Exhibit 6

SECY-99-109

April 9, 1999

FOR: The Commissioners

FROM: William D. Travers /s/
Executive Director for Operations

SUBJECT: RECOVERY OF MILLSTONE NUCLEAR POWER STATION, UNIT 2

PURPOSE:

To provide the Commission with (1) the staff's assessment of the issues related to the restart of Millstone Unit 2, and (2) the staff's recommendation regarding restart authorization for Millstone Unit 2. A summary discussion of these issues is presented in this paper, and where appropriate, a more detailed discussion is attached.

BACKGROUND:

As part of its execution of NRC Inspection Manual Chapter (IMC) 0350, "Staff Guidelines for Restart Authorization," the staff developed a Restart Action Plan (RAP). The RAP was developed to include all expected NRC actions required before the NRC would approve plant restart. The staff developed a RAP for each Millstone unit to incorporate the appropriate aspects of IMC 0350 and to address site-specific and unit-specific issues, including two NRC Orders. The Order issued on August 14, 1996, required Northeast Nuclear Energy Company (NNECO) to perform an Independent Corrective Action Verification Program (ICAVP) at all three Millstone units. The Order issued on October 24, 1996, required NNECO to establish an effective Safety Conscious Work Environment (SCWE) and Employee Concerns Program (ECP) at Millstone.

SECY-98-090, "Selected Issues Related to Recovery of Millstone Nuclear Power Station Unit 3," dated April 24, 1998, provided background on three issues surrounding the extended shutdown of the Millstone nuclear station units, including major NRC and licensee activities. SECY 98-090 provided the Commission with the staff's assessment of 1) the licensee's progress to establish an effective SCWE and ECP; 2) the licensee's efforts to improve its oversight and quality assurance functions; and 3) the licensee's program for managing the backlog of work at Unit 3. At a Commission Meeting on May 1, 1998, the staff stated that the licensee had made appropriate improvements in these three areas to support restart of Unit 3.

SECY-98-119, "Remaining Issues Related to Recovery of Millstone Nuclear Power Station, Unit 3," dated May 28, 1998, reported to the Commission on (1) the staff's assessment of the remaining issues from the RAP for Unit 3, and (2) the staff's recommendation regarding restart authorization for Unit 3. At a Commission Meeting held on June 2, 1998, to discuss issues related to the restart of Unit 3, the staff stated that the ICAVP at Unit 3 had been completed to its satisfaction with the exception of the resolution of a small number of discrepancy reports (DRs) and the issuance of the final Unit 3 ICAVP report by Sargent & Lundy (S&L), the Unit 3 ICAVP Contractor. Shortly following that meeting, resolution of the remaining DRs was completed and S&L issued the Final Report for the Unit 3 ICAVP on June 8, 1998. Therefore, the staff concluded that the Unit 3 ICAVP had been satisfactorily performed and the results of the ICAVP and the staff's oversight provided confidence that Unit 3 was in compliance with its design and licensing basis.

In Staff Requirements Memorandum (SRM) 98-119 dated June 15, 1998, the Commission concurred with

the NRC staff's conclusion that the licensee had taken appropriate corrective actions to support the restart of Unit 3. The Commission, therefore, approved the staff's proposal to change the watch list status of Unit 3 from a Category 3 to a Category 2 plant; authorized the restart of Unit 3, subject to satisfactory completion of all remaining issues requiring NRC verification; and designated the Executive Director for Operations (EDO) as the senior manager responsible for verifying that the appropriate aspects of NRC IMC 0350 were completed and for approving commencement of actions to restart Unit 3. By letter dated June 29, 1998, the EDO authorized the licensee to commence activities to restart Unit 3. Unit 3 has been operating acceptably since its startup on June 30, 1998; the staff's assessment of recent Unit 3 activities is discussed in Attachment 1.

The staff recommended closing the SCWE/ECP Order in SECY-99-010, "Closure of Order Requiring Independent, Third-Party Oversight of NNECO's Implementation of Resolution of the Millstone Station Employees' Safety Concerns," dated January 12, 1999. In a January 19, 1999, meeting with the Commission, the staff, along with Little Harbor Consultants (third-party oversight organization) and NNECO, discussed the basis for this recommendation. In response to a February 19, 1999 SRM, the staff provided the Commission information on future inspection plans to assess the status of the SCWE and ECP. In a subsequent SRM dated March 9, 1999, the Commission approved the staff's recommendation to close the SCWE/ECP Order, and requested the staff to provide its future plans to continue monitoring the SCWE and ECP by May 28, 1999. The staff is currently in the process of developing a formal response, which will be based on the following activities. Region I will assume responsibility for the SCWE/ECP area and will perform a Team Inspection within the next several months using Inspection Procedure 40500, "Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems." The staff will use this opportunity to monitor the licensee's progress in the SCWE/ECP area using IP 40001, "Resolution of Employee Concerns." Region I will also participate in periodic meetings involving NNECO, NRC, and Little Harbor Consultants (LHC), which will be open for public observation. During these meetings, the results of LHC's quarterly assessments, and the status of the SCWE/ECP area will be discussed.

DISCUSSION:

Since June of 1996 when Millstone was designated as a Watch List Category 3 facility, the staff has frequently communicated with the Commission through various Commission papers and status reports. The Commission has also received periodic briefings since January 30, 1997, from the staff, the licensee, pertinent contract organizations involved in oversight activities, and in several of the more recent meetings, from members of the public and state and local officials regarding restart of the Millstone units. Although most of these briefings focused on the status and restart readiness of Unit 3, information on restart activities at Unit 2, including the status of the Unit 2 ICAVP, was usually provided.

The Unit 2 RAP contains several major elements that require resolution before Unit 2 restart. These elements include corrective action program improvements, work planning and control improvements, procedure upgrade programs, and oversight and quality assurance improvements. The RAP also includes staff activities to evaluate the completion of the licensee's ICAVP, and the licensee's response to the NRC's 10 CFR 50.54(f) letter regarding Unit 2. The actions listed in the generic IMC 0350 restart checklist that are applicable to Unit 2, such as those regarding management effectiveness and self-assessment capability, are also included in the RAP. The RAP also provides for the conduct of an Operational Safety Team Inspection (OSTI), and a 40500 Team Inspection. These inspections are normally carried out to assess the overall readiness of a plant for restart after a prolonged shutdown, and were performed at Unit 3.

The information that follows is provided in support of the Commission's Unit 2 restart decision and was developed to be consistent with the guidance provided to the staff by the Commission in its March 18, 1998, SRM on the information it needed to make a restart decision for Unit 3. In the SRM, the

Commission directed the staff to provide crisp, clear analyses of the restart-related issues with recommendations (where appropriate) and a summary of independent NRC actions supporting staff decision making on Millstone's restart.

(1) Independent Corrective Action Verification Program (ICAVP)

The NRC has been maintaining heightened oversight of the corrective actions being conducted by NNECO at Millstone. The ICAVP was intended to independently verify, beyond the licensee's quality assurance and management oversight, that their corrective actions had (1) identified and satisfactorily resolved existing nonconformances with the design and licensing bases; (2) documented and utilized the licensing and design bases to resolve nonconformances; and (3) established programs, processes, and procedures for effective configuration management in the future.

When the August 14, 1996, Order was originally issued, NNECO planned to return all three of the Millstone units to operation. Based on an economic assessment of the viability of Unit 1, NNECO decided to permanently shutdown Unit 1. The NRC was formally informed of this decision in a July 21,1998, letter from NNECO. With the permanent shutdown of Unit 1, the requirement to perform an ICAVP at Unit 1, as stipulated in the ICAVP Order, is no longer necessary. As such, the staff has determined that with the permanent shutdown of Unit 1, NNECO is not required to perform an ICAVP at Unit 1. In SECY-98-119, the staff concluded that the Unit 3 ICAVP was performed satisfactorily, and Unit 3 was in compliance with its design and licensing basis. Therefore, the only remaining condition of the ICAVP Order is the completion of the ICAVP at Unit 2 to the satisfaction of the NRC.

Prior to commencing the ICAVP, NNECO completed its own review, the Configuration Management Plan (CMP), to reestablish the design and licensing bases for all 63 of the Unit 2 Maintenance Rule (10 CFR 50.65) Group 1 and Group 2 systems. The subsequent development and implementation of the ICAVP designed to verify the CMP results involved an extensive level of effort (approximately 223,500 engineering-hours) by an independent contractor, Parsons Power Group Inc. (Parsons). Additionally, the NRC carried out extensive oversight activities that involved both onsite inspection and in-office review of NNECO activities, and review and approval of the Parsons' audit plan and oversight of Parsons' activities

Parsons was selected by NNECO and approved by the NRC to conduct the ICAVP at Unit 2. Implementation of the Unit 2 ICAVP was carried out using a three-tiered approach as described in SECY 97-003, "Millstone Restart Review Process," and specified in an NRC-approved audit plan prepared by Parsons. In Tier 1, Parsons performed a detailed review of the design and licensing bases of 11 of the 63 Maintenance Rule (10 CFR 50.65) Group 1 or Group 2 systems, including a validation of design interfaces of those 11 systems with an additional 50 other systems. In Tier 2, Parsons reviewed the critical design characteristics (CDCs) of 56 systems required for mitigating the consequences of design-basis accidents, described in Chapter 14 of the Final Safety Analysis Report (FSAR). In Tier 3, Parsons reviewed 14 change processes (e.g., procedure changes, drawing changes, setpoint changes, etc.) used at Millstone, other than the design modification process, which had the potential to result in nonconformances with the design or licensing bases of the facility. The scope of the Tier 3 review focused on the implementation of the processes, rather than a programmatic assessment of the processes themselves. The Tier 3 review included a historical review of approximately 460 changes, spanning the interval of licensed operation of the unit.

Parsons also reviewed a sample of corrective actions for issues identified by NNECO during the CMP. The sample was focused primarily on NNECO's CMP identified corrective actions for the 11 ICAVP Tier 1 systems but also included a sample of CMP identified corrective actions, selected by NRC, for other systems included in the CMP but outside the scope of the Parsons' Tier 1 review. Parsons also reviewed

corrective actions performed in response to 30 of the 75 Confirmed Level 3 DRs. The corrective actions for the remaining 45 Level 3 DRs, as well as a sample of the corrective actions for the Level 3 DRs reviewed by Parsons, were reviewed by the NRC during the ICAVP corrective action inspection and were found to be acceptable.

The NRC oversight activities included (1) review and approval of Parsons as the ICAVP contractor, including interviews with and approval of Parsons' staff; (2) review and approval of the ICAVP Audit Plan, implementing procedures, and changes to both; (3) selection of the systems and specification of the systems' boundaries, including the scope of Parsons' ICAVP Tier 1 reviews [the Connecticut Nuclear Energy Advisory Council (NEAC) selected two of the system groups representing 7 of the 63 systems from a population of systems approved by the NRC]; (4) performance of six oversight inspections; and (5) provided regulatory guidance to Parsons during its implementation of the ICAVP. The six NRC oversight inspections of the Unit 2 ICAVP represented approximately 9,500 inspection hours. In addition, the staff reviewed all of the DRs and evaluated the Unit 2 ICAVP report issued by Parsons to identify areas that may have warranted additional NNECO focus.

The involvement of NEAC throughout the ICAVP was significant. NEAC monitored interactions between Parsons and NNECO, and participated in frequent meetings and teleconferences. NEAC was also given the opportunity to observe the oversight activities conducted by the staff.

The public was provided numerous opportunities to observe the staff's interactions with the licensee and Parsons throughout the course of the ICAVP. In addition, the public was provided many opportunities to interact directly with the NRC. The staff held periodic meetings that were open for public observation at Millstone to discuss the status of the ICAVP. Further, the staff held periodic evening meetings at about 6- to 8-week intervals, during which the staff presented the status of the ICAVP and members of the public were given the opportunity to express their concerns and ask questions regarding the status of the ICAVP and results of Parsons' implementation and NRC's oversight of the ICAVP. In addition, meetings, including inspection exit meetings and predecisional enforcement conferences held between the NRC, Parsons, and NNECO, were open for public observation and were conducted at Millstone or in the surrounding communities. To provide public access to concerns raised by Parsons during the ICAVP, Parsons posted its DRs, NNECO's DR responses, and any Parsons comments to a website on the Internet approximately two business days after issuance.

Parsons' review did not result in any Confirmed Level 1 or Level 2 findings (respectively defined as discrepancies with the design and licensing bases that would affect the functionality of a safety system or one train of a multi-train system). At the completion of the discovery phase of the ICAVP (December 1998), Parsons had identified 75 confirmed discrepancies with the Unit 2 design and licensing bases. These 75 instances were documented in ICAVP Significance Level 3 DRs (defined as discrepancies with the design and licensing bases that would not have prevented the system from performing its intended functions).

In addition, at the completion of the discovery phase of the ICAVP, Parsons had issued 521 Confirmed Level 4 DRs. Level 4 DRs were defined as minor errors (calculational, editorial, drawing, etc.) that did not change the results or conclusions of calculations, or inconsistencies between plant drawings and the plant configuration that did not result in nonconformances with the design or licensing bases. As discussed in Attachment 2, trending of these Confirmed Level 4 DRs did not reveal any repetitive technical errors that suggested the need for an expansion of the scope of the ICAVP. Trending of the Confirmed Level 4 DRs did result in recommendations for improvements to applicable programs and processes, which are also addressed in Attachment 2.

The fact that no Confirmed Level 1 or Level 2 DRs were identified by Parsons indicates that NNECO's CMP was adequate to assess the ability of systems to perform their safety functions. While the number of Level 3 DRs identified by the Unit 2 ICAVP is larger than the number identified by the Unit 3 ICAVP (75 vs. 22 Level 3 DRs), the following factors provide some perspective in this regard. Due to the vintage of Unit 2, the licensing and design bases (LB/DB) are not as well defined as those of Unit 3. Therefore, the LB/DB provided more latitude for interpretation by both Parsons and the licensee. A conservative interpretation was generally adopted by Parsons and agreed to by the licensee in instances where the LB/DB were not well defined. These conservative interpretations typically resulted in Level 3 DRs. In two instances, differences in interpretation of the licensing basis could not be resolved between NNECO and Parsons and were referred to the NRC for resolution. In both of these instances, the staff determined that NNECO's understanding of its licensing bases agreed with that of the staff. In addition, NNECO judged CMP discovery to be completed when program areas were identified that appeared to be problematic and in need of additional review, e.g., electrical separation, equipment qualification and Appendix R. At the initiation of the ICAVP, detailed discovery was ongoing in these program areas and specific instances of noncompliance were in the process of being identified by NNECO. A number of the Level 3 DRs (approximately 20) identified specific discrepancies in areas that had been identified as problematic by the licensee prior to the start of the ICAVP and for which detailed discovery was still ongoing during the conduct of the ICAVP. Since these specific instances of noncompliance were first identified by Parsons rather than NNECO, they were counted as Level 3 DRs in accordance with the established ICAVP process. Considering the scope and depth of Parsons' review, the number of Confirmed Level 3 DRs were relatively few and were indicative of an effective effort by the licensee to establish confidence that Unit 2 is in compliance with its design and licensing bases.

Parsons issued Volume 1 of its final Millstone Unit 2 ICAVP Report on December 4, 1998. Volume 1 contained the Executive Summary, including Parsons' conclusions regarding the effectiveness of NNECO's CMP in identifying and resolving design and licensing bases issues. Revision 1 to Volume 1, and Volume 2 of the final report were issued on January 12, 1999. Volume 2 provided the additional information supporting Parsons' conclusions, observations, and recommendations. Also, Parsons issued a supplement to the final report on March 22, 1999, documenting the results of its review of the corrective actions associated with the 30 NRC-selected Confirmed Level 3 DRs. Parsons' overall conclusions regarding the NNECO CMP were that NNECO was generally effective at identifying problems and providing corrective actions relating to the licensing and design bases.

In addition to the review of each individual issue identified by the DRs, Parsons and the NRC examined DRs collectively to determine if any process or programmatic issues could be identified. Parsons identified two areas, based on its review of Confirmed Level 3 DRs, which related to the design control process. These areas are:

a. Requirements for translation of licensing and design bases information into the as-built plant design, specifications, and procedures were not clearly described in configuration management control procedures.
b. NNECO's configuration management process did not ensure the accident analyses design inputs were consistent with the as-built plant and the operating and surveillance procedures.

These areas were reviewed by the NRC as part of the ICAVP corrective action inspection. In response to this identified trend NNECO expanded the scope of their CMP and conducted additional reviews of the accident mitigation system performance parameters contained in their Safety Functional Requirements Manual to assure consistency with other plant design documents and operating and surveillance procedures. NNECO also strengthened their Design Control Manual to ensure on an ongoing basis that consistency would be maintained between accident mitigation system performance parameters and plant

procedures. The team found the actions taken by NNECO to be adequate to address the identified deficiencies.

Another area of weakness identified by Parsons' was electrical separation. Parsons concluded that electrical separation within plant raceway systems, separation inside electrical cabinets, and isolation between Class 1E and non-1E devices were not consistent with the plant electrical separation and isolation design requirements. This had been identified also by NNECO during their CMP and NNECO has expended considerable resources in both identifying specific instances of separation inadequacies and in correcting the identified nonconformances. The area of electrical separation was also reviewed by the NRC during the ICAVP corrective action inspection. The team concluded that the licensee's program was adequate to identify and correct nonconformances.

During performance of its ICAVP Oversight Inspection Plan, the staff identified a number of issues that resulted in NNECO's taking additional corrective actions. As described in Attachment 2, these additional efforts by the licensee effectively resulted in a broadening of the scope of its CMP efforts to recover the design and licensing basis of Unit 2. In some cases, licensee corrective actions were significant. An example of NNECO's CMP scope expansion related to the inclusion of a detailed assessment of the Technical Specification clarifications provided in its Unit 2 Technical Requirements Manual. Similarly, NNECO expanded the scope of its review of the translation of accident analysis assumptions and results into plant operating and maintenance procedures as a result of both NRC and Parsons findings in this area.

The results of the NRC staff's reviews of NNECO's corrective actions in response to findings identified during the ICAVP oversight inspections and Parsons' reviews of NNECO's corrective actions in response to Level 3 DRs indicate that the licensee's corrective actions are adequate to resolve the identified problems, prevent their recurrence, and identify and resolve similar issues in other systems. Thus, and in accordance with the NRC's criteria for evaluating the ICAVP findings, the staff determined that it was not necessary to increase the scope of the ICAVP at Unit 2 for issues identified by Parsons or the NRC.

