCI or RCIC (or most likely both) is providing high pressure make-up water to the vessel.

QUANTIFICATION

For this plant damage state:

Branch 3 : 100 % of the cut sets

Question # 10 : Does the CRD hydraulic system inject?

Determines the availability of the Control Rod Drive (CRD) hydraulic system for injecting water into the vessel. The CRD system provides cooling flow to the control rod drives during normal operation. Normal flow is approximately 70 gpm. Suction for CRD flow is drawn from the CST. The CRD pump head can be up to 1800 psi. Using both CRD pumps, plant operators can manipulate the system to attain flows up to 200 gpm; with the RPV depressurized, over 300 gpm is possible. The branch taken is determined by the ASEP cut sets of interest. It should be noted that the CRD pumps are normally powered off the station bus (offsite AC). At Peach Bottom, emergency power (Diesels) may be used.

This is a Type 1 question and there are 3 branches:

1 . E1fCRD: The CRD cooling system is failed.

2 . E1rCRD: The CRD cooling system is not currently operating but is recoverable. This situation could arise in a loss of offsite power.

3 . E1-CRD: The CRD system is providing high pressure make-up water to the RPV.

QUANTIFICATION

For this plant damage state:

Branch 2 : 100 % of the cut sets

Question # 11 : Do the LPCS and LPCI systems fail?

Determines whether Low Pressure Cooling systems are available to inject water to the RPV. There are two low pressure Emergency Core Cooling (ECC) systems: (1) the Low Pressure Core Spray (LPCS) and Low Pressure Coolant Injection (LPCI). Two of the LPCI pumps are also the Residual Heat Removal (RHR) system pumps and thus provide shut-down cooling, suppression pool cooling, and containment (drywell) spray. The low pressure ECC system (LPCS & LPCI) consists of four pumps divided such that two pumps from each system are powered by a separate electrical division. Thus there are four low pressure pumps powered by each diesel. Each pump has a run-out flow in excess of 5000 gpm. Suction is normally drawn from the suppression pool, but can be taken from the CST in the case of LPCS. High pressure interlocks prevent the injection valves from opening with the RPV above 450 psi. Branch point probabilities are determined by the group of cut sets being considered.

This is a Type 1 question and there are 4 branches:

1 . E1fLPC: Both LPCS & LPCI are failed.

2 . E1rLPC: Both LPCS & LPCI are not available for injection to the vessel. However, at least one of these systems is recoverable. This situation could arise in a station blackout.

3 . E1aLPC: Either LPCS or LPCI (or both) are available (ie the pumps are running) but there is no injection to the vessel (injection valves are closed either due to high RPV pressure or system failure).

4 . E1-LPC: Either LPCS or LPCI (or both) are providing water injection to the vessel.

QUANTIFICATION

For this plant damage state:

Branch 2 : 100 % of the cut sets

Question # 12 : Do the RHR systems fail?

Suppression Pool Cooling (SPC) and the Containment Spray System (CSS) are two modes of the Residual Heat Removal (RHR) system. LPCI (see above) is also a mode of RHR. In either the SPC or CSS modes of operation the RHR system can remove heat from the suppression pool by passing water from the pool through heat

exchangers (with service water on the shell side). In spray mode, water is sprayed into the drywell. Spray water can return to the suppression pool once the water level in the drywell reaches the bottom of the vent pipes (approximately 18" deep). Both SPC and CSS must be manually initiated. Following a LOCA signal (low RPV level & high drywell pressure), automatic interlocks prevent actuation of SPC or CSS for ten minutes so as to assure LPCI availability to provide water to the RPV. The branch point probabilities are determined by the ASEP cut sets which are of being considered.

This is a Type 1 question and there are 3 branches:

1 . E1fRHR: Both SPC and CSS are failed.

2 . E1rRHR: Both SPC and CSS are not currently available but are recoverable. This condition could occur in a station blackout.

3 . E1-RHR: Either SPC or CSS (or most likely both) are available.

QUANTIFICATION

For this plant damage state:

Branch 2 : 100 % of the cut sets

Question # 13 : Does the condensate system fail?

Determines the availability of the condensate system. Since the feedwater pumps are turbine driven, closure of the Main Steam Isolation Valves (MSIVs) results in the loss of feedwater (ie the ability to inject condensate at high pressure). However, condensate and condensate booster pumps are motor driven and thus the condensate system can be available whenever offsite power is available. Injection is through the feedwater lines to the feedwater sparger inside the vessel. The condensate system can thus deliver water when vessel pressures are up to 600 psi. Since this is a high pressure system there are no pressure interlocks and isolation is done manually if at all. Suction is taken from the condenser hot well. The branch point probabilities are determined by the ASEP cut sets by the ASEP cut sets of interest.

This is a Type 1 question and there are 3 branches:

1 . E1fCOND: The condensate system is failed.

2 . E1rCOND: The condensate system is unavailable but can be recovered. Such a condition would result from a loss of offsite power (for example).

3 . E1aCOND: The condensate system is available for injection to the RPV but is not necessarily in use.

QUANTIFICATION

For this plant damage state:

Branch 2 : 100 % of the cut sets

Question # 14 : Does HPSW fail in a mode which would preclude injection?

Determines the availability of the High Pressure Service Water system for providing injection to the vessel through a cross-tie with the RHR (shut-down cooling mode) system. HPSW normally provides cooling flow for the RHR heat exchangers and drywell coolers. The system has four pumps, two powered by each emergency electrical division. Suction is taken essentially from the river. The branch point probabilities are determined by the ASEP cut sets by the ASEP cut sets of interest.

This is a Type 1 question and there are 3 branches:

1 . E1fHPSW: HPSW is not available for injection to the vessel.

2 . E1rHPSW: HPSW is unavailable but may be recovered. Loss of offsite power is the most likely cause of this condition.

3 . E1aHPSW: HPSW is available. Operator action is required to align this system for injection to the vessel.

QUANTIFICATION

For this plant damage state:

Branch 2 : 100 % of the cut sets

Question # 15 : Is there a failure which precludes drywell cooler operation?

Determines the availability of drywell coolers for containment heat removal. The coolers are sized to remove the drywell heat load during normal operation. This load is approximately 1 megawatt. While the drywell coolers are inadequate to remove decay heat, their operation could impact accident progression. The branch taken is determined by the ASEP cut sets of interest. This question is not referenced in the current tree.

This is a Type 1 question and there are 3 branches:

1 . E1fDWC: The drywell coolers are failed.

2 . E1rDWC: The drywell coolers are unavailable but may be recovered.

3 . E1aDWC: The drywell coolers are available.

QUANTIFICATION

For this plant damage state:

Branch 2 : 100 % of the cut sets

Question # 16 : Is ADS blocked or not called upon?

The Automatic Depressurization System is designed to lower the RPV pressure in the event that the high pressure systems are not maintaining adequate vessel level. This situation may occur during a small break LOCA. ADS logic requires three indications to initiate: (1) low RPV level (Level 1), (2) at least one LPCS or LPCI pump running (discharge pressure indication), and (3) the ADS timer (actuated on Level 1 signal) is timed out. The Peach Bottom ADS timer runs for 8 minutes. In an ATWS event the Emergency Operating Procedures (EOPs) dictate that ADS should be inhibited. The reason an 8 minute timer is incorporated is to allow time for the operators to inhibit the ADS. Thus, no ADS is interpreted as success for ATWS. ADS may also be actuated manually. However, manual depressurization is more likely to occur through manual actuation of the S/RVs in relief mode. ADS relief valves (7) have their own air accumulators and require only DC power to the solenoid valve on the accumulator to hold the associated valve open. The branch point probabilities are determined by the ASEP cut sets by the ASEP cut sets of interest. For this question, manual depressurization under circumstances which would have lead to ADS will be taken to be the same as ADS.

This is a Type 1 question and there are 2 branches:

1 . E1nADS: There has been no automatic depressurization of the vessel.

2 . E1-ADS: Automatic (or equivalent manual) depressurization of the vessel has occurred.

QUANTIFICATION

For this plant damage state:

Branch 1 : 100 % of the cut sets

Question # 17 : Does the RPV remain pressurized?

Determines the RPV pressure once the plant damage state has been established. The question accounts for primary system breaks as well as depressurization as described in Question #16. Emergency Operating Procedures (EOPs) prescribe vessel depressurization in circumstances when ADS would not occur. In particular, when the suppression pool temperature rises above the pre-determined limit with respect to RPV pressure. This limit is the High Temperature Condensation Limit (HTCL) which is designed to avoid condensation oscillation dynamic loads in the pool which are postulated to occur when steam is condensed in a hot suppression pool. During isolation events when no ECC injection (or RCIC) is available, depressurization is included in the procedure to prolong core cooling and provide for the use of the condensate system or HPSW for injection to the vessel.

This is a Type 2 question and there are 2 branches:

1 . E2nDeP: The vessel is not depressurized prior to core damage (if any).

2 . E2-DeP: The vessel is depressurized prior to core damage (if any).

Case # 1 :

In this case the Reactor Pressure Vessel (RPV) has been depressurized either through a large break or through the use of ADS. The RPV is thus certainly depressurized.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case, at least one S/RV is stuck open. For the dominant cut sets SPC is failed and low pressure systems are available. The suppression pool is heating. The open S/RV and the action of HPCI will be lowering the vessel pressure. The Emergency Operating Procedures (EOPs) instruct the operator to depressurize the vessel to stay within the HTCL limit (described above). However, there may be some reluctance to follow this procedure since opening additional S/RVs may be perceived to exacerbate the existing problem of an S/RV which is not closed. This possible reluctance is considered in quantifying branch point probabilities for this case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Unlikely	Indeterminate
Branch 2 :	Highly Likely	Likely	Indeterminate

Case # 3 :

In this case there is a station blackout with initial high pressure injection (HPCI / RCIC). The emergency procedures would lead the operators to depressurize the vessel to maintain the vessel pressure below that which is required by the HTCL curve. Consideration is given to the fact that coolant injection comes only from turbine driven systems. There may thus be concern over the loss of high pressure systems should the vessel be depressurized. It is recognized that depressurization to 150-200 psi will not cause isolation of HPCI or RCIC.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Highly Likely	Likely

Case # 4 :

In this case there is a station blackout and DC power has

failed. There is thus no power to operate the ADS system or use the relief mode of the S/RVs. The RPV must remain at the safety valve setpoint (close to operating pressure).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 5 :

This case includes transient initiated sequences with loss of all injection. Such sequences include blackout with loss of both HPCI and RCIC. The availability of condensate and/or High Pressure Service Water may differentiate the non-blackout sequences. However, the EOPs would dictate depressurization in either case. It may be true that the operator would be more likely to depressurize knowing condensate or HPSW were available. It is noted that if these systems were available that the sequence is unlikely to lead to core melt. This being the case, quantification assumes the operators pay no attention to the availability of other injection sources. This approach is consistent with the use of symptom- based emergency procedures.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Unlikely	Indeterminate
Branch 2 :	Certain	Likely	Indeterminate

Case # 6 :

In this case there was a transient initiator and high pressure injection is provided by HPCI, RCIC, or both. Failure of RHR is implied since, with containment heat removal available, such a sequence is not core vulnerable. Since the two high pressure make-up systems will eventually fail without containment heat removal, low pressure systems provide the only means of eventual recovery. However, the operator should be following the emergency procedures and depressurize the vessel to remain within the HTCL curve. Thus, even pessimistically, there is only a negligible possibility that the vessel would remain pressurized.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Unlikely	Indeterminate
Branch 2 :	Certain	Likely	Indeterminate

Case # 7 :

This case is similar to the previous one except that CRD flow is available. This case includes the ASEP TW sequences in which high pressure injection is relied upon in the initial stages. CRD flow can provide adequate long-term cooling. Since the operator could choose to rely on CRD flow and ignore the HTCL limit (or forget that the high pressure systems will fail without containment heat removal) some slightly larger probability for the operator failing to depressurize is given.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Unlikely	Indeterminate
Branch 2 :	Highly Likely	Likely	Indeterminate

Case # 8 :

This case includes all ATWS sequences (TC). ASEP has made an assessment of the probability of controlled depressurization in a TC sequence. The branch point probabilities for this case are thus either zero or unity, depending on which group of cut sets (TC sequence) is being analyzed by the tree. For the majority of the TC sequences the operators depressurize the RPV. However, the human error probabilities (HEPs), which were determined by the Human Reliability Analysis (HRA) carried out by Brookhaven National Laboratory (BNL) sepecifically for ATWS events at Peach Bottom, indicate a non-zero probability for the failure to depressurize prior to core uncovery resulting from the failure of the high pressure systems (HPCI).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 9 :

This case covers transient initiated sequences with no high pressure injection but with low pressure systems available. Depressurization is certain for these cases. Probably the operators would manually depressurize (not waiting for the ADS timer). If there were no manual depressurization, ADS would occur. This case does not arise in any of the ASEP cut sets.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 18 : For TC is inadequate level maintained with LPI?

This question provides ASEP results for TC sequences to the tree. All six TC sequences defined by ASEP are considered. Branch probabilities are calculated from ASEP results for the cut sets being considered. The question pertains only to the use of Low Pressure Injection since the turbine driven high pressure systems (HPCI & RCIC) are inherently incapable of maintaining level. Throughout this analysis it is assumed that the HPCI and RCIC pumps cannot pump water at a temperature above 100 C for prolonged periods due to failure of the pump seals. This is purely an assumption, and it is quite conservative. However, the assumption does not have a large impact on the core damage frequency (CDF) for Peach Bottom. Net Positive Suction Head (NPSH) is not at issue as long as the containment remains intact.

This is a Type 2 question and there are 3 branches:

1 . TL: Operator attempts to control level fail and the water level is allowed to fall sufficiently that adequate core cooling is not maintained.

2 . TAF/OSC: Operator attempts to control level are at least partially successful. Either the level is maintained at Top of Active Fuel (TAF) as specified by the EOPs or the level oscillates but still provides adequate cooling.

3 . na: The sequence is not TC.

Case # 1 :

In this case, the operators failed to inhibit ADS. As the

vessel pressure decreased past the interlock setpoint injection of 20,000 gpm of cold water would begin. Large level and power oscillations would result. Oak Ridge National Laboratory (ORNL) analyzed this sequence (Ref. 6) for the Brown's Ferry Plant (which is very similar to Peach Bottom) and found that containment pressurization will continue at a rapid rate but that core cooling would be maintained as long as water injection continued. The sequence is thus considered to be core vulnerable. This is sequence #61 on the ASEP event tree.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case ADS is inhibited and SLC is successful. Reactor power is decreasing due to poison injection. ASEP sequences #49 and #50 are covered by this case. Sequence 49 includes a failure to maintain adequate cooling with the low pressure systems. Sequence 50 includes a failure to depressurize the RPV, preventing injection by these systems, and thus adequate core cooling. In either sequence, water level is not maintained. If it were maintained this would constitute a success path. The probability that core damage is avoided when SLC is successful is already factored into the TC sequence frequency input to the tree.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case ADS is inhibited but SLC was not initiated. Vessel pressure was lowered by manual action. The probabilities for Branches 1 and 2 are set to either zero or unity depending upon which TC sequence is being considered. Branch 3 will always be zero for this case since the case only considers TC. The sequence in which the RPV level falls too low is referred to as TCSV in the event tree and it is that sequence where operator error in reading

or interpreting the level instrumentation results in too little make-up water being provided to the core.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

In this case no depressurization occurs. The operator is attempting to control level with only high pressure systems which will eventually fail as a result of the high temperatures produced in the suppression pool (from which these systems will take suction). The RPV water level is thus sure to fall too low. This sequence is identified on the ASEP ATWS tree as #60.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

This case covers sequences which are not TC. Therefore, this question does not apply.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Question # 19 : What type of sequence is this (summary of plant damage)?

Determines the sequence specified by the cut set (or sets) being considered. This is a summary question included only to simplify the logic in the questions that follow. Thus, all branch

probabilities are zero or unity.

This is a Type 2 question and there are 10 branches:

1 . AE: The sequence is a large break LOCA with a loss of all injection.

2 . AW: The sequence is a large break LOCA with a loss of the containment heat removal functions of RHR.

3 . S1E: The sequence is a small break with a loss of all injection.

4 . S1W: The sequence is a small break with a loss of the containment heat removal functions of RHR.

5 .TQUV/FTB: The sequence is a transient initiated loss of all RPV make-up water. Included are station blackouts in which both HPCI and RCIC are inoperable.

6 . TB: The sequence is a station blackout in which there is initially injection to the vessel. (The sequence may have been inititiated by a plant transient).

7 . TW: The sequence is a transient initiated event in which core cooling is maintained but the containment heat removal functions of RHR are lost.

8 . TC-fDeP: The sequence is a transient followed by a failure to scram (ie ATWS). The operator does not depressurize.

9 . TC-TL: The sequence is a transient followed by a failure to scram (ie ATWS). The operator depressurizes, or fails to inhibit ADS, and allows the level to fall to low to maintain adequate core cooling.

10 . TC-CV: The sequence is a transient followed by a failure to scram (ie ATWS). The operator controls level at TAF or the level is allowed to oscillate. The CV designation indicates that these are core vulnerable sequences, not necessarily melts.

Case # 1 :

In this case the initiating event is a large break

loss-of-coolant accident (LOCA). Low pressure injection systems (LPCI and LPCS) are failed. Because both high pressure injection systems are turbine driven they are unavailable. This defines the AE sequence.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Impossible	Impossible	Impossible

Case # 2 :

A large break loss-of-coolant accident occurs; followed by a failure of containment heat removal. This defines AW.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Impossible	Impossible	Impossible

Case # 3 :

The initiator is a small break. High Pressure Injection is terminated by depressurization of the vessel. Low pressure injection has failed so there is a total loss of all make-up flow. This defines S1E.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Impossible	Impossible	Impossible

Case # 4 :

A small break loss of coolant accident (in the size range which requires ADS) occurs. Containment heat removal subsequently fails. This defines S1W.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Impossible	Impossible	Impossible

Case # 5 :

This case covers all transient initiated events with no injection. This situation defines TQUV. This case includes station blackout with no high pressure systems available (termed Fast station blackout -- FTB).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible

Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Certain	Certain	Certain
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Impossible	Impossible	Impossible

Case # 6 :

This case includes the remainder of the station blackout sequences (referred to as slow blackouts). Initial operation of at least one of the high pressure systems is implied. Since core cooling can be maintained by the turbine driven systems for approximately six hours (battery failure prevents further operation) such sequences are termed long term station blackouts in the tree. Sometimes the term "station blackout" is also used, without qualification, to mean the same type of sequence.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Certain	Certain	Certain
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Impossible	Impossible	Impossible

Case # 7 :

In this case there is a transient initiator followed by a failure of the containment heat removal functions of RHR. This defines TW. For this case IORV is included as a transient. It should be noted that the large majority of these sequences are expected to be recovered.

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Certain	Certain	Certain
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Impossible	Impossible	Impossible

Case # 8 :

In this case the initiator is ATWS and the operator inhibits ADS and later fails to depressurize. This defines the TC - failure to depressurize sequence. This is ASEP sequence #50.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Certain	Certain	Certain
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Impossible	Impossible	Impossible

Case # 9 :

In this case there is an ATWS event. The operator depressurizes the RPV and unsuccessfully attempts to control level with the low pressure systems. This defines TC - failure to maintain adequate level sequence. This includes ASEP sequences #59 and #60.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Certain	Certain	Certain
Branch 10 :	Impossible	Impossible	Impossible

Case # 10 :

In this case there is an ATWS and core cooling is at least temporarily maintained using the low pressure pumps. The containment continues to pressurize. This defines the TC - core vulnerable sequence. For reference, this is ASEP sequence #58.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Certain	Certain	Certain

Case # 11 :

The program should never reach this point. All cases are defined above.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible
Branch 5 :	Impossible	Impossible	Impossible
Branch 6 :	Impossible	Impossible	Impossible
Branch 7 :	Impossible	Impossible	Impossible
Branch 8 :	Impossible	Impossible	Impossible
Branch 9 :	Impossible	Impossible	Impossible
Branch 10 :	Certain	Certain	Certain

Question # 20 : Is there an LP system break induced by power cycling (ATWS)?

Determines if a break in the low pressure piping (of LPCS or LPCI) occurs as a result of possible power spikes during an ATWS. This is conceivable since the injection of cold water to the core with little or no reactivity control may occur. This is especially true when the operator is attempting to manually control injection with large capacity systems. Power spikes could be sufficiently severe or rapid that a check valve may fail resulting in exposure of the LP piping to high pressure. It is noted that BWR low pressure piping is expected to withstand full RPV pressure and has withstood static testing at these pressures. For completeness, allowance has been made for these postulated dynamic failures. Low pressure system piping in BWRs is designed for approximately 50% of the system operating pressure. Design margins on piping are typically larger than 100%. Thus one would not expect the low pressure piping to fail even if it were exposed to operating pressure. Check valves are used in the piping to prevent such exposure but it is conceivable that these may fail to close or have been inadvertently left open. Indeed, in a recent incident at Brown's Ferry, a testable check valve was left in the open position, allowing the low pressure ECCS (LPCS) piping to be exposed to full RPV pressure. No damage to that piping resulted.

This is a Type 2 question and there are 2 branches:

1 . PCyBk: A break occurs in the LPCS or LPCI piping as a result of an ATWS power spike.

2 . nPCyBk: No break is induced in low pressure piping as a result of ATWS.

Case # 1 :

A large power spike is judged to be likely if ADS were to occur during an ATWS event. This judgement assumes that no steps were previously taken to inhibit low pressure injection (there is little time or reason to do so). Following ADS both the LPCS and the LPCI would inject. The voids in the reactor core would collapse. With the core filled with cold water, an over-moderated condition would result. The core power is expected to increase to a level which would be substantially larger than rated power. Fuel rods would heat rapidly, voids would be formed, resulting in the reactor power decreasing. However, with the void formation, there would be an large increase in the vessel pressure. This occurrence is judged to have the largest potential for inducing a pipe break in the low

pressure systems. Oak Ridge National Laboratory analyzed this sequence for the Brown's Ferry plant (which is very similar to Peach Bottom) under the Severe Accident Sequence Analysis (SASA) Program. The results of this analysis show that the RPV pressure at no time exceeds the design value (ie the S/RVs are able to relieve the excess pressure generated). Since the maximum pressure is thus anticipated to be within the RPV design limit (1350 psia), and probably close to the system operating pressure, the probability of an induced failure is judged to be negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

This case includes TC sequences in which the operator has limited success in controlling level. There is some opportunity for cycling of the power level to be induced if (or when) the operator depressurizes the vessel and attempts to use the low pressure, high capacity, systems to control the RPV level. However, since in the sequences considered here the result of this attempt is that injection is inadequate there is judged to be little chance of significant power cycles and even less chance of a break being induced. As in the previous case, the probability of an induced break is negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

In this case the operator is maintaining adequate core cooling at a reduced level. Manual control of the ECCS pump flowrates has been taken. It is thus conceivable that a power spike could occur from a sudden increase in water injection. However, it is presumed for these sequences that the operator follows the Emergency Operating Procedures. The logical opportunity for a power spike comes as the vessel is depressurized and injection is transferred to the large capacity low pressure pumps. With slow depressurization and adequate throttling of the flow as the

injection valves are opened no problems should result. If the depressurization were too rapid and if the pumps were allowed to begin injection at full flow, a power spike may result as water from the suppression pool (with high subcooling and thus a good moderator) is introduced to the core. With mixing of saturated water already in the vessel any power increase is not likely to be severe enough to cause repressurization of the vessel. A break in the low pressure piping from repressurization thus induced is even less likely and is, as in the previous cases of this question, assigned a negligible probability.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 4 :

This case covers all sequences which are not TC. Power cycles cannot occur if the Reactor Protection System (RPS) functions. Since there are no power cycles, a power cycle break is impossible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 21 : Do low pressure ECC systems continue/begin to inject?

This question determines whether low pressure systems are used to provide cooling flow to the core. The status of the low pressure systems (LPCS and LPCI) is also reflected for reference by future questions. This status will be unchanged from that reflected in Question #11 (above) unless the systems were previously available and are now being used for injection.

This is a Type 2 question and there are 4 branches:

1 . E2fLPC: Low pressure ECCS (both LPCS and LPCI) have failed.

2 . E2rLPC: Neither LPCS nor LPCI are available. However, at least one of these systems is recoverable.

3 . E2aLPC: Either LPCS or LPCI (or both) are available (the pumps are running) but are not providing make-up water to the RPV. (Most likely because the RPV pressure is too high).

4 . E2-LPC: Either LPCS or LPCI (or both) are providing make-up water to the RPV.

Case # 1 :

In this case low pressure systems were initially recoverable and nothing has happened to alter this status. They remain recoverable.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the vessel is not depressurized. Even though the low pressure systems may be available, there can be no injection since the injection valves are closed. This case includes the TC sequence identified by ASEP in which the operators fail to depressurize the vessel. This case is singled out since it specifically represents a branch point on the ASEP tree and does not reflect any judgement on the part of the authors of the Containment Event Tree with respect to branch point probabilities. However, since the case requires that the RPV remain pressurized, it is certain that there will be no low pressure injection.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible

Case # 3 :

This case covers two types of sequence. In the first type, both low pressure systems are failed (LPCS and LPCI) due to hardware failures and thus they remain failed. The second type of sequence covered by this case is an ATWS in which the operator fails to maintain adequate water level in the core after taking manual control of the RPV level. This possibility was identified by ASEP. The frequency of occurrence for this sequence is also quantified by ASEP. It is noted that the frequency is low. For this ATWS sequence, Low Pressure Injection is failed due to operator error. Quantification of the branch probabilities in this case should be understood in this light.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 4 :

This case covers all sequences in which the vessel is depressurized and at least one of the low pressure systems is available. Since low pressure injection is automatic for such circumstances, injection is deemed certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain

Question # 22 : Do containment sprays fail before core degradation?

This question determines the availability of containment spray mode of the RHR system. This includes the availability of spray water only, not the ability to use the sprays for the removal of heat from containment; the latter is considered in questions pertaining to the RHR system. For instance, if Emergency Service Water is failed the RHR heat exchangers are useless but spray water can still be directed to the drywell and this would profoundly influence both the accident progression and source terms. Use of

HPSW for containment spray has been included. The Peach Bottom P&ID for LPCI indicate that valve alignment to spray service water is possible. While this mode would not remove energy from the containment, the containment temperature and pressure would be lowered. Containment spray is directed when the drywell pressure significantly exceeds the normal level. Interlocks prevent spray operation with the RHR pumps for ten minutes after a demand for LPCI. Thus if the RPV level is oscillating, as is likely in an ATWS event, the sprays will shut down as the water level reduces through Level 1 (causing a demand for LPCI).This automatic shut-down of containment spray is judged to reduce the likelihood of continued drywell spray in an ATWS initiated sequence.

This is a Type 2 question and there are 4 branches:

1 . E3fCS: Containment sprays are failed.

2 . E3rCS: Containment sprays are unavailable but may be recovered.

3 . E3aCS: Containment sprays are available but are not providing spray to the drywell.

4 . E3-CS: Containment sprays are used to spray the drywell.

Case # 1 :

In this case all systems which are capable of supplying drywell spray (RHR/LPCI and HPSW) are failed. Containment spray is thus failed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 2 :

This case includes station blackouts in which both systems which are capable of supplying spray (RHR/LPCI and HPSW) are unavailable but can be recovered. Containment spray is thus also unavailable but may be recovered.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 3 :

In this case the accident initiator is a primary system break. For such sequences the drywell pressure is rapidly elevated. The containment spray system is intended to provide rapid reduction in the drywell pressure. In this case, RHR is available, this is assumed to imply that spray mode can be used. That the operator will use spray under these conditions of high containment pressure is judged to be almost certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain

Case # 4 :

In this case the accident sequence is either initiated by a primary system break or involves a loss of heat removal (TW). The plant damage state is such that RHR is not available so the use of spray will not lower the total heat within the containment. However, either the RHR pumps (LPCI) or High Pressure Service Water is available for use in containment spray. (There is a slight inaccuracy here in that the tree references the availability of LPCS and LPCI together so LPCI failed and LPCS available could be the plant damage state for a sequence included in this case. Since none of the ASEP core melt or core vulnerable cut sets contain this damage state, the event tree results are not impacted.) As noted above, High Pressure Service Water can be used for containment spray and this will have the effect of lowering the containment temperature and (at least temporarily) the pressure. Since containment spray is not available in the usual sense, and because the use of HPSW requires more unusual operator actions, a lower probability for successful spray is judged to apply in this case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Very Unlikely	Unlikely
Branch 4 :	Certain	Very Likely	Likely

Case # 5 :

In this case the accident initiator is an ATWS and the RHR system is available. Two of the three ASEP TC sequences are considered in this case. The first is that in which the operator controls level with the high pressure systems and fails to depressurize the RPV. The second is that in which the water level in the RPV is controlled to low. In either sequence, severe water level oscillations are not expected and the operator apparently believes the situation is under control. Under such conditions, the operator is all but certain to use the containment spray to reduce containment pressure. Spray will be available and the containment pressure is high.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Highly Unlikely	Very Unlikely	Unlikely
Branch 4 :	Highly Likely	Very Likely	Likely

Case # 6 :

This case considers the third ASEP TC sequence (the one not considered in the previous case). In this sequence the operators are manually controlling RPV level using LPCS (most likely) or LPCI. It is anticipated that the water level in the RPV will be oscillating. This is expected since the injection capacity of the low pressure ECCS far exceeds what is needed to maintain adequate water level and the operator has only rough control of the injection valve position. As described above, water level oscillation around the Level 1 setpoint will cause the spray system to isolate. Thus the operators are likely to have to repeatedly attempt to initiate spray. The probability that spray will operate for a significant period prior to core damage for this sequence is judged to be indeterminate. The optimistic and pessimistic estimates of the failure probability reflect a reasonable range of

uncertainty in this estimate.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Unlikely	Indeterminate	Certain
Branch 4 :	Likely	Indeterminate	Impossible

Case # 7 :

This case covers sequences in which the initiating event is a transient and there is little pressurization of the containment because the suppression pool will prevent significant increases in the containment pressure. With no pressurization of the containment, there will be no call for containment spray so the operator will not use it. Spray remains available however.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible

Question # 23 : Is the containment vented before core degradation?

Determines whether the operator successfully vents containment prior to core damage. The EOPs instruct containment venting when containment pressure exceeds 60 psig. There are three likely vent pathways: The first is a 2" line (with a 1" valve) which connects to the torus airspace and is part of the vent and purge system. The second consists of two 18" lines, also connected to the torus airspace and also part of the vent and purge system. The third is the Integrated Leak Rate Test (ILRT) line which connects to the torus and vents outside the reactor building. The latter line has four valves in series (two of which are in the above 18" line) and is terminated by a blind flange. The other pathways can be opened from the control room provided AC power is available. The procedure for opening the 18" lines calls for local action to deflate the valve seals prior to opening the valve. In addition there are lines connected to the drywell which could be used for venting. However, since the procedures call for opening the wetwell lines first, and significant time would be required for

these actions, the possibility of drywell venting is judged to be negligibly small and is not considered in the containment event tree. Successful venting is defined to mean that a depressurization of the containment occurs. This definition is particularly significant for TC sequences in which opening an 18" line is unlikely to allow enough steam to escape the containment to result in the containment pressure being lowered.

This is a Type 2 question and there are 2 branches:

1 . E3nVENT: The containment is not successfully vented prior to core damage.

2 . E3-VENT: The containment is successfully vented prior to core damage.

Case # 1 :

This case includes station blackout (High Pressure Injection continues until battery depletion). The containment venting pressure of 60 psig will not be reached prior to core damage. It is also true that the operator has no indication of containment pressure due to the loss of AC power which is used for the pressure transmitters. (A mechanical pressure gauge could be rigged to give this indication but procedures to do this are not specific.) Because following the emergency procedures would not lead to containment venting in a blackout, the probability of successful venting is judged to be negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

This case covers break initiators followed by a subsequent loss of containment heat removal. This sequence is slow to progress. Venting (in accordance with EOPs) would occur approximately 8 to 10 hours after the break occurred. The probability of venting for these accidents has been assessed by ASEP. The optimistic and central estimates reflect what is judged to be an appropriate range of this value. It is noted that with a primary system break there will be alarms indicating high radiation in the containment. These alarms could bring about some reluctance to vent the containment.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Very Unlikely	Unlikely
Branch 2 :	Highly Likely	Very Likely	Likely

Case # 3 :

In this case there is a loss of containment heat removal following a transient event. Transient initiated events are even slower progressing than those which are break-initiated. It requires on the order of a day to reach the venting threshold. There will probably be no radiation alarms in this sequence. The operators will have plenty of time to prepare for venting. Public officials can have ample notification to consider measures which may be needed to protect or reassure the surrounding population. For these sequences, venting is the only measure which is expected to avert core damage, thus it seems all but certain that venting would occur.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Highly Likely	Likely

Case # 4 :

In this case the sequence is TC. For an ATWS sequence successful venting is defined to mean arresting the rise in containment pressure. This is doubtful with only one 18 inch vent line if the core power level is 18%. However, there are large uncertainties in the power level calculation, this is especially true when the vessel is at low pressure, as it would be for these sequences. Quantification of the probabilities for venting in this case reflects this uncertainty. It is considered likely that if the operators are successful in opening one of the 18" vent lines they will open both. Some uncertainty arises with respect to whether the fact that the opening of the first valve does not reduce the containment pressure is identified by the operators in time to open the second line. Recent calculations performed by Battelle Columbus indicate that with the reactor power level at 12.7% (the current best estimate for low pressure) two 18" lines will maintain the containment pressure below 132 psia. Thus, the issue considered here is whether the operating staff will vent.

The procedures do not call for venting until the containment pressure reaches 60 psig. At that time the containment pressure would be rising rapidly. It requires approximately 20 minutes to jumper the containment isolation system such that the valves can be opened. Considering the rapid pressure rise, successful venting is considered to be unlikely. Quantification of the probability for failure to vent was performed by ASEP. Their central estimate is 0.9. Their maximum and minimum values are 1.0 and 0. 5 respectively. Their assumption is that a maximum entropy distribution is appropriate. In SARRP we are assuming the maximum and minimum values to be the pessimistic and optimistic quantifications. For the purpose of determining the accident progression, the branch point probabilities for this question are either zero or unity. The sequences to be analyzed for accident progression include the phenomenological cut sets in the sequence frequency and thus whether the containment is vented or not has been previously factored into the sequence definition. Sequences involving a power cycle break in the low pressure systems containment pressure are excluded from this case since the containment is bypassed and no venting will occur.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Likely	Certain
Branch 2 :	Indeterminate	Unlikely	Impossible

Case # 5 :

This case covers the two remaining types of TC sequences identified by ASEP. In both these sequences, operator error results in core damage prior to containment failure. However, the 60 psig venting threshold pressure is almost certain to be reached. For ATWS sequences in which the operators have failed to depressurize, reactor power may be too high for successful venting. Sequences in which the RPV water level is being maintained too low to provide adequate core cooling (water level below the core midplane) involve power levels sufficiently low for one 18" line to sucessfully vent the containment. However, in both these sequences the plant operating staff are assumed to have already made errors (either in not depressurizing or in failing to keep the core covered. As in the previous case, the branch point probabilities are either zero or unity depending upon which TC cut set groups are being considered. As in the previous case, power cycle break sequences are excluded from this case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 6 :

This case catches those sequences in which the containment challenge, if any, comes after core degradation. Blackouts, in which pressure indication is lost, are not included but have been considered in a previous case of this question. Since the pressure has not reached the venting threshold, it is judged to be certain that the operators will not decide to vent. To do so would violate the EOPs.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 24 : Does the RPV repressurize before core damage?

The S/RVs or ADS valves are held open by air pressure. The valves stay open only as long as the air pressure in the accumulators (containment isolation isolates the accumulators from plant air) exceeds the drywell pressure. If the containment is allowed to pressurize to within 20-25 psi of the air pressure level (ie containment at approx. 110 psi) the valves will reclose and the RPV will begin to repressurize.

This is a Type 2 question and there are 2 branches:

1 . ReP: The Reactor Pressure Vessel (RPV) repressurizes prior to core damage.

2 . nReP: The Reactor Pressure Vessel (RPV) does not repressurize prior to core damage.

Case # 1 :

This case excludes: TB (station blackout), TW (transient followed by loss of RHR), and TC-CV (ATWS with successful level control). These are the only sequences for which repressurization prior to core damage is possible. This case includes sequences

initiated by breaks and transient initiated sequences where there is a loss of adequate RPV water level before containment pressurization is significant. Repressurization does not occur before core damage for these sequences.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case there is a stuck open relief valve. Containment pressurization cannot reseat this valve so regardless of whether other valves are opened in relief mode and can thus be reclosed, there is judged to be a negligible probability that the Reactor Pressure Vessel could repressurize.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

In this case an ATWS power cycle has induced a primary system break in the reactor building. With a break in the primary system, repressurization is impossible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 4 :

In this case the sequence is a TC and the operator is successfully controlling the RPV water level using the low pressure systems. Venting is successful and the containment pressure decreases. It is certain that the S/RVs will not reclose.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 5 :

In this case the sequence is a long term blackout (initial high pressure injection). The vessel was depressurized by operator action to stay within the HTCL. Containment pressurization will be insufficient to cause S/RV reclosure regardless of any action taken to vent. Repressurization will occur before core damage if the station batteries fail prior to the water make-up pumps (HPCI & RCIC) failing as a result of the pumps overheating. If the batteries fail, injection ceases and the S/RVs reclose. If the pumps fail first, the vessel will remain depressurized. Even though there are methods available to the operators for prolonging battery life, battery failure is the more likely cause of repressurization. Quantification of the probabilities for this case thus reflects the probability of battery failure for blackout sequences with initial high pressure make-up. Since Philadelphia Electric's estimate of battery life is 6 to 7 hours under blackout conditions and there are no procedures available to prolong this period, longer survival is judged very unlikely. A small probability of extended operation is included in the central estimate to reflect uncertainty which could be attributed to the assessment of battery life. This also accounts for the possibility that the operating staff could reduce loads sufficiently to extend the life of the batteries.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Likely	Very Likely	Highly Likely
Branch 2 :	Unlikely	Very Unlikely	Highly Unlikely

Case # 6 :

In this case the sequence was transient initiated and depressurization occurred prior to loss of injection capability. The containment continued to pressurize and was not vented. The S/RVs are certain to reclose as a result of the continued increase in the containment pressure.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 7 :

This case covers sequences in which the vessel was not depressurized. Since it was not depressurized it cannot repressurize. TW sequences in which the containment were successfully vented are also covered by this case. Venting will preclude repressurization.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 25 : Does (do) any S/RV-tailpipe vacuum breaker(s) stick open?

This question determines whether one or more of the vacuum breakers on the S/RV tailpipes has stuck open. A stuck open tailpipe vacuum breaker would provide a pathway for suppression pool bypass since gasses released from the vessel down the tailpipe would pass directly into the drywell. Tailpipe vacuum breakers will open after the associated S/RV discharges steam through the tailpipe into the suppression pool. When the steam in the tailpipe condenses on the pipe walls a vacuum is formed. The vacuum breaker prevents the tailpipe from drawing suppression pool water into it. A stuck open tailpipe vacuum breaker is only significant if it is the vacuum breaker on the tailpipe for an S/RV which is expected to be open after core damage occurs. Thus the cases below consider which vacuum breakers are challenged by the sequence during the boil-down phase of the accident. The question only reflects significant vacuum breakers being stuck open (ie ones which will result in fission product releases bypassing the suppression pool). The probability of a tailpipe vacuum breaker sticking open was estimated by ASEP to be 0.03 per demand, based on available data. For all sequences this results in a probability of unity that a tailpipe vacuum breaker will fail to reclose. However, the vacuum breakers at Peach Bottom have been modified from the original design (to which the above failure rate applies). The probability of a failure to reclose for the modified design is unknown. Optimistically, it is assumed that the modifications

resulted in a factor of ten decrease in the failure rate per demand. It is further assumed that there is no reduction in the failure probability for subsequent demands. Reduction of the failure rate for subsequent demand is based on check valve or relief valve performance where the first opening may actually clean the valve seat thus improving reclosure probability. The tailpipe vacuum breakers may actually accumulate damage with subsequent openings; thus the reduction in the failure rate is judged inappropriate.

This is a Type 2 question and there are 2 branches:

1 . oSRVBkr: There is a least one S/RV tailpipe vacuum breaker stuck open.

2 . cSRVBkr: There are no S/RV tailpipe vacuum breakers stuck open.

Case # 1 :

This case covers transients followed by loss of all injection (TQUV) with no depressurization and no stuck open relief valves. The vessel will boil down to the point at which core damage occurs in about an hour. A hand calculation has been made (Appendix B) which indicates that the boil- off of the RPV inventory of water results in 52 lifts of one S/RV. The estimated probability of a failure to reclose is thus 0.16 in the optimistic evaluation. The pessimistic evaluation is 1.0. The mean of these two values (0.6) is taken as the central estimate.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Certain
Branch 2 :	Likely	Indeterminate	Impossible

Case # 2 :

This case covers long term isolation transients. These are similar to those covered in the previous case except that high pressure systems provide initial core cooling. There are thus many more challenges to the tailpipe vacuum breakers. With the vessel at high pressure (with no SORV), the low-low set S/RV will cycle. This is the same valve through which fission products could be released if core damage followed, thus a stuck open vacuum breaker could be significant. A hand calculation (Appendix B) provides an

estimate of 77 S/RV lifts. The optimistic estimate of the probability of failure to reclose is thus 0.23. The pessimistic estimate is 1.0. The central estimate was taken to be 0.7.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Indeterminate	Certain
Branch 2 :	Indeterminate	Indeterminate	Impossible

Case # 3 :

This case includes TC sequences with a failure to depressurize the vessel. The power level is such that one or more S/RVs will be held open in relief mode if depressurization does not occur. The valve which would cycle, thereby challenging the tailpipe vacuum breaker, is not the low-low set valve and thus would not be the valve through which fission products pass. A smaller probability of this bypass is thus judged valid. Challenges to the low-low set valve might occur late in the sequence. The central estimate is that this bypass pathway is unlikely for this sequence. The optimistic and pessimistic estimates reflect a factor of ten variation in probability of a failure to reclose a tailpipe vacuum breaker causing a suppression pool bypass.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Very Unlikely	Unlikely
Branch 2 :	Certain	Very Likely	Likely

Case # 4 :

This case covers sequences with primary system breaks and/or early vessel depressurization. For such cases the release pathway is not through an S/RV which would have been cycling earlier. Thus there can be no bypass through any stuck open tailpipe vacuum breaker.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 26 : Is there a repressurization break of low pressure systems?

Determines whether a break occurs in the low pressure piping of the LPCS or LPCI systems as a result of the RPV repressurization. Since the low pressure piping on a BWR can probably withstand primary system pressure, and since the check valves should function to protect the "low pressure" piping, a break induced as a result of the vessel repressurizing is not considered to be of significant probability. This question is included primarily for completeness since earlier BWR risk assessments have show "V" sequences to be significant risk contributors. While ASEP did not identify interfacing system LOCAs as significant initiating events, they may be considered more likely if the vessel is repressurized with the low pressure ECCS operating. In this case action of the check valve, exclusive of pressure interlocks closing the injection valves, is needed to protect the upstream piping from full RPV pressure. However, even if these valves were not to close, it is judged to be of negligible probability that the piping would fail. Question #20 (above) has more discussion of this issue.

This is a Type 2 question and there are 2 branches:

1 . RePBk: A break in the low pressure ECCS piping results from RPV repressurization.

2 . nRePBk: There are no breaks in the low pressure ECCS piping resulting from vessel repressurization.

Case # 1 :

This case includes all sequences in which there is a repressurization of the primary system prior to core damage. RPV pressure thus increases past the shut-off point of low pressure injection. Only in such sequences is a repressurization break possible. Quantification reflects the probability that the check valve will fail to reclose and that the piping has some defect which results in a break occurring. The piping has sufficient design strength to withstand the pressure, thus the failure probability is taken as negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible

Branch 2 :	Certain	Certain	Certain

Case # 2 :

This case includes all sequences where there is no repressurization. Therefore, a repressurization break is impossible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 27 : Does containment fail before core degradation?

This question determines whether or not the containment fails prior to core degradation. This is possible only when injection to the vessel is maintained but heat removal from the containment is inadequate.

This is a Type 2 question and there are 2 branches:

1 . E3-CFP: The containment fails as a result of overpressurization prior to core degradation.

2 . E3nCFP: The containment is not failed prior to core degradation.

Case # 1 :

This case covers sequences with an induced break in the low pressure ECCS piping (Question #20 or Question #26). With such a break, containment is bypassed. Since there is no challenge to the containment, overpressure failure is impossible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case the containment is successfully vented. By definition, this precludes containment failure due to overpressure. For this case failure is then impossible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

This case includes all sequences in which there is no challenge to containment prior to core degradation. Included are all sequences without initial injection to the vessel, blackouts, and ATWS events in which injection is insufficient to maintain adequate core cooling even though the ECC systems are operable (failure to depressurize or level maintained too low sequences). For all these sequences core damage will occur before the pressure rise in the containment is sufficient to challenge its integrity. Loss of containment heat removal (W) sequences and the core vulnerable TC sequences are specifically excluded.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 4 :

In this case the sequence is an ATWS with adequate core cooling being provided by the low pressure systems. The power level is estimated to be 13% to 18%. Venting was not attempted or was unsuccessful and the containment pressurizes rapidly. As the containment continues to pressurize, there are two possibilities. Either the containment will fail or the S/RVs will reclose due to the elevated containment pressure early enough to prevent pressurization of the containment to the point of failure. In the latter case core degradation will occur in an intact containment. This case thus essentially determines if containment fails after injection is lost but before the level in the RPV boils down to the point at which core damage will occur The probability of containment failure was addressed with a simple hand calculation assuming 470,000 pounds of water are boiled off to the pool after S/RV reclosure prior to core damage. That calculation (in Appendix

B) demonstrates that the containment pressure would certainly be raised far beyond the mean failure pressure. However, the calculation assumed water level to be maintained at the normal level. This is not the expected case. Rather one expects that the level would oscillate between the normal level and TAF. Thus, the probability that the containment will remain intact is uncertain; it depends on the water inventory of the vessel at the time the vessel pressure reaches the cut-off pressure for low pressure injection. In the analysis of accident progression, branch point probabilities will be zero or unity depending upon the group of cut sets being considered. The cut sets include containment failure, and thus the cut sets determine the branch point probabilities for this case. In assessing the sequence frequency for these cut sets, the containment failure probability for this case was 0.6. This quantification reflects the authors' judgement that water level in the RPV is likely to maintained near TAF and thus, once injection fails, there is a significant probability that the containment will no overpressurize.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Highly Likely
Branch 2 :	Likely	Indeterminate	Highly Unlikely

Case # 5 :

This case includes transient initiated sequences with loss of containment heat removal. High pressure systems will fail on high containment pressure (this case includes no venting) or high pool temperature, the RPV will repressurize eliminating low pressure injection. CRD flow is also not available so there is no injection. Unlike the previous case, at the time injection fails the the RPV water level will be in the normal range. As indicated by the calculation described for that case (Appendix B), containment failure is certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 6 :

This case covers the remaining sequences for which injection

continues in the absence of containment venting and containment heat removal. Subsequent failure of the containment prior to core damage is certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 28 : What is location of early containment leakage?

