Comanche Peak Steam Electric Station

Risk-Based In-Service Testing Program

Risk Ranking Determination Study

Summary Report

Engineering Analysis

November 22,1995

Table of Contents

1.0 BACKGROUND

In-service Testing (IST) programs were developed to ensure the reliable operation of safety-related pumps and valves at nuclear power plants. The codes, standards and guides for these tests were developed by the American Society of Mechanical Engineers (ASME) Operations and Maintenance (O&M) Committee. The essential Nuclear Regulatory Commission (NRC) regulation governing this process of testing has been 10CFR50.55 and has been implemented using ASME B&PV Code Section XI (Ref. 1), both for passive component examination (welding, studs, etc.) and for active component testing (pumps and valves).

For the past several years, both the nuclear industry and the NRC have devoted significant attention and resources aimed at improving the performance of pumps and valves. In a letter (Ref. 2) dated September 9, 1991 from James E. Richardson of the NRC to Forrest T. Rhodes of ASME, the NRC requested that the ASME O&M Committee consider revising existing requirements for in-service testing. The letter requested revisions to ensure the ability of certain pumps and valves to perform their intended hydraulic and mechanical safety functions. The revisions requested would:

- Expand the scope to include specific components that are not constructed in accordance with ASME B&PV Code Section III rules for construction or tested in accordance with ASME B&PV Code Section XI;
- Require verification of each safety function for each included component;
- Require such verification be accomplished at design basis conditions, or, where such verification is not possible, a test at less than design basis conditions combined with an analysis may be substituted; and
- Data collected during component testing may be compared with data taken during previous tests to allow determination of the condition of the component.

This request was made in part due to NRC concerns with the ability of some components to perform their safety functions under design basis conditions, such as motor-operated valves and check valves, and concern that the in-service tests required by ASME B&PV Code Section XI and incorporated by reference into 10CFR50.55a(f) do not: a) include each component that has a hydraulic or safety-related function; b) accomplish verification of each safety function of each safety-related component; or c) require that such verification be accomplished at the design basis conditions.

The intent of current IST programs is to include all active safety-related pumps and valves that are credited in the plant design basis safety analysis. In general, the IST equipment lists are developed by review of plant drawings showing ASME Code Class 1, 2 and 3 classification boundaries. All components within the boundaries are then reviewed to determine whether or not they were credited with an active safety function under the plant licensing basis. The FSAR analyses and other design basis documentation are reviewed to make these determinations.

Older plants not initially designed to ASME B&PV Code Section III have applied ANSI Safety Class 1, 2 and 3 classification rules to piping and components for purposes of establishing ASME B&PV Code Section XI test requirements, even though the systems and components were not designed or constructed in accordance with ASME B&PV Code Section III.

As a result of the NRC request for IST program enhancement, there are industry concerns involving the restrictive nature and basis for these requirements and their impact on plant operation. Overly restrictive requirements can complicate plant operation, cause unwarranted operating costs, and most importantly, degrade plant safety through needless component testing and undue burden during plant outages.

Developments in the industry demonstrate an acceptance of the use of risk-based approaches using a plant's probabilistic safety analysis (PSA) to identify prescriptive regulations that have marginal safety benefits. The momentum in this direction is evidenced by recent NRC interest in graded QA and EPRI's applications of risk-based technologies, and most recently, in the issuance of the Nuclear Regulatory Commission's final policy statement on the use of PSA in nuclear regulatory activities (Ref. 3).

Similarly, improvements to IST programs using a risk-based approach can reduce operating costs while maintaining a high level of plant safety. Possible savings from improved IST programs include:

- Reduced costs of engineering analyses to develop test criteria that adequately demonstrate functional capability at design basis conditions;
- Reduced costs of plant modifications where current configurations do not support testing at or near design basis conditions;
- Reduced costs for development of new test procedures implementing the new test criteria; and

- Reduction of incremental costs associated with performing the new tests, including:
  - Additional time required to perform the tests and analyze results;
  - Costs of specialized test equipment or vendor services;
  - Possible effects on critical path outage duration; and
  - Possible increases in radiation exposure.

For these reasons it is advantageous for utilities to pursue IST program improvements. The impact of changes on plant safety is of primary interest and is the controlling factor in implementing such changes. However, changes that negligibly reduce plant safety should not be ruled out, especially if such changes can lead to significant plant performance improvements in other areas.

2.0 PROJECT SCOPE AND OBJECTIVES

The scope of this project is to perform a review of the Comanche Peak Steam Electric Station IST program that optimizes the safety benefits in assuring pump and valve performance. It uses a methodology for a risk-based approach to IST program review and enhancement that is founded on a blend of probabilistic and deterministic methods and that has as its principal results, recommendations for adjustments to test frequency intervals for these components. Thus, it is not aimed at reducing the number of components within the scope of an IST program, rather at optimizing what is tested and when. In this study, all components within the scope of the IST program were examined. However, only those determined to be less safety significant will be considered for a code exemption. The ASME O&M Committee is reviewing the more safety significant components to ensure that the appropriate tests are identified and performed on those components for their respective failure modes.

The objectives of this project are to apply risk-based technologies to IST components to determine their risk significance; to apply risk-based technologies to risk-significant components identified in the IPE and outside of ASME Code Classes 1, 2 and 3 to determine whether additional compensatory measures are appropriate; and to apply a combination of deterministic and risk-based methods to determine appropriate testing frequencies and/or compensatory measures for IST components. The results of this project will be the basis for the CPSES code exemption submittal to the NRC and will be part of a pilot study for the industry.

Several safety enhancements to a plant IST program can be derived, both directly and indirectly, by using the probabilistic and deterministic approach presented in this report. These safety enhancements are very similar to those attendant with the optimized performance of motor-operated valves discussed in NUMARC 93-05 (Ref. 4), from which elements of the following discussion were taken.

Direct Safety Enhancements

Greater attention and resources devoted to the high priority IST components could translate into many direct safety enhancements. First, this group of components could be subjected to, where practical and meaningful, more frequent periodic tests than the lower priority groups. The timeliness of any problem identification and resolution would be improved. Second, requirements associated with the high priority group of IST components are expected to be more

rigorous and demanding in nature than for the other groups. These requirements provide added assurance that any problems that may impact the functionality of the components will be identified and resolved. Third, the resulting risk-based IST program will consider whether some risk-significant components that are outside the scope of ASME Code Classes 1, 2 and 3 should be added to the IST program to improve safety. Finally, because extensive testing can have adverse safety and operational consequences, reduction of testing may reduce component wearout and operator burden. These changes are expected to improve safety.

Indirect Safety Enhancements

There are other indirect safety benefits to this approach that are as important. Risk-based prioritization efforts identify the safety-significant IST components and the impact of their potential failures on plant safety. In addition, these analyses identify important scenarios that provide information with respect to the operational demand that may be placed on a given component. Such information is valuable because it relates the performance of the IST component to the broader context of plant safety. This allows more rational decision making, more efficient use of resources, and is central to optimizing safety benefits.

3.0 PROJECT APPROACH

The TU Electric risk-based IST project was developed and implemented as part of a tailored collaboration (TC) effort with EPRI. The project was conducted under the direction of a Steering Committee that interfaced with the American Society of Mechanical Engineers (ASME) research program funded by the NRC, the Westinghouse Owners Group (WOG), the Nuclear Energy Institute (NEI) and other utilities, and coordinated its activities with other industry efforts such as the WOG check valve program and various NEI activities on risk-based regulation. The TC project was designed to provide plant-specific benefits to TU Electric and, as a pilot project, to provide generic insights and tools that will benefit similar industry projects. In particular, the project developed generic methods for identifying opportunities to reduce those IST-related regulatory requirements and commitments that require significant resources to comply with and/or implement, but contribute insignificantly to safe and reliable operation. This work is being provided to NEI's Risk-Based IST Task Force and ASME B&PV Code Section XI IST Research Task Force to assist them in their formulation of guidelines and in-service testing requirements.

The Steering Committee developed the overall project objectives and milestones and commissioned various work activities and studies in doing this work. The Steering Committee consisted of members with expertise in the areas of licensing, probabilistic safety analysis, ASME B&PV Code Section XI and WOG analysis activities. In addition to providing overall coordination, the Steering Committee served as the central point of decision making for major technical issues and provided technology transfer and guidance to the expert panel in performing its work. These latter activities were accomplished through common membership of several members on the Steering Committee and the expert panel. It was concluded that the strength of this risk-based IST program and the integrity of its results lie both in the robustness of the methodology and in the work of the Steering Committee and expert panel. Further, the robustness of the methodology provides consistency in the results.

The project was divided into two phases. Phase 1 included the development of an implementation guidelines document and actual implementation of the methodology to prioritize components in the IST program. Phase 2 involved the development of tools for evaluating test intervals for the risk-significant IST components. The work activities in each of these phases were reviewed by the Steering Committee and presented to various other peer groups at strategic points in the project. In this way the methodology was refined, and a fairly

mature process was arrived at before involvement of the expert panel. The various tasks that support the project are described in more detail in the sections that follow.

3.1 Methodology

The process described above lead to development of the methodology. The methodology was developed consistent with NUMARC Guides 93-01 (Ref. 5)(Maintenance Rule) and 93-05 (Motor Operated Valve(MOV) testing). The system level ranking approach from the Maintenance Rule process was merged with the component level ranking approach used for MOV testing. The merging of the two approaches was designed to ensure that the new IST program would benefit from and be consistent with the Maintenance Rule process and other industry risk-based programs.

The Risk Achievement Worth (RAW) and Risk Reduction Worth (RRW) risk measures of the Maintenance Rule were combined with the Fussell-Vesely (FV) risk measure of MOV testing. Because this initiative was to *reduce* existing regulatory burden rather than focus on new regulatory initiatives, the methodology applies these risk measures in a manner intended to ensure a safety-neutral outcome.

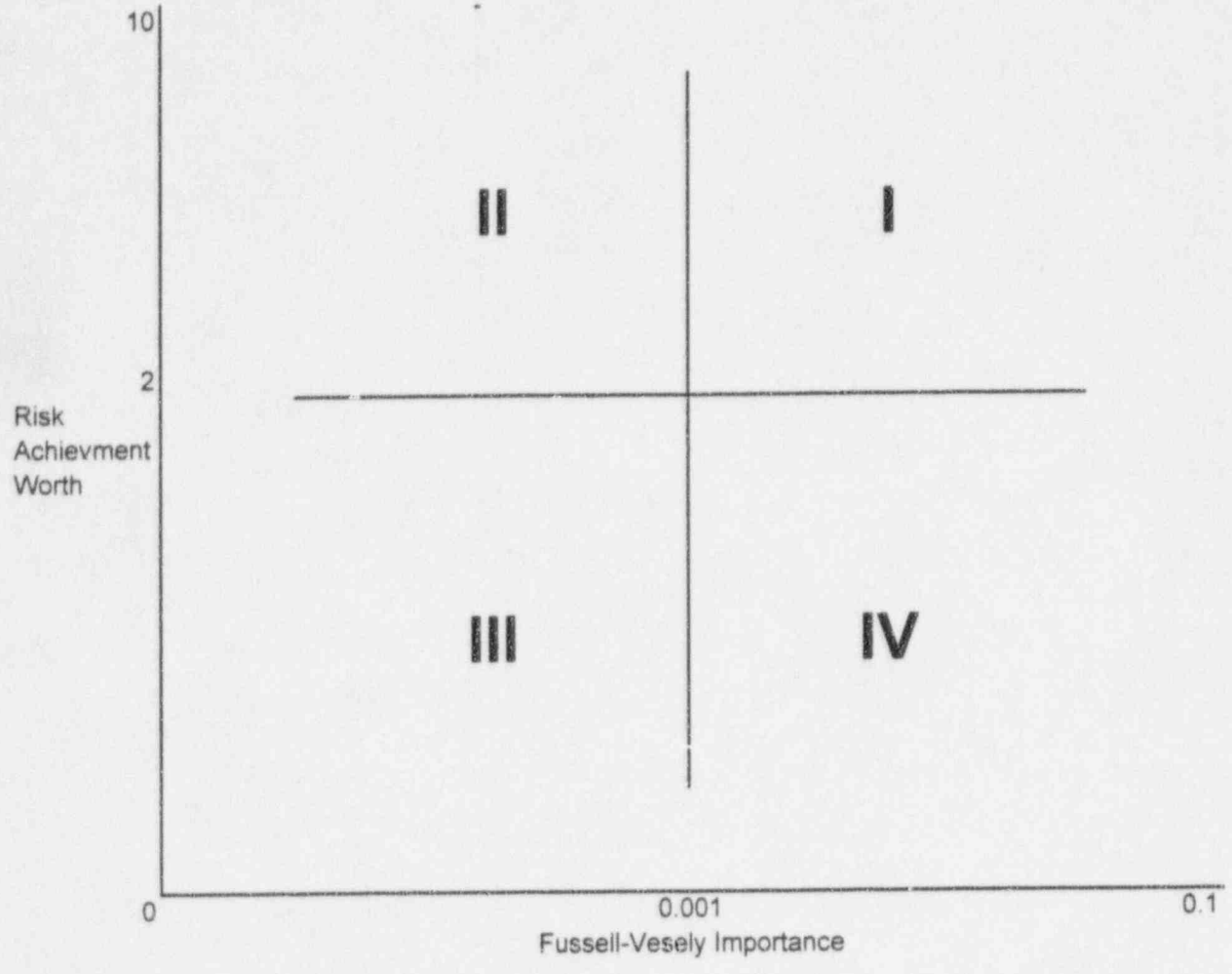
Because RRW and FV provide similar insights, only the FV importance measure was utilized in this analysis. Fussell-Vesely provides a measure of incremental change in total core damage frequency (CDF) that indicates the importance of incremental changes in reliability that might result from changing in-service test intervals. Risk Achievement Worth provides an indicator of the importance of degradations in component reliability. These measures were combined into a decision criteria such as that shown in Figure 3-1.

