September10,1993

NOTE FOR : All DEIIB Personnel

FROM : Sada Pullani

SUBJECT : REVIEW OF STP RESPONSE TO DET REPORT

This note is being issued as directed by Stu. Please find attached the STP Operational Readiness Plan (ORP), which is the first part of its response to the DET report (Business Plan, the second part, is expected in October 1993). If your time permits, please review the ORP and forward your comments to me for incorporating into a memo to from Ed Jordan to Region IV .

According to Henry, things to consider are licensee's understanding of the issues, as well as the depth, breadth, and timing of proposed corrective actions. Mr Jordan has not been too interested, in the past, with having the licensee get into the details of each and every corrective action, but has been more interested in the overall approach to the major problems.

Please return your comments to me along with the bottom part of this note by COB on September 17, 1993.

Enclosure: As stated

cc:
S. Rubin
H. Bailey
File D912
E-File:H:\D912932.SVP

Please check one item below and return to Sada Pullani:

__ 1. I hav no comments

__ 2. I have the following comments (attach additional sheets, if necessary):

cc. Bill Hehl, RI

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Bill,
As directed by Lee Spessard, Stu (Rubin) asked me to send you a copy of the ORP for your review. RIV is waiting for STP's Business Plan (BP) also before they make a single response to H&LP's response, instead of separately for the ORP & BP. So, we have about a month's time. Your comments if any, may be directed to Stu or Lee

Thanks
Sada Pullani, AEOD

CROSS REFERENCE
OF
NRC DIAGNOSTIC EVALUATION TEAM
REPORT ON STP
TO
STP BUSINESS PLAN
AND
HL&P OPERATIONAL READINESS PLAN

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INTRODUCTION

The Business Plan and the Operational Readiness Plan (ORP) provide STP's response to the root causes and specific findings and observations contained in the NRC's Diagnostic Evaluation Team (DET) Report of June 10, 1993. The following matrix shows which Business Plan and ORP elements address the various DET Report findings and observations. References to the Business Plan are by Focus Area Initiative Action Plan number designations (example: C5.1) and to the ORP by section and paragraph designations (example: V.B.1.a) and by the Action Summary designations (example: ORP 51). As illustrated by the matrix all of the DET findings have been or are being addressed. Following the matrix are indexes for the Business Plan Focus Area Action Plans and for the ORP section headings.

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
2.1.1 Marginal Staffing for Scope of Responsibility			**Operations**
a. The shift supervisor spent the majority of his time performing a number of administrative duties, including reviewing work packages for work start authority and again at closeout for post-maintenance test adequacy.	6	C 5.1 C 5.2 D 1.1 D 5.1 D 5.2 D 5.4 D 5.5 F 6.1	V.B.1.a V.B.1.b V.B.2.b ORP 51, 52
b. The team confirmed through interviews that there was a heavy administrative burden placed on the shift supervisors during power operation. This situation was exacerbated during refueling outages.	6	C 5.1 C 5.2 D 1.1 D 4.2 D 4.3 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5	V.B.1.b ORP 51, 52
c. Additionally, the team observed that the shift supervisor was routinely involved in providing the maintenance craft personnel with general information, such as plant status and schedules, that could have been obtained elsewhere.	6	C 5.1 C 5.2 D 1.1 D 4.2 D 4.3 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5	Not Applicable
d. The surveillance test program was also a significant resource burden on the control room staff in general and the SROs in particular. Each unit has three-trains of safety equipment, thus adding a third more surveillance than the conventional two train design.	6	C 5.1 C 5.2 D 1.1 D 4.2 D 4.3 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5 D 6.1 D 6.2	V.B.1.a V.B.1.b ORP 51, 52
e. Operations, in lieu of the instrumentation and control department, conducted the solid state protection system (SSPS) logic surveillance that essentially consumed the entire control room staff. Shift supervisors stated that during these tests, it was sometimes necessary for them to become directly involved in collecting test data.	6	C 5.1 C 5.2 D 4.2 D 4.3 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5 D 6.1 D 6.2	Not Applicable
f. In addition, with the implementation of the reactor trip reduction program, SROs were expected to assume a more active oversight role during certain critical surveillance. This program was a good initiative, but was implemented without regard to the accompanying resource burden.	6	C 5.1 C 5.2 D 4.3 D 5.1 D 5.2 D 5.3 D 5.4	V.B.1.b ORP 51, 52
g. The work control program, including post-maintenance testing (PMT) and equipment clearance orders, had evolved to become cumbersome and labor intensive.	6	D 1.1 D 2.1 D 5.1 D 5.2 D 5.3 D 5.4 F 6.1	V.B.1.b V.C.7 V.B.2.b ORP 87
h. The limited operational experience throughout the site organization placed an excessive reliance on the shift supervisor to screen work packages for safety impact and selection of appropriate PMT.	6	A 2.1 C 5.1 C 5.2 D 4.2 D 4.3 D 5.1 D 5.2 D 5.3 D 5.4 F 6.1	V.A.3 V.B.1.b ORP 49
i. The three train design requirements and the history of material condition problems frequently prompted the control room staff to cause the plant to enter limiting conditions for operation (LCO). ... On the basis of a request by the team, the licensee performed a survey and concluded the plant entered LCOs at a rate greater than four times that of similar facilities.	7	D 5.1 D 5.2 D 5.4 D 6.1 D 6.2	III.B.1 III.C.3 III.B ORP 13, 14, 22, 23
j. The licensee further strained staffing levels for the non-licensed reactor plant operators (RPOs) by implementing 12-hour shifts without margin above the administrative staffing limit of 4 each shift. Thus, any delay in an RPO reporting to work resulted in holding one of the onshift RPOs over past the normal 12-hour shift and therefore, on occasion, exceeding the technical specification (TS) overtime guidelines.	7	C 5.1 C 5.2 D 5.2 D 5.3 D 5.4	V.B.1.a ORP 51, 52

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
k. The RPOs were significantly affected by degraded equipment and balance of plant workar[illegible]unds.	7	D 5.2 D 5.4 D 5.5 F 1.1 F 3.1	III.B III.C ORP 13, 14, 19 - 21, 24 - 25
l. RPO logkeeping rounds were being conducted on an expedited basis to accommodated management's expectation to keep work moving. Numerous examples of frayed insulation and oil leaks were left unchallenged by the RPOs.	7	A 1.1 C 5.1 C 5.2 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5	Not Applicable
m. The shortage of RPOs resulted from the decisions management made ... to reduce the operator training pipeline size and frequency, as well as to staff an operations support activity with reactor operators (RO) and RPOs in lieu of outside contractors.	7	C 5.1 C 5.2 D 4.1 D 4.2 D 4.3 D 5.2 D 5.4 D 5.5	V.B.1.a ORP 51, 52
n. Additionally, management recently decided to relax the standards for staffing a crew to allow the use of apprentice RPOs as long as there were qualified at their specific watchstations. These management decisions could continue to impact plant performance because of the need to utilize seasoned RPOs to fill the upcoming reactor operator license class, thus further reducing the skill level of the remaining RPOs in the field.	7	C 5.1 C 5.2 D 4.1 D 4.2 D 4.3 D 5.2 D 5.3 D 5.5	V.B.1.a ORP 51, 52
o. The additional workload associated with the dual unit outages had forced the licensee to defer operator training and reduce the shift rotation from five to four crews. Personnel from the extra crew that would normally be in training were dispersed into remaining crews to support the outages. Training personnel stated the proposed schedule to resume training would reduce the scope of requalification training to include only the minimum required subjects.	7	C 5.1 C 5.2 D 4.1 D 4.2 D 4.3 D 5.2 D 5.4	Not Applicable
p. In addition, the licensee had suspended on-the-job RPO training since February 18, 1993, to correct performance issues relating to the role of the evaluators. An attempt to retrain evaluators, both in an initial one day class and subsequent series of classes, failed in part because operations could not divert individuals away from their plant duties to attend.	7	C 5.1 C 5.2 D 4.1 D 4.2 D 4.3 D 5.2 D 5.4 D 5.5	Not Applicable
q. The team reviewed the staffing requirements to mitigate a resource-intensive accident (reactor shutdown outside the control room) and concluded that the existing staffing would be significantly strained to handle such a scenario.	8	C 5.1 C 5.2 D 5.2 D 5.4	V.B.1.a ORP 51 , 52
2.1.2 Poor Support to Operations			**Operations**
a. Absence of permanently-installed flow measuring devices required the use of temporary test instrumentation to support routine pump flow surveillance in safety-related systems such as the essential chilled water, auxiliary feedwater, RHR, and spent fuel cooling systems. Extended surveillance setup times had been necessary to obtain accurate and meaningful surveillance results.	8	A 4.1 A 4.2 D 5.2 F 3.1	III.D.8 ORP 37 - 39
b. Numerous Target Rock solenoid valves (SOVs) exhibited problems due in part to installation in high temperature applications. Some of the problems resulted in the SOVs being out of their required position or without proper remote indication. Operators obtained local readings and measurements to compensate for these inadequacies and performed contingency actions to operate these valves properly. Systems where these SOVs were installed included the primary sample system the steam generator bulk water sample system, the chemical volume and control system, and the reactor vessel head vent system.	8	A 4.1 A 4.2 F 3.1	III.D.6 ORP 35

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
c. Numerous automatic controls, such as temperature control valves (TCVs), had been inoperable for a significant period of time. Examples included the TCVs in BOP lube oil coolers, the seal oil coolers, and the hydrogen coolers on the turbine generator. These TCVs were oversized and had to be manually throttled, along with the associated bypass valves, in order to control cooling for the various systems.	8	A 4.1 A 4.2 D 5.2 F 3.1	III.D.5 ORP 34
d. The Information Resources Organization supplied the operations staff with programs, such as a TS Action Statement Program, which it could not use because they did not perform the required tasks and were difficult to use. As a result, operations developed an internal network of computer information systems and software programs that aided in performing such functions as work control, equipment clearances, and reactor coolant system leak rate calculations [also operability tracking]. ... These systems were initially developed without appropriate quality assurance controls and procedural guidance. The team reviewed the licensee's actions to date and found these computer systems still lacked quality controls regarding software development and utilization.	9	D 3.3 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9	V.B.1.b (4) ORP 55
e. The licensee had not aggressively pursued TS revisions to resolve the numerous inconsistencies within the TS at STP. The licensee has written approximately 150 technical specification interpretations (TSIs) and clarifications (TSCs) to help clarify some of these TS inconsistencies.	9	D 6.1 D 6.2	Not Applicable
2.1.3 Confusing and Conflicting Management Expectations			**Operations**
a. Management has sent confusing and conflicting guidance to the control room staff through numerous memoranda without soliciting input from the first line supervisors. Some of this guidance consisted of the implementation of operations policies and standards and other informal guidance. Many of these informal memoranda were revisions or changes that sometimes contradicted earlier memoranda. ... The licensee attempted to consolidate their written guidance to the control rooms into a "Plant Policies and Procedures Manual". This effort appeared to have been hampered by the inability of the licensee to determine the extent and subject matter of the memoranda that had been issued.	9 10	A 1.1 B 3.1 D 2.1 D 5.4 D 5.5 D 6.1 D 6.2 D 8.1	V.C.9
b. Program and policy implementation was ineffective, in part, because of a lack of operations perspective and middle management involvement. ... The reactor trip prevention program was implemented without being explained sufficiently to be uniformly understood and accepted. Management's desire to reduce trips by deferring more work to the outage, while at the same time not providing additional resources or extending the outage duration, appeared as a conflicting message to the control room staffs.	10	A 1.1 B 3.1 D 2.1 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5	Not Applicable
2.1.4 Inconsistent Operator Performance			**Operations**
a. No SRO was in the Unit 2 control room for a short period of time because the unit supervisor left the control room to participate in a surveillance activity. The licensee determined the root cause to have been a lack of self-verification and deficiencies in management guidance regarding command and control. Contributing factors included the relative inexperience of the SROs involved, shift rotation, and competing tasks that called the unit supervisors out of the control room.	11	C 5.1 C 5.2 D 4.1 D 4.2 D 4.3 D 5.4 D 5.5	Not Applicable
b. An inadvertent boron dilution event occurred while the operators attempted to borate the reactor coolant system. The licensee determined that the event was caused by a deficient understanding of the system operation during shutdown conditions. However, other contributing factors mentioned in the licensee's assessment included and inadequate shift turnover, insufficient crew experience, and the inability of personnel to properly focus on a specified task.	11	C 5.1 C 5.2 D 4.1 D 4.2 D 4.3	Not Applicable