On the basis of its oversight of ICAVP activities, the staff has concluded that Parsons conducted the ICAVP at Unit 2 in accordance with the NRC-approved audit plan. The ICAVP provided the staff valuable information that enabled it to make the determination that (1) NNECO's CMP was effective at identifying and satisfactorily resolving existing nonconformances with the design and licensing bases; (2) NNECO had adequately documented the licensing and design bases and used them to resolve nonconformances; and (3) NNECO has implemented programs, processes, and procedures for effective configuration management in the future. Although both Parsons and the NRC staff identified a number of nonconformances with the Unit 2 licensing and design bases, none of the issues affected the functionality of the plant's safety systems. Additionally, the number of such issues were relatively few considering the scope and depth of the Parsons review and were indicative of an effective effort by the licensee to establish confidence that Unit 2 is in compliance with its design and licensing bases.

The scope of the ICAVP, while large, did not review all aspects of the 63 Group 1 and 2 Maintenance Rule systems. Therefore, it is reasonable to assume that similar types of findings may exist in other systems. However, the extent of the ICAVP reviews, the low safety significance of the findings identified by Parsons and the NRC, and the breadth of the corrective actions taken by NNECO for the identified discrepancies provides confidence that any other issues would likely also be of low safety significance.

Therefore, the staff concludes that:

a. NNECO has satisfied the requirements of the August 14, 1996, Order. The Unit 2 ICAVP has been performed to the satisfaction of the staff and the results of the ICAVP and the staff's oversight provide confidence that Unit 2 is in compliance with its design and licensing bases.

b. NNECO has in place configuration control programs that, if properly implemented, will be effective in maintaining conformance with the unit's design and licensing bases.

c. NNECO has an adequate corrective action program at Unit 2, as demonstrated by the effectiveness of the corrective actions to resolve ICAVP related issues.

d. The ICAVP area has been adequately addressed to support restart of Unit 2.

Attachment 2 provides the details of the ICAVP performed at Unit 2.

(2) Corrective Action Program

Previous licensee self-assessments and NRC inspections had found that NNECO's corrective action program had been historically weak in identifying problems and ineffective in ensuring comprehensive and effective corrective actions. In many instances, narrowly focused corrective actions had failed to encompass all aspects of the underlying problem. Additionally, the licensee often did not follow up on corrective actions to ensure they were effective. A relation also existed between the ineffectiveness of the corrective action program and the issues related to the handling of employee safety concerns and the SCWE at Millstone. An important element in an effective corrective action program is encouraging workers to raise issues willingly without fear of retribution or retaliation.

NNECO initiated efforts in early 1997 to improve the corrective action program by adopting industry standards and processes and formalizing them in procedure RP-4, "Corrective Action Program." The improvements included a lower threshold for reportable problems, more management emphasis on the need for employees to identify problems, more management involvement in the process, prompt processing of operability determinations, development of performance indicators, root-cause analysis training, and enhanced tracking and trending programs.

To verify the effectiveness of the licensee's actions, supplementing the day-to-day observations and interactions of the resident inspectors, the staff performed a number of multipurpose inspections to assess the effectiveness of the process. The staff looked at the effectiveness and the appropriateness of the licensee's corrective actions for design concerns raised by the NRC in its ICAVP-related inspections, by the licensee in its CMP, and by Parsons in its ICAVP. The NRC performed a 40500 Team Inspection at Unit 2 in late January and early February 1999, which looked at the overall effectiveness of the corrective action program. The 40500 Team Inspection also gained insights into the effectiveness of the implementation of the corrective action program by assessing a sample of ECP case files and documentation packages to determine the level of use of the process and whether it was effective in responding to potential nuclear safety issues or potential employee protection issues. The NRC also performed an OSTI at Unit 2 in March 1999, which in part, inspected the implementation of the corrective action program to determine if it was adequate to support plant restart.

Resident inspection reports provided an assessment of corrective actions taken to resolve inspector concerns that were identified as part of the NRC core inspection program. In addition, the resident inspection reports documented NRC assessments of corrective actions to address many of the safety significant restart issues contained in the Unit 2 Significant Items List (SIL). Examples included all licensee event reports (LERs) that were determined by the NRC or the licensee to be risk-significant, the Fire Protection/Appendix R Programs (SIL 21), the Material, Equipment, and Parts List Program (SIL 18), the Equipment Environmental Qualification Program (SIL 19), Service Water Piping Liner Detachment

(SIL 55), and Containment Sump Isolation Valves Pressure Locking (SIL 20). The fact that each Unit 2 SIL item was inspected and found to be acceptably addressed, provided examples that indicated line management demonstrated the ability to correct significant technical concerns.

During ICAVP inspections, the staff concluded that NNECO had an acceptable corrective action program that adequately resolved not only specific ICAVP-related issues, but adequately addressed the extent of condition. The staff further concluded that NNECO's corrective action program was being adequately implemented and that NNECO was taking adequate and timely corrective action to resolve ICAVP issues necessary to restore the licensing bases and support Unit 2 restart.

The 40500 Team and OSTI concluded that the Unit 2 corrective action program is an effective process for addressing significant plant issues. The problem identification threshold was observed to be low, with a high volume of items being generated and processed on a daily basis. A review of the root cause evaluations for more significant problems found them to be generally thorough and the corrective actions appropriate and timely. Corrective action assignments and prioritizations were observed to be proper and well tracked. ECP cases involving technical and nuclear safety issues requiring corrective actions were appropriately recognized and processed by ECP, and the eventual corrective actions were responsive to the concerns raised. The Condition Reports and Action Requests that were required to be addressed prior to restart have been identified and are being tracked for completion.

The staff concludes that the licensee's corrective action program is acceptable to support restart of Unit 2.

(3) Oversight and Quality Assurance

Oversight and quality assurance is a restart issue due to past ineffective leadership, program implementation, management support, corrective actions and self-assessments, as identified by internal and external audits, including NRC inspections.

NNECO developed a broad-based corrective action program for the deficiencies identified through internal and external assessments of Nuclear Oversight (NOS). Among these actions were: (1) promulgating corporate expectations for NOS; (2) reorganizing and restaffing; (3) developing new hold-point inspection procedures; (4) improving communications between line organizations and NOS, (5) improving the skills of NOS staff in performance-based assessment; and (6) developing the NOS Restart Verification Plan (NORVP) to assess key issues in the recovery process. The NORVP contained approximately 20 key issues that were tracked by NOS to gauge the performance improvements being made by the line organization.

After Unit 3 restarted in June 1998, NOS changed its NORVP assessment process to a Nuclear Oversight Verification Plan (NOVP). This new format incorporated a review of common site programs (e.g., security, emergency planning, and training) along with separate assessments of Unit 3 operations, Unit 2 restart readiness, and Unit 1 maintenance. The full scope of NOS activities, including the NOVP, appeared directed toward focusing Millstone station management attention on the areas impacting Unit 2 restart readiness and the achievement of operational excellence for overall station performance.

The NRC evaluated NOS effectiveness through the routine inspection program as well as the special inspections associated with the closure of SIL items in the Unit 2 RAP. The 40500 Team and OSTI examined the area of nuclear oversight and quality assurance. Some of the specific items reviewed included self-assessment programs, various department self-assessments, implementation of the NNECO Quality Assurance program required by 10 CFR 50, Appendix B, and independent oversight organizations such as the Plant Operations Review Committee (PORC), Station Operations Review Committee (SORC),

and Nuclear Safety Assessment Board (NSAB).

During routine and special NRC inspections, the staff confirmed that NNECO has established an effective self-assessment process that contains definitive management expectations regarding the need for performance improvement, an emphasis on self-assessment training, and enhanced procedural controls.

The NRC staff found self-assessment programs have been strengthened, and departmental self-assessments were generally self-critical and constructive. The NOS organization has provided meaningful performance assessments and has effectively identified areas for improvement. The NOS organization was found to be actively involved with the day-to-day operations of Unit 2. The PORC, SORC and NSAB comply with the Unit 2 Technical Specification requirements and were effective in providing plant safety oversight.

The NRC staff concludes that oversight and quality assurance are adequate to support the restart of Unit 2.

(4) Operational Safety Team Inspection

The objective of the OSTI was to provide current information to the Restart Assessment Panel by evaluating the readiness of staff and management programs and the adequacy of plant hardware to support restart and continued operation of Unit 2. The OSTI was an intensive inspection activity that focused on providing assessment in the areas of management programs/independent oversight, operations, engineering and technical support, and maintenance and surveillance. The 11 inspectors selected for the team included individuals from Regions I and II and 2 contractors. The team monitored licensee activities during plant transition between modes of operation during both normal and off-normal work hours.

The team found that appropriate management processes have been established and are functioning adequately to support a safe plant restart and continued operation. Management has established appropriate standards, goals and expectations. The Operational Readiness Plan demonstrated resolution of previous performance problems. Management demonstrated strong involvement in emerging plant issues. Quality assurance has been effectively integrated into the line organization. Programs for direct management observation of plant activities have been established and are being implemented.

The conduct of operations, procedure quality and adherence, and operator training were adequate to support plant restart. Supervisory oversight was good. Communications among shift personnel and with external organizations were appropriate and effective. Operator awareness of the control board and responses to annunciators were good. The operators solicited technical and management support when appropriate.

In the engineering and technical support area, the plant modification program was appropriately controlled and implemented. The Engineering and Technical Support Departments provided timely and effective support to the line organizations. The backlog of engineering work was properly prioritized for restart. Engineering programs were effectively implemented.

The team's findings in the areas of maintenance and surveillance were generally positive. Management oversight was a strength. The quality of maintenance work was generally good and post-maintenance testing was appropriate. Housekeeping and equipment storage were generally appropriate and observed equipment condition was acceptable. The preventive maintenance program was acceptable and preventive maintenance required for restart had been completed. The surveillance testing program was also acceptable and those tests required for restart were either complete or identified.

The overall conclusion of the OSTI is that plant hardware, staff, and management programs are adequate to

support a safe plant restart.

(5) Work Planning and Controls

Work planning and controls are areas in which the licensee has shown weaknesses in the past. The ability to plan, control, and complete work is an important element in achieving timely and effective corrective actions. Additionally, effective work planning and controls are prerequisites for reducing and managing work backlogs.

The NRC staff reviewed the licensee's revised automated work order (AWO) process, which was implemented site-wide in 1997. The AWO process is an integral part of the work planning and control system. It is instrumental in establishing the scope of the work, providing the appropriate procedures, and establishing the tagging boundaries. This process has resulted in a noticeable improvement over previous processes at Millstone.

The 40500 Team concluded that implementation of a new work control process (12-week rolling schedule), when considered together with the work associated with the Unit 2 restart and upcoming Unit 3 refueling outage, represented a significant continuing challenge.

The OSTI included an in-depth assessment of the adequacy of the licensee's work planning and controls. The principal focus of this assessment was to evaluate the adequacy of the licensee's program as it relates to ensuring the safety performance of personnel and plant equipment. The OSTI found that work planning package quality was acceptable. However, emergent work was preventing accurate scheduling and planning such that plant schedule goals were not being met during this inspection. As a result, the licensee was in the process of improving the work planning process. As part of the routine resident inspection process, this area will be assessed during future inspections to determine the effectiveness of licensee improvements.

The staff concludes that the work planning and scheduling process is adequate to support Unit 2 restart.

(6) Backlog Management

Effectively managing backlogs contributes measurably to achieving effective work planning and controls and a functional corrective action program. These are areas in which the licensee had demonstrated weaknesses that resulted in the staff including them as key items in the Unit 2 Restart Assessment Plan. Backlog issues were also highlighted by the Commission as an area of concern during the February 19, 1998, Commission meeting, and in its subsequent staff requirements memorandum of March 18, 1998.

On April 16, 1997, the NRC sent a letter to the licensee requesting information pursuant to 10 CFR 50.54(f). This letter requested the licensee to provide information on (1) the significant items that needed to be completed before restart; (2) items to be deferred until after restart; (3) NNECO's process and rationale for deferring items until after restart; and (4) actions taken to ensure that future operation of Unit 2 will be conducted in accordance with its license and FSAR, and the NRC's regulations.

In accordance with the requests made in the 10 CFR 50.54(f) letter, the licensee responded to the NRC in various letters as noted below. In a letter dated January 8, 1998, the licensee provided their criteria used to decide whether an item needed to be completed prior to restart; these criteria were used to develop their deferred items list that was submitted to the NRC on December 1, 1998. In a subsequent letter dated December 22, 1998, NNECO modified their criteria based in part on lessons learned from Unit 3, and findings from their corrective action program; these new criteria were used to develop their deferred items

list submitted to the NRC on March 5, 1999. On December 22, 1998, NNECO provided the NRC with a Unit 2 Restart Backlog Management Plan, which is an integrated, structured approach to successfully manage and disposition the backlog of identified open items at the time of Unit 2 restart. In this Plan, the licensee describes its methodology, process, goals, commitments, and key performance indicators to effectively manage and trend performance. As part of this Plan, the licensee also committed to provide the NRC with quarterly backlog management updates. The licensee submitted a letter dated February 5, 1999 which described their processes and programs to ensure future operations at Unit 2 will be conducted in accordance with its license and FSAR, and the NRC's regulations.

The staff reviewed the December 1, 1998, deferred items list. The staff concluded that the licensee's decision-making process for the identification of items to be completed after Unit 2 restart was accurate and thorough. In addition, the staff did not identify any items that, if not corrected prior to plant restart, would have resulted in a significant safety concern during plant operations. The staff also noted that the licensee's process for developing the deferred items list had been revised to correct completeness and accuracy problems that were identified during an earlier NRC review of the Unit 2 and Unit 3 deferred items lists in late 1997.

The OSTI reviewed the March 5, 1999, deferred items list. The review was conducted because the licensee had modified their criteria since submittal of their last deferred items list, and to assess whether additions or changes to the deferred items list were appropriate. The OSTI found that the backlog of items needed to be addressed prior to restart had been appropriately established, and these items were being tracked for completion. The OSTI also reviewed the Unit 2 Restart Backlog Management Plan. The OSTI concluded that the Plan appears to be an effective management tool if properly implemented following restart.

In a letter dated March 30, 1999, NNECO submitted a change to their commitments previously provided to the NRC concerning backlog management at Units 2 and 3. For Unit 2, the licensee's revised commitment is to disposition ICAVP DR corrective actions (which become part of the post-restart backlog of open items) by December 31, 2001. The remaining recovery backlog items would continue to be prioritized and tracked within the appropriate controlling program. The licensee's previous commitment was to disposition remaining ICAVP DR corrective actions prior to entering Mode 2 following refueling outage (RFO) 13 (approximately June 2000). The licensee stated their adjustment was appropriate in that it will allow a continued focus on safe, event free operation of the unit rather than focus on those backlog items that are not safety significant. The licensee's management of the Unit 2 and Unit 3 backlog will be assessed as part of the routine inspection program during quarterly backlog management updates provided by the licensee, and during enhanced corrective action team inspections.

Successfully addressing the current large backlog of issues and emergent work arising from both units will require continued close management attention by NNECO to ensure appropriate prioritization and timely completion of corrective actions. However, NNECO used conservative criteria for determining if an item could be deferred, and inspections by the staff did not identify any items that, if not corrected prior to plant restart, would have resulted in a significant safety concern during plant operations.

The staff concludes that management of the backlog is adequate to support the restart of Unit 2.

(7) Procedure Upgrade Program

The quality of and adherence to procedures had been a chronic problem for all three Millstone units. The need to improve procedure quality was an element in the Improving Station Performance program (circa 1995) and the earlier Performance Enhancement Program (circa 1992). In response to NRC concerns, the licensee developed the Procedure Upgrade Program (PUP) in 1992 to improve station procedure quality on

a site-wide basis. The licensee's PUP commitment was included in a letter to the NRC dated June 4, 1992, in which the licensee described its overall Performance Enhancement Program. Because of the licensee's longstanding commitment to complete the PUP and address past procedure adherence and quality problems, the satisfactory performance of the licensee's PUP was identified as a separate issue in the Unit 2 RAP.

Although various procedure improvement programs had been ongoing since the late 1980s, the licensee committed to improve procedures to reflect industry standards for format and to standardize procedures at all three units in the PUP. As a result of this process, the station document control administrative procedures were developed to apply to the three units.

The NRC performed a series of inspections of the PUP starting in August 1996, and ending in August 1997. These inspections determined that the licensee had met most of their commitments made to the NRC in a June 4, 1992, letter, particularly in standardizing the format of station procedures and reducing the number of higher tiered procedures. The licensee has met their remaining commitments and has completed the PUP for Unit 2.

Additional insights regarding procedure quality have been obtained through several NRC ICAVP inspections of the licensee's CMP. Only several minor problems were identified. In addition, the OSTI found operating procedure quality to be good, and in general, operating procedures reviewed were technically sound, with only minor problems identified. In addition, the OSTI found that operators conducted observed evolutions in Mode 4 and Mode 3 (plant non-critical heatup) in compliance with operating procedures. The OSTI also found maintenance and surveillance testing procedure quality and adherence to be acceptable.

These NRC inspections and the licensee's own evaluations indicate that Unit 2 procedures are acceptable for restart. As previously noted, the NRC's inclusion of the PUP as a separate issue in the Unit 2 RAP was to assess the licensee's implementation of this longstanding program. In addition, the staff has also had many opportunities to assess the technical adequacy and quality of the procedures, as well as the licensee's adherence to procedures. There has been a substantial improvement over the past 2 years in this area.

The staff considers procedure quality and use of procedures adequate to support restart of Unit 2.

(8) Significant Items List

One element of the Unit 2 RAP is the SIL. The SIL contains items that the NRC is using to audit and evaluate licensee programs and other significant safety and regulatory issues. The licensee provides a package to the staff when it has completed actions associated with a particular item in the SIL. The staff then reviews the package and performs any needed inspection activities before it closes the issue.

The Millstone Restart Assessment Panel identified 55 items for inclusion in the Unit 2 SIL. The staff has completed its efforts to review and close all 55 SIL items. The SIL items constitute the majority of the programmatic, technical, and regulatory issues included in the Unit 2 RAP.

(9) Licensing Issues

There were 51 licensing issues that were determined to be related to plant restart. These issues mainly resulted from the licensee's extensive design basis review efforts. These 51 issues involved 26 Technical Specification license amendments, 9 Unreviewed Safety Question license amendments, 1 Exemption from 10 CFR Part 50, Appendix R, and 15 other licensing actions. Of these, 36 have been completed, 4 have

been withdrawn, and 8 were determined, upon further review, to not require NRC approval prior to plant restart.

As of April 6, 1999, there are three issues remaining. Two license amendments and one leak before break review. The two amendments (submitted in December 1998 and January 1999) are undergoing staff review and are currently expected to be completed prior to the licensee's scheduled shift to Mode 2. For the third issue, the licensee has determined that the leak before break review is not required prior to plant restart. This is based on the licensee's operability determination. The staff's technical review of this issue is complete and the staff concurs in the licensee's application of the leak before break methodology. The staff plans to issue the Safety Evaluation Report (SER) prior to the licensee's shift to Mode 2.