As the figure indicates, components with a significant FV were considered "more risk significant". Components with an insignificant FV were considered "less risk significant". However, it was important to ensure that a reduction in test intervals did not allow unintended consequences, i.e., a compromise in safety resulting from a degradation in reliability.

Figure 3-1

Decision Criteria
Risk Importance Measures

Fussell-Vesely Importance > 0.001
Risk Achievment Worth > 2.0



I: More Safety Significant Component (MSSC)
II: Less Safety Significant Component (LSSC) With Compensatory Measures
III: Less Safety Significant Component (LSSC)
IV: More Safety Significant Component (MSSC)

Not Modeled - Components Reviewed By Expert Panel For Determination Of Ranking

Therefore, if FV was insignificant, it was also required that RAW be insignificant for a component to be classified as "less risk significant". If RAW was significant, the component was considered by the expert panel for placement in the high category. If the panel decided the component could be ranked low, an additional requirement was imposed before a component could be classified as "less risk significant". A compensatory measure was required to be selected by the expert panel to limit degradations in reliability.

During the development of this methodology, EPRI and NEI began working with NRC on the development of the EPRI PSA Applications Guide (Ref. 6). In general, this methodology is consistent with the guide. The guide did provide a specific acceptance criteria for permanent risk increases that was used in this evaluation. A few minor differences between this methodology and the EPRI PSA Applications Guide exit, most of which are more conservative in this study.

The general approach taken included four steps. First, risk importance was determined. This determination was based on the results of the IPE and the IPEEE and other plant operating modes, such as outage modes. In addition to this complete spectrum of core damage accidents, severe accidents leading to large and early fission product releases were also given special attention. Finally, the importance of components not in the IPE and IPEEE models or not in the IST program were evaluated.

The next step addressed the completeness and adequacy of these models through a number of sensitivity analyses to compensate for the limitations of the quantitative models. The third step evaluated the cumulative impact of low risk significant components on plant risk if their in-service test intervals were extended. This step provided technical justification for proposed test intervals for less risk significant components in the existing IST. The fourth and last step was to review the process and results with an expert panel that was knowledgeable of plant risk, plant design, plant operations practices, and plant performance. This process blended deterministic safety insights with quantitative risk insights to ensure that risk significance was appropriately identified.

The following sections further describe the methodology and provide some additional background to this work.

3.2 Risk Importance Determination

In this study, risk importance rankings of the IST components were determined based on the results of the CPSES IPE. These risk rankings were then complemented with rankings based on consideration of other accident initiators and plant operating modes. These other accident initiators are external events such as fires, tornados, and earthquakes. The other plant operating mode is the outage mode. Each of these evaluations considered importance with respect to core damage prevention. Core damage prevention has been found to be a good measure of the spectrum of releases that can result from severe accidents. However, unique risk contributions can occur if severe accident releases are large and early. Hence, risk rankings were also complemented by considering components important to preventing large, early releases. This approach is consistent with the intent of the safety goal and the severe accident policy statement and is a requirement of the EPRI PSA Applications Guide.

In applying the above method, it was found that a significant fraction of IST components are not in the IPE. While it is likely that such components are not risk significant, this study specifically evaluated each component and the design basis functions addressed by the IST program. Most components that are not in the IPE were found to be implicitly modeled by the study. That is, the IPE found that the components either were not required for the system to prevent severe accidents, were in systems that provided a highly redundant function, or performed functions that were extremely unlikely to be required. The systematic review of these components used quantitative and qualitative insights to determine whether components should be considered more or less risk significant and whether risk insights implied that compensatory actions should be considered.

The risk ranking process also identified some IPE components that were more risk significant but which were not in the IST program. These components typically were found to be outside the code class boundary and therefore not subject to IST requirements. These components were considered for compensatory action equivalent to those defined for components in the IST program.

3.3 Completeness Issues

Quantitative risk models have limitations associated with the structure of the models and the assumptions and the input data used. The limitations were compensated for by evaluating truncation limits, identifying IST components masked by the IPE, applying a conservative treatment of common cause failures, requiring an expert panel to identify components with operational concerns, and performing selected sensitivity studies.

The risk ranking process described above used the FV and RAW importance measures. The values for these importance measures are calculated based on cutsets. The cumulative effects analysis described below also is based on cutsets. Cutsets are obtained by solving the model with a truncation limit. Experience has shown that setting the truncation limit arbitrarily low creates inefficiencies such that analysis costs quickly exceed the value of risk insights gained. This project evaluated the truncation limit used in the CPSES IPE and found it to be sufficient for both risk ranking and estimating cumulative effects.

The IPE model may "mask" certain components because they are associated with supercomponents, human events or initiating events but not explicitly identified. The components masked by the IPE model are typically small contributors to the overall probability of the event. However, it was considered appropriate to verify this consideration for this effort. The project evaluated those IST components that were: 1) contained in supercomponents (e.g., some components on the diesel generator skid), 2) required to function as part of a human action, and 3) might cause a significant plant initiator.

Risk ranking results can be strongly affected by the contribution of common cause failure. The approach taken in the project was to conservatively assume that a common cause event in the cutsets should have its entire risk significance assigned to all components represented by the event. This approach lead to the inclusion of a significant number of components in the more risk significant category which otherwise would have been considered less risk significant. The expert panel confirmed that the approach identified potentially important components.

Both risk ranking measures used are influenced by the reliability data assigned to the component. The CPSES IPE uses generic data since an insufficient amount of plant-specific data was available. Generic data (and indeed, most interpretations of plant specific data) considers components in groups. But ranking was done on a component basis. Consequently,

the expert panel considered whether or not plant specific operational insights indicated component reliability problems that might affect the ranking of an individual component or small group of components. Components with operational concerns were considered more risk significant by the expert panel.

Finally, the completeness of the models, assumptions and input data were tested by sensitivity studies. In one sensitivity study designed to consider the impact of human event modeling, risk ranking results were compared assuming operator events in the IPE always failed to occur. Another sensitivity study was designed to consider whether changes to in-service testing offered the potential for common-cause-like degradations in components in different systems. Less risk significant components were assumed to be influenced two at a time. Four such components were identified which, together with other components, offered the potential of becoming more risk significant. Appropriate compensatory actions designed to limit reliability degradations were imposed on these components. A similar sensitivity study was performed where less risk significant components were assumed to be influenced three at a time.

3.4 Cumulative Effects of Test Interval Changes

A risk ranking approach based on importance measures such as was used in this project does not necessarily guarantee that acceptable levels of risk will result. Risk importance measures are based on changes to components one at a time. Changes to many components simultaneously may cause unintended increases in risk despite meeting the selected conservative risk ranking measures.

An analysis was performed to determine the potential risk impact of increasing in-service testing intervals simultaneously on all less risk significant components. Consideration was given to available information on how changes in test intervals will change component unavailability. Uncertainty in this information, together with the complexity required to model such an approach, dictated the use of a very conservative approach. That is, risk impact was measured assuming that component unavailability (including both on demand and time dependent failure rates) increased by the same factor that the test interval increased. Despite the use of this conservative assumption, calculations indicate that test intervals could be increased from quarterly to six years or more with acceptable increases in risk. If consideration were given to improvements in performance that are possible to occur from a risk-based IST program, it is plausible that core damage risk may not increase at all.

3.5 Expert Panel

For the CPSES Risk-Based In-Service Testing (RBIST) Program, an expert panel (EP) was established to make the final determination of risk ranking for the pumps and valves in the CPSES Unit 1 and 2 IST program. The panel was constituted in part of individuals who were members of the Steering Committee and of others who were members of the expert panel established for the implementation of the Maintenance Rule.

The members of the panel were selected based on their nuclear power plant experience which included expertise in the areas of ASME codes and standards, plant operations, maintenance engineering, systems engineering, design engineering and probabilistic safety assessment (PSA). The minimal education and experience requirements for panel members were a BS in an engineering discipline and eight years in nuclear power. The operations representative currently holds a USNRC Senior Reactor Operator License and has held it for at least two years. The chairman has significant technical expertise in PSA applications and project management. The expert panel also utilized the expertise of other consultants and engineers in doing its evaluations.

The minimum quorum necessary for the EP to conduct business was four (4) members consisting of the representatives from operations, probabilistic risk assessment, system engineering/in-service test engineering, and codes and standards. It was decided that the panel would be living and it would participate in periodic updates to the ranking whenever the IPE study is updated.

The scope of the expert panel activities included both risk ranking and application of it. The panel's principal responsibility was to ensure the risk ranking information was consistent with plant design, operating procedures, and with plant-specific operating experience. The panel made a qualitative assessment of the risk importance categories that were developed for the components using the IPE results and insights discussed in the preceding sections of this report. This assessment was based on deterministic insights, plant-specific history, engineering judgements, regulatory requirements, and probabilistic safety analysis insights. The panel reviewed the IPE component risk rankings, compared the IPE and IST functions to ensure consistency with plant design, analyzed applicable deterministic information and determined the final safety significance categorizations for all the IST components. At the end of the expert panel evaluation process, every component in the CPSES IST program was reviewed and

evaluated by the expert panel members. A summary of the expert panel process is provided in section 4 of this report.

3.6 Identification of Component Degradation and Feedback Process

At CPSES, various station procedures are used to govern the activities related to the IST program and other areas such as corrective action and root cause programs. These procedures form a consistent means of controlling and integrating site-wide activities. The ASME B&P Code Section XI in-service testing of pumps and valves is implemented by procedure STA-711, "ASME Section XI In-service Testing Program for Pumps and Valves." This procedure provides guidance to ensure effective, consistent and coordinated implementation of the code requirements. It provides guidance on how the in-service testing program interfaces with other station procedures to perform surveillances, to maintain test records, to assure deficiencies are identified, tracked and resolved, and to assure that corrective actions are performed and documented. These procedures provide the means by which feedback of failures of IST components to the IST program is accomplished. They provide assurance that failures of IST components will be promptly identified and addressed and modifications to the in-service testing program (e.g., change to surveillance intervals) are made in a timely manner.

A failure of an IST component may be identified in the course of doing ordinary maintenance and tests or as part of a surveillance activity. These activities are controlled primarily by STA-606, "Work Requests and Work Orders," and STA-704, "Surveillance Program". When a failure is identified as part of a surveillance test or maintenance activity, a ONE Form is prepared per STA-421, "Operations Notification and Evaluation (ONE FORM)", depending on the nature of the failure. This form is used at CPSES to report potential adverse conditions and resolve issues and to assure that corrective actions are performed and documented. Resolution of a ONE Form is accomplished in accordance with the requirements of STA-422, "Processing of Operations Notification and Evaluation (ONE) Forms". Resolution of a ONE Form includes:

- Assigning a unique identification number and logging in appropriate plant information systems, and initial distribution for trending purposes.
- Reviewing the reported condition to determine the category of correction action required.
- Considering the generic implications of the item, i.e., the potential for the condition to exist elsewhere and initiating works order as required to investigate.

- Determining the probable cause of failure.
- Identifying and performing corrective action.

Depending upon the nature of the adverse condition, the corrective actions may include reporting to outside agencies, performing an engineering evaluation or performing a root cause evaluation. Root cause evaluations are preformed in accordance with STA-515, "Root Cause Analysis." These evaluations include a structured analysis of issues in order to identify causes of and contributing factors to component failure. As appropriate, root cause evaluations consider human performance issues and require failure analysis of components.

In addition to these activities, the implementation of the Maintenance Rule at CPSES requires that failures of components in systems within the scope of the rule be reviewed to determine whether these failures are maintenance preventable functional failures. The IST systems are within the scope of the maintenance rule and thus will come under these provisions. Maintenance preventable failures that result in system functional failures receive root cause analysis and corrective action evaluations, if the Maintenance Rule has been implemented on the system.

For deficiencies arising from surveillance work orders, records of corrective action are documented on work orders per the requirements of STA-606, "Work Requests and Work Orders". Work orders contain details of all corrective actions performed. Records of in-service testing to confirm operational adequacy following corrective actions are documented on post-work test reports per the requirements of STA-623, "Post-Work Test Program." The IST engineer reviews all closed IST-related surveillance work orders and post-work tests. The IST engineer also reviews in-service valve test results during the work order post-work review process and extracts and records any trendable data for early identification of equipment problems that may require modification to the IST program.