This question determines whether early containment failure occurs in the wetwell or in the drywell. Given that the containment fails (determined in the previous question) the split fraction between wetwell and drywell was estimated based on the weighting factors placed on various modes of containment failure by a group of experts assembled by SARRP to consider risk significant issues for Peach Bottom (Ref. 3). (See Appendix B).

This is a Type 2 question and there are 3 branches:

1 . E3nCL: There is no leakage from the containment, prior to core degradation, which is in excess of technical specification limits.

2 . E3-CLD: There is containment leakage from the drywell prior to core degradation.

3 . E3-CLW: There is containment leakage from the wetwell prior to core degradation.

Case # 1 :

In this case there has been an induced LOCA in the low pressure ECCS piping. The RPV is thus open to the reactor building. While the containment structure is intact, there is leakage from the containment and it originates in the drywell.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the containment has been vented. Leakage is thus from the wetwell since drywell venting is assumed to be of negligible probability.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

There has been an overpressure failure of the containment. The probability of drywell (versus wetwell) failure is estimated from the expert responses (Appendix B). The optimistic estimate is the highest weighting assigned to wetwell failure by any one expert. The pessimistic estimate corresponds to the majority of experts, who gave no weight to wetwell failure.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Indeterminate	Likely	Certain
Branch 3 :	Indeterminate	Unlikely	Impossible

Case # 4 :

This case includes all sequences in which the containment is not breached prior to core degradation. The probability is thus unity that the containment does not leak.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 29 : For Drywell failures, is the failure at the head seal?

This question applies to sequences in which early containment failure occurs in the drywell (determined by the previous question). Two possible drywell failure modes have been identified. The Ames Laboratory analysis (Ref. 7) concluded that the weakest point in the drywell wall was at the knuckle (junction between cylindrical and spherical sections). However, leakage at the head seal is also possible. Leakage flows from the latter location pass directly into the refueling bay, bypassing the reactor building. If the reactor building is bypassed, there may be a significant reduction in the retention of fission products by the secondary containment. The split fraction between failure at the head seal and locations lower in the drywell (represented by the knuckle location) was determined on the basis of the same expert opinions described in the previous question. (See Appendix B).

This is a Type 2 question and there are 3 branches:

1 . E3-DHF: There is leakage from the drywell head seal prior to core degradation.

2 . E3-DKF: There is leakage from the drywell to the reactor building (from the knuckle) prior to core degradation.

3 . E3nDF: The drywell retains its integrity prior to core degradation.

Case # 1 :

In this case there has been an induced failure of the low pressure ECCS piping in the reactor building. The leakage pathway from inside the containment is to the reactor building. This is assumed equivalent to a knuckle failure.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the drywell has been assumed to have failed due to o verpressurization by steam. The central estimate of the split fraction between the head seal leakage location and locations lower in the drywell (represented by the knuckle) was determined from the average of the expert weightings. Since the result is close to a 50- 50 split, the optimistic and pessimistic evaluations were taken as the typical range assumed in this event tree around an indeterminate value (ie 0.1 and 0.9) .

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

This case covers sequences in which the drywell retains its integrity. The probability of no drywell leakage is thus unity.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Question # 30 : What is the containment leakage level before core degradation?

This question determines the level (or rate) of leakage from the containment prior to core degradation. Two distinct levels of leakage are allowed. Level 2 corresponds to a small leak which provides essentially no reduction in the containment pressure (leak rate approximately equal to vessel steaming rate). Level 3 corresponds to a rupture of the containment (the containment depressurizes). The probabilities for the various levels were determined based on weights assigned by the SARRP expert review group (Ref. 3) to these levels; considering various modes of containment failure. (See Appendix B).

This is a Type 2 question and there are 3 branches:

1 . E3nCL: There is no leakage from the containment significantly in excess of technical

specifications prior to core damage.

2 . E3-CL2: There is leakage from the containment prior to core damage. However, the leakage is insufficient to result in depressurization of the containment.

3 . E3-CL3: There is a failure of containment prior to core damage of a size sufficient to cause depressurization of the containment.

Case # 1 :

In this case a break has been induced in the low pressure ECC system piping. The containment is effectively bypassed. Containment pressure will remain at approximately its current level so long as the RPV remains intact. However, leakage of steam from the vessel is sufficiently large that, with respect to impact on the reactor building, this is considered to be Level 3 leakage. This classification is consistent with subsequent references to this question.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case the containment has been successfully vented. With the containment vented, leakage from the containment is, by the definition of successful venting, Level 3.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

This case is an ATWS in which containment failure occurs prior

to core damage. With the high pressurization rate assumed to occur for ATWS, a large size failure of containment is judged to be more likely. The IDCOR analyses assume a leak type failure of containment when the drywell temperature is elevated but this will not be so for ATWS events with early containment failure resulting from steam pressurization. This possibility has been reflected in the quantification of the phenomenological cut sets which were "anded" to the ASEP cut set for the TC sequences. The branch point probabilities for this case are thus either zero or unity depending upon the cut set group being analyzed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 4 :

In this case the containment has failed as a result of overpressurization by steam. The failure location is either the torus or the drywell knuckle (as determined by Question #28 and Question #29). The average weight assigned to the leakage failure mode, given these failure locations, was 0.1. The pessimistic estimate is zero which is both the minimum possible and the smallest value assigned by any of the SARRP expert reviewers. The optimistic estimate is 0.9 which is used to reflect the IDCOR position on this issue.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Likely	Unlikely	Impossible
Branch 3 :	Unlikely	Likely	Certain

Case # 5 :

In this case failure occurs at the head seal. There was general consensus among the experts polled that this failure location would always result in a leak. The tortuous leakage pathway around the seal was cited as justification for this conclusion. Due to the consensus between the experts polled by SARRP and the apparent similar conclusion by IDCOR, the quantification for all walkthroughs is the same.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 6 :

In this case the containment is not bypassed, vented, or failed. The probability of significant leakage is thus judged to be negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 31 : Is the suppression pool drained before CD?

If the accident progression involves failure of the torus (wetwell) the failure may occur below the level of the pool. If this were the case, the pool would begin to drain. This question considers this possibility. Since there is no analysis which indicates whether failure is more likely either above or below the pool surface, it is assumed to be a fifty-fifty proposition.

This is a Type 2 question and there are 2 branches:

1 . E4-SPD: The suppression pool begins to drain prior to core damage.

2 . E4nSPD: The suppression pool water inventory is maintained.

Case # 1 :

In this case the wetwell ruptures prior to core degradation. (Level 2 leakage is considered not to significantly impact pool level prior to vessel breach.) As stated above, in the central estimate there is assumed to be a 0.5 probability that the

suppression pool will begin to drain. As with other indeterminate probabilities, the optimistic and pessimistic estimates are 0.1 and 0.9 respectively.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 2 :

This case covers sequences in which there is either no containment failure prior to core damage, failure occurred in the drywell, or there is only a Level 2 leak in the torus which is assumed too small to lower the water level significantly during core degradation.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 32 : Does AC power remain lost during core degradation?

This question accounts for the delayed recovery of offsite power. ASEP accounts for recovery which occurs prior to core damage in estimating the sequence frequency but later recovery is also possible. Late recovery of AC may prevent vessel melt-through and otherwise mitigate accident consequences. The probability of non-recovery for this question is estimated from the generic grid data used by ASEP. ASEP estimates that the non-recovery probability at any given time is within plus-or-minus a factor of 3. This error factor is used in estimating the optimistic and pessimistic non-recovery probabilities for this question.

This is a Type 2 question and there are 2 branches:

1 . E4fAC: AC power is not recovered prior to vessel breach.

2 . E4-AC: AC power is recovered during core degradation.

Case # 1 :

This case includes the so-called fast station blackouts in which high pressure systems fail to inject. For these sequences recovery during core degradation is equivalent to the probability of power being restored between 1 and 2.5 hours after the loss. The probability of non-recovery for this case is thus the probability that offsite power is not recovered 2.5 hours after the loss, given that it was not recovered 1 hour after.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Indeterminate
Branch 2 :	Likely	Indeterminate	Indeterminate

Case # 2 :

This case includes blackouts in which there is early high pressure coolant make-up. AC power would have to be restored between 7 and 8 hours after the blackout to prevent damage; vessel failure is possibly prevented with recovery by 11 hours. The recovery probability was estimated based on sequence timing results from the Source Term Code Package (STCP) calculations. These calculations show core uncovery at 8.8 hours and core slump at 11.6 hours. The non-recovery probability for this case was estimated assuming that power must be restored by 11.6 hours to be efficacious.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Indeterminate	Likely
Branch 2 :	Indeterminate	Indeterminate	Unlikely

Case # 3 :

For the remaining sequences some form of AC power is available (either emergency or offsite) thus AC power remains available with a probability of unity.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible

Branch 2 :	Certain	Certain	Certain

Question # 33 : What is the status of CRD?

This question determines the status of the control rod drive system. Recovery due to the restoration of offsite power and the possible negative impact of reactor building steam flooding are considered. Steam flooding of the reactor building is a possible consequence of containment failure or venting. This occurrence may impact the operability of the control rod drive (CRD) pumps by causing shorts or malfunctions in the motor controls. At Peach Bottom, unlike the majority of Mark I and Mark II containment design BWRs, the CRD pumps are in the turbine building rather than the reactor building. It is thus our assessment that containment failure (or venting) will have a negligible impact on CRD pump operability.

This is a Type 2 question and there are 3 branches:

1 . E34fCRD: The control rod drive cooling flow is failed.

2 . E34rCRD: The control rod drive cooling flow is unavailable, but may be recovered.

3 . E34-CRD: There is flow from the control rod drive cooling system into the vessel.

Case # 1 :

This case includes sequences in which the containment ruptures (or is vented) as a result of overpressurization by steam (possible station blackouts with early venting are excluded). The pool is thus superheated and large volumes of steam would be released. Alternatively, there has been an induced LOCA in the low pressure ECCS piping. In either case the reactor building will be flooded with stream but since there will be little leakage to the turbine building, the CRD pumps are judged certain to continue to operate.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case the CRD pumps are not currently injecting but are recoverable. Thus this case is similar to Case 1 of this question except that the CRD flow remains recoverable rather than remaining operational.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case CRD pumps have been providing injection all along or have been recovered by the recovery of AC power. The pumps are considered certain to remain operational.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 4 :

In this case there is also no significant leakage to the containment to impact the status of the CRD cooling system. Since the system was unavailable but recoverable, it remains in this condition.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

This case includes only those sequences in which the CRD cooling system was previously failed. This being the case, it is

certain to remain failed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 34 : What is the status of HPSW?

This question determines the availability of High Pressure Service Water for injection to the vessel through the cross-tie with the LPCI system. Operator action is required to open the valves on the cross-tie line. To inject to the vessel, the LPCI injection valves must be opened (preferably shut-down cooling mode). The HPSW pumps require offsite power. The HPSW pumps are not in the reactor building, and thus could not fall victim to induced failure by steam flooding. However, the motor operated valves on the cross-tie are in the reactor building and are therefore vulnerable. Since these valves are normally closed, failure of the valves would result in HPSW being unavailable for injection to the RPV. Considerations in quantifying this question are similar to those in the previous question. While the valve operators are probably better able to withstand severe environments than motor controls (recent qualification problems with motor operated valves for BWRs are probably not relevant), the valves are more likely to be exposed to the severe environment (and for a longer period). On balance, the authors' judgement is that failure is unlikely.

This is a Type 2 question and there are 3 branches:

1 . E34fHSW: High Pressure Service Water has failed in a manner which precludes injection to the vessel.

2 . E34rHSW: High Pressure Service Water is unavailable for injection to the vessel but is recoverable.

3 . E34aHSW: High Pressure Service Water is available to supply low pressure injection to the RPV.

Case # 1 :

In this case, as in Case 1 of the previous question, there is a high level of steam flooding in the reactor building. Prior to the

loss of containment integrity, either HPSW was available or it was going to be recovered through the restoration of AC power. Unlike safety related systems, the HPSW cross-tie is not qualified for severe conditions in the reactor building. The probability that the HPSW cross-tie will be inoperable, and thus HPSW will be unavailable (for either vessel injection or containment spray), is judged to be significant.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Unlikely	Indeterminate
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Highly Likely	Likely	Indeterminate

Case # 2 :

This case is similar to Case 1 of this question except that service water was unavailable prior to containment failure. While the condition was recoverable, steam flooding of the reactor building could induce failure. Quantification of the branch probabilities for this case is exactly as in Case 1 with the exception that even if there is no induced failure, HPSW is only recoverable rather than judged to be injecting to the vessel.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Unlikely	Indeterminate
Branch 2 :	Highly Likely	Likely	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case, either HPSW is available and thus remains so, or HPSW was recoverable and AC power has been recovered making HPSW once more available. Any leakage (Level 2 or less) which may be occurring from the containment to the reactor building is judged to be insufficient to impact valve operability.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible

	Optimistic	Central	Pessimistic
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 4 :

In this case HPSW was initially recoverable. Leakage from the containment is sufficiently low (Level 2 or less) that it is judged that there would be no impact on valve operability. It is thus certain that HPSW will remain recoverable.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

This case catches all sequences where High Pressure Service Water is initially failed. This being the case it certainly remains failed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 35 : Does the core melt?

This question resolves core vulnerable sequences into two groups: 1) Those which end in safe stable conditions and 2) those in which core damage occurs. All sequences defined by ASEP to be core melts are properly identified as such by this question.

This is a Type 2 question and there are 2 branches:

1 . MELT: At least some core damage occurs.

2 . nMELT: Core vulnerable sequences assigned to this branch result in stable shut-downs with no core damage.

Case # 1 :

This case covers sequences initiated by a primary system break in which the containment heat removal system fails. However, the condensate system is available and could inject to the vessel. Operator action is required to align the condensate system and re-start the condensate pumps. It is assumed that given that the operator does this, core damage will be avoided. (Even if no venting occurs the containment would flood.) Quantification of the probabilities for this case is based on the fact that the condensate system is one with which the operator is very familiar. Condensate would, more than likely, be the system the operator would turn to. Given this, it is the authors' judgement that the use of condensate (given the 6 to 10 hours available) is highly likely. A factor of 100 uncertainty in the failure probability is applied for the optimistic and pessimistic estimates.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Highly Likely	Likely

Case # 2 :

This case is similar to Case 1 of this question. The difference being that instead of condensate being available for injection to the vessel, it is High Pressure Service Water. This case is quantified in exactly the same manner. It is recognized that use of the HPSW cross-tie is not a familiar action for the operator. However, in these sequences, containment pressurization is sufficiently slow that the operator would have on the order of ten hours to align HPSW. It is highly unlikely that the operator would allow the core to melt with any injection system which is identified in the procedures being available, given this much time.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Highly Likely	Likely

Case # 3 :

This case is again similar to Cases 1 & 2 of this question. In this case however neither condensate or High Pressure Service Water

is available for injection. The only system that is available long term is the CRD cooling system. For these sequences the containment must be vented or eventually failed. It is assumed that this will cause loss of Net Positive Suction Head (NPSH) for the ECCS pumps. Calculations (Ref. 8) by Oak Ridge National Laboratory (ORNL) for Brown's Ferry (similar to Peach Bottom) indicate that CRD flow can remove decay heat from the core 6-8 hours after shut-down. These calculations were performed for a transient initiator. It was also assumed that the operators took action to optimize the flow from the CRD pumps. There is some uncertainty that CRD flow could be adequate when there is a primary system break. This is particularly true is the elevation of the break is below Top of Active Fuel (TAF). This uncertainty is accounted for in the evaluation of the success probabilities for this case. The central estimate is that CRD flow is likely to succeed. The more likely breaks are small and the more likely locations are above the top of the core thus the more likely sequences for this case are similar to the transients analyzed by ORNL. The pessimistic estimate is that the success probability is indeterminate, reflecting the lack of analysis directly applicable to this case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Unlikely	Indeterminate
Branch 2 :	Highly Likely	Likely	Indeterminate

Case # 4 :

In this case the initiating event is a transient. Referring to the comments in Case 3 of this question, the Oak Ridge calculations indicate that CRD flow will provide adequate cooling for long term transients. This being the case, the probability of core melt is negligible for a TW sequence with CRD flow available, regardless of RPV pressure.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 5 :

In this case the sequence was initiated by a transient and

containment heat removal subsequently failed (TW). The RPV was subsequently depressurized. Repressurization of the RPV has either not occurred (ie the containment was vented) or the vessel did repressurize and now is again at low pressure either because a break occurred in the low pressure ECCS piping or because the containment failed thus allowing the S/RVs to reopen. The condensate system is available. As in Case 1 of this question, all that is required is for the operator to align the system and re-start the pumps. The success probabilities are determined in exactly the same manner as for Case 1 above.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Highly Likely	Likely

Case # 6 :

This case is similar to Case 5 of this question except that High Pressure Service Water is available for injection rather than the condensate system. Quantification is identical.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Highly Likely	Likely

Case # 7 :

This case is similar to Case 5 of this question. The vessel pressure is low as described in that case. However, the sequence was initiated by an ATWS (it is TC - core vulnerable) and therefore the operator has far less time than in the TW sequence to restore injection after the containment fails or is vented. This sequence only requires on the order of an hour to reach the point where injection will be lost due to the loss of NPSH for the ECCS pumps. The TW sequence takes about a day and a half. Once injection is lost for this sequence, there are only a few minutes available in which to avert core damage by restoring injection. For the TW sequence the operators have approximately two hours to restore injection after the ECCS is lost. However, this case has condensate available. Since the operators would be very likely to be trying to restore condensate with the ECCS running, quantification of the success probability is the same as for TW.

Again, it is judged highly unlikely that the operators would allow the core to melt with the condensate system available. The optimistic and pessimistic estimates reflect a factor of 100 uncertainty in the failure probability.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Highly Likely	Likely

Case # 8 :

This case is similar to Case 7 of this question with the exception that it is the High Pressure Service Water on which the operator must rely rather than the condensate system. Because the operator would be less familiar with using the High Pressure Service Water for injection than with using condensate and because there are more valves which must be opened or closed, it is judged that success is less likely than when condensate is available. Success is judged to be very likely (0.01 probability of failure). The optimistic and pessimistic estimates reflect a factor of ten uncertainty (0.1 failure probability being the maximum credible).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Very Unlikely	Unlikely
Branch 2 :	Highly Likely	Very Likely	Likely

Case # 9 :

This case catches all the ASEP "core melt" sequences. In other words the previous cases include all sequences identified as being core vulnerable. For this case the core melt probability must thus be unity to maintain consistency with ASEP.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 36 : What is containment pressure before core degradation?

This question provides an assessment of the containment pressure at the onset of core damage. These estimates are based primarily on Source Term Code Package (STCP) (Refs. 1 & 2), MARCON calculations (Ref. 5), and hand calculations which are documented in Appendix B. The containment pressure depends on both the sequence definition and the plant damage state as enumerated by the cases described below. Containment pressures are given in psia.

This is a Type 4 question and there are 1 branches:

1 . PBasel: This is not a branch as in the previous questions. This is more of a parameter name and it is the value (in psig) of the containment pressure prior to core damage (pressure due to steam + heating effects). This "branch" is not referenced below.

Question # 37 : What is the status of containment sprays?

This question determines the availability of the drywell sprays. Drywell spray is a mode of the RHR. In spray mode, the RHR pumps draw suction from the pool and return the water through the RHR heat exchangers (cooled by emergency service water if available) to spray headers in the drywell at the approximate elevation of the vessel head. Because spray water can significantly impact fission product transport, with a dependence on spray water temperature which is small compared to other uncertainties in fission product transport calculations, the presence or absence of the heat removal function of the spray is not considered here but is left to be included in questions regarding the status of RHR. Thus, if both spray and RHR were shown to be in use (for example) then this could mean that the operator was using spray mode for containment heat removal. (It is also possible that one RHR loop is in spray mode and the other is in pool cooling mode. However, for the purposes of the event tree the difference is unimportant.)

This is a Type 2 question and there are 3 branches:

1 . E4fCS: Containment spray mode of the RHR system is failed.

2 . E4rCS: Containment spray mode of the RHR system is unavailable but may be recovered.

3 . E4-CS: Containment sprays are actuated.

Case # 1 :

In this case containment sprays have failed previously. They thus remain failed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case containment sprays would operate if AC power were available but there has been no recovery of AC power. Thus, the sprays remain in the recoverable condition.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case either High Pressure Service Water or the LPCI pumps are available to operate the sprays. Since core damage is incipient, the containment pressure and/or temperature will be above the technical specification limit. Thus the operator may use sprays to reduce temperature and/or pressure. While the Emergency Operating Procedures would indicate the use of sprays, this is a manual action and the operators may be so concerned with the vessel status that containment spra will not be actuated. Quantification of the spray probability thus reflects the possibility that the operators concentrate on restoring vessel injection. It is the authors' judgement that failure to use sprays is unlikely since the the use of spray is a normal procedure for the operators to use in addressing accident situations. The optimistic estimate is that the probability of failure is negligible (th operators would always deal with containment overpressure in the prescribed manner). the pessimistic estimate assigns an indeterminate probability since HPSW may have to be used for spray and the operator is not familiar

with this application.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Unlikely	Indeterminate
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Likely	Indeterminate

Case # 4 :

This case includes sequences in which there are no water sources to operate the sprays. The sprays are thus failed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 38 : What is the H2 generation and pressure rise during CD?

This question determines the amount of hydrogen generated during core degradation. Three possible levels of hydrogen production are considered. The question quantifies the level of hydrogen production in terms of the pressure rise (in psi) in the primary containment which results from hydrogen generation. In each case the optimistic walkthrough corresponds to low hydrogen production (Branch 1), the central walkthrough to medium hydrogen production (Branch 2), and the pessimistic walkthrough to high hydrogen production (Branch 3). Three sources are used to asses the pressure rise values: 1) STCP calculations (Refs. 1 & 2). 2) MARCON calculations (Ref. 5). 3)Available MAAP calculations (Ref. 4). It should be noted that the pressure rise here is not that due to hydrogen alone, but rather the total pressure increase in containment which occurs during the in-vessel hydrogen production phase of the accident.

This is a Type 4 question and there are 3 branches:

1 . H2Low: Hydrogen production in-vessel is in the range predicted by IDCOR's MAAP code for BWRs (4-10% of the available zirconium).

2 . H2Med: Hydrogen production in-vessel is in the range

predicted by MARCH (ie 30-60% of the active fuel clad).

3 . H2Hi: Hydrogen production in-vessel is in the range predicted by MARCON (ie equivalent to 40-80% of the available zirconium).

Case # 1 :

In this case, hydrogen production, regardless of magnitude, cannot pressurize the primary containment because its integrity has been previously violated. The pressure rise is thus zero for all walkthroughs.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Impossible	Impossible
Branch 2 :	Impossible	Certain	Impossible
Branch 3 :	Impossible	Impossible	Certain

Case # 2 :

This case includes sequences initiated by primary system breaks. Since the ASEP sequence frequency evaluation concludes that only larger size breaks (A or S1) result in a significant probability of core damage, breaks in the > 1 ft2 size range were considered in quantifying this question. For breaks of this size, most (>90%) of the hydrogen generated passes directly from the vessel to the drywell. This being the case, the BMI-2104 calculation for the AE sequence is used as the basis for quantification of this case. The evaluated pressure rise is in excess of 100 psi. The value estimated from the reported results is 106 psi (see Appendix B) . This will be taken as the pessimistic estimate. Use of this as the pessimistic result, rathe than the central estimate is because the calculation predicts this high pressure based upon the adiabatic compression of the gas in the drywell during the core slump. Such rapid compression is not believed to be realistic and is certainly bounding. A more realistic calculation assumes the same amount of hydrogen to be in containment and estimates the pressure based on a realistic temperature estimate. The optimistic estimate employs the same procedure but assumes less hydrogen to be present. Both these estimates are documented in Appendix B.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Impossible	Impossible
Branch 2 :	Impossible	Certain	Impossible
Branch 3 :	Impossible	Impossible	Certain

Case # 3 :

This case includes station blackouts with delayed restoration of AC power. Exception is taken to the general rule for this question that the optimistic walkthrough takes Branch 1, the central walkthrough Branch 2, and the pessimistic Branch 3. This is due to the fact that the hydrogen production resulting from late recovery sequences is highly uncertain. Few analyses are available and it is not clear that those which have been done employ suitable models. Thus in the optimistic walkthrough the probability that hydrogen production will be of a medium level is indeterminate (with zero probability of high hydrogen production). In the central estimate, the probability of high hydrogen production is indeterminate (with zero probability of low hydrogen production). Pessimistically, hydrogen production is certain to be high. The pressure rise associated with hydrogen production is that associated with transients which are not recovered (Case 5 of this question) plus the pressure rise in the containment due to depositing the heat contained in the core in the suppression pool The additional pressure rise is calculated using various values for the mean core temperature such that the three walkthroughs reflect the range of reasonable possibility (see Appendix B).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Impossible	Impossible
Branch 2 :	Indeterminate	Indeterminate	Impossible
Branch 3 :	Impossible	Indeterminate	Certain

Case # 4 :

This case includes transient initiated sequences in which CRD flow is present. STCP calculations (Ref. 1) for TC sequences in which CRD flow is present show significantly greater hydrogen generation than for the sequence with no CRD flow. (The comparison is not direct, TC1 assumes a low pressure vessel and no CRD flow TC2/3 has a high pressure vessel but CRD flow is available. Conversations with R. S. Denning have lead to the conclusion that the presence of CRD flow is the determining factor in hydrogen

production.) The containment pressure rise during core degradation for the the TC2 sequence is 51 psi. This is the central estimate. MAAP calculations for La Salle (Ref. 4) show approximately 2 psi increase in drywell pressure during core degradation for a TQUV sequence with CRD flow during core damage (TQUV w/ CRD flow at 11 hrs) shows a similar pressure rise in the La Salle containment. Hydrogen production values are not stated. However, for the case with no CRD injection, the clad oxidation is stated to be 5.2% and the containment pressure rise is approximately 5 psi. These results with CRD injection are surprisingly consistent with STCP results. This agreement not withstanding, a plus-or- minus 40% uncertainty in the central estimate is assumed in evaluating the optimistic and pessimistic results.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Impossible	Impossible
Branch 2 :	Impossible	Certain	Impossible
Branch 3 :	Impossible	Impossible	Certain

Case # 5 :

This case includes transient initiated sequences in which an S/RV tailpipe vacuum breaker has stuck open. In-vessel steam and hydrogen production is expected to be identical to sequences in which there is no stuck open tailpipe vacuum breaker. However, because there is direct leakage of steam and hydrogen to the drywell, the drywell temperature will be elevated compared to those sequences (considered in Case 6 of this question). The higher temperature will result in higher primary containment pressures. In Case 6 of this question, the drywell temperature is taken to be 195 degrees F. The latter value is that calculated by the STCP for the TB1 and TB2 sequences in Reference 1. For this case, assuming a small leak through the stuck-open vacuum breaker, the drywell temperature is estimated to be 550 degrees F. This value is somewhat arbitrary but it represents a drywell temperature increase from the start of the accident equal to 50% of that calculated in BMI- 2104 for the AE sequence at the time prior to core collapse. The amount of hydrogen generated and the suppression pool (wetwell) temperatures are taken to be the same as in Case 6. The pressure rise calculation is shown in Appendix B. The optimistic and pessimistic estimates are calulated in a similar fashion based on reported calculations of hydrogen production (shown in Appendix B).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Impossible	Impossible
Branch 2 :	Impossible	Certain	Impossible
Branch 3 :	Impossible	Impossible	Certain

Case # 6 :

This case covers all transient initiated sequences in which there is no injection of water to the vessel and no suppression pool bypass. RPV pressure remains at the S/RV setpoint pressure during core degradation. The central estimate for the pressure rise in the primary containment during core degradation is based on the STCP calculation of the TB1 and TB2 sequences (Ref. 1). That calculation shows a pressure rise of 24 psi in the containment. This is thus the central estimate of the pressure rise during core degradation. The calculation of the optimistic and pessimistic estimates is shown in Appendix B. The optimistic estimate approximately corresponds to MAAP calculations, the pessimistic estimate corresponds to a MARCON calculation by ORNL.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Impossible	Impossible
Branch 2 :	Impossible	Certain	Impossible
Branch 3 :	Impossible	Impossible	Certain

Case # 7 :

This case is similar to the previous one with the exception that the RPV is depressurized during core degradation. There is no evidence from STCP calculations that the quantity of hydrogen produced is dependent on the RPV pressure. However, it is certain that the quantity of hydrogen released to the containment is dependent on vessel pressure. In the TB1 and TB2 STCP calculations (referenced in the previous case) the vessel contains 50% of the total hydrogen produced at the time of vessel breach. Thus, assuming equal hydrogen production, the containment pressure would be higher prior to vessel breach if the vessel were depressurized. The central estimate is a 30 psi pressure rise (calculation detailed in Appendix B) .

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Certain	Impossible	Impossible
Branch 2 :	Impossible	Certain	Impossible
Branch 3 :	Impossible	Impossible	Certain

Question # 39 : What is the level of suppression pool bypass during CD?

This question determines the extent to which the suppression pool is bypassed during core degradation. Bypass can result from either containment failure in the drywell or the suppression pool being drained (Question #31). Two levels of bypass are considered. Level 2 bypass indicates that vent flows bypass the suppression pool but the majority (> 85%) of fission product release is through the suppression pool T-quenchers. It is assumed that the quenchers remain sufficiently covered that there is no significant reduction in pool scrubbing on this release pathway. Level 3 bypass indicates complete suppression pool bypass, with a negligible fraction of the fission products passing through it.

This is a Type 2 question and there are 3 branches:

1 . E4nSPB: The suppression pool is not bypassed during core degradation.

2 . E4-SPB2: Flows through the drywell vents bypass the suppression pool but the majority of flow from the RPV (> 85%) passes through the pool.

3 . E4-SPB3: The suppression pool is completely bypassed during core degradation.

Case # 1 :

In this case there is a large (A or S1) break in the primary system and the containment is failed in the drywell. This results in essentially complete bypass of the suppression pool.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case there is an induced break in the low pressure ECCS

piping. The containment (including the suppression pool) is completely bypassed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

In this case the initiating event was a large (A or S1) break in the primary system. The suppression pool is draining due to a failure in the torus prior to core degradation. It is judged certain that the drywell vents will be uncovered. Suppression pool bypass is judged to be complete.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 4 :

In this case rupture of the wetwell prior to core degradation resulted in loss of water from the suppression pool. The drywell vents are certainly uncovered but uncovery of the T-quenchers would take a significant amount of time. It is thus judged unlikely that complete bypass would result (some bypass is certain). The pessimistic estimate is 0.5 probability of complete bypass. Optimistically, 0. 01 is used.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Very Likely	Likely	Indeterminate
Branch 3 :	Very Unlikely	Unlikely	Indeterminate

Case # 5 :

In this case there is either a stuck open S/RV tailpipe vacuum breaker or the accident was initiated by a small break in the primary system. The RPV is pressurized and there is a rupture of the drywell. With the RPV pressurized, flow through leaks in the boundary are in proportion to the flow area (choked flow). Small breaks and stuck open tailpipe vacuum breakers have small flow areas compared to the T-quencher (< 15%). Thus, the majority of the flow will pass through the pool. Level 2 bypass, as defined above, is thus certain (flow going directly to the drywell bypasses the pool).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 6 :

This case is similar to the previous one with the exception that the vessel pressure is low. The flow split between the drywell and the T-quenchers is no longer in proportion to the flow area since the quenchers are submerged in the suppression pool and thus have the 5 psi head of water relative to the drywell. If the tailpipe vacuum breaker is stuck slightly open, or the primary system break is very small, there will still only be a Level 2 bypass. The consensus opinion of the experts who reviewed the Peach Bottom risk issues for SARRP (Ref. 3) was that the vacuum breaker was more likely to leak (80% chance given failure to reclose). Thus, the probability of complete bypass is taken as 0.2 (central estimate). This is applied to the smal break case on the basis that it is a reasonable value. The pessimistic evaluation considers complete bypass to be certain. Optimistically, a 0.01 probability of complete bypass is assigned.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Very Likely	Likely	Impossible
Branch 3 :	Very Unlikely	Unlikely	Certain

Case # 7 :

In this case the drywell is either intact or has Level 2

leakage and the suppression pool has not drained. Thus there is no bypass.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 40 : Does at least one drywell vacuum breaker stick open?

This question determines whether a drywell vacuum breaker (wetwell to drywell) sticks open during the in-vessel phase of the accident. These vacuum breakers are essentially check valves which open to prevent suppression pool water being pushed back through the drywell vent pipes should the wetwell pressure exceed that in the drywell. Being check valves, there is some probability that they will stick in the open position. If the vacuum breakers are open when there is flow from the drywell to the wetwell, the suppression pool is at least partially bypassed. The extent of bypass depends on the position in which the vacuum breaker sticks and is considered in Question #57 below. In quantifying the probability that a vacuum breaker will stick in the open position, the WASH-1400 probability of failure per demand was used. The median value in WASH-1400 is 1.1 E-4. The mean value is 3.3 E-4. This value is assumed for the first demand. The failure probability is assumed to be a factor of 10 less on subsequent demands, provided the RPV is at low pressure. With the RPV at high pressure, no reduction is assumed since more than one vacuum breaker would be challenged and any given device may open for the first time. The number of demands on the vacuum breakers was estimated assuming a vacuum breaker opens once for every psi the containment pressure rises above atmospheric. Pressure rise was evaluated using the values given in Question #36 and Question #38 above (see Appendix B).

This is a Type 2 question and there are 2 branches:

1 . E4-VBo: At least one of the drywell vacuum breakers is stuck in the open position.

2 . E4nVBo: None of the drywell vacuum breakers is stuck open.

Case # 1 :

In this case there is a primary system break and all flow from the primary system is to the drywell. The drywell pressure is thus higher than the wetwell and the vacuum breakers do not open and cannot stick open (prior to containment failure). This case also includes sequences in which containment failure occurred in the wetwell prior to core degradation. If this is the case, pressurization of the wetwell relative to the drywell cannot be established and again the vacuum breakers are not opene

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case the sequence is either a TC (ATWS) or a TW. In both these sequences, the containment pressure is raised close to (or beyond) the failure pressure. Over one hundred challenges to the vacuum breaker(s) are to be expected. Quantification assumes 110 demands in the central estimate. For the pessimistic case the failure probability is increased by a factor of 10. The optimistic case is the same as the central to allow the possibility to be recognized (the failure rate per demand is believed to be an optimistic evaluation but is the only one available to use as the central evaluation).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Highly Unlikely	Very Unlikely
Branch 2 :	Highly Likely	Highly Likely	Very Likely

Case # 3 :

In this case the sequence is either transient initiated and an S/RV tailpipe vacuum breaker is stuck open or the sequence was initiated by a small primary system break. For either case the RPV pressure is low. With the vessel pressure low, a significant fraction of the flow from the vessel may pass into the drywell. This will reduce (perhaps to near zero) the number of challenges to the drywell vacuum breakers. Since failure probabilities are low a crude estimate is made for this case by taking 50% of the failure probability in Case 3 of this question.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Very Unlikely
Branch 2 :	Certain	Highly Likely	Very Likely

Case # 4 :

In this case the vessel is at low pressure and all the flow from the vessel is to the wetwell. Optimistically, there is a 20 psi increase in containment pressure (20 challenges to the vacuum breakers). The central estimate is 46. The pessimistic value is 113. Failure probabilities are reduced for demands after the first as described above.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Very Unlikely
Branch 2 :	Certain	Highly Likely	Very Likely

Case # 5 :

In this case the sequence is transient initiated, vessel pressure is high, and the amount of in-vessel hydrogen production is assumed to be high (see description under Question #38). The optimistic estimate is that there are 20 challenges. The central estimate is 40. The pessimistic value is 97.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Very Unlikely	Indeterminate
Branch 2 :	Highly Likely	Very Likely	Indeterminate

Case # 6 :

This case is similar to the previous case (Case 5) with the exception that hydrogen production is moderate rather than high. Since high hydrogen production is approximately twice the moderate (central) value, the failure probability for this case is taken to be 50% of that in the previous case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Very Likely	Likely

Case # 7 :

This case covers transient sequences in which the RPV is at high pressure and hydrogen production is low. Low production is approximately 20% of the central estimate, thus the vacuum breaker failure (to re-close) probability is taken as 20% of that for the previous case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Very Unlikely
Branch 2 :	Certain	Highly Likely	Very Likely

Question # 41 : Does H2 discharge lead to SP bypass?

This question considers the possibility of suppression pool bypass, resulting from structural damage to the drywell vent system, induced by the release of hydrogen from the vessel under high pressure. When core degradation occurs with RPV at high pressure the the low-low set S/RV opens periodically in relief mode. Once the valve opens, pressure within the RPV drops approximately 50 psi before the valve will re-close. Assuming the volume available to gas (steam + hydrogen) within the vessel is 12,000 cubic feet and that the gas mixture behaves as ideal, if the mean RPV pressure is 1070 psia and the mean gas temperature is 2000 R then each valve pop releases nearly 11,000 SCF of gas to the pool. A fifty percent volume fraction of hydrogen is not unlikely (10% by mass). Since S/RV is open for less than 2.5 seconds (0.1 ft opening, 2100 ft/sec choked velocity), even if all the steam were condensed, a 5000 cubic foot bubble could be formed at the quencher (equivalent of a 10 ft radius). This bubble has the potential to do over 350 thousand foot-pounds of work (0.5 megajoules) this is the energy of a small car travelling 10 mph. Clearly, this magnitude of energy release has the potential for damaging the wetwell structure. Both the vent pipes and vent header could be damaged. Either would result in a bypass of the suppression pool. A bounding estimate of the loading on a downcomer has been made. The resultant load was found to to be approximately 25% of the design capability of the downcomers. It

is thus considered that the probability of bypass from this mechanism is negligible.

This is a Type 2 question and there are 2 branches:

1 . H2-SPB: Structural damage to the drywell vent system (from hydrogen discharge under high pressure) has resulted in suppression pool bypass.

2 . H2nSPB: No structural damage, resulting in pool bypass, has occurred in the wetwell.

Case # 1 :

In this case the RPV is at low pressure and thus the potential for structural damage via the mechanism described above does not exist. This case includes sequences initiated by primary system breaks.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

This case (and those following) covers those sequences during which there is discharge of hydrogen to the suppression pool under high pressure. In this case hydrogen production is high and thus discharge to the suppression pool has the highest volume fraction of hydrogen. Since the in-vessel hydrogen concentration is estimated to be on the order of 95% (see analysis for Question #38 in Appendix B) the energy released with each bubble is approximately twice that for the central estimate (50% concentration in-vessel). The probability for bypass is still assumed negligible since the load would remain below the design value.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Certain
Branch 2 :	Very Likely	Likely	Impossible

Case # 3 :

This case is similar to the previous case (2) except that the hydrogen production rate in-vessel is assumed to be moderate. As stated above, the probability of induced bypass is negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Very Likely	Likely	Indeterminate

Case # 4 :

This case covers sequences in which hydrogen production is low and the vessel is at high pressure. The in-vessel hydrogen concentration is on the order of 10%. The bypass probabilities are thus clearly negligible also.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Very Unlikely	Unlikely
Branch 2 :	Highly Likely	Very Likely	Likely

Question # 42 : Does H2 discharge to SP induce WW failure?

This question considers the possibility that the torus is damaged, by the discharge of hydrogen to the suppression pool under high pressure (described in Question #41), resulting in leakage from the containment. If the torus were damaged, at best the containment could be vented in the wetwell airspace, at worst, the suppression pool could be drained. Since our best engineering judgement is that there is a negligible probability of bypass due to structural damage from hydrogen release, negligible probability for containment failure is reflected by this question. Two cases of high pressure discharge is are considered. The first is the case in which suppression pool bypass has been induced (previous question). For this case the central estimate of the probability that the torus is also failed is 0.1. This value is selected simply to include the possibility. The second case is that in which no damage to the drywell vent system was induced. Since water elevated by pool swell would strike the vent system with greater force that it would the torus wall, induced failure of the torus without pool bypass is considered essentially incredible.

This is a Type 2 question and there are 3 branches:

1 . E4nHWF: There is no structural damage to the wetwell resulting from the release of hydrogen under high pressure.

2 . E4-HWF2: The release of hydrogen from the vessel results in a Level 2 leak in the torus. The leakage rate is insufficient to result in significant depressurization of the containment.

3 . E4-HWF3: There is structural damage to the torus as a result of high pressure hydrogen release. A rupture of the torus has resulted and the containment depressurizes.

Case # 1 :

In this case the RPV was depressurized early in the sequence and did not repressurize prior to core damage. Core degradation thus occurs at low pressure and there is no potential for structural damage in the torus due to hydrogen release.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case there has been structural damage to the vent header system. The probability that the torus is also damaged is assumed to be 0.1. This case does not apply to the current tree but is included for completeness.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Likely	Likely	Indeterminate
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Very Unlikely	Unlikely	Indeterminate

Case # 3 :

This case covers sequences in which hydrogen discharge did no cause damage to the vent header system sufficient to result in suppression pool bypass. The probability of structural damage to the torus is zero.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Highly Likely	Very Likely
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Highly Unlikely	Highly Unlikely

Question # 43 : Is the vent threshold reached during core degradation?

This question instructs the event tree code to calculate the sum of the containment pressure at the onset of core damage (Parameter #1) and the pressure rise due to in-vessel hydrogen production (Parameter #2). This sum is compared to the vent threshold pressure of 60 psig stated in the Peach Bottom Emergency Operation Procedures. If the sum is greater that 60 psig branch 1 is taken if not branch 2 is taken.

This is a Type 6 question and there are 2 branches:

1 . E4-Vth: The containment pressure does exceed the vent threshold pressure during core degradation.

2 . E4nVth: The containment pressure does not exceed the vent threshold pressure of 60 psig during core degradation.

Case # 1 :

This case includes all sequences in which there has been no failure of the wetwell (torus) induced by the discharge of hydrogen from the vessel under high pressure. Containment failure modes other than this (described in Question #42) are accounted for in the base pressure used in the evaluation of the pressure at the end of core degradation (Pbase1 defined in Question #36 above). The event tree code thus evaluates whether the vent threshold has been reached for the remaining sequences in which the containment is intact during core degradation.

Case # 2 :

This case includes all sequences in which there has been a rupture of the wetwell (torus) as a result of hydrogen being discharged from the vessel under high pressure. The containment is thus failed and the vent threshold will never be reached. A dummy value of the vent threshold (999 psi rather than 60) is used as the parameter in this question to insure this case always results in Branch 2 (vent threshold not reached) being taken. This case does not apply to the current tree since the probability of torus failure due to hydrogen discharge is zero.

Question # 44 : Does containment venting not occur during core degradation?

This question determines whether or not the containment is vented during core degradation (prior to vessel melt-through if core damage is not arrested in- vessel). Venting is instructed by the emergency procedures once the containment reaches 60 psig. There is no qualification of this procedure to account for radiation levels in the containment. Venting would be carried out as described under Question #23 above.

This is a Type 2 question and there are 2 branches:

1 . E4nVENT: The containment is not vented during core degradation (ie prior to vessel melt- through).

2 . E4-VENT: The containment is vented during core degradation; prior to vessel melt- through.

Case # 1 :

In this case the sequence is a TW. The venting threshold was exceeded long before core damage occurred. If the operator did not vent before, now that there is high radiation in the containment, the probability that he will vent now is judged to be negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the vent threshold is exceeded and there is AC power available to operate the valves on the lines required for venting. However, there is radiation in the containment and while the EOPs instruct venting there are at least two causes for reluctance. First, while the 18" lines can be opened from the control room the EOPs direct deflating the valve seals which must be done local to the valve. This procedure would thus result in an operator being exposed to a high radiation field as flow began through the line following deflation of the seal. Second,the plant owners and government officials would think twice (at least) before allowing the operators vent radioactive gasses (and possibly particulates depending on their faith in pool scrubbing) to the environment. Quantification of this case takes into account this reluctance and the probability of venting used presumes a decision to sacrifice the valve seals and ignore possible offsite (and onsite) consequences. For the central estimate the probability of venting is thus indeterminate. Reluctance factors are assumed to balance the requirements of the procedures.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 3 :

This case includes sequences in which AC power is recovered during core degradation. The venting threshold has also been exceeded. This case is similar to the previous one and is quantified identically.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 4 :

This case is a station blackout and there is no power available to permit venting of the containment by remote actuation of the valves from the control room. Based on the EOPs, the operators would be instructed to open the 6" ILRT line. Opening this line would require personnel to go into the reactor building to the valves located on the floor above the torus room. These valves

could be opened manually and it is judged that, until the last of the four valves was opened, radiation levels would be tolerable. However, as the last valve was opened highly radioactive gas would pass through this pipe adjacent to where the personnel was standing. It seems likely that the personnel involved would be at least seriously injured. Even though this case includes only sequences in which the vent threshold pressure has been exceeded, it is far from certain that the operators would be aware of this fact. As discussed under Question #23 above, containment pressure indication requires AC power. Thus, for this case, venting is considered unlikely. Quantification of this case agrees with the ASEP estimate. The mean failure probability is 0.9, with a maximum (pessimistic) value of 1.0, and a minimum (optimistic) value of 0.5.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Likely	Certain
Branch 2 :	Indeterminate	Unlikely	Impossible

Case # 5 :

This case catches all sequences for which the venting threshold is not reached during core degradation. If the threshold is not reached, the EOPs do not instruct venting. Thus the probability of venting is assumed to be negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 45 : Does the RPV repressurize during core degradation?

This question is analogous to Question #24 above. However, in this question the code is instructed to calculate whether the containment pressure exceeds the level above which the S/RV accumulators cannot hold the valves open. The containment pressure at the onset of core damage (Parameter #1) is summed with the pressure rise due to hydrogen generation (Parameter #2). If the sum exceeds the threshold value, Branch 1 is taken and repressurization is assumed to occur.

This is a Type 6 question and there are 2 branches:

1 . E4-ReP: The RPV repressurizes as a result of containment pressurization during core degradation.

2 . E4nReP: The RPV does not repressurize during core degradation.

Case # 1 :

In this case the initiating event is a transient, there are no stuck open relief valves, and the containment has not failed or been previously vented. Thus repressurization is possible and the code procedes with the calculation described above.

Case # 2 :

This case is the complement of Case 1 and includes all sequences in which the RPV could not repressurize. In this case, Parameter #2 is excluded from the sum which assures that repressurization will not be indicated.

Question # 46 : Is there a repressurization break during core degradation?

This question is analogous to Question #26 above. Refer to the description there

This is a Type 2 question and there are 2 branches:

1 . E4-RePB: There is a break in one of the low pressure systems as a result of RPV repressurization during core degradation.

2 . E4nRePB: There is no break in the low pressure systems as a result of RPV repressurization during core degradation.

Case # 1 :

In this case the vessel repressurizes during core degradation. Quantification of the probability of repressurization is identical to Question #26 above (ie there is a negligible probability of an induced LOCA).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

This case covers all sequences in which there is no repressurization of the RPV and thus a repressurization break is impossible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 47 : Does the containment fail by pressure during core degradation?

This question instructs the code to calculate the probability of containment failure during core degradation. The containment fragility is assumed to be normally distributed. The mean failure pressure is estimated based on optimistic, central, and pessimistic assumptions. The code calculates the sum of the containment pressure at the onset of core degradation (Parameter #1) and the pressure rise due to hydrogen generation (Parameter #2). Based on the fragility, the probability of containment failure (of Branch 1 being taken) is then calculated. The central estimate of the containment failure probability is based on an assumed mean failure pressure of 132 psia. This value was calculated by Ames Laboratory on the basis of a 2% strain criteria for yielding (failure). It is the authors' opinion that this value is conservative. However, for the purposes of SARRP we are using referencable evaluations as far as possible in the central walkthrough. A 5 psi standard deviation has been assumed in the central estimate to reduce the probability of containment failure significantly below 132 psia to a minimum

This is a Type 6 question and there are 2 branches:

1 . E4-CFP: The containment fails during core degradation.

