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 MARTIN, J.B. Region 5 (Post 820201)

SUBJECT: Submits self-assessment rept re overall effectiveness of
 util programs/organizations for June 1989 to Jul 1990.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

October 1, 1990
G02-90-163

Docket No. 50-397

J. B. Martin, Regional Administrator
U. S. Nuclear Regulatory Commission
Region V
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596

Dear Mr. Martin:

The Supply System has recently completed a review of our performance in areas related to plant operations and support. This self assessment evaluated the overall effectiveness of Supply System programs and organizations relative to the operation and support of WNP-2 and covers the time period June 1, 1989 through July 30, 1990. Through the reporting requirements of the Code of Federal Regulations (e.g. 10CFR50.73, etc.), and the NRC inspection program, problems encountered in the operation and support of a nuclear power plant are routinely brought to the attention of the Nuclear Regulatory Commission and the public. Because these processes always focus on problems or things that have gone wrong, there is a perception that the operation is fraught with problems.

Our intent in this report is not to downplay or gloss over areas needing improvement, but to recognize that the rules under which we work require only that the negatives be reported. In order to provide a balanced view of Supply System performance, this report focuses attention on our accomplishments during the period. A summary of the performance assessment follows with additional detail provided in the attachment.

Summary of Significant Accomplishments

- **Power Generation** - During the period total power generation was 6.51 million megawatt-hours, a record production for WNP-2 operation. Additionally, the plant set a continuous generation record for WNP-2 of 203 days. A total equivalent availability of 71.0% was achieved, compared to an industry average of 65.2%.
- **Simulator** - A contract was awarded to the Westinghouse Electric Company to fabricate a new plant-specific simulator for WNP-2. This state-of-the-art simulator will be available in late 1991 and will greatly enhance the usefulness of the simulator as a training tool.

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- **Wide-Range Neutron Monitoring System** - The Supply System successfully qualified the WNP-2 wide-range neutron monitoring system to meet Regulatory Guide 1.97 criteria. This represents one of the first qualified wide-range neutron monitoring systems for a BWR.
- **Organizational/Personnel Changes** - A new Projects directorate was organized to focus management attention on several major programs which were previously part of the Engineering directorate. Mr. J. P. Burn, formerly the Director of Engineering, was assigned as the Director of Projects. In this capacity, he is responsible for the WNP-2 simulator, preservation activities related to WNP-1 and WNP-3, support of a Bonneville Power Administration request to use the WNP-3 main generator as a synchronous condenser and studies to define plant improvements which will increase the efficiency (obtain increased net electrical megawatts) of WNP-2.

The Engineering directorate is now under the direction of Mr. C. M. Powers, formerly the WNP-2 plant manager. With the creation of the Projects directorate, Engineering is able to concentrate its resources on those activities which directly support the operation of WNP-2.

Mr. A. L. Oxsen was promoted to the position of Deputy Managing Director replacing Mr. J. W. Shannon who has retired. Mr. Oxsen continues as the Acting Assistant Managing Director for Operations until a replacement is found.

Mr. J. W. Baker, formerly the Assistant WNP-2 Plant Manager, has been promoted to the Plant Manager position.

- **Turbine Rotor Replacement** - A contract has been entered into with Westinghouse Company to replace the existing low pressure turbine rotors with new integral disk design rotors. This new design is expected to eliminate blade cracking problems experienced in the existing design and also increase the electrical output of the generator. The new rotors will be installed in R-7 (spring 1992).
- **Industrial Safety** - The Supply System completed in excess of one million man-hours of work without a lost time accident. As of September 19, 1990, we have 1,780,000 man-hours toward two million man-hours worked without a lost time accident.
- **Total Quality Programs** - The Supply System's total quality program was introduced to employees at all levels through a series of two-day workshop sessions which brought together employee groups which deal with each other in a "customer-supplier" relationship. This was a

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continuation of a seven-day Quality Management Skills training course given to all managers and supervisors which started in calendar year 1988 and was completed during calendar year 1989. This training is being scheduled as needed on an ongoing basis to train new managers and supervisors.