Because the IST engineer is a member of the systems engineering group, his activities are closely integrated with those of the system engineers. The pump and valve performance records maintained by the IST engineer are used extensively by systems engineers to determine corrective actions and to monitor system performance. The IST engineer is also a member of the expert panel for implementation of the Maintenance Rule and the risk-based IST program. He participates in periodic reviews of the performance of systems within the scope of these

programs, and through these means, he can provide timely feedback of performance of components in the systems.

Thus, the various procedures and programs in place at CPSES provide assurance that failures of IST components will be promptly identified and addressed and modifications to the in-service testing program will be considered and made in a timely manner.

3.7 Quality and Technical Adequacy of CPSES IPE

In general, the IPE study for CPSES fully satisfies the requirements of a full-scope Level-I and Level-II PRA. One of the main objectives of the IPE development was to be able to utilize its results and insights toward the enhancement of plant safety through risk-based applications. With this objective in mind, the IPE elements were developed in detail and integrated in a manner sufficient to satisfy both the NRC Generic Letter 88-20 requirements and support future plant applications.

The CPSES IPE study was performed by developing large fault trees and small event trees. The large fault trees were then linked together according to the event tree logics for quantifying accident sequences. The major elements of the IPE study were developed and reviewed in a manner consistent with and in excess of the good practices of the time. In general, it is believed that the CPSES IPE meets or exceeds the quality standards subsequently suggested by the EPRI PSA Applications Guide. These major elements are briefly described below.

Initiating Event Analysis

A detailed review of plant equipment and operating procedures was performed to identify all the potential plant-specific initiating events as well as those initiating events that were identified in the industry. The loss of support system initiators such as service water, component cooling water, safety chilled water, HVAC, Instrument Air, Electrical Power subsystems were also identified and evaluated in the IPE study. In addition, other special initiators including interfacing systems LOCA, SGTR, ATWS, internal flooding and station blackout were analyzed in detail and documented in the IPE.

Accident Sequence Analysis

A detailed accident sequence analysis was performed and resulted in the development of functional event trees for all the initiating events identified in the IPE study. This also included induced LOCA initiating events such as stuck open primary side safety valves, stuck open PORVs, and most importantly, reactor coolant pump seal LOCA.

The accident sequences were quantified using the fault tree linking methodology. The common concern in the industry is the truncation limit which could potentially impact the importance evaluation. The total core damage frequency for CPSES was estimated to be 5.72 E-05. The truncation limit chosen for the CPSES accident sequence quantification was set at 1.0E-09 which is approximately 2.0E-05 below the total core damage frequency. The recommended truncation limit in the EPRI PSA Application Guide document is 10^{-4} below the baseline IPE core damage frequency. The analysis of truncation limits for this application is described in section 4 of the main report. Most assumptions related to IST components were in effect validated by the treatment of not-modeled IST components. In addition, ATWS mitigating IST components have been ranked appropriately.

Systems Analysis

One of the major elements of the CPSES IPE study was the system analysis task. A total of 15 systems including support systems and front-line systems required for accident mitigation were analyzed. For all 15 systems, detailed system notebooks were developed which are found to be excellent documents for plant support activities. The impact of the loss of room cooling on equipment operability was carefully evaluated by the plant-specific room heat-up calculations and other available information in the industry. As part of this effort, the impact of loss of room cooling on the control room and switchgear room were also evaluated.

Common Cause Failure Analysis

Common Cause Failures (CCF) impacting two or more components in a system were carefully examined and appropriately placed in the system fault tree models. The Multiple Greek Letter (MGL) method described in NUREG/CR-4780, "Procedures for Treating Common Cause Failures in Safety and Reliability Studies," was used to quantify the effect of common cause

failure events. The evaluation process is consistent with the NRC and EPRI guidelines. The typical IST-related component types are included in the CCF analysis. These are:

- Motor operated valves
- Air operated valves
- Check valves
- Electro-hydraulic valves
- Solenoid valves
- Operating pumps
- Standby pumps
- Turbine-driven pumps
- Positive displacement pumps

Human Reliability Analysis

TU Electric spent extensive amount of time to review, analyze and document human interactions that were modeled in the IPE study. This analysis is consistent with the guidelines of SHARP methodology developed by EPRI. This analysis included an evaluation of operator timing and emergency operating procedures that might create more demands on the operator. In general, three groups of human interactions were considered, namely, latent human errors, human errors associated with initiating events, and dynamic human errors. In addition, a detailed recovery analysis was performed to properly account for the possible recovery actions. The approach adopted for the CPSES IPE follows the general guidelines in the EPRI recovery analysis (EPRI RP 3206-03, "Modeling of Recovery Actions in PRAs"). The recovery analysis included the interview of operations staff with extensive plant experience, development of decision trees, review of related procedures and drawings, and consideration of the available time for each critical recovery action. The human reliability analysis process and results were all documented in a separate notebook.

IPE Review Process

To ensure a high-quality IPE and to provide quality control to the IPE Process, two types of independent reviews were conducted. One was done internally by TU Electric staff, and the other was done externally by outside PSA experts. In general, both reviews were applied to the entire examination process except when it was not possible due to the availability of resources or required skills. In those few cases, as a minimum, each task was reviewed thoroughly by either an internal or external independent reviewer. Furthermore, a final independent review was performed after the IPE study was completed. A team of PRA experts was selected from the industry to independently review the entire IPE study and its supporting analyses. The review team spent one week at the TU Electric offices where documents, procedures and supporting calculations and analyses were available for use. The results of all independent review activities performed by internal and external reviewers were well documented as part of the IPE documentation requirements.

4.0 SUMMARY AND CONCLUSIONS

Section 3.0 provides an overview of the process used to develop the risk based IST plan for CPSES. This section provides a discussion of the results and conclusions of the process.

4.1 Summary of Expert Panel Process

As described earlier, the expert panel process was integrated with a Steering Committee which in turn coordinated with other industry activities such as the ASME research program and the WOG check valve program. The expert panel for risk-based IST was essentially the same as the Maintenance Rule expert panel with the addition of the Steering Committee chairman and the IST program coordinator, both of whom were knowledgeable of IST requirements and commitments, IST plan implementation, and CPSES plant performance.

To prepare for the expert panel review, the risk ranking team developed a set of simplified P&IDs for all the systems modeled in the IPE. The IPE risk category results, component tag numbers, and the location of the components in the systems were all shown on the simplified diagrams. Using this information and the design basis functions addressed by IST as documented in the IST plan, the panel reviewed and validated or adjusted the ranking results.

The panel's principal responsibility was to ensure the risk ranking information was consistent with plant design, operating procedures, and with plant- specific operating experience. The IPE and IST functions were compared to ensure consistency with plant design. In particular, reverse flow in check valves was evaluated to see if it might be risk significant since the IPE assumed this to be low probability. If redundant trains could be affected by that failure mode, the risk ranking was adjusted accordingly. Also, information was fed back to the ranking process to reflect unmodeled operator actions that altered some ranking information, usually a RAW value rather than a FV value. Finally, the panel identified operational concerns about a specific component that might affect the risk ranking or might make in-service testing desirable for other reasons. In more than one case, a component's ranking was increased to high because in-service testing helped prevent entry into a limiting condition for operation (LCO).

The panel also reviewed the sensitivity of the component rankings to common cause failure. Many of these components were valves in the lower half of the FV medium category (i.e., from 0.005 to 0.001). The panel felt that these were important components and that they should be retained as is in the IST program.

The panel also reviewed the rankings and their associated technical bases for other sources of risk and other risk measures, namely, the IPEEE and outage risk sources and the large, early release risk measure. Based on this information, the ranking of some components was increased to high.

In the event that the panel found a component to be potentially high (low FV, but high RAW), the panel selected a compensatory measure to ensure that component functionality would still be evaluated on a regular basis by other plant programs. Because pumps were often ranked high and potentially high components were often in the flow path for the IST pump test, the quarterly pump test was often found to be an effective compensatory measure for suction and discharge check valves. Potentially high MOVs were often "tested" by other technical specification requirements, namely slave relay tests.

The panel also spent a significant portion of its time reviewing IST components not modeled by the IPE, and IST components that were modeled by the IPE but for which not all IST functions were modeled. Risk ranking of these functions was based on insights gained from the earlier work, e.g., components whose failures might affect redundant trains were ranked high.

The final ranking step performed by the panel was to consider IPE components not in the IST which met the criteria for high risk. All the high risk components not in the IST program were confirmed by the expert panel. In general, the importance of instrument air and the decay heat removal related portions of main steam were the principal focus of the panel's considerations. Evaluations were designated to determine how to best use in-service testing techniques to address the more safety significant failure modes modeled in the IPE.

For high ranked components in the IST, the panel decided to maintain all in-service testing as is, regardless of whether some failure modes (and therefore some tests) were not risk significant. This conservative approach was adopted for ease of implementation and administrative consistency. For low ranked components in the IST, the panel discussed the technical basis for increasing test intervals and yet maintaining plant safety. In addition, the panel considered implementation issues associated with particular test intervals. The panel concluded that generally a staggered test implementation over 6 years would be the best implementation strategy.

4.2 Results and Conclusions

In this study, all components within the scope of the IST program were examined. In all, a total of 687 components were examined and ranked as either High-more safety significant or Low-less safety significant. Of this total, 654 valves were evaluated, 117 (17.9%) of which were ranked high and 537 (82.1%) of which were ranked low. Thirty-three (33) pumps were evaluated, 21 (63.6%) of which were ranked high and 12 (36.4%) of which were ranked low. Of the total components, 375 (54.6%) were modeled in the IPE and 312 (45.4%) were in IST only, most (285) of the latter being low ranked valves. Only those determined to be less safety significant (low) will be considered for a code exemption.

Table 4-1 lists all the components by tag number that were examined in this evaluation. This table shows the entire spectrum of the review and the results of the expert panel evaluations. The risk ranking process was concluded to be robust. It generated results that were consistent with deterministic insights from the expert panel and found to be safety neutral. The following spectrum of risk and deterministic insights demonstrates this conclusion:

- a spectrum of risk sources were considered, i.e., IPE, external *and* outage,
- multiple risk measures were considered, i.e., CDF *and* LERF,
- diverse importance measures were used, i.e., FV *and* RAW,
- sensitivity studies *consistently* demonstrated that the risk significant components had been identified,
- both IPE *and* IST functions were compared and evaluated and considered in an integrated manner, and
- both PRA *and* deterministic insights from the expert panel were incorporated into both the ranking results and the resulting IST plan.

The scope and level of detail of the results review by the expert panel, the emphasis placed on understanding why components were ranked high or low, the careful comparison of the IPE and the IST functions, and the sensitivity studies performed all demonstrated the technical adequacy of the IPE to serve as the basis for this and other risk based applications. The resulting risk based IST program is considered by the expert panel to have the appropriate changes (both increases as well as decreases in scope) and the appropriate checks and balances to ensure burden reduction can be achieved while maintaining or even improving plant safety.

The results of this analysis indicate that the risk increase associated with the proposed interval changes is acceptable even with the very conservative assumptions used in the study. The total risk may in fact decrease if the overall IST program becomes more efficient by focusing on the more important components. Each of the important components are represented more than once in nearly all of the cutsets containing pumps and valves. A small improvement in the unavailabilities of important components would likely translate into a corresponding reduction in risk. This reduction in risk is probably larger than the increase that might result from increased test intervals since it is expected that the risk increase would be even less than the amounts calculated here.

In conclusion, modifying the test frequencies of the IST components in the low safety significance category to every 6 years is reasonable and at worst would result in an insignificant increase in total plant risk. By every indication from both engineering judgment and risk insights, the selected test interval increase for less safety significant components is prudent and the overall change to the IST program is believed to be safety neutral.

5.0 REFERENCES

1. ASME Bioler and Pressure Vessel Code, Section XI

2. Letter dated September 9, 1991 from James E. Richardson of the NRC to Forrest T. Rhodes of ASME.

3. Nuclear Regulatory Commission, "Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities; Final Policy Statement," Federal Register, Vol. 60, No. 158, August 16,1995.

4. NUMARC 93-05, "Guideline for Optimizing Safety Benefits in Assuring the Performance of Motor-Operated Valves," Nuclear Management and Resources Council, Inc., December 1993.

5. NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,"Nuclear Management and Resources Council, Inc., May 1993.

6. Electric Power Research Institute, "PSA Applications Guide," TR-105396, Project 3200-12, Final Report, August 1995.

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Cnanges	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 0	CP1-AFAPMD-01 (1)	MOTOR DRIVEN AUXILIARY FEEDWATER PUMP 1-01	0.0282	2.8296	High	No change	No change	No change	No change	High	No Change	High
Table 0	CP1-AFAPMD-02	MOTOR DRIVEN AUXILIARY FEEDWATER PUMP 1-02	0.0394	3.3020	High	No change	No change	No change	No change	High	No Change	High
Table 0	CP1-AFAPTD-01	TURBINE DRIVEN AUXILIARY FEEDWATER PUMP 1-01	0.2351	12.9035	High	No change	No change	No change	No change	High	No Change	High
Table 0	CP1-CCAPCC-01	COMPONENT COOLING WATER PUMP 1-01	0.0366	4.8323	High	No change	No change	No change	No change	High	No Change	High
Table 0	CP1-CCAPCC-02	COMPONENT COOLING WATER PUMP 1-02	0.0303	38.5384	High	No change	No change	No change	No change	High	No Change	High
Table 0	CP1-CHAPCP-05	SAFETY CHILLED WATER RECIRC PUMP 1-05	0.0060	1.7278	Medium	No change	No change	No change	No change	* Medium	No Change	High
Table 0	CP1-CHAPCP-06 (2)(4	SAFETY CHILLED WATER RECIRC PUMP 1-06	0.0003	1.3459	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 0	CP1-CTAPCS-01	CONTAINMENT SPRAY PUMP 1-01	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	High
Table 0	CP1-CTAPCS-02	CONTAINMENT SPRAY PUMP 1-02	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	High
Table 0	CP1-CTAPCS-03	CONTAINMENT SPRAY PUMP 1-03	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	High
Table 0	CP1-CTAPCS-04	CONTAINMENT SPRAY PUMP 1-04	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	High
Table 0	CP1-DDAPRM-01	REACTOR MAKEUP WATER PUMP 1-01	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 0	CP1-DOAPFT-01	DIESEL GENERATOR 1-01 FUEL OIL TRANSFER PUMP 1-01	0.0478	140.0000	High	No change	No change	No change	No change	None	Decreased	Low
Table 0	CP1-DOAPFT-02	DIESEL GENERATOR 1-01 FUEL OIL TRANSFER PUMP 1-02	0.0478	140.0000	High	No change	No change	No change	No change	None	Decreased	Low
Table 0	CP1-DOAPFT-03	DIESEL GENERATOR 1-02 FUEL OIL TRANSFER PUMP 1-03	0.0478	140.0000	High	No change	No change	No change	No change	None	Decreased	Low
Table 0	CP1-DOAPFT-04	DIESEL GENERATOR 1-02 FUEL OIL TRANSFER PUMP 1-04	0.0478	140.0000	High	No change	No change	No change	No change	None	Decreased	Low
Table 0	CP1-SWAPSW-01	STATION SERVICE WATER PUMP 1-01	0.0969	77.6709	High	No change	No change	No change	No change	High	No Change	High
Table 0	CP1-SWAPSW-02 (1)	STATION SERVICE WATER PUMP 1-02	0.0386	107.0000	High	No change	No change	No change	No change	High	No Change	High
Table 0	CP1-WPAPSS-01	SAFEGUARD BUILDING SUMP 1-01 PUMP 1-01	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 0	CP1-WPAPSS-02	SAFEGUARD BUILDING SUMP 1-01 PUMP 1-02	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 0	CP1-WPAPSS-03	SAFEGUARD BUILDING SUMP 1-02 PUMP 1-03	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 0	CP1-WPAPSS-04	SAFEGUARD BUILDING SUMP 1-02 PUMP 1-04	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 0	CPX-DDAPRM-01	REACTOR MAKEUP WATER PUMP X-01	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 0	CPX-SFAPSF-01	SPENT FUEL POOL COOLING WATER PUMP X-01	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 0	CPX-SFAPSF-02	SPENT FUEL POOL COOLING WATER PUMP X-02	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 0	TBX-CSAPBA-01	BORIC ACID TRANSFER PUMP 1-01	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	High
Table 0	TBX-CSAPBA-02	BORIC ACID TRANSFER PUMP 1-02	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	High
Table 0	TBX-CSAPCH-01 (1)	CENTRIFUGAL CHARGING PUMP 1-01	0.0125	1.5301	High	No change	No change	No change	No change	High	No Change	High