2 . E4nCFP: There is no failure of the containment during core degradation.

Case # 1 :

In this case the containment was not vented and there was no repressurization break resulting in containment bypass during core degradation. Failure due to overpressure is a possibility.

Case # 2 :

In this case the containment has been vented or has previously failed. The case also includes sequences in which there has been a repressurization break. The code will assign zero probability for overpressure failure in this case.

Question # 48 : What is location of containment leakage prior to vessel breach?

This question determines the location of containment leakage (if any) prior to vessel failure. The question is analogous to Question #28 and in the case that containment failure is predicted to occur during core degradation, it is quantified the same.

This is a Type 2 question and there are 3 branches:

1 . E4nCL: There is no leakage from within the containment in excess of technical specifications.

2 . E4-CLD: The leakage from within the containment comes from the drywell (or from within the RPV).

3 . E4-CLW: The leakage from within the containment comes from the wetwell.

Case # 1 :

In this case, either there was previously leakage from the drywell or a repressurization break (induced LOCA) occurred during core degradation (Question #46). Previous leakage may include induced primary system breaks. Since leakage from the drywell has been previously established, it is judged certain to continue to be the dominant mode. Even if the previous failure were a leak, subsequent overpressure failure (since the leak was too small to relieve the pressure) is assumed certain to be at the same location. Implicit in the latter assumption is the belief that a leak indicates structural weakness at the location of the leak and a predilection for exacerbated leakage, or rupture, to occur at the same point.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case, leakage from the wetwell (torus) has previously been established. This leakage could result from: 1)previous overpressurization, 2)leakage induced as a result of hydrogen discharge to the suppression pool, or 3) containment venting. Following the logic delineated in the previous case, further leakage is judged certain to be from the wetwell.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

In this case there has been an overpressure failure of the containment during core degradation (Question #47). The more likely location for that failure is judged to be in the drywell. The split fraction for drywell versus wetwell failure location is based on the opinion of a group of experts assembled to review issues impacting the SARRP evaluation of risk for Peach Bottom. The quantification here is identical to Case 3 of Question #28.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Indeterminate	Likely	Certain
Branch 3 :	Indeterminate	Unlikely	Impossible

Case # 4 :

This case catches all sequences in which there has been no breach of the containment. Thus leakage is from neither the wetwell or drywell and "no significant leakage" is certain for all

walkthroughs.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 49 : For Drywell failures, is the failure at the head seal?

This question determines the location of leakage from within the drywell; given that the failure location is in the drywell. This question is completely analogous to Question #29.

This is a Type 2 question and there are 3 branches:

1 . E4-DHF: Containment leakage is from the drywell head and thus flow is directly from the drywell to the refueling bay.

2 . E4-DKF: Containment leakage is from the drywell to the reactor building (characteristics are similar to leakage from the knuckle).

3 . E4nDF: The drywell remains intact (no leakage from the drywell).

Case # 1 :

Leakage was previously from the drywell head. Leakage is assumed certain to continue to be from the head region.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

Leakage was previously from the drywell to the reactor building. It is assumed certain to continue along the same

pathway.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

Containment overpressure failure occurs in the drywell (based on branch taken in Question #48). This case is quantified exactly the same as Case 1 of Question #29.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

In this case the drywell remains intact. There is no leakage from either the head or the knuckle.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Question # 50 : What is the level of containment leakage before VB?

This question determines the level (or rate) of leakage from the containment at the time of vessel breach. A full description of the failure level definitions is given in Question #30 above.

This is a Type 2 question and there are 3 branches:

1 . E4nCL: There is no leakage from the containment, significantly in excess of technical

specifications, prior to vessel breach.

2 . E4-CL2: There is leakage from the containment which is significantly in excess of technical specifications prior to vessel breach but it is insufficient to cause the containment to depressurize.

3 . E4-CL3: There is a containment breach prior to containment failure which is sufficiently large to cause the containment to depressurize.

Case # 1 :

In this case the containment previously ruptured or was vented, leakage will certainly persist at the same level.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case the containment is completely bypassed through a primary system break in the reactor building. The terminology here is somewhat confusing since depressurization of (leakage from) the containment would not begin until vessel breach. However, the main purpose of this question is to determine the impact of leakage rate on the reactor building thermal-hydraulics and on fission product transport. For sequences with containment bypass, containment behavior prior to vessel breach does not have a significant impact on the consequence evaluation so this slight ambiguity is acceptable. Subsequent questions properly distinguish containment bypass sequences (which are expected to have negligible impact on risk due to their low frequency) from sequences with a rupture in the containment. Since a break in low pressure systems is expected to be large (pumps seal failures are regarded to be negligible leaks) this case is assumed to be certain to have Level 3 leakage.

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

In this case the containment has been successfully vented. Successful venting has been defined to mean that the containment depressurizes. Thus this case is certain to result in level three leakage in all walkthroughs.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 4 :

In this case the containment failed as a result of overpressurization. The failure location was either in the wetwell or in the drywell at a location other than the head seal (see Question #29). Quantification of the probability of rupture is based upon the opinion of the group of experts which were consulted. The evaluation is identical to Case 4 of Question #30.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Likely	Unlikely	Impossible
Branch 3 :	Unlikely	Likely	Certain

Case # 5 :

In this case containment leakage due to overpressure occurs at the drywell head seal. It was the consensus of the experts consulted (Case 5 of Question #30) that this failure mode would always be a leak type of failure (Level 2).

QUANTIFICATION

	Optimistic	Central	Pessimistic

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 6 :

This case covers all sequences in which Level 2 leakage has previously been established. No further challenge to the containment integrity has occurred so the leakage is assumed certain to persist at the same level.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 7 :

This case covers sequences in which there has been no challenge to the containment sufficient to result in leakage. "No significant leakage" is thus certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 51 : Is the RPV depressurized before vessel breach?

This question determines the RPV pressure at the time of vessel breach.

This is a Type 2 question and there are 2 branches:

1 . E5nDeP: The RPV is at high pressure (approx. 1100 psig) at vessel breach.

2 . E5-DeP: The RPV is depressurized at the time of vessel breach.

Case # 1 :

In this case there has been an induced break in the primary system. Such breaks are assumed to always result in depressurization of the vessel.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case the RPV was previously depressurized, but repressurized during core degradation. Allowance is made for the fact that failure of containment (with DC power available), or the restoration of AC power in blackout sequences, will result in the RPV once again depressurizing. If the RPV repressurized,and nothing has changed that would result in depressurization, the condition is certainly that of being pressurized.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 3 :

This case includes only the postulated TC sequence in which the operator fails to depressurize the vessel. The ASEP analysis of ATWS provides for this case on the basis that, under stress, the operators may fail to depressurize the vessel once high pressure injection fails even though the means for low pressure injection are available. It seems reasonable to allow a significant probability of delayed depressurization for this case. Such depressurization would allow the restoration of injection and the possibility of arresting the accident. The probability of delayed depressurization (ie after core damage but prior to vessel breach - a 1 hour time frame according to STCP calculations) is assumed to be 0.5 for the central estimate. While no human factors analysis has been performed, it appears overly conservative to assume continued failure to depressurize certain. Depressurization is intrinsic to BWR accident management. The optimistic evaluation is

that depressurization is likely. The pessimistic evaluation is 0.1.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 4 :

This case includes transient (non-ATWS) sequences in which the vessel has remained at pressure during the entire boil-down phase. Given that depressurization has not occurred prior to core damage it seems reasonable to assume a negligible probability that depressurization will occur during core damage (unless offsite power is recovered, which is considered in the next case). It should be noted that this case has a negligible frequency of occurrence.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 5 :

This case catches all sequences in which the vessel has remained depressurized since early in the sequence. Nothing is assumed to change in this respect. This case also includes fast station blackout sequences in which offsite power is recovered. The recovery of AC power will restore DC power through the inverters. Depressurization is judged to be certain since even if the operators did not depressurize, ADS would function.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 52 : What is the status of CRD?

As noted above (Question #33) there is the possibility that steam flooding of the reactor building, resulting from containment failure, could impact the operability of the CRD pumps for the majority of Mark I and II BWRs. In this question the possibility of hydrogen burns in the reactor building impacting CRD pump operability must also be considered since hydrogen would be released from the containment, subsequent to core damage, if its integrity was violated. Since in the Peach Bottom plant the CRD pumps are located in the turbine building, there is assumed to be a negligible probability of induced failure.

This is a Type 2 question and there are 3 branches:

1 . E5fCRD: The CRD pumps are not (or are no longer) available to supply make-up water to the vessel.

2 . E5rCRD: The CRD pumps are unavailable but may be recovered.

3 . E5-CRD: The CRD pumps are injecting water to the vessel.

Case # 1 :

In this case the containment pressure has been relieved to the reactor building (rupture or vent). Large quantities of steam and/or hydrogen would be released into it. The CRD pumps are operating at the time of the failure. As stated above, the probability of failure being induced is considered negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

This case is like the previous one except that CRD pumps are unavailable. Their recoverability may be impacted by the containment leakage which has occurred. Quantification of the failure probability is identical to the previous case. This is based on the assumption that the potential for damage is independent of whether the system is energized at the time containment integrity is lost.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case there was previously flow from the CRD system to the vessel. The containment either has not ruptured, ruptured prior to core degradation (with no effect on the CRD pumps), or was vented to the atmosphere via the ILRT line. This case also includes sequences in which there is only Level 2 (defined in Question #30) leakage from the containment to the reactor building. Even if the CRD pumps were in the reactor building, there would be little potential for steam damage in this case. The probability that the CRD pumps fail is thus zero.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 4 :

This case is similar to the previous one except that it is the recoverability which is being examined rather than the operating status.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

This case covers sequences in which the CRD pumps were previously failed. They are certain to remain so.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 53 : What is the status of HPSW?

This question treats the status of HPSW much as the question above treated the status of CRD flow. There is a significant difference. As with the CRD pumps, the HPSW pumps will not be impacted by steam flooding of the reactor building or by hydrogen burns. As was noted in Question #34 (above), the HPSW pumps are outside the the reactor building and only valve operability could be impacted. Thus, if HPSW were already aligned to the LPCI system there would be a negligible probability of any impact. If HPSW were not in service, conditions in the reactor building could impact its operability. Note that in the branch definitions, failure is taken to include failure of the operator to use the system.

This is a Type 2 question and there are 3 branches:

1 . E5fHPSW: The High Pressure Service Water system cannot be (or is not due to operator error) aligned to provide water to the LPCI system.

2 . E5rHPSW: The High Pressure Service Water system remains unavailable but may be recovered.

3 . E5-HPSW: The High Pressure Service Water system is supplying water to the LPCI system.

Case # 1 :

In this case High Pressure Service Water is available but the operator has not previously aligned it to the LPCI system. There is steam flooding and hydrogen in the reactor building (cause as in Case #1 of Question #52). Two factors are considered in the quantification. First, the probability that the reactor building environment will cause one or more of the required valves to fail in the closed position. This is quantified exactly as in the subsequent case of this question with regard to failure of the HPSW system given that it was previously recoverable. The second factor is the probability that the operator will take the actions required

to align the system. In the central estimate (and the optimistic) the probability of failure for each cause is judged equal (unlikely). The quantification for these two walkthroughs is thus twice that in Case #1 of Question #34. For the pessimistic estimate, a failure probability larger that 50% is hard to justify, thus this is the estimated failure probability.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Unlikely	Indeterminate
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Highly Likely	Likely	Indeterminate

Case # 2 :

In this case the containment depressurized into the reactor building and the HPSW system was previously in an unavailable but recoverable condition. Quantification of this question reflects the probability that the resultant severe reactor building conditions will cause at least one of the motor operated valves required to align HPSW to the LPCI system to fail in the closed position (identical to Cases #1 & #2 of Question #34).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Unlikely	Indeterminate
Branch 2 :	Highly Likely	Likely	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case there has been no rupture of containment and the HPSW system is available. Quantification of this case reflects a judgement of the probability that the operator will align the HPSW system to supply water to the LPCI system. Account is taken of the fact that this was not done prior to core damage (ASEP considered such use of the system). It is judged to be unlikely that the operators would allow core damage to progress unarrested if a source of injection water were available. Thus the central estimate of the probability of failure to align HPSW for injection is 0.1. The optimistic and pessimistic estimates reflect a factor of 5 uncertainty in this evaluation.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Very Likely	Likely	Indeterminate

Case # 4 :

In this case there was no containment rupture during core degradation and the HPSW system was recoverable. It is assumed that the HPSW will remain in the recoverable condition. This case includes station blackout sequences in which venting occurred. Such venting occurs through the ILRT line which bypasses the reactor building (no steam flooding).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

The case catches all sequences in which the HPSW system was previously failed. It is thus certain to remain so.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 54 : Is MSIV leakage control or condenser vacuum maintained?

This question determines the availability of the MSIV leakage control system (MSIV-LCS). The purpose of the MSIV-LCS is to direct fission products, which may leak from the MSIVs after they have closed, to the SGTS system. If condenser vacuum is maintained the same end is achieved. The MSIV-LCS consists of two (inboard and outboard) safety systems. They are powered by the emergency busses. Actuation is by manual action from the control room. Interlocks prevent actuation if the Main Steam Line pressure is

high (not a concern here since MSIVs are assumed closed). This manual actuation is a normal part of the post-LOCA procedure. This question is not referenced in the current tree but is included since this may be of interest in source term binning. For Peach Bottom, possible influence on risk is probably minor owing to the large releases associated with the dominant core melt sequences.

This is a Type 2 question and there are 2 branches:

1 . MSIVnLC: There is no MSIV leakage control.

2 . MSIV-LC: The MSIV leakage control system is operating.

Case # 1 :

In this case AC power is available. The operation of the MSIV Leakage Control System depends only on action by the operator to start the system. There is some possibility that this would not be done and that the condenser vacuum pumps were not running. It is noted that actuation of this system is a routine part of operator response to a LOCA or other accident resulting in MSIV closure. The central estimate is thus that the probability of failure is highly unlikely (0.001). The optimistic and pessimistic estimates reflect a factor of 100 uncertainty (large enough to have noticeable impact in the pessimistic walkthrough).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Unlikely
Branch 2 :	Certain	Highly Likely	Likely

Case # 2 :

This case covers sequences in which there is no AC power. It is certain that the MSIV Leakage Control System would be inoperable and that there would be no condenser vacuum.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 55 : Is the suppression pool drained before VB?

This question determines the availability of water in the torus to provide for pressure suppression, pool scrubbing, and low pressure ECC. Given that one allows for wetwell failures one must consider failures which may occur below the pool surface. Failure occurring more that about 2 meters below the water level would drain the pool sufficiently that flow coming through the drywell vents would not be impacted by the pool (ie flow through the drywell vents would completely bypass the pool). This question is analogous to Question #31 above and is used to determine the status of the suppression pool immediately prior to vessel breach.

This is a Type 2 question and there are 2 branches:

1 . E5-SPD: The suppression pool is drained to a distance below the normal level that results in pool bypass for at least drywell vent flows.

2 . E5nSPD: The suppression pool maintains at least normal operating level.

Case # 1 :

In this case the suppression pool began to drain prior to core degradation. It is assumed certain that it is drained at vessel breach.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case either the torus developed a Level 2 leak prior to core degradation or it ruptured during core degradation. In the case that an earlier leak developed, it is assumed (considering the pressurization of the containment) that the pool will be drained by the time vessel breach occurs. In the case that the torus ruptured during core degradation, the level is assumed to be reduced rapidly. In the central estimate we assume that failure is equally likely either above or below the water line. The optimistic and pessimistic quantifications reflect a reasonable range of possibility.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 3 :

In this case the release of hydrogen to the pool under high pressure has resulted in a large breach in the torus (Question #42). In the central estimate it is judged that this failure is likely to be above the pool level. This is because the hydrogen bubbles would tend to lift the pool, throwing water against the upper part of the torus. The fall back under gravity would be far less energetic. The energy released in this case is discussed under Question #41 above.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Very Likely	Likely	Indeterminate

Case # 4 :

In this case there is no large failure of the torus. Leaks are assumed to be of insufficient size to result in a significant loss of pool inventory. Thus the pool is certain to maintain an adequate inventory of water.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 56 : Will the SP flash following containment vent or rupture?

This question determines whether or not the suppression pool is saturated. (Saturation is defined to mean that the bulk temperature of the pool is equal to the saturation temperature which corresponds to the wetwell airspace pressure.) This is

distinct from the pool being in equilibrium with the airspace (partial pressure of steam in the airspace equal to the saturation pressure which corresponds to the pool surface temperature). The significance of the pool being saturated is three-fold: First, the pool flashes at containment failure resulting in the release of large quantities of steam to the reactor building (approximately 360 metric tons if vented at 60 psig, approximately 540 metric tons if failure occurs at 135 psig). Second, in a saturated pool, all the energy deposited in the pool is used to convert water into steam; none of the energy is stored as sensible heat. Third, the ECCS pumps (and RCIC) draw suction from the pool. In BWRs such as Peach Bottom, these pumps cannot pump water which is at or near saturation since the pumps will cavitate. Thus, if the pool saturates on containment failure there is no ECCS. NOTE: The pool cannot be saturated if the containment is intact but may become so if the containment integrity is not maintained. If the pool is saturated with respect to the ambient pressure (14.7 psia) it is saturated for the purpose of this question.

This is a Type 2 question and there are 2 branches:

1 . SatSP: The suppression pool will flash and saturate following containment venting or a rupture.

2 . SubcSP: The pool temperature is subcooled relative to atmospheric pressure (temperature below 100 C).

Case # 1 :

In this case the the high pressure systems have supplied make-up water to the vessel for sufficiently long that enough heat has been deposited in the pool to raise the temperature to 100 C. The RHR system has not been used to remove the heat. This occurs in TW sequences and in blackouts where there is no battery failure. Under these conditions the pool will certainly flash when the containment is depressurized.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case low pressure ECCS was operated but the RHR system

was not used to remove the heat deposited in the pool. Since the low pressure systems did inject they are certain to run at least until the pool reaches 100 C. This situation arises in all the loss of containment heat removal (W) sequences in which there was no early high pressure injection (AW, S1W and some TW).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 3 :

In this case the sequence is an ATWS. Pool heat-up is so rapid that 100 C is reached in no more than 25 minutes. The pool is thus certain to flash and saturate when containment integrity is lost.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 4 :

This case catches all sequences in which the pool cannot saturate until after vessel breach (if at all). This includes most station blackout sequences, AE, S1E, and TQUV.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 57 : What is the level of suppression pool bypass at VB?

This question determines the extent to which flows from the primary system into the containment or the reactor building (or to the environment) bypass the suppression pool. Pool bypass determines the pressure suppression ability of the containment as well as the fission product removal (due to pool scrubbing) along the release pathway. Some additional explanation of the branch

definitions is required. For the purposes of this question, a Level 2 bypass is taken to mean that the pressure suppression function of the suppression pool is still available but fission products which are gradually released to the drywell airspace will most likely bypass the pool (ie the DF for vent flows is 2 or less due to bypass). This would occur with a Level 2 leak in the drywell. Level 3 bypass indicates complete bypass of the suppression pool by all released fission products and gasses.

This is a Type 2 question and there are 3 branches:

1 . E5nSPB: The suppression pool is not bypassed. Gas flow from the vessel to the containment is directed toward the pool.

2 . E5-SPB2: There is some significant amount of pool bypass. Less that 50% of the flow leaving the vessel will bypass the pool.

3 . E5-SPB3: The suppression pool is effectively completely bypasses. It is assumed that no pressure suppression or fission product scrubbing can occur.

Case # 1 :

In this case either the drywell is ruptured or the suppression pool has drained. In either case complete bypass of the suppression pool is assured.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case the containment is completely bypassed since there is a primary system break outside containment. The pool is also certainly bypassed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

In this case either a drywell vacuum breaker has stuck open or the discharge of hydrogen from the RPV when it was at high pressure (Question #41) has resulted in damage to the drywell vents (ring header or downcomers) sufficient to cause pool bypass. For either failure mechanism, suppression pool bypass is assumed to be complete.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 4 :

In this case there is Level 2 leakage from the drywell but the suppression pool is intact. This case defines Level 2 bypass (which is therefore certain in this case). With slow pressurization of the drywell, the majority of the flow will escape containment through the drywell leak. With rapid pressurization, most of the flow will go through the vents.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

This case covers all sequences in which the drywell, its vent system, and the suppression pool are intact. There is thus no pool bypass.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 58 : What is level of RB breach/bypass before VB without burn?

This question determines the extent to which fission products could be retained in the reactor building (assuming they are released from the primary containment). There is an implicit assumption that fission product retention varies inversely with the extent to which the reactor building is bypassed or with the flow rate of aerosol through it. This assumption maybe in conflict with the IDCOR model which appears to rely heavily on aerosol impaction for fission product removal. This question does not consider the impact of possible hydrogen burns in the reactor building. In order to correctly represent the sequence progression, the impact of hydrogen burns (if any) are determined in Question #62, below.

This is a Type 2 question and there are 4 branches:

1 . E5nRBB: There is no breach or bypass of the reactor building. What flow may exist to the reactor building could be handled by the Standby Gas Treatment System (SGTS) if it is operational.

2 . E5-RBB2: There is leakage from the reactor building but the leakage flow from the primary containment passes through the building.

3 . E5-RBB3: The reactor building is essentially bypassed. Either primary containment leakage is directly to the refueling bay or there is sufficient damage to the reactor building that retention along the release pathway would be similar to that case.

4 . E5-RBB4: The reactor building is completely bypassed. There would be no significant fission product retention.

Case # 1 :

In this case there is a primary system break in the reactor building. During core degradation leakage flow to the reactor building is small (compared to that resulting from a rupture in the

containment) but large enough to cause the reactor building blowout panels to lift. However, the low pressure ECCS piping (assumed to be the release pathway) is low in the reactor building. Thus, the released gasses must pass completely through the building in order to be released. The bypass level is thus certain to be Level 2.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the sequence is a station blackout. Venting occurred without AC power. The vent line which must have been used is the 6" ILRT line (described under Question #24). This line is made of piping and passes through the reactor building, at the next level above the torus, exhausting outside the building. With this line is open, the reactor building is bypassed completely.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain

Case # 3 :

In this case there has been an overpressure failure of the containment at the drywell head seal. The containment leakage level for this failure mode is always assumed to be Level 2 (Question #50). Leakage from the head seal passes around the refueling plug and into the refueling bay. This constitutes a Level 3 bypass by definition. Thus, the probability of Level 3 bypass is unity for all walkthroughs. It is noted that there may be substantial retention of aerosols on the pathway around the refueling plug. Consideration of this is left to the source term calculation.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible

Case # 4 :

In this case the containment is successfully vented. It is assumed that the 6" ILRT line which would be used in a blackout (see previous Case #2) would not be employed for non-blackout sequences. Thus the reactor building would not be completely bypassed as in that case. However, opening one or both of the 18" vent lines would cause rapid pressurization of the reactor building and loss of its integrity. A partial bypass (Level 2) is thus certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 5 :

In this case there has been a rupture of the containment as a result of overpressurization. Ruptures are assumed to occur either in the drywell, at or below the knuckle, or in the torus. Either location of primary containment failure results in a leakage pathway to the reactor building. This situation corresponds to the definition of Level 2 reactor building bypass.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 6 :

In this case there is leakage from the containment but the leakage rate is low compared to that associated with a rupture or venting. There is significant probability that the Standby Gas Treatment System could handle such flow rates. Structural heat sinks may absorb enough heat from gasses leaving the primary containment to prevent the hot gas from closing the fire dampers in the SGTS system. Quantification thus allows for the possibility of no breach or bypass. The central estimate for the probability of partial (Level 2) bypass is 0.5. This reflects the fact that the quantification is based solely on the authors' engineering judgement. The optimistic and pessimistic evaluations reflect what is judged to be a reasonable range of uncertainty.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Indeterminate	Likely
Branch 2 :	Impossible	Indeterminate	Unlikely
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 7 :

This case catches sequences for which there is no significant leakage from the primary containment prior to vessel breach. This being the case, the probability of reactor building breach is negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Question # 59 : Are fire systems actuated before VB without burn?

This question determines whether the fire sprays in the reactor building are triggered. Triggering due to hydrogen burns is considered in a subsequent question. This question considers only the impact of hot gasses being released to the building prior to vessel breach. Fire sprays will start automatically when the building temperature is raised significantly above normal operating limits. The sprays in Peach Bottom are limited to the area above the cable trays thus the impact on fission product retention is not

as great as it would be if the spray was more global (like the containment spray). The fire sprays are independent of plant AC power since the pumps are driven by dedicated fire system diesels.

This is a Type 2 question and there are 2 branches:

1 . EFireS: Fire sprays are actuated in the reactor building prior to vessel breach.

2 . nEFireS: Fire sprays are not actuated in the reactor building as a result of steam being released from the containment prior to vessel breach.

Case # 1 :

In this case there is significant leakage from the containment to the reactor building. (Sequences with leakage directly to the refueling bay are excluded since such leakage is not expected to result in fire spray actuation.) The reactor building is not bypassed and so the gasses released from primary containment are anticipated to accumulate. The suppression pool is either bypassed or saturated such that the released gasses are certain to be sufficiently hot that the fire sprays will be actuated. Thus, in this case, fire sprays are certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

This case is the complement of case one. Sequences with the following characteristics are included: 1) The containment is intact and no significant quantity of gas is released to the reactor building. 2) The reactor building is bypassed so there is no accumulation of released gasses within the building. 3) The suppression pool is not bypassed and is subcooled. In the latter instance any gasses released to the reactor building will be relatively cool. If any of the above three conditions are met the reactor building will not heat up and the fire sprays will not be triggered.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 60 : Does SGTS fail before VB without burn?

This question determines the availability of the Standby Gas Treatment System (SGTS). The SGTS is a safety system designed to limit the leakage of particulate fission products from the reactor building. When activated, SGTS draws air (or whatever gas is present) from the reactor building and exhausts it through charcoal filters up the stack. At Peach Bottom, the SGTS lines contain fire dampers which are intended to close if there is a fire in the reactor building. Dampers are secured open by fusible links. These links fail at approximately 160 F causing the dampers to close (by the action of gravity). Thus, when the reactor building temperature is raised, the fire dampers close and SGTS fails. The SGTS draws power from the emergency busses and will not operate in a station blackout.

This is a Type 2 question and there are 3 branches:

1 . E5fSGTS: The Standby Gas Treatment System is failed.

2 . E5rSGTS: The Standby Gas Treatment System is unavailable but may be recovered.

3 . E5-SGTS: The Standby Gas Treatment System is operating.

Case # 1 :

In this case the reactor building temperature has not been raised sufficiently high to actuate the fire sprays (discussed in the previous question). The containment is not vented (which may cause SGTS to isolate -- see Case #2 of this question). Lack of fire sprays implies that the SGTS dampers will be open (high temperatures in the reactor building would both start the fire sprays and close the fire dampers). Only sequences with AC power are included in this case so all all the conditions are met for SGTS to be operating. It is thus certain to be operating.

QUANTIFICATION

	Optimistic	Central	Pessimistic

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case the primary containment is vented to the SGTS (or to the reactor building if the duct work on the vent lines cannot withstand the pressure). With hot gasses channeled to the SGTS it may cause the dampers to close. Whether or not the dampers close depends on the suppression pool temperature. The pool temperature will probably be in a range which may cause the dampers to fail so some uncertainty is reflected in the quantification. In the central estimate the SGTS failure probability is assumed to be 0.5 since there are no analyses available to provide guidance. The optimistic and pessimistic evaluations reflect a reasonable range of uncertainty. Sequences in which the pool is definitely hot enough to cause the dampers to close are not included in this case by virtue of the fact that fire systems would be operating in this instance. As in the previous case, fire systems not operating is used in the tree as a surrogate for reactor building temperatures below the temperature at which the fire dampers close.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Impossible	Impossible	Impossible.
Branch 3 :	Likely	Indeterminate	Unlikely

Case # 3 :

This case includes station blackouts in which the reactor building temperature is still low enough not to result in actuation of the fire systems. The SGTS thus is unavailable due to the lack of AC power. However, the dampers remain open so the system could be recovered.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

This case covers all sequences in which the fire sprays start due to high reactor building temperature. It is thus expected that the fire dampers will close; failing SGTS.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 61 : Does hydrogen burn in RB before VB?

This question determines whether or not there are hydrogen burns in the reactor building. This becomes possible if there is a loss of containment integrity and the reactor core is damaged. Even though the primary containment is inerted, the reactor building contains sufficient air that even if mixed with all the nitrogen escaping from the primary containment hydrogen combustion could still be supported. Hydrogen burning is assumed to occur even in the absence of electrical power since ignition is very easily achieved. However, it is also assumed that if large quantities of steam are released to the reactor building, the building will initially be steam-inerted.

This is a Type 2 question and there are 2 branches:

1 . HBbVB: Hydrogen burns in the reactor building prior to vessel breach.

2 . nHBbVB: There is no hydrogen burn in the reactor building prior to vessel breach.

Case # 1 :

In this case there is a primary system break in the reactor building. Very hot hydrogen and superheated steam will be released directly into the air of the reactor building. Combustion is judged to be certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the reactor building has been completely bypassed. With the reactor building totally bypassed in this manner, no significant amount of hydrogen can leak into it and thus there will be no combustion.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

In this case, hydrogen production has been assumed to be low (on the order of that predicted by the MAAP code for BWRs). With only a few hundred pounds released from the in-vessel reaction of Zircaloy, combustible concentrations will not accumulate in the reactor building. Thus the probability of a significant hydrogen burn is judged to be negligible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 4 :

In this case there is some leakage of steam, hydrogen, and nitrogen from the primary containment. However, the leakage is not sufficient to depressurize the primary containment (Level 2). The SGTS is operating and thus it seems unlikely that combustible hydrogen concentrations would accumulate. The central estimate of the probability of a hydrogen burn of significant magnitude is thus 0.1. The optimistic estimate is that the SGTS is certain to prevent the accumulation of combustible concentrations. The pessimistic estimate (0.5) reflects a reasonable level of uncertainty, given the lack of available analysis for this case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Unlikely	Indeterminate
Branch 2 :	Certain	Likely	Indeterminate

Case # 5 :

In this case the reactor building is substantially bypassed (leakage is essentially directly to the refueling bay). If SGTS is operating, containment leakage is large (the previous case considered Level 2 containment leakage). If the SGTS is not operating, there will be some opportunity for hydrogen accumulation even if containment leakage is Level 2. For Level 3 containment leakage, SGTS is judged not to be effective in limiting hydrogen accumulation. It is thus assumed that hydrogen combustion would be highly likely (.999 probability) in the central estimate. The pessimistic estimate is that combustion is certain. Optimistically, the probability is set at 0.5 since there may be sufficient leakage from the building (with this level of bypass) to limit hydrogen accumulation (low to moderate hydrogen source rate is implicit.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Highly Likely	Certain
Branch 2 :	Indeterminate	Highly Unlikely	Impossible

Case # 6 :

In this case there is a large leak from the primary containment into the reactor building. The Standby Gas Treatment System is operating. It is judged highly unlikely that SGTS will prevent combustible hydrogen concentrations from accumulating in the reactor building; given the large leakage level from the containment. The pessimistic estimate is that combustion is certain. The optimistic evaluation is 0.5, allowing some credibility to mitigation by the SGTS.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Highly Likely	Certain
Branch 2 :	Indeterminate	Highly Unlikely	Impossible

Case # 7 :

This case covers sequences in which there is leakage from the containment but no SGTS operation. Calculations have been performed at Sandia and ORNL, using various codes (CONTAIN, HECTRE, and MELCOR), which demonstrate that burns will occur in the reactor building if there is a large leak from the containment (these calculations considered core-concrete interaction hydrogen sources but the initial burn occurs before a significant amount from this source has left the primary containment). For low leakage rates, in the absence of a large bypass of the reactor building and without SGTS operation, combustible concentrations are also certain to accumulate eventually.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Likely	Certain	Certain
Branch 2 :	Highly Unlikely	Impossible	Impossible

Case # 8 :

This case covers sequences in which there is no significant leakage from the primary containment. There is thus little, if any, hydrogen in the reactor building which could burn. The probability of a burn is thus zero.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 62 : What is level of reactor building (RB) breach/bypass before VB?

This question determines the impact of possible hydrogen burning on the integrity of the secondary containment. If hydrogen burning occurs in the reactor building rapid pressure increases would occur which could alter gas flow pathways through the building by damaging doors and/or walls or causing blow-out panels to fail. The burns would also tend to increase the level of bypass by shortening the residence time of the aerosol-carrying gasses (less effective retention). Three sources of information have been considered in quantifying this question. The first source is the STCP calculations which indicate that the peak pressure generated

by a hydrogen burn in the reactor building far exceeds the design pressure. This result may lead one to believe that a hydrogen burn would destroy the building. Sandia and ORNL calculations using CONTAIN, HECTRE, and MELCOR with a multi-volume volume representation of the reactor building rather than the single volume MARCH (STCP) calculation, indicate relatively benign peak pressures (less than 50% of the design pressure). However, it has been found that these latter results are highly sensitive to assumptions about the flame speed and the concentration of hydrogen required for ignition. If one selects pessimistic values for these parameters results similar to the STCP calculation can be duplicated. The third source of information considered is the opinions of the experts convened to consider containment and source term issues relevant to the SARRP estimate of risk for Peach Bottom (Ref. 3). The consensus of these experts was that the probability of a hydrogen burn exacerbating reactor building bypass was 0.25 (maximum 0.6, minimum 0).

This is a Type 2 question and there are 4 branches:

1 . nERBB: There is no loss of the reactor building integrity prior to vessel breach.

2 . ERBB2: There is significant leakage from the reactor building prior to vessel breach. However, the majority of the gas flow passes through the building with some opportunity for fission product deposition.

3 . ERBB3: The reactor building is essentially bypassed prior to vessel breach. The release pathway is either directly to the refueling bay or damage to the reactor building results in similar levels of fission product retention.

4 . ERBB4: The reactor building is completely bypassed. There would be no significant fission product retention.

Case # 1 :

In this case large leakage from, or bypass of, the reactor building began prior to the opportunity for hydrogen burning. The building thus remains in this condition.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain

Case # 2 :

In this case either primary containment leakage is from the drywell head (directly to the refueling bay) or the reactor building has been bypassed to the extent that a similar level of fission product retention would be expected. Hydrogen burning has occurred. A hydrogen burn in the refueling bay is would almost certainly blow out the blow-out panels. With the panels gone and if the release were directly to the refueling bay what would be essentially a total bypass would result. For sequences in which the release is not to the refueling bay, a Level 3 reactor building bypass would imply previous structural damage to the building, it is assumed very likely that a hydrogen burn would exacerbate this damage. Thus, for this case the central estimate of the probability of complete bypass is 0.99. The pessimistic estimate is that complete bypass is certain. The optimistic estimate is 0.9.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Indeterminate	Unlikely	Impossible
Branch 4 :	Indeterminate	Likely	Certain

Case # 3 :

In this case the reactor building is either intact or leaking through the blow- out panels (Level 2 bypass) at the time a hydrogen burn occurs. The central estimate of the probability that the burn causes sufficient damage to the reactor building to result in complete bypass is taken as 0.25; the consensus of the SARRP expert review group. If the building does not fail (Level 4 bypass) it is assumed to (continue to) leak. The assumption that a hydrogen burn will always result in at least some uncontrolled leakage is well supported by the computer code calculation described above in the introduction to this question. A factor of 10 uncertainty in the bypass probability is assumed. In the pessimistic case, bypass is assumed certain after a burn.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Very Likely	Likely	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Very Unlikely	Unlikely	Certain

Case # 4 :

In this case the reactor building previously had Level 3 bypass and no hydrogen burning has occurred. The bypass level thus remains the same.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible

Case # 5 :

This case includes sequences in which the reactor building had Level 2 bypass and no hydrogen burns occurred. The bypass level thus remains the same.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 6 :

This case covers sequences in which the reactor building was intact and remains so after the possibility of hydrogen burns is considered since none are found to occur. (Either because primary containment is intact or there was just no burn.)

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Question # 63 : Are fire systems actuated before VB?

This question determines the impact of possible hydrogen burning on the operation of the reactor building fire sprays. The fire spray system is discussed above (Question #59).

This is a Type 2 question and there are 2 branches:

1 . EFireS: The reactor building fire sprays are operating prior to vessel breach.

2 . nEFireS: The reactor building fire sprays are not operating prior to vessel breach.

Case # 1 :

In this case the fire sprays were not operating previously and no hydrogen burn occurred in the secondary containment which would cause them to start. Alternatively, leakage from the primary containment is through the drywell head seal, directly to the refueling bay. Hydrogen burns in the refueling bay are assumed not to trigger the fire sprays. Thus, the fire sprays are certain not to operate.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

This case covers sequences in which either the fire sprays came on regardless of any hydrogen burn in the reactor building or sequences in which there was a hydrogen burn. Hydrogen burns are certain to activate the fire system since they are designed to come on if there is a fire in the reactor building.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 64 : Does SGTS operate until VB?

This question determines the impact of possible hydrogen burns in the reactor building on the Standby Gas Treatment System. As noted above, fire dampers are expected to isolate the SGTS should the temperature in the reactor building be elevated significantly. This feature is intended to protect the SGTS from fire.

This is a Type 2 question and there are 3 branches:

1 . EfSGTS: The Standby Gas Treatment System is failed (isolated).

2 . ErSGTS: The Standby Gas Treatment System is unavailable but may be recovered.

3 . E-SGTS: The Standby Gas Treatment System is operating prior to vessel breach.

Case # 1 :

In this case the SGTS was operating prior to the possibility of a hydrogen burn. The fire sprays have not started (ie. there was no burn). Since fire sprays and SGTS isolation are triggered by the same thing (high reactor building temperature the SGTS is thus certain to continue to run.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case SGTS was not running prior to the possibility of a hydrogen burn but it was recoverable (ie the fire dampers remain

open). As with the previous case the fire sprays are not on so the fire dampers will remain open. SGTS thus remains recoverable.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

This case covers sequences in which the SGTS was previously failed or in which a hydrogen burn occurred. The burn is assumed to both actuate the fire sprays and isolate the SGTS.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 65 : What is containment pressure after CF or vent during meltdown?

This question determines the containment pressure at the time of vessel breach for those sequences in which the containment has been vented, or has failed, during core degradation. This question is thus irrelevant for sequences in which either the containment has remained intact or in which it failed prior to core degradation. Containment pressure at the time of vessel breach for the latter group of sequences is given by Question #36, above. For those sequences with containment failure during vessel breach, this question inputs the containment pressure (in psig) to the event tree code as Parameter #3.

This is a Type 4 question and there are 1 branches:

1 . PBase2: This question actually has no branches. The value of Pbase2, the containment failure at vessel breach for sequences in which the containment failed or was vented during core degradation, is merely determined for future reference by the tree.

Question # 66 : Is there injection during core degradation?

This question determines whether there was injection of water to the vessel during core degradation. Water injection could result either from the recovery of offsite power (most likely) or from belated operator action (such as vessel depressurization in a TC sequence). Water injection will certainly increase the rate (and probably the amount) of hydrogen production. However, if sufficient water is delivered before the core geometry is badly distorted vessel breach may be avoided (considered in Question #67). Even if vessel breach is not averted, late injection implies that water will be supplied to core debris in the drywell, this would significantly alter the accident progression and reduce fission product releases.

This is a Type 2 question and there are 3 branches:

1 . E5-LPIn: Water is delivered to the vessel during core degradation by injection systems which operate only when the vessel pressure is low.

2 . E5-HPIn: Water is delivered to the vessel during core degradation only by the CRD hydraulic system.

3 . nE5-In: There is no water injection to the vessel during core degradation.

Case # 1 :

In this case there is injection from the low pressure systems. Three water sources are considered, for any of them to operate, the vessel must be depressurized. The first system considered is the condensate system. If AC power is available and condensate is not failed injection from this system is considered to be certain. The second system considered is the low pressure ECCS (LPCI and LPCS). In addition to the availability of AC power the suppression pool must be subcooled or the containment must be intact in order for the pumps to have sufficient NPSH. The third and final system considered is HPSW. Question #53 previously considered the availability of this system and the operator actions required to utilize it for water injection to the RPV. Low pressure injection to the vessel is judged to be certain with any of the above systems available.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the CRD pumps have been providing injection. They are certain to continue to do so. (Possible induced failures have previously been considered) .

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

This case covers sequences in which no injection system is available. There is thus certainly no injection to the vessel.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Question # 67 : What is the nature of meltdown?

This question determines whether the core melt proceeds by the gradual flow of molten corium into the lower plenum or by catastrophic failure of the core supports resulting in complete collapse of the core. Despite numerous analyses and various models there is still no widespread agreement among experts as to how core degradation will progress. This question resolves the disagreement into two distinct possibilities. A slump type of melt was that envisioned in WASH-1400 and propagated into the current MARCH 3 code (some variations on the original slump concept are modelled). The slump model assumes that as the core melts the debris collects on the core plate until the core plate fails (due to heating and/or melting). Failure of the core plate is assumed to result in the

entire reactor core "slumping" downward. This model is more applicable to PWRs than BWRs since the BWR core plate provides lateral support only. The core is supported by the control rod guide tubes in four fuel bundle groups. However, the source term code package models assume a slump type failure for BWRs. Other models for BWRs, most notably MELRPI (developed by R. Lahey et al for the NRC Severe Accident Sequence Analysis program) and the IDCOR program MAAP model, assume that molten fuel can accumulate on the core plate (or fuel bundle tie plates) and at some point will locally melt the core plate allowing flow of the molten material down the guide tubes into the lower plenum. This flow type melt is more gradual than the slump type melt. In the flow melt scenario, a vessel bottom head penetration is assumed to melt through before a large quantity of core debris has accumulated in the lower plenum, thus only small quantities (of essentially solid) debris could be ejected were the RPV at high pressure. In the slump scenario, at the time of vessel melt-through, the lower plenum contains a large quantity of semi-molten debris.

This is a Type 2 question and there are 3 branches:

1 . Slump: The entire core slumps into the lower plenum prior to vessel breach.

2 . Flow: Molten material flows from the core region into the lower plenum. Vessel breach may occur with some part of the core intact.

3 . nMelt: Core degradation did not occur.

Case # 1 :

This case includes sequences in which adequate injection was provided by operator action prior to significant core damage. There is thus no core melt.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case injection was restored during core degradation

with the high capacity low pressure systems (condensate, LPCS, LPCI, HPSW). Such injection is judged very likely to mitigate gross structural damage to the core support structure, even if it is unable to prevent the migration of molten core material into the lower plenum of the vessel. Thus, water injection is expected to reduce the likelihood of slump type melts. In the central estimate, a probability of 0. 01 is assigned to the slump typ of melt progression. Optimistically, they are judged to be impossible. In the pessimistic estimate, a probability of 0.1 is assigned.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Very Unlikely	Unlikely
Branch 2 :	Certain	Very Likely	Likely
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case there is injection from the CRD hydraulic system only. The STCP calculation of a TC sequence with CRD injection during core degradation (Ref. 1) predicts that the CRD flow can profoundly influence melt progression. The CRD flow has the effect of cooling the core support structure (assumed to be the core plate in the STCP) and thus retaining core debris in the core region longer than if there had been no CRD flow (TC2 & TC3 with TC1 in Ref. 1) . Since CRD flow can reasonably expected to decrease the vulnerability (if any) of the core support structure to collapse, it is judged to increase the probability of a flow type melt; as quantified for this case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Very Unlikely	Unlikely
Branch 2 :	Certain	Very Likely	Likely
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

This case covers sequences in which there is no delayed restoration of water injection. Quantification of this question is judged to reflect current thought in the reactor safety community as to whether BWR core melts are more likely to be flow type melts or slump type melts. Flow type melts are considered likely in the

central estimate. The pessimistic evaluation is that the probability of a flow melt is 0.5, this reflect the fact that this issue is not settled. Optimistically, flow type melts are certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Unlikely	Indeterminate
Branch 2 :	Highly Likely	Likely	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Question # 68 : What is the mode of vessel breach?

This question determines the nature of the failure of the vessel.

This is a Type 2 question and there are 4 branches:

1 . Alpha: There is a steam explosion in-vessel with debris forming a missile which subsequently lifts the upper vessel head resulting in failure of the drywell.

2 . SE-BH: An in-vessel steam explosion causes catastrophic failure of the vessel bottom head.

3 . Mthru: The vessel bottom head melts through as a result of the accumulation of hot core debris on its inner surface.

4 . nBreach: Core melt is arrested in-vessel.

Case # 1 :

This case covers sequences with no core damage. There can be no vessel breach.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain

Case # 2 :

In this case it is assumed that a slump type of core melt occurs. This (according to some experts) gives rise to the possibility that a steam explosion could occur. Only the pessimistic walkthrough allows this as a significant possibility. For that pessimistic quantification, the Alpha failure mode is given a probability of 0.01, the probability of an in-vessel steam explosion of sufficient size to fail the RPV bottom head is assumed to be 0.2. This quantification reflects what is judged to be reasonable coverage of the issues.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Highly Unlikely	Very Unlikely
Branch 2 :	Impossible	Impossible	Unlikely
Branch 3 :	Certain	Highly Likely	Likely
Branch 4 :	Impossible	Impossible	Impossible

Case # 3 :

This case includes sequences in which injection is restored during core degradation. There is thus some possibility that vessel breach may be avoided. This depends on whether the core debris in the vessel is in a coolable geometry. Just what this means is not clear and expert opinion varies. Clearly there will be a sensitivity to the extent of core damage at the time injection begins. The IDCOR position is that less than 20% of the core must be melted in order for there to be recovery. Since melt proceeds rapidly once it has begun, there seems little justification for a high probability of preventing vessel failure. It is thus judged that the probability of preventing vessel failure with late injection is indeterminate. The optimistic evaluation is that the prevention of vessel breach is likely, pessimistically it is unlikely. This quantification is judged to be reasonable, given the large uncertainties with respect to this issue.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Unlikely	Indeterminate	Likely
Branch 4 :	Likely	Indeterminate	Unlikely

Case # 4 :

This case includes long term station blackout (initial high pressure injection) in which CRD flow only is restored during core degradation. If the operators were able to optimize the flow from this system, flow could approach the level necessary to remove the decay power (9 to 10 hours from scram). There is thus a slight (very) possibility that vessel breach may be prevented (recall CRD flow is injected through the vessel bottom head). The central estimate of the success probability is 0.001 (almost negligible). The pessimistic estimate is zero. Optimistically, a value of 0.1 is assigned.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Likely	Highly Likely	Certain
Branch 4 :	Unlikely	Highly Unlikely	Impossible

Case # 5 :

This case covers sequences in which a flow-type melt has been assumed. Steam explosions are excluded on the basis that there is insufficient mechanical energy available to trigger an explosion which has enough energy to fail the vessel. These sequences are thus assumed to result in a vessel melt-through.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible

Question # 69 : Is the RPV blowndown before vessel breach?