Several quality action teams (QAT's) have been organized and given the responsibility for recommending solutions for specific problems. Recommendations from a QAT related to drywell access were implemented during the recently completed refueling outage. Feedback from plant and contractor personnel indicates that the recommendations were successful in eliminating previous problems with drywell access.

- Outage Performance - The annual WNP-2 refueling outage (R-5) began on April 20, 1990 and was scheduled for a duration of 45 days. Scheduled outage activities were completed on June 22, 1990, 63 days later, but the plant remained shut down until August 4 due to a bearing failure which occurred on May 30 during a functional test of one of the emergency diesel generators. The failure required removal and offsite repair of the generator. Testing of the generator rotor at the repair shop detected degradation of the rotor windings and a decision was made to rewind all eight rotor poles prior to reinstallation of the unit.

Overall, performance improved during the R-5 outage over past years. Generally, work instructions and work controls were better, teamwork and cooperation were improved and no significant rework was required for planned outage work. There were relatively few significant outage events (i.e. LERs) in R-5 compared with previous outages.

Diesel generator repairs were primarily responsible for the delay in plant restart following the outage. From a safety perspective, a conservative approach was taken during repair of the unit.

While continued improvement is needed, our overall assessment is that R-5 outage performance represented a significant improvement over past outages.

- Nuclear Safety - Nuclear safety performance was excellent during the evaluation period. Positive indications of nuclear safety performance include:
 - A total of only three unplanned scrams and two forced outages during the period.

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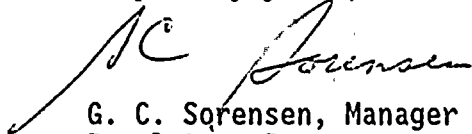
- No significant technical specification violations.
- No incidents that degraded safety to a material degree.
- No worker over-exposures to radiation and no release of radiation to the public.
- Both the total number of significant events and the number of events caused by "human error" were reduced from previous years.
- Performance Indicators - Performance indicators show improving trends in most areas. While improvement trends are notable, additional progress is needed in several areas in order to achieve excellence compared to other nuclear utilities.
- Problem Evaluation Report (PER) Process - The PER process is in its second year of use and continues to pay dividends. This process provides an opportunity for any employee to raise concerns on potential problems for management review. The problem reports are reviewed each morning by a committee chaired by the plant manager and including representatives from all organizations that could be affected by the problem or that could contribute to evaluation and resolution, including operations, maintenance, quality assurance, plant technical, licensing, chemistry, health physics and generation engineering. The composition of this committee provides for a diverse and objective evaluation of each problem and allows all potentially impacted organizations to provide input to assignments made for problem resolution. Through the PER process, all support organizations have the opportunity to become involved in the daily management of plant problems, thus fostering interorganizational communications and cooperation in problem resolution.
- Planning and Scheduling - A more effective planning, scheduling and work control program has resulted in improved execution of plant modifications, major maintenance and significant plant problem resolution. Improved planning has fostered better coordination between groups and accountability in performance.

The above provides a summary of some of the major accomplishments and undertakings since the beginning of the current SALP period. The enclosure provides details with respect to the various functional areas. Through increased management involvement we have seen a significant improvement in

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plant performance, adherence to procedures and safety. We appreciated the opportunity to meet with you and your staff to discuss these improvements on August 30.