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
c. During a periodic surveillance of the ECW system, the operator who was performing the local valve manipulation had to leave the area to locate a valve lock key so he could throttle flow to heat exchanger. When he returned, he throttled the valve to the wrong heat exchanger in a different train. The licensee determined that the event resulted in part from inadequate self verification. The licensee stated that a contributor to the event was the insufficient number of personnel available to perform the evolution. SROs who have performed this surveillance in the past stated to the team that generally, four RPOs are required to perform this surveillance, although the surveillance could have been performed efficiently with three RPOs. In this case, only two RPOs performed this surveillance which made it difficult to focus on the required specific tasks. The three remaining RPOs on shift at the time were not available because they were performing other duties.	11	C 5.1 C 5.2 D 4.1 D 4.2 D 4.3 D 5.2	V.B.2.d
d. Weaknesses in the PMT program, such as difficulties in understanding the PMT reference manual, have resulted in confusion and differing interpretations by the various users. As a result, the PMT recommendations from the planners were often very broad and vague. This contributed to the performance of incorrect post-maintenance testing following painting activities on SDG 13.	12	D 1.1 D 2.1 D 4.2 D 4.3 F 6.1	V.C.7 ORP 87
e. Poor procedures contributed to two occasions in which an RHR pump tripped on low flow. One of these trips occurred during a reactor cavity draindown.	12	D 2.1 D 4.2 D 4.3	Not Applicable
f. An operating crew shifted from charging pump 1B, which was operable, to charging pump 1A, which was inoperable, because they did not thoroughly review a work package for closure. In this case, two maintenance groups were performing work activities associated with pump 1A. One group had completed its work and had sent its package to the control room, the other had not. There was no easy way to determine the status of work being performed.	12	D 1.1 D 4.2 D 4.3 D 5.5	Not Applicable
g. The team generally agreed with the licensee's assessment that there were two fundamental factors for the events in 1992 and early 1993: (1) personal accountability and responsibility needed to be emphasized, stressing self-verification and attention to detail and (2) organizational and programmatic support had to be strengthened to enhance the clarity of written guidance, oral briefings and instructions, equipment design and labeling, and repetitive task assignments. However, the team considered that work schedule, work practices and staffing issues have also been significant contributors to past events. These were only recently being considered as contributory causes by the licensee.	12	C 5.1 C 5.2 D 1.1 D 2.1 E 2.1 E 3.1	V.B.2.d
2.1.5 Ineffective Problem Identification and Resolution			**Operations**
a. The procedure for performing the operations' self-assessment program appeared to provide a good, detailed methodology. However, in implementing this procedure, the operations staff performed shallow assessments that were relatively ineffective in identifying program weaknesses.	12	D 4.3 E 2.1 E 3.1	Not Applicable
b. Evaluations of operational events, both by operations and other organizations, were of limited depth and did not always consider the broader implications and impact on the plant.	13	E 1.1 E 1.2 E 1.3 E 1.4 E 2.1	V.C.1 ORP 78
c. In followup to a Unit 1 inverter trip on March 29, 1993, the corrective actions group (CAG) focused on several narrow elements of the event such as the RPO energizing the cabinet without a procedure in hand. However, the CAG did not address other generic aspects of the event, such as the adequacy of the recovery actions and the RHR system controls automatically swapping to the remote shutdown panel.	13	E 1.1 E 1.2 E 1.3 E 1.4 E 2.1	V.C.1 ORP 78

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
d. Two performance problems reviewed by the team concerned the return of essential chiller 21A to service without proper paperwork being completed and failed to verify control rod position between digital rod position indication and demand position. The operations staff determined that the root causes were inattention to detail and human performance problems, respectively. Recommended corrective actions focused on counseling the individuals or issuing memoranda to the operators. However, the more fundamental aspects of these events, including weaknesses in the work control process and distractions in the control room, were not pursued. Discussions with applicable operations personnel indicated that they were aware that more fundamental issues existed; but did not have the time or charter to pursue further.	13	D 1.1 D 5.2 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4	V.B.2.d V.C.1 ORP 78
e. The two SPR coordinators on the operations staff were responsible for performing 8 to 10 OER and 20 to 30 SPR reviews a month. These individuals spent large amounts of overtime to complete the sizable workload as the volume of SPRs continued to grow.	13	C 5.1 C 5.2 D 5.2 D 5.3 D 5.4 E 1.1 E 1.2 E 1.3 E 1.4 E 4.1	V.C.1 ORP 78
f. Management support to correct program and component problems was not always effective. This was evidenced by management deferral of corrective action proposals to fix several longstanding problems.	13	A 1.1 A 4.1 A 4.2 C 4.1 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4	Not Applicable
g. The operators continually faced challenges such as poor plant labeling, ... Poor component labels contributed to numerous plant transients and other events. In response to a 1991 NRC concern, the licensee stated that a labeling improvement program was being implemented, and committed to reconsider the direction and schedule for the program. ... At the end of the evaluation (DE) the licensee informed the team that it was again reviewing the prioritization of the plant labeling upgrade.	13	See ORP	V.C.2 ORP 79, 80
h. The operators continually faced challenges such as a weak locked valve program.	13	See ORP	V.C.3 ORP 81
i. The operators continually faced challenges such as difficulty in controlling plant cooldown after a reactor trip.	13	F 1.1 F 3.1 F 4.1	Not Applicable
j. Additionally, to reduce waterhammer in the auxiliary feedwater (AFW) system, the operators had to control AFW flow to the steam generators with a stop check valve. Management did not properly address this problem until after the thermal cycles on the steam generator from this method of flow control became an issue.	13	A 4.1 A 4.2 D 5.5 F 3.1	Not Applicable
2.2.1 Ineffective Corrective Maintenance			**Maintenance and Testing**
a. The licensee had established a program to determine the root cause of events and major equipment failures but the identification and evaluation of maintenance issues did not always occur.	15	D 5.2 E 1.1 E 1.2 E 1.3 E 1.4 E 2.1 F 3.1	V.C.1 ORP 78
b. Though the procedures in many cases did not help alert workers to potential problems, a well trained, qualified, attentive workforce could have successfully completed the tasks.	15	D 2.1 D 4.2 D 4.3 E 3.1	V.B.2.a V.B.2.e ORP 60

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
c. A feedwater isolation bypass valve (a containment isolation valve) was found partially open for over a year. Maintenance had been performed on the valve to correct a failure to get a closed indication light in the control room. Maintenance personnel stroked the valve several times and then adjusted the closed limit switch to bring in the closed light without confirming the actual position of the valve. Five months later the licensee issued another SR to correct an apparent discrepancy between the control room indication and the local position indication. However, the potential safety significance of this condition was not properly recognized and the SR was worked six months later. At that time maintenance personnel determined the valve was only going 75% closed.	15	E 1.1 E 1.2 E 1.3 E 1.4	Not Applicable
d. Standby diesel generator (SDG) injector pump hold down studs failed on nine separate occasions. The root cause analysis was shallow and corrective actions were insufficient to preclude recurrence. The licensee did not perform a more detailed analysis of the stud failures until the team became involved.	15	E 1.1 E 1.2 E 1.3 E 1.4 E 2.1 E 4.2 F 3.1	V.C.1 ORP 78
e. A SDG jacket water leak took four attempts to correct. The first two repair efforts were unsuccessful because maintenance personnel installed the wrong size of gasket. In a third repair attempt, the gaskets were made on site with material not suited for that application.	16	D 4.2 D 4.3 E 2.1 E 3.1 F 5.1 F 5.3	V.B.2.e ORP 60
f. Corrective maintenance performed on the high head safety injection (HHSI) pump damaged the motor when too much oil was added. The oil level sight glass was reinstalled upside down resulting in a higher level mark on the sight glass. The procedure specified 11 quarts as the capacity of the bearing reservoir. Due to the unrecognized reversed level sight glass, maintenance personnel added 20 quarts of oil to obtain the level mark on the sight glass. The result was oil intrusion into the motor windings.	16	D 4.2 D 4.3 D 5.5 F 5.2	Not Applicable
g. Repeatedly, the overspeed trip tappet of a turbine driven auxiliary feedwater pump (TDAFWP) did not return to its normal position after a manual or overspeed trip. The initial corrective action involved removing a sticky tar-like substance from the tappet and the upper turbine housing. Personnel did not determine the cause of the tar-like substance and took no action to preclude its recurrence. Approximately six months later the tappet stuck again in its tripped position when the turbine was manually tripped.	16	D 4.2 E 1.1 E 1.2 E 1.3 E 1.4 E 2.1 F 3.1	Not Applicable
h. In 1989, the windings of a motor-operated valve, critical in establishing hot leg recirculation following a LOCA, electrically shorted rendering the valve inoperable. The licensee performed an inadequate root cause analysis and did not rectify the problem. In 1993, the windings shorted again rendering the valve inoperable.	16	D 4.2 E 1.1 E 1.2 E 1.3 E 1.4 E 2.1 F 3.1	V.C.1 ORP 78
i. In August of 1992, the licensee discovered that seismic hold down screws in the Qualified Display Processing System (QDPS) card racks were missing but did not issue an SR to replace the missing screws for four months. The team noted that the SR had not been implemented or evaluated for operability. At the request of the team the licensee evaluated the situation. Consequently, QDPS was declared inoperable affecting both units.	16	C 5.1 C 5.2 D 4.2 E 1.1 E 1.2 E 1.3 E 2.1 F 1.1	Not Applicable
j. The steam generator primary side access covers on Unit had 1 known leak for two and a half years prior to being repaired. On four separate occasions licensee personnel noted the leaks, however, corrective action was not implemented. These leaks existed through two refueling outages. While numerous SRs were written for repairs, confusion concerning the status of the SRs resulted in the repair efforts not being performed.	16	A 4.1 A 4.2 C 5.1 C 5.2 E 1.1 E 1.2 E 1.3 F 1.1	Not Applicable