This question determines the pressure within the Reactor Pressure Vessel (RPV) at the time of vessel breach. Note that Question #51 above has previously determined the RPV pressure during core degradation. The purpose of this question is to allow for the possibility that the melt-through of the vessel (determined by Question #68) occurs in such a way that the gas pressure is

relieved before a significant amount of corium is ejected. This could occur if the RPV pressure boundary is broken first in a control rod guide tube at a location which is both above the debris accumulated in the bottom head (if any) and below debris accumulated at the elevation of the core plate. Failure of an instrument tube penetration before a large amount of debris has collected on the bottom head of the vessel could have the same result.

This is a Type 2 question and there are 2 branches:

1 . nEBlowD: The Reactor Pressure Vessel is at high pressure when core debris begins to be ejected.

2 . EBlowD: The Reactor Pressure Vessel is depressurized as a result of localized melting prior to significant debris ejection.

Case # 1 :

In this case core degradation occurs with the RPV at low pressure. The pressure is thus low at vessel breach regardless of the failure mode.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case the core melt is assumed to be of the flow type (described in Question #67 above). The vessel bottom head fails by melting-through. In a flow melt, corium will flow down the control rod guide tubes and will accumulate around the stub tubes where the control rod drive enters the vessel. A leak at this point in the pressure boundary could occur before a significant quantity of core debris had accumulated in the lower plenum. This leak would have the potential for depressurizing the RPV prior to a gross melt through of the head. A less likely possibility is that corium flows through the fuel support casting and down the inside of the contol rod guide tube. A melt through of the pressure boundary inside the guide tube could then occur; isolated from any large quantities of debris which may have accumulated. The latter is less likely since the inside of the guide tube is probably full of

water. The central estimate of the probability of vessel depressurization prior to significant melt ejection is 0.6. This value represents the consensus of the group of experts convened to review containment loading issues for the SARRP evaluation of Peach Bottom risk. The optimistic evaluation is 0.9. The pessimistic evaluation is 0.1. This quantification is judged to adequately reflect the uncertainty.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 3 :

This case covers sequences in which the vessel is at high pressure during core degradation and there is a slump type melt so there is a reduced probability of blowdown prior to a large failure of the bottom head. For slump melts the core debris would have to be essentially solid to permit vessel depressurization prior to significant debris ejection. Since those investigators who support the core slumping model generally envision the debris to be in at least a partially liquid state, the central estimate is that the probability of early depressurization for this case is 0.1. The pessimistic evaluation is a factor of 10 lower. The optimistic estimate is 0.5 since no general agreement on this issue is availab

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Likely	Very Likely
Branch 2 :	Indeterminate	Unlikely	Very Unlikely

Case # 4 :

This case covers sequences in which there is no breach of the vessel or in which vessel failure results from an in-vessel steam explosion. The question of early blow-down is not relevant for these sequences, thus the no blow-down case branch is assigned

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 70 : Does direct heating occur?

This question determines whether there is direct heating of the containment. If the vessel fails at high pressure, very hot core debris can be blown into the containment atmosphere. If the containment contains significant oxygen or steam the debris may burn as zirconium, and uranium oxide, oxidize. A portion of the sensible heat of the debris will be transferred to the containment atmosphere with relatively high efficiency. This results in rapid pressurization of the containment. This phenomenon is direct heating. If a significant fraction of the core debris (> 10%) participates in direct heating, the containment will almost certainly fail as a result of overpressurization.

This is a Type 2 question and there are 2 branches:

1 . DH : Direct heating occurs at vessel breach.

2 . nDH: There is no direct heating of the primary containment.

Case # 1 :

In this case the vessel pressure is high at the time of vessel breach. The melt progression is assumed to be a core slump so that there are large quantities of core debris in the vessel bottom head. These are the conditions which are assumed to allow direct heating to occur. However, the confined geometry of the BWR pedestal and the restricted opening to the drywell (2 meters by 1 meter) will serve to mitigate the dispersal of debris into the drywell airspace. (It is also noted that the pipes and associated whip restraints, as well as pumps and equipment in the drywell, will also tend to hamper debris dispersal). Thus, even if the conditions at in the RPV at vessel breach favor direct heating, the probability that it will occur is judged to be indeterminate (ie 0.5 probability of significant debris participation). The pessimistic evaluation is that significant direct heating is likely. Optimistically, it is unlikely.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Likely	Certain

	Indeterminate	Unlikely	Impossible
Branch 2 :			

Case # 2 :

This case covers sequences in which either there has been a flow type melt (so little debris has accumulated on the bottom head) or the vessel is depressurized at vessel breach. Either of these conditions is assumed to prevent direct heating.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 71 : Does an ex-vessel steam explosion occur?

This question determines whether a steam explosion occurs as a result of corium ejection from the Reactor Pressure Vessel. A steam explosion could result from the hot melt falling into water in the sumps or water which has accumulated on the drywell floor. For the purposes of this question, only steam explosions of sufficient magnitude to cause a significant increase in containment pressure are considered. Small steam explosions, which may result in small incoherent pressure spikes, are more probable but are not included since they have a negligible impact on containment integrity. In a discussion of this issue with M. Corradini (U. of Wisconsin) he stated that he had recently investigated the depth of water necessary to support a large steam explosion. His results indicate that a few meters are required. At Peach Bottom, a maximum of less than 2 meters is available (in the sumps). The average maximum depth on the drywell floor is about half a meter.

This is a Type 2 question and there are 2 branches:

1 . ExSE: There is a steam explosion in the containment at vessel breach.

2 . nExSE: There is no steam explosion in the containment.

Case # 1 :

In this case a slump type melt has occurred. Slump type core melts are a prerequisite for steam explosions. The slump melt allows for the possibility of a large quantity of hot molten material to fall from the vessel into the water beneath at the time

of vessel breach. If a sufficiently large mass of corium falls into a water pool with enough velocity to induce fragmentation of the molten material a steam explosion is likely. Three factors mitigate the probability of a steam explosion: First, the amount of material which is molten when the vessel bottom head fails may not be very large or may mix with solid debris prior to reaching the water in the bottom of the pedestal. Second, the control rod drive mechanisms and their supporting structural beams will inhibit the fall of molten material and a significant quantity my refreeze on the steel surfaces. Third, apart from water in the sumps, there can be at most 2 feet of water accumulated on the pedestal floor. This water could be displaced by the falling material and mixing of the water and corium could be poor. However, it should be noted that the pedestal would tend to contain the water and while it might be temporarily displaced eventual mixing is likely. The above factors were considered quantifying the probability of an ex-vessel steam explosion in this case. The central estimate is that it is very unlikely (0.01). Pessimistically, the possibility is recognized by assigning a 0.1 probability. Optimistically, ex-vessel steam explosions are impossible.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Very Unlikely	Unlikely
Branch 2 :	Certain	Very Likely	Likely

Case # 2 :

This case covers sequences in which either there is a flow melt or in which core melt is arrested in-vessel. In either case, there is no possibility of a steam explosion. If the vessel remains intact, this is clearly true. In the case of a flow melt corium leaves the vessel more-or-less as the fuel melts. This is a relatively slow rate. The corium is also close to the solidus temperature and should readily refreeze on the control rod drive structure below the vessel. With small quantities of solid, or almost solid, debris falling into the pedestal water (if any) there is a negligible probability that a steam explosion, of a magnitude which could impact the containment integrity, would occur.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 72 : What is pressure rise due to blowdown (effective VS and RCdry)?

This is the first of three questions (Question #72, Question #73, and Question #74) which addresses the pressure rise in the containment resulting from vessel melt-through. Each of the questions assigns a value to a separate pressure rise parameter. The sum of these three parameters is the total pressure rise (in psi) resulting from vessel breach. This question quantifies the pressure rise which results from the blowdown of the vessel. The blowdown of the vessel from 1100 psi, assuming 50% steam by volume, results in approximately a 30 psi rise in the containment pressure. Uncertainties in this value arise from uncertainties in the bulk gas temperature in vessel, the hydrogen content, and the final temperature in the containment (considering PV work). The impact of possible direct heating is also considered in this question. Quantification of the pressure rise due to direct heating can be accomplished with a simple model but the uncertainties are large. These uncertainties are principally, the amount of debris which participates in direct heating, the extent of distribution into the containment atmosphere, the rate of debris ejection, and the degree to which the debris undergoes exothermic reactions with the atmosphere. The central estimates for pressure rise for this case were derived on the basis of responses from the group of experts convened to review SARRP containment loading issues for Peach Bottom (Ref. 3).

This is a Type 4 question and there are 1 branches:

1 . DPblow: This question has no actual branches. The purpose of this question is to evaluate Dpblow, the pressure rise in the containment due to blowdown of the RPV. The question is not referenced by subsequent questions, only the evaluated parameter (#4) is used.

Question # 73 : What is the pressure rise due to debris quenching?

This question determines whether there is more water in the base of the reactor pedestal than that contained in the sumps. The pressure rise which results from the core debris contacting that excess water is also evaluated. The value of the pressure rise resulting from the quenching of some fraction of the debris is assigned by this question (Parameter #5). This evaluation is based on the consensus of expert opinion, as in the previous question. The water level in the dryweil sumps varies stochastically from essentially zero to the full capacity of 1000 gallons. The amount

at any given time depends on when the operators last decided to pump them down. It is assumed that on the average the sumps are half full. Thus, the sumps are assumed to contain 500 gallons for the purpose of evaluating pressure rise due to debris quenching when the drywell floor is "dry" (sump water only). If containment sprays were operated during the accident, if there is ECC injection at the time of vessel breach, or if the initiator was a primary system break, then the drywell floor is "wet". There may be up to 18" of water accumulated.

This is a Type 4 question and there are 2 branches:

1 . RCwet: The reactor pedestal floor is covered by up to 2 feet of water.

2 . RCdry: There is no water in the reactor pedestal beyond what is contained in the drywell sumps.

Case # 1 :

In this case the accident initiator is a primary system break in the drywell. With this leakage from the RPV there will be much more water on the drywell floor than would be present due to condensation in sequences where steam discharge from the RPV is passed to the suppression pool through the S/RVs. The drywell floor is thus "wet" but there is probably less water accumulated than if containment spray had operated or if ECC injection occurs. The optimistic and central estimates of the pressure rise are thus 50% of the values used for those sequences. The pessimistic value is identical, since the pessimistic assumption would be that there is no difference.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case either the drywell sprays operated at some time during the accident or there was injection of water to the vessel prior to vessel breach; the injection is assumed to continue. The drywell floor is thus "wet". The central estimate of the pressure rise due to debris quenching is 30 psi. The optimistic and pessimistic estimates reflect the range of opinions given by the

experts and assigns a plus-or-minus 50% uncertainty.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 3 :

In this case there is no water on the drywell floor. The only water available to quench debris is the 500 gallons assumed to be in the drywell sumps. The central estimate of the pressure rise due to debris quenching in the sumps is 10 psi. The optimistic estimate is 5 psi; the lowest value given any credence by the experts. The pessimistic value is 30 psi; the largest value given any credence.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 74 : Is SP bypassed or vents not cleared at VB (effect. VS)?
-- DPfVS

This question is the last of the three which are used to assess the containment pressure rise at vessel breach. The pressure rise indicated in the two previous questions was evaluated assuming that pressure suppression occurs. This question adds a pseudo-pressure rise which accounts for suppression pool bypass, pool temperatures close to the saturation point, and dynamic loads resulting from steam explosions and direct heating. Thus, the parameter evaluated below is a correction to the previously evaluated pressure increases to account for any lack of effectiveness in the pressure suppression system. Because the question has branches and evaluates the pressure rise parameter, there can be "cases within a case". The value that the pressure rise parameter (#6) assumes is dependent on which question branch is taken in that case. Thus the probability that the vents have time to clear in a specific case will impact the predicted pressure rise. Evaluation of the pressure rise parameter for cases in which there are ex- vessel steam explosions is based on hand calculations performed at Sandia which attempted to extrapolate results from MARCH calculations made prior to the development of the STCP. The assumptions made in these

calculations are not clearly documented. However, in the current quantification of the tree the numerical values, provided that they are greater than about 50 psi (in the central estimate) have no impact on the results of the Containment Event Tree analysis.

This is a Type 4 question and there are 3 branches:

1 . Vclr: The drywell vents clear (no large dynamic load) and the pressure suppression system works as designed.

2 . nVclr: There is a large, rapid increase in the drywell pressure and the drywell vents do no clear with sufficient rapidity.

3 . Bypass: The suppression pool is bypassed and there is no vapor suppression function.

Case # 1 :

In this case there is an ex-vessel steam explosion but no direct heating. The suppression pool is not bypassed but its temperature is high enough that the effectiveness of vapor suppression is reduced. Because a steam explosion would produce a large dynamic load, there is some probability that the drywell vents will not clear. The resulting pressure rise in the drywell would be large since the steam generated by the explosion would not be condensed. The value assigned to the pressure rise parameter, given that the vents do not clear, is large enough to ensure containment failure in the central and pessimistic estimates. The optimistic estimate is 70 psi. If the vents do clear, the central estimate of the pressure rise is 50 psi. The optimistic and pessimistic evaluations reflect a plus-or-minus 50% uncertainty in the central estimate. The probability that the drywell vents clear is indeterminate (0.5 central, 0. 9 pessimistic, 0.1 optimistic) since no analysis is available to provide guidance for this evaluation.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Likely	Indeterminate	Indeterminate
Branch 2 :	Unlikely	Indeterminate	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

This case is similar to the previous one with the exception that the suppression pool has a substantial amount of subcooling. Pressure suppression will thus be effective if the vents clear. The probability that the vents clear is evaluated exactly as in the previous case. When the vents do not clear the pressure rise is evaluated identically to the previous case. If the vents do clear, the pressure rise is taken to be 5 psi lower than the previous case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Likely	Indeterminate	Indeterminate
Branch 2 :	Unlikely	Indeterminate	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case, direct heating occurs, there is no ex-vessel steam explosion, the suppression pool is not bypassed but the water in it is hot. Direct heating can result in a very rapid increase in the containment pressure. If the vents do not clear the pressure rise is set to 999 psi (this dummy value ensures containment failure). If the vents do clear the pressure increment required is that due to the suppression pool being saturated rather than being subcooled. Since the containment pressure rise during direct heating is due to the thermal expansion of gas in the drywell and the production of non-condensable gasses, the pressure suppression function of the pool (ie steam condensation) is relatively unimportant. If the pool is saturated, more steam would be produced as a result of hot gasses being forced through the pool giving up their heat. The central estimate is that the additional steam would create a pressure increase of 10 psi in the containment. The optimistic and pessimistic evaluations represent an uncertainty of plus-or- minus 50%. The probability of the vents failing to clear is based on the responses provided by the expert reviewers. The central estimate of the probability of the vents not clearing is 0.16. This is the average weight (weights were between zero and unity and are here interpreted to be subjective probabilities) assigned to the scenario that direct heating results in certain containment failure. The optimistic estimate reduces this probability by a factor of 10. For the pessimistic evaluation, the probability assigned is 0.5, since no analysis is available.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Likely	Likely	Indeterminate
Branch 2 :	Very Unlikely	Unlikely	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

This case is similar to the previous one except that the suppression pool is significantly subcooled. Provided that the vents clear there is no additional containment pressure rise. The total pressure rise is given in Question #72. If the vents do not clear, containment failure is certain (parameter set to dummy value of 999 psi). The probability that the vents do not clear is quantified as in the previous case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Likely	Likely	Indeterminate
Branch 2 :	Highly Unlikely	Unlikely	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

In this case, both direct heating and a steam explosion occur at vessel breach. Such an occurrence is extremely unlikely; as indicated by previous quantification of the tree. The suppression pool is also hot so the effectiveness of pressure suppression is reduced. With both a steam explosion and direct heating the drywell will pressurize very rapidly. As in the previous case, if the vents do not clear, the pressure rise is assigned a value so large that containment failure is assured (999 psi). Given that the vents clear the pressure rise is simply the sum of those given in Cases #1 and #3 above. The central estimate for the probability of the vents not being able to clear is taken to be identical to that for Case #1 on the basis that the explosion generates the most rapid increase in pressure and will thus govern the ability of the vents to clear.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Likely	Indeterminate	Indeterminate
Branch 2 :	Unlikely	Indeterminate	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Case # 6 :

This case is similar to the previous one with the exception that the suppression pool is subcooled and the steam released to, or generated in, the drywell is largely condensed. There is thus a negligible pressure rise from this steam provided that the drywell vents clear. The pressure rise parameter is evaluated exactly as in Case #1 (no pressure increment for direct heating). The probability that the vents clear is evaluated exactly as in the previous case.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Likely	Indeterminate	Indeterminate
Branch 2 :	Unlikely	Indeterminate	Indeterminate
Branch 3 :	Impossible	Impossible	Impossible

Case # 7 :

In this case there is a significant amount of water on the drywell floor. The RPV was at high pressure at the time of vessel breach. The suppression pool temperature is high but it has not been bypassed. Interaction of the debris with the water on the drywell floor will produce steam and hydrogen in addition to what is released from the vessel. The effectiveness of pressure suppression is reduced by the hot pool. It is certain that the vents will clear (the system is designed for very rapid pressurization of the drywell). The pressure rise parameter for this case accounts for the effect of additional steam generated from the suppression pool in absorbing the steam and hydrogen released by the blowdown of the vessel and generated by the interaction of debris with the water on the drywell floor. The central estimate for the additional pressure rise for this case is 15 psi. This value was determined assuming a pool temperature of approximately 250 degres F (180 degrees F for non-saturated) and that 10% of the steam generated would not be condensed in the pool. The pessimistic estimate assumes 35% of the generated steam will not be condensed. Optimistically, all the steam is condensed and thus the pressure increment is due only to sensible heat (5 psi).

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 8 :

This case is similar to the previous one with the exception that the vessel was depressurized during core degradation. There is thus no blowdown of the vessel to be taken into account. The pressure rise for this case is just that due to the suppression pool (hot) absorbing the energy transferred to it by the steam and hydrogen generated in the interaction of the core debris with water on the drywell floor plus that due to the hydrogen being added to the containment.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 9 :

In this case there is no water on the pedestal floor above what is contained in the sumps. The suppression pool is hot. The vessel pressure may either be high or low. The suppression pool being hot reduces the effectiveness of vapor suppression and thus there is a small added pressure rise from that given for vessel blowdown in the question above (Question #72). This pressure rise corresponds to that resulting from pool heat-up as a consequence of condensing the steam which was released from the vessel at high pressure. There is a slight inaccuracy in this case in that if the vessel is depressurized at vessel breach the pressure rise is expected to be lower that that given in this case. However, the difference is less than 10% of the total failure pressure so there is no impact on the results predicted by the event tree code.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 10 :

In this case the suppression pool is subcooled and not bypassed. There is also no ex-vessel steam explosion or direct heating (such sequences are considered in previous cases). Because vapor suppression is effective there is no additional pressure rise for this case. (The vents are certain to clear). All the appropriate pressure rise is given by Question #72 above.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 11 :

In this case the suppression pool is at least partially bypassed but the containment has previously ruptured. With the containment ruptured there can be no pressure rise (definition of rupture). The branch of this question indicating suppression pool bypass is taken in this case and in all the succeeding cases of this question. All the non- bypass sequences are covered by the previous ten cases.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 12 :

In this case there is a significant quantity of water on the drywell floor, the vessel was pressurized prior to vessel failure and the suppression pool is bypassed. The pressure rise parameter thus accounts for the increase in containment pressure if vessel blowdown occurs with no pressure suppression over that occurring with normal pressure suppression (the assumption made in Question #72). The additional pressure rise due to the steam created during debris quenching is also taken into account.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 13 :

This case is similar to the previous case (#12) with the exception that the RPV was depressurized at vessel breach. Since there is little pressure rise associated with vessel breach with the vessel depressurized, even with the suppression pool bypassed, the pressure rise parameter for this case essentially reflects the pressure exerted by the steam generated by debris quenching on the drywell floor (since in this case it does not condense).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Question # 75 : Does pressurization fail containment at VB?

This question instructs the Event Tree Code to determine the probability of containment failure immediately after (at) vessel breach. To do this the code calculates the containment pressure using parameter values supplied by previous questions. (Question #36 and Question #38, or Question #65, and Question #72 through Question #74) The calculated pressure is used to evaluate the probability of failure based on an input containment fragility. This question is analogous to Question #47 above; the same fragilities are assumed.

This is a Type 6 question and there are 2 branches:

1 . IP: The containment fails at vessel breach.

2 . nIP: The containment retains its integrity following vessel breach.

Case # 1 :

In this case the containment has not been vented and did not fail during core degradation. The pressure in the containment

immediately prior to vessel breach is "Pbasel" which is evaluated in Question #36 plus the pressure rise due to hydrogen production in-vessel (Question #38). The containment pressure after vessel breach is evaluated by summing the above defined pressure rise parameters (Question #72 through Question #74) to this initial value.

Case # 2 :

In this case the vessel does not melt-through so the probability of containment failure is assessed based on the containment pressure evaluated by summing the pressure at the onset of core degradation (Question #36) and the pressure rise due to hydrogen production (Question #38). The result is the containment pressure when the accident is recovered (assuming that it did not fail).

Case # 3 :

In this case the containment was previously failed or has been vented. The pressure after vessel breach is thus evaluated using the base pressure given by Question #65 which accounts for containment failure or venting during core degradation. The pressure rise in containment following vessel breach is added (Question #72 through Question #74). This allows for what may previously been Level 2 leakage (defined under Question #30) to be exacerbated to a rupture.

Question # 76 : Does direct melt-structure attack fail containment at VB?

This question determines whether containment failure occurs as a result of core debris contacting the steel containment shell at the point of embedment. Core debris may flow from the vessel pedestal and spread over the drywell floor to the point at which the steel containment shell is embedded in the concrete of the drywell floor and basemat. Two failure modes can be conceived: The debris maybe sufficiently hot that the carbon steel of the shell is melted. Or, the combined effects of high containment pressure and local heating of the steel shell may result in a creep-rupture type failure. IDCOR (Chicago Bridge and Iron) has evaluated the latter mode and concluded that the shell is adequately restrained to preclude this mode of failure. It should be noted however that this evaluation was carried out assuming a 1500 degree Fahrenheit debris temperature, whereas a temperature close to, or exceeding, the melting point of the steel would seem more appropriate. It is conceivable that a cooler crust might still form on the debris preventing a melt-through. However, melt-through of the containment is clearly possible (especially assuming the CORCON-VANESA model for core-concrete interaction, which can, under

some conditions, predict very high debris temperature > 2000 C). The factor most likely to limit containment failure by melt-structure attack is the failure of the corium to flow out as far as the containment shell. This containment failure mode will predominate overpressure failures which resulted in Level 2 leakage of the primary containment. This failure mode is considered equivalent to a rupture of the drywell at any location below the head seal.

This is a Type 2 question and there are 2 branches:

1 . IM: The containment is failed as a result of melt-through at the point of embedment.

2 . nIM: The containment is not failed as a result of melt-structure attack.

Case # 1 :

In this case the core debris was dispersed at vessel breach as a result of the high pressure in the RPV (slump-type melt is assumed). Such dispersal is judged to slightly increase the probability of containment failure due to melt- through. The assumption here is that the debris is ejected out of the pedestal manway with considerable velocity; directed at the drywell wall. The evaluation of the drywell melt-through probability is based on the consensus opinion of the containment experts who were convened to consider the SARRP Peach Bottom issues (Ref. 3). That probability is 0.95 (central). Optimistically, high pressure ejection is unlikely so the failure probability is 0.1. The pessimistic evaluation is unity (certain failure).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Likely	Certain
Branch 2 :	Likely	Very Unlikely	Impossible

Case # 2 :

In this case the drywell floor is dry and core debris trickles from a depressurized vessel. Depending on the temperature of the debris it may spread over the drywell floor and contact the containment shell at the point of embedment. Even if the debris falling from the vessel is close to the solidus temperature it may reheat and spread out as core-concrete interaction (CCI) begins.

The consensus evaluation of the SARRP expert reviewers (Ref. 3) was 0.9 probability of melt-through. This value is the central estimate. The optimistic value is 0. 1 (it is noted that the IDCOR position is zero but there is some uncertainty as to whether the supporting analysis is consistent with previous IDCOR calculations). The pessimistic estimate is unity; corresponding to the value given by a couple of the reviewers.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Likely	Certain
Branch 2 :	Likely	Unlikely	Impossible

Case # 3 :

In this case the core debris has been dynamically dispersed as a result of an in-vessel steam explosion which failed the bottom head. This dispersal is judged similar to the Case #1 in which there is high pressure debris ejection. A slump type melt in vessel is also required for this kind of interaction to occur since there must be a sufficient supply of molten corium at the time of vessel breach. The probability of drywell melt-through is quantified exactly as in Case #1 of this question.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 4 :

This case covers sequences in which the drywell floor has excess water. The central estimate for the melt-through probability is 0.7; corresponding to the mean of the probabilities assigned by the SARRP expert reviewers. It was their stated opinion that the debris migration would not be greatly effected by the presence of water. The optimistic estimate is only 0.001 which is intended to recognize the potential for debris quenching. The pessimistic estimate is unity; as in the previous cases.

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Highly Unlikely	Indeterminate	Certain
Branch 2 :	Highly Likely	Indeterminate	Impossible

Question # 77 : What is the location of containment failure after VB?

This question determines the location in the containment from which leakage (if any) occurs. This question is subsequently used to evaluate the extent of suppression pool and/or reactor building bypass. Question #30 and Question #48 above are analogous.

This is a Type 2 question and there are 3 branches:

1 . nICL: There is no leakage from the containment up to the time at which core debris is released from the vessel (or core melt is arrested).

2 . ICLD: Containment leakage is from the drywell.

3 . ICLW: Containment leakage is from the wetwell (torus).

Case # 1 :

This case considers four possible failure modes; each of which are certain to result in primary containment leakage from the drywell: 1) Alpha mode in- vessel steam explosion which lifts the drywell head. 2) Melt-through of the drywell wall (previous question). 3) Overpressure failure at vessel breach with the drywell vents not clearing (containment fails before the wetwell experiences a significant pressure increase). 4) Previous leakage from the drywell.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the containment previously leaked from the wetwell. It is judged certain that leakage will continue from this location.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

In this case the containment failed due to over-pressurization at vessel breach. In the absence of large dynamic loads to the drywell there is some possibility that failure may occur in the wetwell. This case is quantified exactly as Case #3 of Question #28.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Indeterminate	Likely	Certain
Branch 3 :	Indeterminate	Unlikely	Impossible

Case # 4 :

In this case the containment remains intact following vessel breach. It is therefore certain that there will be "no significant leakage".

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 78 : For Drywell failures, is the failure at the head seal?

This question is completely analogous to Question #29 and Question #49. The discussion under Question #29 is relevant.

This is a Type 2 question and there are 3 branches:

1 . IDHF: Drywell leakage is from the head seal to the refueling bay following vessel breach.

2 . IDKF: Drywell leakage is from the knuckle region (or equivalent) following vessel breach.

3 . nIDF: The drywell retains its integrity following vessel breach.

Case # 1 :

In this case the drywell wall is melted through at the point of embedment. This failure mode is assumed to be equivalent to overpressure failure at the drywell knuckle.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case leakage was previously at the vessel head. Provided the drywell wall did not melt-through (previous case) leakage is assumed certain to continue to be predominantly through the head seal.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

There was previous leakage from the knuckle location (or equivalent). Leakage is assumed certain to continue from this location.

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

In this case the containment failed in the drywell as a result of overpressurization at vessel breach. The split between leakage from the head seal and knuckle location is quantified exactly as in Case #1 of Question #29.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

This case covers sequences in which leakage is predominantly from the wetwell or in which the containment retains its integrity following vessel breach.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Question # 79 : What is the containment leakage level after VB?

This question determines the level of containment leakage immediately after vessel breach. Given that the containment is no longer intact, two levels of leakage are considered. Level 2 leakage is a failure which results in only slow depressurization of the containment (on the order of 2 hours to reach atmospheric pressure). Level 2 leakage corresponds to a leakage area on the order of 0.1 square feet. Level 3 leakage is a rupture of the containment (several square feet of area) which results in containment depressurization is several minutes.

This is a Type 2 question and there are 3 branches:

1 . nICL: The containment retains its integrity immediately

following vessel breach.

2 . ICL2: The containment to leaks subsequent to vessel breach. The leakage rate is results in very slow containment depressurization.

3 . ICL3: The containment ruptures, resulting in depressurization, subsequent to vessel breach.

Case # 1 :

In this case there is either an alpha failure (WASH-1400 type in-vessel steam explosion), or the core debris melts the containment at the point of embedment, or the drywell vents did not clear at the time of vessel breach. The alpha mode failure results in a missile; the drywell head is assumed to be lifted. Alpha mode is certainly Level 3 leakage. It is assumed that if the drywell is melted at the point of embedment that the leakage area is large enough to result in rapid depressurization. Drywell failure at the time of vessel breach coupled with the drywell vents being unable to clear is also assumed to result in containment rupture since the pressurization is rapid and typically peak pressures are well in excess of the assessed ultimate capability of the containment. Sequences in which the containment previously ruptured are also included in this case. The rupture is certain to remain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

This case covers sequences in which the containment failed at vessel breach either at the drywell knuckle (or equivalent location in the drywell) or in the wetwell (torus). This case is quantified exactly as Case #4 of Question #30.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible

Branch 2 :	Likely	Unlikely	Impossible
Branch 3 :	Unlikely	Likely	Certain

Case # 3 :

In this case containment failure at vessel breach resulted in leakage from the drywell head seal. Provided the failure was not induced by sudden pressurization, (considered in Case #1 of this question) this failure mode is always assumed to result in Level 2 leakage. This is consistent with Case #5 of Question #30 and Case #5 of Question #50.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

In this case Level 2 leakage developed prior to vessel breach and this was not exacerbated at vessel breach. Thus, the leakage is certain to remain Level 2.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

This case covers sequences in which there has been no significant threat to the containment integrity up to the time the core debris is released from the vessel. (Sequences in which there is no vessel breach are also included). There is thus no containment failure and "no leakage" is certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain

Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 80 : Is AC power not available late?

This question allows consideration of offsite power being restored subsequent to vessel breach. Quantification of the probabilities is done using the same data as was used in the ASEP quantification of the blackout sequence frequencies. National data for the time for recovery of offsite power was used. Values for the optimistic and pessimistic estimates for recovery probability were obtained as described under Question #32.

This is a Type 2 question and there are 2 branches:

1 . LfAC: AC power is not recovered during the sequence until after most of the fission product release has occurred.

2 . L-AC: AC power is recovered subsequent to vessel breach and in time to impact the core-concrete interaction.

Case # 1 :

In this case there was initial operation of the high pressure make-up systems and thus vessel breach occurs approximately 11 hours after the loss of offsite power. The probability for AC power availability thus approximates the probability of of offsite power being available at 12.5 hours (somewhat arbitrary) following interruption, given that it was not available at 11 hours following interruption.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Likely	Likely
Branch 2 :	Indeterminate	Unlikely	Unlikely

Case # 2 :

This case includes the so-called fast station blackout sequences in which there is no early high pressure injection. Vessel breach would occur approximately 3 hours following the loss of power. The probability of AC power recovery is taken to be the probability that it was recovered after 4.5 hours given that it was

not recovered after 3 hours.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Indeterminate	Likely
Branch 2 :	Indeterminate	Indeterminate	Unlikely

Case # 3 :

This case covers sequences in which AC power was not lost or was recovered prior to vessel breach. It is thus certain that AC power remains available.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 81 : Is RHR not operating late?

This question determines the availability of containment heat removal late in the sequence. Containment heat removal can be accomplished using either the spray or suppression pool cooling modes of RHR operation. Heat removal from the containment by venting or as a result of containment failure is considered in other questions.

This is a Type 2 question and there are 2 branches:

1 . nLRHR: There is no heat removal from the containment (using the RHR system) subsequent to vessel breach.

2 . LRHR: The RHR system is used to remove heat from the containment subsequent to vessel breach.

Case # 1 :

In this case either: the RHR system has previously failed, or there is no AC power available to operate the system, or the suppression pool is drained so there is no water to pump. Thus, there is certainly no containment heat removal.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the RHR was not available due to the lack of AC power. Power is restored after vessel breach. The RHR system cannot operate unless the pumps have sufficient Net Positive Suction Head (NPSH) thus either the containment must be intact or the suppression pool must be subcooled in order for RHR to be operable. The RHR system is manually initiated. Quantification of the probability that the RHR system is operated for this case thus considers the probability that the operator will start the system. Operation is far from certain since the plants condition has gone far beyond anything that plant personnel are trained to handle. The central estimate is that operation of RHR is likely since this would be one of the few options available to the operator. The optimistic estimate reduces the failure probability by a factor of 10. The pessimistic estimate is 0.5 since no analysis is available.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Very Likely	Likely	Indeterminate

Case # 3 :

In this case either the RHR has been operating up until the time of vessel breach or it was recovered subsequent to vessel breach as a result of AC power being restored. However, the containment has failed and the suppression pool subsequently saturated. The RHR pumps do not have adequate NPSH so the system is failed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 4 :

This case covers all sequences in which the RHR system was previously operating. The containment has remained intact so RHR continues.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 82 : Do containment sprays not operate late?

This question determines whether the containment sprays are operating subsequent to vessel breach. Operation of the containment sprays will profoundly influence the release of fission products to the environment. In particular, the operation of sprays late in the sequence (during core-concrete interaction) will significantly reduce, and possibly prevent, the release of non-volatile fission product species.

This is a Type 2 question and there are 2 branches:

1 . nLCS: The containment (drywell) sprays are not operating subsequent to vessel breach.

2 . LCS: The containment (drywell) sprays are operating subsequent to vessel breach.

Case # 1 :

In this case either the sprays failed earlier in the sequence (perhaps initially) or there is no AC power available to power the pumps. Either way, there is no late containment spray.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the sprays were previously unavailable but AC power is recovered subsequent to vessel breach. In addition, either the containment is intact or the suppression pool is subcooled so if the operators align the RHR system for spray mode and start the pumps there will be sufficient NPSH for the pumps to provide spray flow. (The suppression pool is not drained.) Quantification of this case thus reflects the probability that plant personnel will initiate sprays late in the sequence. Quantification is exactly as in Case #2 of the previous question, under the assumption that if sprays are operable the operator would use them for RHR. If RHR were unavailable (service water failure) the operators would still use spray (with approximately the same probability) in an attempt to reduce containment pressure.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Very Likely	Likely	Indeterminate

Case # 3 :

In this case the High Pressure Service Water System (HPSW) was recoverable and AC power has been restored. HPSW can be used for containment spray and the quantification of the probability of spray in this case reflects a judgement as to whether the plant operators will use HPSW for drywell spray. Late in the accident this is the best use of HPSW as far as mitigating accident consequences. Since there has been no analysis of the human factors involved here the authors have again chose to use a success probability of 0.5 for the central estimate. The optimistic and pessimistic estimates reflect a reasonable range of uncertainty.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 4 :

In this case containment sprays were operating up until the time of vessel breach using the RHR pumps. The containment has failed and either the suppression pool is saturated (the pumps loose NPSH) or the suppression pool is drained (no water to pump).

In either case, drywell spray does not continue.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 5 :

This case covers sequences in which the containment sprays were operating at the time of vessel breach. In these sequences either: the containment remained intact, the suppression pool was subcooled, or spray water was being delivered by the High Pressure Service Water (HPSW) system. With any (or all) of these conditions met, the sprays will continue to operate.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 83 : Is water not supplied to the debris late?

This question determines whether water is delivered to the core debris in the drywell subsequent to vessel breach. This is significant since water has the potential to quench the debris, halting the core-concrete interaction (CCI) and preventing the further release of fission products. Even if CCI is not prevented, fission product releases will be mitigated.

This is a Type 2 question and there are 2 branches:

1 . nLDBWat: No water is supplied to the core debris on the drywell floor.

2 . LDBWat: Water is supplied to the core debris.

Case # 1 :

In this case the core debris is quenched in-vessel and there was no breach of the vessel. This implies that water was supplied to the core debris.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case the containment (drywell) sprays are operating. There is thus at least 5000 gpm of water being pumped into the drywell. This water will certainly reach the core debris.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

In this case the condensate system is available to pump water into the vessel. Since the vessel bottom head is breached, if the condensate pumps were started the water would reach the debris on the drywell floor. In the quantification of this case it was considered that the condensate system is the system of choice for supplying water to the core. However, for these severely degraded conditions it is not certain that the operators would avail themselves of this option. The central estimate of the failure probability is 0.01. A factor of 10 uncertainty is applied for the optimistic and pessimistic estimates.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Highly Unlikely	Very Unlikely	Unlikely
Branch 2 :	Highly Likely	Very Likely	Likely

Case # 4 :

In this case there was water injection to the vessel (either CRD flow or High Pressure Service Water) but the core debris was not quenched in vessel. The vessel breach was due to a melt-through and there was no subsequent (immediate) failure of the

containment. With no steam explosion or containment failure there is no threat to either of these injection systems. Injection to the vessel continues and since the vessel is breached this water is supplied to the debris on the drywell floor.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 5 :

In this case either the CRD flow was recovered (AC power has been restored after vessel breach) or CRD flow was being injected to the vessel at the time of vessel breach. For sequences in which CRD flow was operating previously, either the vessel failed as the result of a steam explosion or the containment failed as a result of the vessel breach (other sequences in which there was CRD flow were considered in the previous case of this question). The steam explosion and/or containment rupture presents the possibility that the CRD pumps are damaged or the flow of water through the CRD system is otherwise prevented. For sequences in which AC power is recovered subsequent to vessel breach, operator action is required to restore CRD flow. The probability of CRD flow failure resulting from a steam explosion or containment rupture is judged to be zero for Peach Bottom where the CRD pumps are in the turbine building. The probability of a failure to restore CRD flow is assumed to be 0.1. The optimistic evaluation represents a factor of 10 uncertainty. The pessimistic value is 0.5; reflecting the lack of any analysis for this situation.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Very Likely	Likely	Indeterminate

Case # 6 :

This case is similar to the previous one except that it is the High Pressure Service Water (HPSW) system which is being considered as a source of cooling water to the debris rather than the CRD cooling water system. The HPSW system is considered to have little potential for damage and, like the CRD system, operator action would be required to use it for injection to the vessel were AC

power to be recovered late in the sequence. Quantification is identical.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Very Likely	Likely	Indeterminate

Case # 7 :

In this case the RHR system is operational subsequent to vessel breach. Plant operators could use this system to deliver water to the core debris through use of the LPCI or shut-down cooling modes. Operator action would be required to switch to one of these modes from the containment cooling mode of operation. It is not certain that plant operating personnel would perceive this to be an advantageous action. However, a reasonably high probability is assigned. Such action is similar to that considered in the two previous cases of this question and is thus the failure probability is quantified the same.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Very Likely	Likely	Indeterminate

Case # 8 :

This case covers sequences in which there are no systems available for the injection of water into either the vessel or the drywell. Therefore, no water can be supplied to the core debris.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 84 : Is the debris not coolable without water?

This question determines whether the core debris, which has fallen or been ejected from the vessel, is distributed such that it

gives up sufficient heat to the drywell to prevent core-concrete interaction from being sustained. The heat loss mechanisms would be: direct radiation to the drywell structures, convection, and conduction to the surfaces on which the debris has been deposited.

This is a Type 2 question and there are 2 branches:

1 . nDBCwoW: The core debris cannot be cooled without water.

2 . DBCwoW: The debris is distributed in the drywell such that it is self-cooling (no water needed).

Case # 1 :

In this case debris has been dispersed in the drywell as a result of a steam explosion (in-vessel or ex-vessel) or direct heating has occurred. If there has been direct heating, the debris will necessarily have been dispersed. Dispersal does not assure coolability, but with any of these events the dispersal is expected to be widespread within the drywell such that there is a slight probability that core-concrete interaction cannot be sustained. The central estimate is that coolability without water in highly unlikely (0. 001 probability). Pessimistically, it is impossible. The optimistic estimate allows a 0.1 probability so that the possibility is recognized.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Likely	Highly Likely	Certain
Branch 2 :	Unlikely	Highly Unlikely	Impossible

Case # 2 :

This case covers sequences in which there has been no energetic dispersal of the core debris. The debris is thus pooled on the drywell floor. In this geometry, cooling by convection and radiant transfer to the drywell structures is not expected to be adequate to remove the decay heat plus the heat generated as a result of reactions in the melt (ie not coolable without water).

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 85 : Is the debris coolable with water?

This question determines whether not the core debris can be cooled with water. The phenomenological uncertainty with regard to whether the heat transfer to water covering a pool of molten corium which is reacting with concrete is adequate to remove the heat generated within the melt. Recent experiments performed at Sandia National Laboratory indicate that the addition of water to the melt will not prevent core concrete interaction from continuing. However, analyses performed by IDCOR indicate that the addition of water will result in quenching of the melt.

This is a Type 2 question and there are 2 branches:

1 . nDBC: The core debris in the drywell is not coolable.

2 . DBCwW: The core debris in the drywell can be quenched (further core-concrete interaction prevented) by supplying water to it.

Case # 1 :

In this case either the debris was dispersed sufficiently at vessel breach that it can be cooled even without water (see the previous question) or the Reactor Pressure Vessel was not breached. If the latter is true, it is only because the debris was coolable with water that the vessel was not breached. Thus, in either instance, the debris can certainly be cooled by supplying water to it.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case, as in Case #1 of the previous question, the debris was energetically dispersed at the time of vessel breach. Sequences in which this dispersal was sufficient to allow cooling without water were considered under the previous case of this question. However, given that the debris cannot be cooled without

water, there is still a significant probability that it can be cooled by the addition of water. A judgement of this probability is reflected by the quantification of this case. There is no analysis for this case so the optimistic probability of failure is 0.5. The optimistic and pessimistic estimates reflect a reasonable level of uncertainty in the quantification.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 3 :

In this case there was a slump type melt in-vessel. The core debris was dumped on the pedestal floor en masse when the vessel was breached. A significant fraction of the debris is expected to be molten, thus there is expected to be some flowing of the melt out from the pedestal area (through the manway) onto the drywell floor. With the debris in one lump with a substantial fraction being molten, the probability of it being coolable is judged to be at a minimum. On the basis of discussions with D. Powers of Sandia and G. Green at BNL, who both ascribe little credibility to corium being quenched by an overlaying pool of water, the probability of quenching is set to 0.1 in the central estimate. The optimistic estimate is 0.9 based on the IDCOR analysis which shows that cooling would occur. (This analysis has not been reviewed by the authors). The pessimistic estimate is that there is a negligible probability of coolability.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Likely	Certain
Branch 2 :	Likely	Unlikely	Impossible

Case # 4 :

This case covers sequences in which there was a flow type melt. Melted debris leaving the vessel is expected to be closer to the solidus temperature than for a slump type of in-vessel melt. For this type of melt there is a greater chance that the debris will (at least initially) be retained in the pedestal area. However, whether the geometry of the debris resulting from this type of core melt is more or less easily cooled is not known.

Since the debris comes out gradually at lower temperature there is reason to believe that a coolable geometry will be formed (the debris falls into water). With no analysis available, the probability that the debris will not be coolable is 0.5. Again, the optimistic and pessimistic estimates reflect a reasonable range of uncertainty.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Question # 86 : Is the debris not cooled?

This question summarizes the results of the three previous questions with respect to whether core-concrete interaction (CCI) is prevented or mitigated by cooling the core debris.

This is a Type 2 question and there are 2 brancnes:

1 . nCoolDB: The core debris in the drywell is not cooled sufficiently to remove the decay heat plus the heat generated by core-concrete interaction.

2 . CoolDB: The core debris in the drywell is cooled sufficiently to prevent further core- concrete interaction.

Case # 1 :

In this case either the debris received adequate cooling in-vessel such that vessel breach was prevented or the debris was sufficiently dispersed at vessel breach that cooling is assured.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case the debris in the drywell can be cooled if water

is supplied to it and some method of delivering water flow to the drywell has been established. On the basis of the way the previous questions are defined, the debris is certainly cooled.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

This case covers sequences in which either the debris is not coolable or there is no water supplied to it. Either way, the debris is not cooled and core concrete interaction will proceed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 87 : Is the containment not vented late?

This question determines whether the containment is vented from the wetwell airspace after vessel breach.

This is a Type 2 question and there are 2 branches:

1 . LnVent: The operator does not (or is not able to) vent the containment after vessel breach. (Note: The containment may have been previously vented.)

2 . L-Vent: The plant operators successfully vent the containment only after the vessel has been breached.

Case # 1 :

In this case either the containment has already lost its integrity and the pressure can no longer reach the level at which the procedures require venting or, there is no AC power available. Venting is judged not to be a credible occurrence, without AC power, once the RPV has been breached. Such a venting operation

would require manual action in the reactor building. Once core debris was on the drywell floor, radiation levels in the reactor building would be extremely high. Even if an operator were to consider the measured radiation levels acceptable, the action of venting would expose him to excessive radiation as radioactive material flowed out the vent line.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the accident has essentially been arrested. Decay heat is being removed from the containment via the RHR heat exchangers and core-concrete interaction has been terminated. Since the containment pressure would be decreasing there is no necessity for venting.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 3 :

This case covers sequences in which the containment pressure continues to rise subsequent to vessel breach. While the containment pressure will certainly exceed the venting threshold, venting is considered to be more unlikely at this point in the accident than it would have been earlier. Radiation levels in the containment would be extreme. In addition, there has been time to notify local government officials of the plant situation. Under these circumstances there will be considerable reluctance to intentionally vent the containment regardless of what the emergency operating procedures dictate. The central estimate of the probability of success is 0.1. In the pessimistic estimate this probability is reduced by a factor of 100. For the optimistic evaluation a value of 0.5 is used which reflects a balance between the position of plant personnel who would say that, if the procedures instruct venting, and if it is physically possible, then they will vent and the position expressed by some members of the NRC staff who insist that the vent would have to be closed if

radiation were to be released.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Likely	Highly Likely
Branch 2 :	Indeterminate	Unlikely	Highly Unlikely

Question # 88 : Does the containment fail late due to temperature?

This question determines whether there is a failure of drywell penetration seals as a result of elevated temperature. High temperature failures of the drywell penetration seals was the assumed mode of failure in the IDCOR Task 23. 1 report on Peach Bottom. Loss of drywell integrity due to high temperatures can occur even if the containment has previously failed in the wetwell or been vented. Thus, such failures may significantly impact fission product release to the environment.

This is a Type 2 question and there are 2 branches:

1 . LTCF: There is a failure of one or more drywell penetration seals, due to elevated temperatures in the drywell, subsequent to vessel breach.

2 . nLTCF: There are no drywell penetration seal failures resulting from high drywell temperatures.

Case # 1 :

In this case the core debris is distributed in the drywell and is giving up its heat (decay power) to the drywell structures and equipment. No water is being supplied to the drywell so there is no effective mechanism for removing this heat. The drywell temperature will continue to rise until heat conduction through the containment wall reaches equilibrium with the decay heat being generated. This would not occur until the temperature in the drywell, and in the walls, was well above what the seals could withstand. Temperature induced failure is thus certain. (Note that the structure of the tree allows overpressure failure to occur prior to temperature failures).