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 0	TBX-CSAPCH-02	CENTRIFUGAL CHARGING PUMP 1-02	0.0271	2.1861	High	No change	No change	No change	No change	High	No Change	High
Table 0	TBX-RHAPRH-01 (1)	RESIDUAL HEAT REMOVAL PUMP 1-01	0.0050	1.3468	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 0	TBX-RHAPRH-02	RESIDUAL HEAT REMOVAL PUMP 1-02	0.0088	1.6201	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 0	TBX-SIAPSI-01 (1)	SAFETY INJECTION PUMP 1-01	0.0146	1.2559	High	No change	No change	No change	No change	High	No Change	High
Table 0	TBX-SIAPSI-02	SAFETY INJECTION PUMP 1-02	0.0257	1.4509	High	No change	No change	No change	No change	High	No Change	High
Table 1	1-FV-2456	MD AFW PMP 1-01 TO CST RECIRC FLO VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1-FV-2457	MD AFW PMP 1-02 TO CST RECIRC FLO VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1-HV-2459	TD AFW PMP 1-01 DISCH TO SG 1-01 FLO CTRL VLV	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 1	1-HV-2460	TD AFW PMP 1-01 DISCH TO SG 1-02 FCV	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 1	1-HV-2461 (1)	TD AFW PMP 1-01 DISCH TO SG 1-03 FLO CTRL VLV	n/a	n/a	None	No change	Low	No change	No change	None	No Change	Low
Table 1	1-HV-2462	TD AFW PMP 1-01 DISCH TO SG 1-04 FLO CTRL VLV	0.0000	1.9356	None	No change	Low	No change	No change	None	No Change	Low
Table 1	1-HV-2480	MD AFW PMP 1-01 SSW SUCT ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1-HV-2481	MD AFW PMP 1-02 SSW SUCT ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1-HV-2482	TD AFW PMP 1-01 SSW SUCT ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1-HV-2484	CST 1-01 DISCH VLV 2484	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1-HV-2485	CST 1-01 DISCH VLV 2485	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1-HV-2491A	TD AFW PMP 1-01 DISCH TO SG 1-01 ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1-HV-2491B	MD AFW PMP 1-01 DISCH TO SG 1-01 ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1-HV-2492A	TD AFW PMP 1-01 DISCH TO SG 1-02 ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1-HV-2492B	MD AFW PMP 1-01 DISCH TO SG 1-02 ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1-HV-2493A	MD AFW PMP 1-02 DISCH TO SG 1-03 ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1-HV-2493B	TD AFW PMP 1-01 DISCH TO SG 1-03 ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1-HV-2494A	MD AFW PMP 1-02 DISCH TO SG 1-04 ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1-HV-2494B	TD AFW PMP 1-01 DISCH TO SG 1-04 ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1-LV-2478	MIN WTR TO CST 1-01 MU VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Revie *	Final Ranking Based On IST Study
Table 1	1-PV-2453A	MD AFW PMP 1-01 DISCH TO SG 1-01 FLO CTRL VLV	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 1	1-PV-2453B	MD AFW PMP 1-01 DISCH TO SG 1-02 CTRL VLV	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 1	1-PV-2454A (1)	MD AFW PMP 1-02 DISCH TO SG 1-03 CTRL VLV	n/a	n/a	None	No change	Low	No change	No change	None	No Change	Low
Table 1	1-PV-2454B	MD AFW PMP 1-02 DISCH TO SG 1-04 CTRL VLV	0.0000	2.8715	None	No change	Low	No change	No change	None	No Change	Low
Table 1	1AF-0009	DEMIN WTR TO CST 1-01 MU LN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0014	CST TO MD AFW PMP 1-01 SUCT CHK VLV	0.0003	2.0232	Low	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0024	CST TO MD AFW PMP 1-02 SUCT CHK VLV	0.0004	2.4741	Low	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0032	CST 1-01 TO TD AFW PMP CHK VLV	0.0003	2.0581	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0038	TD AFW PMP 1-01 DISCH CHK VLV	0.0003	2.0581	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0041	TD AFW PMP 1-01 DISCH ISOL VLV	0.0002	2.0582	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0042	TD AFW PMP 1-01 DISCH TST ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0045	TD AFW PMP 1-01 DISCH RECIRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0051	MD AFW PMP 1-02 DISCH CHK VLV	0.0004	2.4741	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0054	MD AFW PMP 1-02 DISCH ISOL VLV	0.0003	2.4741	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0055	MD AFW PMP 1-02 DISCH TST ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0057	MD AFW PMP 1-02 DISCH RECIRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0065 (1)	MD AFW PMP 1-01 DISCH CHK VLV	0.0003	2.0232	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0066 (1)	MD AFW PMP 1-01 DISCH ISOL VLV	0.0002	2.0232	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0067	MD AFW PMP 1-01 DISCH TST ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0069	MD AFW PMP 1-01 DISCH RECIRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0075	MD AFW PMP 1-01 DISCH TO SG 1-01 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0078	TD AFW PMP 1-01 DISCH TO SG 1-01 CHK VLV	n/a	n/a	None	No change	No change	No chang	No change	n/a	No Change	Low
Table 1	1AF-0083	MD AFW PMP 1-01 DISCH TO SG 1-02 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0086	TD AFW PMP 1-01 DISCH TO SG 1-02 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0093	MD AFW PMP 1-02 DISCH TO SG 1-03 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0098	TD AFW PMP 1-01 DISCH TO SG 1-03 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 1	1AF-0101	MD AFW PMP 1-02 DISCH TO SG 1-04 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0106	TD AFW PMP 1-01 DISCH TO SG 1-04 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0167	U1 AFW PMPS DISCH RECIRC TO CST CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 1	1AF-0215	MD AFW PMP 1-01 FCV TO SG 1-01 AIR SPLY UPSTRM CHK VLV	0.0003	1.9358	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0216	MD AFW PMP 1-01 FCV TO SG 1-01 AIR SPLY DNSTRM CHK VLV	0.0003	1.9358	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0217	MD AFW PMP 1-01 FCV TO SG 1-02 AIR SPLY UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0218	MD AFW PMP 1-01 FCV TO SG 1-02 AIR SPLY DNSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0219	MD AFW PMP 1-02 FCV TO SG 1-03 AIR SPLY UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0220	MD AFW PMP 1-02 FCV TO SG 1-03 AIR SPLY DNSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0221	MD AFW PMP 1-02 FCV TO SG 1-04 AIR SPLY UPSTRM CHK VLV	0.0003	1.9358	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0222	MD AFW PMP 1-02 FCV TO SG 1-04 AIR SPLY DNSTRM CHK VLV	0.0003	1.9358	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0223	TD AFW PMP 1-01 FCV TO SG 1-01 AIR SPLY DNSTRM CHK VLV	0.0003	1.9358	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0224	TD AFW PMP 1-01 FCV TO SG 1-01 AIR SPLY UPSTRM CHK VLV	0.0003	1.9358	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0226	TD AFW PMP 1-01 FCV TO SG 1-02 AIR SPLY UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0227	TD AFW PMP 1-01 FCV TO SG 1-02 AIR SPLY DNSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0228	TD AFW PMP 1-01 FCV TO SG 1-03 AIR SPLY UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0229	TD AFW PMP 1-01 FCV TO SG 1-03 AIR SPLY DNSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 1	1AF-0230	TD AFW PMP 1-01 FCV TO SG 1-04 AIR SPLY UPSTRM CHK VLV	0.0003	1.9358	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0231	TD AFW PMP 1-01 FCV TO SG 1-04 AIR SPLY DNSTRM CHK VLV	0.0003	1.9358	Low	No change	No change	No change	No change	Low	No Change	Low
Table 1	1AF-0232	AFWPT 1-01 STM SPLY VLV 2452-1 AIR SPLY DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0233	AFWPT 1-01 STM SPLY VLV 2452-1 AIR SPLY UPSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0234	AFWPT 1-04 STM SPLY VLV 2452-2 AIR SPLY DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 1	1AF-0235	AFWPT 1-01 STM SPLY VLV 2452-2 AIR SPLY UPSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-FV-4536	CCW PMP 1-01 RECIRC FLO VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 2	1-FV-4537	CCW PMP 1-02 RECIRC FLO VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 2	1-FV-4550A	VENT CHLR U1 CCW SPLY VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-FV-4650B	VENT CHLR U1 CCW RET VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-HV-4512 (1)(4)	U1 SFGD LOOP A CCW RET VLV	0.0028	23.7844	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 2	1-HV-4513	U1 SFGD LOOP B CCW RET VLV	0.0018	30.9018	Medium	No change	No change	No change	No change	None	No Change	High
Table 2	1-HV-4514	U1 SFGD LOOP A CCW SPLY VLV	0.0050	23.7844	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 2	1-HV-4515	U1 SFGD LOOP B CCW SPLY VLV	0.0018	30.9018	Medium	No change	No change	No change	No change	* None	No Change	High
Table 2	1-HV-4524	U1 NON-SFGD LOOP CCW DNSTRM RET VLV	0.0019	40.9779	Medium	No change	No change	No change	No change	None	No Change	High
Table 2	1-HV-4525	U1 NON-SFGD LOOP CCW UPSTRM RET VLV	0.0019	40.9779	Medium	No change	No change	No change	No change	None	No Change	High
Table 2	1-HV-4526	U1 NON-SFGD LOOP CCW UPSTRM SPLY VLV	0.0019	40.9779	Medium	No change	No change	No change	No change	None	No Change	High
Table 2	1-HV-4527	U1 NON-SFGD LOOP CCW DNSTRM SPLY VLV	0.0019	40.9779	Medium	No change	No change	No change	No change	None	No Change	High
Table 2	1-HV-4572	RHR HX 1-01 CCW RET VLV	0.0045	9.2011	Medium	No change	No change	No change	No change	Low	No Change	High
Table 2	1-HV-4573	RHR HX 1-02 CCW RET VLV	0.0048	9.2781	Medium	No change	No change	No change	No change	Low	No Change	High
Table 2	1-HV-4574	CS HX 1-01 CCW RET VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	1-HV-4575	CS HX 1-02 CCW RET VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	1-HV-4631A	U1 PSS CCW SPLY HDR ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-HV-4631B	U1 PSS CCW RET HDR ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-HV-4696	U1 THBR CLR CCW RET IRC ISOL VLV	0.0000	5.9646	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1-HV-4699	U1 RCP/THBR CLR CCW SPLY ORC UPSTRM ISOL VLV	0.0000	19.2050	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1-HV-4700	U1 RCP/THBR CLR CCW SPLY ORC DNSTRM ISOL VLV	0.0000	19.2050	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1-HV-4701	U1 RCP CLR CCW RET IRC ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	1-HV-4708	U1 RCP CLR CCW RET ORC ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	1-HV-4709	U1 THBR CLR CCW RET ORC ISOL VLV	0.0000	5.9646	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1-HV-4710	U1 XS LTDN/RCDT HX CCW SPLY ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-HV-4711	U1 XS LTDN/RCDT HX CCW RET ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 2	1-HV-4725	CNTMT CCW DRN TK 1-02 IRC ISOL VLV	n/a	n/a	None	No change	No change	Medium CIV	No change	n/a	No Change	High
Table 2	1-HV-4726	CNTMT CCW DRN TK 1-02 ORC ISOL VLV	n/a	n/a	None	No change	No change	Medium CIV	No change	n/a	No Change	High
Table 2	1-LV-4500	CCW SRG TK 1-01 MU VLV 4500	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-LV-4500-1	CCW SRG TK 1-01 RMUW SPLY VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-LV-4501	CCW SRG TK 1-01 MU VLV 4501	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1-PV-4552 (1)	SFTY CHLR 1-05 CCW RET PCV	n/a	n/a	None	No change	No change	No change	No change	* None	No Change	Low
Table 2	1-PV-4553	SFTY CHLR 1-06 CCW RET PCV	0.0000	1.1249	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1CC-0003	CCW SRG TK 1-01 RMUW SPLY CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1CC-0004	CCW SRG TK 1-01 DEMIN WTR SPLY CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1CC-0031	CCW PMP 1-01 DISCH CHK VLV	0.0005	3.0208	Low	No change	No change	No change	No change	Low	No Change	Low
Table 2	1CC-0061 (1)(4)	CCW PMP 1-02 DISCH CHK VLV	0.0000	38.5415	Low	No change	No change	No change	No change	Low	No Change	Low
Table 2	1CC-0611	XS LTDN HX 1-01 CCW SPLY RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1CC-0618	RCDT HX 1-01 CCW SPLY RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1CC-0629	U1 RCP CLR CCW RET HDR CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1CC-0646	RC PMP 1-04 THBR CLR CCW SPLY UPSTRM STOP CHK VLV	0.0000	6.1735	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1CC-0657	RC PMP 1-03 THBR CLR CCW SPLY UPSTRM STOP CHK VLV	0.0000	6.1735	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1CC-0687	RC PMP 1-02 THBR CLR CCW SPLY UPSTRM STOP CHK VLV	0.0000	6.1735	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1CC-0694	RC PMP 1-01 THBR CLR CCW SPLY UPSTRM STOP CHK VLV	0.0000	6.1735	None	No change	No change	No change	No change	None	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 2	1CC-0713	U1 RCP CLR CCW SPLY HDR CHK VLV	0.0000	19.2052	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1CC-0831	U1 RC PMP THBR CLR CCW RET HDR RLF CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1CC-1067	CNTMT CCW DRN TK 1-02 RET HDR RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	1CC-1075	RC PMP 1-01 THBR CLR CCW SPLY STOP CHK VLV	0.0000	6.1735	None	No change	No change	No change	No change	' None	No Change	Low
Table 2	1CC-1076	RC PMP 1-02 THBR CLR CCW SPLY STOP CHK VLV	0.0000	6.1735	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1CC-1077	RC PMP 1-03 THBR CLR CCW SPLY STOP CHK VLV	0.0000	6.1735	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1CC-1078	RC PMP 1-04 THBR CLR CCW SPLY STOP CHK VLV	0.0000	6.1735	None	No change	No change	No change	No change	None	No Change	Low
Table 2	1CC-1079	CIRCLE SEAL CHECK VALVE 1/2" FNPT	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	1CC-1080	CIRCLE SEAL CHECK VALVE 1/2" FNPT	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	1CC-1081	CIRCLE SEAL CHECK VALVE 1/2" FNPT	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	1CC-1082	CIRCEL SEAL CHECK VALVE 1/2 FNPT	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	X-PCV-H116A (1)(4)	UPS A\C UNIT X-01 CCW RET PCV	0.0000	1.0132	Low	Medium	No change	Medium	No change	Low	No Change	High
Table 2	X-PCV-H116B	UPS A\C UNIT X-02 CCW RET PCV	0.0002	1.1610	Low	Medium	No change	Medium	No change	Low	No Change	High
Table 2	X-PV-3583	CR A\C UNIT X-01 CCW RET PCV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 2	X-PV-3584	CTRL RM A\C UNIT X-02 REFRIG CNDSR CCW RET PRESS CTRL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 2	X-PV-3585	CR A\C UNIT X-03 CCW RET PCV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 2	X-PV-3586	CTRL RM A\C UNIT X-/4 REFRIG CNDSR CCW RET PRESS CTR L VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 3	1-HV-6720	SFTY CH WTR SRG TK 1-01 RMUW SPLY VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 3	1CH-0300	SFTY CH WTR SRG TK 1-01 DEMIN WTR SPLY CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 3	1CH-0301	SFTY CH WTR SRG TK 1-01 DEMIN WTR SPLY CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 3	1CH-0302	SFTY CH WTR SRG TK 1-01 MU LVL VLV 6712 BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 3	1CH-0305	SFTY CH WTR SRG TK 1-01 MU LVL VLV 6713 BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8100	U1 Rcp Sl Wtr Ret Isol Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8104	U1 Emer Borate Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8105	U1 Chrg Pmp To RCS Cntmt Isol Vlv	0.0002	1.7840	Low	No change	No change	No change	No change	None	No Change	Low
Table 4	1-8106	U1 Chrg Pmp To RCS Cntmt Isol Vlv	0.0002	1.7840	Low	No change	No change	No change	No change	None	No Change	Low
Table 4	1-8109	PD CHRG PMP 1-01 RECIRC VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8110 (1)(4)	Ccp 1-01/1-02 Dnstrm Miniflow Vlv	0.0002	1.7840	Low	Medium	No change	No change	No change	Low	No Change	High
Table 4	1-8111	Ccp 1-01/1-02 Upstrm Miniflow Vlv	0.0009	1.9458	Low	Medium	No change	No change	No change	Low	No Change	High
Table 4	1-8112	U1 RC Pmp Seal Wtr Ret Isol Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8145	U1 Przr Aux Spr Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8146	U1 RCS Loop 4 Chrg Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8147	U1 RCS LOOP 1 CHRG VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8152	U1 LTDN CNTMT ORC ISOL VLV	n/a	n/a	None	No change	No change	Medium CIV	No change	n/a	No Change	High
Table 4	1-8153	U1 XS LTDN ISOL VLV 8153	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8154	U1 XS LTDN ISOL VLV 8154	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8160	U1 LTDN CNTMT IRC ISOL VLV	n/a	n/a	None	No change	No change	Medium CIV	No change	n/a	No Change	High
Table 4	1-8202A	PD CHRG PMP 1-01 SUCT STAB DNSTRM VNT VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8202B	PD CHRG PMP 1-01 SUCT STAB UPSTRM VNT VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 4	1-8210A	PD CHRG PMP 1-01 SUCT STAB H2/N2 SPLY VLV 8210A	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8210B	PD CHRG PMP 1-01 SUCT STAB H2/N2 SPLY VLV 8210B	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8351A	RC Pmp 1-01 SI Wtr Inj Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8351B	RC Pmp 1-02 SI Wtr Inj Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8351C	RC Pmp 1-03 SI Wtr Inj Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8351D	RC Pmp 1-04 SI Wtr Inj Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8378A	RCS Loop 1-04 Chrg Dnstrm Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8378B	RCS Loop 1-04 Chrg Upstrm Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8379A	RCS LOOP 1-01 CHRG LN DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8379B	RCS LOOP 1-01 CHRG LN UPSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8381	Chrg Ln Irc Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8481A (1)	Ccp 1-01 Disch Chk Vlv	0.0001	1.5050	Low	No change	No change	No change	No change	Low	No Change	Low
Table 4	1-8481B	Ccp 1-02 Disch Chk Vlv	0.0003	2.0913	Low	No change	No change	No change	No change	Low	No Change	Low
Table 4	1-8497	Pd Pmp 1-01 Disch Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-8510A	CCP 1-01 ALT MINIFLO RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8510B	CCP 1-02 ALT MINIFLO RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-8511A	Ccp 1-01 Alt Miniflo Isol Vlv	0.0012	4.8723	Medium	No change	No change	No change	No change	None	No Change	High
Table 4	1-8511B	Ccp 1-02 Alt Miniflo Isol Vlv	0.0012	4.8723	Medium	No change	No change	No change	No change	None	No Change	High
Table 4	1-8512A	Ccp 1-02 Alt Miniflo Isol Vlv	0.0012	4.8723	Medium	No change	No change	No change	No change	None	No Change	High
Table 4	1-8512B	Ccp 1-01 Alt Miniflo Isol Vlv	0.0012	4.8723	Medium	No change	No change	No change	No change	None	No Change	High
Table 4	1-8546	Rwst 1-01 To Chrg Pmp Suct Chk Vlv	0.0002	1.7840	Low	Medium	No change	Medium	No change	Low	No Change	High
Table 4	1-FCV-0110B	U1 RCS MU TO CHRG PMP FLO CTRL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-FCV-0111A	RMUW TO CVCS BA BLNDR 1-01 FLO CTRL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial "SR" Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 4	1-FCV-0111B	RCS MU TO VCT 1-01 ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1-HV-8220	U1 CHARGE PMP SUCT HI PNT VNT VLV 8220	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-HV-8221	U1 CHARGE PMP HI PNT VNT VLV 8221	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1-LCV-0112B (1)(4)	VCT 1-01 TO CHRG PMP SUCT VLV 0112B	0.0002	1.7841	Low	Medium	No change	No change	No change	Low	Increased	High
Table 4	1-LCV-0112C	VCT 1-01 TO CHRG PMP SUCT VLV 0112C	0.0009	1.9459	Low	Medium	No change	No change	No change	Low	Increased	High
Table 4	1-LCV-0112D (1)(4)	RWST 1-01 TO CHRG PMP SUCT VLV 0112D	0.0002	1.7841	Low	Medium	No change	No change	No change	Low	Increased	High