Very truly yours,



G. C. Sorensen, Manager (280)
Regulatory Programs

GCS:lg
Enclosure

cc: P. L. Eng/NRC
N. S. Reynolds/BCP&R
D. L. Williams/BPA/399
C. Sorensen/NRC Resident Inspector/901A
NRC Document Control Desk

ATTACHMENT

I. SUPPLY SYSTEM PERFORMANCE EVALUATION BY FUNCTIONAL AREA

A. Plant Operations

During this evaluation period, the plant experienced fewer operational events than past periods and enjoyed a record operating run of 203 continuous days. Plant management took an active role in addressing problems and assuring that personnel at all levels were aware of management's expectations. The initiation of the Management Review Committee (MRC) provided a process for the plant manager and his direct reports, as well as support organizations, to become aware of issues or events that had occurred since the previous day and provide their input for assignment and resolution.

When confronted with operational issues, plant management has taken a conservative approach. Examples are the decision to rewind the emergency diesel generator and the plant shutdown when a 480 volt motor control center design deficiency was discovered.

During R-4 (Spring 1989 outage), the plant experienced a large number (11) of inadvertent shutdown cooling isolations. Management action taken during this year to assure that this was not repeated in R-5 included a review (and revision where necessary) of procedures to assure they were clear and could be accomplished without creating problems, added training for the craft, full time supervision of critical surveillances and an in-depth review of surveillance practices. Action taken resulted in a significant reduction in the number of shutdown cooling isolations during R-5 (4).

All the elements of an integrated procedural development program have been conceived and set in motion. These elements include definitive administrative guidance, significant operational involvement and the required computer hardware. This integrated approach, coupled with the present level of effort can be expected to render procedures which are well human factored and both administratively and technically correct. The operations department is committed to utilizing the procedural process as an important vehicle to implement management's expectations. In addition, the necessary linkage has been established between the plant procedure development process and operator training. This includes effective use of the training update system and examination maintenance process. This will assure any procedure changes will be analyzed and incorporated, as needed, into the appropriate training forum. The elements of this program include:

- Procedure Development Process - The experience gained in the procedure development process for the Emergency Procedure Guidelines (EPG)-Rev IV has been refined and incorporated into a comprehensive procedure verification/validation administrative process. A procedure is initially authored utilizing a procedure writer's guide. Writers guide compliance provides assurance that the

procedure is correctly formatted and human factored and all management expectations for procedural execution are reviewed for applicability. The procedure is then independently verified and validated to ensure it is both technically and operationally correct. This involves significant multi-departmental review and a comprehensive field walkdown. All discrepancies identified in this process are documented and resolved prior to procedure issuance.

- **Computer-Based Process** - The procedure development effort has been significantly enhanced through the procurement and utilization of the latest procedure computer software. Key department personnel are being trained in its use and application by various software suppliers. The use of individual computerized work stations has increased both the throughput and quality of the process.
- **Department Personnel Involvement** - The procedure development group is presently comprised of a licensed control room supervisor, two licensed reactor operators, a clerk and two industry consultants (who specialize in procedure development). In addition, a significant number of dayshift relief personnel are utilized to support the technical needs of the verification and validation process. Utilizing shift personnel on a continuing basis promotes ownership and sensitivity to the complexity of procedural development and the rigor required by the process.
- **Training Update Interface** - All procedure changes, both revisions and deviations, are screened for training applicability by the procedure development group. This screening includes an analysis of importance, frequency of action and difficulty in execution. Those changes which mandate training will be incorporated in the applicable training medium and tracked via the training update system. The training update system is a computer-based tracking process which tracks training commitments from conception to execution.
- **Licensed Examination Update** - A computerized process to update licensed examination material when plant procedure manual (PPM) changes mandate has been developed and implemented. All examination questions and their associated answers are tied to the PPM numbering system. Whenever a procedure change is made which may impact examination criteria, the associated questions are flagged. Prior to use of any examination question a review is initiated to assure all reflected information is current and applicable.