(10) Enforcement

During NRC inspections conducted between January 1996 and December 1998, 38 potential escalated enforcement issues (EEIs) were identified at Unit 2 as a result of NRC inspection activities. Out of 28 EEIs identified in 1996, 22 were included in the December 10, 1997, $2,100,000 civil penalty package, 4 were granted enforcement discretion, 1 was cited as a severity level IV violation, and 1 was not a violation. Out of nine EEIs identified in 1997, two were aggregated to a severity level III violation with a civil penalty of $55,000, one was granted enforcement discretion, and five were cited as severity level IV violations. One EEI is still under evaluation; however, NNECO has implemented corrective action for this issue. Only one EEI was issued in 1998 and was issued as a severity level III violation, but received enforcement discretion. Thus far for reports issued in 1999, no EEIs have been identified at Unit 2.

Also in September 1997, NNECO informed the NRC that separate investigations by the ECP organization and LHC determined that two contractor employees in the Motor Operated Valve Department at Millstone had been retaliated against in August 1997 for engaging in protected activities. Although senior management was slow in recognizing and responding to early indications of retaliation, subsequent to the ECP and LHC investigations, NNECO took significant actions to reverse the terminations, as well as improve the climate at the Millstone station to ensure that a work environment exists such that employees feel free to raise safety concerns. Nevertheless, the NRC Office of Investigations confirmed the finding, and NNECO was issued a Severity Level II Notice of Violation and Proposed Imposition of Civil Penalty in the amount of $88,000 on March 9, 1999.

The corrective actions implemented by the licensee for the enforcement items issued between 1996 and 1999 have been evaluated by the staff and have been determined to be adequate. There are currently no open enforcement items that may have a potential impact on the licensee's capability to safely restart and operate Unit 2.

(11) Allegations

The number of open allegations at Millstone has been fluctuating between 20 to 25. The number of allegations received during the past six months as compared to the previous six months has been essentially constant (16 vs.14). An increase in the receipt rate of allegations has occurred in February and March 1999, most likely due to the release of the Inspector General report concerning harassment and intimidation issues at Millstone, closure of the SCWE/ECP Order, and Unit 2 nearing restart.

CONCLUSION

With the permanent shutdown of Unit 1, NNECO is not required to perform an ICAVP at Unit 1. The Unit 2 ICAVP has been performed to the satisfaction of the staff, and the results of the ICAVP and the

staff's oversight provide confidence that Unit 2 is in compliance with its design and licensing bases. In SECY-98-119, the staff concluded that the Unit 3 ICAVP was performed satisfactorily, and Unit 3 was in compliance with its design and licensing basis. Therefore, the August 14, 1996, Order for NNECO to perform an ICAVP for the Millstone Station can be closed.

In addition, the staff concludes that for the remaining issues discussed, the licensee has made appropriate improvements and has established adequate programs needed to support restart of Unit 2. The recently completed OSTI concluded that plant hardware, staff, and management programs are ready to support a safe plant restart and continued operation of Unit 2.

Accordingly, the staff has completed its assessment of the elements contained in the Millstone Unit 2 RAP, including evaluation of the licensee's actions in response to the two Orders issued in 1996. The staff concludes that the licensee has taken appropriate corrective actions to support restart of Millstone Unit 2.

RECOMMENDATION

That the Commission agree with the staff's conclusions that (1) NNECO has satisfied the August 14, 1996, Order for the Millstone Station and that the Order be closed; and (2) NNECO has taken appropriate corrective actions to support restart of Millstone Unit 2. The staff recommends that the Commission provide its restart authorization for Unit 2, similar to that given to Unit 3 in the June 15, 1998, SRM. Should the Commission authorize restart, this would entail changing the watch list status of Unit 2 from Category 3 to Category 2, and designating the EDO as the senior manager responsible for (1) verifying that the appropriate aspects of IMC 0350 are complete and (2) approving commencement of actions to restart Unit 2. All remaining issues requiring NRC verification before Unit 2 enters Mode 2 will be completed before the EDO gives approval for restart of Unit 2.

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Attachments: 1. Unit 3 Status
2. Independent Corrective Action Verification Program

ATTACHMENT 1

Unit 3 Status

Unit 3 resumed critical operations on June 30, 1998, after a shutdown of over two years. There were three manual reactor trips from full power, one automatic trip from full power caused by an unexpected main steam isolation valve closure, and one forced outage to repair auxiliary feedwater isolation valves. Two of the manual trips were associated with high conductivity at the discharge of the condensate pumps due to salt water intrusion. The third was in anticipation of a loss of condenser vacuum due to fouling of the circulating water system during a storm. An event involving the inadvertent discharge of carbon dioxide

into the cable spreading room, which later migrated into the control room, caused operators to wear self-contained breathing equipment. This event was not anticipated in the current design basis of the plant, and led to identifying a condition for which the technical specifications were not clear and were not properly interpreted relative to control room filtration system operability.

While there have been a number events, Unit 3 was operated safely, as evidenced by deliberate and controlled operator responses to plant events and equipment problems. These events indicated some problems related to plant material condition and the conduct of Unit 3 operations, but the licensee recognized these problems and put in place a plan to address them. Specifically, NNECO has placed greater emphasis on the operational focus of all departments. However, this focus has slowed their progress in implementing a 12-week work control process somewhat.

The Nuclear Oversight organization has been a positive influence in the assessment process and has provided rigorous evaluations of line management performance. The corrective action program has improved.

The conduct of maintenance and surveillance activities, including troubleshooting and repair work, continues to be generally well controlled, particularly with respect to detailed planning and the use of procedural controls. However, the new on-line work control process has not yet matured, and the emergent workload caused in part by the transients and the impact of previously deferred backlogged items adversely affected process efficiency and challenged plant configuration controls at Unit 3.

Engineering support during restart of Unit 3 has been challenged by the growing backlog of emergent work, the focus on completing Unit 2 restart items and preparations for the Unit 3 refueling outage. As a result, progress on reducing the backlog of deferred Unit 3 work has been limited, and some of the deferred work has contributed to the Unit 3 transients. In addition, several modifications late in the extended outage during final system testing and preparation for Unit 3 restart were not thoroughly engineered and resulted in equipment damage in one case.

Radiation protection activities at Unit 3, including the ALARA program, applied radiological controls, supervision and site wide technical support were generally effective. Radioactive waste processing and handling have improved. The radioactive liquid and gaseous effluent, environmental monitoring and plant security programs continued to be effectively implemented and maintained.

ATTACHMENT 2

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1.0 BACKGROUND

In the Fall of 1995, the NRC determined that refueling practices and operation of the Spent Fuel Pool Cooling systems at Unit 1 were not consistent with the Final Safety Analysis Report (FSAR). In February 1996, Northeast Nuclear Energy Company (NNECO) issued Adverse Condition Report (ACR) 7007 - Event Response Team Report that described in detail the causes for numerous inaccuracies contained in Millstone Unit 1's FSAR. ACR 7007 documented a programmatic breakdown in the configuration management controls at Unit 1. ACR 7007 acknowledged that the potential existed for similar configuration management problems at Unit 2.

In March and April 1996, the NRC conducted a special inspection at Unit 2 that identified design and other deficiencies similar to those reported in ACR 7007. On February 20, 1996, Unit 2 was shutdown when NNECO declared both trains of the high pressure safety injection (HPSI) system inoperable because there was the potential to plug the HPSI throttle valves with debris from the sump when operating in the sump recirculation mode.

NNECO's own findings and NRC inspections indicated significant design control deficiencies, and degraded and nonconforming conditions existed at Unit 2. Three major types of design control problems had been identified that included (1) errors in the licensing and design bases documentation; (2) failures to translate design bases into procedures and hardware; and (3) inadequate engineering and modifications.

To recover the design and licensing basis of Unit 2, NNECO implemented its Configuration Management Plan (CMP). The scope of the CMP included those systems that it had categorized to meet the requirements of the Maintenance Rule (10 CFR 50.65) as either Group 1 (safety-related and risk

significant) or Group 2 (safety-related or risk significant). Included within NNECO's CMP were reviews of the design and licensing bases for the Maintenance Rule systems and reviews of topical program areas (e.g., fire protection, high energy line break, and environmental qualification).

On August 14, 1996, the NRC issued a Confirmatory Order directing NNECO to contract with a third-party to conduct an Independent Corrective Action Verification Program (ICAVP) at all three Millstone units to verify the adequacy of its efforts to reestablish adequate design bases and implement effective design controls. The ICAVP was intended to provide additional assurance, prior to unit restart, that NNECO has identified and corrected existing problems in the design and configuration control processes.

The Order required that the ICAVP be performed and completed to the satisfaction of the NRC by an independent contractor approved by the NRC. Parsons Power Group Inc (Parsons) was the contractor selected by NNECO and approved by the NRC to conduct the ICAVP at Unit 2. The Order required Parsons to submit for NRC approval a plan for conducting the ICAVP. The plan was required to include (1) provisions for an in-depth review of the design and design bases of selected systems; (2) the risk- and safety-based criteria for system selection; (3) an audit plan that provided assurance that the results of NNECO's problem identification and corrective action programs for the selected systems were representative of and consistent with that of other systems; (4) procedures and schedules for reporting findings to both the NRC and NNECO in parallel; and (5) procedures to comment on NNECO's resolution of the ICAVP findings and recommendations.

The Order defined the ICAVP scope as encompassing all modifications made to the selected systems since initial licensing, and included (1) review of engineering design and configuration control processes; (2) verification of current, as-modified conditions against design and licensing basis documentation; (3) verification that the design and licensing bases requirements were translated into operating, maintenance, and test procedures; (4) verification of system performance through review of specific test records and/or observation of selected testing; and (5) review of proposed and implemented corrective actions for licensee-identified design deficiencies.

The Order requires that NNECO provide written replies to the Regional Administrator, Region I, and to the Director, Office of Nuclear Reactor Regulation (NRR) for the ICAVP findings and recommendations that include a statement of agreement or disagreement for each ICAVP finding or recommendation and the status of implementation of corrective actions. The Order also required subsequent written replies be made until all corrective actions have been implemented.

SECY-98-119, "Remaining Issues Related to Recovery of Millstone Nuclear Power Station, Unit 3," dated May 28, 1998, provides the staff's conclusions regarding NNECO's CMP and the ICAVP conducted at Unit 3. Sargent & Lundy (S&L), the Unit 3 ICAVP Contractor, concluded, in part, that NNECO had established programs, processes, and procedures to maintain effective configuration control of its design and licensing bases in the future. S&L's conclusion was consistent with the staff's. The staff further concluded that NNECO's site-wide corrective action program was satisfactory to support restart of Unit 3. In its Staff Requirements Memorandums (SRMs) dated June 15, 1998, and August 20, 1998, the Commission directed the staff to incorporate lessons learned from the completion of the Unit 3 ICAVP into the Unit 2 ICAVP. The staff provided the Commission with the changes made to the ICAVP process at Unit 2 in its October 7, 1998, memorandum discussing additional details for disbanding the NRR Special Projects Office.

As discussed in the October 7, 1998, memorandum to the Commission, the staff determined that NNECO's site-wide corrective action program was adequate to support restart of Unit 3. Based on this determination,

the staff developed a sampling criteria for Parsons' review of corrective actions during the Unit 2 ICAVP that were identified by NNECO during the CMP. The sample method for review of the 30 NRC selected NNECO identified issues was described to NNECO and Parsons in an October 21, 1998, letter to NNECO. The methodology employed a two-phased sampling approach that automatically increased the sample size if a Confirmed Level 3 issue was identified with the corrective actions for these issues.

The October 7, 1998, memorandum to the Commission also indicated that Parsons would review the corrective actions for all Confirmed Level 1 and Level 2 DRs and a sample of Confirmed Level 3 DRs selected by the staff using risk insights and the complexity of the required corrective action. Accordingly, the staff selected for Parsons' review 30 Confirmed Level 3 DRs that required complex engineering corrective actions or for which the effectiveness of the corrective action could impact the capability of a system or component to perform its safety function(s). The implementation of the corrective actions for the remaining 45 Confirmed Level 3 DRs was reviewed by the NRC. The October 7, 1998, memorandum to the Commission indicated that acceptance criteria would be developed for expanding Parsons' review sample, however, since all 75 Confirmed Level 3 DRs were being reviewed, no expansion of Parsons review was necessary. Further, as discussed in the October 7, 1998, memorandum, since Confirmed Level 4 DRs are not safety significant and do not call into question conformance with the unit's design and licensing bases, no review of the corrective actions associated with Level 4 DRs was required by Parsons. The resolution of Confirmed Level 4 DRs will be handled by NNECO using its normal corrective action process.

2.0 ICAVP PROCESS

The purpose of the ICAVP, as stated in the August 14, 1996, Order, was to confirm that the plant's physical and functional characteristics were in conformance with its licensing and design bases. The ICAVP provided independent verification, beyond NNECO's quality assurance and management oversight, that NNECO's corrective actions had identified and satisfactorily resolved existing nonconformances with the design and licensing bases; documented and utilized the licensing and design bases to resolve nonconformances; and established programs, processes, and procedures for effective configuration management in the future. The programmatic assessment of NNECO programs, processes, and procedures used to maintain configuration management performed as part of the Unit 3 ICAVP determined that these programs were acceptable. Since the procedures and programs for configuration control are used site wide, the scope of the ICAVP at Unit 2 in this area focused on the implementation of the existing processes, rather than a programmatic assessment of the processes themselves.

Communication protocols were necessary to ensure the independence of Parsons during performance of the ICAVP. The protocol required NRC to monitor all but administrative interactions between Parsons and NNECO. To minimize the potential for adversely impacting the independence of Parsons' technica reviewers, the protocol limited direct interaction between Parsons' technical reviewers and NNECO's technical staff. Further, the protocol required that most of the communication between Parsons and NNECO be in writing. In order to provide assurance to the public that Parsons was maintaining its independence, the Connecticut Nuclear Energy Advisory Council (NEAC), was invited to observe interactions between Parsons and NNECO. During the conduct of the ICAVP, the NEAC has observed many of these interactions during meetings and telephone conferences. Communication protocols, were incorporated into the ICAVP Audit Plan and implementing procedures prepared by Parsons and approved by the NRC to maintain the independence of Parsons during the ICAVP at Unit 2. Imposition of the communication protocol made the exchange of technical information time consuming and inefficient. In many instances, it was necessary for Parsons to provide supplemental written requests for information or requested teleconferences in order for NNECO to understand the scope of the information requested, to clarify the question raised by Parsons, or to request NNECO to clarify its responses.

To provide the level of assurance necessary to support a unit restart decision, the ICAVP was structured in a three tier format to validate many aspects of configuration management. In Tier 1, 11 systems were selected from the 63 Maintenance Rule (10 CFR 50.65) Group 1 and Group 2 systems to test the thoroughness of NNECO's reviews at identifying potential nonconformance with the design and licensing bases. Parsons was tasked to conduct a multidisciplined review of all design changes made to these systems after the issuance of the operating license, the remaining part of the original system configuration, and all operational aspects of these systems. Design features assessed for each system in the Tier 1 review included system fluid flow and heat transfer characteristics, system capability to function assuming a single failure, piping and pipe hangers, equipment anchorages and supports, electrical power requirements, instrumentation and control, seismic design and electrical equipment environmental qualification. Also included in the Tier 1 scope were maintenance, surveillance testing, and training to insure that design requirements were appropriately translated into the applicable procedures. The type of multidisciplined, multifaceted review, performed in Tier 1, is referred to as a "vertical slice" design review because the review encompasses many aspects of system design necessary for a selected system to perform its specified function.

In order to provide a broader perspective on the adequacy of NNECO's corrective actions, as a part of the Tier 1 effort, Parsons was tasked to review a sample of NNECO's corrective actions for previously identified design-related deficiencies for the selected systems, including the deficiencies discovered during the implementation of NNECO's corrective action programs. Parsons also reviewed a sample of corrective actions selected by NRC, for licensee-identified problems in systems outside of the 11 system Tier 1 ICAVP scope.

Tier 2 of the ICAVP was developed to review configuration management from a different perspective than the "vertical slice" Tier 1 review described above. The starting point for the Tier 2 review was the accidents and transients analyzed in the FSAR. The purpose of the Tier 2 review was to validate the critical design characteristics (CDCs) of accident mitigation systems that formed the bases for the inputs to the accident and transient analyses contained in the FSAR. The Tier 2 review provided an additional level of confidence that plant configuration had been appropriately maintained and that changes to plant configuration affecting CDCs of accident mitigation systems had been properly translated in the accident analyses. Tier 2 included a validation of CDCs for approximately 56 Maintenance Rule Group 1 or Group 2 systems credited with accident mitigation in the FSAR. The validation of CDCs was performed by reviewing test and surveillance data, design calculations, instrument setpoints and setpoint analyses, and plant abnormal and emergency operating procedures.

Tier 3 of the ICAVP required the review of a sample of historical changes made to Unit 2's configuration since issuance of the operating license through 14 processes other than the design change (modification) process. These included processes such as calculation changes, proposed Technical Specification (TS) changes, temporary modifications, drawing changes, procedure changes, set point change requests, and replacement item evaluations. Tier 3 provided insights into the effectiveness of the various change processes in controlling the plant's configuration.

In developing the process for implementing the ICAVP, the NRC established a threshold for handling findings identified by Parsons. This threshold was defined in SECY 97-003, "Millstone Restart Review Process," dated January 3, 1997, as a "defect" that represents any condition resulting in the plant being outside its current licensing bases. In addition to a focus on the identification of any defects, Parsons and the NRC evaluated deficiencies identified by Parsons that did not meet the definition of a defect (such as a calculation error that does not place the plant outside the licensing bases), to determine if any repetitive technical errors existed that in other circumstances could result in a nonconformance with the unit's design

or licensing bases. A very low threshold was established by the NRC for issues that Parsons was required to document during the ICAVP.

Parsons documented its ICAVP findings in discrepancy reports (DRs). The DR process allowed any of Parsons' reviewers to initiate a DR after they identified that a potential for a discrepant condition existed. After being initiated, if Parsons determined, based on further review of the information it had available that a discrepant condition did not exist, the DR was issued as an Invalid DR. As an Invalid DR, no response was expected from NNECO and the DR was considered closed by Parsons. If Parsons determined, based on a review of the information it had available, that there existed a discrepant condition, the DR was issued as a Valid DR. All DRs (Valid and Invalid) were issued to the NRC and NNECO concurrently, with a copy provided to the NEAC. To allow public access to the DRs, Parsons posted the DRs, including NNECO's responses, to a website on the Internet approximately 2 business days after the DR was issued.