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
k. Failure to assess the safety impact of a steam leak and properly prioritize the repair effort resulted in an inoperable steam generator power operated relief valve (PORV). The steam was impinging on the PORV actuator but was not immediately repaired. Having observed previous failures of the FWIVs, caused by degraded hydraulic fluid, the licensee knew that subjecting hydraulic fluid to high temperatures would cause it to degrade. Eventually, the oil degraded preventing the PORV from operating, and it was declared inoperable. After repair efforts failed, the licensee entered and 8-day forced maintenance outage.	16	E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	Not Applicable
l. There was a large maintenance backlog of security system components such as rusted camera base plates, water in manholes, broken doors, and degraded intrusion detection systems. An average of 13 officers, each working 12 hour shifts were being scheduled to compensate for long term maintenance issues.	17	E 1.1 E 1.2 E 1.3 E 1.4 E 2.1 F 1.1 F 3.1	III.B ORP 13 - 21
m. A number of components in the inservice test program were in the alert and failed condition. Seven had been in the alert condition since 1989 without effective corrective action taken. Eleven components had been in the alert range before failing and being declared inoperable. Also, the increased testing frequency for items in the alert range from quarterly to monthly resulted in another burden on operators to accomplish testing.	17	C 5.1 C 5.2 E 1.1 E 1.2 E 1.3 E 1.4 F 1.1 F 3.1 F 4.1	III.D.7 ORP 36, 85, 86
2.2.2 Less than Fully Effective Preventative Maintenance Program			**Maintenance and Testing**
a. In developing the initial PM program before plant licensing, the licensee identified approximately 33,000 PM tasks. In the late 1980's the licensee revise the program to include approximately 11,000 "active" tasks, 12,000 "inactive" (no longer scheduled) tasks, and the remaining tasks either cancelled or superseded. The licensee selected the inactive tasks based on "importance factors: that had been assigned to the individual PM activities when they were developed. After the "importance factors" screening the only review performed to determine which individual PM tasks would be classified as inactive or active, was a non-technical one by maintenance personnel. As a result of not performing these inactive PM tasks, ..., preventable events, equipment failures, and instances of poor assurance of operability (mostly dealing with instrument calibration) occurred.	17	F 4.2	V.C.4 ORP 82, 83
b. Appropriate PM tasks were not developed or included in the PM program for some important equipment in the SDGs and support systems. Relay failures in the voltage-regulating circuit caused inoperable SDGs on two different occasions. The relays had never been replaced nor scheduled to be replaced. Main control board meters used during SDG testing and SDG monitoring were not in the PM program and had not been calibrated since startup. In reviewing the issue of noncalibrated SDG meters the licensee identified approximately 150 additional main control board instruments the were not in the PM program. Some of these instruments monitored important parameters for the 125 VDC batteries and the battery chargers.	18	F 4.2	V.C.4 ORP 82, 83
c. Incomplete or incorrect PM procedures resulted in poor equipment performance. Examples of equipment failures, malfunctions or inoperable equipment resulting from procedural deficiencies were: 1) Repeated examples of 13.8 KV breakers failing to cycle due to inadequate PM lubrication instructions; 2) An ESF actuation from an improperly calibrated emergency cooling water transmitter because the PM instruction did not specify the type of M&TE equipment to be used. The improperly calibrated transmitter contributed to the ESF actuation; and 3) Two relief valves having incorrect setpoints because the PM procedures specified the wrong setpoint.	18	D 2.1 F 4.2	V.C.4 ORP 82, 83
d. The method for improving the PM program involved the use of PM "feedback" forms to identify errors and refinements for incorporation into the program. However, since 1991 a large backlog of PM feedback forms had accumulated. In 1992 over 2500 feedback forms were not processed on schedule. As of April, 1993 the backlog of unprocessed PM feedback forms was approximately 5800. Recently, the licensee added personnel to address this large backlog.	18	D 1.1 F 4.2 F 5.1 F 7.1	III.C.2 ORP 24

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
2.2.3 Maintenance Training Deficiencies			**Maintenance and Testing**
a. In mid-1992, an industry organization determined the licensee's basic maintenance craft skills training program was deficient. In response the licensee established a recertification testing program for journeyman in the three disciplines. To allow continuation of work, craft qualification matrices were established. Each matrix listed individual craftsmen and the tasks in which they were currently "qualified," such as breaker maintenance. To compensate for a lack of "qualified" individuals, a supervisor or qualified journeyman continuously observed the work of the unqualified personnel.	18	D 4.1 D 4.2 D 4.3	V.B.2.e ORP 60
b. The training for molded case circuit breakers did not include the correct method for determining the breaker settings based on the values (amperes) provided in the setpoint document. This lack of training and the complex procedural instructions for determining the breaker settings resulted in incorrect breaker settings rendering seven safety-related components inoperable.	19	D 2.1 D 4.1 D 4.2 D 4.3	III.D.3 V.B.2.e ORP 60
c. I&C technicians introduced air into essential chillers and flooded a control panel with oil due to a lack of understanding of how the chillers function under vacuum. This contributed to degraded equipment performance and lack of equipment operability.	19	D 4.1 D 4.2 D 4.3	V.B.2.e ORP 60
d. Craft personnel were not trained on the need to expeditiously place battery chargers into service after performing discharge testing of 125 VDC station batteries. This lack of training and omission from the testing procedure of this critical element of battery testing could have resulted in permanent damage to the station batteries.	19	D 2.1 D 4.1 D 4.2 D 4.3	V.B.2.e ORP 60
e. Beyond the basic skills training deficiencies, the licensee identified that training in specialized skill did not match the necessary tasks to be performed.	19	D 4.1 D 4.2 D 4.3	V.B.2.e ORP 60
f. The Mechanical maintenance staff was not trained to maintain the TDAFWP governor or the TDAFWP overspeed trip mechanism. This contributed to the numerous unsuccessful attempts to resolve problems on the TDAFWP.	19	D 4.1 D 4.2 D 4.3	III.D.1 V.B.2.e ORP 29, 60
g. Training for reactor coolant pump motors was based on a generic 2000 horsepower motor and did not include the unique features of these motors.	19	D 4.1 D 4.2 D 4.3	V.B.2.e ORP 60
h. Training on the SDGs did not include the governor or voltage regulator.	19	D 4.1 D 4.2 D 4.3	V.B.2.e ORP 60
i. I&C technicians assigned to work on the security system were not trained on certain aspects of that system. Three of the five designated technicians had not received specific security system related training and the other technician received only limited training.	19	D 4.1 D 4.2 D 4.3	V.B.2.e ORP 60
2.2.4 Deficiencies in the Replacement Parts Program			**Maintenance and Testing**
a. The lack of parts caused safety-related equipment to remain inoperable and degraded the performance of equipment important to safety. The lack of readily available parts contributed to the size of the maintenance backlog. ... Numerous general usage material such as bolts, nuts, gaskets, and desiccant were not available as general issue items from the warehouse. To support emergent work, needed items were obtained by substituting parts that were reserved for other planned work.	19 20	D 3.3 D 5.2 D 5.4	V.C.8 ORP 88, 89
b. In December 1992, during maintenance to repair an AFW turbine trip throttle valve, a replacement disc and seat were not available in the warehouse. The valve was reassembled and the system declared operable. This leaking valve contributed to numerous overspeed turbine trips in January and February of 1993.	20	D 3.3 D 5.2 D 5.4	V.C.8 ORP 88, 89

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
c. The lack of spare parts contributed to valves within the primary containment being inoperable for a year. During the 1991 refuel outage, "T" drains were not available for installation into some new valve motors. ... A failure of the work control system later resulted in the "T" drains not being installed in a timely manner.	20	D 5.2 D 5.4 F 6.1	V.C.8 ORP 88, 89
d. The Unit 2 secondary side B PORV was inoperable because of an internal hydraulic leak that caused premature failure of a pressure switch. The internal leak caused the hydraulic pump to cycle frequently and eventually resulted in the high pressure switch failing low. The hydraulic pump ran continuously until its thermal overloads tripped. The switch was replaced but the leak was not fixed because of a lack of parts.	20	D 5.2 D 5.4 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	V.C.8 ORP 88, 89
e. Previously, several switches on the CH system failed and were replaced. However, if they had failed again no replacements were in the warehouse or on order when the inventories were reviewed by the team.	20	D 3.3 D 5.2 D 5.4	V.C.8 ORP 88, 89
f. Occasionally, maintenance personnel installed or attempted to install the wrong part in safety-related systems at the facility. The major reason for these situations appeared to be in the parts sourcing process. The process to determine the correct replacement part was extremely difficult and cumbersome. The computerized parts reference system consisted of two databases requiring the viewing of multiple screens. The overall response of the system was slow. Numerous part numbers were "flagged" for revision because of the large engineering document backlog. Sometimes part numbers, as in some Rockwell valve components, were wrong. ... When computer information was questionable, such as being flagged, design and purchase documentation had to be used. However, a number of these documents had unincorporated revisions due to the large engineering backlog.	20	D 1.1 D 3.3 D 3.6 D 5.2 F 7.1	III.C.3 V.C.5 ORP 25 - 28, 84
g. During repair activities to stop a jacket water leak on the inlet header of a SDG, the discharge header gasket was installed. This occurred twice before the mechanics recognized that the gasket was not the correct size.	20	D 4.2 D 4.3 F 5.1 F 5.3	Not Applicable
h. During repair activities to return an essential chiller to service, the correct type of pressure switch was installed but was not qualified as safety-related [sic]. The switch was replaced before the chiller was placed back into service.	20	D 3.3 D 3.6	Not Applicable
2.2.5 Insufficient Support to Maintenance			**Maintenance and Testing**
a. Maintenance department senior supervisors provided limited reinforcement of expected quality performance standards. Their time was dominated by preparation for meetings, attending meetings, and performing administrative tasks.	21	A 1.1 A 2.1 D 5.1 D 5.2 D 5.4 D 5.5 F 5.2	V.B.2.a ORP 59
b. The staff size was insufficient to accomplish corrective maintenance given the productivity achieved using the existing system, the unique three-train design of the facility, and the untimely resolution of design deficiencies. The balance of plant corrective maintenance effort suffered mostly due to the lack of personnel resources.	21	D 1.1 D 5.1 D 5.2 D 5.4 F 1.1	Not Applicable
c. From the end of the Unit 2 refuel outage (December 1991) until the beginning of the Unit 1 refuel outage (September 1992) both unit were essentially operating at power. However, during these 9 months, the backlog of non-outage SRs increased by 1600, an increase of approximately 50 percent.	21	D 1.1 F 1.1	III.B V.B.2.f V.B.2.g ORP 13 - 21, 62