Table 4	1-LCV-0112E	RWST 1-01 TO CHRG PMP SUCT VLV 0112E	0.0009	1.9459	Low	Medium	No change	No change	No change	Low	Increased	High
Table 4	1-LCV-0459	U1 LTDN ISOL VLV 0459	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 4	1-LCV-0460	U1 LTDN ISOL VLV 0460	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 4	1CS-8180	U1 IRC SL WTR RET CNMT ISOL BYP CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8350A	RC PMP 1-01 SL WTR INJ CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8350B	RC PMP 1-02 SL WTR INJ CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8350C	RC PMP 1-03 SL WTR INJ CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8350D	RC PMP 1-04 SL WTR INJ CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8367A	RC PMP 1-01 SL INJ IMB CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8367B	RC PMP 1-02 SL INJ IMB CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8367C	RC PMP 1-03 SL INJ IMB CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8367D	RC PMP 1-04 SL INJ IMB CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8368A	RC PMP 1-01 SL INJ IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8368B	RC PMP 1-02 SL INJ IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8368C	RC PMP 1-03 SL INJ IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8368D	RC PMP 1-04 SL INJ IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8377	U1 RCS AUX SPR LN TO PRZR 1-01 CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1CS-8442	U1 EMER BORATE LN CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8473	BA PMP 1-02 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	1CS-8480A	CCP 1-01 RECIRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 4	1CS-8480B	CCP 1-02 RECIRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	1CS-8487	BA PMP 1-01 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 4	XCS-0037	BA PMP 1-01 MINIFLO CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	XCS-0039	BA PMP 2-01 MINIFLO CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 4	XCS-0041	BA PMP 1-02 MINIFLO CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	* n/a	Low	Low
Table 4	XCS-0044	BA PMP 2-02 MINIFLO CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	1-FV-4772-1	Cs Pmp 1-01 Recirc Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-FV-4772-2	Cs Pmp 1-03 Recirc Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-FV-4773-1	Cs Pmp 1-02 Recirc Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-FV-4773-2	Cs Pmp 1-04 Recirc Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-HV-4758	RWST TO CS PMP 1-01/1-03 SUCT VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-HV-4759	RWST TO CS PMP 1-02/1-04 SUCT VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-HV-4776	CS HX 1-01 OUT VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-HV-4777	CS HX 1-02 OUT VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-HV-4782	CNTMT SMP TO CS PMP 1-01/1-03 SUCT ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-HV-4783	CNTMT SMP TO CS PMP 1-02/1-04 SUCT ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 5	1-LV-4754	CS CHEM ADD TK 1-01 DISCH VLV 4754	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	1-LV-4755	CS CHEM ADD TK 1-01 DISCH VLV 4755	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	1CT-0013	CS PMP 1-04 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0020	CS PMP 1-04 EDUCT SUCT CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	1CT-0025	RWST TO CS PMP 1-02/1-04 SUCT CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0031	CS PMP 1-02 EDUCT SUCT CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	1CT-0042	CS PMP 1-02 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 5	1CT-0047	CS PMP 1-04 MINIFLO LN CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0048	CS PMP 1-02 MINIFLO LN CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0063	CS PMP 1-03 MINIFLO LN CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0064	CS PMP 1-01 MINIFLO LN CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0065	CS PMP 1-03 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0072	CS PMP 1-03 EDUCT SUCT CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	* n/a	Low	Low
Table 5	1CT-0077	RWST TO CSP 1-01/1-03 SUCT CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0082	CS PMP 1-01 EDUCT SUCT CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	1CT-0094	CS PMP 1-01 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0142	U1 CS TRN A HDR IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0145	U1 CS TRN B HDR IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0148	CNTMT SMP TO CS PMP 1-02/1-04 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0149	CNTMT SMP TO CS PMP 1-01/1-03 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	Low	Low
Table 5	1CT-0309	CNTMT SMP TO CS PMP 1-01/1-03 SUCT ISOL VLV BONNET RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	1CT-0310	CNTMT SMP TO CS PMP 1-02/1-04 SUCT ISOL VLV BONNET RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	CTVBCA-01	CHEMICAL ADDITIVE TANK VENTPATH	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 5	CTVBCA-02	CHEMICAL ADDITIVE TANK VENTPATH	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1-HV-5365	U1 CNTMT DEMIN/RMUW SPLY ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1-HV-5366	U1 CNTMT DEMIN/RMUW SPLY IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1DD-0006	RMUWST 1-01 IN UPSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1DD-0016	RMUW PMP 1-01 RECIRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1DD-0018	RMUW PMP 1-01 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1DD-0020	RMUW PMP 1-01 TO RMUW HDR ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1DD-0064	RMUWST 1-01 RET UPSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1DD-0065	RMUWST 1-01 IN DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	1DD-0066	RMUWST 1-01 RET DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 6	1DD-0430	U1 DEMIN/RMUW CNTMT PENET ORC RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	XDD-0044	RMUW PMP X-01 MINIFLO RECIRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	XDD-0048	RMUW PMP X-01 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 6	XDD-0103	RMUW PMP 2-01 TO RMUW HDR ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0004	DG 1-01 FO XREF PMP 1-01 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 7	1DO-0005	DG 1-01 FO XREF PMP 1-02 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 7	1DO-0016	DG 1-02 FO XFER PMP 1-03 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 7	1DO-0017	DG 1-02 FO XFER PMP 1-04 DISCH CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 7	1DO-0049 (1)	DG 1-01 FO DAY TK 1-01 XFER HDR CHK VLV	0.0003	1.9795	Low	No change	No change	No change	No change	Low	No Change	Low
Table 7	1DO-0050	DG 1-02 FO DAY TK 1-02 XFER HDR CHK VLV	0.0005	3.0296	Low	No change	No change	No change	No change	Low	No Change	Low
Table 7	1DO-0058	DG 1-01 START AIR RCVR 1-01 IN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0059	DG 1-01 START AIR RCVR 1-02 IN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0060	DG 1-02 START AIR RCVR 1-03 IN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0061	DG 1-02 START AIR RCVR 1-04 IN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0062	DG 1-01 AIR DRYR 1-02 OUT DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0063	DG 1-01 AIR DRYR 1-01 OUT DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0064	DG 1-02 AIR DRYR 1-04 OUT DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0065	DG 1-02 AIR DRYR 1-03 OUT DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0104	DG 1-01 JKT WTR KWP 1-01 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0107	DG 1-01 JKT WTR TEMP CTRL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0157	DG 1-01 ENGN L\O PMP 1-01 SUCT CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0158	DG 1-01 AUX L\O PMP 1-02 SUCT CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0204	DG 1-02 JW KWP 1-02 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0207	DG 1-02 JW TEMP CTRL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 7	1DO-0257	DG 1-02 ENGN L\O PMP 1-03 SUCT CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 7	1DO-0258	DG 1-02 AUX LIO PMP 1-04 SUCT CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-FV-2181	SG 1-01 FW SPLIT FLO BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-FV-2182	SG 1-02 FW SPLIT FLO BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-FV-2183	SG 1-03 FW SPLIT FLO BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-FV-2184	SG 1-04 FW SPLIT FLO BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-FV-2193	SG 1-01 Fw Prehtr Byp Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1-FV-2194	SG 1-02 FW PREHTR BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-FV-2195	SG 1-03 FW PREHTR BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-FV-2196	SG 1-04 Fw Prehtr Byp Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1-HV-2134	SG 1-01 FW ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	High	High
Table 8	1-HV-2135	SG 1-02 FW ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	High	High
Table 8	1-HV-2136	SG 1-03 FW ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	High	High
Table 8	1-HV-2137	SG 1-04 FW ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	High	High
Table 8	1-HV-2154	FW LN 1-01 SEC SMPL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-HV-2155	FW LN 1-02 SEC SMPL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-HV-2185	SG 1-01 FW ISOL BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-HV-2186	SG 1-02 FW ISOL BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-HV-2187	SG 1-03 FW ISOL BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1-HV-2188	SG 1-04 FW ISOL BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1FW-0070	SG 1-03 FW HDR CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0076	SG 1-02 FW HDR CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 8	1FW-0082	SG 1-01 FW HDR CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0088	SG 1-04 FW HDR CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0191	SG 1-04 FW PREHTR BYP ORC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1FW-0192	SG 1-01 FW PREHTR BYP ORC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1FW-0193	SG 1-02 FW PREHTR BYP ORC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1FW-0194	SG 1-03 FW PREHTR BYP ORC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 8	1FW-0195	SG 1-04 FW PREHTR BYP IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0196	SG 1-01 FW PREHTR BYP IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0197	SG 1-02 FW PREHTR BYP IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0198	SG 1-03 FW PREHTR BYP IRC CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0199	SG 1-04 AFW NZL CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0200	SG 1-01 AFW NZL CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0201	SG 1-02 AFW NZL CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 8	1FW-0202	SG 1-03 AFW NZL CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1-HV-2333A	MSIV 1-01	0.0004	6.9592	Low	No change	No change	Low SGTR-CIV	No change	None	No Change	Low
Table 9	1-HV-2333B	MSIV 1-01 BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2334A	MSIV 1-02	0.0004	6.9592	Low	No change	No change	Low SGTR-CIV	No change	None	No Change	Low
Table 9	1-HV-2334B	MSIV 1-02 BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2335A	MSIV 1-03	0.0004	6.9592	Low	No change	No change	Low SGTR-CIV	No change	None	No Change	Low
Table 9	1-HV-2335B	MSIV 1-03 BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2336A	MSIV 1-04	0.0004	6.9592	Low	No change	No change	Low SGTR-CIV	No change	None	No Change	Low
Table 9	1-HV-2336B	MSIV 1-04 BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2397	SG 1-01 BLDN ISOL VLV	n/a	n/a	None	No change	No change	Low SGTR-CIV	No change	n/a	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 9	1-HV-2397A	SG 1-01 BLDN HELB ISOL VLV	n/a	n/a	None	No change	No change	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2398	SG 1-02 BLDN ISOL VLV	n/a	n/a	n/a	n/a	n/a	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2398A	SG 1-02 BLDN HELB ISOL VLV	n/a	n/a	n/a	n/a	n/a	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2399	SG 1-03 BLDN ISOL VLV	n/a	n/a	n/a	n/a	n/a	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2399A	SG 1-03 BLDN HELB ISOL VLV	n/a	n/a	n/a	n/a	n/a	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2400	SG 1-04 BLDN ISOL VLV	n/a	n/a	n/a	n/a	n/a	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2400A	SG 1-04 BLDN HELB ISOL VLV	n/a	n/a	n/a	n/a	n/a	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2401A	SG 1-01 DRUM SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2401B	SG 1-01 BLDN SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2402A	SG 1-02 DRUM SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2402B	SG 1-02 BLDN SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2403A	SG 1-03 DRUM SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2403B	SG 1-03 BLDN SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2404A	SG 1-04 DRUM SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2404B	SG 1-04 BLDN SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2405	SG 1-01 SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2406	SG 1-02 SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2407	SG 1-03 SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2408	SG 1-04 SMPL ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1-HV-2409	MSL 1-01 BEF MSIV DPOT 1-25 ISOL VLV	n/a	n/a	None	No change	No change	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2410	MSL 1-02 BEF MSIV DPOT ISOL VLV	n/a	n/a	None	No change	No change	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2411	MSL 1-03 BEF MSIV DPOT ISOL VLV	n/a	n/a	None	No change	No change	Low SGTR-CIV	No change	n/a	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 9	1-HV-2412	MSL 1-04 BEF MSIV DIPOT ISOL VLV	n/a	n/a	None	No change	No change	Low SGTR-CIV	No change	n/a	No Change	Low
Table 9	1-HV-2452-1	MSL 1-01 TO AFWPT STM SPLY VLV	0.0000	1.0083	None	No change	No change	Low SGTR-CIV	No change	None	No Change	Low
Table 9	1-HV-2452-2	MSL 1-04 TO AFWPT STM SPLY VLV	0.0000	1.0083	None	No change	No change	Low SGTR-CIV	No change	None	No Change	Low
Table 9	1-PV-2325	SG 1-01 ATMOS RLF VLV	0.0008	1.0329	Low	Medium	No change	Low SGTR-CIV	No change	Low	No Change	High
Table 9	1-PV-2326	SG 1-02 ATMOS RLF VLV	n/a	n/a	n/a	Medium	No change	Low SGTR-CIV	No change	n/a	No Change	High
Table 9	1-PV-2327	SG 1-02 ATMOS RLF VLV	n/a	n/a	n/a	Medium	No change	Low SGTR-CIV	No change	n/a	No Change	High
Table 9	1-PV-2328	SG 1-04 ATMOS RLF VLV	0.0006	1.0248	Low	Medium	No change	Low SGTR-CIV	No change	Low	No Change	High
Table 9	1MS-0021	SG 1-01 SFTY VLV 0021	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0022	SG 1-01 SFTY VLV 0022	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0023	SG 1-01 SFTY VLV 0023	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0024	SG 1-01 SFTY VLV 0024	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0025	SG 1-01 SFTY VLV 0025	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0026	VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0058	SG 1-02 SFTY VLV 0058	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0059	SG 1-02 SFTY VLV 0059	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0060	SG 1-02 SFTY VLV 0060	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0061	SG 1-02 SFTY VLV 0061	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0062	SG 1-02 SFTY VLV 0062	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0063	VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0093	SG 1-03 SFTY VLV 0093	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0094	SG 1-03 SFTY VLV 0094	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0095	SG 1-03 SFTY VLV 0095	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0096	SG 1-03 SFTY VLV 0096	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0097	SG 1-03 SFTY VLV 0097	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0098	SG 1-03 ATMOS RLF VLV UPSTRM ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0129	SG 1-04 SFTY VLV 0129	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0130	SG 1-04 SFTY VLV 0130	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0131	SG 1-04 SFTY VLV 0131	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0132	SG 1-04 SFTY VLV 0132	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0133	SG 1-04 SFTY VLV 0133	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 9	1MS-0134	VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 9	1MS-0142	CHK VLV	0.0000	1.0083	None	No change	No change	No change	No change	None	No Change	Low
Table 9	1MS-0143	CHK VLV	0.0000	1.0083	None	No change	No change	No change	No change	None	No Change	Low
Table 9	1MS-0680	SG 1-01 ATMOS RLF VLV AIR SPLY UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0681	SG 1-01 ATMOS RLF VLV AIR SPLY DNSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0682	UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0683	SG 1-02 ATMOS RLF VLV AIR SPLY DNSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0684	SG 1-03 ATMOS RLF VLV AIR SPLY UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0685	DNSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0686	UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 9	1MS-0687	DNSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 10	1-8000A (2)(4)	Przr 1-01 Porv 0455A Blk Vlv	0.0028	1.3049	High	No change	No change	No change	No change	High	No Change	High
Table 10	1-8000B	Przr 1-01 Porv 0456 Blk Vlv	0.0110	2.6299	High	No change	No change	No change	No change	High	No Change	High
Table 10	1-8010A	Przr 1-01 Sfty Vlv A	0.0057	3.8695	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 10	1-8010B	Przr 1-01 Sfty Vlv B	0.0057	3.8695	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 10	1-8010C	Przr 1-01 Sfty Vlv C	0.0057	3.8695	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 10	1-8026	PRT 1-01 VNT IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 10	1-8027	PRT 1-01 VNT ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 10	1-8046	RMUW TO PRT 1-01 SPLY IRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 10	1-8047	RMUW TO PRT 1-01/CNTMT SPLY ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 10	1-HV-3607	RV 1-01 HEAD UPSTRM VNT VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 10	1-HV-3608	RV 1-01 HEAD DNSTRM VNT VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 10	1-HV-3609	PRZR 1-01 UPSTRM VNT VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 10	1-HV-3610	PRZR 1-01 DNSTRM VNT VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 10	1-PCV-0455A	PRZR 1-01 PORV 0455A	0.0128	1.5130	High	No change	Category 1	No change	No change	High	No Change	High
Table 10	1-PCV-0456	PRZR PWR OPERATED RELIEF VLV	0.0167	2.6291	High	No change	Category 1	No change	No change	High	No Change	High
Table 10	1RC-0036	RMUW TO PRT 1-01/CNTMT ORC RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Low	Low
Table 10	1SI-0166	PRZR 1-01 PORV 0455A N2 ACCUM 1-02 UPSTRM IN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 10	1SI-0167	PRZR 1-01 PORV 0455A N2 ACCUM 1-02 DNSTRM IN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 10	1SI-0168	PRZR 1-01 PORV 0456 N2 ACCUM 1-01 UPSTRM IN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 10	1SI-0169	PRZR 1-01 PORV 0456 N2 ACCUM 1-01 DNSTRM IN CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 11	1-8701A	RHR Pmp 1-01 Hl 1-01 Recirc Omb Isol Vlv	n/a	n/a	None	No change	Category 2	Medium ISLOCA	No change	n/a	No Change	High