The operations department is committed to effective interdepartmental communication. The intent is to have all issues or concerns and their associated resolution understood. These issues have included, among others, management expectation with regards to procedural adherence, health physics practices and event followup. A broad spectrum of forums to communicate has been selected including:

- **Simulator Oversight** - Operations management is consistently involved with the simulator examination process. This allows for a review of crew performance and an opportunity to convey management's expectations on any number of operational concerns. It should be noted, credit has been given to crew performance during simulator examination by both INPO and NRC.
- **Management Update Meetings** - Each week operations management meets with the crew scheduled for training. These meetings are formatted to promote a balanced exchange between shift personnel and management. A broad range of issues is typically discussed during these exchanges, including problem evaluation report (PER) mandated followup, NRC concerns, plant issues and events, and training initiatives.
- **Training Cycle Review Meetings** - At the completion of each training cycle, a meeting is held with licensed training personnel. Any issues involving the previous cycles are discussed and resolved. The upcoming cycle is reviewed for content and resource availability. Any issues which need training support are discussed at this time to assure timely and appropriate incorporation into the program.
- **Observation/Evaluation Program** - This program provides a process to review and document program implementation by both management and supervision. All comments are reviewed and discussed on a continuing basis with corrective action assignments made. The program involves the implementation of our performance based training program.
- **Management Involvement** - Operations management is consistently involved with and oversees plant operational activities. It is an operational policy to be on site during all significant preplanned plant maneuvering. This includes all startups, shutdowns and significant testing. Management meets daily with each of the three shift crews to assure operational continuity and provide for timely problem resolution.

Significant initiatives and accomplishments within the plant operations department include:

- **Establishment of a Six-Crew Shift Compliment** - Approximately a year ago, the operations department went from a six-crew rotation to five crews to strengthen each crew. With additional personnel available, the sixth crew has been re-established. This allows for a reduction in overtime, better support of training, plant procedure verification and validation involvement and support for the simulator effort.
- **Continuation of the Clearance Order Review Committee** - This group was established in 1988, following a "near miss" electrical problem. Their function is to review all work

requests for clearance orders and assure that clearance orders are used where required.

- Successful Implementation of Operator License Renewal Process.
- Successful Completion of Re-Accreditation Process.
- Implementation of Integrated Procedure Revision and Development Process.
- Completion of the First in a Series of Self-Evaluation Reports Based on INPO Performance Criteria.
- Development of Six Performance (Systematic) Based Training Programs:
 - Equipment Operator Initial (with Job Task Analysis [JTA])
 - Equipment Operator Continuing (with JTA)
 - RO/SRO Initial (with JTA)
 - RO/SRO Requalification (with JTA)
 - Shift Support Supervisor Training Program (with JTA)
 - Refuel Training Program (with JTA)
- Hiring of Twenty-Four New Equipment Operators.
- Commencement of a Hot License Training Class for Operators.
- Implementation of an Operations Liaison to the Outage Planning Group on a Rotational Basis.
- Successful Development and Implementation of Emergency Operating Procedures per Revision 4 of the Boiling Water Reactor Owner's Group Emergency Procedure Guidelines.

While a definite improving trend was observed in the plant operations area during this period, a 25KV grounding incident while attempting to backfeed the plant from the offsite power supply pointed out the need for continued attention to detail. This event occurred because of communication deficiencies, a lack of understanding of the placement of temporary grounding straps on both sides of the disconnect links and a failure to walk down the system prior to energizing the bus. Following this event, management and plant staff acted promptly and conservatively to investigate and take corrective action.

B. Radiological Controls

Improvement has been noted during this period in several measures of radiological protection performance. Improvement initiatives during this period centered on issues raised by the previous SALP report, including:

- improving compliance to radiological programs by workers by strengthening health physics practices training for supervisors and craft;
- increasing health physics technician and station supervision time in the field;
- improving posting of radiation areas;
- increasing the use of pre-job briefings with crafts to increase knowledge of ALARA considerations and RWP requirements; and
- improving radiological training.