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
d. Recognized design deficiencies for numerous equipment had not been resolved. Examples included the Brown Boveri breakers for the TSC diesel generators.	21	A 4.1 D 5.2 D 5.4 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	III.C III.D.4 V.B.3 V.B.4 ORP 22 - 28, 32, 33, 63 - 75
e. Recognized design deficiencies for numerous equipment had not been resolved. Examples included the obsolete fire protection computer.	21	A 4.1 D 5.2 D 5.4 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	III.C V.B.1.b(3) V.B.3 V.B.4 ORP 22 - 28, 53, 54, 63 - 75
f. Recognized design deficiencies for numerous equipment had not been resolved. Examples included water intrusion into the startup feedwater pump's lubrication system.	21	A 4.1 D 5.2 D 5.4 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	III.C V.B.3 V.B.4 ORP 22 - 28, 63 - 75
g. Recognized design deficiencies for numerous equipment had not been resolved. Examples included refrigerant and oil contamination mitigation devices had not been permanently installed on essential chillers even though air and moisture intrusion had reduced their reliability.	21	A 4.1 D 5.2 D 5.4 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	III.C III.D.2 V.B.3 V.B.4 ORP 22 - 28, 30, 31, 63 - 76
h. In an outage condition, substantial, routine use of overtime was used to try to accomplish the scheduled tasks. ... In some instances Technical Specification overtime guidelines were exceeded without appropriate management review and approval.	21	A 1.1 C 2.1 C 5.1 C 5.2 D 5.2 D 5.3 D 5.4 D 5.5 F 4.2	V.B.2.c
i. Staffing limitations impaired the amount of vibration monitoring accomplished under the predictive maintenance program.	22	D 5.2 F 4.2	Not Applicable
j. During a vibration analysis in May 1990, the Unit 1 main generator seal oil backup pump exceeded alarm limits. However, over 2 1/2 years passed before the next vibration readings were taken in January 1993. Subsequently, the deteriorated motor and pump bearing had to be replaced.	22	D 2.1 D 5.2 F 4.2	Not Applicable
k. Since the plant began commercial operation the vibration of the Unit 1 HHSI pump motors exceeded the alarm limits of the predictive maintenance program. However, more than 27 months passed between vibration readings on the 1C pump and 18 months passed for the 1A pump. Eventually, unsatisfactory oil samples were taken on the 1A and 1C motor bearings.	22	D 2.1 D 5.2 F 4.1 F 4.2	Not Applicable
l. As much as three years passed between vibration readings on the Unit 1 auxiliary feedwater pumps.	22	D 2.1 D 5.2 F 4.1 F 4.2	Not Applicable
2.2.6 Inefficient Work Control Process			**Maintenance and Testing**
a. The large amount of emergent work significantly contributed to the inefficient work control process. This was due, in part, to the large corrective maintenance backlog which inhibited the timely repair of deficiencies before their condition degraded. ... The excessive amount of emergent work prompted the staff to postpone previously planned or partially planned jobs, adding to the backlog.	22	A 4.1 A 4.2 C 4.1 D 1.1 D 5.2 D 5.4 D 5.5 F 1.1	III.B V.B.2.b ORP 13 - 21
b. A major detractor [in the planning and preparation to accomplish work] was the quality of management information systems.	22	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9	V.C.5 ORP 84

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
c. Planner performance was inhibited, in some cases, by incorrect component identification within the facility on SRs. This necessitated walkdowns of all equipment to verify correct component number against design documents.	23	D 2.1 D 4.2 D 4.3 F 6.1	V.C.2 ORP 79, 80
d. The computer hindered schedular performance because it did not allow for changes in workforce size or show support discipline ties to performing the job.	23	D 3.2 D 3.3 D 3.4 D 3.7 D 5.2 D 5.4	V.C.5 ORP 84
e. The [work] schedule was only published every other day with handwritten updates needed when it was not published.	23	C 4.1	
f. Due to previous training program deficiencies, there were numerous unqualified maintenance personnel requiring increased supervisor observation and direction.	23	D 4.1 D 4.2 D 4.3 D 5.2 D 5.5	V.B.2.e ORP 60
g. Coordination and communication weaknesses contributed to poor maintenance while work package quality and parts availability deficiencies decreased efficiency.	23	B 1.1 D 1.1 D 3.3 D 5.2 F 6.1	V.B.2.a ORP 59
h. During an uncoupled run of the reactor coolant pump, the lower motor bearing failed as a result of lube oil starvation. The starvation occurred when a maintenance worker, attempting to correct a suspect high lube oil level, drained approximately 3 gallons of lube oil before the run. The maintenance worker failed to notify the control room that the lube oil had been drained. The maintenance worker's supervisor, stationed in the control room, stated that he did not know of the suspect high lube oil level and would have stopped the job if he had known that 3 gallons had been drained.	23	D 4.2 D 4.3 D 5.5 F 5.2	Not Applicable
i. Several SDG failures resulted from broken fuel oil injector pump hold down studs, many of which were installed using a deficient stud driver tool designed by the system engineer. The system engineer failed to consult design engineering or the SDG vendor while designing the tool.	23	C 2.1 F 3.1	V.B.3 V.B.4 ORP 63 - 75
j. An inadequate turnover contributed to maintenance personnel flushing two feedwater isolation valve hydraulic systems with used coolant from the balance-of-plant diesel generator instead of the proper flushing fluid.	23	F 5.2	Not Applicable
k. An inadequate pre-job brief contributed to a HHSI motor pump bearing reservoir sight glass being improperly installed. As a result, lube oil was introduced into the motor windings.	23	D 4.2 D 4.3 F 5.2	Not Applicable
l. Coordination of the various support groups did not always occur as evidenced by the team observing two work activities which could not continue because support workers did not erect the designated scaffolding.	23	D 1.1 D 5.4 F 5.1 F 6.1	V.B.1.b (2)
m. Approximately 20 percent of the work packages were revised to correct errors or to change the scope of the work activity.	23	D 1.1 D 4.2 D 4.3 F 6.1	V.B.1.b (2)
n. The work procedures occasionally contained unneeded information and did not match the experience of the individual using the procedures.	23	D 2.1 D 4.2 D 4.3 F 6.1	Not Applicable
o. Procedures were sometimes ignored. ... Contractors testing motor operated valves did not take the procedure to the field or taped all four corners of the 200 plus page procedure shut.	23	A 1.1 D 2.1 D 4.2 D 5.3 D 5.5	Not Applicable
p. When the job required parts not originally anticipated, the parts had to be sourced for availability and usually deallocated from another planned job. However the General Maintenance Supervisor, who had to approve the deallocation, and numerous line supervisors were not sufficiently trained to use the computer which detracted from the parts sourcing effort	23	D 3.3 D 3.6 D 3.7 D 3.9	Not Applicable

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NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
2.2.7 Post-Maintenance Testing Program Not Always Effective			**Maintenance and Testing**
a. The PMT reference manual used by planners to select the appropriate test requirement did not specify appropriate detail and occasionally specified the wrong test.	24	B 3.1 D 1.1 D 2.1 D 5.5 F 6.1	V.C.7 ORP 87
b. The planners lacked appropriate training, experience and guidance that would allow them to compensate for the [PMT reference] manuals deficiencies.	24	D 4.2 D 4.3 D 5.4 F 6.1	V.C.7 ORP 87
c. [Deficiencies in the PMT reference manual and planner experience and training] resulted in planners listing all possible PMT that might be necessary and specifying PMTs to be performed as "if required." This required the already heavily burdened shift supervisor to review the scope of work completed in order to specify the appropriate post maintenance test to be performed.	24	B 3.1 D 1.1 D 4.2 D 4.3 D 5.2 D 5.4 F 6.1	V.C.7 ORP 87
d. Periodically, the shift supervisor selected inappropriate PMT and in some instances inoperable equipment was not identified such as: SDG 13 was inoperable for 2 weeks because of the failure to perform adequate PMT after painting activities. The correct PMT had been specified in the work package but was inappropriately cancelled due to a concern over excessive SDG starts.	24	C 5.1 C 5.2 D 1.1 D 2.1 F 6.1	Not Applicable
e. Periodically, the shift supervisor selected inappropriate PMT and in some instances inoperable equipment was not identified such as: PMT was not performed on a SDG output breaker after a fuel oil injector pump was repaired. During that maintenance activity, the output breaker was racked out to support work on the injector pump and later improperly racked in. For PMT the SDG was started but breaker closure was not tested. During a subsequent surveillance test, the SDG output breaker would not close onto the bus.	24	C 5.1 C 5.2 D 1.1 D 2.1 F 6.1	V.C.7 ORP 87
f. Periodically, the shift supervisor selected inappropriate PMT and in some instances inoperable equipment was not identified such as: After work was performed on the feeder breaker for essential chiller 21C, no PMT was performed, yet the chiller was declared operable. The following day the chiller's feeder breaker tripped during a routine start attempt due to breaker problems.	24	C 5.1 C 5.2 D 1.1 D 2.1 F 6.1	V.C.7 ORP 87
2.2.8 Periodic Testing Not Always Effective			**Maintenance and Testing**
a. Numerous instances had been identified where [surveillance] procedures were inadequate to meet TS surveillance requirements, thereby reducing assurance that the equipment was operable. Among these was a failure to completely test a manual reactor trip handswitch and the nonconservative setting of one of the four reactor protection channels during a reactor startup.	24	See ORP	V.C.6 ORP 85, 86
b. In a followup, the team questioned the licensee concerning an engineering test of the control room emergency ventilation recirculation charcoal adsorbers. Subsequently, the licensee determined the surveillance requirements had not been satisfied in that a defective method had been devised to determine when adsorber testing should be performed. The failure to send the charcoal sample for testing within the required interval resulted in a 3 month delay in determining that the charcoal bed was below required standards for iodine adsorbtion.	25	A 4.1 C 2.1 E 1.1 E 1.2 E 1.3 E 1.4	V.C.6 ORP 85, 86
c. The licensee committed to expand the scope of the enhancement program to meet the original [all surveillance procedures] intent.	25	See ORP	V.C.6 ORP 85, 86
2.3.1 Weak Support in Resolving Plant Problems			**Engineering Support**
a. Examples of ineffective engineering support, investigations, root cause analyses and corrective actions include: The licensee did not determine the root cause of repetitive failures of the fuel injector pump hold-down studs associated with the SDGs. Nine separate failures occurred between 1987 and 1993, including five failures on SDG 22. The failure of these studs was a significant contributor to the high unavailability of SDG 22.	27	E 1.1 E 1.2 E 1.3 E 1.4 E 4.2 F 3.1	V.B.3 V.B.4 V.C.1 ORP 63 - 75, 78