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 11	1-8701B	RHR Pmp 1-02 Hl 1-04 Recirc Omb Isol Vlv	n/a	n/a	None	No change	Category 2	Medium ISLOCA	No change	n/a	No Change	High
Table 11	1-8702A	RHR Pmp 1-01 Hl 1-01 Recirc Imb Isol Vlv	n/a	n/a	None	No change	Category 2	Medium ISLOCA	No change	n/a	No Change	High
Table 11	1-8702B	RHR Pmp 1-02 Hl 1-04 Recirc Imb Isol Vlv	n/a	n/a	None	No change	Category 2	Medium ISLOCA	No change	n/a	No Change	High
Table 11	1-8708A	RHR Pmp 1-01 Suct Rlf Vlv	n/a	n/a	None	No change	Category 1	No change	No change	n/a	No Change	High
Table 11	1-8708B	RHR Pmp 1-02 Suct Rlf Vlv	n/a	n/a	None	No change	Category 1	No change	No change	n/a	No Change	High
Table 11	1-8716A (1)	RHR Pmp 1-01 Xtie Vlv	0.0034	5.3279	Medium	No change	No change	No change	No change	Low	No Change	High
Table 11	1-8716B	RHR Pmp 1-02 Xtie Vlv	0.0037	5.3988	Medium	No change	No change	No change	No change	Low	No Change	High
Table 11	1-8717	U1 RHR Pmps Disch To Rwst Isol Vlv	0.0002	5.2624	Low	No change	No change	Medium ISLOCA	No change	Low	No Change	High
Table 11	1-8730A	RHR Hx 1-01 Disch Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 11	1-8730B	RHR Hx 1-02 Disch Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 11	1-FCV-0610 (1)	RHR Pmp 1-01 Miniflo Vlv	0.0000	1.3467	Low	Medium	No change	No change	No change	None	No Change	High
Table 11	1-FCV-0611	RHR Pmp 1-02 Miniflo Vlv	0.0001	1.6200	Low	Medium	No change	No change	No change	None	No Change	High
Table 11	1-FCV-0618	RHR Hx 1-01 Byp Flo Ctrl Vlv	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 11	1-FCV-0619	RHR Hx 1-02 Byp Flo Ctrl Vlv	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 11	1-HCV-0606	RHR Hx 1-01 Flo Ctrl Vlv	n/a	n/a	None	No change	Category 1	No change	No change	n/a	No Change	High
Table 11	1-HCV-0607	RHR Hx 1-02 Flo Ctrl Vlv	n/a	n/a	None	No change	Category 1	No change	No change	n/a	No Change	High
Table 11	1-HV-4178	U1 RHR TRN A SMPL LN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 11	1-HV-4179	U1 RHR TRN B SMPL LN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 11	1-HV-4182	RHR TO RC PASS FLSH AND DIVERT MNFLD 1-07A LN ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	1SF-0011	U1 REFUEL CAV PURIF LOOP HDR UPSTRM ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	1SF-0012	U1 REFUEL CAV PURIF LOOP HDR DNSTRM ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	1SF-0021	U1 REFUEL CAV DRN TO REFUEL WTR PURIF PMP HDR UPSTRM ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	1SF-0022	U1 REFUEL CAV DRN TO REFUEL WTR PURIF PMP HDR DNSTRM ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	1SF-0053	REFUEL CAV SKM PMP 1-01 IRC DISCH VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	1SF-0054	REFUEL CAV SKM PMP 1-01 ORC DISCH VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	XSF-0003	SFP CLG WTR PMP X-01 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	XSF-0004	SFP CLG WTR PMP X-02 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	XSF-0160	U1 RMUW TO SFPCS CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	XSF-0161	U1 RMUW TO SFPCS ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 12	XSF-0179	U2 RMUW TO SFPCS ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 12	XSF-0180	U2 RMUW TO SFPCS CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8800A	RWST 1-01 TO SFPCS PMP DNSTRM DRN VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8800B	RWST 1-01 TO SFPCS PMP UPSTRM DRN VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8801A	Ccp 1-01/1-02 SI Isol Vlv 8801A	0.0002	1.7840	Low	No change	No change	No change	No change	None	No Change	Low
Table 13	1-8801B	Ccp 1-01/1-02 SI isol Vlv 8801B	0.0002	1.7840	Low	No change	No change	No change	No change	None	No Change	Low
Table 13	1-8802A	SI Pmp 1-01 To HI 2 & 3 Inj Isol Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8802B	SI Pmp 1-02 To HI 1 & 4 Inj Isol Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8804A (2)(4)	RHR Pmp 1-01 To Ccp Suct Vlv	n/a	n/a	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 13	1-8804B	RHR Pmp 1-02 To SI Pmps Suct Vlv	0.0011	1.1151	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 13	1-8806	Rwst 1-01 To SI Pmps Suct Vlv	0.0005	1.4773	Low	Medium	No change	Medium	No change	Low	No Change	High
Table 13	1-8807A	U1 SIP/CCP Suct Hdr Xtie Vlv 8807A	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8807B	U1 SIP/CCP Suct Hdr Xtie Vlv 8807B	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8808A	SI Accum 1-01 Inj Vlv	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 13	1-8808B	SI Accum 1-02 Inj Vlv	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 13	1-8808C	SI Accum 1-03 Inj Vlv	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 13	1-8808D	SI Accum 1-04 Inj Vlv	n/a	n/a	None	No change	Low	No change	No change	n/a	No Change	Low
Table 13	1-8809A (1)	RHR To CI 1-01/1-02 Inj Isol Vlv	0.0034	5.3279	Medium	No change	Category 1	No change	No change	Low	No Change	High
Table 13	1-8809B	RHR To CI 1-03/1-04 Inj Isol Vlv	0.0037	5.3968	Medium	No change	Category 1	No change	No change	Low	No Change	High
Table 13	1-8811A (1)	Cntmt Smp To RHR Pmp 1-01 Suct Isol Vlv	0.0045	5.0741	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 13	1-8811B	Cntmt Smp To RHR Pmp 1-02 Suct Isol Vlv	0.0072	9.4595	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 13	1-8812A (1)	Rwst 1-01 To RHR Pmp 1-01 Suct Vlv	0.0028	4.9150	Medium	No change	Category 1	No change	No change	Low	No Change	High
Table 13	1-8812B	Rwst 1-01 To RHR Pmp 1-02 Suct Vlv	0.0031	4.9650	Medium	No change	Category 1	No change	No change	Low	No Change	High
Table 13	1-8813	SI Pmp 1-01/1-02 Miniflo Ret Vlv	0.0021	5.3732	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 13	1-8814A	SI Pmp 1-01 Miniflo Vlv	0.0016	4.8719	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 13	1-8814B	SI Pmp 1-02 Miniflo Vlv	0.0016	4.8719	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 13	1-8815	Ccp 1-01/1-02 Inj Chk Vlv	0.0002	1.7870	Low	Medium	No change	Medium	No change	Low	No Change	High
Table 13	1-8817A	RHR CI 1-01 Inj Chk Vlv	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1-8817B	RHR CI 1-02 Inj Chk Vlv	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1-8818C	RHR CI 1-03 Inj Chk Vlv	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1-8818D	RHR CI 1-04 Inj Chk Vlv	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1-8821A	SI Pmp 1-01 Xtie Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8821B	SI Pmp 1-02 Xtie Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8823	U1 S. TO CL TST ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 13	1-8824	SI TO HL 1-01/1-04 TST ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8825	RHR TO HL 1-02/1-03 TST ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8835	SI Pmp 1-01/1-02 To CI Inj Isol Vlv	0.0006	1.4773	Low	Medium	Category 1	Medium	No change	Low	No Change	High
Table 13	1-8840	RHR To HI 1-02/1-03 Inj Isol Vlv	0.0247	13.9685	High	No change	No change	No change	No change	High	No Change	High
Table 13	1-8841A	RHR To RCS HI 1-02 Upstrm Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8841B	RHR To RCS HI 1-03 Upstrm Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8843	CCP 1-01/1-02 INJ HDR CHK VLV UPSTRM TST VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8871	U1 SI TST HDR RET IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8875A	SI Accum 1-01 N2 SPLY/VENT Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8875B	SI Accum 1-02 N2 SPLY/VENT Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8875C	SI Accum 1-03 N2 SPLY/VENT Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8875D	SI Accum 1-04 N2 SPLY/VENT Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8877A	SI Accum 1-01 Tst Ln Isol Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8877B	SI Accum 1-02 Tst Ln Isol Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8877C	SI Accum 1-03 Tst Ln Isol Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8877D	SI Accum 1-04 Tst Ln Isol Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8878A	SI Accum 1-01 Fill Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8878B	SI Accum 1-02 Fill Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8878C	SI Accum 1-03 Fill Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8878D	SI Accum 1-04 Fill Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8879A	RHR TO CL 1-01 TST VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8879B	RHR TO CL 1-02 TST VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8879C	RHR TO CL 1-03 TST VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8879D	RHR TO CL 1-04 TST VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8880	U1 SI/PORV ACCUM N2 SPLY ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8881	SI TO HL 1-02/1-03 TST ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8882	CCP 1-01/1-02 INJ HDR CHK VLV DNSTRM TST VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8888	U1 SI ACCUM FILL LN ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8889A	SI TO HL 1-01 TST LN VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8889B	SI TO HL 1-02 TST LN VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8889C	SI TO HL 1-03 TST LN VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8889D	SI TO HL 1-04 TST LN VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8890A	RHR TO CL 1-01/1-02 TST VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8890B	RHR TO CL 1-03/1-04 TST VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 13	1-8922A	SI Pmp 1-01 Disch Chk Vlv	0.0001	1.2558	Low	No change	No change	No change	No change	Low	No Change	Low
Table 13	1-8922B	SI Pmp 1-02 Disch Chk Vlv	0.0001	1.4509	Low	No change	No change	No change	No change	Low	No Change	Low
Table 13	1-8923A	SI Pmp 1-01 Suct Vlv	0.0000	1.0061	None	Medium	No change	Medium	No change	None	No Change	High
Table 13	1-8923B	SI Pmp 1-02 Suct Vlv	0.0000	1.0061	None	Medium	No change	Medium	No change	None	No Change	High
Table 13	1-8924	U1 SIP/CCP Suct Hdr Xtie Isol Vlv	0.0000	1.0002	None	No change	No change	No change	No change	None	High	High
Table 13	1-8926	SI Pmp 1-01/1-02 Suct Chk Vlv	0.0001	1.4773	Low	No change	No change	Medium	No change	Low	No Change	High
Table 13	1-8948A	SI Accum 1-01 Dnstrm Inj Chk Vlv	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1-8948B	SI Accum 1-02 Dnstrm Inj Chk Vlv	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1-8948C	SI Accum 1-03 Dnstrm Inj Chk Vlv	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1-8948D	SI Accum 1-04 Dnstrm Inj Chk Vlv	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1-8949A	RHR To Rcp Hl 1-01 Dnstrm Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8949B	RHR To Rcp Hl 1-02 Dnstrm Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8949C	RHR To Rcp Hl 1-03 Dnstrm Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8949D	RHR To Rcp Hl 1-04 Dnstrm Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8956A	SI Accum 1-01 Upstrm Inj Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	Increased	High
Table 13	1-8956B	SI Accum 1-02 Upstrm Inj Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	Increased	High
Table 13	1-8956C	SI Accum 1-03 Upstrm Inj Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	Increased	High
Table 13	1-8956D	SI Accum 1-04 Upstrm Inj Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	Increased	High
Table 13	1-8958A	Rwst 1-01 To RHR Pmp 1-01 Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8958B	Rwst 1-01 To RHR Pmp 1-02 Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8964	U1 SI TEST HDR RET ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1-8969A (1)	RHR To Ccp 1-01/1-02 Suct Chk Vlv	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1-8969B	RHR To SI Pmp 1-01/1-02 Suct Chk Vlv	0.0000	1.1151	None	No change	No change	No change	No change	None	No Change	Low
Table 13	1SI-0047 (A)	RWST 1-01 TO SI ISOL VLV	0.0050	5.7600	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 13	1SI-0182	BONNET RELIEF VALVE FOR CONTAINMENT ISOLATION VALVE 1-8811A	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
able 13	1SI-0183	BONNET RELIEF VALVE FOR CONTAINMENT ISOLATION VALVE 1-8811B	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 13	1SI-8819A	SI TO CL 1-01 CHK VLV	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1SI-8819B	SI TO CL 1-02 CHK VLV	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1SI-8819C	SI TO CL 1-03 CHK VLV	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1SI-8819D	SI TO CL 1-04 CHK VLV	n/a	n/a	None	No change	No change	Medium ISLOCA	No change	n/a	No Change	High
Table 13	1SI-8900A	CCP 1-01/1-02 TO CL 1-01 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8900B	CCP 1-01/1-02 TO CL 1-02 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8900C	CCP 1-01/1-02 TO CL 1-03 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8900D	CCP 1-01/1-02 TO CL 1-04 CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8905A	SI TO HL 1-01 INJ UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8905B	SI TO HL 1-02 INJ UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8905C	SI TO HL 1-03 INJ UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8905D	SI TO HL 1-04 INJ UPSTRM CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8919A	SI PMP 1-01 TO RWST CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8919B	SI PMP 1-02 TO RWST CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 13	1SI-8968	SI N2 SPLY HDR 1-01/1-02 CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 13	1SI-8972	U1 SI TST HDR RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 14	1-HV-4286	SSW PMP 1-01 DISCH VLV	0.0061	9.0386	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 14	1-HV-4287 (2)(4)	SSW PMP 1-02 DISCH VLV	0.0001	37.1754	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 14	1-HV-4393	DG 1-01 JKT WTR CLR SSW RET VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 14	1-HV-4394	DG 1-02 JKT WTR CLR SSW RET VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 14	1-HV-4395	SSW TRN A TO U1 AFW PMP SUCT VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 14	1-HV-4396	SSW TRN B TO U1 AFW PMP SUCT VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 14	1SW-0016 (3)	U1 SSW TRN B SPLY HDR IN CHK VLV	0.0005	3.0296	None	No change	No change	No change	No change	None	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 14	1SW-0017 (3)	U1 SSW TRN A SPLY HDR IN CHK VLV	0.0003	1.9796	None	No change	No change	No change	No change	None	No Change	Low
Table 14	1SW-0373	SSW PMP 1-02 DISCH CHK VLV	0.0015	70.7025	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 14	1SW-0374	SSW PMP 1-01 DISCH CHK VLV	0.0012	71.8633	Medium	No change	No change	No change	No change	Medium	No Change	High
Table 14	SWVAVB-01	VENT PATH FORWATER HAMMER PROTECTION	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 14	SWVAVB-02	VENT PATH FORWATER HAMMER PROTECTION	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 14	SWVAVB-03	VENT PATH FORWATER HAMMER PROTECTION	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 14	SWVAVB-04	VENT PATH FORWATER HAMMER PROTECTION	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 15	1CI-0644	CR AIC ACCUM X-01 INST AIR SPLY UPSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 15	1CI-0645	CR AIC ACCUM X-01 INST AIR SPLY DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 15	1CI-0646	CR AIC ACCUM X-02 INST AIR SPLY UPSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 15	1CI-0647	CR AIC ACCUM X-02 INST AIR SPLY DNSTRM CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	High	High
Table 16	1-HV-5157	RX CAV SMP & CNTMT SMP 1-01/1-02 DISCH HDR ORC ISOL VLV	n/a	n/a	None	No change	No change	Medium CIV	No change	n/a	No Change	High
Table 16	1-HV-5158	RX CAV SMP & CNTMT SMP 1-01/1-02 DISCH HDR IRC ISOL VLV	n/a	n/a	None	No change	No change	Medium CIV	No change	n/a	No Change	High
Table 16	1VD-0907	RX CAV SMP & CNTMT SMP 1-01/1-02 DISCH HDR PRESS RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 16	VD-0003	SFGD BLDG SMP 1-01 PMP 1-01 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 16	VD-0004	SFGD BLDG SMP 1-01 PMP 1-02 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 16	VD-0011	SFGD BLDG SMP 1-02 PMP 1-03 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 16	VD-0012	SFGD BLDG SMP 1-02 PMP 1-04 DISCH CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-7126	LWPS RCDT 1-01 VNT HDR IRC DNSTRM ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-7135	LWPS RCDT 1-01 LVL CTRL VLV BYP VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-7136	Rcdt Pump Discharge Control Valve	n/a	n/a	None	No change	No change	Medium CIV	No change	n/a	No Change	High
Table 17	1-7150	LWPS RCDT 1-01 VNT HDR ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-3486	U1 CNTMT SERV AIR ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-3487	U1 CNTMT INST AIR HDR ISOL VLV	n/a	n/a	None	No change	No change	Low SGTR-CIV	No change	n/a	No Change	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 17	1-HV-4075B	U1 CNTMT FP HDR ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4075C	U1 CNTMT FP HDR IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4165	PRZR 1-01 STM SPACE SMPL LN IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4166	PRZR 1-01 LIQ SPACE SMPL LN IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4167	PRZR 1-01 LIQ SPACE SMPL LN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4168	RC LOOP 1-01 HOT LEG SMPL LN IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4169	RC LOOP 1-04 HOT LEG SMPL LN IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4170	RC LOOP 1-01 & 1-04 HOT LEG SMPL LN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4171	ACCUM 1-01 LIQ SPACE SMPL LN IRC ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 17	1-HV-4172	ACCUM 1-02 LIQ SPACE SMPL LN IRC ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 17	1-HV-4173	ACCUM 1-03 LIQ SPACE SMPL LN IRC ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 17	1-HV-4174	ACCUM 1-04 LIQ SPACE SMPL LN IRC ISOL VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 17	1-HV-4175	U1 ACCUM LIQ SPACE SMPL LN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-4176	PRZR 1-01 STM SPACE SMPL LN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5536	U1 CNTMT AIR PRG SPLY ORC ISOL DMPR AO	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5537	U1 CNTMT AIR PRG SPLY IRC ISOL DMPR AO	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5538	U1 CNTMT AIR PRG EXH ORC ISOL DMPR AO	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5539	U1 CNTMT AIR PRG EXH IRC ISOL DMPR AO	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5540	U1 CNTMT H2 PRG EXH ORC ISOL DMPR	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5541	U1 CNTMT H2 PRG EXH IRC ISOL DMPR	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5542	U1 CNTMT H2 PRG SPLY ORC ISOL DMPR	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan												
IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 17	1-HV-5543	U1 CNTMT H2 PRG SPLY IRC ISOL DMPR	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5544	U1 CNTMT AIR PIG RAD DET UNIT 5502/03/66 SMPL IN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5545	U1 CNTMT AIR PIG RAD DET UNIT 5502/03/66 SMPL IN IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5546	U1 CNTMT AIR PIG RAD DET UNIT 5502/03/66 SMPL OUT ORC ISOL VL	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5547	U1 CNTMT AIR PIG RAD DET UNIT 5502/03/66 SMPL OUT IRC ISOL VL	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5548	U1 CNTMT PRESS RLF SYS ORC ISOL VLV	n/a	n/a	None	No change	No change	Low CIV	No change	n/a	No Change	Low
Table 17	1-HV-5549	U1 CNTMT PRESS RLF SYS IRC ISOL VLV	n/a	n/a	None	No change	No change	Low CIV	No change	n/a	No Change	Low
Table 17	1-HV-5556	U1 CNTMT AIR PASS SMPL RET LN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5557	U1 CNTMT AIR PASS SMPL RET LN IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5558	U1 CNTMT AIR PASS SMPL SPLY LN ORC ISOL VLV 5558	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5559	U1 CNTMT AIR PASS SMPL SPLY LN IRC ISOL VLV 5559	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5560	U1 CNTMT AIR PASS SMPL SPLY LN ORC ISOL VLV 5560	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5561	U1 CNTMT AIR PASS SMPL SPLY LN IRC ISOL VLV 5561	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5562	U1 CNTMT PRG EXH IRC ISOL DMPR BYP DMPR	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-5563	U1 CNTMT H2 PRG SPLY IRC ISOL DMPR	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-6082	U1 VENT CH WTR SPLY ORC UPSTRM ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-6083	U1 VENT CH WTR RET IRC DNSTRM ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-6084	U1 VENT CH WTR SPLY ORC DNSTRM ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-7311	RC PASS SMPL MODULE 1-04 TO RCDT 1 01 RET LN ORC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-HV-7312	RC PASS SMPL MODULE 1-04 TO RCDT 1 01 RET LN IRC ISOL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-LCV-1003	LWPS RCDT 1-01 LVL CTRL VLV	n/a	n/a	None	No change	No change	Medium CIV	No change	n/a	Increased	High
Table 17	1-PS-0500	U1 ACCUM LIQ SPACE SMPL LN ORC RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