When a Valid DR was issued, Parsons assigned the DR an ICAVP Significance Level as a measure of the DR's importance to the design and licensing basis of the unit. The NRC established four levels of ICAVP significance. The most significant DRs are considered Level 1 and the least significant are considered Level 4. Level 1 DRs are discrepant conditions that identify instances when the system did not meet its licensing or design bases and could not perform its intended function, i.e., has the potential to simultaneously affect redundant trains. Level 2 DRs are discrepant conditions that identify instances when a single train of a redundant system did not meet its licensing or design bases and that the train could not perform its intended function. Level 3 DRs are discrepant conditions that identify instances when a system did not meet its licensing or design bases, but the system is capable of performing its intended function. Level 4 DRs are discrepant conditions that identify instances when the system meets its licensing and design bases, however, there existed minor errors, such as minor arithmetic errors, that do not significantly affect the results of the calculation or there are inconsistencies between documents of an editorial nature. As Parsons performed its DR reviews, the DR status was tracked as described below:

1. **In Progress**: ICAVP Contractor is reviewing NNECO's response to the DR.

2. **Followup**: Additional information is required from NNECO to finalize its response.

3. **Pending**: ICAVP Contractor and NNECO agree on the issue and the significance level, but the ICAVP Contractor has not yet received NNECO's written response documenting that the issue has been included in NNECO's corrective action program.

4. **Unresolved**: NNECO has provided additional responses to the ICAVP Contractor and some or all of the DR resolution is not acceptable. This type of DR requires the NRC to make a final determination of the condition of the DR. Once NRC's determination is made, the ICAVP Contractor closes the DR appropriately.

5. **Closed**: The DR resolution is finalized and the ICAVP Contractor accepts NNECO's resolution as either a **Previously Identified, Non-Discrepant**, or **Confirmed DR.**

a. **Confirmed DRs** - both the ICAVP Contractor and NNECO agreed that a new discrepant condition existed and that the assigned ICAVP significance level was appropriate.

b. **Nondiscrepant DRs** - the ICAVP Contractor agreed with NNECO that the issue described in the DR was not a discrepant condition based on its review of the additional information provided by NNECO.

c. **Previously Identified DRs** - the ICAVP Contractor agreed that NNECO had previously identified the issue based on its review of the additional information provided by NNECO.

Confirmed Level 3 or higher (Level 1 or 2) DRs satisfy the definition of a "defect" as stated in SECY 97-003, but may contain several issues, some of which may individually be Significance Level 4 in that the individual issue did not call into question conformance with the design or licensing bases. At Unit 2, Parsons identified a number of Confirmed Level 3 DRs that were based on discrepancies between design and licensing bases documents that only required minor FSAR or licensing bases documentation changes.

Confirmed Level 4 DRs were below the threshold of a "defect." These DRs generally represented enhancements to procedures or processes, or corrected minor editorial or calculational errors that did not result in a nonconformance with the design or licensing bases of the unit. The type of issues documented in Level 4 DRs would generally not be included in NRC inspection reports. However, during the ICAVP, a low threshold for documenting discrepant conditions was established to provide a method for identifying repetitive technical errors that in other circumstances could result in a noncomformance with the licensing or design bases. Parsons screened and sorted Confirmed Level 4 DRs to identify trends that were reviewed by the NRC for possible expansion of the ICAVP scope in accordance with the process described in the January 30, 1998, letter to NNECO. No trends were identified that required an expansion of the ICAVP scope.

Parsons issued Volume 1 of its final Millstone Unit 2 ICAVP Report on December 4, 1998, based on the status of the Unit 2 ICAVP as of December 4, 1998. Volume 1 contained the Executive Summary, including Parsons' conclusions regarding the effectiveness of NNECO's CMP at identifying and resolving design and licensing bases issues. Revision 1 to Volume 1 and Volume 2 of the final report was issued on January 12, 1999. Volume 2 provides the additional information supporting Parsons' conclusions, observations, and recommendations. Also, Parsons issued a supplement to the final report on March 19, 1999, documenting the results of its review of the corrective actions associated with the NRC-selected Confirmed Level 3 DRs. Section 6.5, below, provides a summary of Parsons' findings.

3.0 NRC OVERSIGHT AND MANAGEMENT OF ICAVP

3.1 Review and Approval of Parsons as the ICAVP Contractor for Unit 2

The August 14, 1996, Confirmatory Order, required that the ICAVP be conducted by an independent verification team whose selection must be approved by the NRC. NNECO submitted information regarding the selection of Parsons as the contractor for the Unit 2 ICAVP on February 14, 1997. Additions and corrections to the proposal were submitted on March 4, March 27, and May 14, 1997. The staff also held a meeting with the public on the evening of March 18, 1997, to obtain comments regarding the proposed contractor.

Members of the public expressed concern about the process used to select and approve Parsons. The principal concerns related to the potential for bias by a contractor that derives a substantial portion of its

income through work in the commercial nuclear power industry and was selected and paid for by NNECO. In conducting the organizational review, the staff recognized that a threshold existed for both technical and financial interactions above which the independence of the contractor could not be assured. In making the determination, the staff balanced the need to ensure adequate financial independence with the need to ensure that the contractor had the necessary skills and experience to effectively conduct the ICAVP.

The staff conducted a review of the information submitted by NNECO regarding the selection of Parsons, to ensure that Parsons was technically and financially independent of NNECO, and its design contractors, and technically capable of effectively performing the ICAVP. To complete this task, the staff performed the following activities:

1. Evaluated whether Parsons, as a corporation, had any financial interest or had any technical involvement with the design or construction of Millstone Unit 2.

2. Evaluated whether Parsons, as a corporation had adequate technical and managerial qualifications to conduct the ICAVP.

3. Evaluated whether Parsons' proposed specialists had the appropriate technical background to participate in the ICAVP.

4. Evaluated the financial and technical independence of the Parsons proposed specialists.

The staff conducted interviews with each specialist to confirm that the individual specialists had no financial interest in NNECO or other entities named on the operating license, the nuclear steam supply system (NSSS) vendor, or the architect-engineer (AE) for Millstone Unit 2 and to confirm that the team members had no prior technical involvement with Millstone Unit 2. As new team members were added to Parsons' ICAVP team during the implementation of the ICAVP, the staff interviewed each new member and reviewed the conflict of interest statement completed by the new team member.

Regarding Parsons' financial independence from NNECO, the staff found sufficient independence in that, organizationally, Parsons, its subsidiaries, its Retirement Plan, and its Savings Investment Plan, did not directly own any licensee stock, bonds, or other financial instruments issued by Northeast Utilities (NU), NNECO, or other entities named on the Millstone Unit 2 operating license. In addition, each of the proposed ICAVP team members completed a written statement regarding conflict of interests that included financial interests that was reviewed by the staff. To further ensure the continued independence of Parsons during the performance of the ICAVP at Millstone, NNECO stated that Parsons will be restricted from performing or seeking new work at any NU facility for the duration of the ICAVP contract and that Parsons will not seek work at any NU facility for 12 months following the completion of the ICAVP.

The staff determined that Parsons was sufficiently independent from the design and operation of Unit 2, in that, it had not been involved in design activities that would affect its ability to perform the ICAVP at Unit 2. The staff provided conditional approval, pending the receipt of sworn statements from Parsons, and NNECO regarding the financial independence of Parsons as the ICAVP contractor for Unit 2, in a letter tc NNECO dated May 28, 1997. The certifications were received from NNECO on June 27, 1997, and from Parsons on June 24, 1997. On August 1, 1997, the staff provided final approval of Parsons as the ICAVP contractor for Unit 2 following receipt and review of the financial independence statements.

3.2 Review and Approval of Parsons' ICAVP Audit Plan

The staff reviewed and approved Parsons' ICAVP Audit Plan and implementing procedures for Unit 2 to

ensure that the plan accomplished the objectives of the August 14, 1996, Order, included sufficient scope and depth, and provided sufficient guidance and instructions to its specialists to effectively implement an assessment of the capability and effectiveness of NNECO's CMP at identifying and addressing design- and licensing-bases deficiencies. The staff verified that Parsons' ICAVP Audit Plan and implementing procedures included the following attributes:

1. A vertical slice system review method for selected systems similar to the guidance provided in NRC's Inspection Procedure (IP) 93801, and NRC's Inspection Manual Chapter 2530 (this is considered the Tier 1 review). Included within Parsons' review was the confirmation that for the selected Tier 1 systems, the regulatory requirements, and design and licensing bases were correctly implemented in specifications, drawings, calculations and procedures, and that systems can perform their specified functions. Parsons' ICAVP Audit Plan and implementing procedures contained the controls necessary for Parsons to confirm that for the selected Tier 1 systems (1) the scope encompassed all modifications since original construction; (2) the FSAR accurately reflected the current licensing bases, and current plant configuration and operational characteristics; (3) the analyzed facility configuration in the design bases was consistent with the current plant configuration and operational characteristics; (4) the correct design and licensing bases information was reflected in the appropriate engineering, maintenance, and operations procedures and; (5) system design changes had not invalidated preoperational and startup acceptance testing.

2. An accident mitigation system review of the systems described in Chapter 14 of the FSAR used to mitigate the consequences of analyzed accidents (this is considered the Tier 2 review). As part of their Tier 2 Audit Plan, Parsons proposed critical design characteristics (CDCs) for the systems credited with the mitigation of each accident analyzed in Chapter 14 of the FSAR. The conformance of the physical plant to the CDCs ensures that the systems and components can perform their specified safety functions as assumed in the accident analyses. The staff reviewed and approved the CDCs proposed by Parsons. The staff verified that for accident mitigation systems, the CDCs were adequate to ensure the systems fulfilled their safety functions. This was accomplished by verifying that the CDCs included (1) the parameters necessary to measure system performance (pressure, flow, volume, voltage, current, temperature, etc.); (2) the changes of state (pump start from stop, solenoid energize from de-energized, check valve close from open, etc.) required of the various components; (3) the interactions between safety-related systems necessary to mitigate the consequences of the accident scenarios and; (4) the required operator actions necessary to mitigate the consequence of the accident scenarios.

3. A review of historical examples of the implementation of the various processes used by NNECO to change the facility design or change the characteristics, procedures, or practices for maintaining, operating, testing, and training on safety or risk significant systems, structures, and components outside the design change (modification) process (this is considered the Tier 3 review). The staff verified that Parsons' Audit Plan and implementing procedures included verification that design controls, as applied to the original design, had also been applied in the design change processes used to change the configuration or operation of the facility. Also, the staff ensured that appropriate methods were used by Parsons to select representative samples from each of NNECO's change processes.

4. Controls for verifying the adequacy of NNECO's corrective actions and assessing the effectiveness of NNECO's implementation of the corrective actions developed during the CMP and in response to the ICAVP findings.

5. Controls for documenting observations and findings, providing them to the NRC and NNECO

concurrently on an ongoing basis, and to provide the NRC with comments on NNECO's proposed resolution of Parsons' findings and recommendations.

6. Controls for communicating with NNECO that were consistent with the need to maintain independence from NNECO.

7. Administrative and technical instructions and guidance to Parsons' specialists sufficient to enable them to implement the ICAVP Audit Plan as approved by the NRC staff.

8. Adequate system selection criteria that applied appropriate risk and safety criteria.

Based on the verification that the attributes listed above were satisfied, the staff, in a letter dated July 15, 1997, approved Parsons' ICAVP Audit Plan and implementing procedures with the exception of the CDCs. Parsons developed the CDCs after the Audit Plan was approved and submitted them for staff review and approval in letters dated July 18, July 25, August 4, August 29, and September 29, 1997. The staff completed its review and provided approval of the CDCs in letters to Parsons dated October 15, 1997, and January 20, 1998. Throughout the implementation of the ICAVP, the staff reviewed and approved all of the changes made to the ICAVP Audit Plan and implementing procedures to ensure the conditions of the August 14, 1996, Order continued to be met.

3.3 Selection of ICAVP Tier 1 Systems

SECY 97-003 stated that a minimum of four systems would be selected for the ICAVP Tier 1 review. These systems were to be selected from the 63 Unit 2 Maintenance Rule Group 1 and Group 2 systems. A minimum of two of the systems were to be selected by the NRC with the other two systems available for selection by the NEAC from an NRC provided list of systems.

In identifying the systems for inclusion within the ICAVP Tier 1 scope, the staff decided to take a broader definition of a system rather than using the method used by NNECO to identify Group 1 and Group 2 Maintenance Rule systems. The system definitions used by the staff were more aligned to the system functional descriptions provided in the FSAR, including the associated safety-related subsystems necessary for safety-related functions to be accomplished. The staff developed a set of attributes for evaluating the systems to identify those that would be the best candidates for ICAVP Tier 1 reviews. These attributes included:

1. Risk significance - An NRR Senior Reactor Analyst (SRA) reviewed the Unit 2 Individual Plant Examination and updated Probabilistic Risk Assessment (PRA) to gain insights regarding the Unit 2 plant design and system interactions. On the basis of this review the SRA recommended a group of systems for the ICAVP and included a discussion of the risk-significance of these systems and the rationale for the recommendations. Although the selection process did not include assignment of numerical scores or weighting factors for each objective element, the risk significance element was considered as the most important in the selection of systems.

2. System characteristics and complexity - The staff reviewed the Group 1 and Group 2 systems to determine which systems had multiple safety-related functions, multiple system interfaces, and operate in multiple operational modes. The FSAR description was used to develop a general understanding of the system characteristics and complexity. The staff also reviewed a list of the number of safety-related components included in each system to evaluate the complexity of the systems.

3. Previous opportunities for introducing inappropriate changes - The staff reviewed a list of Plant Design Change Records (PDCRs) for the systems to determine the number of design changes that had been performed on each system since initial licensing. In addition, the titles of the design changes were reviewed to attain a general understanding of the scope and depth of the modifications performed.

4. Previous problems with a system - The staff reviewed a list of Licensee Event Reports (LERs) for the period between 1990 and 1997. The LERs were reviewed for the number of previous problems reported regarding each system, and the number of design-related problems reported for each system. The staff also discussed the operating history of the systems with the current resident inspectors to determine if any systems appeared problematic.

5. Engineering disciplines involved with system - The staff reviewed the FSAR discussion of the systems to evaluate the scope of the engineering disciplines that were likely to be involved with the system design. In general, fluid systems with active functions (pumps and valves) included most of the engineering disciplines (electrical, instrumentation and control (I&C), mechanical, civil/structural).

6. Results of previous reviews - The staff discussed the general inspection history of Unit 2 with the resident inspectors to determine whether specific systems had been a subject of significant inspection activity in the last few years.

In a July 16, 1997, letter the staff forwarded to Parsons the first group of Unit 2 ICAVP Tier 1 systems. Based on the Maintenance Rule classification, Parsons was requested to review the high pressure safety injection system (HPSI) including the refueling water storage tank (RWST) and the auxiliary feedwater system (AFW) including the condensate storage tank (CST). The staff considered these four systems, as defined by the Maintenance Rule, to be the first "two" systems.

Consistent with SECY 97-003, NEAC was given the opportunity to select the remaining Unit 2 ICAVP Tier 1 systems. In September 1997, the NRC provided NEAC with a list of systems from which it could choose the remaining systems, using the selection method of its choice, for Parsons to include within the ICAVP Tier 1 reviews. The list contained 21 Maintenance Rule Group 1 or Group 2 systems that when combined based on functional requirements, resulted in seven system groups from which NEAC could select two.

On September 15, 1997, NNECO notified the NRC that the problem identification phase of its CMP was completed for the Maintenance Rule Group 1 and Group 2 systems. During the September 1997 NEAC meeting, the NEAC allowed members of the public to select the last two systems. The systems selected were the emergency diesel generator (EDG) and support systems (EDG, EDG fuel oil, EDG room ventilation, 4160 Volt AC and fast bus transfer, and the engineering safeguards features actuation system (ESFAS) for the EDG load sequencer only) and the radiological release control (RRC) systems (containment and enclosure building purge and enclosure building filtration). These "two" systems included 7 Maintenance Rule Group 1 or Group 2 systems. The four Tier 1 system groups encompass 11 Maintenance Rule Group 1 or Group 2 systems. A listing of the systems contained in each group is provided in Section 6.1.

3.4 NRC Oversight of ICAVP Implementation

To ensure that the ICAVP was being implemented to the satisfaction of the staff, as required by the August 14, 1996, Order, the staff provided instructions to Parsons regarding the scope and depth of the ICAVP

during meetings, teleconferences, through the review and approval of its Audit Plan and implementing procedures, and through the review and approval of changes to the Audit Plan and implementing procedures. The staff also reviewed and approved the Parsons' staff assigned to conduct the ICAVP reviews.

To assess the effectiveness of Parsons' implementation of the ICAVP, the staff conducted a number of multidisciplined inspections, including inspections similar to the three tiers employed by Parsons during the ICAVP. Details regarding the inspection plan can be found in SECY 97-003. The inspection plan included reviews of Parsons' implementation of the Unit 2 ICAVP Audit Plan and implementing procedures, a design and licensing basis inspection of an ICAVP Tier 1 system that Parsons reviewed (Tier 1 In-Scope), a design and licensing basis inspection of one system that was not included in the ICAVP scope (Tier 1 Out-of-Scope), an inspection of the CDCs associated with two accident scenarios from the FSAR (Tier 2), an inspection of the design change processes (Tier 3), and an inspection of the implementation of corrective actions for issues identified during the CMP, the ICAVP, and NRC inspections. The implementation inspection, and the Tier 1 In-Scope, Tier 2, and Tier 3 inspections directly assessed Parsons' implementation of the Unit 2 ICAVP Audit Plan, and implementing procedures by either directly observing Parsons' activities or comparing the results of the NRC's inspections with the findings made by Parsons. The results of these inspections are provided in Section 7.0.

During the ICAVP, the NRC was required to monitor all but administrative interactions between NNECO and Parsons. To facilitate the communication and to reduce the inefficiency inherent with the requirement to monitor the interactions between NNECO and Parsons, the staff made sure it was available when necessary to support these interactions, including attending frequent meetings at the site and monitoring frequent teleconferences.

3.5 Review of Discrepancy Reports

Throughout the ICAVP, the staff reviewed and trended the DRs issued by Parsons to evaluate the need to increase the scope of the ICAVP, verify that the DRs were properly classified and dispositioned, assess the thoroughness of Parsons' review of NNECO's response, identify programmatic trends, and measure the effectiveness of the CMP. The DRs were reviewed and inspected by the staff using the steps outlined below:

1. Screen issue(s) described in the Preliminary DR. During this screening, the staff categorized the DRs to determine if the DRs exhibit discernable trends and identified questions with the DRs that Parsons was required to address (i.e., correct significance level assigned, valid versus invalid, etc). The DRs were categorized by technical discipline, types of documentation reviewed by Parsons, apparent causes, programmatic areas, and regulatory bases. The categorization information was used to identify potential programmatic problem areas that, when the DRs were closed, may have warranted further NRC or Parsons review. No areas were identified through the review of DRs that warranted the expansion of either the NRC's inspection effort or Parsons' reviews.