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
b. Examples of ineffective engineering support, investigations, root cause analyses and corrective actions include: The RCAs and accompanying corrective actions were ineffective in preventing repeated failures of the toxic gas monitors and containment ventilation isolation system.	27	E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	V.B.3 V.B.4 V.C.1 ORP 63 - 75, 78
c. Examples of ineffective engineering support, investigations, root cause analyses and corrective actions include: Widespread, longstanding problems with the application and performance of Target Rock solenoid-operated valves (SOVs) were not resolved. These valves were used extensively in several safety-related systems. ... Temporary modifications were installed to bypass containment isolation valves to allow steam generator sampling. Previous corrective actions, such as re-orienting the main steam isolation valve above the seat drains, did not prevent additional failures.	27	A 4.1 E 1.1 E 1.2 E 1.3 E 1.4 E 4.1 F 3.1	III.B.6 V.B.3 V.B.4 V.C.1 ORP 35, 63 - 75, 78
d. Examples of ineffective engineering support, investigations, root cause analyses and corrective actions include: The licensee started up with a significant design deficiency that resulted in excessive water hammer in the auxiliary feedwater system. Engineering's resolution to the issue was to install mechanical stops on the AFW valves to prevent them from closing, which created additional operational concerns. Operators could no longer effectively throttle valves during certain plant conditions to control flow to the steam generators. As a result, operators controlled flow by cycling the stop check valves, resulting in an excessive number of thermal cycles on steam generator nozzles.	27	C 2.1 C 3.1 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	V.B.3 V.B.4 ORP 63 - 75
e. Examples of ineffective engineering support, investigations, root cause analyses and corrective actions include: Corrective actions for numerous safety and nonsafety related circuit breaker problems were not aggressive or complete. The licensee evaluated each breaker failure and took corrective actions for safety-related circuit breakers. Many of these actions were incomplete. Further, the licensee was slow in resolving problems and taking corrective actions for many nonsafety-related breakers.	27	C 2.1 C 3.1 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	V.B.3 V.B.4 ORP 63 - 75
f. Examples of ineffective engineering support, investigations, root cause analyses and corrective actions include: After a reactor trip, the startup feedwater pump (SUFP) failed to start upon demand because of low oil pressure. Repeated occurrences of moisture intrusion had caused the oil filters to be clogged, reducing the lube oil pressure. A previous SUFP trip on low lube oil pressure had not been properly evaluated, resulting in the failure to recognize design deficiencies.	27	C 2.1 C 3.1 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	V.B.3 V.C.1 V.B.4 ORP 63 - 75, 78
g. Examples of ineffective engineering support, investigations, root cause analyses and corrective actions include: During oil pump transfers, the steam generator feed pump turbine tripped repeatedly because the oil pressure decreased rapidly. Engineering mistakenly accepted the recommendation of a vendor to drill holes in the pump casing to prevent air binding, which, when implemented, exacerbated the problem.	27	C 2.1 C 3.1 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	V.B.3 V.B.4 ORP 63 - 75
h. Examples of ineffective engineering support, investigations, root cause analyses and corrective actions include: The Technical Support Center diesel generator was not reliable, as evidenced by repeated failures to start and load during testing. Contributing to the poor reliability was exposure to the environment, design weaknesses, and poor circuit breaker reliability. The licensee only partially implemented proposed resolutions to these problems.	28	C 2.1 C 3.1 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	III.B.4 V.B.3 V.B.4 V.C.1 ORP 32, 33, 63 - 75, 78
i. The engineering staff did not always adequately evaluate equipment operability as illustrated below: In August 1992, a system engineer discovered that seismic hold-down screws were missing from the Unit 1 quality display parameter system (QDPS) card racks, but did not understand the seismic consequences and did not request an evaluation for operability. The licensee did not properly evaluate the effect of the deficiency on operability until so requested by the team in April 1993. The QDPS was subsequently declared inoperable.	28	C 2.1 E 1.1 E 1.2 E 1.3 E 1.4	V.B.3 V.C.1 ORP 63 - 72, 78

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
j. The engineering staff did not always adequately evaluate equipment operability as illustrated below: Torque measurements and computations associated with testing of motor operated valves were not evaluated to verify valve operability. The licensee discovered, upon evaluating previous test data, that several residual heat removal valves had been torqued above design values because of a deficiency in the test procedure and associated engineering documents to measure or compute torque.	28	C 2.1	V.B.3 V.B.4 ORP 63 - 75
k. The installation of plant modifications to effect plant improvements was not always successful.	28	B 1.1 C 3.1 E 2.1	V.B.3 V.B.4 ORP 63 - 75
l. TMs were not thoroughly evaluated and were not aggressively pursued to closure as illustrated in the following: Sixteen TMs were installed for more than 2 years, including some that cause problems for operators. Some TMs were originally assigned a long restoration period (1 to 2 years) or given an extension without adequate justification. Some were later converted to permanent modifications and remained open until the permanent modifications were closed.	28	A 1.1 A 4.1 A 4.2 C 3.1 D 5.2 F 3.1	III.C.3.a V.B.3 V.B.4 ORP 25, 63 - 75
m. TMs were not thoroughly evaluated and were not aggressively pursued to closure as illustrated in the following: In performing engineering evaluation for TMs affecting the CH system and steam generator sample valves, the engineering staff failed to realistically evaluate required operator action in a potential high radiation field, to compensate for failed safety-related automatic valve actuators.	28	A 1.1 A 4.1 A 4.2 C 3.1 D 5.2 F 3.1	III.C.3.a V.B.3 V.B.4 ORP 25, 63 - 75
2.3.2 System Engineering Program Not Effectively Implemented			**Engineering Support**
a. Program expectations for the system engineers greatly exceeded the resources provided. Some system engineers were assigned the primary responsibility for as many as 10 systems, with an additional 10 systems assigned as backup.	28 29	A 1.1 C 2.1 C 3.1 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5	V.B.3.a V.B.3.c ORP 63, 64
b. Most system engineers could not remember what backup systems they were assigned, and were not knowledgeable in their backup system assignment.	29	C 2.1 C 3.1 D 4.1 D 4.2 D 4.3 D 5.2 D 5.3 D 5.4 D 5.5	V.B.3.a V.B.3.c ORP 63, 64
c. Staffing allocation was roughly based upon other two-unit facilities, however, the three-train safety system design resulted in an increased work load for the system engineers when compared to otherwise equivalent nuclear facilities with two trains.	29	C 2.1 C 3.1 D 5.2 D 5.3 D 5.4 D 5.5	V.B.3.c
d. System engineers generally did not complete their monthly walkdowns or did not sufficiently document them when performed. Some system engineers performed walkdowns of multiple systems in both units on the same day, indicating a cursory review at best.	29	C 2.1 C 3.1 D 5.2 D 5.3 D 5.4 D 5.5	V.B.3.a ORP 63, 64
e. System health reports lacked useful detail and trending information. Most system engineers received no feedback on the content of the system health reports from their supervisors, did not review and track service requests on their assigned systems, did not know how many service requests were outstanding on their systems, did not know how many modifications affected their systems, and did not track and trend problems or particular attributes of their systems.	29	B 1.1 B 2.1 B 3.1 C 2.1 C 3.1 D 3.2 D 3.3 D 3.4 D 3.6 D 3.7 F 4.2	V.B.3 ORP 63 - 72
f. The licensee indicated that trending will not be performed until the end of 1993 when the software becomes available.	29	D 3.2 D 3.3 D 3.4 D 3.6 D 3.7 F 4.2	V.B.3.d(3) ORP 71, 72
g. Several engineers were deficient in training or equivalent work experience, which with the demands on time available for daily responsibilities and a perception of limited resources, resulted in system engineers receiving little training for specific jobs, components, or systems.	29	C 2.1 C 3.1 D 4.1 D 4.2 D 4.3 D 5.2 D 5.4	V.B.3 ORP 63 - 72

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
h. Those [system] engineers who were "hands-on" oriented and focused more on the equipment aspects of their systems tended not to be as involved in technical monitoring and analysis which included design basis issues, system tracking and trending, and proactive activities.	29	C 2.1 C 3.1 D 4.2 D 4.3 F 4.2	V.B.3.a ORP 63, 64
i. Management did not oversee and direct the [system engineer] program in a consistent manner. System engineers reported to different supervisors who had differing standards for implementing the system engineering program.	29	A 1.1 C 2.1 C 3.1 D 5.5	V.B.3.a ORP 63, 64
k. Because of the reactive nature of system engineering work, and networking between operations and maintenance, first line supervisors maintained minimal control over work assigned to the system engineers, who spent over 40 percent of their time supporting emergent work of other site organizations. Thus, the system engineer received support requests that had not been screened for validity by PED supervision.	29	A 1.1 A 2.1 B 1.1 C 2.1 C [illegible] C 4.1 D 5.2 D 5.4 D 5.5	V.B.3.a ORP 63
2.3.3 Engineering Work Backlogs Were Large, Poorly Tracked, and Not Well Managed			**Engineering Support**
a. The licensee did not have an effective method to determine the size and composition of the engineering backlog. This conclusion is based on the fact that the data initially given to the team was grossly inaccurate and it subsequently took more than four weeks to provide reasonably accurate data. The backlog consisted of approximately 10,800 work items on May 1, 1993. ... The backlog did not include work assignments of administrative or contractor personnel.	30	A 1.1 A 2.1 B 1.1 C 2.1 C 3.1 F 7.1	III.C V.B.3 V.B.4 ORP 22 - 28, 63 - 75
b. The number of work items in the backlog was increasing at a net rate of 428 each calendar quarter (seven person-years each quarter). To compensate for this workload, numerous individuals worked more than 70 percent overtime and some worked more than 100 percent overtime in a pay period.	30	A 1.1 A 2.1 B 1.1 C 2.1 C 3.1 D 5.2 D 5.3 D 5.4 F 7.1	III.C V.B.3 V.B.4 ORP 22 - 28, 63 - 75
c. The licensee was not incorporating amendments into site vendor drawings in a timely manner. On March 19, 1993, approximately 11,500 vendor drawings (approximately 50 percent being safety-related) had one or more unincorporated amendments. Drawings with many unincorporated amendments rendered the associated vendor drawings cumbersome to use and impeded work planning and execution. Previous initiatives to reduce this backlog were not effective.	30	D 5.2 D 5.4 D 5.5 E 4.2 F 7.1	III.C.2 III.C.3.c ORP 27
2.3.4 Use of Industry and Site Operational Experience was Inadequate			**Engineering Support**
a. Industry and site OERs performed by the licensee were not comprehensive or timely, and failed to completely address problems or recommendations. In several instances, engineering failed to review and benefit from industry experience, such as described in NRC information notices and bulletins, vendor service bulletins, and industry reports, or site operational experience, which led to avoidable site events, repetitive equipment failures, and additional engineering time expenditures.	30	D 4.2 D 4.3 D 5.4 D 5.5 E 4.1 F 7.1	III.C.3.b V.B.3 V.B.4 ORP 26, 63 - 75
b. The following are examples in which the licensee failed to properly implement the OER program: NRC Information Notice 91-046, "Degradation of Emergency Diesel Generator Fuel Oil Delivery Systems," listed instances where inadvertent painting of fuel injector assemblies, including metering rods, rendered emergency diesel generators inoperable. The licensee's response to the notice indicated that adequate controls were in place and that no further actions were necessary. However, during painting activities, paint dripped into the holes which contained the fuel metering rods, rendering a diesel inoperable as later discovered during the performance of a surveillance test.	30 31	C 2.1 C 3.1 D 4.2 D 4.3 D 5.4 D 5.5 E 4.1	III.C.E.b V.B.3 V.B.4 ORP 26, 63 - 75