Table 4-1
Summary of Risk Ranking Results for IST Components

Sorted By IST Plan

IST Plan Table Number	Component Tag Number	Component Description	Fussell-Vesely *	Risk Achievement Worth *	Initial IPE Ranking Based on FV **	IPEEE Fire & Tornado FV Ranking Changes	Outage Risk Ranking Changes	Large, Early Release FV Ranking Changes	Seismic Risk Ranking Changes	CDF Ranking Changes w/out CCF	Ranking Changes Due To Expert Panel Review	Final Ranking Based On IST Study
Table 17	1-PS-0501	PRZR 1-01 LIQ SPACE SMPL LN ORC RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-PS-0502	PRZR 1-01 STM SPACE SMPL LN ORC RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1-PS-0503	RC LOOP 1-01/1-04 HL SMPL LN ORC RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1BS-0015	CNTMT PERS AIRLOCK 1-01 EXT DOOR MAN EQUAL VLV 0015	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1BS-0025	CNTMT PERS AIRLOCK 1-01 EXT DOOR AUTO EQUAL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1BS-0029	CNTMT PERS AIRLOCK 1-01 EXT DOOR MAN EQUAL VLV 0029	n/a	n/a	n/a	n/a	n/a	n/a	No change	* n/a	Low	Low
Table 17	1BS-0030	CNTMT PERS AIRLOCK 1-01 INT DOOR AUTO EQUAL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1BS-0044	CNTMT PERS AIRLOCK 1-01 INT DOOR MAN EQUAL VLV 0044	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1BS-0056	CNTMT PERS AIRLOCK 1-01 INT DOOR MAN EQUAL VLV 0056	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1BS-0202	U1 CNTMT PERS EMER AIRLOCK INT DOOR MAN EQUAL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1BS-0203	U1 CNTMT PERS EMER AIRLOCK EXT DOOR MAN EQUAL VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1CA-0016	U1 CNTMT SERV AIR HDR CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1CH-0024	U1 VENT CH WTR SPLY IRC CHK VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1CH-0271	U1 CNTMT VENT CH WTR SPLY HDR ORC PRESS RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1CH-0272	U1 CNTMT VENT CH WTR RET HDR ORC PRESS RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1CI-0030	U1 INST AIR HDR TO U1 CNTMT CHK VLV	n/a	n/a	None	No change	No change	No change	No change	n/a	No Change	Low
Table 17	1WP-7176	LWPS RCDT 1-01 DRN HDR RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low
Table 17	1WP-7177	RC PASS SMPL RET TO RCDT 1-01 RLF VLV	n/a	n/a	n/a	n/a	n/a	n/a	No change	n/a	Low	Low

ENCLOSURE 4 TO TXX-95260