In addition, greater emphasis has been placed on performance trending to identify areas that require management attention; for example:

- monthly performance trend reports are provided for six critical plant groups. These reports are discussed with the affected groups during regularly scheduled safety meetings. These forums provide information interchange between crafts and the health physics organization;
- a full-time staff member was again devoted to radiation protection performance trending during R-5 to identify areas requiring immediate attention. This effort provided the basis for health physics action to correct adverse trends caused by incorrect protective clothing assignment;
- radiation protection trends are discussed at the plant manager's staff meetings on a monthly frequency to provide plant management sensitization and to disseminate expectations down through the organization;
- health physics supervision attends advanced radiological training sessions to provide plant perspective on current trends. This has been an effective method of communicating radiation protection issues during the training experience;
- the health physics sponsor program continues to be an effective tool in fostering improved performance by allowing a constructive interface between health physics and the plant staff; and
- training improvements include full implementation of the revised Advanced Radiological Training for Supervisors. This course requires attendees to prepare ALARA scope sheets and initiate RWPs using simulated work packages. The quality of submittals in actual use has improved as a result of this training.

In addition to these items, WNP-2 has acted proactively to effect improvements in radiological controls as follows:

- advanced radiological training for crafts is more focused on simulated activities and review of WNP-2 and industry experience in radiation protection;
- subject matter experts have been designated for review of radiological training materials. These individuals function to review material for technical accuracy and relevance to current plant issues;
- a quality action team (QAT) was commissioned to resolve problems associated with accessing the drywell during refueling outages. This team successfully redesigned the access process in a way that also enhanced contamination control and helped minimize dry active waste. The plant manager has requested that a QAT also address the issue of improving compliance with health physics program controls;
- changes in the organization of the health physics/chemistry department are currently being formulated that will provide more focus to health physics performance and radwaste issues; Significant improvement will result in the area of health physics planning; and
- a senior site ALARA committee has been authorized and its operating charter is under development. This committee will be chaired by the plant manager and be comprised of each of the plant department managers, in addition to representation by radiological programs and technical training. The primary functions will be to provide direction to the existing working level ALARA committee, ensure resource allocation, develop plant ALARA goals and monitor performance trends.

Performance monitoring always provides the best feedback on the effectiveness of corrective actions. The following information provides an overview of some of the important performance measures.

Personnel Exposure

Prior to R-5, WNP-2 operating exposure continued its downward trend (17.2 man-rem per month in 1988, 15.1 man-rem per month in 1989, and 13.4 man-rem per month for January/February/March 1990). This performance is related to plant reliability, reduction in routine turbine tours by operations and better coordination of the work control process.

The station goal for R-5 was 300 man-rem. Actual exposure is estimated to be approximately 412 man-rem.

Not reflected in the original goal was repair of the RRC-V-60A valve and the unexpected extension of the outage to effect repairs to an emergency diesel generator. If the exposures associated with these impacts are deducted from the total (27 and 73 man-rem, respectively), R-5 would have been completed for 312 man-rem.

It is believed that the controlled shutdown sequence, first used this outage, was effective in minimizing the escalation of recirculation loop dose rates. Modifications to the control rod drive (CRD) rebuild room and use of the undervessel ALARA shields reduced the total exposure associated with CRD work from 2.88 man-rem per drive to 1.77 man-rem per drive.

As a result of improvement initiatives in the above areas and increased attention by management, outage tasks with the potential for significant exposure were handled well. During R-5, RRC-V-60A corrective maintenance was one such job. This task received extensive ALARA planning, effective health physics monitoring, and effective execution by maintenance personnel. As a result, exposure was minimized and the dose received was in close agreement with the planned dose estimate. During R-4, the removal of the bottom head drain line "hot spot" was handled similarly with a cost of 18.4 man-rem compared to the 18.2 man-rem estimated during planning.

The plant continues to implement improvements in major recurring activities that contribute significantly to personnel exposure. Considerable resources, for example, were expended during this period to improve the CRD overhaul process. The result was a decrease of 33 percent in man-rem expended per CRD overhauled.