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
c. The following are examples in which the licensee failed to properly implement the OER program: During tests in March 1993, the licensee discovered that 36 control rods in Unit 1 were thermally locked. The event occurred following a reactor cooldown in February 1993, with the control rods energized on the core bottom. The licensee could have avoided the event by following the guidance in Westinghouse Technical Bulletin TB-92-05 of May 21, 1992. The licensee received the bulletin in June 1992 but failed to route it to Reactor Engineering and Operations Support Groups. Therefore, its contents were not incorporated into operating procedures by cognizant operational groups.	31	D 2.1 D 4.2 D 4.3 D 5.1 D 5.5 E 4.1 E 4.2	III.C.3.b V.B.3 V.B.4 ORP 26, 63 - 75
d. The following are examples in which the licensee failed to properly implement the OER program: When replacing SDG rocker arms with a modified design, the licensee failed to include specific Cooper-Bessemer service bulletin requirements for torquing and installing modified parts. This could have prevented the replaced rocker arms from functioning properly.	31	D 4.2 D 4.3 D 5.5 E 4.1 E 4.2	III.C.3.b V.B.3 V.B.4 ORP 26, 63 - 75
e. The following are examples in which the licensee failed to properly implement the OER program: During an uncoupled run of a reactor coolant pump, the lower motor bearing failed from a lack of lube oil (LO) after a maintenance worker drained approximately 3 gallons of LO in an attempt to correct a suspect high LO level. An investigation showed that the reactor coolant pump motor bearing oil levels had a history of erratic readings and that a lower reactor coolant pump bearing was damaged during a previous outage because of insufficient LO in the lower bearing.	31	C 2.1 C 3.1 D 4.2 D 4.3 E 1.1 E 1.2 E 1.3 E 1.4 E 4.1	Not Applicable
f. The following are examples in which the licensee failed to properly implement the OER program: In May 1990, the licensee detected high vibration readings on the Unit 1 turbine generator seal oil backup pump, but did not monitor the pump until completing the 1992 outage and inspection of the main turbine and auxiliaries. During turbine startup, high vibration readings were again observed on the seal oil motor and pump bearings that necessitated repair.	31	C 2.1 C 3.1 F 4.1	V.B.3 V.B.4 ORP 63 - 75
g. The licensee assigned limited personnel and hardware resources to the VETIP to receive, distribute, and track vendor information. The licensee added staff temporarily to correct problems, but did not take long term corrective actions, thus permitting the problem to recur. ... Many examples of inadequate incorporation of vendor information were repeatedly noted by QA, ISEG, and other audit groups without substantive corrective action being taken.	31	A 1.1 E 4.2 F 7.1	III.C.2 III.C.3.c ORP 24, 27
h. The licensee had not updated the PRA database to reflect actual plant equipment failure data. ... The licensee was not using the unique capabilities of the PRA group to identify plant equipment reliability or to help in ranking modification or maintenance work. During this evaluation, the licensee used PRA to address team concerns with the reliability of the SDGs, in particular for SDG 22, but only in response to specific and repeated team requests.	31 32	C 2.1 C 3.1 F 3.1	Not Applicable
2.3.5 Insufficient Support to Engineering			**Engineering Support**
a. Management assigned inadequate information systems to aid engineering in evaluating system performance, trending maintenance history, accessing industry and site experience, performing investigations and root cause analyses, and making informed decisions.	32	C 2.1 C 3.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2 F 3.1 F 4.1	V.B.3.d V.C.5 ORP 71, 72, 84

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b. The equipment maintenance history database was not accurate and current because of the poor quality of information loaded into the system, and because of the large backlog of outstanding entries, estimated by the licensee to be approximately 6-8 months.	32	C 2.1 C 3.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 F 4.1 F 7.1	III.C.3.c V.B.3.d V.C.5 ORP 27, 71, 72, 84
c. A sample of various databases showed conflicting and incomplete in[illegible]mation concerning the maintenance history of CH chillers, failure h[illegible]stories for the SDGs, lists of TMs, and MOV issues.	32	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 F 4.1 F 7.1	III.C.3.c V.B.3.d V.C.5 ORP 27, 71, 72, 84
d. The licensee could not retrieve design basis variances concerning MOV setpoints, and could not track or index Plant Change Forms by system or type.	32	C 2.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2 D 8.1 F 7.1	V.B.3.d V.C.5 ORP 71, 72, 84
e. The licensee had to manually search service requests to determine where modified SDG rocker arms were installed, and whether they were installed in accordance with a Cooper-Bessmer bulletin.	32	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 E 4.2	III.C.3.c V.B.3.d V.C.5 ORP 27, 71, 72, 84
f. The effectiveness of engineering was hampered by sparse computer resources and analytical tools to monitor and assess component and or system performance. Until the end of 1992, only five percent of the system engineers had a computer to aid in performing their job function.	32	C 2.1 C 3.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2 F 4.1	V.B.3.d V.C.5 ORP 71, 72, 84
g. Backlogged engineering work continued to increase at the rate of seven person-years each quarter, even though most groups in PED and DED worked substantial amounts of overtime.	32	A 1.1 D 5.3 D 5.4 D 5.5 F 7.1	III.C V.B.3 V.B.4 ORP 22 - 28, 63 - 75
h. Management support for training was weak and inequitable. PED was weaker than DED in terms of background and experience, had more staff (179 vs. 148), but were assigned only one-seventh the training budget of DED.	32	A 4.1 C 1.1 C 3.1 D 4.1 D 4.2 D 4.3 D 5.5	V.B.3.b V.B.3.c ORP 65 - 70
i. The licensee fell behind its schedule in completing many [engineering] improvement programs and cancelled some after investing substantial resources. Some corrective actions resulting from improvement programs produced no improvement in performance and were later cancelled. The licensee appeared to classify improvement program action items as "closed" without evaluating their effectiveness.	33	A 1.1 A 4.1 A 4.2 C 1.1 D 5.5	V.B.3 V.B.4 ORP 63 - 75
j. Substantial recurrent problems noted by maintenance, operations, engineering or other groups often resulted in design modifications to resolve the problem. However, the modifications were not installed in a timely manner.	33	A 4.1 B 1.1 C 4.1 D 5.4 F 3.1	III.C.3 V.B.4 ORP 22 - 28, 73, 75
k. The licensee failed to make effective use of studies critical of engineering activities.	33	C 2.1 C 3.1 D 5.5 E 3.1	Not Applicable

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2.3.6 Configuration Control Weaknesses			**Engineering Support**
a. Configuration control weaknesses which adversely affected safety-related plant equipment, were noted in several instances, such as molded case circuit breakers, SDGs, and environmental qualification of MOVs. In other instances, such as vendor drawings, the team observed weaknesses in configuration control that, if left uncorrected, could adversely affect plant operations. Ineffective management oversight and direction, including insufficient resources, were significant contributors to these weaknesses.	33	A 1.1 A 2.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2 D 5.5	Not Applicable
b. The Electrical Setpoint Index for molded case circuit breakers was not properly understood or implemented in the field. ... Although the index contained appropriate criteria, the licensee had not prepared detailed work or procedural instructions for craft personnel to use in interpreting or scaling the index guidance.	33 34	D 1.1 D 2.1 D 4.2 D 4.3 D 5.5 F 6.1	III.D.3 V.B.3 V.B.4 ORP 63 - 75
c. While performing maintenance on molded case circuit breakers, the licensee discovered that the magnetic trip settings were adjusted using the electrical penetration test point calculations for permissible currents rather than trip values obtained from the index. The licensee later determined that the instantaneous trip (magnetic) settings were improperly adjusted for approximately 30 breakers in Units 1 and 2. The licensee found operability concerns with 10 breakers powering MOVs such as containment and accumulator isolation valves.	34	E 1.1 E 1.2 E 1.3 E 1.4 F 5.2	III.D.3 V.B.3 V.B.4 ORP 63 - 75
d. When installing SDG rocker arms with a modified design, the licensee failed to include specific Cooper-Bessmer service bulletin requirements for torquing and installing the modified part, which could have cause the replaced rocker arms to function improperly.	34	D 2.1 E 1.1 E 1.2 E 1.3 E 1.4 E 4.1 E 4.2	III.C.3.b V.B.3 V.B.4 ORP 26, 63 - 75
e. Once alerted to the bulletin requirements, installation of the rocker arms was still not completed correctly, i.e., the requirement to replace both the intake and exhaust rocker arms as a set was not accomplished.	34	E 1.1 E 1.2 E 1.3 E 1.4 E 4.1 E 4.2 F 5.2 F 6.1	V.B.3 V.B.4 ORP 63 - 75
f. The licensee also had to resort to hand searches of service requests to locate where the modified rocker arms were installed.	34	C 3.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 F 7.1	V.B.3.d V.C.5 ORP 71 - 72, 84
g. The licensee did not maintain the environmental qualification of valve actuator motors in containment by installing "T" drains as required by design. The licensee found five actuator motors that did not have "T" drains. The engineering staff evaluated three of the five, concluded that no action was required, and was evaluating corrective actions for the remaining two valve actuator motors.	34	C 2.1 C 3.1 D 3.3 D 5.2 D 5.4 F 6.1	Not Applicable
h. The many unincorporated amendments to vendor drawings remained significant and could impede work planning and execution.	34	D 5.2 D 5.4 E 4.2 F 7.1	III.C.3.c ORP 27
2.3.7 Functional and Programmatic Weaknesses Could Adversely Affect the Operability of the Essential Chilled Water System			**Engineering Support**
a. The licensee did not complete an analysis for the CH system under low heat load conditions. If an accident occurred during cold weather and all chillers operated, the chillers would be under loaded, causing surging and failure, resulting in loss of CH cooling of safety related equipment. ... The licensee made a commitment to the team to evaluate under-loading of chillers during accident conditions.	35	F 3.1	III.D.2 ORP 30, 31

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b. Preoperational, surveillance, and post-maintenance testing performed on the CH system did not demonstrate that the system would be operable for extended periods of time under design basis heat load conditions. The piping design configuration did not allow the CH system to be tested with heat loads representative of those anticipated during accident conditions.	35	See ORP	III.D.2 ORP 30, 31
c. Compressor refrigerant and oil contamination was a long term problem that significantly affected reliability. The vendor proposed installing a proven refrigerant clean-up kit that would allow uninterrupted chiller operation. Although the modification was approved in September 1991 for installation in 1992, its installation date was deferred to October 1994 for Unit 1 and April 1995 for Unit 2.	35	A 4.1 C 1.1 C 4.1 F 3.1	III.D.2 ORP 30, 31
d. In 1993, after further evaluation and repeated attempts at installation, the licensee cancelled plans to install proximity vibration probe assembly recommended by the vendor in 1988 to detect high speed thrust bearing displacement and an automatic compressor trip function for the 300-ton compressors to prevent catastrophic failure.	35	A 1.1 C 1.1 C 4.1	III.D.2 ORP 30, 31
e. In 1989, the licensee implemented a temporary modification to remove an ECW valve actuator which automatically controlled flow to the chiller condensers by using an upstream manual valve rather than correcting automatic control system design and material deficiencies.	35	A 4.1 F 3.1	III.D.2 ORP 30, 31
f. After maintenance work was performed on the feeder breaker for essential chiller 21C, the chiller was declared operable without PMT. The following day the chiller tripped during a routine start attempt because of breaker problems.	36	E 1.1 E 1.2 E 1.3 E 1.4 F 6.1	V.C.7 ORP 87
g. The maintenance craft personnel introduced air into the essential chillers and flooded a control panel with oil because they did not understand how the chillers function under vacuum. Inadequate training caused poor maintenance work and contributed to degraded performance of the equipment and lack of availability.	36	D 4.1 D 4.2 D 4.3 D 5.5 F 5.2	V.B.2.e ORP 60
2.3.8 Untimely Resolution of Fire Protection Issues			**Engineering Support**
a. Excessive shrinkage and resultant cracks of Hydrosil-type penetration seals allowed free air to pass between fire areas and raised questions of structural integrity, making the seals ineffective fire barriers. The problem was previously identified in 1990 and was thought to have been corrected after a 100 percent survey in 1991-92 and subsequent repairs/rework. The cracking was again identified in March 1993. The investigation of the problem was scheduled to be completed by May 31, 1993.	36	D 1.1 F 3.1	Not Applicable
b. The Pyrotronics fire protection computer system, which monitors fires in various plant areas and alarms in the control room, was unreliable with numerous chronic problems, including defective detectors and electronic transmitter boards. Numerous false alarms frequently annunciated (20-30 each day) and control room operators could not quickly ascertain which detector was in alarm status.	36	A 4.1 C 4.1 F 3.1	V.B.1.b(3) ORP 53, 54
c. Replacement parts were not available [for the Pyrotronics] because the system was obsolete. Although a modification was proposed to replace the system, the modification received low priority, and was not scheduled for installation until 1996. The team raised concerns about the system reliability and the ability of operators to determine if and where a fire existed.	36	A 4.1 C 4.1 F 3.1	V.B.1.b(3) ORP 53, 54
d. At the time of the evaluation, the licensee had a large backlog of 361 open SRs for the fire protection systems. ... The large backlog indicated that the reliability of the fire protection system was questionable.	36	A 4.1 C 4.1 F 1.1	V.B.1.b(3) V.B.2.g ORP 53, 54, 62