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case containment pressure is low due to venting or previous containment failure. While the inner surface of the penetration seals would be exposed to high temperatures, the outer surface would take much longer to heat up as a result of conduction. Since the containment is depressurized, there is also little pressure on the seals which could drive them to leak. Thus, the failure probability in the central estimate is 0.1. The optimistic estimate is a factor of 10 less. In the pessimistic estimate, the evaluation is 0.5; reflecting the lack of analysis.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Very Unlikely	Unlikely	Indeterminate
Branch 2 :	Very Likely	Likely	Indeterminate

Case # 3 :

In this case there is debris on the drywell floor and core-concrete interaction is occurring. Heat generated in the melt is either transferred to the concrete, carried away by the gasses being generated (most of this portion will be absorbed by the pool and/or released from the containment), or goes into the drywell equipment and structures. The magnitude of this latter fraction (and also the extent of exothermic reactions in the melt) largely determines the drywell temperature. The IDCOR Task 23.1 assessment was that the drywell temperature would rise sufficiently to cause loss of the seal integrity. However, there is sufficient uncertainty in the CCI phenomena that such a consequence is not certain. The central estimate of the thermal failure probability is 0.5. The optimistic and central estimates reflect reasonable uncertainty in this value.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 4 :

This case covers sequences in which water is supplied to the drywell. Whether or not the debris is cooled or quenched by the water, the boil-off of this water will provide an effective means of transferring the heat which is being generated drywell to the suppression pool and eventually out of the containment or directly out of the containment. The presence of water in the drywell will prevent temperatures from rising to levels at which seal integrity is threatened to the point at which there is a significant probability of failure.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 89 : Does the containment fail late?

This question determines whether containment integrity is lost as a result of core-concrete interaction, or containment heat-up, after vessel breach.

This is a Type 2 question and there are 3 branches:

1 . LPCF: The containment fails as a result of overpressurization due to core-concrete interaction (or the containment is vented).

2 . LTCF: The containment fails as a result of drywell peneteration seal failure after vessel breach.

3 . nLCF: Containment integrity is maintained throughout the accident.

Case # 1 :

In this case the drywell penetration seals have failed. Containment integrity is thus lost as a result of high temperatures.

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case water is being supplied to the core debris on the drywell floor which is thereby successfully cooled. The containment heat removal (or RHR) system is operating. The heat generated by core debris in the drywell will be transferred to the suppression pool by the water flow through the drywell vents back into the suppression pool. Under these conditions the containment pressure will be decreasing and the containment integrity will not be further threatened.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

In this case there is water being supplied to the core debris on the drywell floor and the debris is thereby successfully cooled. However, there is no heat removal from the containment so the containment will continue to pressurize. Eventual overpressure failure is thus certain. (Note: sequences with earlier containment failure are excluded from this case but are reflected in subsequent questions with regard to leakage.)

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

In this case the debris is not cooled but containment heat removal is operating. The containment will fail as a result of the overpressure from noncondensable gasses (carbon dioxide, hydrogen, carbon monoxide) produced by CCI.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

In this case water is being supplied to the core debris on the drywell floor but core-concrete interaction continues. The containment is still intact after vessel breach but pressurization continues. The presence of water in the drywell will keep drywell temperatures below levels at which seal failures due to temperature are a significant concern. Containment failure as a result of ov erpressurization by the combination of steam and/or non-condensable gases is certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 6 :

In this case no water is supplied to the core debris in the drywell and core- concrete interaction continues. The containment is intact subsequent to vessel breach but pressurization continues due to the heat and non-condensable gas generation. Drywell thermal failures were previously considered (Question #88 and Case #1 of this question) so the only type of failure considered here is failure due to overpressure, which is certain to occur.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 7 :

This case covers sequences in which the containment has previously been failed or vented. The containment pressure is not rising and secondary failure of the drywell penetration seals due to high drywell temperatures has be previously considered. (Question #88 and Case #1 of this question).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Question # 90 : What is the location of late containment leakage?

This question determines the location of containment leakage. The leakage location profoundly influences fission product retention along the release pathway to the environment. This question is analogous to previous questions (Question #28, Question #48, and Question #77)

This is a Type 2 question and there are 3 branches:

1 . nLCL: There is no leakage from the containment in excess of technical specification limits.

2 . LCLD: Containment leakage subsequent to vessel breach is from the drywell.

3 . LCLW: Containment leakage subsequent to vessel breach is from the wetwell (torus).

Case # 1 :

In this case, either previous leakage was from the drywell or there was a late thermal failure of the drywell penetration seals (Question #88). If thermal failure of the the drywell penetration seals occurs, this will be the dominant release pathway unless the wetwell (torus) was vented or has ruptured and the pool is bypassed such that the release pathway through the wetwell offers less resistance to the flow of gas. The latter (pool bypass) circumstances are specifically excluded from this case. Thus, for sequences included in this case, leakage from the drywell (previously existing or from thermal failure) is certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the wetwell has been successfully vented or previously developed leakage. Excluding the case of thermal failures (previous case of this question) the dominant leakage path will continue to be through the wetwell.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

This case includes sequences in which the containment fails as a result of overpressurization but in which the drywell temperatures are maintained below approximately 500 degrees F by the presence of water. For such sequences (drywell temperature moderate) the split fraction between wetwell and drywell failure location is determined exactly as for sequences in which containment failure occurs prior to vessel breach (Case #3 of Question #28).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Indeterminate	Likely	Certain
Branch 3 :	Indeterminate	Unlikely	Impossible

Case # 4 :

This case is similar to the previous one in that there is an over pressurization failure of the containment late in the sequence. However, in this case water is not supplied to the debris and the drywell temperature is expected to be quite high

(greater than 500 F). The central estimate of the split fraction between wetwell and drywell failure is based on the opinions of the containment performance experts who were convened to review source term issues for SARRP (Ref. 3). The optimistic and pessimistic quantifications of the split fraction reflect the range in their opinions.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Indeterminate	Very Likely	Certain
Branch 3 :	Indeterminate	Very Unlikely	Impossible

Case # 5 :

This case covers sequences in which the containment remained intact throughout the accident. There is thus negligible probability of leakage from either the drywell or the wetwell.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 91 : For Drywell failures, is the failure at the head seal?

This question is completely analogous to Question #29.

This is a Type 2 question and there are 3 branches:

1 . LDHF: The dominant leakage path from the containment late in the accident is from the drywell head seal.

2 . LDKF: The dominant leakage path from the containment late in the accident is from the drywell, below the head seal (knuckle region or below) to the reactor building.

3 . nLDF: The dominant leakage path from the containment (if any) is not from the drywell.

Case # 1 :

In this case high temperatures and pressures in the drywell have lead to thermal failure of the penetration seals. These seals are in the drywell wall below the head closure. Since leakage flow from these seals will generally go to the reactor building, this failure mode is considered equivalent to a failure at the drywell knuckle.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 2 :

There was prior leakage from the containment from the drywell head seal. The drywell penetration seals remain intact and the drywell wall has not melted- through (previous case). It is assumed that the dominant leakage pathway will continue to be from the drywell head seal.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Case # 3 :

In this case there was previous drywell leakage from the knuckle (or equivalent) region. It is judged that this is certain to remain the dominant leakage pathway.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

In this case overpressurization failure occurred in the drywell late in the accident sequence. The split fraction between the head seal and knuckle (or eqivalent) locations is determined on the basis of the expert responses. The quantification is essentially the similar to Case #1 of Question #29. The central estimates in this situation are slightly biased toward the head seal failure in consideration of the elevated drywell temperature. (Note: unlike the split fraction between drywell and wetwell failure, the split fraction considered here was not regarded by the experts to be very sensitive to temperature (Ref. 3); a case with and without drywell water is not required.)

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely
Branch 3 :	Impossible	Impossible	Impossible

Case # 5 :

In this case the drywell remains intact throughout the accident. There is thus no leakage from the drywell.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Question # 92 : What is the level of late containment leakage?

This question determines the level of leakage from the containment in the time period after the beginning of core-concrete interaction, or the time of containment failure (whichever is earlier).

This is a Type 2 question and there are 3 branches:

1 . nLCL: The containment retains its integrity over the entire course of the accident. Leakage rates are not significantly higher than technical

specification limits.

2 . LCL2: The containment develops a leak but the leak rate is sufficient to cause only slow (> 2 hours) depressurization of the containment.

3 . LCL3: The containment is ruptured and the interior pressure is approximately atmospheric pressure.

Case # 1 :

In this case the containment was previously ruptured and thus remains ruptured.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

This case includes late thermal failures in the drywell. The IDCOR position is that this failure mode is certain (or at least highly likely -- the optimistic assumption here) to result only in a leak (Level 2). However, once leakage began through the seals, there would seem to be a significant probability that the seals would erode; resulting in a leakage area equivalent to a rupture. Since there has been no analysis of this failure mode a probability of 0.5 is assigned to the scenario that leakage equivalent to a rupture developed. The pessimistic case assumes rupture to be certain.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Highly Likely	Indeterminate	Impossible
Branch 3 :	Highly Unlikely	Indeterminate	Certain

Case # 3 :

In this case overpressurization failure of the containment

occurred at the head seal. Consistent with the previous questions with regard to containment leakage level (Question #30 and Question #78), this failure location is always assumed to result in Level 2 leakage.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 4 :

In this case overpressurization failure occurs at the drywell knuckle (or equivalent) location late in the sequence. The consensus opinion of the containment performance experts who considered this question for SARRP was that the split between leak and rupture type failures was fifty-fifty. The IDCOR position appears to be represented by assuming the rupture failure (Level 3) probability to be 0. 001; this is the optimistic evaluation. The pessimistic evaluation assumes rupture to be certain

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Likely	Indeterminate	Unlikely
Branch 3 :	Unlikely	Indeterminate	Likely

Case # 5 :

In this case the containment has been vented late in the sequence. Venting will result in containment depressurization and is thus a Level 3 leak, defined to be equivalent to a rupture of the containment.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 6 :

In this case the containment was leaking immediately after vessel breach and subsequent progression of the accident has not placed additional loading on the containment. Leakage is considered to continue and the containment pressure will continue to gradually decline.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 7 :

This case includes sequences in which the accident is recovered either prior to, or shortly after vessel breach and the containment had not previously failed. Since there is recovery, by definition, the containment integrity is maintained. The containment leakage rate is not significantly higher than technical specification limits.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 93 : Is the suppression pool drained late?

This question determines whether the suppression pool still contains enough water to cover the drywell vents and therefore maintain fission product scrubbing for sequences in which the dominant release pathway is through the wetwell. If the containment has failed in the wetwell, this allows the possibility that the failure has occurred below the pool water level. Partial (or complete) draining of the pool could then occur. The level need only be lowered 3-4 feet before there will be essentially no scrubbing of the gas effluent from the containment.

This is a Type 2 question and there are 2 branches:

1 . LSPD: The suppression pool is drained below the level of

the drywell vents during the period following the deposition of core debris into the drywell.

2 . nLSPD: The suppression pool is not drained. The drywell vents remain submerged in the suppression pool.

Case # 1 :

In this case the pool level was previously drained down and the drywell vents were uncovered. The pool level will remain too low.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the containment has failed in the wetwell either at the time of vessel breach or subsequent to that time. There is no evidence to suggest whether failure is more likely above or below the water line. The central estimate is thus a fifty-fifty split. The optimistic and pessimistic evaluations reflect reasonable uncertainty.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 3 :

This case covers both sequences in which containment failure occurred prior to vessel breach with pool level was maintained and sequences with later failures in the drywell. The pool is not drained in these sequences.

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 94 : What is the level of late suppression pool bypass?

This question determines the extent to which the suppression pool is bypassed. Suppression pool bypass can profoundly influence the quantity of fission products released to the reactor building since pool scrubbing will not be effective.

This is a Type 2 question and there are 3 branches:

1 . nLSPB: The dominant release pathway for fission products to the reactor building is through the suppression pool.

2 . LSPB2: There is a partial bypass of the suppression pool. A significant fraction of the gas flow from the containment is not scrubbed.

3 . LSPB3: Gas flow from the containment completely bypasses the suppression pool. There is no fission product scrubbing.

Case # 1 :

In this case the vessel has been breached and either the dominant release pathway from the containment is through the drywell or the suppression pool has been drained or otherwise bypassed. Suppression pool bypass is complete.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 2 :

In this case there has been an induced primary system break in the reactor building. The suppression pool is thus certainly bypassed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 3 :

THIS CASE TO BE DELETED

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Very Likely	Likely	Impossible
Branch 3 :	Very Unlikely	Unlikely	Certain

Case # 4 :

In this case the vessel was not breached. However, there was a previous partial bypass (level 2) of the suppression pool. This bypass remains.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain

Case # 5 :

In this case the vessel is not breached but the suppression pool has previously been completely bypassed. The complete bypass remains.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible

Case # 6 :

This case covers sequences in which the containment either, remains intact, has been vented, or in which failure of the containment occurs in the wetwell above the suppression pool water level. Pool scrubbing will retain a significant quantity of fission products in the pool during these sequences; there is no pool bypass.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible

Question # 95 : What is the level of late RB bypass without a burn?

This question determines the extent to which fission products released from the containment subsequent to vessel breach could be retained in the reactor building. There is an implicit assumption that fission product retention in the building is proportional to the gas residence time. The extent to which the gas bypasses the building (the length of the release pathway) and the flowrate through the building are thus considered. This basic assumption may be in conflict with the IDCOR model which appears to rely heavily on impaction for fission product retention in the reactor building. This question is completely analogous to Question #58 above. More complete documentation is given thereunder.

This is a Type 2 question and there are 4 branches:

1 . nLRBB: There is no breach or bypass of the reactor building. What leakage there may be from the containment could be handles by the Standby Gas Treatment System (SGTS) assuming that it were operational.

2 . LRBB2: There is leakage from the reactor building but all of that flow passes through the building on the pathway from the primary containment.

3 . LRBB3: The reactor building is essentially bypassed. Either primary containment leakage is directly through the refueling bay or there is sufficient damage to the reactor building that retention along the release pathway would be similar to that case.

4 . LRBB4: The reactor building is completely bypassed. There would be no significant fission product retention.

Case # 1 :

In this case the reactor building was bypassed prior to vessel breach. The building will thus remain bypassed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain

Case # 2 :

In this case vessel breach was the result of an Alpha mode steam explosion. By definition, all containment (including the reactor building) is completely bypassed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain

Case # 3 :

In this case the reactor building was previously essentially bypassed (Level 3) , it will remain so.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible

	Optimistic	Central	Pessimistic
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible

Case # 4 :

This case is identical to Case #3 of Question #58. It is quantified in the same manner.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible

Case # 5 :

In this case the primary containment has ruptured, either in the wetwell or in the drywell below the head seal. As in Case #5 of Question #58, this is defined to result in a Level 2 bypass of the reactor building. This case also includes sequences in which the reactor building previously has a Level 2 bypass. This is assumed certain to remain at this level in the absence of further hydrogen burns (considered in subsequent questions).

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 6 :

In this case the primary containment has developed Level 2 leakage (defined in Question #30). This case is identical to Case #6 of Question #58.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Likely	Indeterminate	Unlikely

	Unlikely	Indeterminate	Likely
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 7 :

This case covers all sequences in which the primary containment remains intact. With the primary containment intact, the reactor building will remain intact.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Question # 96 : Are fire systems operating late without a late HB?

This question determines whether the fire sprays in the reactor building are running at the time fission products which are released subsequent to vessel breach enter. Operation of the fire sprays will increase fission product retention in the reactor building. However, because the Peach Bottom fire sprays are located only above the cable trays, the increased retention may not be significant. The fire spray system is described above under the discussion of Question #59.

This is a Type 2 question and there are 2 branches:

1 . LFireS: The reactor building fire sprays are running subsequent to vessel breach.

2 . nLFireS: The reactor building fire sprays are not started as a result of a late failure of the containment.

Case # 1 :

In this case the fire spray system was actuated prior to vessel breach. The fire sprays will continue to run.

QUANTIFICATION

	Optimistic	Central	Pessimistic

Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

In this case the accident is arrested prior to containment failure. There is no release to the reactor building and thus the fire spray system would not be actuated.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

In this case the reactor building is completely bypassed. With no accumulation of hot steam or gasses in the areas of the reactor building which house the cable trays, the fire sprays would not be triggered.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 4 :

In this case the containment failure location is at the drywell head seal. Leakage from the head closure would pass up into the refueling area. Leakage of hot gas into this region would not result in the fire sprays being triggered since there are no cables there to be protected.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 5 :

In this case the release pathway from the containment to the reactor building is through a subcooled suppression pool. With only warm gasses being passed into the reactor building, the fire sprays would not be triggered.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 6 :

This case covers all sequences in which there is release of hot gas from the containment to the reactor building. The building is not completely bypassed and so there will be significant heating of areas of the building which are protected by fire sprays. This heating will cause the fire sprays to be triggered.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 97 : Does standby gas treatment not work late without late HB?

This question determines whether the Standby Gas Treatment System (SGTS) is operating during the period in which fission products, released from the containment after vessel breach , are in the reactor building. The impact of possible burning of combustible gasses in the reactor building on SGTS operation is considered in a subsequent question. SGTS characteristics have been described previously (Question #60).

This is a Type 2 question and there are 2 branches:

1 . nLSGTS: The Standby Gas Treatment System does not operate subsequent to vessel breach.

2 . LSGTS: The Standby Gas Treatment System is operating after the containment has failed, following vessel breach.

Case # 1 :

In this case the SGTS has not previously failed and there is AC power available to operate it. The fire dampers in the SGTS duct work are still held open by the fusible links. Since SGTS operation is automatic (assuming the system is operable) it is considered certain to run. (Note: It is assumed that conditions in the rector building which would result in the fire sprays being triggered would also cause the isolation of SGTS by failing the fusible links on the fire dampers.)

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

This case covers sequences in which the SGTS has failed (or the fire dampers have closed rendering the system inoperable) or in which there is no AC power. It is thus certain that SGTS is failed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 98 : Does H2 burn in the reactor building after vessel breach?

This question determines whether hydrogen (and carbon monoxide which is also released by the corium-concrete interaction) burns in the reactor building following vessel breach. Late combustion of hydrogen released earlier is not considered (if a burn was going to occur it would have already). Combustion in the reactor building can impact fission product retention by increasing the level of reactor building bypass and actuating the fire protection systems. This question is analogous to Question #61. The computer analyses described thereunder apply directly to this case, especially the MELCOR calculations in which carbon monoxide combustion was considered.

This is a Type 2 question and there are 2 branches:

1 . LHB: Combustible gases burn in the reactor building following vessel breach.

2 . nLHB: There is no burning of combustible gasses in the reactor building following vessel breach.

Case # 1 :

In this case the containment failed prior to vessel breach and the vessel was depressurized when it failed. There was thus no large influx of hydrogen into the reactor building after the vessel was breached and what may have been present before is assumed to have either burned or been swept out. The core debris is cooled so there is no further production of combustible gas. Under these conditions there will be no combustion in the reactor building.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case there is significant leakage of combustible gasses from the containment subsequent to vessel breach. The Standby Gas Treatment System is operating however, and depending on the rate at which combustible gasses are produced, they may or may not accumulate to flammable concentrations in the reactor building. The SGTS will reduce the chance of combustion by removing some portion of the gas from the reactor building an lessening the probability that there will be flammable concentrations.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

In this case there is significant leakage from the containment and the Standby Gas Treatment System is not operating. Without SGTS, combustible gasses may accumulate to flammable levels depending on the production rate inside the containment. The IDCOR model predicts that flammable concentrations are not attained in the reactor building. However, the Source Term Code Package models predict combustible concentrations are readily attained. It would seem that combustion is not certain but even from an optimistic standpoint, some consideration to this event must be given.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Unlikely	Indeterminate	Likely
Branch 2 :	Likely	Indeterminate	Unlikely

Case # 4 :

This case covers sequences in which the containment retains its integrity throughout the accident. No significant quantities of combustible gas are released to the reactor building so there is no chance of combustion.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Indeterminate	Certain	Certain
Branch 2 :	Indeterminate	Impossible	Impossible

Case # 5 :

This case covers sequences in which the primary containment retains its integrity throughout

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Question # 99 : What is the level of late RB bypass?

This question considers the impact of possible combustible gas burns in the reactor building on its capability for fission product

retention. Burning within the building will increase the probability of bypass, and also the level of bypass. Doorways and hatches could be blown out and leakage through the building walls could be increased. In addition, burns will accelerate the flow of gas through the building, decreasing the residence time. This question is completely analogous to Question #62. More complete documentation of the considerations used in the quantification is given thereunder.

This is a Type 2 question and there are 4 branches:

1 . nLRBB: The reactor building retains its integrity throughout the accident.

2 . LRBB2: There is leakage flow from the reactor building but all the leakage from the primary containment passes through the building (to the refueling bay then to the environment).

3 . LRBB3: The reactor building is essentially bypassed. Either primary containment leakage is directly to the refueling bay or there is sufficient damage to the reactor building that the retention along the release pathway would be similar to that case.

4 . LRBB4: The reactor building is completely bypassed. There would be no significant fission product retention.

Case # 1 :

The reactor building was bypassed even without the effects of later combustible gas burns. The building is certain to remain bypassed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Certain	Certain	Certain

Case # 2 :

In this case the reactor building had a Level 3 bypass prior to

the burning of combustible gases. This case is quantified exactly as is Case #2 of Question #62.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Indeterminate	Unlikely	Impossible
Branch 4 :	Indeterminate	Likely	Certain

Case # 3 :

In this case a hydrogen burn occurs. The reactor building was previously intact or leaking through the blow-out panels. This case is identical to Case #3 of Question #62 and the probabilities for reactor building bypass are quantified exactly the same.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Likely	Unlikely
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Unlikely	Likely

Case # 4 :

In this case the SGTS is handling the leakage from the primary containment.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Certain	Certain	Certain
Branch 4 :	Impossible	Impossible	Impossible

Case # 5 :

In this case the reactor building bypass was previously Level 3. No burn occurred so the bypass level remains the same.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Case # 6 :

In this case there was previously leakage from the reactor building. No burn occurred. The reactor building remains only partially bypassed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible
Branch 3 :	Impossible	Impossible	Impossible
Branch 4 :	Impossible	Impossible	Impossible

Question # 100 : Are fire systems operating late?

This question determines the impact of possible hydrogen burns in the reactor building on the operability of the fire sprays. The description of Question #59 above includes a description of the fire spray system. This question is completely analogous to Question #63.

This is a Type 2 question and there are 2 branches:

1 . LFireS: The reactor building fire sprays are running during at least some portion of the period following vessel breach.

2 . nLFireS: The fire sprays are not actuated during the accident.

Case # 1 :

In this case the fire sprays were not actuated prior to vessel breach. Reactor building temperature remained below the threshold at which the fire sprays are triggered after vessel breach and no

combustible gas burns occurred. The fire spray will thus never be actuated.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 2 :

In this case the fire sprays were not actuated prior to the hydrogen burn which occurs following vessel breach. However, because the drywell failure location is assumed to be in the drywell head closure seal the burn is assumed to occur above the refueling floor (described in the discussion above). A burn in this location will not cause the fire sprays to come on.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Certain	Certain	Certain

Case # 3 :

This case covers sequences in which the fire sprays were operating prior to vessel breach or were activated subsequent to vessel breach either by the hot gasses released from the containment or by a subsequent hydrogen burn.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Question # 101 : Does standby gas treatment work late?

This question determines whether the Standby Gas Treatment System (SGTS) continues to operate throughout the accident. Hydrogen burns in the containment (except if they occur above the refueling floor) will cause SGTS to isolate since the fusible links in the duct work will fail, resulting in the closure of the fire

dampers.

This is a Type 2 question and there are 2 branches:

1 . nLSGTS: The Standby Gas Treatment System (SGTS) does not operate during the latter portion of the accident following vessel breach.

2 . LSGTS: The Standby Gas Treatment System (SGTS) continues to operate throughout the accident.

Case # 1 :

In this case the SGTS was operating after vessel breach and no hydrogen burns occurred in the reactor building. The fire dampers will thus remain open and SGTS is certain to continue to operate.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Certain	Certain	Certain
Branch 2 :	Impossible	Impossible	Impossible

Case # 2 :

This case covers sequences in which the SGTS has previously failed and is therefore certain to remain failed.

QUANTIFICATION

	Optimistic	Central	Pessimistic
Branch 1 :	Impossible	Impossible	Impossible
Branch 2 :	Impossible	Impossible	Impossible

REFERENCES

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APPENDIX B

SUPPORTING CALCULATIONS

FOR THE

SARRP PEACH BOTTOM EVENT TREE

I. REACTOR VESSEL AND CONTAINMENT PARAMETERS

Table 1, Reactor Vessel

Parameter	Symbol	Value	Units
Power	pw	3293	MW
Initial Water Inventory	M_{LV}	6.7×10^5	lbm
Initial Steam Inventory	M_{GV}	2.4×10^4	lbm
Operating Pressure	Pv	1050	psia
Liquid Density	h_{fv}	550	Btu/lbm
Steam Enthalpy	h_{gv}	1190	Btu/lbm
Liquid Density	V_{fv}	46.3	lbm/ft
Steam Density	Vgv	2.24	lbm/ft
Vessel Volume	Vv	2.5×10^4	ft^3
Mass of Zircaloy	Mzr	1.44×10^5	lbm
Mass of UO	Muo	3.51×10^5	lbm

Table 2, Containment

Parameter	Symbol	Value	Units
Drywell Free Volume	V_D	1.59×10^5	ft^3
Wetwell Free Volume	V_W	1.19×10^5	ft^3
Total Volume	Vc	2.78×10^5	ft^3
Mass in Suppression Pool	Mp	8.7×10^6	lbm

II. Supporting Calculations

Calculations used in providing information for the CET for the following questions are included:

Question # 25, Cases 1 & 2
Question # 27, Case 4
Question # 28, Case 3
Question # 29, Case 2
Question # 32, Cases 1 & 2
Question # 36, Cases 4 & 5
Question # 38, Cases 2, 3, 5, 6 & 7
Question # 40, Cases 2, 4 & 5
Question # 71, Cases 1 & 2
Question # 73, Cases 2 & 3
Question # 74, All Cases
Question # 81, Cases 1 & 2

Question 25: Does an S/RV Tailpipe Vacuum Breaker Stick Open

ASEP quantification of failure probability: 0.03 per demand. A factor of 10 reduction is assumed to account for design modifications. This reduction is considered optimistic. The unreduced value is pessimistic. No frequency reduction for multiple demands. To quantify probability of stuck open tailpipe vacuum breaker (SOTVB), the number of demands is estimated for each case.

Case 1: Fast Station Blackout, no depressurization

- From Ref. 1, Figure 4.24, estimate 4.7×10^5 lbm boil-off to core uncovery.

- From Ref. 1, Table 4.2 (TB1) additional 7.1×10^4 lbm boil-off to core sump.

- Assume boil-off from core collapse forces several ($\sim$3) S/RVs open for an extended period (add six challenges to account for this).

- Calculate steam relief from 1 S/RV opening.
  - o Assume steam volume in RPV is 1.5×10^4 ft^3 on average during the boil-off.

- Assume 3×10^5 lbm saturated water in vessel on the average (=M_V).

- Assume S/RV 11ft drops RPV pressure from 1150 psia to 1100 psia.

- Steam generated by flashing:

$$M_f = \frac{M_V \, h_f\,(1150) - h_f\,(1100)}{h_{fg}\,(1125)}$$

$$M_f = 3 \times 10^5 \text{ lbm} \times \frac{565 \text{ Btu/lbm} - 557 \text{ Btu/lbm}}{636 \text{ Btu/lbm}}$$

$$M_f = 3.8 \times 10^3 \text{ lbm}$$

- Steam released due to steam dome expansion: (flashing neglected).

$$Me = Vs\,(\rho_{1150} - \rho_{1100})$$
$$Me = 1.5 \times 10^4 \text{ ft}^3\,(45.6 \text{ lbm/ft}^3 - 45.17 \text{ lbm/ft}^3)$$
$$Me = 6.45 \times 10^3 \text{ lbm}$$

- Total Steam realese: Mt

$$Mt = Me + Ms$$
$$Mt = 3.8 \times 10^3 \text{ lbm} + 6.45 \times 10^3 \text{ lbm}$$
$$Mt = 10.3 \times 10^3 \text{ lbm/demand}$$

- Total mass release during boil-off = 4.75×10^5 lbm + 7.1×10^4 lbm = 5.4×10^5 lbm

- Number of Demands:

$$N = 5.4 \times 10^5 \text{ lbm}/(10.3 \times 10^3 \text{ lbm/demand})$$
$$N = 52 \text{ demands}$$

- Failure probability:

$$52 \text{ demand} \times 3 \times 10^{-3}/\text{demand} = 0.16$$

In the pessimistic estimate the probability of failure is taken as 0.03 per demand (the ASEP value). The resultant failure probability is unity (1.0). The central estimate is taken as the mean of the optimistic and pessimistic values:

$$P_C = \frac{0.16 + 1.0}{2} = 0.6$$

This evaluation introduces a bias toward the optimistic quantification, this is judged to be reasonable.

Case 2: Blackout (initial HPCI and/or RCIC) or TW

These sequences involve high pressure boil-off similar to Case #1 above: in addition, the lowest set S/RV will cycle from the time the MSIVs close until the time the operators take control of vessel pressure. This is assumed to occur when the suppression pool temperature reaches 120 F. This temperature selection is based on the procedures which instruct the operators to control vessel pressure within the HTCL (described under Question #17).

Calculation of S/RV cycles prior to pool temperature reaching 120°F:

- Assume 90°F initial temperature (30°F rise)

- Heat added:

  $H = cp\ Mp \times \Delta T = (1\ Btu/lbm.F)\ (8.7 \times 10^6\ lbm)\ (30F)$

  $H = 2.61 \times 10^8\ Btu$

- Average enthalpy of steam relesed from vessel

  $hg = 1106.2\ Btu/lbm$ (saturated @ 1125 psia)

- Average suppression pool enthalpy:

  $hp = 73\ Btu/lbm$ (saturated @ 105°F)

- Calculate steam mass released from vessel to raise pool temperature:

$$M = \frac{H}{hg - hp} = \frac{2.61 \times 10^8\ Btu}{(1106.2 - 73)\ Btu/lbm}$$

$$M = 2.5 \times 10^5\ lbm$$

- Calculate # of S/RV pops

$$N = \frac{M}{M_t} = \frac{2.5 \times 10^5\ lbm}{10.3 \times 10^3\ lbm/d} = 25\ demands$$

(Mt from Case 1 Above)

25 demands + 52 demands (from Case 1)

N = 77 demands

- Failure probability:

  77 demands x 3×10^{-3} /demand = 0.23

- Central Esitmate:

$$P_C = \frac{1 + 0.23}{2} = 0.6$$

Question 27: Does the Containment Fail Before Core Degradation

This question is answered yes or no except for the case in which RPV depressurization causes loss of low pressure injection, HPCI and RCIC are failed and CRD flow cannot maintain adequate injection. This occurs in the TC-core vulnerable sequence (Case #4). In this situation, the pressurization of the containment may or may not cause failure prior to core damage.

The following calculation of containment pressurization during RPV boil-off applies to Case #4. The calculation applies to the central estimate only.

- As in Case 1 of Question #25 assume 4.7×10^5 lbm of water boiled-off from RPV (M_B).

- Assume injection lost with containemnt pressure at 110 psia (T_p = 335°F).

- Interative calculation is used to estimate containment pressure:
  - Assume Me lbm of pool evaporates
  - Assume P' is the new containment pressure

  Then:

$$h_g M_B = C_p M_p [T_{sat}(P') - T_p] = M_e h_g (P')$$

$$P' = \frac{(M_e/M)\, R\, [T_{sat}(P') + 460^\circ R]}{V_C} + P_O$$

M = 18 lbm/lb mole (molecular weight of water)

R = 1544 ft-lbf/lb-mole °R

Po = 110 psia

Substituting known values:

$(1106\ ^{Btu}/_{lbm})\ (4.7\times10^5\ lbm) = (1\ Btu/lbm\ F)\ (8.7\times10^6\ lbm) \times [Tsat(P') - 335\ F] + me\ hg\ (P')$

$$P' - P_0 = \frac{(^{Me}/_{18})\ 1545\ [Tsat\ (P') + 460^0\ R]}{2.78 \times 10^5\ ft^3}$$

Combining:

$$5.2\times10^8 = 8.7\times10^6\ [Tsat(P') - 335] + \frac{3.24 \times 10^3 (P' - 110)(144)}{Tsat\ (P') + 460}\ hg\ (P')$$

P' (psia)	Tsat (P') (F)	hg(P') /lbm	r.h.s. Btu
130	347	1193	1.2×10^8
140	353	1194	1.8×10^8
190	378	1199	4.2×10^8
220	390	1201	5.5×10^8

Interpolating:

$$P' = 190 + \frac{5.2 \times 10^8 - 4.2 \times 10^8}{5.5 \times 10^8 - 4.2 \times 10^8}\ (30)$$

$$P' = 213\ psia$$

Since the central estimate of containment failure pressure is 132 psia, the probability of the containment surviving is negligible.

Question # 28: What is The Location of Early Containment Failure

Only Case 3 considers location (drywell versus wetwell) of containment failure given that an overpressure failure occurs. The central estimate of the probability of wetwell failure is taken as the mean value of those given by the SARRP expert reviewers (Ref. 3). The weighting factors given to wetwell failure for Issue 7B were:

Initials	Weighting Factors
HA	0
CH	0.2
SH	0.3
EH	0.1

RD	0.2
WV	0.3
KP	0.1
	1.2

The mean weighting factor (probability) is:
1.2/7 = 0.17
The central estimate is 0.2.

Question # 29: For Drywell Failures, is the Failure at the Head Seal

Only Case 2 considers the location (head versus knuckle) given drywell failure.

Using responsenses to Issue 7B (Ref. 3):

Initials	Probability of Drywell Failure (DF)	Weighting of Head Failure (HF)	Probability of Head Failure Given Drywell Failure (HF/DF)
HA	1	0.6	0.6
CH	0.8	0.4	0.5
SH	0.7	0.25	0.36
EH	0.9	0.2	0.22
RD	0.8	0.25	0.31
WV	0.7	0.3	0.43
KP	0.9	0.5	0.56
			2.98

The mean weighting factor (probability) is:
P = 2.98/7 = 0.43
Central estimate of head failure probability given drywell failure is thus 0.4.

Question # 32: Does AC Power Remain Lost During Core Degradation

Use the ASEP equation for probability of non-recovery of off-site power:

$$P_{NR} = \sum_{i=1}^{3} \lambda_i \exp\left(-\alpha_i t^{\beta_i}\right) \quad t \text{ in hours}$$

Where

$\alpha_1 = 1.2174$
$\beta_1 = 1.0308$
$\lambda_1 = 0.019$
$\alpha_2 = 0.29669$
$\beta_2 = 0.83959$
$\lambda_2 = 0.011$
$\alpha_3 = 1.7803$
$\beta_3 = 0.57319$
$\lambda_3 = 0.04$

Case 1: Short-Term Blackout (no HPCI or RCIC)

From Ref. 1 station blackout (TB1 and TB2):
ECC Fails: 360 min
Core Slump: 695 min

Total Time from ECC failure to core slump = 335 minutes

- Assume that fast blackout requires half this time as a result of higher decay power. (This is conservative but power non-recovery probability is not highly sensitve).
  - Take 150 minutes (2.5 hours) as latest time AC recovery is significant.
  - Take 60 minutes (1 hour) as latest time ASEP allowed power recovery to prevent melt (again conservative actually used 35 minutes).

$t = 1$ hr $\quad P_{NR}(1) = 2.05 \times 10^{-2}$
$t = 2.5$ hrs $\quad P_{NR}(2.5) = 8.6 \times 10^{-3}$

- Probability of power recovery by 2.5 hours, given it was not recovered at 1 hour is given by:

$$P = \frac{P_{NR}(2.5)}{P_{NR}(1)} = 0.42$$

Thus, the central estimate is 0.4.

- Optimistic and Pessimistic estimates: ASEP estimate is that the non-recovery probability is within a factor of 3. To obtain a reasonable range fo uncertainly:

Pessimistic estimate = P/3 = 0.1

Optimistisc estimate = P + (P - P/3) = 0.7

(This formulation retains the central estimate as central).

Case 2: Long Term Blackout (initial HPCI or RCIC)

- Take 695 minutes (11.6 hrs) as latest time AC power recovery is significant; based on the STCP calculation of core slump.

- Take 570 minutes (9.5 hours) as the latest power ASEP considered as preventing melt (actually 7 hours).

  $t = 9.5$ hrs $\quad P_{NR}(9.5) = 1.60 \times 10$

  $t = 11.6$ hrs $\quad P_{NR}(11.6) = 1.11 \times 10$

Pessimistic = P + P/3 = 0.9

Optimistic = P - p/3 = 0.5

which again provides a reasonable range.

Question # 30: What is the Containment Pressure Prior to Core Degadation

Case 1: Described in text.

Case 2: Described in text.

Case 3: Described in text.

Case 4: Assume large break (without drywell spray). Add steam partial pressure resulting from 2 hours of decay heat added to the suppression pool. (This uses MARCH assumption of wetwell - pool equilibrium).

- Integrated decay heat @ 2hrs = 113.8 full-power seconds = F_D

$$\Delta T = \frac{P_W F_D}{C_p M_p}$$

$$\Delta T = \frac{(3293 \times 10^6 \text{ W})(113.8 \text{ s})(9.49 \times 10^{-4} \frac{\text{Btu}}{\text{W-s}})}{(1 \text{ Btu/lbm } ^\circ\text{F})(8.7 \times 10^6 \text{ lbm})}$$

- Assume initial temperature 121 F (Ref. 2, Table 6.4) the initial steam partial pressure would be 1.7 psia.

- Final temperature, 162 F (121 + 41) the partial pressure would be 5.0 psia.
- Pressure rise is 5 - 1.7 or 3.3 psia.
- Add to 35 psia for Case # 3. The result is 38 psia. This is rounded up to 40 psia. (This gives significant allowance for concrete degassing).

Case 5: Station Blackout, No Injection

- Mass boiled to pool prior to core uncovery:
  $M_B = 4.7 \times 10^5$ lbm (Question # 25, Case 1 above)

Resulting pool temperature rise:

$$\Delta T_p = \frac{h_g M_B}{C_p M_p} = \frac{(1106\ Btu/lbm)(4.7 \times 10^5\ lbm)}{(1\ Btu/lbm \cdot F)(8.7 \times 10^6\ lbm)}$$

$$\Delta T_p = 60^0\ F$$

- From Ref. 1, Table 4.3, temperature rise in suppression pool from core uncovery to start melt is 6^0F.
- Assume initial pool temperature (at start of melt) is 156^0F. The corresponding steam partial pressure is 4.3 psia.
- Calculate partial pressure of non-condensables assuming the drywell temperature rises from 135 F (operating temperature) to 350 F (approximate result from loss of drywell coolers). Assume wetwell temperature is 156 F.

Initial moles of non-condensable:

$$N = \frac{1}{R}\left[\frac{P_{ID} V_D}{T_{ID}} + \frac{P_{IW} V_W}{T_{IW}}\right]$$

$$N = 6.47 \times 10^{-4}\ \frac{lb\text{-}mole\ R}{ft\text{-}lbf}\left[\frac{(2117\ lbf/ft^2)(1.59 \times 10^5\ ft^3)}{595\ R} + \frac{(2117\ lbf/ft^2)(1.19 \times 10^5\ ft^3)}{550\ R}\right]$$

$$N = 662\ lb\text{-}moles$$

At the elevated temperatures:

$$N = \frac{P}{R}\left[\frac{V_D}{T_D} + \frac{V_W}{T_W}\right]$$

$$P = \frac{NR}{\left[\frac{V_D}{T_D} + \frac{V_W}{T_W}\right]}$$

$$P = \frac{(1545)(662)}{\frac{1.59 \times 10^5}{810} + \frac{1.19 \times 10^5}{616}} = 2626 \frac{lbf}{ft^2}$$

P = 18.2 psi

- Total pressure:
  18.2 + 4.3 psi = 22.5 psia
  Use 23 psia as central estimate

Cases 6 - 12: Described in text.

Question # 38: What is the Hydrogen Generation and Pressure Rise During Core Degradation

Case 1: Described in text.

Case 2: LOCA (Large or Medium)

- From Ref. 2, Tables 6.3 and 6.4 (AE):
- At containment failure the pressure has risen 100 psi (from start of melt) and 34% of the Zircaloy has reacted.
- The total quantity of Zr reacted is 36% (to Bottom Head Fail).
- For the pessimistic estimate (see text)

$$\Delta P = \Delta P \text{ (34\% Zr)} \times \frac{.36}{.34} = 106 \text{ psi}$$

(Assumes pressure rise is proportional to Zr oxidation).

- For the central estimate (neglect adiabatic compression:
  36% of Zr reacted:
  0.36 (Mzr) /(91.2 lbm/lb-mole Zr) = 570 lb mole Zr
  570 lb mole Zr x (2 lb-mole H_2/lb-mole Zr) = 1140 lb mole H_2
- Assume suppression pool temperature is 130 F (Ref. 1, Table 6.4, AE). Assumed equal to wetwell temperature when core melt is gradual.
- Assume drywell temperature 2000 F (Ref. 1, Table 6.4, AE).
  Calculate pressure:

- Following Case 5 of Question # 36

$$P = \frac{NR}{\frac{V_D}{T_D} + \frac{V_W}{T_W}}$$

N = 662 + 1140 = 1802 lb-moles

$$P = \frac{(1802)(1545)}{\frac{1.59 \times 10^5}{2460} + \frac{1.19 \times 10^5}{590}}$$

P = 72.6 psi

Initial pressure was 30 psi. Thus the pressure rise would be 43 psi. Round to 45 psi.

- For the optimistic estimate assume 5% clad reacted, thus 158 lb-mole of H_2 produced (typical of MAAP code calculations, Ref. 4)

  N = 662 + 158 = 820 lb-mole

  Using the above equation,

  P = 33.1 psi

  The base pressure (Question # 36, Case 1) is 17 psi thus the pressure rise is 16.

Case 3: Station Blackout, Injection Recovered

No reliable calculation of hydrogen and steam production for this case is availabe. A crude estimate is necessary.

- Assume clad oxidation is equivalent to a TW sequence (water in the core during degradation). From Ref. 2, Table 6.3 (TW) Zr reacted is 61 %. Hydrogen production would be:

$$0.61\ (1.44 \times 10^5\ \text{lbm}/91.2\ \text{lbm/lb-mole}) \times 2\frac{\text{lb-mole}}{\text{lb-mole Zr}} = 1926\ \text{lb-mole } H_2$$

  This is more than 240% of that produced in a blackout with no recovery. It is judged that this is probably a conservative calculation.

- Calculate the partial pressure of noncondensables in the containment. Assuming an average temperature of 300°F (considered maximum)

$$P = \frac{NR\ Tc}{Vc}$$

N = 1926 + 662 (Question # 36, Case 5)

N = 2588 lb-moles

$$P = \frac{(2588 \text{ lb-mole})(1545 \text{ ft-lbf/lb-mole R})(760 \text{ R})}{2{,}78 \times 10^5 \text{ ft}^3}$$

P = 76 psi

- o Calculate the pool heat-up due to core quenching:
  - Assume 3000°F average core temperature when injection begins (3591 F in Ref. 2, Table 6.3 - TW at core slump).
  - Heat capacity of core:
    Average Cp = 0.082 Btu/lbm F
    Mass = Mzr + Muo = 4.95×10^5 lbm
    Mcp = 4.1×10^4 Btu/°F
  - Assume quenched at 200°F
    $\Delta T = 2800^\circ F$
    Mcp $\Delta T = 1.14 \times 10^8$ Btu
  - Pool heat-up:

$$\Delta T_p = \frac{Mcp\ \Delta T}{MpCp\ (pool)} = 13^\circ F$$

- o Take pool heat-up resulting from hydrogen genration as 240% of that for TB1 in Ref. 1:
  224 F at core uncovery
  230 F at core slump
  $\Delta T = 6^\circ F$, assume $14^\circ F$ for this case
- o Final Pool Temperature (initial temperature 230°F - STCP calculation for blackout, fast blackout would be less).
  $T = 230 + 14 + 13 = 257^\circ F$
  Partial pressure of steam: 34psi
- o Total Pressure = 34 + 76 = 110 psi
- o Inital Pressure = 27 psi (mean of Cases 5 and 6 of Question # 36)
- o Pressure rise = 83 psi
- o Take + 50% for pessimistic value (results in almost certain containment failure)
- o Optimistic evaluation: Take 10% clad reacted rather than 61 % (leave other parameters unchanged from the central estimate):
  Non-condensable gas pressure = 13 psi
  Optimistic estimate of pressure rise is 20 psi.

Case 4: Described in text.

Case 5: Deferred to after Case 6 (see below)

Case 6: Transient, Vessel at High Pressure

- o Central esitmate of pressure rise is 24 psi (Ref. 1, see text)
- o Calculate hydrogen distribution for STCP calculation:
  - Zr oxidation is 25% (1583 ibm of H_2 produced - 792 lb-moles)
  - Calculate H_2 partial pressure in containment: (Ref. 1, Table 4.3 - TB1) Pressure at Bottom Head Dryout = 51.8 psia, Pool Temperature = 244 °F. Thus steam partial pressure is 26.8 psi.

    Partial Pressure H_2:

    51.8 - 14.7 - 26.8 = 10.3 psi
  - Calculate quantity of H in containment:

    Drywell temperature = 196 F

    Wetwell temperature = 244 F

$$N = \frac{P}{R}\left[\frac{V_D}{T_D} + \frac{V_W}{T_W}\right]$$

$$N = \frac{(10.3\ lbf/in^2)(144\ \frac{ft^2}{in^2})}{1545\ ft\text{-}lbf/lb\text{-}mole\ R}\left[\frac{1.59 \times 10^5 ft^3}{656\ R} + \frac{1.19 \times 10^5 ft^5}{704\ R}\right]$$

N = 395 lb-moles

Thus 50 % remains in the vessel.

Volume fraction in vessel: (assume 2500°F average)

$$N_V = \frac{P_V V_V}{RT_V} = \frac{(1050\ lbf/in^2)(144\ in^2/ft^2)(2.5 \times 104\ ft^3)}{(1545\ ft\text{-}lbf/lb\text{-}mole\ R)\ (\ 2960\ R)}$$

Nv = 827 lb-moles

N = 397 lb-moles

Volume fraction = 48%

- o Optimistic estimate:

Assume 5.2% Zr reacted (MAAP calculation of TQUV at LaSalle, Ref. 4)

- Total H production:

  792 (0.052/0.25) = 165 lb-moles
- Quantity in-vessel:

  48% (o.o52/0.25) = 10% or 82.7 lb-moles in-vessel
- Quantity in containment: 82 lb-moles

$$P_H = \frac{NR}{\left[\frac{V_D}{T_D} + \frac{V_W}{T_W}\right]}$$

Assume temperatures are same as for central estimate:

$$P_H = \frac{(83 \text{ lb-mole})(1545 \text{ ft-lbf/lb-mole R})}{\left[\frac{1.59 \times 10^5 \text{ft}^3}{656 \text{ R}} + \frac{1.19 \times 10^5 \text{ft}^3}{704 \text{ R}}\right]}$$

$P = 309 \text{ lbf/ft}^2 = 2 \text{ psi}$

- Pool temperature rise 14 F for STCP calculation (TB1)

$$14 \text{ R} \frac{0.052}{0.25} = 3^0\text{F}$$

Pool temperature = 233°F

Psat = 22 psia

- Relative to central estimate:

  Hydrogen partial pressure 8 psi lower

  Steam partial pressure 4.8 psi lower

  Optimistic estimate is 13 psi lower than central or 11 psi.

o Pessimistic Estimate

Based on MARCON results (Ref. 5) 34.4 psia in containment at start of core degradation 106.2 psia in containment immediately prior to vessel failure. Thus, pressure rise is 72 psi.