2. Review Closed DRs. The purpose of this review was to identify those DRs that required further NRC followup or for which the DR did not provide sufficient information for the staff to determine whether the disposition of the DR was appropriate. The staff evaluated whether the DRs were appropriately responded to by NNECO and dispositioned by Parsons, and that the final ICAVP significance level was appropriate. In addition, Confirmed DRs were trended to identify programmatic areas that warranted additional NRC or Parsons focus. Section 7.7 provides the results of the staff's trending of Confirmed DRs.

3. Inspect the resolution of selected DRs. A sample of Confirmed Level 3 and a sample of Confirmed, Nondiscrepant, and Previously Identified Level 4 DRs were included within the scope of the NRC's inspection of DRs (no Confirmed Level 1 or Level 2 DRs were identified during the Unit 2 ICAVP). During the corrective action inspection the staff reviewed the DRs to assess the effectiveness of NNECO's proposed corrective actions including its determination regarding the timing of corrective action completion (i.e., restart required or deferred). The results and scope of the NRC's corrective action inspections are provided in Section 7.6.

In assessing whether an issue could be deferred until after restart, the staff determined that the corrective actions required to restore or reestablish the design or licensing bases of the unit for Level 3 Confirmed DRs were required to be completed before the unit could restart. Since most of the issues identified in Level 4 DRs represent enhancements to procedures or processes, or corrected minor editorial or arithmetic errors that did not impact the design or licensing bases, the corrective action for Confirmed Level 4 DRs, and those corrective actions resulting from findings contained in Level 3 Confirmed DRs that were not required to restore or reestablish the design or licensing bases, were determined by the staff to be deferrable till after restart. However, the staff recognized the importance of ensuring that NNECO completes the corrective actions for all of the issues identified during the ICAVP in a reasonable period.

3.6 Assessment Method for Determining ICAVP Scope Increase

The staff defined four levels of significance that were used during the ICAVP to classify DRs. In addition to the four significance levels, the staff developed likely or potential NRC actions corresponding to each level. The public had asked that the staff develop and provide specific, predetermined NRC actions that were automatically triggered by ICAVP findings. However, the complexity inherent in detailed licensing and design reviews does not lend itself to the establishment of automatic thresholds to trigger the expansion of the ICAVP scope.

The staff provided NNECO with its discussions regarding the expansion of ICAVP scope in a letter dated January 30, 1998. In summary, this letter indicated that (1) if there was a Confirmed Level 1 finding, the NRC would likely increase the scope of the ICAVP by the selection of an additional system(s) for review; (2) if there was a Confirmed Level 2 finding, the NRC would likely expand the ICAVP scope to evaluate similar nonconformance issues in other systems; (3) if there were Confirmed Level 3 findings, the ICAVP scope could be expanded to evaluate similar issues in other systems if the staff determined that NNECO's corrective actions were ineffective or that adverse trends were identified when multiple Level 3 findings were considered and NNECO had not implemented effective corrective actions to address the adverse trend; and (4) for Confirmed Level 4 issues, if the staff determined that these DRs identified an adverse trend that raised questions with the design and licensing bases, and NNECO had not implemented effective corrective actions, the ICAVP scope would be expanded as determined appropriate by the Millstone Restart Assessment Panel.

4.0 INVOLVEMENT OF THE NUCLEAR ENERGY ADVISORY COUNCIL (NEAC)

The NEAC was invited to observe ICAVP implementation at the Millstone site as part of NRC's efforts to provide additional assurance of public participation in the oversight of the ICAVP. The State of Connecticut established the NEAC pursuant to Section 17 of Public Act 96-245. The NEAC is required to hold regular public meetings to discuss issues relating to the safety and operations of nuclear power plants, and to advise the governor, legislature, and municipalities within a 5-mile radius of the plants on these issues. Also, the NEAC is responsible to work with Federal, state, and local agencies, and the companies

operating nuclear power plants to ensure public health and safety.

In meeting its responsibilities, the NEAC has invited and NRC representatives have attended, the regularly scheduled meetings of the NEAC held on a number of different occasions to discuss issues relating to the conduct of the ICAVP. In addition, the NEAC designated two members as observers and named two alternates, the NRC staff has kept NEAC appraised of NRC's oversight of ICAVP activities.

In order to facilitate NEAC's observations of NRC oversight activities, the designated observers entered into a Memorandum of Understanding (MOU) with the NRC. The MOU allows the NEAC representatives to be informed on nuclear-related matters that may involve proprietary, safeguards, and predecisional inspection-related information. Additionally, the MOU details the process to be used if the NEAC observers become aware of apparent nonconformance with safety or regulatory requirements and if the NEAC observers have conclusions or views that are substantially different from those of the NRC oversight team members. The NEAC has documented its involvement and reviews of the NRC's ICAVP process, in part, in its annual reports to the legislature dated January 9, 1997, January 29, 1998, and January 7, 1999. A number of actions were taken by the NRC to support the NEAC observation of ICAVP activities that included:

1. Parsons' Unit 2 ICAVP findings (DRs) were made available to the NEAC.

2. Parsons' Communication Plan, PLN-02, provided the guidance for interaction with the NEAC and also identified the organizational-points of contact for the NEAC.

3. NRC oversight activities during meetings or teleconferences, whether conducted at the site, NRC Headquarters, or Parsons' offices, included invitations for NEAC participation. NEAC has been diligent in implementing their State charter. To that end, they have participated in many of the frequent teleconferences between the NRC staff, NNECO, and Parsons, and have attended many of the exit meetings including those at the offices of Parsons in Reading, PA. NEAC representatives have attended and participated in Commission meetings in Rockville, MD.

In a cooperative effort on the part of the NRC staff and NEAC to ensure the independence of the ICAVP, the public was afforded the opportunity to select the last two systems for the Tier 1 assessment. A NEAC subcommittee reviewed the system groupings provided by the NRC for the random selection process. Using data provided by NNECO and the NRC, the subcommittee analyzed the risk and safety significance of the relevant systems and approved the 7 groups of systems (consisting of 21 separate systems) as reasonable candidate systems to be used to validate NNECO's CMP. At the September 1997, NEAC meeting, members of the public then randomly selected two system groups from those provided by the NRC for the Unit 2 ICAVP.

The Communications Protocol, a formal element used to facilitate independence of the ICAVP, included the NEAC. To facilitate the NEAC's participation, they were provided with documents, notifications, and opportunities to observe the NRC's oversight of Parsons' activities. As such, requests for informal working conferences by any of the organizations involved in the conduct of the ICAVP included the prior notification of the NEAC. As indicated above, NEAC observed many of these interactions.

5.0 NRC INTERACTIONS WITH THE PUBLIC DURING THE ICAVP

Starting early in the process, the public showed an active interest in all regulatory activities related to plant

recovery and restart. In response, the staff took extraordinary measures to assure that to the maximum extent possible, regulatory business was conducted in a manner that was open to public observation. The staff used input from local public interest groups such as the Citizens Regulatory Commission, the Citizens Awareness Network, and the NEAC to structure evening meetings that provided an opportunity for the public to interact directly with the NRC staff. The staff established and implemented the following avenues of communication that allowed the public to observe NRC activities and interact with the NRC:

1. Public participation in evening public meetings where the staff solicited public comments on recovery and restart activities.

2. Public observation of periodic meetings where Parsons presented the status of its review efforts to the NRC and NNECO.

3. Public observation at all exit meetings of inspections conducted by the NRC ICAVP inspection teams, including inspections held at the offices of Parsons in Reading, PA.

4. Public access to Parsons' Website that included DRs, DR responses, subsequent Parsons comments, and the final Parsons report.

5. Public access to two local public document rooms located near the plant.

6. Public access to ICAVP related staff external correspondence through direct distribution to representatives of public interest groups.

The staff made a concerted effort to hold the vast majority of meetings in the vicinity of the Millstone Station to make them accessible for public observation.

6.0 PARSONS' ICAVP IMPLEMENTATION AND FINDINGS

Parsons implemented the ICAVP at Unit 2 as described in its NRC-approved ICAVP Audit Plan and implementing procedures. A summary of the ICAVP process is provided in Section 2.0 above. Parsons indicated to the staff that in implementing the ICAVP at Unit 2, it had expended approximately 271,800 person-hours of effort (12,200 hours Project Management; 4,000 hours Quality Assurance oversight; 32,100 hours administrative support; and 223,500 hours technical evaluation) as of December 4, 1998. Included, in part, within Parsons' Tier 1 review were about 922 calculations; 1,188 drawings (P&IDs, one-line, logic diagram, etc.) in addition to direct access to aperture card files containing essentially all of the available NNECO drawings for Unit 2; 1,754 procedures; 555 maintenance work orders; 1,679 components; and 263 modifications to the Tier 1 systems. At Unit 2, the ICAVP started on July 15, 1997, after NNECO declared that they had completed discovery on one-half of the risk and safety significant systems, and ended March 11, 1999, essentially 20 months of effort. During this period Parsons stated that about 100 different individuals participated as technical reviewers for Parsons, with about 75 people assigned at any given period. The scope and results of Parsons' Tier 1, Tier 2, Tier 3, and corrective action reviews follows.

6.1 Scope of Parsons' ICAVP Tier 1 Review

The Tier 1 system reviews performed by Parsons focused on two objectives (1) to verify the system design elements being reviewed were technically adequate and consistent with the licensing and design bases, and (2) to verify the modifications implemented after receipt of the operating license were technically adequate and that configuration control of design documents was maintained. Parsons accomplished these objectives

by verifying that:

1. The current configuration accurately reflected the licensing-bases, including the FSAR.

2. Calculations and analyses were performed using recognized and acceptable analytical methods and assumptions made in calculations or analysis supporting changes were technically sound.

3. The results of calculations or analysis supporting the unmodified portions of the original configuration and design changes were reasonable (based on engineering judgement) for the scope of the change.

4. NNECO considered the effect of a change on design margins and the design changes received the appropriate level of engineering and management review during the design phase and before implementation.

5. NNECO considered the effect of a change on pre-operational, startup or system baseline acceptance test results.

6. Design changes were accurately reflected in operating, maintenance, and test procedures, as well as in training materials.

7. Proposed design changes, subsequently canceled, were not replaced by procedural changes that imposed excessive burdens on plant operators.

8. NNECO maintained adequate control of operational, maintenance, and test and surveillance procedures; and control of operator training and the plant simulator configuration.

9. The current configuration was consistent with the licensing bases at the level of detail contained in piping and instrumentation diagrams (P&IDs) or system flow diagrams, piping isometric drawings, electrical single-line diagrams, and emergency, abnormal, and normal operating procedures.

10. The analyzed configuration was consistent with the current plant configuration.

11. Identification numbers were as indicated on the P&ID or process flow diagram, and equipment name plate data were consistent with design specifications and analyses.

12. The location of pipe supports, snubbers, and other pipe restraints were consistent with design specifications and piping stress analyses.

13. Divisional separation of safety-related systems, structures and components, seismic II/I, and other topics addressed by NNECO's hazards analyses were reflected in the current plant configuration.

The 11 Maintenance Rule Group 1 or Group 2 systems that were selected to be included within the scope of Parsons' Tier 1 review were combined into four functional groups as outlined below:

HPSI	AFW	RRC	EDG
1. HPSI	1. AFW	1. Enclosure Building Filtration System	1. Emergency Diesel Generator
2. RWST	2. CST	2. Containment and Enclosure	2. EDG Fuel Oil
		Building Purge System	3. EDG Room Ventilation
			4. 4160 Volt AC/fast bus transfer
			5. ESFAS (diesel sequencer only)

Legend: HPSI (High Pressure Safety Injection System); RWST (Refueling Water Storage Tank); AFW (Auxiliary Feedwater System); CST (Condensate Storage Tank); RRC (Radiological Release Control Systems); EDG (Emergency Diesel Generator); ESFAS (Engineered Safeguard Features Actuation System)

Parsons' review verified the technical adequacy of all parameters, including operating ranges and/or limitations contained in procedures. Additionally, all operating modes not explicitly identified in the licensing basis were reviewed to verify that the design and analysis supported operation in that mode. The scope of the modification review during Tier 1 included all major modifications (Design Change Requests - DCRs), Minor Modifications (MMODs) and all Design Change Notices (DCNs) generated to support the DCR and MMOD processes. The modification review included only the modifications to the Tier 1 systems.

Parsons also conducted a physical configuration review of the Tier 1 systems. This review focused on verifying that the current as built condition of the plant matched the current design and licensing bases documents. During this review Parsons also performed a physical and functional walkdown of the Tier 1 systems to verify that the as built condition conformed to the modifications and to verify the modifications had been accurately incorporated into the affected design drawings or were posted against the affected design drawings.

In preparation for the Tier 1 review, Parsons also conducted a regulatory review to identify design and licensing bases commitments made by NNECO. This review encompassed NRC Bulletins, NRC Generic Letters, NRC Safety Evaluation Reports, and Unit 2 Licensee Event Reports. The licensing and design bases requirements that were identified during the regulatory review were verified during the Tier 1 review.

The Tier 1 systems interfaced with about 50 other systems. Portions of these interfacing systems were included within the scope of the Tier 1 review or were reviewed to a lesser extent as necessary to ensure the functions of the Tier 1 systems could be satisfied. Descriptions of the general approaches for establishing the Tier 1 interface boundaries for mechanical, electrical, and I&C systems are provided below:

Tier 1 Systems' Mechanical Interface Boundaries

For the mechanical systems, the boundary of the ICAVP Tier 1 system reviews extended to the first isolation valve in the interfacing system and to the first structural support outside the ICAVP Tier 1 system (beyond the isolation valve). For interfaces with mechanical systems, Parsons reviewed the interfacing system calculations, drawings, and procedures to the extent needed to verify that the functions required to support the ICAVP Tier 1 system were addressed in the design of the interfacing system (e.g., the HVAC system was capable of maintaining environmental conditions required for the Tier 1 system), or that the Tier 1 system was capable of performing its functions necessary to support operation of the interfacing

system (e.g., heat removal from the interfacing system).

Tier 1 Systems' I&C Interface Boundaries

For indirect I&C input signals, those signals that originated in another system and input into the Tier 1 system by first passing through another system (i.e. Reactor Protection System), the scope of the Tier 1 system review included a single channel for each of the process variables. The system that the indirect signal passed through was assumed to operate as intended. Direct I&C input signals were those signals that originated in another system and input directly into the Tier 1 system without passing through another system. For direct I&C input signals, the review included the signal path from the interfacing system instrument to its input into the Tier 1 system. Both indirect and direct I&C input reviews verified that the functions required to support the Tier 1 systems were addressed in the design of the interfacing system. The Tier 1 review of output signals, those signals that originated in the Tier 1 system and output to the interfacing system, included the I&C output signals from the Tier 1 system through to the input point (usually up to the control relay; or in the case of an analog signal, up to and including the signal isolator) of the interfacing system. The reviews included the signal paths as they appeared on interfacing system P&IDs, logic diagrams, and schematics as appropriate. During these reviews, signal parameters, divisional power supplies, setpoints, ranges, and accuracies were verified by Parsons. Also, setpoint and loop accuracy calculations for the affected instrumentation were reviewed for technical adequacy.

Tier 1 Systems' Electrical Interface Boundaries

In addition to the detailed Tier 1 review of the EDG, Parsons reviewed, in detail, the portion of the electrical distribution system from the motor control center (MCC) or switchgear, as applicable, to the Tier 1 system component loads. Parsons performed a load path review for the remainder of the electrical distribution system (EDG to switchgear or MCC). Parsons identified the busses that fed the Tier 1 system components (including indirect I&C signal input components) and determined their load-time profiles. The load paths from these busses were identified up to the onsite electrical sources (i.e. EDG, battery and charger, inverter). After the Tier 1 systems and most of the components that were fed from MCCs were identified, Parsons selected two MCCs with different electrical loads for a review of feeder cable sizing, circuit breaker coordination, and other design attributes.

The load carrying components in the load path were checked for design sizing using the total operating load of the bus based on the bus loading calculations. Loading for components of non-Tier 1 systems were accepted (without verification) as shown in the bus loading calculations. Parsons verified coordination of protective devices (i.e., relays, breakers, fuses) for the load paths required to supply the components of the Tier 1 systems to confirm acceptable coordination and that the required bus operating loading was addressed. Parsons verified that the onsite electrical source load-time profiles included the loads (including transient loads) associated with the components of the Tier 1 systems. The adequacy of the overall sizing of the onsite electrical sources were verified against total loading of the source using the associated bus loading calculations. In addition, the battery charger (or inverter) and its continuous loading profile were checked to confirm the size was appropriate, that the load path was complete to the EDG, and that the load profile matched or enveloped the EDG loading input from the charger (inverter).

6.2 Scope of Parsons' ICAVP Tier 2 Review

Parsons reviewed the initiating events in the Unit 2 FSAR and identified the accident mitigating systems and components within the systems. The FSAR and supporting analyses were used to identify the specific CDCs that were required to mitigate the events. Parsons verified that the CDCs were satisfied using a documented system or component test, a surveillance test required by the Unit 2 TS, a post maintenance

test, or as applicable, design bases calculations

or analyses. The Tier 2 review was not as detailed a systems review as the Tier 1 review. Tier 2 of the ICAVP was developed to review configuration management from a different perspective than the "vertical slice" Tier 1 review described above. The bases or starting point for the Tier 2 review was the accidents and transients analyzed in Chapter 14 of the FSAR. Tier 2 reviewed in a limited manner, 56 of the 63 Maintenance Rule Group 1 and 2 systems. The systems for which CDCs were validated during the Tier 2 review included:

1.	120v Vital AC	29.	Hydrogen Monitoring
2.	125v DC System	30.	Inadequate Core Cooling
3.	4160 Emergency Buses*	31.	Instrument Air
4.	480v Load Center	32.	Intake Structure
5.	480v Motor Control Centers	33.	Low Pressure Safety Injection
6.	AFW*	34.	Main Exhaust
7.	Boric Acid	35.	Main Steam
8.	Chemical & Volume Control (Volume)	36.	Main Feedwater
9.	Chilled Water	37.	Main Transformer
10.	Condensate Storage and Transfer	38.	NI Linear Power Range
11.	Containment Spray	39.	NI Wide Range Log Channel
12.	Containment Isolation	40.	Normal Station Service Transformer
13.	Containment Post Incident H_2 Control	41.	Pressurizer
14.	Containment Air Recirculation and Cooling	42.	Process & Area Radiation Monitoring
15.	Containment and Enclosure Bldg Purge*	43.	Reactor Coolant and Vessel
16.	Control Element Drive	44.	Reactor Regulating
17.	Control Room Air Conditioning	45.	Reactor Protection
18.	DC and Vital Switchgear Ventilation	46.	Reactor Coolant Pump
19.	EDG Room Ventilation*	47.	RWST*
20.	EDG Fuel Oil*	48.	RBCCW
21.	EDG Starting Air*	49.	Reserve Service Station Transformer
22.	Electro-hydraulic Control	50.	Safety Injection Tanks
23.	Emergency Diesel Generator*	51.	Service Water
24.	Enclosure Building	52.	Shutdown Cooling
25.	Engineered Safeguards Features Actuation*	53.	Spent Fuel Pool Cooling and Purification
26.	Engineered Safeguards Feature Room Ventilation	54.	Steam Generators
27.	Fuel Handling Bldg Ventilation	55.	Sump Recirculation - Piggy Back Mode
28.	HPSI*	56.	Switchyard
* Included in the scope of the Tier 1 review			

6.3 Scope of Parsons' ICAVP Tier 3 Review

The Tier 3 review conducted by Parsons was a horizontal review (a so called "horizontal" review is one in which the same design attribute, for example electrical equipment qualification, is reviewed across systems) to determine whether NNECO's change processes were effective at maintaining the design and licensing bases and whether the current change processes were satisfactorily being implemented at Unit 2. The configuration changes performed using the following change processes were examined by Parsons as part of their Tier 3.