The number of skin and clothing contaminations improved over the previous SALP period but continues at an unacceptable rate. Skin contaminations decreased by 16 percent (108 in R-4 and 91 during R-5) and clothing contaminations decreased by 44 percent (294 in R-4 and 160 during R-5). However, the total skin and clothing contaminations of 309 for fiscal year 1990 compares unfavorably with the INPO median value for fiscal year 1989 of 163 and continued efforts are being made to drive the number down.

Health physics technicians availability and active involvement in support of outage tasks was much improved and the performance and attitude of temporary health physics technicians was improved over past outages. New measures to speed up drywell access while still providing appropriate radiological protection controls were effective. In addition, only a couple of incidents of posting problems surfaced. This has been a frequent problem in the past.

Active involvement by health physics was noted during the R-5 outage when a health physics technician stopped all work on the refueling floor when he believed the number of people and the level of activity on the refueling floor was beyond the level that the available health physics technicians could successfully control. It was his assessment that pre-planning for several activities had not been adequate and that contamination control was threatened (several personnel contaminations had already occurred). The refueling floor was cleared, the area surveyed, necessary decontamination was performed and re-access was established following review of each work activity by the lead health physics technician.

While improvement initiatives have resulted in improvements in certain aspects of radiological control, we continue to find examples of past problems such as lack of respect for contamination area boundaries, poor frisking practices, failure to return posting signs after passage, failure to contact health physics prior to starting work on a contaminated component or when conditions change and improper donning and removal of anti-contamination clothing. These problems, while decreasing in frequency, still occur at an unacceptable level. Management attention continues to be directed at this issue in an effort to continue improvement. Table 1 provides a summary of the rate of radiological occurrences.

C. Maintenance/Surveillance

This functional area saw a number of improvement initiatives during the period. A discussion of these initiatives was a major part of the Supply System/NRC SALP status meeting held at the Region V offices on January 18, 1990. Based on internal assessments, improvements were noted in the period related to work package content, the staging of parts for outage work, craft supervision time spent in the field, the effectiveness of area coordinators in maintaining cleanliness and a decrease in non-outage maintenance work requests. A notable improvement in performance was evident during the R-5 outage with no significant rework required and improved teamwork and cooperation.

In May, the Supply System and a contract team began a thirty (30) month effort to upgrade the preventive maintenance program based on reliability centered maintenance (RCM) concepts.

The overall competence in the maintenance area is considered to be a strong point. The initiatives to strengthen management and supervision have produced positive results as evidenced in the R-5 outage. Previous SALP reports have identified problems with less than adequate work controls and inadequate procedures. While improvements have been noted in both areas, it is clear that continued attention is required. During the past year, the procedure writer's guides have been completed and a procedure writer's group has been established. Approximately ten percent (10%) of the maintenance procedures have been rewritten. The goal of this group is to rewrite all maintenance procedures over a two-year period.

Near the close of this evaluation period, a plant technician performed unauthorized work on a temperature detector, underscoring the need for continued attention to control of work. On the positive side of this event, management took prompt corrective action and a thorough investigation was conducted, including sampling other work performed by this technician, as well as work performed by other technicians. An NRC maintenance team inspection conducted during the period May 21 through June 5, 1990 concluded that while "the overall maintenance program for WNP-2 appeared to be adequately defined and addressed current industry maintenance program initiatives", continued management efforts were strongly encouraged. The maintenance team noted that many of their

TABLE 1

RADIOLOGICAL OCCURRENCE REPORTS

Rate of Occurrence

CY 1988	1.02 Events Per Week
CY 1989	0.75 Events Per Week
CY 1990 (To Date)	0.80 Events Per Week

Outage Performance

RF-88A	4.10 Events Per Week
RF-89A	2.00 Events Per Week
RF-90A	1.50 Events Per Week

ANALYSIS BY CAUSE CATEGORY

Failure to Adhere to Program Controls

CY 1988	0.38 Events Per Week
CY 1989	0.23 Events Per Week
CY 1990	0.17 Events Per Week

Poor Radiological Work Practices

CY 1988	0.31 Events Per Week
CY 1989	0.11 Events Per Week
CY 1990	0.11 Events Per Week

observations were in agreement with the results of Supply System self-assessments.