Case 5: (Defferred from above) Transient With Open S/RV Tailpipe Vacuum Breaker

o Assume drywell temperature is 550 F rather than STCP calculated value of 196 F.

- From Case 5 of Question # 36 there are 622 lb-moles of non-condensable gas initially in containment.
- From Case 6 (this question) the central estimate is 395 lb-moles of H in containment. Thus assume 1060 lb-moles in containment.
- Calculate non-condensable pressure.

$$P = \frac{NR}{\left[\frac{V_D}{T_D} + \frac{V_W}{T_W}\right]}$$

$$P = \frac{(1060 \text{ lb-mole})(1545 \text{ ft-lbf.lb-mole R})}{\left[\frac{1.59 \times 10^5 \text{ft}^3}{1010 \text{ R}} + \frac{1.19 \times 10^5 \text{ft}^3}{704 \text{ R}}\right]}$$

$P = 5020 \text{ lbf/ft}^2 = 34.8 \text{ psi}$

o Steam partial pressure is 26.8 psi (assuming same as Case 6).

- Total pressure = 61.6 was 51.8 for STCP so pressure rise is 10 psi higher than for the case without a stuck open S/RV tailpipe vacuum breaker.
  - o Use 34 psi as the central estimate of the pressure rise.

o For the optimistic evaluation repeat the above calculation assuming:
T_D = 400°F (reasonable lower bound)
N_H = 82 lb-moles (H_2 in containment from Case 6 optimistic evaluation).

- Pressure due to non-condensables
  P= 22.6 psi (744 lb-moles of non-condensable gas in containment).
- Partial pressure of steam = 22 psi (233 F pool temperature as in Case 6).
- Total pressure = 44.6 psi, 17 psi lower than calculated for the central estimate.
- Use 17 psi as the optimistic evaluation of the pressure rise (34-17).

o For the pessimistic evaluation calculate the pressure corresponding to the MARCON calculation (Ref. 5 and Case 6 of this question) assume a 700°F drywell temperature (reasonable upper bound).

MARCON calculated parameter:
Drywell temperature, T_D = 306°F
Wetwell temperature, Tw = 335°F
Total Pressure = 106.2 psia

- Calculate moles of gas in containment

$$N = \frac{P}{R}\left[\frac{V_D}{T_D} + \frac{V_W}{T_W}\right]$$

$$N = \frac{(106.2\ \text{lbf/in}^2)(144\ \text{in}^2/\text{ft}^2)}{1545\ \text{ft-lbf/lb-mole R}}\left[\frac{1.59 \times 10^5 \text{ft}^3}{766\ \text{R}} + \frac{1.19 \times 10^5 \text{ft}^3}{795\ \text{R}}\right]$$

N = 3536 lb-moles

- Calculate pressure assuming 1160 R drywell temperature.

$$P = \frac{NR}{\left[\frac{V_D}{T_D} + \frac{V_W}{T_W}\right]}$$

P = 132 psi

- Without stuck open tailpipe vacuum breaker pressure was 106 psi. Thus, 26 psi (132-106) is added to Case 6 pessimistic result. Pressure rise of 98 psi is taken as pessimistic evaluation (72+26).

Case 7: Transient With Vessel Depressurized

The calculation of pressure rise is similar to Case 6, above. The following changes are made to account for depressurization of the vessel:

1. Pool temperature raised 4°F. This is the temperature rise due to vessel blowdown calculated for the TB1 sequence using the STCP (Ref. 1, Table 4.3).
2. Vessel hydrogen inventory added to containment.
3. Vessel volume added to containment (drywell) volume.

o Central Estimate

- 662 moles non-condensables initially in containment
- 792 moles of hydrogen added
- 28.8 psi partial pressure of steam (248°F in wetwell) = Ps
- Assume drywell temperature 196 F as in Case 6
- Assume vessel temperature 2500 F
- Calculate pressure of non-condensables

$$P_C = \frac{NR}{\left[\frac{V_D}{T_D} + \frac{V_W}{T_W} + \frac{V_V}{T_V}\right]}$$

$$P_C = \frac{(1450 \text{ lb-moles})(1545 \text{ ft-lbf/lb-mole R})}{\left[\frac{1.59 \times 10^5 \text{ft}^3}{656 \text{ F}} + \frac{1.19 \times 10^5 \text{ft}^3}{704 \text{ R}} + \frac{2.5 \times 10^4}{2960 \text{ R}}\right]}$$

P_C = 37 psi

- Add steam partial pressure

  $P = P_C + P_s = 37 + 29 = 66$ psi

  In Case 6 the central estimate of containment pressure was 51.8 (based on STCP calculation).

  66 - 51.8 = 14 psi higher than Case 6 pressure rise.

  Case 6 value was 24 psi use 38 psi for this case.

o Optimistic Estimate

Following the central evaluation (same temperatures) but assume 165 moles of hydrogen (see Case 6) for a total of 827 lb-moles of non-condensables.

P_C = 21 psi

This is 16 psi less than central evaluation. Thus, pressure rise is 22 psi (38 - 16).

- Pessimistic Estimate
  MARCON calculates 817 lb-moles of hydrogen in containment (Ref. 5). Assume ratio of in-vessel to ex-vessel is same as STCP calculation.

$$\frac{792 \text{ (total for STCP)}}{397 \text{ (ex-vessel for STCP}} \times 817 \text{ (ex-vessel for MARCON)} = 1626 \text{ moles } H_2 \text{ total}$$

Thus 809 moles of H_2 were in-vessel 3536 moles (all gasses) in containment.

- Calculate pressure resulting from adding hydrogen, increasing pool temperature to 339 F (4 F higher than MARCON).

$$P = \frac{[(809 + 3536)\text{lb-moles}]\ (1545\ \frac{\text{ft-lbf}}{\text{lb-mole R}})}{\frac{1.59 \times 10^5 \text{ft}^3}{766 \text{ R}} + \frac{1.19 \times 10^5 \text{ft}^3}{799 \text{ R}} + \frac{2.4 \times 10^4 \text{ft}^3}{2960 \text{ R}}}$$

P = 128 psi

Pressurized case pressure was 106 psi (Case 6). Thus increase was 22 psi due to depressurization. Case 6 pressure rise was 72 psi thus 98 psi is used for this case (72 + 22).

Question # 40: Does At Least One Drywell Vacuum Breaker Stick Open

The failure probability per demand recommended by ASEP is that used in WASH-1400 of 1.1×10^{-4} per demand. This is a median value, the mean value is 3.3×10^{-4} per demand. The failure probability is reduced a factor of 10 for subsequent demands. The number of challenges is estimated as described in the text.

Case 1: Described in text.

Case 2: 110 psi containment pressure. 1 demand per 1 psi increment.

$$P = 3.3 \times 10^{-4} + 3.3 \times 10^{-5}\ (109) = P_F = 0.004$$
(central estimate)

Case 3: Described in text.

Case 4:

- Optimistic - Assume 20 demands

$$P_F = 3.3 \times 10^{-4} + 3.3 \times 10^{-5}\ (19)$$
$$P_F = 1 \times 10^{-3}$$

- Central - Assume 46 demands
  $P_F = 3.3 \times 10^{-4} + 3.3 \times 10^{-5}$ (45)
  $P_F = 2 \times 10^{-3}$
- Pessimistic - Assume 113 demands
  $P_F = 3.3 \times 10^{-3} + 3.3 \times 10^{-4}$ (112)
  $P_F = 0.04$

Case 5: High Vessel Pressure, Assume no reduction in failure probability for subsequent demands (vacuum breaker will open more violently).

- Optimistic Estimate - Assume 20 demands
  $P_F = 20\ (3.3 \times 10^{-4}) = 7 \times 10^{-3}$
- Central Estimate - Assume 40 demands
  $P_F = 40\ (3.3 \times 10^{-4}) = 1.4 \times 10^{-2}$
- Pessimistic Estimate - Assume 97 demands
  $P_F = 97\ (3.3 \times 10^{-3}) = 0.3$

Case 6: Described in text.

Case 7: Described in text.

Question # 71: What is the Pressure Rise Due to [RPV] Blowdown

For these estimates, conditions are assumed to be normal. This means that the drywell floor is dry and that there is no bypass of the suppression pool.

Case 1: Use the responses of the SARRP expert reviewers to determine the central estimate. From Ref. 3, Issue 11 (Case 3).

Initials:	GG	RD	FEH	KP	MKR	SH	MCL
Pressure Rise			Weighting Factor				
30 psi	0	0.1	0.1	0	0	0	0.1
45 psi	0	0.5	0.3	0.1	0	0.3	0.5
60 psi	0.3	0.3	0.3	0.2	0.3	0.5	0.4
75 psi	0.4	0.1	0.3	0.3	0.3	0.2	0
>120 psi	0.3	0	0	0.4	0.4	0	0

Collective weight for each level:

Pressure Rise	Weight
30 psi	0.3
45 psi	1.7
60 psi	2.3
75 psi	1.6
>120 psi	1.1

Thus 60 psi is the central estimate of the pressure rise.

Case 2: Vessel blowdown from high pressure, no direct heating.
Again, the weightings assigned by the experts are used (Ref. 5, Issue 11, Case 1):

Initials:	GG	RD	FEH	KP	MKR	SH	MCL
Pressure Rise	Weighting Factor						
30 psi	0.2	0.2	0.9	0.2	0.3	0.9	0.2
45 psi	0.6	0.6	0.1	0.7	0.6	0.1	0.5
60 psi	0.2	0.2	0	0.1	0.1	0	0.3
75 psi	0	0	0	0	0	0	0
>120 psi	0	0	0	0	0	0	0

Collective weight for each level:

Pressure Rise	Weight
30 psi	2.9
45 psi	3.2
60 psi	0.9
75 psi	0
>120 psi	0

Since weights are split almost evenly between 30 and 45 psi we employ a weighted average to better reflect the mean.

$$\Delta P = \frac{2.9(30 \text{ psi}) + 3.2 (45 \text{ psi})}{2.9 + 3.2}$$

$$\Delta P = 38 \text{ psi}$$

Use as the central estimate.

- Estimate pressure rise with hand calculation:
  - Initial N_2 + air in containment = 662 lb-moles

(Question # 36, Case 5)

- Hydrogen added during core degradation = 395 lb-moles

(Question # 38, Case 6)

- Initial Drywell Temperature: 196 F (STCP, Ref. 1)
- Initial Pool (Wetwell) Temperature 244 F (STCP, Ref. 1)
- Vessel contains: 397 lb-moles H_2 (48%)
  430 lb-moles H_2 (52%)

(Question # 38, Case 6)

- Assume average temperature of gas invessel is 2737 F (STCP, Ref. 1, Table 4.2)
- Worst Case: Gas in vessel expands isothermally into the containment

$$P_V = \frac{NRT}{V} = \frac{(927 \text{ lb-moles})(1545 \text{ ft-lbf/lb-mole R})(3197 \text{ R})}{(3.03 \times 10^5 \text{ft}^3)(144 \text{ in}^2/\text{ft}^2)}$$

Pv = 93.6 psi = partial pressure exerted by gas from the vessel

More Realistic Case:

- Assume steam passing to pool is condensed and that hydrogen is cooled to the pool temperature.

Esimate quantity passing to pool:

Volume that gas released occupies:

$$V_G = \frac{NRT}{P} = \frac{(827 \text{ lb-moles})(1545 \text{ ft-lbf/lb-mole R})(3197 \text{ R})}{P\,(144 \text{ in}^2/\text{ft}^2)}$$

$V = 2.84 \times 10^7 / P$

Volume of gas passing to pool = $V_G - V_D$

Quantity of steam not condensed:

$= 430 \text{ lb-moles } [1 - (V_G - V_D / V_G)]$

$= 430 \text{ lb-moles } (V_D / V_G) =$

$= 430 \text{ lb-moles } (6.49 \times 10^{-3} P)$

$= 2.79 P$

$$P_{NC} = \frac{NR}{\left[\frac{V_D}{T_D} + \frac{V_W}{T_W}\right]}$$

(V_D = drywell + vessel)
(Tw assumed 250 F)

$$P_{NC} = \frac{(662 + 395 + 397 + 2.79\,P) \text{ lb-moles } (1545 \text{ ft-lbf/lb-mole R})}{\left[\frac{1.84 \times 10^5 \text{ft}^3}{3197 \text{ R}} + \frac{1.19 \times 10^5}{710 \text{ R}}\right] (144 \text{ ft}^2/\text{in}^2)}$$

$$P_{NC} = \frac{(145 + 2.79\,P)(1545)}{225\,(144)}$$

$$P = P_{NC} + \text{partial pressure of steam}$$

$$P = P_{NC} + 30 \text{ psi}$$

$$P_{NC} = \frac{(1538 + 2.79\ P_{NC})(1545)}{3.24 \times 10^4}$$

$$P_{NC} = 73.3 + 0.133\ P_{NC}$$

$$0.87\ P_{NC} = 73.3$$

$$P_{NC} = 85 \text{ psi}$$

Total pressure = 85 psi + 30 psi = 115 psia
This value is close to the STCP calculation (129 psi in Ref. 1): However, the drywell temperature is 336 F not 2737 F. If 336 F were assumed above, the pressure calculated would be 78 psi which would be equivalent to a 22 psi pressure rise. Thus the central estimate of a 38 psi pressure rise is intermediate to these simple estimates.

Case 3: Described in text.

Question # 73: What is the pressure rise due to debris quenching?

Case 1: Described in text.

Case 2: Use the responses of the SARRP expert reviewers. (Ref. 3, Issue 11, Case 2)

Initials:	GG	RD	FEH	KP	MKR	SH	MCL
Pressure Rise			Weighting Factor				
15 psi	0	0	0	0.9	0.1	0	0
30 psi	0.9	1	1	0.1	0.9	1	0.9
45 psi	0.1	0	0	0	0	0	0.1
60 psi	0	0	0	0	0	0	0
75 psi	0	0	0	0	0	0	0
>120 psi	0	0	0	0	0	0	0

Cummulative Weight for each level:

Pressure Rise	Weight
15 psi	1.9
30 psi	5.0
45 psi	0.2

60 psi	0
75 psi	0
>120 psi	0

Thus 30 psi pressure rise is used as the central estimate.

SARRP Calculation:

- Assume drywell contains maximum water:
  30ft diameter floor, covered 1.5ft deep.
  Mass = $\rho R^2 d$
  = $(62.4\ lbm/ft^3)\ \ (15ft)^2\ (1.5ft)$
  = 6.62×10^4 lbm
- STCP calculation of core quenching at slump (Ref. 1, Table 4.2, TB1).
  At Core Collapse:
  Mass of water in vessel = Mv = 1.81×10^5 lbm
  Average core temperature = Tc = 3407 F
  Fraction Zr reacted = Fz = 0.22

  At Bottom Head dryout:
  Mv = 4.17×10^4 lbm
  Tc = 2428 F
  Fz = 0.25

  Core Collapse Evaporated:
  $\Delta Mv = 1.81 \times 10^5 - 4.17 \times 10^4 = 1.39 \times 10^5$ lbm
  ΔTc = 3407 F - 2428 F = 979 F
  ΔFz = 0.25 - 0.22 = 0.03
- Assume Bottom Head Failure evaporates all the water on the drywell floor. Ratio Zr oxidation based on mass of water evaporated. Assume 6.62×10^4 lbm of saturated steam is produced (3678 lb-moles).
- Hydrogen production

$$0.03\ \frac{6.62 \times 10^4 lbm}{1.39 \times 10^5 lbm} = 0.014 \text{ of Zr}$$

$$0.014\ [(1.44 \times 10^5\ lbm\ Zr)(91.2\ \frac{lbm\ Zr}{lb\text{-}mole\ Zr})]\ 2\ \frac{lb\ mole\ H_2}{lb\ mole\ Zr} = 45\ lb\ mole\ h_2$$

- Calculate Pressure Rise (same approach as Case 2 of question # 71).
- Estimate quantity of steam which passes to the suppression pool.

- Assume drywell temperature 330°F (saturated at 100 psi)
- Assume wetwell temperature 250°F (roughly STCP value).

$$V_G = \frac{NRT}{P} = \frac{(3678 \text{ lb-mole})(1545 \text{ ft-lbf/lb-mole R})(790 \text{ R})}{P\ (144 \text{ in}^2/\text{ft}^2)}$$

$$V_G = 3.12 \times 10^7 / P$$

Volume of steam going to pool = $V_G - V_D$

Quantity of steam not condensed:

$$= 3678 \text{ lb-mole } [1 - (V_G - V_D/V_G)]$$
$$= 3678 \text{ lb-mole } (V_D/V_G)$$
$$= 3678 \text{ lb-mole } (5.1 \times 10^{-3} P)$$
$$= 18.8 P$$

$$P_{NC} = \frac{NR}{\frac{V_D}{T_D} + \frac{V_W}{T_W}}$$

$$P_{NC} = \frac{(1454 + 18.8 P) \text{lb-mole}(1545 \text{ ft-lbf/lb-mole R})}{\frac{1.59 \times 10^3}{790 \text{ R}} + \frac{1.19 \times 10^5}{710 \text{ R}} \quad 144 \frac{\text{ft}^2}{\text{in}^2}}$$

$$P_{NC} = \frac{(2017 + 18.8 P_{NC})(1545)}{5.31 \times 10^4}$$

P_{NC} = 129 psi

Total pressure = 129 psi + 30 psi = 159 psia

This is the instantaneous pressure, assuming no condensation in the drywell it is this much larger than what is actually expected. The 45 lb-moles of hydrogen assumed to be produced would result in negligible added pressurization. The pressure rise from this calculation would be 69 psi, enough to almost cetainly fail the containment. It is not used since it is judged a severe overestimate.

Case 3: Pressure rise due to the boil-off of 500 gallons of water in the drywell sumps. The expert responses were (Ref. 3, Issue 11a, no bypass).

Initials:	GG	RD	FEH	KP	MKR	SH	MCL
Pressure Rise	Weighting Factor						
5 psi	0.2	0.5	0.5	0.2	0.6	0.3	0.6
15 psi	0.5	0.5	0.5	0.6	0.4	0.7	0.4
30 psi	0.3	0	0	0.2	0	0	0
45 psi	0	0	0	0	0	0	0

Cumulitive weight for each level:

Pressure Rise	Weight
5 psi	2.9
15 psi	3.6
30 psi	0.5
45 psi	0

Thus, the central estimate is 15 psi.

Using the simple SARRP model (as in Case 2):

500gal x 0.1337 ft^3/gal x 62.4 lbm/ft^3/(18 lbm/lb-mole) = 231lb-mole

P_{NC} = 82 psi

Total pressure = 82 psi + 30 psi = 112 psi

The pressure rise would be 22 psi, again this procedure overestimates the pressure rise since the amount of steam assumed to condense is the absolute lower bound.

Question # 74: Is the suppression pool bypassed or [drywell] vents not cleared at vessel breach? [and what is the effective pressure rise?]

Case 1: Ex-Vessel Steam Explosion, Suppression Pool "Saturated" (as defined in Question # 56) But Not Bypassed.

Since ex-vessel steam explosions are very unlikely, the pressure rise in the containment which results from a steam explosion has been only crudely estimated. These estimates are based on hand calculations which extrapolates results of calculations made by a early version of the MARCH computer code. These calculations are not repeated here since they do not impact calculated risk. Essentially these calculations estimate the pressure rise resulting from 100% of the water within the confines of the vessel pedestal (25' in diameter by 2' deep) being evaporated into the drywell instantaneously.

Case 2: Ex-Vessel Steam Explosion, Suppression Pool Not Bypassed

Same comment applies as for Case 1

Case 3: Direct Heating, Suppression Pool "Saturated" But Not Bypassed

Based on a simple calculation of direct heating loads for Peach Bottom, performed for SARRP by R. Gasser of Sandia, any significant amount of direct heating (>10% of the core debris participating) would result in pressures sufficiently high to assure containment failure. Thus, regardless of whether or not the vents clear, the pressure rise of direct heating is always set sufficently large to assure containment failure.

Case 4: Direct Heating, Suppression Pool Not Bypassed - See discussion under Case 3

Case 5: Direct Heating and Ex-Vessel Steam Explosion Suppression Pool "Saturated" But Not Bypassed - See discussion under Case 3

Case 6: Direct Heating and Ex-Vessel Steam Explosion Suppression Pool Not Bypassed - See discussion under Case 3

Case 7: Water on Drywell Floor Suppression Pool "Saturated" But Not Bypassed

From Case 2 of Question # 73 the pressure rise is 30 psi with the pool subcooled. This case is the added pressure rise from the pool being "saturated" plus the added pressure rise from vessel blowdown to a saturated pool.

- o Calculate energy deposited in the pool
  - Vessel blowdown (assume 100% of static enthalpy goes to pool). Assuming average temperature within the vessel is 2400 F:

    400 lb-moles H_2, $h_{H_2} = 2 \times 10^4$ Btu/lb-mole
    400 lb-moles H_2O, $h_g = 3.5 \times 10^4$ Btu/lb-mole

    Total energy deposited pool:

$$(400 \text{ lb-mole})[(2 \times 10^4 \text{ Btu/lb-mole}) + 3.5 \times 10^4 \text{ Btu/lb-mole}] = 2.2 \times 10^7 \text{ Btu}$$

  - Evaporation of water on the drywell floor (see Case 2 of Question # 37 above)

    45 lb-mole of H_2
    6.62×10^4 lbm of steam produced

Assume 2400°F is also the average temperature at which steam and hydrogen are produced (debris quenched from 2700°F).

$$(45 \text{ lb-mole})(2 \times 10^4 \text{ Btu/lb-mole}) + (6.62 \times 10^4 \text{ lbm})(3.5 \times 10^4 \text{ Btu/lb-mole})/18 \text{ lbm/lb-mole} = 1.3 \times 10^8 \text{ Btu}$$

- Calculate pool enthaply (specific) increase
  $(1.3 \times 10^8 \text{ Btu} + 2.2 \times 10^7 \text{ Btu})/8.6 \times 10^6 \text{ lbm} = 18 \text{ Btu/lbm}$
  @ 180°F $d/Psat/dh = 0.23$ psia/(Btu/lbm)(subcooled)
  @ 250°F $d/Psat/dh = 0.53$ psia/(Btu/lbm 0)(saturated)
  Thus saturated versus subcooled gives 0.3 psi-lbm/Btu difference in steam partial pressure
  (18 Btu/lbm) 0.3 psi-lbm/Btu = 6 psi
  use -15% for optimistic (3 psi)
  use +100% for pessimistic (12 psi)

Case 8: Suppresion Pool Subcooled and Not Bypassed

No additional pressure rise

Case 9: Suppression Pool Bypassed but Containment Failed

No pressure rise

Case 10: Drywell Floor Wet, RPV at High Pressure, Suppression Pool Bypassed

This is containment loading Issue 11 Cases 4 and 5 (pressure rises added) in Refernce 3. The mean of the expert responses would indicate that the total pressure rise for this case should be 105 psi. Subtracting the 38 psi resulting from vessel blowdown (Question # 72, Case 2) and 30 psi resulting from debris quenching (Question # 73, Case 2) the pressure rise for this case would be 37 psi. However, the calculation below indicated that this would be optimistic.

SARRP Calculation:

From question # 73, Case 2, estimate 3678 lb-moles of steam would be released from debris quenching and 45 lb-moles of H_2. As in Question # 38 Case 6 827 lb-moles of gas are released from the vessel. The total gas release to containment is thus:

$$3678 + 45 + 827 = 4550 \text{ lb-moles}$$

The resulting pressure (1057 lb-moles of gas present initially: N_2 + air + H_H) is given by: (assume 500°F final temperature)

$$P = \frac{NRT}{Vc + Vv}$$

$$P = \frac{(4550 + 1057 \text{ lb-mole})(1545 \text{ ft-lbf/lb-mole R})(960 \text{ R})}{(3.03 \times 10^5 \text{ft}^3)(144 \text{ in}^2/\text{ft}^2)}$$

P = 191 psia

Subracting the 68 psi previously accounted for the pressure rise for this case is 120 psi. The optimistic and pessimistic values are 30%.

Case 11: Same as Case 10 but with the RPV depressurized.

The quantity of gas in the containment would be identical to the previous case but the temperature would be lower since the steam and hydrogen from the vessel would be released gradually and most (or all) would pass through the suppression pool.

Repeating the above calculation assuming a 300°F mean temperature in containment, the added pressure rise is 90 psi.

Case 12: Suppression Pool Bypassed, RPV Depressurized, Drywell Floor Dry.

This case is just the added pressure rise due to boil-off of water in the drywell sumps. From Case 2 of Issue 11a (Ref. 3) the expert weighting factors were:

Initials: Pressure Rise	GG	RD	FEH	KP	MKR	SH	MCL
5 psi	0	0.5	0.4	0	0.6	0	0.4
15 psi	0.3	0.5	0.4	0.5	0.4	0.4	0.6
30 psi	0.5	0	0.2	0.5	0	0.6	0
45 psi	0.2	0	0	0	0	0	0

Cumulative Weight for Each Level:

Pressure Rise	Weight
5 psi	1.9
15 psi	3.1
30 psi	1.8
45 psi	0.2

Thus, the central estimate is 15 psi. No correction for previous 10 psi pressure rise (Question # 73 Case 3) was made since this would result in an overly optimistic estimate.

Case 13: Suppression Pool Bypassed, RPV Pressurized, Drywell Floor Dry

Use the Expert responses -- Issue 11, Case 4 (Ref. 3)

Initials: Pressure Rise	GG	RD	FEH	KP	MKR	SH	MCL
30 psi	0	0	-	0	0	-	-
45 psi	0	0	-	0	0	-	-
60 psi	0.1	0.05	-	0.09	0.15	-	-
75 psi	0.7	0.9	-	0.9	0.8	-	-
>120 psi	0.2	0.05	-	0.01	0.05	-	-

Cummulative Weight:

Pressure Rise	Weight
30 psi	0
45 psi	0
60 psi	0.39
75 psi	3.3
>120 psi	0.31

Thus 75 psi is the consensus level. Subtracting the 38 psi previously accounted for (Question # 72) and adding 15 psi for the water in the drywell sumps (previous case). We employ 45 psi as the central estimate (52 psi rounded downward to the nearest level is deemed appropriate).

Question # 80: Is AC Power Not Available Late?

Case 1: Long Term Blackout

Previous power recovery question (# 32) considered recovery up until

11.6 hours. In order to have any probability of mitigating the accident given that the vessel fails then injection must be recovered prior to significant release from the core concrete interaction. The STCP calculation (Ref. 1) for TBI predicts vessel failure at 12.2 hours. It requires slightly less than 1 hour for the ex-vessel release rates to become substatial (>16 g/s relative to a peak rate of 1531 g/s). Thus, power recovery within 13.1 hours is considered to effectively mitigate the accident.

Probability of non-recovery at 11.6 hours = $P_{NR11} = 1.11 \times 10^{-3}$
Probability of non-recovery at 13.1 hours = $P_{NR13} = 8.47 \times 10^{-4}$

$\frac{P_{NR13}}{P_{NR11}} = 0.77$ Central estimate of the failure to recover late.

The optimistic and pessimistic values are determined such there is a factor of 3 difference in the recovery probability between these evaluations.

Case 2: Short Term Blackout

Question # 32 considered recovery up until 2.5 hours. Assuming the same time is available to nutigate the accident, recovery up to 4 hours is considered

Probability of non-recovery by 2.5 hours = $P_{NR2} = 8.6 \times 10^{-3}$
Probability of non-recovery by 4 hours = $P_{NR4} = 5.5 \times 10^{-3}$

$\frac{P_{NR4}}{P_{NR2}} = 0.64$ Central estimate of failure to recover late.

APPENDIX C
SAMPLE EVENT TREE PROBLEM

A sample event tree problem has been constructed to facilitate the discussion of how input for the event tree program is structured. Before discussing this sample problem, some of the capabilities of the program are discussed.

The event tree program was written to do the bookkeeping of very large event trees that were necessary to properly address problems in the Severe Accident Risk Reduction Program (SARRP). The event trees developed in SARRP typically involved 50-100 "top questions" or "nodes". This in itself established a need for an automated bookkeeping procedure for the trees. In addition, without making very conservative assumptions nearly all of the branch point probabilities were dependent upon the occurrence or absence of prior events in the tree -- something very few other past event tree analyses have allowed for. Not only were most of the branch point probabilities dependent upon the path taken in the event tree up to that point, some of the probabilities needed to be calculated internally. That is, the user did not know a priori what the probability would be. This was most frequently the case for the probability of containment failure. In these instances, pressure loads were compared to estimates of a containment failure pressure distribution to obtain an estimate of containment failure probability. Keeping these points in mind, several key features of the program will be discussed.

As mentioned above, most of the questions involve user supplied branch point probabilities. However some questions utilize the capability of the program to internally calculate the branch point probability. The way this is performed is certain "parameters" which have had values specified at previous nodes are added together and compared to "reference parameters" which have a value specified at the current node. Take for example the probability of containment failure due to an early hydrogen burn. This is dependent upon the baseline pressure in containment prior to the burn, the probability of a hydrogen burn occurring, the pressure rise due to the burn, and containment failure pressure. Typically the value of baseline pressure and pressure rise due to the burn would be supplied at prior nodes as "parameters". The probability of the burn occurring would be input as a branch point probability at an earlier node (most likely the same one that supplied the value of pressure rise due to the burn). Then at the node which addresses early hydrogen burn failures, the program would be instructed to add the values of baseline pressure and hydrogen-burn pressure rise and compare the sum to a distribution of containment failure pressure to obtain a branch point probability. The containment failure pressure (a "reference parameter") is specified through input for that node.

From the discussion above it becomes apparent that there are at least three different types of questions for the event tree. They are those which the user supplies only branch point probabilities, those for which the user supplies "parameter" values as well as branch point probabilities, and those which the user supplies a list of "parameters" to be added and "reference parameters" to which the sum is to be compared. In fact, there are six different types of questions distinguished by the program. The remaining three types arise by considering the three types mentioned above as being either independent of or dependent on prior events in the tree. A summary of the different question types is shown below in Table C.1.

Table C.1
Summary of the different question types
for the event tree program

	Dependency upon prior events	
	Independent	Dependent
User Supplies Branch Point Probabilities Only	Type 1	Type 2
User Supplies Branch Point Probabilities and Parameter Values	Type 3	Type 4
User Specifies a List of Parameters to be Summed and Compared to Reference Parameters to Obtain Branch Point Probabilities	Type 5	Type 6

For those questions which are dependent upon prior events, different "dependency cases" are defined for which different sets of branch point probabilities are supplied. The "dependency cases" are described by specifying branches which must have been or must not have been taken for a series of key questions. To specify a branch that must have been taken the question number and the branch number are supplied to the program in the set of data for that "dependency case". To specify that a branch must not have been taken, the negative of the branch number is supplied to indicate a "not" condition. Using this strategy, many different "dependency cases" can be specified.

Marching through the event tree and finding the probability of each of the pathways would be useless without some means of condensing all of the different outcomes into some more tangible form. Thus the program was written to bin all of the different outcomes, in some user specified fashion, for the output. This binning is performed based upon certain key

characteristics by which the user would like to be able to differentiate the output. For example, for the SARRP analysis we were interested in the fraction of the sequence initiating frequency which would result in different modes of early and late containment failure, with containment sprays operating or not, with different levels of secondary containment bypass, etc.

Based on these needs the program was set up to have characteristically different "dimensions" for binning. These "dimensions" are things such as those mentioned in the previous paragraph. Within each of these "dimensions", different bins are specified. For example, in the early containment failure category there may be several different levels of containment leakage as well as gross failures due to several different causes. In the case of containment sprays, commonly considered bins were different combinations of early and late spray failure and success. The binning information for the SARRP analyses was chosen to adequately describe scenarios such that fission product source terms could be assigned to the scenarios without requiring an overly conservative binning of the outcomes.

The binning is completely user specified. Input is prepared to specify the number and title of each of the different "dimensions" and the number and title of each of the bins within each of the dimensions. Then information is provided identifying combinations of key questions and branches which must or must not have been taken for an outcome to fall within each of the respective bins in each "dimension". The output then consists of aggregate probabilities of occurrence of different combinations of the various "dimensional bins".

Table C.2 provides a sample input deck constructed solely for the purpose of familiarizing the novice with the construct of the input. It deals with early failure of containment in a sub-atmospheric PWR containment due to an early hydrogen burn. The discussion of the input follows in Table C.3 with reference to line numbers in the sample input found in Table C.2.

The event tree processor EVNTRE has been extended to allow the use of boolean expressions in the specification of pathway dependencies for particular cases in the tree quantification and in the binning of pathways through the tree. Boolean expressions facilitate the building and readability of large trees and have been used extensively in the event tree for Peach Bottom accident progression analysis. Table C-4 provides an example of a boolean expression that combines cases two and four in Question 7 of the sample event tree in Table C-2.

Table C.2
Sample Problem Input

Line No.

Input

```
 1 SAMPLE - Early failure due to H2 burning in S3D at a PWR
 2        3      1.0      1.0      1.0        8 1.0E-04 1.0E-07
 3      Nwal  Pinit    Pinit    Pinit  Nquest  Prntol   Toler
 4   1 Is there pre-existing leakage or isolation failure?
 5        4      EE3      EE2      EE1      EE0
 6        1        1        2        3        4
 7             0.000    0.000    0.013    0.987
 8             0.000    0.002    0.028    0.970
 9             0.000    0.002    0.051    0.947
10   2 Initial break size
11        4        A       S1       S2       S3
12        1        1        2        3        4
13             0.000    0.000    0.000    1.000
14             0.000    0.000    0.000    1.000
15             0.000    0.000    0.000    1.000
16   3 Induced failure in primary system?
17        5        A       S1       S2       S3     none
18        2        1        2        3        4        5
19        2
20        1        2
21                 4
22                S3
23             0.000    0.000    1.000    0.000    0.000
24             0.250    0.000    0.250    0.000    0.500
25             0.000    0.000    0.000    0.000    1.000
26           Otherwise
27             0.000    0.000    0.000    0.000    1.000
28             0.000    0.000    0.000    0.000    1.000
29             0.000    0.000    0.000    0.000    1.000
30   4 Sprays on early?
31        2      ESp    noESp
32        2        1        2
33        5
34        1        1
35                 1
36               EE3
37             0.000    1.000
38             0.000    1.000
39             0.000    1.000
40        2        1        2
41                 2        1
42               EE2        A
43             1.000    0.000
44             1.000    0.000
45             1.000    0.000
```

Table C.2 (cont.)
Sample Problem Input

Line No.	Input			
46	2	1	2	
47		2	2	
48		EE2	S1	
49		0.900	0.100	
50		0.900	0.100	
51		0.900	0.100	
52	3	1	2	2
53		2	-1	-2
54		EE2	noA	noS1
55		0.000	1.000	
56		0.000	1.000	
57		0.000	1.000	
58		Otherwise		
59		1.000	0.000	
60		1.000	0.000	
61		1.000	0.000	
62	5 Early baseline presure			
63	1	Pbase		
64	4	1		
65	5			
66	3	1	1	4
67		-1	-2	1
68		noEE3	noEE2	ESp
69		1.000		
70		1.000		
71		1.000		
72	1			
73	1	20.000		
74		20.000		
75		20.000	EPbase	
76	3	1	1	4
77		-1	-2	2
78		noEE3	noEE2	noESp
79		1.000		
80		1.000		
81		1.000		
82	1			
83	1	40.000		
84		40.000		
85		40.000	EPbase	

Table C.2 (cont.)
Sample Problem Input

Line No.	Input
86	2 1 4
87	2 1
88	EE2 ESp
89	1.000
90	1.000
91	1.000
92	1
93	1 15.0
94	15.0
95	15.0 EPbase
96	2 1 4
97	2 2
98	EE2 noESp
99	1.000
100	1.000
101	1.000
102	1
103	1 20.0
104	20.0
105	20.0 EPbase
106	Otherwise
107	1.000
108	1.000
109	1.000
110	1
111	1 14.7
112	14.7
113	14.7 EPbase
114	6 Maximum break size in primary system
115	4 A S1 S2 S3
116	2 1 2 3 4
117	7
118	2 2 3
119	4 5
120	S3 none
121	0.000 0.000 0.000 1.000
122	0.000 0.000 0.000 1.000
123	0.000 0.000 0.000 1.000
124	2 2 3
125	3 5
126	S2 none
127	0.000 0.000 1.000 0.000
128	0.000 0.000 1.000 0.000
129	0.000 0.000 1.000 0.000

Table C.2 (cont.)
Sample Problem Input

Line No.	Input				
130	2	2	3		
131		2	5		
132		S1	none		
133		0.000	1.000	0.000	0.000
134		0.000	1.000	0.000	0.000
135		0.000	1.000	0.000	0.000
136	1	3			
137		4			
138		S3			
139		0.000	0.000	0.000	1.000
140		0.000	0.000	0.000	1.000
141		0.000	0.000	0.000	1.000
142	1	3			
143		3			
144		S2			
145		0.000	0.000	1.000	0.000
146		0.000	0.000	1.000	0.000
147		0.000	0.000	1.000	0.000
148	1	3			
149		2			
150		S1			
151		0.000	1.000	0.000	0.000
152		0.000	1.000	0.000	0.000
153		0.000	1.000	0.000	0.000
154		Otherwise			
155		1.000	0.000	0.000	0.000
156		1.000	0.000	0.000	0.000
157		1.000	0.000	0.000	0.000
158	7	Hydrogen burn	before	vessel	breach?
159	2	EHB	noEHB		
160	4	1	2		
161	6				
162	4	1	1	4	6
163		-1	-2	1	1
164		noEE3	noEE2	ESp	A
165		0.000	1.000		
166		0.100	0.900		
167		0.100	0.900		
168	1				
169	2	0.0	0.0		
170		25.0	0.0		
171		50.0	0.0	DP-EH	

Table C.2 (cont.)
Sample Problem Input

Line No.	Input					
172	4	1	1	4	6	
173		-1	-2	1	2	
174		noEE3	noEE2	ESp	S1	
175		0.000	1.000			
176		0.000	1.000			
177		0.100	0.900			
178	1					
179	2	0.0	0.0			
180		0.0	0.0			
181		35.0	0.0	DP-EH		
182	5	1	1	4	6	6
183		-1	-2	1	-1	-2
184		noEE3	noEE2	ESp	noA	noS1
185		0.000	1.000			
186		0.000	1.000			
187		0.000	1.000			
188	1					
189	2	0.0	0.0			
190		0.0	0.0			
191		0.0	0.0	DP-EH		
192	3	1	4	6		
193		2	1	1		
194		EE2	ESp	A		
195		0.000	1.000			
196		0.000	1.000			
197		0.100	0.900			
198	1					
199	2	0.0	0.0			
200		0.0	0.0			
201		35.0	0.0	DP-EH		
202	3	1	4	6		
203		2	1	2		
204		EE2	ESp	S1		
205		0.000	1.000			
206		0.000	1.000			
207		0.100	0.900			
208	1					
209	2	0.0	0.0			
210		0.0	0.0			
211		25.0	0.0	DP-EH		
212		Otherwise				
213		0.000	1.000			
214		0.000	1.000			
215		0.000	1.000			
216	1					
217	2	0.000	0.000			
218		0.000	0.000			
219		0.000	0.000	DP-EH		

Table C.2 (cont.)
Sample Problem Input

Line No.

Input

```
220    8 Does containment fail due to an early hydrogen burn?
221         2       EH     noEH
222         5        1        2
223         2        1        2
224             EPbase    DP-EH
225              'AND'
226             'NORMAL'        2      134      2.5
227                                    134       15
228                                     60       15
229                           CFP     MEAN    SIGMA
230 'SAMPLE Early failure due to H2 burning in S3D at a PWR
231 'OPTIMISTIC'     'CENTRAL'          'PESSIMISTIC'
232   2          'CF' 'Sprays'
233   5    5    'EE0'    'EE1'    'EE2'    'EE3'     'EH'
234   2    1        1        8
235                 4        2
236               EE0     noEH
237   2    2        1        8
238                 3        2
239               EE1     noEH
240   2    3        1        8
241                 2        2
242               EE2     noEH
243   2    4        1        8
244                 1        2
245               EE3     noEH
246   1    5                  8
247                           1
248                          EH
249   2    2    'ESp' 'noESp'
250   1    1        4
251                 1
252               ESp
253   1    2        4
254                 2
255             noESp
```

Table C.3
Detailed Discussion of Sample Input

Line in Table C.2	Input Description
1	Dummy title for this set of input. Not actually used by program but made available for the user for quick identification of the input
2-3	Number of quantifications of the tree, the initiating frequency of each of the quantifications (when set equal to one, conditional probabilities are obtained), the number of questions in the tree, the print tolerance (output with aggregate probability less than the print tolerance is not found in the printed output), and the cutoff tolerance in the tree (if the probability of a pathway is reduced below the cutoff tolerance, calculations cease for that portion of the tree). The titles in line three are not used by the program but facilitate the user in preparing the input.
4	Question number one is concerned with the level of preexisting leakage or isolation failure.
5	This first node in the tree has four branches. They are titled EE3, EE2, EE1, and EE0. EE3 stands for leakage of sufficient size to be equivalent to a gross failure of containment. EE2 is leakage smaller than gross failure (in terms of amounts of fission products released) but still large enough to prevent containment failure due to long term and gradual overpressurization. EE1 is leakage too small to prevent long term overpressurization but larger than design leakage of containment. Design leakage or less is designated by EE0. These titles are not used by the program but are provided for ease of preparing and reading the input.
6	The first number is all that is actually used by the program and denotes this question as being of type 1 (see earlier discussion of question types). The other numbers are simply the branch numbers for this question which are supplied for ease of reading the input.
7-9	These three lines provide the branch point probabilities for this question for the three different quantifications. Each line supplies the probabilities for a different quantification. In this example (this will be true for all the questions in this sample input), the first line represents input for an optimistic quantification, the third line for a pessimistic quantification, and the second line represents a central viewpoint.

Table C.3 (cont.)
Detailed Discussion of Sample Input

Line in Table C-2	Input Description
10	Question number 2 addresses the size of the initial break in the primary system.
11-12	The question has four branches (A, S1, S2, S3) and is of type 1. The branches are "large" (A), "intermediate" (S1), "small" (S2), and "very small" (S3).
13-15	The branch point probabilities for the three different quantifications are given in these three lines.
16	Question 3 is concerned with the possibility of induced failures in the primary system in high pressure scenarios due to natural convection of hot gases throughout the system.
17-18	Question three has 5 branches (four similar to question 2 and one additional to account for no induced failure) and is of type 2. Type 2 means the branch point probabilities are dependent upon prior events such that "dependency cases" must be specified.
19	There will be two "dependency cases" specified.
20	For this first "dependency case," there is 1 question-branch pair specified which must either have or have not been taken previously in the tree for the following branch point probabilities to be used for this question. The question of dependency is question number 2.
21	The branch specification is 4. This means (since the branch specification is positive) that branch 4 must have been taken previously at question 2 for the following set of branch point probabilities to be used.
22	The title of the branch which must have been taken is S3. This title is not used by the program but is supplied for ease of preparation and examination of the input.
23-25	The branch point probabilities for this dependency case for this question for the three different quantifications.
26	This is the second and last dependency case. In fact, it is a catchall case. That is, any paths which did not fit into any of the previous cases use this set of

Table C.3 (cont.)
Detailed Discussion of Sample Input

Line in Table C-2	Input Description
26 cont	branch point probabilities. (Hence the "otherwise" descriptor.) This line is not actually used by the program but is another clarification feature of the input structure.
27-29	The three sets of branch point probabilities for the "otherwise" catchall case.
30-32	Question 4 addresses early spray operation, it has 2 branches, and is of type 2.
33	5 dependency cases are specified for this question.
34-36	The first dependency case has 1 question-branch pair specified, this is branch 1 of question 1 (the EE3 branch).
37-39	The branch point probabilities of for spray operation given preexisting leakage or isolation failure equivalent to gross rupture of containment.
40-42	The second dependency case has 2 question-branch pairs specified, these are questions 1 and 2 and branches 2 and 1 respectively, corresponding to preexisting leakage or isolation of level 2 and a large initial break in the primary system. Both question-branch pairs must have been taken previously for the set of branch point probabilities that follow to be used.
43-45	The branch point probabilities for spray operation for the three different quantifications and the second dependency case.
46-51	The third dependency case specification (leakage level 2 and intermediate initial break in the primary system) and the corresponding branch point probabilities.
52-54	The fourth dependency case specifies a leakage level of 2 and an initial break in the primary system other than large or intermediate (signified by the negative branch number). Thus either a small or a very small initial break with a leakage level of 2 would fall into this case.
55-57	The branch point probabilities for the fourth dependency case.

Table C.3 (cont.)
Detailed Discussion of Sample Input

Line in Table C-2	Input Description
58-61	The catchall branch point probabilities for question number 4.
62	Question 5 addresses the early baseline pressure in containment.
63-65	There is only one branch for this question since it is only in the tree to supply the value of the early baseline pressure "parameter". The question is of type 4, meaning it is dependent upon prior events and that a parameter value is specified. There are 5 dependency cases specified.
66-71	The first dependency case is specified as branch one of question 4 and anything but branch 1 or 2 on question 1. Since this is a single branch node, the probabilities for all three quantifications are all unity.
72	The value of 1 parameter will be specified in this case. (The value of more than one parameter can be specified at a type 3 or 4 question.)
73-75	The parameter identification number is 1 and the value of the parameter for the three different quantifications is 20.0.
76-113	Specification of the remaining four dependency cases, and the associated branch point probabilities, parameter identification numbers and parameter values.
114	Question number 6 combines the information from question 2 and 3 to simplify the specification of dependency cases in later questions. No new information is gained by this node, but past information is summed up into a more convenient form.
115-117	Question 6 has 4 branches and is of type 2. There are 7 dependency cases specified.
118-157	Specification of the seven different dependency cases and the branch point probabilities. Note that since this question serves in a summary manner, the branch point probabilities are all unity or zero and are invariant with the three different quantifications.
158	Question 7 addresses the probability of a hydrogen burn before vessel breach and the magnitude of such a hydrogen burn.

Table C.3 (cont.)
Detailed Discussion of Sample Input

Line in Table C-2	Input Description
159-161	Question seven consists of two branches and is of type 4. 6 dependency cases are specified.
162-167	The first dependency case has 4 question-branch pairs specified. They are "not" branch 1 or 2 of question 1 and branch 1 of both question 4 and 6. The three sets of branch point probabilities are also supplied.
168	The value of 1 parameter will be specified for this dependency case.
169-171	The parameter identification number is 2. (This parameter is the pressure rise associated with the hydrogen burn.) The values of the parameter are 0., 25., and 50., for the three different quantifications if branch 1 is taken. Otherwise the values are all zero, since the other branch involves no combustion. (The value of the parameter for a given branch appears under that branch in order of the different quantifications.)
172-219	Specification of the remaining five dependency cases along with the parameter identification and values.
220	Question 8 addresses the probability of containment failure due to an early hydrogen burn.
221-222	Question eight has 2 branches (a necessity for this type of question) and is of type 5. This means it is of the type which compares a sum of specified parameters to some reference parameters and the branch point probability will be internally calculated by the program.
223-224	There are 2 parameters specified to manipulate. These are parameters 1 and 2. These are the values of early baseline pressure and early hydrogen burn pressure rise respectively. The titles in line 224 are provided entirely for clarification reasons and are not actually used in the program.
225	The parameters are to be "anded" together. That is they are to be summed. Other options here are 'MAX' and 'MIN' which specify the program to take the maximum or minimum of the specified parameter values respectively.