1.	Setpoint Changes	6.	Non-Conformance Reports	11.	Master Equipment Parts List
2.	Specification Revisions	7.	Engineering Work Requests	12.	Commercial Grade Dedication
3.	Drawing Revisions	8.	Equivalency Substitution	13.	Licensing Document Changes
4.	Calculation Revisions	9.	Procedure Revisions	14.	Temporary Changes
5.	Vendor Technical Information Updates	10.	ISI/IST, ASME Section XI Repair and Replacements		

For each of the change processes listed above that are not generally associated with modifications, Parsons selected a sample of historical changes made since receipt of the operating license and reviewed them for technical adequacy. The changes were selected from various systems other than the Tier 1 systems in order to maximize plant coverage. The reviews evaluated the changes to identify modifications to plant design, design documents or information; departures from the plant licensing or design basis documentation that had not been properly evaluated; and whether acceptable documentation was available describing and supporting the changes. The focus of the review was not on the processes used to make the changes, but on the effectiveness of NNECO's CMP at identifying and correcting design and licensing bases discrepancies. The Tier 3 review provided additional assurance that past changes did not compromise the unit's design or licensing basis.

6.4 Scope of Parsons' Review of Licensee-Initiated Corrective Actions

Parsons' corrective action review was conducted in three parts, (1) the corrective action documents related to the four Tier 1 systems; (2) the NRC selected sample of corrective actions for systems outside the scope of the Tier 1 systems; and (3) the NRC selected sample of corrective actions resulting from Confirmed Level 3 DRs. Parsons assessed the corrective actions to determine whether NNECO had adequately addressed the following attributes:

1. Root-cause determination - the extent to which plant processes and procedures contributed to the discrepancy.

2. Extent of condition determination - the extent to which other systems, structures or components were affected.

3. Plant restart - proper categorization with regard to completion either before or after restart.

4. Content - technical adequacy in restoring compliance with the design and licensing bases.

For the corrective actions associated with the Confirmed Level 3 DRs, the scope of Parsons' review included, as applicable, (1) completed engineering assessments, (2) major calculation changes, (3) significant procedure changes, (4) significant FSAR changes, (5) training and personnel qualification requirement changes, (6) new test procedures, (7) inspection acceptance criteria changes, and (8) major changes to design or installation specifications.

6.5 ICAVP Findings (Note: Terms, such as "Preliminary," "Valid," and "Confirmed," are defined in Section 2.0)

Parsons issued 824 preliminary DRs during the ICAVP at Unit 2. Of the Preliminary DRs, 51 were issued as invalid, with the remaining 773 DRs issued as valid. Following completion of Parsons' review of NNECO's response 596 DRs were closed as Confirmed DRs (75 as Level 3 and 521 as Level 4); 58 were closed as Previously Identified; and 119 were closed as Nondiscrepant. Section 2.0 provides a discussion of the DR process, including how the DRs were classified during various phases of their review and closure. For the Tier 1 systems, Valid Preliminary DRs were issued as noted in Table 1 to Enclosure 1 for various discrepancy types based on information provided to the staff by Parsons. Parsons did not identify any Confirmed Level 1 or 2 DRs during the ICAVP.

Using the information contained in Table 1 to Enclosure 1 (developed from information provided by Parsons), the areas of implementation, calculational, and procedural errors indicate that additional management attention to attention-to-detail may be necessary in implementing its existing program requirements in these areas. Table 2 to Enclosure 1 provides a breakdown by ICAVP Significance Level and discipline of the implementation, calculational, and procedural areas. The areas identified using this data, provided by Parsons, were consistent with the areas identified by the NRC, based on its independent classification of Confirmed DRs.

Parsons issued Volume 1 of its final Millstone Unit 2 ICAVP Report on December 4, 1998, based on the status of the Unit 2 ICAVP as of December 4, 1998. Volume 1 contained the Executive Summary, including Parsons' conclusions regarding the effectiveness of NNECO's CMP at identifying and resolving design and licensing bases issues. Revision 1 to Volume 1 and Volume 2 of the final report were issued on January 12, 1999. Volume 2 provided the additional information supporting Parsons' conclusions, observations, and recommendations. Also, Parsons issued a supplement to the final report on March 19, 1999, documenting the results of its review of the corrective actions associated with the 30 NRC-selected Confirmed Level 3 DRs. As stated in their Supplemental Report, Parsons found that NNECO's corrective action process was effective at correcting licensing and design basis issues. In Volume 1 of its final ICAVP report, Parsons' overall conclusions were that NNECO was generally effective at identifying problems and providing corrective actions relating to the licensing and design bases.

In addition to the review of each individual issue identified by the DRs, Parsons and the NRC examined DRs collectively to determine if any process or programmatic issues could be identified. Parsons identified two areas, based on its review of Confirmed Level 3 DRs that related to the design control process. These areas are:

1. Requirements for translation of licensing and design bases information into the as-built plant design, specifications, and procedures were not clearly described in configuration management control procedures.

2. NNECO's configuration management process did not ensure the accident analyses design inputs were consistent with the as-built plant and the operating and surveillance procedures.

These areas were reviewed by the NRC as part of the ICAVP corrective action inspection and the process changes implemented by NNECO adequately addressed these two areas.

Another area of weakness identified by Parsons was that electrical separation within plant raceway systems, separation inside electrical cabinets, and isolation between Class 1E and non-1E devices were not consistent with the plant electrical separation and isolation design requirements. This had been identified also by NNECO during their CMP and NNECO has expended considerable resources in both identifying specific instances of separation inadequacies and in correcting the identified nonconformances. The area of electrical separation was also reviewed by the NRC during the ICAVP corrective action inspection. The team concluded that NNECO's program was adequate to identify and correct nonconformances.

Parsons also evaluated the Confirmed Level 4 DRs to identify aspects of the configuration management process that could be strengthened or enhanced by NNECO. Although Parsons concluded that NNECO's processes are adequate to support the restart of Unit 2, a number of areas were identified through the trending of Confirmed Level 4 DRs where NNECO's processes could either be enhanced or better implemented. The staff has reviewed the Level 4 DRs and concluded that the errors identified did not reveal any repetitive technical errors that suggested the need for an expansion of the scope of the ICAVP. The areas that warrant further NNECO attention are noted below along with the underlying Parsons Level 4 DR trends:

Calculation Control

1. Licensing and design bases calculations contain numerous minor errors or invalid or undocumented assumptions.

2. Calculations and other plant records supporting licensing and design bases requirements were difficult to identify and retrieve.

3. Processes that control calculations and analyses should track the cumulative effects of incremental changes.

Identification of Controlled Documents and Databases Requiring Update as a Result of Physical or Procedural Changes

1. Inconsistencies exist between licensing and design bases documents and related engineering bases documentation.

2. Configuration management control processes did not clearly define the requirements for incorporating accident analysis requirements and assumptions into plant operating procedures.

3. Plant documents requiring updating as a result of corrective actions requires additional NNECO attention to ensure more consistent identification.

Control Of Vendor Technical Information

1. Programmatic control of vendor technical information interfaces and the translation of the information into design bases and plant procedures was not clearly defined.

2. Instances were identified of inconsistencies between similar vendor manuals, incomplete identification of vendor requirements, and an inconsistent level of detail regarding identification of

plant procedures that are impacted by vendor technical information.

Commercial Grade Dedication of Spare Parts

1. Commercial grade dedication packages lacked complete documentation for the selection of values for special tests and inspections performed to verify selected critical characteristics and the technical basis for sampling items undergoing special tests or inspections.

Equipment Safety Classification

1. Examples were identified where the Master Equipment Parts List safety classification changes did not provide complete documentation or provide a complete evaluation supporting changing a components classification from nonsafety-related to safety related.

The staff concluded that the areas identified by Parsons and the NRC in their reviews of Confirmed Level 4 DRs result from the following four causes that warrant continued attention by NNECO going forward:

1. Minor documentation deficiencies in the design and licensing bases.

2. Introduction of minor differences between the design and licensing bases records, and the physical plant during field implementation of design changes.

3. Attention to detail errors in the performance and review of calculations and analyses, and in the preparation and approval of plant modifications, purchase specifications, and procedure and drawing changes.

4. Procedure updating errors due to inconsistent adherence to design change process and corrective action program requirements, and a weakness in relating design and licensing bases requirements to affected procedures.

NNECO has incorporated the corrective actions for these areas into its corrective action program. As specified in the NRC's ICAVP Order, NNECO responded to the Parsons' findings. The staff has reviewed NNECO's response to the identified trends and inspected NNECO's corrective actions as part of the ICAVP corrective action inspection. The staff determined that improvements or enhancements adequately address the areas identified by Parsons.

7.0 NRC INDEPENDENT OVERSIGHT OF ICAVP

Consistent with the directions provided in SECY-97-003, the staff oversaw the implementation of the ICAVP at Unit 2 by directly monitoring the performance of Parsons and through the performance of independent inspection of NNECO activities. NRC's oversight provided confidence that NNECO's CMP and corrective action programs have been effective, and to assure that the review conducted by Parsons was performed (1) in a critical manner, (2) in accordance with the NRC-approved audit plan, and (3) in a manner independent of NNECO and its design contractors. The NRC inspections included vertical slice inspections of out-of-scope (i.e., not included in the scope of Parsons' Tier 1 review) and in-scope systems (i.e., included in the 11-system Tier 1 ICAVP scope) to verify Tier 1 reviews performed by Parsons and NNECO's CMP, evaluation of CDCs of accident mitigation systems to validate the Tier 2 reviews, and evaluation of change processes other than the principal design change process, to validate the Tier 3 reviews.

The inspections generally followed the guidelines of IP 93801, "Safety System Functional Inspection," IP 92701 "Followup," and IP 92702, "Followup on Corrective Action for Violations and Deviations," of the NRC inspection program. Further, the staff evaluated NNECO's corrective actions in response to self-identified, ICAVP contractor, or NRC ICAVP-related inspection findings. In addition to the oversight inspections, the staff also reviewed all Confirmed DRs to identify areas that may have warranted further NNECO review and compared the NRC identified areas with those identified by Parsons Confirmed DR trending as documented in its Final ICAVP Report (see Section 6.5 above). The results of the staff's Confirmed DR review is documented in Section 7.7. Table 3 of Enclosure 1 provides the level of effort associated with each of the various ICAVP oversight inspections.

The staff has completed the six planned ICAVP oversight inspection activities. The inspections completed include: (1) the ICAVP Implementation Inspection (Inspection Report (IR) 50-336/97-211) completed on December 12, 1997, that provided an early evaluation of Parsons efforts in implementing the ICAVP audit plan; (2) the Tier 1 Out-of-scope safety system functional inspection (SSFI) (IR 50-336/98-202) completed on April 4, 1998, of the reactor building closed cooling water (RBCCW) system and associated portions of the service water system (SWS) and electrical systems; (3) the Tier 3 Design Change Process inspection (IR 50-336/98-201) completed on May 15, 1998; (4) the Tier 2 Accident Mitigation System inspection (IR 50-336/98-213) completed on September 11, 1998, of the main steam line break (MSLB) and small break loss-of-coolant accident (SBLOCA) as analyzed in Chapter 14 of the Millstone Unit 2 FSAR; (5) the Tier 1 Inscope SSFI (IR 50-336/98-203) completed on October 2, 1998, of AFW; and (6) the corrective action inspection (IR 50-336/98-205) completed March 5, 1999.

Table 5 of Enclosure 1 provides a list of the NRC identified inspection findings from the ICAVP oversight inspections that the staff determined were equivalent to ICAVP Significance Level 3 issues. Table 6 of Enclosure 1 provides a list of the NRC identified inspection findings from the ICAVP oversight inspections that the staff determined were equivalent to ICAVP Significance Level 4 issues.

7.1 Parsons ICAVP Implementation Inspection (IR 50-336/97-211)

The staff initiated a plan to monitor Parsons' implementation of the ICAVP. The plan included the assessment of Parsons' project manual and associated project instructions, the evaluation of the technical experience of project personnel, and scheduled inspections of implementation activities. Specifically, the team evaluated Parsons' implementation of the ICAVP Audit Plan that was approved by the NRC on July 15, 1997.

During the ICAVP Implementation Inspection, the staff determined that Parsons was adhering to the NRC-approved ICAVP audit plan in its implementation of the ICAVP at Millstone Unit 2. Minor issues were identified for which Parsons took appropriate actions to address. The staff inspected Parsons' activities during the periods of August 25 through September 5 and December 1 through 5, 1997. The inspection was conducted in two phases since during the initial phase of the inspection, Parsons was in the early stages of implementing the ICAVP at Unit 2. The team consisted of eight technical discipline specialist inspectors including a team leader. The staff continued to assess the status and evaluate the quality of the ICAVP through follow-up activities that involved additional visits to Parsons' offices, as part of scheduled NRC Tier 1 In-Scope, Tier 2, and Tier 3 team inspections, and during frequent public status meetings with Parsons.

The team concluded that Parsons' reviews were being conducted in a critical manner. The team found that Parsons was following the NRC-approved audit plan and project procedures, was providing an acceptable depth and breadth of review, provided work products that were readily auditable, and established an

adequate threshold for the identification of problems. The team concluded that Parsons' staff exhibited a questioning attitude and in-depth understanding of the technical areas being reviewed.

7.2 Tier 1 Out-of-Scope Inspection (IR 50-336/98-202)

An NRC ICAVP Oversight staff team performed a vertical slice, safety system functional inspection (SSFI), on the Millstone Unit 2 reactor building closed cooling water (RBCCW) system during the period of March 2 through April 3, 1998. In addition, the team reviewed the functions of important support and interfacing systems including the service water system (SWS) and electrical systems. The inspection was an independent examination and part of the coordinated oversight of the ICAVP described in SECY-97-003. The team consisted of seven technical discipline specialist inspectors including a team leader.

The purpose of the inspection was to assess the effectiveness of NNECO's CMP at Unit 2. Additionally, this inspection was to assure that NNECO's review of the RBCCW system had accurately assessed the capability of the system to perform the safety functions required by its design basis, the condition of the system was compared with its design and licensing bases, the accuracy of the as-built configuration was compared to design drawings, and compliance of system operations with the FSAR and the plant's Technical Specifications (TSs).

The team observed that, before the NRC's selection of the RBCCW as the out-of-scope system on September 19, 1997, NNECO had already identified and resolved many RBCCW design vulnerabilities. For example, NNECO had reanalyzed system flows, determined that some flows were not adequate and increased flow to those components by increasing piping sizes.

At the start of the inspection, the team was aware that not all problems were analyzed and resolved. NNECO's March 2, 1998, letter to NRC identified uncompleted tasks. For example, NNECO hac identified that program reviews such as the high-energy line break and environmental qualification would not be completed. Subsequently, NNECO identified that other activities would not be complete, such as operator training, calculations, and modifications. In addition, at the start of the inspection, the team identified other activities that were not completed and had not been identified in NNECO's March 2, 1998, letter. For example, the team identified that the calculation and actions required for the failure of an RBCCW pump to start had not been analyzed. With the understanding of the status discussed above, the team concluded that sufficient information was available to inspect and form a reasonable basis for conclusions about the adequacy of the licensee's CMP, its review of the RBCCW system, the capability of the system to perform the safety functions required by its design basis, the condition of the system compared with its design and licensing bases, the accuracy of the as-built configuration compared to design drawings, and the compliance of system operations with the FSAR and the plant's TSs.

The team identified eight violations (see Table 5 of Enclosure 1), some with multiple examples. One unresolved item and the eight violations were considered equivalent to ICAVP Significance Level 3 findings. NNECO had identified and corrected many system problems in its CMP review of the RBCCW system. In accordance with NRC policy, when the team identified a problem that the CMP had already identified and had or was in the process of correcting, the team did not issue a violation. Additionally, the team made a number of observations of strengths and good practices. For example, NNECO's broad electrical reviews performed over the past two years were considered comprehensive in depth and breadth and conservative in nature.

The team concluded that NNECO had identified and resolved many important RBCCW system vulnerabilities. Although the team had findings, the number of findings was not unusual for this type of

inspection. Also, the team recommended that NNECO give continued attention to lowering the threshold for performing safety evaluations in accordance with 10 CFR 50.59.

Overall, the team concluded that NNECO had accurately assessed the RBCCW system's capability to perform its safety functions, its condition compared to its design and licensing bases, and its operational compliance with the FSAR and the plant's TSs.

7.3 Tier 1 In-Scope Inspection (IR 50-336/98-203)

During the periods from August 24 through September 4, 1998, and September 14 through 25, 1998, a team from the NRC's ICAVP Branch, conducted an SSFI of systems within the scope of the Unit 2 ICAVP (AFW and the EDG Sequencer). Following the 3 week onsite inspection at Unit 2, the team spent a week at Parsons' offices in Reading, Pennsylvania. This inspection represents one of the many facets of the NRC's oversight of the ICAVP. Within that context, the purpose of this inspection was to further assess the effectiveness of NNECO's CMP at Unit 2, as well as the effectiveness of Parsons' review of the Tier 1 systems. The team consisted of six technical discipline specialist inspectors including a team leader. During the inspection the AFW system was undergoing modifications (both physical and analytical), however, the team was able to review a substantial portion of the AFW system design, including some of the modifications completed during this outage.

During the onsite portion of the inspection, the team identified one apparent violation. This violation involved the failure to properly evaluate a Technical Requirements Manual (TRM) clarification that would have allowed isolation of the single flow path for AFW system to one of the two steam generators (SGs). With the AFW system in the allowed condition, a main steam line break on the opposite SG would result in a condition outside the accident analysis assumptions. Specifically, in such a scenario no AFW would be supplied to an intact SG. The NRC team verified that the unit had not been operated with AFW isolated to a single steam generator as allowed by the TRM, therefore the actual safety significance of this issue was low. The finding was missed by NNECO's CMP review as well as the Parsons' review. Both NNECO and Parsons initiated additional reviews in these areas as requested by the NRC staff. Parsons' review was confined to the portions of the TRM that addressed Tier 1 systems. Parsons did not identify any other issues. NNECO's review of the TRM identified a similar issue with new fuel handling that was corrected.