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e. In April 1993, the licensee located significant quantities of transient combustibles such as wooden tables, waste oil, oil soaked rags, and miscellaneous combustible items located throughout the plant. The presence of such large amounts of transient combustibles was indicative of an inadequate control program.	37 37	D 4.2 F 2.1	D 4.3 F 5.2	Not Applicable
2.4.1 Ineffective Direction and Oversight		**Management and Organization**		
a. Senior management failed to provide the staff clear direction and oversight in several key areas including performance standards and station priorities. Frequent, conflicting messages about implementation of these standards and priorities were sent by senior management.	38	A 1.1 B 1.1 D 5.5	A 2.1 D 5.1	V.A.2 V.A.3 ORP 44 - 50
b. Numerous uncontrolled memoranda and oral instructions were used to change standards and priorities. ... Management's stated emphasis on "doing things right, not just doing them" often seemed to conflict with these memoranda and instructions. As a result, the staff questioned the credibility of senior management.	38	A 1.1 B 2.1 D 2.1 D 5.5	B 1.1 B 3.1 D 5.1 D 6.2	Not Applicable
c. Middle managers often failed to obtain feedback on problems and give consistent direction because they did not interact frequently enough with people in the plant.	38	A 2.1 B 2.1 C 3.1 D 5.5	B 1.1 B 3.1 D 5.1	Not Applicable
d. Although the licensee initiated the management surveillance program in 1990 in an attempt to increase management's presence in the plant, the plant staff did not fully accept this program. The perception by plant personnel was that the managers focused on minor housekeeping items rather than effectively interfacing with personnel and providing one-on-one direction and feedback.	38	A 1.1 B 2.1 D 5.1 F 2.1	A 2.1 B 3.1 D 5.5	Not Applicable
e. The lack of clear and consistent station management direction combined with senior management's over-involvement in lower level issues created a widespread perception that middle managers had little authority.	38	A 1.1 A 5.2 A 5.4 B 2.1 D 5.5	A 5.1 A 5.3 B 1.1 D 5.1	V.A.2 V.A.3 ORP 44 - 50
f. Over-involvement contributed to a high senior management workload, limited their time available to focus and provide direction on higher level issues, and discouraged ownership and accountability at the lower levels of management.	39	A 1.1 B 1.1 D 5.1 D 5.5	A 2.1 B 2.1 D 5.4	V.A.2 V.A.3 ORP 44 - 50
g. Many of the plant's more important activities and initiatives, such as root cause analyses, didn't receive consistent and clear management direction and didn't have an owner that really felt accountable.	39	A 1.1 C 1.1 E 1.1 E 1.3	A 2.1 D 5.5 E 1.2 E 1.4	V.A.2 V.A.3 ORP 44 - 50
h. Key performance issues were often not fully appreciated by senior management even after they were identified by outside industry and regulatory agencies, despite precursors and warnings within the organization at STP.	39	A 1.1 B 2.1	B 1.1 D 5.5	V.A.2 V.A.3 ORP 44 - 50
i. Most managers at STP lacked commercial nuclear experience outside of STP. Some managers had Navy nuclear experience, but had very limited experience at STP.	39	A 2.1 D 4.3	D 4.2 D 5.5	Not Applicable
j. Many managers had recently been rotated into positions for which they had little background. The majority of the department level managers had been rotated one or more times during the past year.	39	A 2.1 D 4.3	D 4.2 D 5.5	Not Applicable

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2.4.2 Poor Support and Resource Utilization		**Management and Organization**	
a. Management failed to provide and adequately focus sufficient resources to maintain performance levels and standards for the existing plant conditions. Significant station activities were not adequately funded despite the clearly stated objections of the responsible middle level managers.	39	A 1.1 A 4.1 A 4.2 A 5.2 C 1.1 D 5.2 D 5.3 D 5.4 D 5.5	V.A.2 V.A.3 ORP 44 - 48, 50
b. Middle level managers perceived that resources would not be approved if the proposed line item caused the department budgets to exceed the target budget levels established by senior management.	39	A 1.1 A 4.1 A 4.2 A 5.2 C 1.1 D 5.2 D 5.5	V.A.2 V.A.3 ORP 44 - 48, 50
c. STP management had not established management systems that would effectively and efficiently accomplish the strategic goals listed in the MOP by implementing these goals into the daily work schedule.	39	A 1.1 A 5.2 B 2.1 C 1.1 C 1.2 D 5.4 D 5.5	V.A.2 V.A.3 ORP 44 - 48, 50
d. The planning, scheduling, and work process controls did not support the timely and reliable completion of work by maintenance, operations, and engineering. Although station management had recognized this problem, they had failed, until recently, to focus the necessary resources to correct this situation.	39	A 4.1 A 5.2 C 1.1 C 1.2 C 4.1 D 1.1 D 5.2 D 5.3 F 1.1	III.B.1 V.B.1.b (1) V.B.2.b ORP 14
e. Senior management's reaction to unforeseen, emergent work was to defer or cancel other previously budgeted line items to maintain the target budget expenditure goals. ... STP routinely experienced a significant end-of-year deficit in the accomplishment of planned, priority work because of the failure to adequately anticipate and budget for emergent work.	40	A 4.1 A 5.2 C 1.1 C 1.2 D 5.3 D 5.5	V.A.3 ORP 50
f. Staffing levels were marginal or insufficient in several key areas.	40	A 4.1 C 1.1 C 2.1 C 3.1 C 5.1 C 5.2 D 5.2	V.A.3 V.B.1.a V.B.3.c ORP 50 - 52
g. Recommended staffing levels in the most recent (outside contractor) study were based on incorrect assumptions on productivity.	41	C 1.1 C 2.1 C 3.1 C 5.1 C 5.2	V.B.1.a V.B.3.c ORP 51, 52
h. Staff productivity was not effectively measured or understood by management. Although the licensee identified inefficient work control processes as major contributors to the large work backlog, the MIS did not provide adequate measures of staff productivity. The maintenance required to complete SRs was not accurately measured and no system existed to measure engineering staff productivity. Additionally, the licensee did not account for all overtime worked by salaried employees.	41	A 1.1 D 1.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 F 1.1	Not Applicable
i. In addition to staffing based upon incorrect assumptions on productivity, the licensee generally appeared to be staffing based upon levels predicated on the station operating in a stable condition with only long term requirements and no significant backlogs or emergent workloads.	41	A 4.1 C 1.1 C 2.1 C 4.1 C 5.1 C 5.2 D 5.2 D 5.3 D 5.4	Not Applicable
j. Support of training, including funding, was weak.	41	A 4.1 C 1.1 D 4.1 D 4.2 D 4.3 D 5.2	V.A.3 ORP 50
k. The scope and duration of operations training was frequently altered to support manpower shortages in the plant.	42	A 4.1 C 5.1 C 5.2 D 4.1 D 4.2 D 4.3 D 5.2	V.B.1.a ORP 52

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l. Management did not adequately budget for or effectively manage spare/replacement parts.	42	A 4.1 A 4.2 C 1.1 D 5.2	V.C.8 ORP 88 - 89
m. Several problems identified by the team indicated that this system [master parts list] may have been based on an inaccurate economic model, coupled with errors in the plant labeling system.	42	See ORP	V.C.2 ORP 79, 80, 88, 89
n. It appeared that management considered the entire inventory as homogenous when assessing inventory turnover frequency rather than separating long-term strategic from rotating stock. When requested by the team to provide numbers identifying the turnover frequency of routinely used parts, it was apparent that these figures were not considered or monitored by STP.	42	A 4.2	V.C.8 ORP 88, 89
o. Station improvements were adversely impacted due to budget pressures. Examples: Plant Labeling Program; Engineering Improvement Program.	42	A 4.2 C 1.1 D 5.2 D 5.5	V.A.3 ORP 50, 79, 80
2.4.3 Communications and Teamwork Were Weak		**Management and Organization**	
a. Expectations regarding competing priorities between budget, schedule, and safety performance were not communicated well.	42	A 1.1 A 4.1 A 4.2 B 1.1 C 1.1 C 1.2 C 4.1 D 5.2 D 5.4 D 5.5	V.A.2 ORP 44 - 48
b. Vertical communications were particularly weak. Senior managers did not foster frank, open feedback from lower managers and staff.	42	A 1.1 B 1.1 B 2.1 D 5.1 D 5.2 D 5.3 D 5.5	V.A.2 V.A.3 ORP 45, 47, 48
c. Horizontal communications and interface problems added to the difficulty of completing work using established processes. There was a lack of coordination and accountability between disciplines during routine work. As a result, an excessive number of task forces, outside the normal organization, seemed to be required to accomplish work.	42	A 1.1 B 1.1 D 1.1 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5 F 5.2 F 6.1	V.A.2 ORP 47, 48
d. The level of routine administrative workload and the reactive mode of the organization tended to leave little time for communications and coordination within work groups and with other groups. This problem existed, to some extent, at all levels of the organization.	43	A 1.1 A 4.1 A 4.2 B 1.1 C 4.1 D 5.4	V.A.2
e. The team observed during meetings to discuss the Unit 1 workload and startup schedule that senior management did not appreciate the impact of their startup schedule expectation on the operations department workload and had not accurately weighed the competing priorities of safety and schedule adherence partly due to a lack of operation's input into the startup schedule.	43	A 2.1 C 1.1 C 4.1 D 5.2 D 5.3 D 5.4 D 5.5	V.B.1.a ORP 52
f. Management had failed, in some cases, to clearly define and communicate appropriate standards and priorities for personnel and plant performance. In addition, there were often conflicting messages sent in the implementation of these standards.	43	A 1.1 B 1.1 D 5.5	V.A.2
g. The threshold of SPR initiation and depth of root cause analyses were not well defined, and communicated to the staff. As a result, the quality of root cause analyses was often weak, but varied significantly between groups and individuals within a group.	43	A 1.1 B 1.1 E 1.1 E 1.2 E 1.3 E 1.4 E 2.1	V.C.1 ORP 78
h. The MOP goal of increased reliability was in conflict with the deferral of maintenance.	43	A 1.1 C 1.1 C 1.2 C 4.1 D 5.5 F 1.1	Not Applicable