Table C.3 (cont.)
Detailed Discussion of Sample Input

Line in Table C-2	Input Description
226-229	The outcome of the above mentioned manipulation of parameter values is to be compared to a normally distributed reference parameter, hence the 'NORMAL' descriptor in the input. (In this case the reference parameter is the containment failure pressure.) There are 2 reference parameters, each of which has a value specified for the three different quantifications. For this case, these are the mean and the standard distribution of the normal distribution. Another possibility for this type of question is a threshold comparison in which case 'THRESH' would appear instead of 'NORMAL' and only one reference parameter would need to be specified, namely the value of the threshold. The titles supplied in line 229 are for clarification purposes and are not used by the program.
230	Problem title. (Will be printed in the output.)
231	Titles for the three different quantifications. (Will be printed in the output.)
232	The number of binning "dimensions" is specified to be 2. The titles of these "dimensions" are CF and Sprays.
233	The first dimension consists of 5 bins. 5 "pathways" for binning into these five bins are specified in the input. (The number of pathways must always equal or exceed the number of bins unless a vacuous bin has been defined.) The bin titles for this dimension are EE0, EE1, EE2, EE3, and EH.
234-236	These lines describe the first "pathway". There are 2 question-branch pairs specified for this pathway and any outcomes of the tree matching this "pathway" criterion are to be place in bin number 1. The question branch pairs are branch 4 of question 1 and branch 2 of question 8.
237-248	Specification of the remaining four pathways. The first three of which utilize 2 question-branch pairs and the last only 1 pair.
249	Dimension two consists of 2 bins and has 2 "pathways" specified. The titles are ESp and noESp.

Table C.3 (cont.)
Detailed Discussion of Sample Input

Line in Table C-2	Input Description
250-252	There is one question-branch pair specified for the first "pathway". Any outcomes of the tree which match this outcome will be placed in bin number one of this dimension.
253-255	The second and last "pathway" specification. Outcomes matching this criterion will be placed in bin number 2 of this dimension.

Table C.4
Example of a Boolean Expression for a Pathway

6	4		1		1		6		1		6
	1	*(	(3	+	4)	*	2	+	2	*	1)
	Esp		EE1		EE0		S1		EE2		A

Notes:
1) * => AND; + => OR
2) AND is evaluated before OR
3) The AND operator is optional (i.e., the absence of an operator symbol is interpreted as an AND operator)
4) -1 and /1 are both interpreted as not branch 1

The boolean expression requires that Question 4 take branch 1 (Esp) and either Question 6 take branch 1 (A) and Question 1 take branch 2 (EE2), or Question 6 take branch 2 (S1) and question 1 take branch 3 (EE1) or branch 4 (EE0). This boolean expression would allow the combination in Question 7 of cases 2 (line 172) and 4 (line 192) in the sample event tree given in Table C.2.

```
PEACH BOTTOM EVENT TREE                SARRP
    101
     NQ
      3     1.00      1.00      1.00
             opt       cen      pess
  1 What is the initiating event?
      7       A        S1       S2/3     TLOSP      TPCS        TC      IORV
      1       1         2          3         4         5         6         7
          0.000     0.000     0.000     1.000     0.000     0.000     0.000
          0.000     0.000     0.000     1.000     0.000     0.000     0.000
          0.000     0.000     0.000     1.000     0.000     0.000     0.000
  2 What is the initial break location?
      5      RPV     Rcirc       MSL        FW       SRV
      1        1         2          3         4         5
          0.000     0.000     0.000     0.000     1.000
          0.000     0.000     0.000     0.000     1.000
          0.000     0.000     0.000     0.000     1.000
  3 What is the level of pre-existing leakage or isolation failure?
      5    E1L2D     E1L1D     E1L2W     E1L1W      E1L0
      1        1         2          3         4         5
          0.000     0.000     0.000     0.000     1.000
          0.000     0.000     0.000     0.000     1.000
          0.000     0.000     0.000     0.000     1.000
  4 Is there a loss of offsite power?
      2   E1-LOP    E1nLOP
      1        1         2          ALL TLOSP'S => 1,0; OTHERS => 0,1
          1.000     0.000
          1.000     0.000
          1.000     0.000
  5 Is there a Station Blackout (Diesel generators fail)?
      2       SB       nSB
      1        1         2          ALL TB'S => 1,0; OTHERS => 0,1
          1.000     0.000
          1.000     0.000
          1.000     0.000
  6 Is DC power not available?
      2    E1fDC     E1-DC          TBUX & DCUX => 1,0; OTHERS => 0,1
      1        1         2
          0.000     1.000
          0.000     1.000
          0.000     1.000
  7 For TC, does SLC fail to inject?
      3   E1fSLC    E1-SLC        na   TCS~ => 1,0,0; TC/S~ => 0,1,0;
      1        1         2         3   OTHERS => 0,0,1
          0.000     0.000     1.000
          0.000     0.000     1.000
          0.000     0.000     1.000
  8 Does a S/RV stick open early?
      2 E1-SORV  E1nSORV          TBP & TBUP => 1,0; OTHERS => 0,1
      1        1         2
          0.000     1.000
          0.000     1.000
          0.000     1.000
  9 Do the HPCI and RCIC systems fail to inject?
```

```
     3  E1fHPC  E1rHPC  E1-HPC          ALL U'S => 1,0,0;
     1       1       2       3         OTHERS => 0,0,1
         0.000   0.000   1.000
         0.000   0.000   1.000
         0.000   0.000   1.000
10 Does the CRD hydraulic system inject?
     3  E1fCRD  E1rCRD  E1-CRD          TB => 0,1,0; OTHERS => 0,0,1
     1       1       2       3
         0.000   1.000   0.000
         0.000   1.000   0.000
         0.000   1.000   0.000
11 Do the LPCS and LPCI systems fail?
     4  E1fLPC  E1rLPC  E1aLPC  E1-LPC   TB'S => 0,1,0,0; ALL V'S NOT T
     1       1       2       3       4   => 1,0,0,0; OTHERS => 0,0,1,0
         0.000   1.000   0.000   0.000
         0.000   1.000   0.000   0.000
         0.000   1.000   0.000   0.000
12 Do the RHR systems fail?
     3  E1fRHR  E1rRHR  E1-RHR   TB'S => 0,1,0; ALL W'S
     1       1       2       3   => 1,0,0; OTHERS => 0,0,1
         0.000   1.000   0.000
         0.000   1.000   0.000
         0.000   1.000   0.000
13 Does the condensate system fail?
     3 E1fCOND E1rCOND E1aCOND   TB'S => 0,1,0; ALL V'S NOT TC & V23'S
     1       1       2       3   => 1,0,0; OTHERS => 0,0,1
         0.000   1.000   0.000
         0.000   1.000   0.000
         0.000   1.000   0.000
14 Does HPSW fail in a mode which would preclude injection?
     3 E1fHPSW E1rHPSW E1aHPSW   TB'S => 0,1,0; ALL V'S NOT TC & V23'S
     1       1       2       3   => 1,0,0; OTHERS => 0,0,1
         0.000   1.000   0.000
         0.000   1.000   0.000
         0.000   1.000   0.000
15 Is there a failure which precludes drywell cooler operation?
     3  E1fDWC  E1rDWC  E1aDWC   TB'S => 0,1,0
     1       1       2       3
         0.000   1.000   0.000
         0.000   1.000   0.000
         0.000   1.000   0.000
16 Is ADS blocked or not called upon?
     2  E1nADS  E1-ADS          TC*/A & *X => 1,0; OTHERS => 0,1
     1       1       2
         1.000   0.000
         1.000   0.000
         1.000   0.000
17 Does the RPV remain pressurized?
     2  E2nDeP  E2-DeP
     2       1       2
     9
-    3       1       1      16
             1+      2+      2
             A       S1  E1-ADS
```

```
        0.000    1.000
        0.000    1.000
        0.000    1.000
  1        8
           1
       E1SORV
        0.001    0.999
        0.100    0.900
        0.500    0.500
  2        5        9
           1        3
          SB   E1-HPC
        0.000    1.000
        0.001    0.999
        0.100    0.900
  1        6
           1
        E1fDC
        1.000    0.000
        1.000    0.000
        1.000    0.000
  5        5        1        1        9       11
           1   +(( 4 +      5)      -3       -4)
          SB    TLOSP     TPCS nE1-HPC  nE1LPC
        0.000    1.000
        0.100    0.900
        0.500    0.500
  5        1        1        9       11       10
          (4 +      5)        3       -4       -3
        TLOSP     TPCS  E1-HPC  nE1LPC  nE1CRD
        0.000    1.000
        0.100    0.900
        0.500    0.500
  6        1        1        9       11       12       10
          (4 +      5)        3       -4        1        3
        TLOSP     TPCS  E1-HPC  nE1LPC  E1fRHR  E1-CRD
        0.001    0.999
        0.100    0.900
        0.500    0.500
  1        1          TCSX & TCUX => 1,0 ; OTHER TC'S => 0,1
           6
          TC
        0.000    1.000
        0.000    1.000
        0.000    1.000
      Otherwise
        0.000    1.000
        0.000    1.000
        0.000    1.000
 18 For TC is inadequate level maintained with LPI?
     3       TL TAF/OSC       na
     2        1        2        3
     5
     2        1       16
```

```
           6        2
          TC   E1-ADS          ** TCSA'S
       0.000    1.000    0.000
       0.000    1.000    0.000
       0.000    1.000    0.000
   2       1        7
           6        2
          TC   E1-SLC          ** TC/S'S (e.g. TCUX, TCUV)
       1.000    0.000    0.000
       1.000    0.000    0.000
       1.000    0.000    0.000
   2       1       17
           6        2
          TC   E2-DeP          ** TCSV => 1,0,0; OTHER TC => 0,1,0
       0.000    1.000    0.000
       0.000    1.000    0.000
       0.000    1.000    0.000
   1       1
           6
          TC                   ** TCSX **
       1.000    0.000    0.000
       1.000    0.000    0.000
       1.000    0.000    0.000
     Otherwise
       0.000    0.000    1.000
       0.000    0.000    1.000
       0.000    0.000    1.000
19 What type of sequence is this (summary of plant damage)?
   10      AE       AW       S1E      S1W TQUV/FTB      TB       TW
     TC-fDeP   TC-TL    TC-CV
    2     1\8      2\9      3\10       4        5        6        7
   11
    2       1       11
            1        1
            A   E1fLPC
       1.000    0.000    0.000    0.000    0.000    0.000    0.000
       0.000    0.000    0.000
       1.000    0.000    0.000    0.000    0.000    0.000    0.000
       0.000    0.000    0.000
       1.000    0.000    0.000    0.000    0.000    0.000    0.000
       0.000    0.000    0.000
    2       1       12
            1       -3
            A  nE1-RHR
       0.000    1.000    0.000    0.000    0.000    0.000    0.000
       0.000    0.000    0.000
       0.000    1.000    0.000    0.000    0.000    0.000    0.000
       0.000    0.000    0.000
       0.000    1.000    0.000    0.000    0.000    0.000    0.000
       0.000    0.000    0.000
    3       1       11       14
            2        1        1
           S1   E1fLPC  E1fHPSW
       0.000    0.000    1.000    0.000    0.000    0.000    0.000
```

```
      0.000    0.000    0.000
      0.000    0.000    1.000    0.000    0.000    0.000    0.000
      0.000    0.000    0.000
      0.000    0.000    1.000    0.000    0.000    0.000    0.000
      0.000    0.000    0.000
2         1       12
          2       -3
         S1  nE1-RHR
      0.000    0.000    0.000    1.000    0.000    0.000    0.000
      0.000    0.000    0.000
      0.000    0.000    0.000    1.000    0.000    0.000    0.000
      0.000    0.000    0.000
      0.000    0.000    0.000    1.000    0.000    0.000    0.000
      0.000    0.000    0.000
7         1        1        1        9       11       11       10
         -3       -6       -7        1       -3       -4       -3
      nS2/3      nTC    nIORV   E1fHPC  nE1aLPC  nE1-LPC  nE1-CRD
      0.000    0.000    0.000    0.000    1.000    0.000    0.000
      0.000    0.000    0.000
      0.000    0.000    0.000    0.000    1.000    0.000    0.000
      0.000    0.000    0.000
      0.000    0.000    0.000    0.000    1.000    0.000    0.000
      0.000    0.000    0.000
1         5
          1
         SB
      0.000    0.000    0.000    0.000    0.000    1.000    0.000
      0.000    0.000    0.000
      0.000    0.000    0.000    0.000    0.000    1.000    0.000
      0.000    0.000    0.000
      0.000    0.000    0.000    0.000    0.000    1.000    0.000
      0.000    0.000    0.000
3         1        1       12
         -3       -6       -3
      nS2/3      nTC  nE1-RHR
      0.000    0.000    0.000    0.000    0.000    0.000    1.000
      0.000    0.000    0.000
      0.000    0.000    0.000    0.000    0.000    0.000    1.000
      0.000    0.000    0.000
      0.000    0.000    0.000    0.000    0.000    0.000    1.000
      0.000    0.000    0.000
2         1       17
          6        1
         TC   E2nDeP
      0.000    0.000    0.000    0.000    0.000    0.000    0.000
      1.000    0.000    0.000
      0.000    0.000    0.000    0.000    0.000    0.000    0.000
      1.000    0.000    0.000
      0.000    0.000    0.000    0.000    0.000    0.000    0.000
      1.000    0.000    0.000
2         1       18
          6        1
         TC    E2TL
      0.000    0.000    0.000    0.000    0.000    0.000    0.000
```

```
        0.000    1.000    0.000
        0.000    0.000    0.000    0.000    0.000    0.000    0.000
        0.000    1.000    0.000
        0.000    0.000    0.000    0.000    0.000    0.000    0.000
        0.000    1.000    0.000
    2       1       18
            6        2
           TC E2TAF/OC
        0.000    0.000    0.000    0.000    0.000    0.000    0.000
        0.000    0.000    1.000
        0.000    0.000    0.000    0.000    0.000    0.000    0.000
        0.000    0.000    1.000
        0.000    0.000    0.000    0.000    0.000    0.000    0.000
        0.000    0.000    1.000
      Otherwise          *** SHOULD NEVER BE USED ***
        0.000    0.000    0.000    0.000    0.000    0.000    0.000
        0.000    0.000    1.000
        0.000    0.000    0.000    0.000    0.000    0.000    0.000
        0.000    0.000    1.000
        0.000    0.000    0.000    0.000    0.000    0.000    0.000
        0.000    0.000    1.000
20 Is there an LP system break induced by power cycling (ATWS)?
    2   PCyBk  nPCyBk
    2       1        2
    4
    2       1       16
            6        2
           TC  E1-ADS
        0.000    1.000
        0.000    1.000
        0.000    1.000
    1      19
            9
        TC-TL
        0.000    1.000
        0.000    1.000
        0.000    1.000
    1      19
           10
        TC-CV
        0.000    1.000
        0.000    1.000
        0.000    1.000
      Otherwise
        0.000    1.000
        0.000    1.000
        0.000    1.000
21 Do low pressure ECC systems continue/begin to inject?
    4  E2fLPC  E2rLPC  E2aLPC  E2-LPC
    2       1       2       3       4
    4
    1      11
            2
       E1rLPC
```

```
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
    2      17       11
           1       -1
       E2nDeP   nE1fLPC
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
    2      11       19
           1   +    9
       E1fLPC    TC-TL
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
      Otherwise
        0.000    0.000    0.000    1.000
        0.000    0.000    0.000    1.000
        0.000    0.000    0.000    1.000
22 Do containment sprays fail before core degradation?
    4    E3fCS    E3rCS    E3aCS    E3-CS
    2        1        2        3        4
    7
    3       11       12       14
            1        1        1
       E1fLPC   E1fRHR   E1fHPSW
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
    2       11       14
            2        2
       E1rLPC   E1rHPSW
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
    4       12        1        1        1
            3   * (  1   +   2   +   3)
       E1-RHR         A       S1    S2/3
        0.000    0.000    0.000    1.000
        0.000    0.000    0.000    1.000
        0.000    0.000    0.000    1.000
    7       21       21       14        1        1        1       19
       (    4   +   3   +   3) * (  1   +   2   +   3   +   7)
       E2-LPC   E2aLPC   E1aHPSW        A       S1    S2/3       TW
        0.000    0.000    0.000    1.000
        0.000    0.000    0.010    0.990
        0.000    0.000    0.100    0.900
    2       19       19
            8   +    9
      TC-fDeP    TC-TL
        0.000    0.000    0.001    0.999
        0.000    0.000    0.010    0.990
        0.000    0.000    0.100    0.900
    1       19
```

```
          10
        TC-CV
        0.000    0.000    0.100    0.900
        0.000    0.000    0.500    0.500
        0.000    0.000    1.000    0.000
      Otherwise
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
23 Is the containment vented before core degradation?
     2 E3nVENT E3-VENT
     2       1        2
     6
     1      19
             6
           TB
        1.000    0.000
        1.000    0.000
        1.000    0.000
     2      19       19
             2   +    4
           AW      S1W
        0.001    0.999
        0.025    0.975
        0.100    0.900
     1      19
             7
           TW
        0.000    1.000
        0.001    0.999
        0.100    0.900
     2      19       20
            10        2
        TC-CV   nPCyBk   TCSR & TCSAR => 1,0; Other TC => 0,1
        1.000    0.000
        1.000    0.000
        1.000    0.000
     2       1       20
             6        2
           TC   nPCyBk   TCSV23 & TCSAV23 => 0,1; OTHER TC => 1,0
        1.000    0.000
        1.000    0.000
        1.000    0.000
      Otherwise
        1.000    0.000
        1.000    0.000
        1.000    0.000
24 Does the RPV repressurize before core damage?
     2      ReP     nReP
     2        1        2
     7
     3       19       19       19
            -6       -7      -10
           nTB      nTW   nTC-CV
```

```
        0.000    1.000
        0.000    1.000
        0.000    1.000
1         8
          1
       SORV
        0.000    1.000
        0.000    1.000
        0.000    1.000
1        20
          1
       PCyBk
        0.000    1.000
        0.000    1.000
        0.000    1.000
2        19         23
         10          2
       TC-CV  E3-VENT
        0.000    1.000
        0.000    1.000
        0.000    1.000
2        19         17
          6          2
         TB   E2-DeP
        0.900    0.100
        0.990    0.010
        0.999    0.001
2        17         23
          2          1
     E2-DeP  E3nVENT
        1.000    0.000
        1.000    0.000
        1.000    0.000
    Otherwise (either nDeP or nReP)
        0.000    1.000
        0.000    1.000
        0.000    1.000
25 Does (do) any S/RV-tailpipe vacuum breaker(s) stick open?
   2 oSRVBkr cSRVBkr
   2         1          2
   4
   4        19          8        17        24
            5          2    (   1     +   1)
     TQUVFSB  E1nSORV   E2nDeP      ReP
        0.160    0.840
        0.600    0.400
        1.000    0.000
   5        19         19         8        17        24
        (   6    +    7)         2    (   1     +   1)
           TB        TW  E1nSORV   E2nDeP      ReP
        0.300    0.700
        0.700    0.300
        1.000    0.000
1        19
```

```
          8
       TC-fDeP                    ** Cycling valve not low-low set
         0.000    1.000
         0.010    0.990
         0.100    0.900
       Otherwise
         0.000    1.000
         0.000    1.000
         0.000    1.000
26 Is there a repressurization break of low pressure systems?
     2   RePBk  nRePBk
     2       1       2
     2
     1      24
             1
           ReP
         0.000    1.000
         0.000    1.000
         0.000    1.000
       Otherwise
         0.000    1.000
         0.000    1.000
         0.000    1.000
27 Does containment fail before core degradation?
     2  E3-CFP  E3nCFP
     2       1       2
     6
     2      20      26
             1  +    1
          PCyBk   RePBk
         0.000    1.000
         0.000    1.000
         0.000    1.000
     1      23
             2
       E3-VENT
         0.000    1.000
         0.000    1.000
         0.000    1.000
     4      19      19      19      19
            -2      -4      -7     -10
           nAW     nS1W     nTW  nTC-CV
         0.000    1.000
         0.000    1.000
         0.000    1.000
     1      19
            10
          TC-CV          TCSRX3 & TCSARX3 => 0,1; OTHER TC/R => 1,0
         1.000    0.000
         1.000    0.000
         1.000    0.000
     2      19      10
             7       1
            TW  E1nCRD
```

```
          0.000    1.000
          0.000    1.000
          0.000    1.000
        Otherwise
          1.000    0.000
          1.000    0.000
          1.000    0.000
28 What is location of early containment leakage?
     3    E3nCL   E3-CLD   E3-CLW
     2        1       2        3
     4
     2       20      26
              1  +    1
          PCyBk    RePBk
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
     1       23
              2
        E3-VENT
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
     1       27
              1
         E3-CFP
          0.000    0.500    0.500
          0.000    0.800    0.200
          0.000    1.000    0.000
        Otherwise
          1.000    0.000    0.000
          1.000    0.000    0.000
          1.000    0.000    0.000
29 For Drywell failures, is the failure at the head seal?
     3   E3-DHF   E3-DKF    E3nDF
     2        1        2        3
     3
     2       20       26
              1  +    1
          PCyBk    RePBk
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
     1       28
              2
         E3-CLD
          0.100    0.900    0.000
          0.400    0.600    0.000
          0.900    0.100    0.000
        Otherwise
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
30 What is the containment leakage level before core degradation?
```

```
      3   E3nCL  E3-CL2  E3-CL3
      2       1       2       3
      6
      2      20      26
             1   +   1
          PCyBk   RePBk                    ** V **
          0.000   0.000   1.000
          0.000   0.000   1.000
          0.000   0.000   1.000
      1      23
             2
        E3-VENT
          0.000   0.000   1.000
          0.000   0.000   1.000
          0.000   0.000   1.000
      2       1      27
              6       1
             TC  E3-CFP    TCSRX2 & TCSARX2 => 0,1,0; OTHER TC/R => 0,0,
          0.000   0.000   1.000
          0.000   0.000   1.000
          0.000   0.000   1.000
      2      28      29
          (   3    +  2)
         E3-CLW  E3-DKF
          0.000   0.900   0.100
          0.000   0.100   0.900
          0.000   0.000   1.000
      1      29
             1
         E3-DHF
          0.000   1.000   0.000
          0.000   1.000   0.000
          0.000   1.000   0.000
        Otherwise
          1.000   0.000   0.000
          1.000   0.000   0.000
          1.000   0.000   0.000
31 Is the suppression pool drained before CD?
      2  E4-SPD  E4nSPD
      2       1       2
      2
      3      27      28      30
             1       3       3
         E3-CFP  E3-CLW  E4-CL3
          0.100   0.900
          0.500   0.500
          0.900   0.100
        Otherwise
          0.000   1.000
          0.000   1.000
          0.000   1.000
32 Does AC power remain lost during core degradation?
      2   E4fAC   E4-AC
      2       1       2
```

```
     3
     2        5        9
              1       -3
             SB nE1-HPC
          0.100    0.900
          0.400    0.600
          0.700    0.300
     1        5
              1
             SB
          0.550    0.450
          0.700    0.300
          0.850    0.150
        Otherwise
          0.000    1.000
          0.000    1.000
          0.000    1.000
33 What is the status of CRD?
     3 E34fCRD E34rCRD E34-CRD
     2        1        2        3
     5
     6       30       10       10       32       23        5
              3    (   3  + (  2    *   2)) (   1  +    2)
        E3-CL3  E1-CRD  E1rCRD   E4-AC E3nVENT     nSB
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
     4       30       10       23        5
              3        2    (   1  +    2)
        E3-CL3  E1rCRD E3nVENT     nSB
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
     3       10       10       32
          (   3  + (  2    *   2))
        E1-CRD  E1rCRD   E4-AC
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
     1       10
              2
        E1rCRD
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
        Otherwise
          1.000    0.000    0.000
          1.000    0.000    0.000
          1.000    0.000    0.000
34 What is the status of HPSW?
     3 E34fHSW E34rHSW E34aHSW
     2        1        2        3
     5
     6       30       14       14       32       23        5
```

```
          3   (   3  + (  2   *   2)) (   1  +    2)
      E3-CL3 ElaHPSW ElrHPSW   E4-AC E3nVENT     nSB
       0.001   0.000   0.999
       0.100   0.000   0.900
       0.500   0.000   0.500
    4     30      14      23       5
          3       2   (   1  +    2)
      E3-CL3 ElrHPSW E3nVENT     nSB
       0.001   0.999   0.000
       0.100   0.900   0.000
       0.500   0.500   0.000
    3     14      14      32
       (   3  + (  2   *   2))
     ElaHPSW ElrHPSW   E4-AC
       0.000   0.000   1.000
       0.000   0.000   1.000
       0.000   0.000   1.000
    1     14
          2
     ElrHPSW
       0.000   1.000   0.000
       0.000   1.000   0.000
       0.000   1.000   0.000
     Otherwise
       1.000   0.000   0.000
       1.000   0.000   0.000
       1.000   0.000   0.000
35 Does the core melt?
    2    MELT   nMELT
    2       1       2
    9
    3      19      19      13
          (2+      4)       3
          AW     S1W ElaCOND
       0.000   1.000
       0.001   0.999
       0.100   0.900
    3      19      19      34
          (2+      4)       3
          AW     S1W E34aHSW
       0.000   1.000
       0.001   0.999
       0.100   0.900
    3      19      19      33
          (2+      4)       3
          AW     S1W E34-CRD
       0.001   0.999
       0.100   0.900
       0.500   0.500
    2      19      33
           7       3
          TW E34-CRD
       0.000   1.000
       0.000   1.000
```

```
        0.000   1.000
    6      19      13      17      24      26      30
            7       3       2  (    2   +   1   +   3))
           TW E1aCOND  E2-DeP    nReP   RePBk  E3-CL3
        0.000   1.000
        0.001   0.999
        0.100   0.900
    6      19      34      17      24      26      30
            7       3       2  (    2   +   1   +   3))
           TW E34aHSW  E2-DeP    nReP   RePBk  E3-CL3
        0.000   1.000
        0.001   0.999
        0.100   0.900
    6      19      13      17      24      26      30
           10       3       2  (    2   +   1   +   3))
        TC-CV E1aCOND  E2-DeP    nReP   RePBk  E3-CL3
        0.000   1.000
        0.001   0.999
        0.100   0.900
    6      19      34      17      24      26      30
           10       3       2  (    2   +   1   +   3))
        TC-CV E34aHSW  E2-DeP    nReP   RePBk  E3-CL3
        0.001   0.999
        0.010   0.990
        0.100   0.900
      Otherwise
        1.000   0.000
        1.000   0.000
        1.000   0.000
36 What is containment pressure before core degradation?
    1  PBase1
    4
   11
    2      19      22
            1       4
           AE   E3-CS
        1.000
        1.000
        1.000
    1
    1    17.0
         30.0                          BMI-2104
         43.0
    1      19
            1
           AE
        1.000
        1.000
        1.000
    1
    1    30.0
         35.0                          BMI-2104
         52.0
    2      19      12
```

```
         3        3
       S1E  E1-RHR
     1.000
     1.000
     1.000
1
1     15.0
      17.0
      19.0
1       19
         3
       S1E
     1.000
     1.000
     1.000
1
1     30.0
      40.0
      52.0
1       19
         5
   TQUV/FTB
     1.000
     1.000
     1.000
1
1     20.0
      23.0
      26.0
1       19
         6
        TB
     1.000
     1.000
     1.000
1
1     22.0
      31.0                          CHECK MARCON
      40.0
1       20
         1
     PCyBk
     1.000
     1.000
     1.000
1
1     20.0
      60.0
     100.0
1       26
         1
     RePBk
     1.000
     1.000
```

```
        1.000
    1
    1   100.0
        110.0
        120.0
    2       1      30
            6       1
           TC   E3nCL
        1.000
        1.000
        1.000
    1
    1   105.0
        125.0
        130.0
    1      30
            2
       E3-CL2
        1.000
        1.000
        1.000
    1
    1   160.0
        130.0
        100.0
      Otherwise
        1.000
        1.000
        1.000
    1
    1    20.0
         20.0
         20.0
37 What is the status of containment sprays?
    3   E4fCS   E4rCS   E4-CS
    2       1       2       3
    4
    1      22
            1
        E3fCS
        1.000   0.000   0.000
        1.000   0.000   0.000
        1.000   0.000   0.000
    2      22      32
            2       1
        E3rCS   E4fAC
        0.000   1.000   0.000
        0.000   1.000   0.000
        0.000   1.000   0.000
    6      34      21      21      21      32      30
            3 +((   3   +   4  + (  2   *   2)) *   1)
      E34aHSW  E2aLPC  E2-LPC  E2rLPC   E4-AC   E3nCL
        0.000   0.000   1.000
        0.100   0.000   0.900
```

```
        0.500    0.000    0.500
      Otherwise
        1.000    0.000    0.000
        1.000    0.000    0.000
        1.000    0.000    0.000
38 What is the H2 generation and pressure rise  during CD?
     3   H2Low    H2Med     H2Hi          DP-H2bVB
     4       1        2        3
     7
     4      20       26       23       27
            1   +    1   +    2   +    1
         PCyBk    RePBk E3-VENT  E3-CFP
         1.000    0.000    0.000
         0.000    1.000    0.000
         0.000    0.000    1.000
     1
     2      0.0      0.0      0.0
            0.0      0.0      0.0
            0.0      0.0      0.0
     2        1        1
              1   +    2
              A       S1                    **LOCA, to drywell **
         1.000    0.000    0.000
         0.000    1.000    0.000
         0.000    0.000    1.000
     1
     2     17.0     45.0    106.0
           17.0     45.0    106.0
           17.0     45.0    106.0
     2        5       32
              1        2
             SB    E4-AC
         0.500    0.500    0.000
         0.000    0.500    0.500
         0.000    0.000    1.000
     1
     2     20.0     83.0    120.0
           20.0     83.0    120.0
           20.0     83.0    120.0
     1       33
              3
       E34-CRD                    **Transient with CRD Flow**
         1.000    0.000    0.000
         0.000    1.000    0.000
         0.000    0.000    1.000
     1
     2     30.0     51.0     70.0
           30.0     51.0     70.0
           30.0     51.0     70.0
     2       25        1
              1   +    3
       oSRVBkr     S2/3             **Transient with oSRVBkr**
         1.000    0.000    0.000
         0.000    1.000    0.000
```

```
      0.000    0.000    1.000
1
2     17.0     34.0     98.0
      17.0     34.0     98.0
      17.0     34.0     98.0
1       17       24
         1   +    1
     E2nDeP      ReP          ** High Pressure
      1.000    0.000    0.000
      0.000    1.000    0.000
      0.000    0.000    1.000
1
2     11.0     24.0     72.0
      11.0     24.0     72.0
      11.0     24.0     72.0
    Otherwise                  ** Low Pressure **
      1.000    0.000    0.000
      0.000    1.000    0.000
      0.000    0.000    1.000
1
2     22.0     38.0     88.0
      22.0     38.0     88.0
      22.0     38.0     88.0
39 What is the level of suppression pool bypass during CD?
3   E4nSPB E4-SPB2 E4-SPB3
2        1        2        3
7
3        1        1       28
       (  1   +    2)       2
         A       S1  E3-CLD          ** to DW and CLD  **
      0.000    0.000    1.000
      0.000    0.000    1.000
      0.000    0.000    1.000
2       20       26
         1   +    1
     PCycBk   RePBk          ** V -  break outside cont. **
      0.000    0.000    1.000
      0.000    0.000    1.000
      0.000    0.000    1.000
3       31        1        1
         1     (  1   +    2)
     E4-SPD        A       S1
      0.000    0.000    1.000
      0.000    0.000    1.000
      0.000    0.000    1.000
1       31
         1
     E4-SPD
      0.000    0.990    0.010
      0.000    0.900    0.100
      0.000    0.500    0.500
5       25        1       17       24       28
       (  1   +    3) * (  1   +    1)       2
     oSRVbkr     S2/3  E2nDeP      ReP  E3-CLD
```

```
        0.000    1.000    0.000
        0.000    1.000    0.000
        0.000    1.000    0.000
    3      25        1       28
          (  1    +   3)       2
       oSRVbkr     S2/3   E3-CLD
        0.000    0.990    0.010
        0.000    0.800    0.200
        0.000    0.000    1.000
       Otherwise                          ** everything through SP **
        1.000    0.000    0.000
        1.000    0.000    0.000
        1.000    0.000    0.000
40 Does at least one drywell vacuum breaker stick open?
    2  E4-VBo   E4nVBo
    2       1        2
    7
    4       1        1       20       26
            1    +   2    +   1    +   1
            A       S1    PCyBk    RePBk
        0.000    1.000
        0.000    1.000
        0.000    1.000
    2      19       19
            7    + 10
           TW    TC-CV
        0.004    0.996
        0.004    0.996
        0.040    0.960
    3      17       24       25
            2        2        1
       E2-DeP     nReP oSRVBkr VBkrs open may, but gradual h2 release
        0.000    1.000
        0.002    0.998
        0.020    0.980
    2      17       24
            2        2
       E2-DeP     nReP          VBkrs open, but gradual h2 release
        0.000    1.000
        0.002    0.998
        0.040    0.960
    1      38
            3
        H2Hi                     VBkrs open, rapid H2 release
        0.007    0.993
        0.014    0.986
        0.300    0.700
    1      38
            2
       H2Med                     VBkrs open, rapid H2 release
        0.000    1.000
        0.005    0.995
        0.200    0.800
      Otherwise         >H2Low VBkrs open, rapid H2 release
```

```
          0.000    1.000
          0.001    0.999
          0.030    0.970
41 Does H2 discharge lead to SP bypass?
      2  H2-SPB  H2nSPB
      2       1       2
      4
      2      17      24
             2       2
         E2-DeP    nReP
          0.000   1.000
          0.000   1.000
          0.000   1.000
      1      38
             3
          H2Hi
          0.000   1.000
          0.000   1.000
          0.000   1.000
      1      38
             2
          H2Med
          0.000   1.000
          0.000   1.000
          0.000   1.000
        Otherwise         >H2Low
          0.000   1.000
          0.000   1.000
          0.000   1.000
42 Does H2 discharge to SP induce WW failure?
      3  E4nHWF E4-HWF2 E4-HWF3
      2       1       2       3
      3
      2      17      24
             2   *   2
         E2-DeP    nReP
          1.000   0.000   0.000
          1.000   0.000   0.000
          1.000   0.000   0.000
      1      41
             1
         H2-SPB
          1.000   0.000   0.000
          1.000   0.000   0.000
          1.000   0.000   0.000
        Otherwise       > No SP Bypass
          1.000   0.000   0.000
          1.000   0.000   0.000
          1.000   0.000   0.000
43 Is the vent threshold reached during core degradation?
      2  E4-Vth  E4nVth
      6       1       2
      2
      1      42
```

```
          -3
      E4nHWF3
    2       1       2
       PBase1   DP-H2
          AND
       THRESH       1    60.0
                         60.0
                         60.0
                      VThresh
      Otherwise
    1       1
       PBase1
          AND
       THRESH       1   999.0
                        999.0
                        999.0
                      VThresh
44 Does containment venting not occur during core degradation?
    2 E4nVENT E4-VENT
    2       1       2
    5
    3      19      30      43
            7       1       1
           TW   E3nCL  E4-Vth If Op didn't vent yet, he won't
        1.000   0.000
        1.000   0.000
        1.000   0.000
    2       5      43
            2       1
          nSB  E4-Vth
        0.100   0.900
        0.500   0.500
        0.900   0.100
    3       5      43      32
            1       1       2
           SB  E4-Vth   E4-AC
        0.100   0.900
        0.500   0.500
        0.900   0.100
    2      19      43
            6       1
           TB  E4-Vth
        0.500   0.500
        0.900   0.100
        1.000   0.000
      Otherwise
        1.000   0.000
        1.000   0.000
        1.000   0.000
45 Does the RPV repressurize during core degradation?
    2  E4-ReP  E4nReP
    6       1       2
    2
    7      44       1       1       8      42      17      24
```

```
          1       -1       -2        2       -3        2        2
    E4nVENT       nA      nS1    nSORV E4nHWF3   E2-DeP    nReP
2         1        2
     Pbase1   DP-H2
      'AND'
    'THRESH'        1   110.0
                        110.0
                        110.0
                      RPThresh
    Otherwise
1         1
     Pbase1
      'AND'
    'THRESH'        1   999.0
                        999.0
                        999.0
                      RPThresh
46 Is there a repressurization break during core degradation?
     2 E4-RePB E4nRePB
     2         1       2
     2
     1        45
               1
        E4-ReP
         0.000   1.000
         0.000   1.000
         0.000   1.000
       Otherwise
         0.000   1.000
         0.000   1.000
         0.000   1.000
47 Does the containment fail by pressure during core degradation?
     2  E4-CFP  E4nCFP
     6         1       2
     2
     3        44      46      42
               1       2      -3
       E4nVENT E4nRePB E4nHWF3
     2         1       2
        Pbase1   DP-H2
           AND
        NORMAL        2   175.0    15.0
                          132.0     5.0        CV=0.16
                          132.0    15.0        ASK IMAN
                 CFailP    Mean   Sigma
       Otherwise
     1         1
        Pbase1
           AND
        THRESH        1   999.0
                          999.0
                          999.0
              Prevent containment failure
48 What is location of containment leakage prior to vessel breach?
```

```
      3   E4nCL  E4-CLD  E4-CLW
      2       1       2       3
      4
      2      28      46
             2   +   1
         E3-CLD E4-RePB
          0.000   1.000   0.000
          0.000   1.000   0.000
          0.000   1.000   0.000
      3      28      42      44
             3   +  -1    +  2
         E3-CLW  E4-HWF E4-VENT
          0.000   0.000   1.000
          0.000   0.000   1.000
          0.000   0.000   1.000
      1      47
             1
         E4-CFP
          0.000   0.500   0.500
          0.000   0.800   0.200
          0.000   1.000   0.000
        Otherwise
          1.000   0.000   0.000
          1.000   0.000   0.000
          1.000   0.000   0.000
49 For Drywell failures, is the failure at the head seal?
      3  E4-DHF  E4-DKF   E4nDF
      2       1       2       3
      4
      1      29
             1
         E3-DHF
          1.000   0.000   0.000
          1.000   0.000   0.000
          1.000   0.000   0.000
      1      29
             2
         E3-DKF
          0.000   1.000   0.000
          0.000   1.000   0.000
          0.000   1.000   0.000
      1      48
             2
         E4-CLD
          0.100   0.900   0.000
          0.400   0.600   0.000
          0.900   0.100   0.000
        Otherwise
          0.000   0.000   1.000
          0.000   0.000   1.000
          0.000   0.000   1.000
50 What is the level of containment leakage before VB?
      3   E4nCL  E4-CL2  E4-CL3
      2       1       2       3
```

```
      7
      2       30        42
              3    +    3
         E3-CL3  E4-HWF3
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
      1       46
              1
        E4-RePBk
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
      1       44
              2
        E4-VENT
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
      3       47        49        48
              1    (    2    +    3)
         E4-CFP   E4-DKF   E4-CLW
          0.000    0.900    0.100
          0.000    0.100    0.900
          0.000    0.000    1.000
      1       49
              1
         E4-DHF
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
      2       30        42
              2    +    2
         E3-CL2  E4-HWF2
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
        Otherwise
          1.000    0.000    0.000
          1.000    0.000    0.000
          1.000    0.000    0.000
51 Is the RPV depressurized before vessel breach?
      2   E5nDeP   E5-DeP
      2        1        2
      5
      3       20        26        46
          (    1    +    1    +    1)
         PCycBk    RePBk  E4-RePB
          0.000    1.000
          0.000    1.000
          0.000    1.000
      5       24        45        50        19        32
           (   1    +    1)   (   -3    +    6    *    1)
             ReP   E4-ReP   E4nCL3        TB    E4nAC
```

```
        1.000   0.000
        1.000   0.000
        1.000   0.000
    2      17      19
           1       8
       E2nDeP TC-fDeP
        0.100   0.900
        0.500   0.500
        0.900   0.100
    1      17
           1
       E2nDeP
        1.000   0.000
        1.000   0.000
        1.000   0.000
      Otherwise
        0.000   1.000
        0.000   1.000
        0.000   1.000
52 What is the status of CRD?
    3  E5fCRD  E5rCRD  E5-CRD
    2       1       2       3
    5
    6      47      50      33      23      32       5
           1       3       3   (   1   +   2   +    2)
       E4-CFP  E4-CL3 E34-CRD E3nVENT   E4-AC     nSB
        0.000   0.000   1.000
        0.000   0.000   1.000
        0.000   0.000   1.000
    6      47      50      33      23      32       5
           1       3       2   (   1   +   2   +    2)
       E4-CFP  E4-CL3 E34rCRD E3nVENT   E4-AC     nSB
        0.000   1.000   0.000
        0.000   1.000   0.000
        0.000   1.000   0.000
    1      33
           3
      E34-CRD
        0.000   0.000   1.000
        0.000   0.000   1.000
        0.000   0.000   1.000
    1      33
           2
      E34rCRD
        0.000   1.000   0.000
        0.000   1.000   0.000
        0.000   1.000   0.000
      Otherwise
        1.000   0.000   0.000
        1.000   0.000   0.000
        1.000   0.000   0.000
53 What is the status of HPSW?
    3 E5fHPSW E5rHPSW E5-HPSW
    2       1       2       3
```

```
     5
     6      47      50      34      23      32       5
             1       3       3   (   1   +   2  +    2)
        E4-CFP  E4-CL3 E34aHSW E3nVENT   E4-AC     nSB
         0.001   0.000   0.999
         0.100   0.000   0.900
         0.500   0.000   0.500
     6      47      50      34      23      32       5
             1       3       2   (   1   +   2  +    2)
        E4-CFP  E4-CL3 E34rHSW E3nVENT   E4-AC     nSB
         0.001   0.999   0.000
         0.100   0.900   0.000
         0.500   0.500   0.000
     1      34
             3
       E34aHSW
         0.020   0.000   0.980
         0.100   0.000   0.900
         0.500   0.000   0.500
     1      34
             2
       E34rHSW
         0.000   1.000   0.000
         0.000   1.000   0.000
         0.000   1.000   0.000
       Otherwise
         1.000   0.000   0.000
         1.000   0.000   0.000
         1.000   0.000   0.000
54 Is MSIV leakage control or condenser vacuum maintained?
     2 MSIVnLC MSIV-LC
     2       1       2
     2
     1      32
             2
        E4-AC
         0.000   1.000
         0.001   0.999
         0.100   0.900
       Otherwise
         1.000   0.000
         1.000   0.000
         1.000   0.000
55 Is the suppression pool drained before VB?
     2  E5-SPD  E5nSPD
     2       1       2
     4
     1      31
             1
        E4-SPD
         1.000   0.000
         1.000   0.000
         1.000   0.000
     6      47      50      48      27      28      30
```

```
        (   1        3        3) + (  1        3        2)
       E4-CFP  E4-CL3  E4-CLW  E3-CFP  E3-CLW  E4-CL2
        0.100   0.900
        0.500   0.500
        0.900   0.100
    1      42
            3
      E4-HWF3
        0.010   0.990
        0.100   0.900
        0.500   0.500
      Otherwise
        0.000   1.000
        0.000   1.000
        0.000   1.000
56 Will the SP flash following containment vent or rupture?
    2   SatSP  SubcSP
    2       1       2
    4
    6       9      12      19      19      24       8
        (   3   *  -3   *  -6) + (  6   *   2   *   2)
       E1-HPC  E1nRHR     nTB      TB    nReP E1nSORV
        1.000   0.000
        1.000   0.000
        1.000   0.000
    2      21      12
            4      -3
       E2-LPC  E1nRHR
        1.000   0.000
        1.000   0.000
        1.000   0.000
    1       1
            6
           TC
        1.000   0.000
        1.000   0.000
        1.000   0.000
      Otherwise
        0.000   1.000
        0.000   1.000
        0.000   1.000
57 What is the level of suppression pool bypass at VB?
    3  E5nSPB E5-SPB2 E5-SPB3
    2       1       2       3
    5
    3      48      50      55
            2       3   +   1
       E4-CLD  E4-CL3  E5-SPD
        0.000   0.000   1.000
        0.000   0.000   1.000
        0.000   0.000   1.000
    3      20      26      46
            1   +   1   +   1
       PCycBk   RePBk E4-RePB ** V -  break outside cont. **
```

```
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
    2      40       41
           1   +    1
       E4-VBo   H2-SPB
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
    2      48       50
           2        2
       E4-CLD   E4-CL2
        0.000    1.000    0.000
        0.000    1.000    0.000
        0.000    1.000    0.000
      Otherwise                              ** everything through SP **
        1.000    0.000    0.000
        1.000    0.000    0.000
        1.000    0.000    0.000
58 What is level of RB breach/bypass before VB without burn?
    4  E5nRBB E5-RBB2 E5-RBB3 E5-RBB4
    2       1        2        3        4
    7
    3      20       26       46
           1   +    1   +    1
       PCycBk    RePBk E4-RePB          ** V **
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
    4       5       23       44       32
           1   (    2   +    2   *    1)
          SB E3-Vent E4-Vent    E4fAC
        0.000    0.000    0.000    1.000
        0.000    0.000    0.000    1.000
        0.000    0.000    0.000    1.000
    1      49
           1
       E4-DHF
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
    2      23       44
           2   +    2
      E3-Vent E4-Vent
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
    1      50
           3
       E4-CL3
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
    1      50
```

```
          2
       E4-CL2
        1.000    0.000    0.000    0.000
        0.500    0.500    0.000    0.000
        0.900    0.100    0.000    0.000
      Otherwise
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
59 Are fire systems actuated before VB without burn?
    2  EFireS nEFireS
    2       1        2
    2
    5      57       56       58       58       50
        (  -1   +   1)  (   1   +   2)      -1
       E5-SPB   SatSP  E5nRBB E5-RBB2   E4-CL
        1.000   0.000
        1.000   0.000
        1.000   0.000
      Otherwise
        0.000   1.000
        0.000   1.000
        0.000   1.000
60 Does SGTS fail before VB without burn?
    3 E5fSGTS E5rSGTS E5-SGTS
    2       1        2       3
    4
    4      59       32       23       44
            2        2        1        1
      nEFireS   E4-AC E3nVent E4nVent ** no venting **
        0.000   0.000   1.000
        0.000   0.000   1.000
        0.000   0.000   1.000
    2      59       32
            2        2
      nEFireS   E4-AC                  ** venting **
        0.100   0.000   0.900
        0.500   0.000   0.500
        0.900   0.000   0.100
    2      59       32
            2        1
      nEFireS   E4fAC
        0.000   1.000   0.000
        0.000   1.000   0.000
        0.000   1.000   0.000
      Otherwise                        ** EFireS **
        1.000   0.000   0.000
        1.000   0.000   0.000
        1.000   0.000   0.000
61 Does hydrogen burn in RB before VB?
    2   HBbVB  nHBbVB
    2       1        2
    8
    3      20       26       46
```

```
          1   +   1   +   1
      PCycBk    RePBk E4-RePB
       1.000    0.000
       1.000    0.000
       1.000    0.000
1        58
          4
     E5-RBB4
       0.000    1.000
       0.000    1.000
       0.000    1.000
1        38
          1
       LowH2
       0.000    1.000
       0.000    1.000
       0.000    1.000
2        50        60
          2         3
      E4-CL2 E5-SGTS
       0.000    1.000
       0.100    0.900
       0.500    0.500
1        58
          3
     E5-RBB3
       0.500    0.500
       0.999    0.001
       1.000    0.000
2        50        60
          3         3
      E4-CL3 E5-SGTS
       0.500    0.500
       0.999    0.001
       1.000    0.000
2        50        60
         -1        -3
       E4-CL E5nSGTS
       0.999    0.001
       1.000    0.000
       1.000    0.000
     Otherwise
       0.000    1.000
       0.000    1.000
       0.000    1.000
62 What is level of reactor building (RB) breach/bypass before VB?
4     nERBB    ERBB2    ERBB3    ERBB4
2         1        2        3        4
6
1        58
          4
     E5-RBB4
       0.000    0.000    0.000    1.000
       0.000    0.000    0.000    1.000
```

```
        0.000    0.000    0.000    1.000
    3      49       58       61
        (   1    +   3)       1
      E4-DHF E5-RBB3    HBbVB
        0.000    0.000    0.500    0.500
        0.000    0.000    0.100    0.900
        0.000    0.000    0.000    1.000
    3      58       58       61
        (   1    +   2)       1
      E5-RBB1 E5-RBB2    HBbVB
        0.000    0.980    0.000    0.020
        0.000    0.760    0.000    0.240
        0.000    0.000    0.000    1.000
    1      58
            3
      E5-RBB3
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
    1      58
            2
      E5-RBB2
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
      Otherwise
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
63 Are fire systems actuated before VB?
    2  EFireS nEFireS
    2       1       2
    2
    3      59      61      49
            2       2   +   1
      nEFireS  nHBbVB  E4-DHF
        0.000    1.000
        0.000    1.000
        0.000    1.000
      Otherwise
        1.000    0.000
        1.000    0.000
        1.000    0.000
64 Does SGTS operate until VB?
    3  EfSGTS  ErSGTS  E-SGTS
    2       1       2       3
    3
    3      60      63      61
            3       2       2
      E5-SGTS nEFireS  nHBbVB
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
    3      60      63      61
```

```
          2         2         2
      E5rSGTS  nEFireS   nHBbVB
        0.000    1.000    0.000
        0.000    1.000    0.000
        0.000    1.000    0.000
      Otherwise
        1.000    0.000    0.000
        1.000    0.000    0.000
        1.000    0.000    0.000
65 What is containment pressure after CF or vent during meltdown?
   1  PBase2
   4
   2
   1       50
            3
      E4-CL3
        1.000
        1.000
        1.000
   1
   3     20.0
         20.0
         20.0
      Otherwise          ** CL Level 2 Only**
        1.000
        1.000
        1.000
   1
   3    170.0
        132.0
        100.0
66 Is there injection during core degradation?
   3 E5-LPIn E5-HPIn  nE5-In
   2        1        2        3
   3
   7       13       21       56       50       32       53       51
      ((   -1   +   -1 * (    2   +   1))  *    2   +    3)  *    2
     nE1fCONDnE2fLPC    SubSP    E4nCL    E4-AC E5-HPSW  E5-DeP
        1.000    0.000    0.000
        1.000    0.000    0.000
        1.000    0.000    0.000
   1       33
            3
      E34-CRD
        0.000    1.000    0.000
        0.000    1.000    0.000
        0.000    1.000    0.000
      Otherwise
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
67 What is the nature of meltdown?
   3   Slump     Flow    nMelt
   2        1        2        3
```

```
      4
      1      35
              2
          nMelt
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
      1      66
              1
        E5-LPIn
          0.000    1.000    0.000
          0.010    0.990    0.000
          0.100    0.900    0.000
      2      66       19
              2        6
        E5-HPIn       TB
          0.000    1.000    0.000
          0.010    0.990    0.000
          0.100    0.900    0.000
        Otherwise                    ** no injection **
          0.001    0.999    0.000
          0.100    0.900    0.000
          0.500    0.500    0.000
68 What is the mode of vessel breach?
      4   Alpha    SE-BH    Mthru nBreach
      2       1        2        3        4
      5
      1      35
              2
          nMelt
          0.000    0.000    0.000    1.000
          0.000    0.000    0.000    1.000
          0.000    0.000    0.000    1.000
      1      67
              1
          Slump
         0.0000   0.0000   1.0000   0.0000
         0.0001   0.0000   0.9999   0.0000
         0.0100   0.2100   0.7800   0.0000
      1      66
              1
        E5-LPIn
          0.000    0.000    0.100    0.900
          0.000    0.000    0.500    0.500
          0.000    0.000    0.900    0.100
      1      66
              2
        E5-HPIn
          0.000    0.000    0.900    0.100
          0.000    0.000    0.999    0.001
          0.000    0.000    1.000    0.000
        Otherwise                =>    Flow ** no injection **
          0.000    0.000    1.000    0.000
          0.000    0.000    1.000    0.000
```

```
        0.000   0.000   1.000   0.000
69 Is the RPV blowndown before vessel breach?
     2 nEBlowD  EBlowD
     2       1       2
     4
     1      51
             2
        E5-Dep
         0.000   1.000
         0.000   1.000
         0.000   1.000
     2      68      67
             3       2
         Mthru    Flow
         0.100   0.900
         0.400   0.600
         0.900   0.100
     1      68
             3
         Mthru
         0.500   0.500
         0.900   0.100
         0.990   0.010
       Otherwise
         1.000   0.000
         1.000   0.000
         1.000   0.000
70 Does direct heating occur?
     2      DH      nDH
     2       1       2
     2
     3      51      67      69
             1       1       1
        E5nDEP   Slump nEBlowD ** requries slump and HiP **
         0.500   0.500
         0.900   0.100
         1.000   0.000
       Otherwise
         0.000   1.000
         0.000   1.000
         0.000   1.000
71 Does an ex-vessel steam explosion occur?
     2    ExSE   nExSE
     2       1       2
     2
     1      67
             1
         Slump                    ** requires slump **
         0.000   1.000
         0.010   0.990
         0.100   0.900
       Otherwise
         0.000   1.000
         0.000   1.000
```

```
        0.000   1.000
72 What is pressure rise due to blowdown (effective VS and RCdry)?
     1  DPblow
     4       1
     3
     1      70
             1
            DH
         1.000
         1.000
         1.000
     1
     4    30.0
          60.0
         999.0
     1      51
             1
        E5nDEP
         1.000
         1.000
         1.000
     1
     4    10.0
          38.0
          60.0
       Otherwise                ** LoP **
         1.000
         1.000
         1.000
     1
     4     0.0
           0.0
           0.0
73 What is the pressure rise due to debris quenching?
     2   RCwet   RCdry
     4       1       2
     3
     3       1       1       1
             1   +   2   +   3
             A      S1    S2/3 ** loca **
         1.000   0.000
         1.000   0.000
         1.000   0.000
     1
     5     7.0     5.0
          15.0    10.0
          45.0    30.0
     7      37      13      21      56      50      32      53
            3 + (( -1   +  -1 * (   2   +  1)) *   2   +   3)
         E4-CS nE1fCONDnE2fLPC   SubSP   E4nCL   E4-AC E5-HPSW
         1.000   0.000
         1.000   0.000
         1.000   0.000
     1
```

```
 5    15.0     5.0
      30.0    10.0
      45.0    30.0
   Otherwise
      0.000   1.000
      0.000   1.000
      0.000   1.000
 1
 5     7.0     5.0
      15.0    10.0
      40.0    30.0
74 Is SP bypassed or vents not cleared at VB (effect. VS)? -- DPfVS
 3    Vclr   nVclr  Bypass
 4       1       2       3
13
 4      70      71      56      57
        2       1       1      -3
      nDH    ExSE   SatSP nE5SPB3
    0.900   0.100   0.000
    0.500   0.500   0.000
    0.500   0.500   0.000
 1
 6    25.0    70.0    40.0
      50.0   125.0    70.0
      75.0   180.0   100.0
 3      70      71      57
        2       1      -3
      nDH    ExSE nE5SPB3
    0.900   0.100   0.000
    0.500   0.500   0.000
    0.500   0.500   0.000
 1
 6    20.0    50.0    30.0
      45.0   105.0    60.0
      70.0   160.0    90.0
 4      70      71      56      57
        1       2       1      -3
      DH   nExSE   SatSP nE5SPB3
    0.980   0.020   0.000
    0.840   0.160   0.000
    0.500   0.500   0.000
 1
 6   999.0   999.0   999.0
     999.0   999.0   999.0
     999.0   999.0   999.0
 3      70      71      57
        1       2      -3
      DH   nExSE nE5SPB3
    0.999   0.001   0.000
    0.840   0.160   0.000
    0.600   0.400   0.000
 1
 6   999.0   999.0   999.0
     999.0   999.0   999.0
```

```
     999.0    999.0    999.0
4      70       71       56       57
        1        1        1       -3
       DH     ExSE    SatSP nE5SPB3
    0.900    0.100    0.000
    0.500    0.500    0.000
    0.500    0.500    0.000
1
6   999.0    999.0    999.0
    999.0    999.0    999.0
    999.0    999.0    999.0
3      70       71       57
        1        1       -3
       DH     ExSE nE5SPB3
    0.900    0.100    0.000
    0.500    0.500    0.000
    0.500    0.500    0.000
1
6   999.0    999.0    999.0
    999.0    999.0    999.0
    999.0    999.0    999.0
3      73       56       57
        1        1       -3
    RCwet    SatSP nE5SPB3
    1.000    0.000    0.000
    1.000    0.000    0.000
    1.000    0.000    0.000
1
6     3.0      0.0      0.0
      6.0      0.0      0.0
     12.0      0.0      0.0
1     57
      -3
  nE5SPB3
    1.000    0.000    0.000
    1.000    0.000    0.000
    1.000    0.000    0.000
1
6     0.0      0.0      0.0
      0.0      0.0      0.0
      0.0      0.0      0.0
1     50
       3
   E4-CL3          ** Bypass but previous failure **
    0.000    0.000    1.000
    0.000    0.000    1.000
    0.000    0.000    1.000
1
6     0.0      0.0      0.0
      0.0      0.0      0.0
      0.0      0.0      0.0
3     73       51       57
       1        1        3
    RCwet  E5nDEP E5-SPB3
```

```
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
    1
    6     0.0      0.0     80.0
          0.0      0.0    120.0
          0.0      0.0    180.0
    3      73       51       57
           1        2        3
        RCwet  E5-DEP E5-SPB3
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
    1
    6     0.0      0.0     60.0
          0.0      0.0     90.0
          0.0      0.0    120.0
    2      51       71
           2        2
       E5-DeP   nExSE ** Bypass but no blowdown or SE - sump water**
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
    1
    6     0.0      0.0     10.0
          0.0      0.0     15.0
          0.0      0.0     25.0
      Otherwise         ** Bypass and blowdown or SE --> CF **
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
    1
    6     0.0      0.0     30.0
          0.0      0.0     45.0                          ** blowdown **
          0.0      0.0     70.0
75 Does pressurization fail containment at VB?
    2       IP      nIP
    6        1        2
    3
    4       47       44       42       68
             2        1        1       -4
      nE4-CFP E4nVent  E4nHWF VBreach
    5        1        2        4        5        6
       Pbasel   DP-H2  DPBlow   DPWat   DPfVS
          AND
       NORMAL        2   175.0    15.0
                         132.0     5.0
                         132.0    15.0
                CFailP   Mean    Sigma
    1       68
             4
      nBreach
    1        1
       PBasel
```

```
          AND
       THRESH        1   999.0
                         999.0
                         999.0
              Prevent containment failure
      Otherwise
    4       3        4        5        6
       Pbase2   DPBlow   DPWat    DPfVS
          AND
       NORMAL        2   175.0     15.0
                         132.0      5.0
                         132.0     15.0
              CFailP   Mean     Sigma
76 Does direct melt-structure attack fail containment at VB?
    2      IM      nIM
    2       1        2
    4
    5      68       73       67       51       69
            3        2        1        1        1
       Mthru    RCDry    Slump   E5nDEP  nEBlowD
       0.100    0.900
       0.950    0.050
       1.000    0.000
    2      68       73
            3        2
       Mthru    RCDry                    ** no dispersal **
       0.100    0.900
       0.900    0.100
       1.000    0.000
    2      68       73
            2        2
       SE-BH    RCDry                            ** SE-BH **
       0.100    0.900
       0.500    0.500
       0.900    0.100
      Otherwise
       0.001    0.999
       0.700    0.300
       1.000    0.000
77 What is the location of containment failure after VB?
    3    nICL     ICLD     ICLW
    2       1        2        3
    4
    5      68       76       48       74       75
            1   +    1   +    2   +    2        1
       Alpha       IM   E4-CLD    nVclr       IP
       0.000    1.000    0.000
       0.000    1.000    0.000
       0.000    1.000    0.000
    1      48
            3
      E4-CLW
       0.000    0.000    1.000
       0.000    0.000    1.000
```

```
          0.000    0.000    1.000
     1      75
             1
            IP
          0.000    0.500    0.500
          0.000    0.800    0.200
          0.000    1.000    0.000
        Otherwise
          1.000    0.000    0.000
          1.000    0.000    0.000
          1.000    0.000    0.000
78 For Drywell failures, is the failure at the head seal?
     3     IDHF     IDKF     nIDF
     2        1        2        3
     5
     1      76
             1
            IM
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
     1      49
             1
          E4-DHF
          1.000    0.000    0.000
          1.000    0.000    0.000
          1.000    0.000    0.000
     1      49
             2
          E4-DKF
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
     1      77
             2
           ICLD
          0.100    0.900    0.000
          0.400    0.600    0.000
          0.900    0.100    0.000
        Otherwise
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
79 What is the containment leakage level after VB?
     3     nICL     ICL2     ICL3
     2        1        2        3
     5
     5       68       76       50       74       75
             1    +   1    +   3    +   2        1
          Alpha       IM   E4-CL3   nVclr       IP
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
     3      77       78       75
```

```
          (   3     +  2)       1
           ICLW      IDKF       IP
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
      1      78
             1
           IDHF
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
      1      50
             2
         E4-CL2
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
        Otherwise
          1.000    0.000    0.000
          1.000    0.000    0.000
          1.000    0.000    0.000
80 Is AC power not available late?
      2     LfAC     L-AC
      2        1        2
      3
      2       32       19
              1        6
          E4fAC       TB
          0.650    0.350
          0.770    0.230
          0.890    0.110
      1       32
              1
          E4fAC
          0.380    0.620
          0.640    0.360
          0.900    0.100
        Otherwise
          0.000    1.000
          0.000    1.000
          0.000    1.000
81 Is RHR not operating late?
      2    nLRHR     LRHR
      2        1        2
      4
      3       12       80       55
              1    +   1    +   1
          E1fRHR     LfAC   E5-SPD
          1.000    0.000
          1.000    0.000
          1.000    0.000
      3       12       79       56
              2    (   1    +   2)
          E1rRHR     nICL   SubcSP
```

```
        0.010   0.990
        0.100   0.900
        0.500   0.500
    4      12      12      79      56
          (  3   +  2)     -1       1
       E1-RHR  E1rRHR     ICL   SatSP ** RHR fails with saturated pool
        1.000   0.000
        1.000   0.000
        1.000   0.000
      Otherwise
        0.000   1.000
        0.000   1.000
        0.000   1.000
82 Do containment sprays not operate late?
    2    nLCS     LCS
    2       1       2
    5
    2      22      80
           1   +   1
       E3fCS    LfAC
       1.000   0.000
       1.000   0.000
       1.000   0.000
    4      21      79      56      55
           2   (   1   +   2)      2
       E2rLPI    nICL  SubcSP  E5nSPD
       0.010   0.990
       0.100   0.900
       0.500   0.500
    1      53
           2
      E5rHPSW
       0.100   0.900
       0.500   0.500
       0.900   0.100
    6      22      22      79      56      53      55
       (  3   +   4)     -1       1       1   +   1
       E3aCS   E3-CS     ICL   SatSP E5fHPSW  E5-SPD
       1.000   0.000
       1.000   0.000
       1.000   0.000
      Otherwise
        0.000   1.000
        0.000   1.000
        0.000   1.000
83 Is water not supplied to the debris late?
    2 nLDBWat  LDBWat
    2       2
    8
    1      68
           4
      nBreach
        0.000   1.000
        0.000   1.000
```

```
        0.000    1.000
1         82
           2
         LCS
        0.000    1.000
        0.000    1.000
        0.000    1.000
3         13       13       80
           3   + (  2   *    2)
     ElaCOND  ElrCOND     L-AC
        0.001    0.999
        0.010    0.990
        0.100    0.900
4         75       68       52       53
           2        3   (    3    +   3)
         nIP    Mthru   E5-CRD  E5-HPSW ** injection on **
        0.000    1.000
        0.000    1.000
        0.000    1.000
3         52       52       80
           3   + (  2   *    2)
      E5-CRD   E5rCRD     L-AC
        0.010    0.990
        0.100    0.900
        0.500    0.500
3         53       53       80
           3   + (  2   *    2)
     E5-HPSW  E5rHPSW     L-AC
        0.010    0.990
        0.100    0.900
        0.500    0.500
1         81
           2
         LRHR                    ** LPI Implied **
        0.010    0.990
        0.100    0.900
        0.500    0.500
     Otherwise
        1.000    0.000
        1.000    0.000
        1.000    0.000
84 Is the debris not coolable without water?
     2 nDBCwoW   DBCwoW
     2       1        2
     2
     3       68       70       71
          (   2    +   1    +   1)
         SE-BH       DH     ExSE *** dispersal ***
        0.900    0.100
        0.999    0.001
        1.000    0.000
     Otherwise
        1.000    0.000
        1.000    0.000
```

```
        1.000    0.000
85 Is the debris coolable with water?
     2     nDBC    DBCwW
     2        1        2
     4
     2       84       68
             2    +   4
        DBCwoW nBreach
         0.000    1.000
         0.000    1.000
         0.000    1.000
     3       68       70       71
             2    +   1    +   1
         SE-BH       DH     ExSE *** dispersal ***
         0.100    0.900
         0.500    0.500
         0.900    0.100
     1       67
             1
         Slump                     *** IDCOR says likely ***
         0.100    0.900
         0.900    0.100
         1.000    0.000
       Otherwise                   *** trickle out of vessel ***
         0.100    0.900
         0.500    0.500
         0.900    0.100
86 Is the debris not cooled?
     2 nCoolDB  CoolDB
     2        1        2
     3
     2       68       84
             4    +   2
       nBreach  DBCwoW
         0.000    1.000
         0.000    1.000
         0.000    1.000
     2       85       83
             2        2
         DBCwW  LDBWat
         0.000    1.000
         0.000    1.000
         0.000    1.000
       Otherwise
         1.000    0.000
         1.000    0.000
         1.000    0.000
87 Is the containment not vented late?
     2 LnVent  L-Vent
     2        1        2
     3
     3       79       80       68
             3    +   1    +   4
          ICL3     LfAC nBreach
```

```
          1.000    0.000
          1.000    0.000
          1.000    0.000
      2      86       81
             2        2
        CoolDB     LRHR
          1.000    0.000
          1.000    0.000
          1.000    0.000
       Otherwise
          0.500    0.500
          0.900    0.100
          0.999    0.001
88 Does the containment fail late due to temperature?
      2     LTCF    nLTCF
      2        1        2
      4
      2       84       83
              2        1
         DBCwoW nLDBWat
          1.000    0.000
          1.000    0.000
          1.000    0.000
      2       79       87
          (   3    +   2)
           ICL3   L-Vent          ** Reduced driving force
          0.010    0.990
          0.100    0.900
          0.500    0.500
      2       68       83
             -4        1
       VBreach nLDBWat
          0.100    0.900
          0.500    0.500
          0.900    0.100
       Otherwise
          0.000    1.000
          0.000    1.000
          0.000    1.000
89 Does the containment fail late?
      3     LPCF     LTCF     nLCF
      2        1        2        3
      7
      1       88
              1
           LTCF
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
      2       86       81
              2        2
         CoolDB     LRHR
          0.000    0.000    1.000
          0.000    0.000    1.000
```

```
        0.000   0.000   1.000
    6      86      81      79      87      83      68
            2       1       1       1       2      -4
       CoolDB   nLRHR    nICL  LnVent  LDBWat  Breach
        1.000   0.000   0.000
        1.000   0.000   0.000
        1.000   0.000   0.000
    4      86      81      79      87
            1       2       1       1
      nCoolDB    LRHR    nICL  LnVent ** non-condensibles **
        1.000   0.000   0.000
        1.000   0.000   0.000
        1.000   0.000   0.000
    4      86      79      87      83
            1       1       1       2
      nCoolDB    nICL  LnVent  LDBWat
        1.000   0.000   0.000
        1.000   0.000   0.000
        1.000   0.000   0.000
    3      86      79      87
            1       1       1
      nCoolDB    nICL  LnVent ** dh & non-condensibles **
        1.000   0.000   0.000
        1.000   0.000   0.000
        1.000   0.000   0.000
      Otherwise
        0.000   0.000   1.000
        0.000   0.000   1.000
        0.000   0.000   1.000
90 What is the location of late containment leakage?
    3    nLCL    LCLD    LCLW
    2       1       2       3
    5
    6      77      88      77      79      55      41
            2   +   1 * (  -3   +  -3  + (  2   *   2))
         ICLD    LTCF   nICFW   nICL3  E5nSPD  H2nSPB
        0.000   1.000   0.000
        0.000   1.000   0.000
        0.000   1.000   0.000
    2      77      87
            3   +   2
         ICLW  L-Vent
        0.000   0.000   1.000
        0.000   0.000   1.000
        0.000   0.000   1.000
    2      89      83
            1       2
         LPCF  LDBWat
        0.000   0.500   0.500
        0.000   0.800   0.200
        0.000   1.000   0.000
    1      89
            1
         LPCF
```

```
          0.000    0.600    0.400
          0.000    0.960    0.040
          0.000    1.000    0.000
        Otherwise
          1.000    0.000    0.000
          1.000    0.000    0.000
          1.000    0.000    0.000
91 For Drywell failures, is the failure at the head seal?
      3     LDHF     LDKF     nLDF
      2        1        2        3
      5
      1       89
               2
            LTCF
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
      1       78
               1
            IDHF
          1.000    0.000    0.000
          1.000    0.000    0.000
          1.000    0.000    0.000
      1       78
               2
            IDKF
          0.000    1.000    0.000
          0.000    1.000    0.000
          0.000    1.000    0.000
      1       90
               2
            LCLD
          0.100    0.900    0.000
          0.630    0.370    0.000
          0.900    0.100    0.000
        Otherwise
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
92 What is the level of late containment leakage?
      3     nLCL     LCL2     LCL3
      2        1        2        3
      7
      1       79
               3
            ICL3
          0.000    0.000    1.000
          0.000    0.000    1.000
          0.000    0.000    1.000
      1       89
               2
            LTCF
          0.000    0.999    0.001
          0.000    0.500    0.500
```

```
        0.000    0.000    1.000
2         89       91
           1        1
         LPCF     LDHF
        0.000    1.000    0.000
        0.000    1.000    0.000
        0.000    1.000    0.000
3         89       91       90
           1   (    2   +    3)
         LPCF     LDKF     LCLW
        0.000    0.900    0.100
        0.000    0.500    0.500
        0.000    0.100    0.900
1         87
           2
       L-Vent
        0.000    0.000    1.000
        0.000    0.000    1.000
        0.000    0.000    1.000
1         79
           2
         ICL2
        0.000    1.000    0.000
        0.000    1.000    0.000
        0.000    1.000    0.000
     Otherwise
        1.000    0.000    0.000
        1.000    0.000    0.000
        1.000    0.000    0.000
93 Is the suppression pool drained late?
2       LSPD    nLSPD
2          1        2
3
1         55
           1
       E5-SPD
        1.000    0.000
        1.000    0.000
        1.000    0.000
5         75       77       89       90       92
        (  1   *     3) +(    1    *    3    *    3)
             IP     ICLW     LPCF     LCLW     LCL3
        0.100    0.900
        0.500    0.500
        0.900    0.100
     Otherwise
        0.000    1.000
        0.000    1.000
        0.000    1.000
94 What is the level of late suppression pool bypass?
3      nLSPB    LSPB2    LSPB3
2          1        2        3
6
4         90       93       57       68
```

```
          (   2   +    1   +   3)      -4
           LCLD     LSPD E5-SPB3   Breach
          0.000    0.000   1.000
          0.000    0.000   1.000
          0.000    0.000   1.000
      3      20       26      46
          (   1   +   1   +   1)
         PCycBk   RePBk E4-RePB
          0.000    0.000   1.000
          0.000    0.000   1.000
          0.000    0.000   1.000
      4      25       51      90       68
              1        2       2       -4
        oSRVBkr  E5-DeP    LCLD   Breach
          0.000    0.990   0.010
          0.000    0.800   0.200
          0.000    0.000   1.000
      2      68       57
              4        3
        nBreach E5-SPB3
          0.000    0.000   1.000
          0.000    0.000   1.000
          0.000    0.000   1.000
      3      68       39      57
              4        2   +   2
        nBreach E4-SPB2 E5-SPB2
          0.000    1.000   0.000
          0.000    1.000   0.000
          0.000    1.000   0.000
        Otherwise
          1.000    0.000   0.000
          1.000    0.000   0.000
          1.000    0.000   0.000
95 What is the level of late RB bypass without a burn?
      4   nLRBB   LRBB2   LRBB3   LRBB4
      2       1       2       3       4
      7
      1      62
              4
           ERRB4
          0.000   0.000   0.000   1.000
          0.000   0.000   0.000   1.000
          0.000   0.000   0.000   1.000
      1      68
              1
           Alpha
          0.000   0.000   0.000   1.000
          0.000   0.000   0.000   1.000
          0.000   0.000   0.000   1.000
      1      62
              3
           ERRB3
          0.000   0.000   1.000   0.000
          0.000   0.000   1.000   0.000
```

```
        0.000    0.000    1.000    0.000
1         91
           1
         LDHF
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
        0.000    0.000    1.000    0.000
2         92       62
           3    +   2
         LCL3    ERRB2
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
        0.000    1.000    0.000    0.000
1         92
           2
         LCL2
        0.900    0.100    0.000    0.000
        0.500    0.500    0.000    0.000
        0.100    0.900    0.000    0.000
      Otherwise
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
        1.000    0.000    0.000    0.000
96 Are fire systems operating late without a late HB?
      2  LFireS nLFireS
      2       1       2
      6
      1         59
                 1
              EFireS
               1.000    0.000
               1.000    0.000
               1.000    0.000
      1         92
                 1
               nLCL
              0.000    1.000
              0.000    1.000
              0.000    1.000
      1         95
                 4
              LRBB4
              0.000    1.000
              0.000    1.000
              0.000    1.000
      1         91
                 1
              .LDHF
              0.000    1.000
              0.000    1.000
              0.000    1.000
      3         92       94       56
                 3        1        2
               LCLW    nLSPB   SubcSP
```

```
          0.000    1.000
          0.000    1.000
          0.000    1.000
        Otherwise                  *** LFireS ***
          1.000    0.000
          1.000    0.000
          1.000    0.000
97 Does standby gas treatment not work late without late HB?
     2  nLSGTS    LSGTS
     2       1        2
     2
     3      79       96       60
             2        2        1
          L-AC nLFireS nEfSGTS
         0.000    1.000
         0.000    1.000
         0.000    1.000
       Otherwise
         1.000    0.000
         1.000    0.000
         1.000    0.000
98 Does H2 burn in the reactor building after vessel breach?
     2      LHB     nLHB
     2        1        2
     5
     1       95
              4
         LRBB4
         0.000    1.000
         0.000    1.000
         0.000    1.000
     1       86
              2
        CoolDB
         0.000    1.000
         0.000    1.000
         0.000    1.000
     2       92       97
              2        2
          LCL2    LSGTS
         0.100    0.900
         0.500    0.500
         0.900    0.100
     2       92       97
             -1        1
           LCL   nLSGTS
         0.500    0.500
         1.000    0.000
         1.000    0.000
       Otherwise
         0.000    1.000
         0.000    1.000
         0.000    1.000
99 What is the level of late RB bypass?
```

```
      4   nLRBB    LRBB2    LRBB3    LRBB4
      2       1        2        3        4
      6
      1      95
             4
          LRBB4
          0.000    0.000    0.000    1.000
          0.000    0.000    0.000    1.000
          0.000    0.000    0.000    1.000
      2      98       95
             1        3
           LHB    LRBB3
          0.000    0.000    0.500    0.500
          0.000    0.000    0.100    0.900
          0.000    0.000    0.000    1.000
      3      98       95       95
             1   (    1   +    2)
           LHB    LRBB2    LRBB2
          0.000    1.000    0.000    0.000
          0.000    0.750    0.000    0.250
          0.000    0.100    0.000    0.900
      1      95
             3
          LRBB3
          0.000    0.000    1.000    0.000
          0.000    0.000    1.000    0.000
          0.000    0.000    1.000    0.000
      1      95
             2
          LRBB2
          0.000    1.000    0.000    0.000
          0.000    1.000    0.000    0.000
          0.000    1.000    0.000    0.000
        Otherwise
          1.000    0.000    0.000    0.000
          1.000    0.000    0.000    0.000
          1.000    0.000    0.000    0.000
100 Are fire systems operating late?
      2  LFireS nLFireS
      2       1        2
      3
      2      96       98
             2        2
        nLFireS     nLHB
          0.000    1.000
          0.000    1.000
          0.000    1.000
      3      91       96       98
             1        2        1
          LDHF nLFireS      LHB
          0.000    1.000
          0.000    1.000
          0.000    1.000
        Otherwise
```

```
          1.000    0.000
          1.000    0.000
          1.000    0.000
101 Does standby gas treatment work late?
      2  nLSGTS    LSGTS
      2       1        2
      2
      2      97      100
             2        2
         LSGTS  nLFireS
         0.000    1.000
         0.000    1.000
         0.000    1.000
       Otherwise
         1.000    0.000
         1.000    0.000
         1.000    0.000
```