The team noted that the ICAVP Tier 2 inspection (see Section 7.5 below - IR 50-336/98-213) identified an apparent configuration control process weakness regarding the proper translation of accident analyses inputs and assumptions into the facility design and plant operating procedures and the reconciliation of the facility design and procedures to the accident analyses inputs and assumptions. The apparent violation and several other findings identified by the team represent additional examples that further highlight this concern.

Based on the Unit 2 onsite inspections, the team identified six issues (including the apparent violation discussed above) that the staff classified as equivalent to ICAVP Significance Level 3 issues. Table 5 of Enclosure 1 provides a list of these issues. Also, the team identified eight issues that the staff classified as equivalent to ICAVP Significance Level 4 issues as listed in Table 6 of Enclosure 1.

The team concluded that overall, the breath and depth of the Parsons review was comprehensive, and Parsons' reviews were conducted in accordance with the NRC-approved audit plan. Further, the team concluded that Parsons' assessments were generally thorough and that the team's findings were consistent with Parsons' findings.

While the team identified issues that had not been identified by Parsons or by the NNECO CMP, the safety

significance of these findings was low. This provides confidence that other issues, should any be discovered, would likely be of low significance. Based on the team's independent design review, and on the team's assessment of the Parsons implementation of Tier 1, the team concluded that NNECO's CMP was generally effective in identifying and correcting nonconformances with the plant's design and licensing bases.

7.4 Tier 3 Inspection (IR 50-336/98-201)

On April 13 through May 8, 1998, a team from the NRC ICAVP Branch, in accordance with the guidelines outlined in SECY-97-003, "Millstone Restart Review Process," conducted a Tier 3 inspection at Unit 2 and at the Parsons' offices in Reading, Pennsylvania. The purpose of this Tier 3 inspection was to independently assess NNECO's ability to identify and resolve licensing-basis deficiencies, focusing but not limited to the period of CMP implementation; determine if NNECO's change processes were adequate to maintain the Unit 2 design and licensing bases; and to assess the effectiveness of the Tier 3 aspects of Parson's ICAVP. The review evaluated a sample of changes made to the facility configuration since issuance of the operating license and a review of the processes that governed those changes. The Unit 3, Tier 3, inspection reviewed and evaluated the change processes in a forward looking manner and determined that many change process improvements, both programmatically and procedurally, had been implemented and such processes can assure effective configuration management going forward. The team consisted of six technical discipline specialist inspectors including a team leader.

The team's independent review addressed a large number of change processes (similar breadth as Parsons Tier 3 review). The combined sample size was sufficiently large to provide overall indications of NNECO's approach to work, problem solving skills, technical abilities, and commitment to quality. The team evaluated both NNECO's past and present performance during the Tier 3 inspection, in addition to Parson's implementation of the ICAVP. The team reviewed approximately 160 changes to the plant implemented since 1990. In addition, the team selected 50 past changes for which Parsons had completed its review to provide insights into the effectiveness of Parsons' implementation of the ICAVP.

Based on indications from this overall sample. The team determined that the existing Millstone Unit 2 change processes and procedures reviewed by the team met the requirements of 10 CFR Part 50, Appendix B, "Quality Assurance," and if adequately implemented, will maintain the Unit 2 design and licensing bases. The team found that NNECO generally used good engineering practices, however technical work lacked appropriate attention to detail.

The team found that the Parsons Tier 3 ICAVP review was conducted in accordance with the NRC-approved audit plan and project procedures and that the reviews were conducted in a thorough and critical manner. Generally, the findings identified by the team were consistent with the findings identified by Parsons. For example, Parsons identified similar problems with the threshold for writing safety evaluations for FSARCRs.

The team identified eight cited and three noncited violations during the site inspections. Some of the violations had multiple examples. The eleven violations and the one unresolved item identified in the report were classified by the staff as equivalent to ICAVP Significance Level 3 issues as indicated in Table 5 to Enclosure 1. Further, the team identified four issues that the staff classified as equivalent to ICAVP Significance Level 4 issues as indicated in Table 6 to Enclosure 1. NNECO had identified and was in the process of correcting many system and process problems from its Unit 2 CMP review. In accordance with NRC policy, when the team identified a problem that the CMP had already identified and had or was in the process of correcting, the team did not issue a violation.

Similar to previous NRC inspection teams' conclusions, the team recommended that NNECO give continued attention to lowering the threshold for performing safety evaluations in accordance with 10 CFR 50.59. Additionally, the team made a number of observations of strengths and good practices. For example, while the team found instances of inadequacies for past work, the team observed a current positive attitude and a major improvement in the approach to solving plant problems. The team noticed a good level of response to the team's questions raised during the inspection, indicative of good information retrieval capabilities, as well as adequate technical knowledge in providing backup evaluations that were missing in the reviewed documentation.

The team also concluded that NNECO had identified and resolved many important CMP deficiencies and was continuing the process of enhancing site programs. Although the team had findings, the number of findings was not unusual for this type of inspection.

7.5 Tier 2 Inspection (IR 50-336/98-213)

From August 10 through September 3, 1998, a team from the NRC's ICAVP Branch, in accordance with the guidelines outlined in SECY-97-003, conducted a Tier 2 Accident Mitigation Systems inspection at Millstone Unit 2 and at the Parsons' offices in Reading, Pennsylvania. The team's independent review consisted of a thorough review of certain important aspects of accident mitigation systems for two accident scenarios: the main steam line break (MSLB); and the small break loss of coolant accident (SBLOCA). The purpose of the Tier 2 inspection was to independently assess NNECO's ability to identify and resolve licensing-basis deficiencies, focusing but not limited to the period of NNECO's CMP implementation; verify that CDCs of systems relied upon to mitigate the consequences of accidents analyzed in Chapter 14 of the FSAR were consistent with those used in the design of the mitigation systems; verify that the accident analyses were adequate to maintain the Unit 2 design and licensing bases; and assess the effectiveness of the Tier 2 aspects of Parsons' ICAVP. The team consisted of five technical discipline specialists including a team leader and reviewed approximately 92 CDCs for the two accidents selected.

The team found that the Parsons Tier 2 ICAVP review was conducted in accordance with the NRC-approved ICAVP Audit Plan and project procedures with one minor exception and that the reviews were conducted in a thorough, detailed and critical manner. Generally, the findings identified by the team were consistent with the findings identified by Parsons. For example, Parsons identified similar problems with the use of procedures in the "DO NOT USE" status, and problems with measuring and test equipment calibration.

The team identified two violations during the site inspection. One of the violations had multiple examples of the failure to translate design basis requirements into plant procedures. The most significant example was the failure to include a prohibition for using the feedwater regulating bypass valves above 25 percent power level in the operating procedure for the feedwater system. A second violation concerned the fact that approximately 144 station procedures are currently classified as "DO NOT USE." These two violations are considered equivalent to ICAVP Significance Level 3 findings as listed in Table 5 of Enclosure 1. Also, the team identified two issues that the staff classified as equivalent to ICAVP Significance Level 4 findings as listed in Table 6 of Enclosure 1.

Based on results of this sample review, the team determined that the accidents analyzed in Chapter 14 of the FSAR appeared consistent with those used in the design of the mitigation systems and that the accident analyses should be adequate to maintain the Unit 2 design and licensing bases. The team also concluded that NNECO had identified and resolved many important CMP deficiencies and was continuing the process of implementing several improvements to the program through the use of condition reports (CRs) and action requests (ARs) for the team's findings. In accordance with NRC policy, when the team

identified a problem that the CMP had already identified and had or was in the process of correcting, the team did not issue a violation. Also, the team made a number of observations of strengths and good practices. For example, the team noticed a good level of response to the team's questions and concerns, sound technical knowledge was exhibited by the Unit 2 design engineering group, and relatively good information retrieval capabilities were demonstrated in responding to the team.

7.6 ICAVP Corrective Action Implementation Inspections (IR 50-336/98-205)

The scope of the inspection included reviewing (1) corrective actions for issues identified during NNECO's CMP; (2) corrective actions for Confirmed Level 3 DRs identified by Parsons; and (3) corrective actions taken in response to findings identified by the NRC inspections associated with the NRC oversight of the ICAVP. The inspection was a part of the ICAVP oversight activities for Millstone Unit 2 as described in SECY-97-003. The team examined technical resolutions, assessment of root cause, and assessment of the extent of the adverse conditions. The team also looked at resolutions for some technical issues identified in the Parsons Final ICAVP Report such as, the High Energy Line Break analysis in containment, electrical separation issues, fuse control, methods of tracking the cumulative effects of design changes on design margins, and the process enhancements to assure proper translation of accident analyses inputs and assumptions into plant procedures and design documents. The inspection was performed during the periods of December 14 through 18, 1998, January 26 through 29, February 8 through 12, February 16 through 19, and March 1 through 5, 1999. The inspection team leader discussed the results of the inspection at a public exit meeting held on March 18, 1999.

Although the team identified one instance of ineffective corrective action, generally, the team found that corrective actions were adequate. The root causes appeared reasonable, the extent of the problem was explored, and the corrective actions matched the root causes and the extent of condition. Only a few cases existed where documentation of the root cause and the extent of condition were not adequate, but the corrective actions taken were adequate. In response to the team's observations, NNECO initiated condition reports to assess methods to enhance the applicable areas of the corrective action process.

Overall, the team concluded that NNECO had an acceptable corrective action program that adequately resolved not only the specific issues identified, but adequately addressed the extent of condition. The team further concluded that NNECO's corrective action program is being adequately implemented and is acceptable to support restart of Millstone Unit 2. For each of the technical areas reviewed during this inspection, the team concluded that NNECO was taking adequate and timely corrective action to resolve the issues necessary to support Unit 2 restart.

7.7 NRC's Trending Results for Confirmed DRs

In addition to the review of each individual issue identified by DRs, the NRC examined DRs collectively to determine if any trends in the root causes of these findings could be identified. Regarding the Level 3 DRs, the staff identified four areas that contained a significant number of DRs, which could be indicative of a trend. The areas were: 1) undocumented engineering judgement, 2) original design errors, 3) calculational errors, and 4) implementation errors. For the Level 4 DRs, the areas that contain significant numbers were the same as those of the Level 3 DRs. The NRC was extensively involved in the review of the Level 4 DRs as many of them were initially issued as Level 3 and subsequently downgraded by Parsons to Level 4 based on additional information provided by NNECO.

For Level 3 DRs, in the areas of original design errors and undocumented engineering judgement, the staff noted that most of these DRs were a direct result of differences in perception between NNECO and Parsons as to what level of documentation was required for a plant of Millstone Unit 2's vintage. The staff

concluded that while the Level 3 DRs in this area accurately reflected a weakness in the documentation of the design and licensing basis of Unit 2, the safety significance of the individual issues and the trend were minor and were not indicative of an ineffective CMP.

In the area of calculational errors for Level 3 DRs, the staff determined that continued improvement was needed. While none of the errors individually or collectively called into question equipment operability, the errors did call into question NNECO's attention to detail and thoroughness of independent review during the configuration management program. To improve the quality of its change documents (DCRs, modifications, calculations, calculation changes, etc.), NNECO established the Quality Review Board (QRB) that reviews a substantial portion of all change documentation. The staff found that NNECO has been successful in reducing the level of rework required by change documents reviewed by the QRB, providing an indication that progress is being made at addressing the concern with the attention to detail issues identified in Level 3 DRs. The staff determined that NNECO was making acceptable progress in improving the attention to detail in the preparation, review, and approval of its design and licensing bases calculations and other change documentation.

In the area of implementation errors, the staff determined that many of these issues were a secondary cause assigned to the above mentioned causes and did not represent independent issues documented in Level 3 DRs. As such, the staff determined that this trend was of minimal safety significance. However, it does highlight that attention to detail is an area that would benefit form continued attention by NNECO management.

Trends in the Level 4 DRs were similar to the trends identified in the Level 3 DRs. In all cases, the staff concluded that the safety significance of the trends identified for Level 4 DRs were minimal because the physical plant configuration was correct and it was unlikely that similar errors in other systems would result in conditions where the physical plant would be outside its design or licensing bases. As such, the Level 4 DRs collectively did not affect the licensing or design basis of the plant.

Based on the results of the staff's evaluation of Confirmed DRs and the identified trends, the staff determined that an expansion of ICAVP scope was not warranted. However, the staff also concluded that these trends indicate a need for improvement in attention to detail and in the thoroughness of the NNECO's independent review. The staff determined that these improvements can be made on an ongoing basis.

8.0 SUMMARY OF NRC's CONCLUSIONS ON THE ICAVP AT UNIT 2

The staff, as described above, conducted its oversight of the ICAVP program through a series of inspections to verify that Parsons implemented the ICAVP in accordance with the NRC-approved Audit Plan and to validate Parsons' conclusions. The oversight inspections focused on the plant's conformance with its design and licensing bases, NNECO's corrective actions taken in response to self-identified, NRC- and ICAVP-identified nonconformances, and licensee programs currently in place to manage and control the plant configuration subsequent to unit restart.

The staff, through its oversight, concluded that the ICAVP fulfilled the requirements of the NRC's August 14, 1996, Order and that the ICAVP provided valuable information to the NRC staff to make the determination that (1) NNECO's CMP was effective at identifying and satisfactorily resolving existing nonconformances with the design and licensing bases; (2) NNECO had adequately documented the licensing and design bases, and used it to resolve nonconformances; and (3) NNECO had implemented the programs, processes, and procedures to control configuration management in the future at Unit 2. Although

both Parsons and the NRC staff identified a number of nonconformances with the Unit 2 licensing and design bases, none of the issues impacted the functionality of the plant's safety systems. These issues are documented in ICAVP Significance Level 3 DRs issued by Parsons and in NRC Notices of Violations contained in inspection reports. These are summarized in Enclosure 1, Tables 4 and 5, respectively. Table 6, of Enclosure 1, provides a list of NRC identified issues equivalent to ICAVP Significance Level 4. Additionally, the number of such issues, while greater than the number found on Unit 3, were relatively few for a unit of the vintage of Unit 2 and indicative of a generally effective effort by NNECO to reestablish confidence that Unit 2 is in compliance with its design and licensing bases.

The review of the implementation of the corrective actions required to restore the design and licensing bases of Unit 2 resulting from Confirmed Level 3 DRs and NRC violations has been completed. For each Level 3 DR, and the other comparable findings documented in various NRC inspection reports related to oversight of the ICAVP, the staff determined that NNECO has taken adequate and timely corrective actions to address not only the specific issue, but also the extent of condition, i.e., applicability to other systems, and corrected other identified nonconformances.

The large majority of Confirmed DRs identified by Parsons (521 of 595) at the completion of the ICAVP (December 1998), were categorized as ICAVP Significance Level 4. ICAVP Significance Level 4 DRs document minor errors, e.g., calculation errors that do not significantly alter the results or conclusions of the calculation or minor errors of an editorial nature that are not nonconformances with the design and licensing bases. These types of errors are not typically included in NRC inspections reports because they are not violations of NRC requirements or regulations. Occasionally, NRC inspection reports contain inspector followup items (IFIs). For the purposes of drawing a comparison between NRC and the Parsons ICAVP results, IFIs are being considered as equivalent to Level 4 DRs. Nonetheless, Parsons was required to identify, document and trend such errors to gain additional insights into areas where further enhancements could be made to licensee programs.

As noted in Section 6.5, Parsons identified a number of areas requiring addition NNECO attention based on its trending of Confirmed DRs. NRC identified similar issues during the conduct of its inspections. NNECO has implemented corrective actions in response to these issues that were reviewed by the staff. Based on its reviews, the staff determined that these programs and the performance of NNECO is at an acceptable level to support restart of Unit 2.

NNECO adopted a "graded systems review" during the Unit 2 CMP in order to focus on the identification of potentially safety significant issues. The graded approach used during CMP was a higher level review, concentrating on calculation inputs, assumptions, methodology and reasonableness of results. The fact that no Confirmed Level 1 or Level 2 DRs were identified by Parsons indicates that the graded systems review methodology used by NNECO was adequate to assess the ability of systems to perform their safety functions. While the number of Level 3 DRs identified by the Unit 2 ICAVP is larger than the number identified by the Unit 3 ICAVP (75 vs. 22 Level 3 DRs), several factors previously discussed provide some perspective in this regard. The relative lack of clarity of the design and licensing bases as contrasted to that of Unit 3, due to the vintage of the unit, and the fact that NNECO judged CMP discovery to be completed prematurely. Although both of these factors resulted in a higher number of Confirmed Level 3 DRs than discovered on Unit 3, the safety significance of the DRs was low.

The number of Level 4 DRs that were identified by Parsons' review was fewer than identified for Unit 3. The trending of the Level 4 DRs did not reveal any repetitive technical errors that suggested the need for an expansion of the scope of the ICAVP.

The scope of the ICAVP, while extraordinarily large, did not review all aspects of all systems. Therefore, it

is reasonable to assume that similar types of findings may exist in other systems. However, the extent of the ICAVP reviews, the low safety significance level of the findings identified by Parsons and the NRC staff, and the corrective actions implemented by NNECO provides confidence that any other issues would also be of low safety significance. Therefore, the staff concludes that the Unit 2 ICAVP has been satisfactorily performed and the results of the ICAVP and the staff's oversight provide reasonable assurance that Unit 2 is in compliance with its design and licensing bases.

Table 1 - Parsons' Confirmed DRs by Cause, Tier 1 System, and Level

DISCREPANCY TYPE	Totals		Other		AFW		EDG		HPSI		RRC	
	Level 3	Level 4	Level 3	Level 4	Level 3	Level 4	Level 3	Level 4	Level 3	Level 4	Level 3	Level 4
1. Calculational Error	25	125	8	37	2	32	2	13	6	31	7	12
2. Corrective Action Error	10	32	5	31	1	0	3	1	1	0	0	0
3. Drawing Error	2	78	0	21	0	12	0	10	2	21	0	14
4. Editorial Error	0	49	0	21	0	5	0	8	0	11	0	4
5. Implementation Error	38	134	10	68	8	19	5	15	10	20	5	12
6. Modification Error	17	51	2	10	5	12	3	11	5	10	2	8
7. Original Design Error	7	8	2	2	3	2	0	0	1	3	1	1
8. Procedural Error	16	131	5	47	4	19	1	25	3	31	3	9
9. Undocumented Judgement	5	10	0	3	0	0	0	1	3	6	2	0
10. Unverified Assumption	21	59	8	23	3	12	1	8	5	13	4	3
11. Other Causes	1	0	0	0	0	0	0	0	1	0	0	0
TOTALS	142	677	40	263	26	113	15	92	37	146	24	63

Total may equal more than number of DRs issued (75 Level 3 and 521 Level 4) since each DR may have had multiple causes assigned. The Other system category includes DRs related to corrective actions, programmatic issues, Tier 2 issues, Tier 3 issues, and other issues not related to a specific system.