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i. The team attended meetings where senior management dominated the meeting to such an extent that there was little communication except top down. On several occasions after senior management left the meeting, the team observed markedly improved communications and coordination.	43	A 2.1 B 1.1 B 2.1 B 3.1 B 4.1 D 5.1 D 5.3 D 5.4 D 5.5	V.A.2
j. Although both programs [Speakout and Employee Assistance] were supposed to be anonymous, there was a perception among many employees that these programs were not, which limited their effectiveness.	43	B 2.1 B 3.1 E 2.1	V.C.10 ORP 90
k. There was also a perception that management was not interested in hearing about problems as demonstrated by the lack of results when issues were brought forward.	44	A 1.1 B 1.1 B 2.1 D 5.1 D 5.3 D 5.5	V.A.2 V.A.3
2.4.4 Ineffective Corrective Action Process		**Management and Organization**	
a. Poor problem identification, shallow root cause analyses, inadequate safety impact evaluations, and lack of aggressive problem resolution, combined with poor information systems and budgetary constraints, resulted in short term rather than long term solutions to station problems.	44	A 4.1 A 4.2 C 1.1 C 1.2 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 E 1.1 E 1.2 E 1.3 E 1.4	V.A.3 V.C.1 V.C.5 ORP 50, 78, 84
b. The team found several examples where confusion and lack of training resulted in SPRs not being issued in a timely manner on safety-related equipment. The licensee's QA department had repeatedly notified management of a weakness in the definition of "conditions adverse to quality" which resulted in licensee personnel not being aware of when to write a SPR.	44	D 4.2 D 4.3 D 5.4 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4 E 2.1	V.C.1 ORP 78
c. Additionally, lack of effectiveness in reporting problems reflected workers' willingness to live with problems, due at least in part to conflicting management expectations and standards regarding material condition.	44	A 1.1 A 4.1 A 4.2 B 1.1 D 5.1 D 5.2 D 5.3 D 5.5 E 2.1 F 5.2	V.C.1 ORP 78
d. Several individuals outside of the CAG who performed root cause analyses had not been adequately trained. Also, in the case of engineering, individuals performing root cause analyses often were not knowledgeable on the system or component of concern.	45	D 4.2 D 4.3 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4 F 3.1	V.B.3.b V.C.1 ORP 65 - 75, 78
e. Additionally, until very recently, the licensee had not identified fatigue as a root cause of personnel errors.	45	D 5.1 D 5.3 D 5.4 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4	V.C.1 ORP 78
f. The team identified several instances where inadequate safety evaluations resulted in ineffective corrective actions.	45	C 2.1 C 3.1 D 4.2 D 4.3 D 5.5	V.C.1 ORP 78
g. The team identified several examples where timely and effective corrective actions were not taken.	45	D 5.5 E 1.1 E 1.2 E 1.3 E 1.4	V.C.1 ORP 78
h. Although senior management expressed the desire to become more responsive on corrective actions, it appeared from documentation and interviews that little progress had been made and that budgetary pressures had an adverse impact on corrective actions.	45	A 1.1 A 4.1 A 4.2 C 1.1 C 1.2 C 4.1 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4	V.A.3 ORP 50

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
i. The CAG had been budgeted to perform .... However, the current workload was more than twice this amount as well as additional scope.(paraphrased)	45	A 4.1 C 1.1 C 1.2 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4	V.C.1 ORP 78
j. The team found that the CAG had been funded by reducing or eliminating the corrective action funds of other departments. In fact, the corrective action workload had increased in maintenance, operations, and engineering since the establishment of the CAG. The limited staffing available for SPR review and root cause analysis had contributed to shallow and hurried efforts.	45	C 1.1 C 1.2 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4	V.C.1 ORP 78
k. The team found the CAG lacked ownership of the corrective action program with respect to the SPR reviews and root cause analysis not performed by CAG.	46	A 1.1 D 5.5 E 1.1 E 1.2 E 1.3 E 1.4	V.C.1 ORP 78
l. The effectiveness of ISEG in identifying root causes of problems and proper corrective actions was also limited. The scope and detail of work assigned to ISEG had exceeded the capability of the assigned staff to meet those functions required by technical specifications in a timely manner.	46	A 4.1 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5 E 4.1	V.C.1 ORP 78
m. Coordination of the OER program suffered severely from ISEG's overloaded and limited staff.	46	A 4.1 D 5.2 D 5.4 D 5.5 E 4.1	Not Applicable
n. Managements failure to provide more than the technical specification minimum staffing for ISEG and the frequent change or absence of ISEG directors were further evidence of management's lack of support for corrective actions.	46	A 4.1 D 5.1 D 5.2 D 5.3 D 5.4 D 5.5	Not Applicable
2.4.5 Ineffective Utilization of Self-assessment and Quality Oversight Functions		**Management and Organization**	
a. Managers did not respond effectively to the findings, concerns, and recommendations of their principal self-assessment and quality oversight functions, including the NSRB and QA. In addition, management had not fully supported the ISEG review for lessons learned.	46	A 1.1 A 4.1 D 5.1 D 5.3 D 5.4 D 5.5 E 3.1	V.A.2 V.A.3 ORP 44 - 50
2.4.6 Inadequate Information Systems		**Management and Organization**	
a. The computerized information system consisted of several non-integrated hardware configurations, including seven local area networks. There were also several uncontrolled computer programs utilized in the control room for various work control processes. There was no interactive interface between the different computers which meant that similar data was duplicated on different computers. This method of managing data was inefficient and increased the probability of error due to multiple entry at different time intervals. The team found that data in several areas was unreliable.	47	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2	V.B.1.b (4) V.C.5 ORP 55, 84
b. STP was experiencing significant delays in processing data from its main computer system due to hardware and processing limitations.	47 48	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2 D 5.4	V.C.5 ORP 84
c. The team identified and confirmed the following weaknesses in information systems: Equipment history records were incomplete and approximately eight weeks behind in being updated. This resulted in the licensee's tendency not to rely on these records.	48	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2 D 5.4 F 7.1	III.C.3.c V.C.5 ORP 27, 84

NRC DIAGNOSTIC EVALUATION TEAM REPORT OBSERVATION	DER PG.	ACTION PLAN	ORP
d. The team identified and confirmed the following weaknesses in information systems: The acquisition of parts information was cumbersome, slowing down maintenance work package preparation.	48	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2 D 5.4 D 5.5 F 6.1	V.C.5 ORP 84, 88
e. The team identified and confirmed the following weaknesses in information systems: The information system used for outage planning was not capable of performing assessments of critical path items.	48	C 4.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2	V.C.5 ORP 84
f. The team identified and confirmed the following weaknesses in information systems: Computer assistance to aid the system engineer in documenting and trending system performance and condition was not generally available. The licensee had purchased approximately 700 personal computers in 1992, however, most of these remained in the warehouse at the time of the evaluation.	48	C 2.1 C 3.1 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2	V.B.3.d ORP 71, 72
g. The team identified and confirmed the following weaknesses in information systems: The PRA database was not updated to reflect actual plant failure data.	48	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2	Not Applicable
h. The team identified and confirmed the following weaknesses in information systems: Information used to derive plant performance indicators was inaccurate and misleading.	48	C 1.1 C 1.2 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9	V.C.5 ORP 84
i. The team identified and confirmed the following weaknesses in information systems: Information to support management in budget justification was missing or inaccurate.	48	C 1.1 C 1.2 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.4 D 5.5	V.C.5 ORP 84
j. The team identified and confirmed the following weaknesses in information systems: Staff productivity measurements were nonexistent or misleading.	48	A 1.1 C 1.1 C 1.2 D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.2 D 5.5	V.C.5 ORP 84
k. The licensee was in the process of purchasing a new computer program directed at improving information systems. However, managements errors in establishing the current system were being repeated in the information improvement program in that input and feedback from end users was not being adequately incorporated.	48	D 3.1 D 3.2 D 3.3 D 3.4 D 3.5 D 3.6 D 3.7 D 3.8 D 3.9 D 5.3	V.C.5 ORP 84
l. Management's lack of support for information systems improvement was further evidenced by the failure to replace, in a timely manner, the manager responsible for the improvement program following his promotion to another on-site organization.	48	A 1.1 A 2.1 D 5.4 D 5.5	Not Applicable

FOCUS AREA INITIATIVES ACTION PLANS
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Focus Area	Action Plan	
Leadership and Management	A1.1	Establish and communicate goals.
	A2.1	Technical supervisory/people skill requirements.
	A3.1	Develop processes that are used to implement changes on site.
	A4.1	Balance between short-term costs and long-term investment.
	A4.2	Demonstrate a commitment to long-term improvement by investment in programs that have long-term benefits.
	A5.1	Identify inequities between organizations.
	A5.2	Employee Incentive Program.
	A5.3	Facilities and Work Areas equity.
	A5.4	Corporate and station policy application.
Communication and Teamwork	B1.1	Foster a culture and develop processes, promote station standards for communication and teamwork.
	B2.1	Increase individual involvement, improve personnel and customer involvement.
	B3.1	Develop the most effective communication tools for conducting business.
	B4.1	Implement a continuous improvement process.
Resources	C1.1	Planning/Budgeting guidelines.
	C1.2	Integrated management systems.
	C2.1	Clearly define responsibilities/site expectations for System Engineers.
	C3.1	Improve System Engineering organization performance.
	C4.1	Establish priority system(s) and scheduling support plan.
	C5.1	Short-term (prior to each unit start-up) Operator staffing.
	C5.2	Short-term and long-term operator staffing.
	C6.1	Cost-benefit analysis for a second control room simulator.
Human Performance	D1.1	Analyzing, improving, and maintaining effective work processes.
	D2.1	Administration, control, standards, etc. for STP procedures.
	D3.1	Establish a site Management Information Systems Users Group.
	D3.2	Long Range Information Systems Plan.
	D3.3	Local area network centralized databases.
	D3.4	Short-term Plan for automation and communication.
	D3.5	Long-term Plan for automation and communication.
	D3.6	Improve Information Systems business processes.
	D3.7	Information Systems end user training.
	D3.8	Ensure Station software is developed and maintained.
	D3.9	Data/Validation Control procedure for Databases.
	D4.1	Improve coordination between Plant and Training department.
	D4.2	Establish personnel training as a Station priority.
	D4.3	Develop and implement a long-range training vision and plan.
	D5.1	Improve environment promoting individual respect and teamwork.
	D5.2	Assess station philosophy regarding resources.
	D5.3	Improve morale and work ethics to enhance human performance.
	D5.4	Time management standards that promote human performance.
	D5.5	Philosophy promoting empowerment of employees/develop responsibility/ accountability.
	D6.1	Short-term Technical Specifications enhancement.
	D6.2	Long-term Technical Specifications enhancement.

Focus Area	Action Plan	
	D7.1	Evaluate existing external commitments.
	D7.2	Improve external commitment management process.
	D8.1	Consolidate and maintain the licensing and design basis of facility.
Self Assessment & Corrective Action	E1.1	Ensure adequate and effective problem identification, etc.
	E1.2	Ensure adequate and effective root cause analysis.
	E1.3	Ensure adequate and effective corrective action selection and implementation.
	E1.4	Ensure adequate and effective trend analysis and oversight.
	E2.1	Educate station personnel/correcting problems.
	E3.1	Culture that promotes continual self-assessment and problem correction.
	E4.1	Enhance site OER program.
	E4.2	Enhance vendor Technical Information program.
Material Condition & Plant Reliability	F1.1	Reduce backlog of material condition deficiencies.
	F2.1	Housekeeping and equipment/structure preservation practices.
	F3.1	Equipment failure/repetitive maintenance root cause analysis program.
	F4.1	Improve Preventive/Predictive Maintenance program.
	F4.2	Enhance reliability centered Maintenance program.
	F5.1	Enhance elements that facilitate quality work performance.
	F5.2	Enhance performance standards/measures/expectations.
	F5.3	Improve interface between Quality Control and Maintenance.
	F6.1	Improve work package planning process.
	F7.1	Backlog of engineering documents and unincorporated amendments.

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