J. 5.6

THE DIRECT HEATING PROBLEM

by

T.G. Theofanous / Steve Lee
Purdue

Presented at The Containment Loads Working Group Meeting
Rockville, Md, March 1984

Aknowledgements:
Discussions with
U. Lyon (NRC)
Ragsdi (NRC)
Dolby (EG;G)

JT

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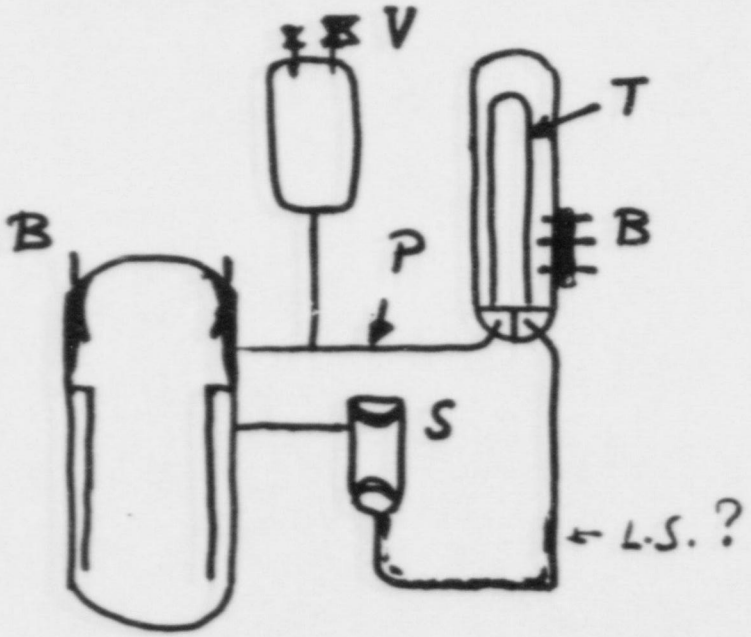
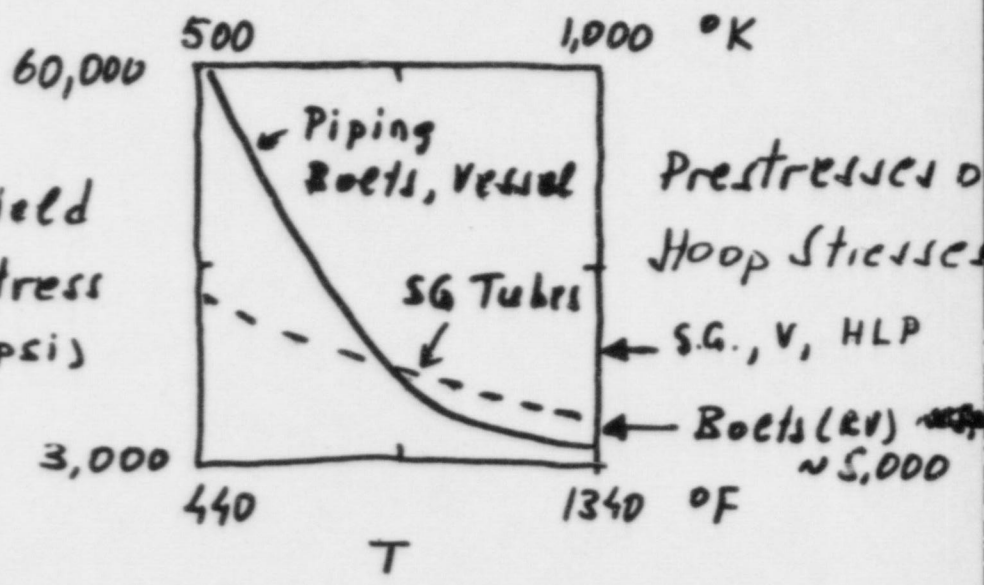
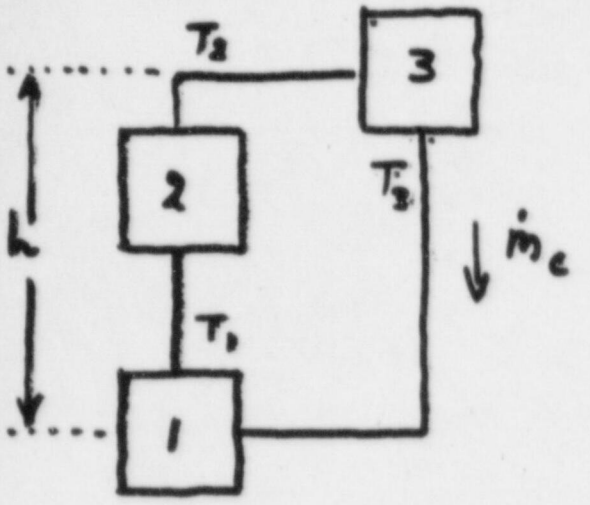
- DIRECT HEATING CONCERN IS THE RESULT OF HIGH P SCENARIO AND CHEMICAL ENERGY RELEASE
  - CAN HIGH P SCENARIO DEVELOP ?
  - GIVEN A HPS CAN Zr-AL EXIST IN LARGE QUANTITIES?





- Few thousant seconds of relief valve actuation at high T
  Significant fraction of oxidation in-vessel (near complete)
- Energy redistribution by steam natural convection at high pressure. What is T_c, T_s, T_p, T_v, T_r prior to core melting? i.e. $T_c \sim 3500$ °F.
- Loop Seal Blowing Uncertain at this time: Use 2 models.
  (a) Loop circulation (b) Vessel circulation. Need: $\Delta T \sim 2{,}000$°
  S: Fail at ~550°F → 500 gpm leak!

"THE MODELS"



$$R_1 = \frac{m_1 c_{ps}}{\dot{m}_c c_{pc}} \qquad R_2 = \frac{m_2 c_{ps}}{\dot{m}_c c_{pc}} \qquad R_3 = \frac{m_3 c_{ps}}{\dot{m}_c c_{pc}}$$

$$Q' = \frac{\dot{Q}}{\dot{m}_c c_{pc}}$$

$$R_1 \frac{dT_1}{dt} = Q' + T_3 - T_1$$

$$R_2 \frac{dT_2}{dt} = T_1 - T_2$$

$$R_3 \frac{dT_3}{dt} = T_2 - T_3$$

$$\tilde{K} \frac{\dot{m}_c^2}{2\bar{\rho}_c} \sim g h (\rho_3 - \rho_1)$$

$$[illegible] + C_2 e^{z_1 t} \sin z_2 t + C_3 t + C_4$$

$$T_2 = \{C_1 + R_3 (C_1 z_1 + C_2 z_2)\} e^{z_1 t} \cos z_2 t + \{C_2 + R_3 (C_2 z_1 [illegible])\} e^{z_1 t} \sin z_2 [illegible]$$
$$+ C_3 t + R_3 C_3 + C_4$$

$$T_1 = \frac{Q' t}{[illegible]} + [illegible] - [illegible] T_2 - \frac{R_3}{[illegible]} T$$

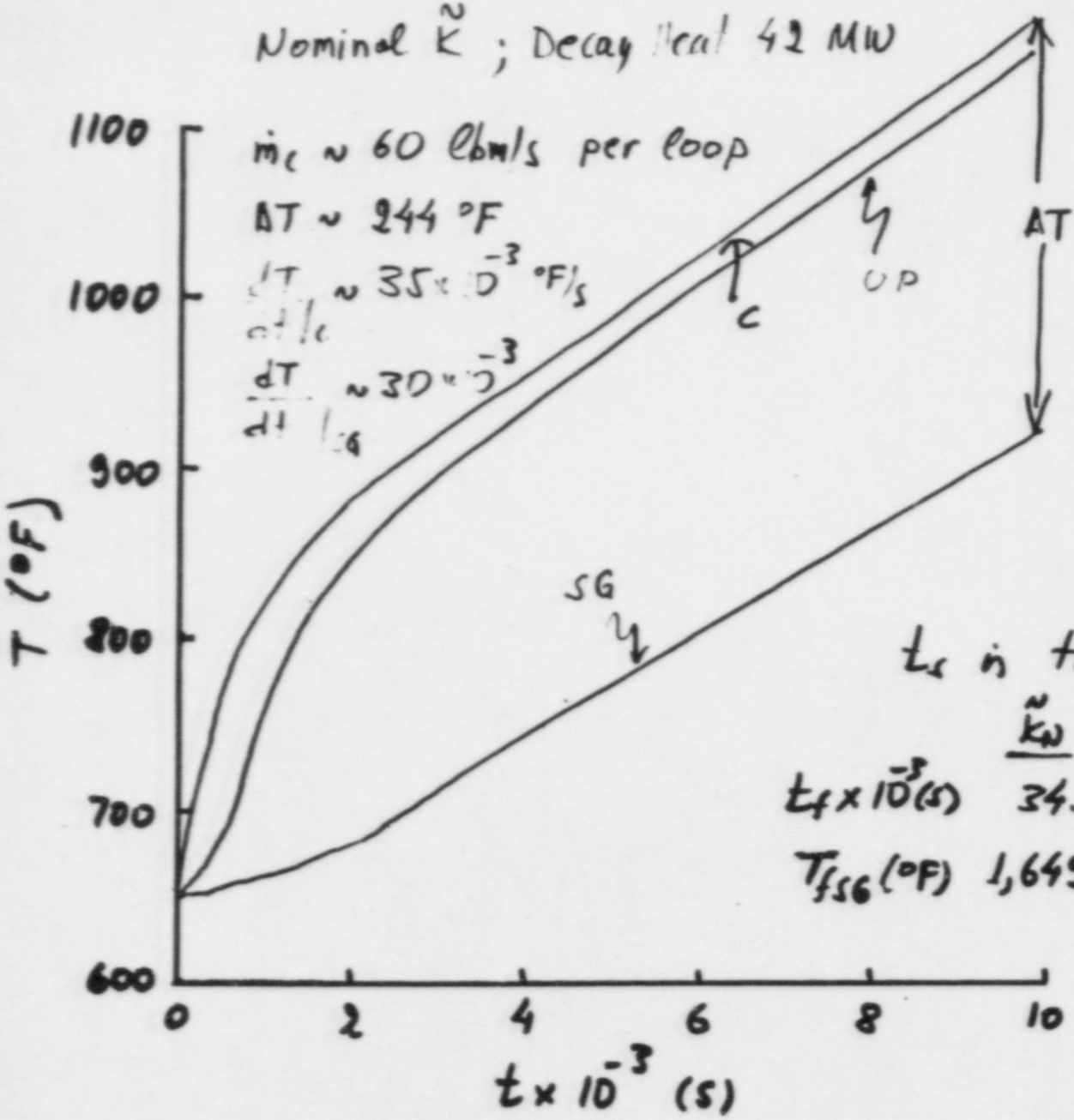
$$C_0 = T_0 (R_1 + R_2 + R_3) \qquad C_1 = T_0 - C_4 \qquad C_2 = -C_1 \frac{z_1}{z_2} - C_3 / z_2$$

$$C_3 = Q' / C R_1 \qquad C_4 = \frac{C_0}{C_1 R_1} - \frac{b Q'}{C^2 R_1}$$

$$[illegible] = R_2 R_3 \qquad [illegible] = R_2 + \frac{R_2 R_3}{R_1} + R_3 \qquad C = \frac{R_3}{R_1} + \frac{R_2}{R_1} + 1$$

$$z_1 = -b/2a \qquad z_2 = \sqrt{4ac - b^2} / 2a$$

"LOOP CIRCULATION CASE"

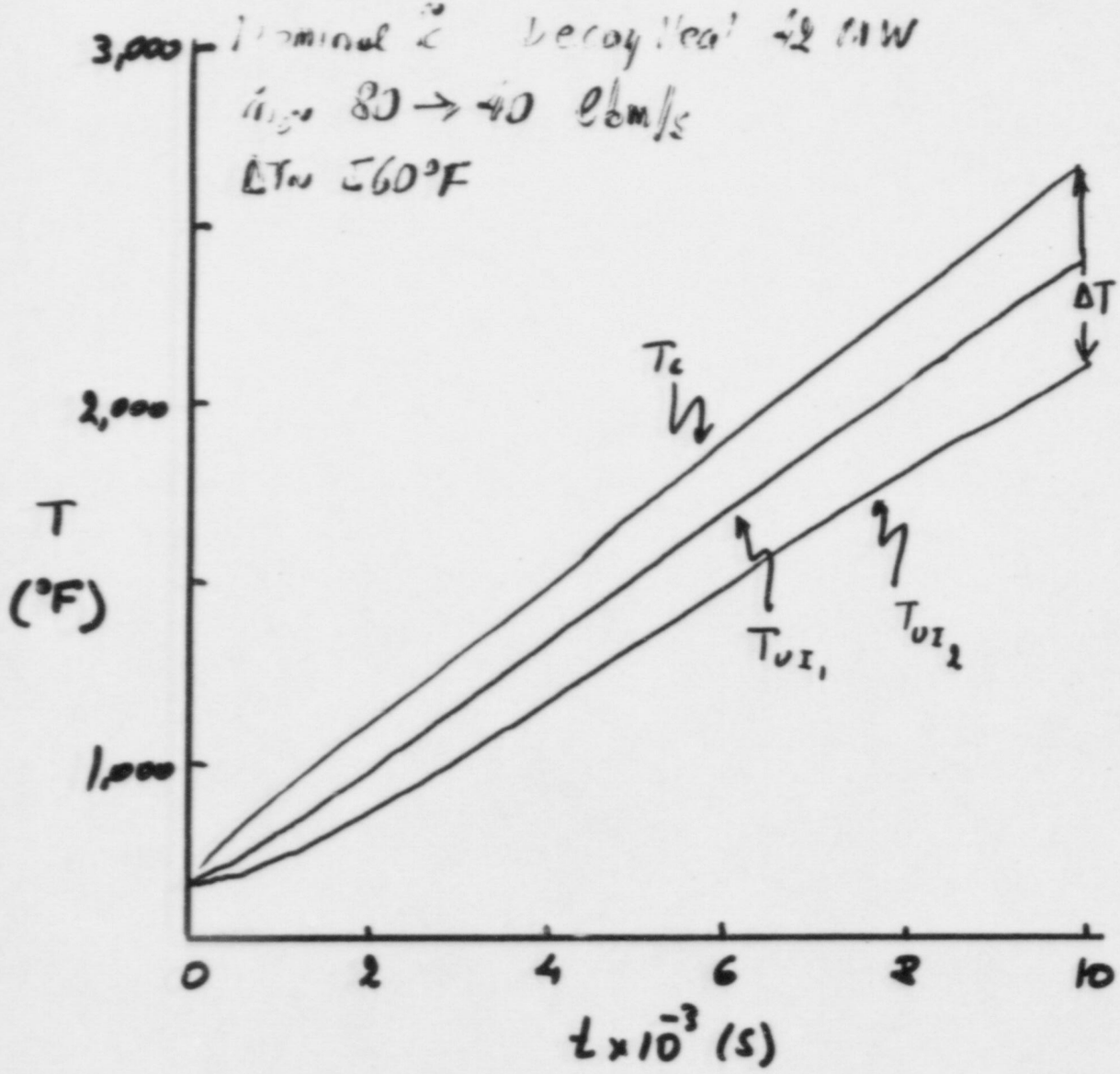


$\tilde{K}=$	$5\times\tilde{K}_N$	$10\times\tilde{K}_N$
$\dot{m}_c$ (lbm/s)	34	25
ΔT (°F)	[illegible]	357
$\frac{dT}{dt}\Big\|_c$ (°F/s)	37×10^{-3}	40×10^{-3}
$\frac{dT}{dt}\Big\|_{SG}$	23×10^{-3}	12×10^{-3}

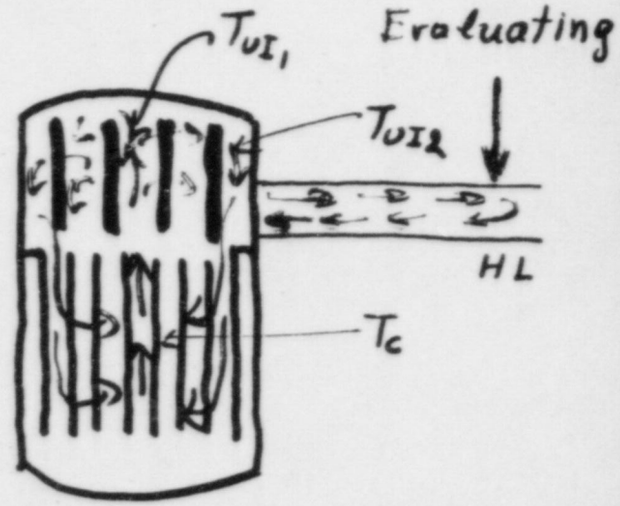
t_f is time when $T_{fc} \sim 2{,}000$ °F

	$\tilde{K}_N$	$5\times\tilde{K}_N$	$10\times\tilde{K}_N$
$t_f \times 10^{-3}$ (s)	34.3	307	30
T_{fSG} (°F)	1,649	1,510	1,490

"IN-VESSEL CIRCULATION CASE"



[illegible]	$5 \times \tilde{k}_N$	[illegible]
$\dot{m}$ (lb/s)	50 → 2[illegible]	[illegible]
Δ[illegible] °F	[illegible]	[illegible]



Set: Nominal $\tilde{k} \sim 2 \times$ of $\tilde{k}_c$
"[illegible]".

CONCLUSIONS

- High P scenario seems highly improbable.
- Even if postulated the existence of large quantities of unreacted Zr-Al highly improbable.

" Due to significant (non-negligible) likely load of steam generator tube failures and potential adverse consequences of such it is important to ensure early depressurization. Fuse-type relief would be best. "

- More detail elaboration of temperature distributions in space-time in progress to confirm above results in progress.
- More detailed investigation of early scenario and thermal-hydraulics to assess behavior of loop-seal plug.
- Effects of clad beackages in case loop seal is judged to persist interrupting the natural circulation path.
- Still to check differential thermal expansion failures