Table 2 - Parsons' Confirmed DRs by Discipline and Significance Level for Implementation, Calculational, and Procedural Errors

		Totals	Mechanical	Electrical	Piping/Stru	I&C	Ops/Maint	Other
1. Implementation	Level 3	38	8	5	3	18	3	1
	Level 4	134	29	7	20	31	21	26
2. Calculational	Level 3	25	11	1	8	3	1	1
	Level 4	125	43	21	43	10	3	5
3. Procedural	Level 3	16	9	0	2	4	1	0
	Level 4	131	60	3	18	17	26	7

Table 3 - NRC ICAVP Inspection Level of Effort

INSPECTION	TEAM SIZE	PREP & DOC Days	SITE or PARSONS Days	INSPECTION EFFORT Staff-Hrs. (8 X Days X Size)
50-336/97-211 Implementation	8	15	15	1920
50-336/98-202 Tier 1 Out-of-Scope	7	19	20	2184
50-336/98-201 Tier 3	6	10	20	1440
50-336/98-213 Tier 2	5	14	15	1160
50-336/98-203 Tier 1 Inscope	6	14	20	1632
50-336/98-205 (Phase 1) Corrective Action	5	2	5	280
50-336/98-205 (support) Corrective Action	2	2	3	80
50-336/98-205 (Phase 2) Corrective Action	5	5	15	800
TOTAL ICAVP OVERSIGHT INSPECTION EFFORT				9496

Table 4 - Confirmed Level 3 DRs Issued by Parsons

	DR No.	DR Title	Type of Issue	Area
1.	DR-0030	FSAR Requirements for Condensate Storage Tank (CST) Tornado Wind Protection	Calculation, Original Design	AFW
2.	DR-0032	Failure to Verify Quarterly Operability of Valves 2-CS-15A/B in Accordance with IST Requirements	Implementation, Procedural	HPSI
3.	DR-0033	HPSI Degraded Pump Curve	Procedural, Unver. Assumption	Tier 2
4.	DR-0045	Control Rod Assembly Shutdown Groups not withdrawn before Deboration During Reactor Startup	Procedural	Tier 2
5.	DR-0070	Refueling Water Storage Tank Foundation Design	Undoc. Judgement	HPSI
6.	DR-0104	HELB Pressure-Temperature Model Deficiencies Regarding the Lack of HVAC	Calculation, Procedural, Corrective Action	Prog.
7.	DR-0113	Pressure Locking of Containment Sump Isolation Valves 2-CS-16.1A & 2-CS-16.1B	Calculation, Modification	HPSI
8.	DR-0116	Specification SP-M2-EE-0012 (RG 1.97 Program) Deficiency	Implementation	Prog.
9.	DR-0119	Seismic Support for Accumulator Tanks T123A&B	Drawing,	HPSI

		and T124A&B, ESF Pumps Minimum Flow Recirculation Header Isolation Valve Assembly	Undoc. Judgement	
10.	DR-0124	Discrepancy in HPSI Pipe Support H-10 on ISO 25203-20224, Sheet 37	Implementation	HPSI
11.	DR-0127	RPS Analytical Limit Violation with the Existing Setpoint Due to Steam Generator Narrow Range Low Level Tap Span	Calculation, Modification, Implementation, Unver. Assumption	Prog.
12.	DR-0131	Lack of Appendix R Required Emergency Lighting	Implementation, Procedural	HPSI
13.	DR-0137	AFW System (AFWS) FT-5277A&B and FT-5278A&B Transmitter Separation and Cable Color Identification	Implementation, Original Design	AFW
14.	DR-0158	Technical Specification 4.6.1.4 Read Off Meter That Does Not Cover Full Scale	Modification	HPSI
15.	DR-0177	Discrepancies for Problems TMR-004/ 005/ 006/ 007	Calculation, Drawing, Unver. Assumption	HPSI
16.	DR-0203	SI Room Flooding	None assigned	HPSI
17.	DR-0212	Auxiliary Feedwater Inservice Inspection Program Discrepancies	Procedural	AFW
18.	DR-0239	Pressurizer Instrument Tubing System Design and Installation	Implementation	Other
19.	DR-0251	Stress Problem #03 Discrepancies	Calculation, Unver. Assumption	AFW
20.	DR-0269	Fuse Control Deficiencies	Implementation, Corrective Action	HPSI
21.	DR-0289	Electrical Separation Discrepancies - Z15RK20/Z24RC10	Original Design	Other
22.	DR-0313	RPS Trip Setpoint for Reactor Coolant Low Flow Trip Function	Calculation, Unver. Assumption	Tier 2
23.	DR-0319	RWST Required Tech Spec Volume Not Adequately Defined and Incorrectly Applied in Design Calculations and Design Bases	Calculation, Undoc. Judgement, Unver. Assumption	HPSI
24.	DR-0328	Associated Circuits by Common Tray on the 120 VAC Vital System	Implementation Original Design	Other
25.	DR-0350	Positive Differential Pressure Offset for RWST Level Transmitters LT-3001, LT-3002, LT-3003, and LT-3004 Due to Transmitter Elevation Below Instrument Taps	Calculation, Modification, Implementation	HPSI
26.	DR-0352	High Energy Line Break Outside Containment	Calculation, Implementation	Prog.
27.	DR-0360	Channel Color Code Identification Not in Accordance with FSAR	Implementation, Original Design	HPSI
28.	DR-0411	EBFS-Dampers 2-EB-60 and 2-EB-61 Single Failure During AEAS Operation	Calculation, Unver. Assumption	RRC

29.	DR-0412	Containment Purge Supply Air Flow Deficit	Calculation, Unver. Assumption	RRC
30.	DR-0414	Certain Line Designations Are Not Identified in PMMS or System MEPL and Are Not in Accordance with FSAR Commitments	Implementation, Procedural	HPSI
31.	DR-0417	2-CH-432 and 2-CH-433, Lack of Closure Testing	Modification, Implementation	HPSI
32.	DR-0422	Inadequate Seismic Considerations for Certain HPSI Instrumentation Loops	Implementation	HPSI
33.	DR-0426	EBFS Calculation 97-EBF-02000-M2, Rev 0 Discrepancy	Calculation, Implementation, Procedural, Undoc. Judgement	RRC
34.	DR-0449	Spatial Separation - RG 1.97 Indicators (PI-8113-8116, PI-102A-D, LI-3001-3004)	Implementation	HPSI
35.	DR-0477	Discrepancy With "As-Built" Configuration of Accumulator Tanks	Calculation, Unver. Assumption	HPSI
36.	DR-0481	Seismic Support for Accumulator Tanks T121, T122, T133, and T134	Calculation, Undoc. Judgement	RRC
37.	DR-0487	Evaluation of HPSI Flows not in Accordance with FSAR	Calculation, Unver. Assumption	HPSI
38.	DR-0505	AFW Pipe Support Site Observation	Modification	AFW
39.	DR-0508	Absence of Calculation to Support Compliance With Regulatory Guide 1.11	Modification Unver. Assumption	HPSI
40.	DR-0538	Programmatic Discrepancy: The Millstone Unit 2 Measuring & Test Equipment Program Does Not Meet 10CFR50 Appendix B Requirements	Implementation, Procedural	Prog.
41.	DR-0539	Discrepancy With IE Bulletin 80-11 Masonry Wall Program	Corrective Action	Other
42.	DR-0549	Diesel Generator Meter and Relay Circuits' QA Status	Implementation	EDG
43.	DR-0573	47 Fuses Missing From The Master Fuse List	Implementation, Corrective Action	Other
44.	DR-0578	Technical Specification Surveillance Requirements and Surveillance Procedures Could Result in Significantly Degraded Auxiliary Feedwater Pumps	Implementation, Procedural	AFW
45.	DR-0603	EBFS - Charcoal Cooling Discrepancies	Calculation	RRC
46.	DR-0606	EBFS - Insufficient Exhaust Rate from the EBFR Due to Failures in Charcoal Cooling Tie-In Ductwork	Calculation, Unver. Assumption	RRC
47.	DR-0610	Calculation 92FFP-849ES, Rev 2, MP2 Diesel Generator Rooms #140 & #141-Heating and Cooling Requirements	Calculation, Corrective Action	EDG
48.	DR-0612	EDG System Pipe Support Observations	Modification	EDG
49.	DR-0618	EDG Sequencer FSAR, Logic and Testing Discrepancy	Implementation, Procedural	EDG

50.	DR-0629	Conflicting Information Presented in Final Safety Analysis Report	Implementation, Corrective Action	Other
51.	DR-0630	Loss of Fuse Control	Corrective Action	EDG
52.	DR-0642	Inadequate Seismic Pressure Boundary Qualification for EDG Instrumentation	Implementation, Corrective Action	EDG
53.	DR-0658	Radiation Monitoring Calculation Discrepancies	Calculation, Modification, Implementation	RRC
54.	DR-0677	Diesel Generator Meter and Relay Circuits - QA Status	Modification, Implementation	EDG
55.	DR-0678	Potential Pressure Boundary Breach of TDAFW Pump Steam Supply Pressure Transmitter (PT 4190), Indicator (PI 4190-1), and Level Switch (LS-4590)	Modification, Unver. Assumption	AFW
56.	DR-0680	Electrical and Instrumentation and Controls Separation and Equipment/Raceway Identification Discrepancies	Modification, Implementation, Original Design	RRC
57.	DR-0685	MSLB Containment Analysis	Calculation, Unver. Assumption	Other
58.	DR-0694	Fuel Handling Accidents - Design Input Discrepancies	Calculation, Unver. Assumption	Other
59.	DR-0701	Safety Related AFW Turbine Speed Control System Has Unidentified and Potentially Unqualified Components	Implementation	AFW
60.	DR-0702	AFW Turbine Speed Control, Bypass Indication and Use of NSR Control Switches	Modification, Implementation Corrective Action	AFW
61.	DR-0704	AFW Turbine Speed Control, Tests and Inspections	Implementation	AFW
62.	DR-0712	ATWS System Lack of Seismic / Isolation Qualification and Electrical Separation Documentation Issues	Modification, Unver. Assumption	Prog.
63.	DR-0746	LPN Undervoltage PT's and Wiring are Not in Compliance with FSAR Requirements for Independence and Separation	Modification, Implementation	EDG
64.	DR-0747	Improper Safety Classification of Components for FW Reg Valves 2-FW-43-A(B)	Implementation	AFW
65.	DR-0751	Manual Actions to Support Design Bases Analysis Not Supported In Operating Procedures	Procedural	AFW
66.	DR-0759	Loss of Normal Feedwater Analysis	Calculation, Implementation, Unver. Assumption	Tier 2
67.	DR-0761	Unqualified Components, Non 1E Circuits, Unanalyzed Bases, Lack of Set Point Calculations, and Untested Circuits Combined to Protect the Integrity of the Category 1 Enclosure Building	Procedural, Implementation, Unver. Assumption	RRC
68.	DR-0770	Failure of AFW System to Meet Chapter 14	Original Design	AFW

		Accident Analysis		
69.	DR-0773	Sequencer Design Drawings not in Compliance with FSAR	Calculation, Unver. Assumption	EDG
70.	DR-0781	CEBPS Discharge Isolation Damper 2-AC-11	Implementation, Procedural	RRC
71.	DR-0785	Main Control Board Cable Separation Does Not Comply With Design Requirements	Modification, Implementation	AFW
72.	DR-0802	Turbine Driven AFW Pump Procedure SP 21107 IST Acceptance Limits Do Not Meet Minimum Flow Requirements Utilized in Safety Analysis	Procedural, Unver. Assumption	AFW
73.	DR-0804	Field Device Terminal/Junction Box Electrical Separation	Modification, Implementation	AFW
74.	DR-0814	Design Bases Accident (DBA) Radiological Consequences	Calculation, Unver. Assumption	Tier 2
75.	DR-0820	EQ Documentation - Technical Discrepancies	Implementation, Procedural, Corrective Action	Other

*Type of issue and area based on information provided by Parsons.

Table 5 - NRC Identified Violations Equivalent to ICAVP Significance Level 3

	NRC Issue No.	Issue Description	Type of Issue
1.	50-336/98-201-01	Failure to perform leakage testing of safety-related valves.	Implementation
2.	50-336/98-201-02	Failure to implement adequate corrective actions.	Corrective Action
3.	50-336/98-201-03	RBCCW heat exchanger relief valve setting above design pressure contrary to ASME VIII requirements	Modification
4.	50-336/98-201-04	Design change notice not issued to update all drawings when seals replaced on the HPSI pumps.	Implementation
5.	50-336/98-201-05	Inadequate or undocumented engineering design basis information to support multiple design changes.	Undoc. Judgement
6.	50-336/98-201-06	Inadequate safety evaluations for FSAR changes due to maintenance support engineering evaluations (MSEEs).	Implementation
7.	50-336/98-201-07	SP-EE-261was not followed for changes made to control room panel labels.	Implementation
8.	50-336/98-201-08	Inadequate engineering evaluation of replacement components to ensure safety functions can be met (multiple examples).	Modification
9.	50-336/98-201-12	Failure to classify analog-to-digital replacement modification as a USQ.	Modification
10.	50-336/98-201-13	Number of Post Accident Monitor channels inconsistent with FSAR commitments.	Modification
11.	50-336/98-201-14	Failure to properly qualify 5 solenoid valves for design	Modification

		basis accident environment.	
12.	50-336/98-201-15	Failure to include ASME III as a design bases reference for the CST in the FSARCR supporting the modification from an atmospheric to a pressurized tank.	Implementation
13.	50-336/98-202-01	Failure to correctly translate design requirements into testing procedures or post modification tests for RBCCW.	Implementation
14.	50-336/98-202-02	Two examples of inadequate corrective actions (Failure to revise RBCCW operating procedure and to correct the offsite power TS)	Corrective Action
15.	50-336/98-202-03	Failure to maintain a unique valve identification number on the RBCCW letdown heat exchanger outlet temperature control valve.	Other
16.	50-336/98-202-04	Multiple examples of failure to follow procedures to maintain or document the design and licensing bases (cable separation, seismic/safety classification, pipe/support installation, and updating FSAR).	Implementation
17.	50-336/98-202-05	RBCCW radiation monitor setpoint methodology did not consider flow imbalance dilution and background radiation impact on maximum allowable setpoint.	Procedural
18.	50-336/98-202-06	RBCCW Alarm Response Procedures contained inconsistencies, widely differing levels of detail, and poor integration with operating and abnormal procedures.	Implementation
19.	50-336/98-202-07	Copies of P&IDs in Controlled Document Library not maintained up-to-date.	Implementation
20.	50-336/98-202-08	Failure to identify an unreviewed safety question related to reducing the minimum electrical separation distance.	Implementation
21.	50-336/98-202-09	Corrective action for delayed manual start of RBCCW pump impact on waterhammer analysis not performed.	Corrective Action
22.	50-336/98-203-02	Affects of accident analysis on TS surveillance acceptance criteria for AFW system not assessed.	Calculation
23.	50-336/98-203-03	Environment Qualification of AFW components in turbine building.	Calculation
24.	50-336/98-203-04	Standards for testing and maintaining the AFW feed regulator valve backup air system do not meet standards for safety-related components.	Modification
25.	50-336-98-203-09	Failure to perform required 50.59 evaluation for TS clarification on AFW flow path operability requirements.	Unver. Assumption
26.	50-336/98-203-10	Ability to manual start TDAFWP within the 10 minutes stated in licensing basis with 2-MS-201 or 202 closed.	Unver. Assumption
27.	50-336/98-203-14	Evaluate if CST pressure control devices and relief valves are required to be in IST program.	Implementation
28.	50-336/98-213-01	Multiple examples of failure to adequately translate the	Procedural

		design requirements into plant procedures.	
29.	50-336/98-213-04	The failure to maintain as current procedures that were identified in "DO NOT USE" status because they exceeded their biennial review dates.	Procedural

*Type of issue assigned by the NRC for violations and unresolved items.

Table 6 - NRC Inspector Followup Items Equivalent to ICAVP Significance Level 4

	NRC Issue No.	Issue Description	Type of Issue
1.	50-336/98-201-09	Concern with the required position for a valve (2-CS-28) with potential for backleakage to RWST.	Corrective Action
2.	50-336/98-201-10	Review of ECCS pumps seal o-ring material qualification requirements for radiation and temperature.	Undoc. Judgement
3.	50-336/98-201-11	Capability of the enclosures for MCCs B51 and B61 to withstand the overpressure from the most severe HELB.	Calculation
4.	50-336/98-201-16	Licensee to develop an action plan regarding the status of the Millstone Unit 2 MEPL.	Procedural
5.	50-336/98-202-10	Lack of documentation for balance of plant setpoint calculations.	Procedural
6.	50-336/98-202-11	Some original pipe support calculations not on site.	Procedural
7.	50-336/98-202-12	Unclear, confusing, or conflicting instructions in RBCCW valve lineup procedures.	Procedural
8.	50-336/98-202-13	Five minor RBCCW equipment labeling errors	Implementation
9.	50-336/98-202-14	Five examples where valve positions on P&IDs were incorrect based on operating procedures positions.	Drawing
10.	50-336/98-202-15	RBCCW CAR cooler coil vent valves not indicated as sealed on system alignment checklist.	Implementation
11.	50-336/98-203-01	Potential AFW system overpressure on TDAFW overspeed	Original Design
12.	50-336/98-203-05	Affect of cable tray overfill on cable ampacity (480-Volt)	Calculation
13.	50-336/98-203-06	Adequacy of Appendix R exemption request for fire area R-3 (separation of AFW control valves).	Undoc. Judgement
14.	50-336/98-203-07	Material condition of TDAFW pump speed control circuitry.	Other (maint.)

15.	50-336/98-203-08	Minor examples were loads or stress were not appropriately considered (Integrated weld attachment and CST stress calculations)	Calculation
16.	50-336/98-203-11	Basis for cycling TDAFWP steam supply valves to prevent pressure locking and thermal binding of the valves.	Undoc. Judgement
17.	50-336/98-203-12	Turbine building HELB impact on ability to station a dedicated operator for AFW flow control bypass valve when AFW flow control valve inoperable.	Unver. Assumption
18.	50-336/98-203-13	Equivalency of security measures for AFW valves.	Other (security)
19.	50-336/98-213-02	Vendor recommended testing not incorporated in control element drive mechanism maintenance procedure.	Implementation
20.	50-336/98-213-03	Pressurizer pressure transmitters calibrated with a gage of inappropriate range.	Procedural

*Type of issue assigned by the NRC for inspector followup items