Previous NRC SALP reports have cited programmatic concerns for plant material condition and work backlog, work control process inadequacies in content, detail and rigor, procedural inadequacies including over-reliance on "skill of the craft" to compensate for weaknesses in procedures and deferral of long-term corrective maintenance activities.

Over the past 12 months, WNP-2 maintenance has evaluated its performance and reviewed the evaluations provided by others and concluded that the department has not kept pace with changes in the industry and that change is necessary.

A number of changes have been initiated over the past year to resolve these shortcomings and efforts are continuing to complete and implement these changes. A brief summary of the issues and methods for resolution, including progress to date and future planned actions, are included.

- Maintenance Work Request (MWR) Overhaul - The MWR process has been completely overhauled with every aspect of the needs and requirements of the process reviewed. This new process was implemented August 6, 1990. Some specifics include:
 - work process breakout into two separate procedures;
 - elimination of the "vital" work request;
 - greater emphasis on detail with standard sections required for each set of work instructions;
 - requirements for personnel sign-off of all action steps (one-over-one craft sign-off of key critical steps);
 - requirement for craft feedback built into each package;
 - increased emphasis on problem identification and failure cause documentation;
 - detailed training on the process provided to Supply System, contractor engineering and craft personnel prior to implementation (347 people);
 - installation of computers in each shop prior to implementation; and
 - ongoing evaluation of the new process to evaluate effectiveness and the need for further change.
- Institution of a Work Control Group - A work control group has been established at the plant in the planning and scheduling department

with membership from maintenance, operations, health physics and planning and scheduling. Basic goals and activities of the group include:

- development of a demand schedule for the plant;
- coordination of maintenance, operations and health physics activities on a daily basis;
- serving as the focal point for coordination and implementation of the outage plan during forced and planned outages; and
- minimizing the challenges to the operating crews for performance of daily plant maintenance activities.

The value of this group was demonstrated during the recent refueling outage by the successful implementation of the outage plan. The basic goals and objectives of the outage were met with significant improvements in execution of maintenance and modification activities.

- Procedure Upgrade Program - The procedure upgrade program has been instituted in the plant to improve the content and quality of maintenance, operations and health physics/chemistry procedures. Within maintenance, the following activities have been completed or are currently underway:

- a group of six people along with a supervisor assigned full time to procedure development;
- the schedule for this effort spans a 30-month time period beginning January 1990;
- computers have been installed to assist in the development of standardized procedure packages;
- a verification and validation process has been developed and is currently being implemented in the upgrade process;
- training in human factors techniques specific to procedure development has been provided to these personnel; and
- new requirements for procedures are being identified to help eliminate the over-reliance on craft skills within individual maintenance discipline shops.

- Plant Material Condition/Work Backlog - Significant steps have been taken over the last 12 months to improve the preventive maintenance (PM) program for the plant with the goal to better direct maintenance activities to improve plant/system availability. These include:

- the specification, bidding and award of a contract for performance of a review of the WNP-2 PM program utilizing reliability centered maintenance (RCM) techniques;
- the development of a PM group including a supervisor and three full time personnel within the maintenance department to work with the RCM contractor to implement PM program changes;
- RCM contractor mobilization on site in May; and
- contractor review of the first three pilot systems underway with recommendations for the first system expected in September.

The contractor is currently ahead of schedule. His efforts will be continuing over a 30-month period with program results implemented as they are developed and approved. Thus, at the end of the 30-month period, the entire PM program will be revised and implemented. This effort represents a significant expenditure in both Supply System manpower and dollar cost. The benefits of the program will be far reaching, including areas such as plant performance monitoring and component condition monitoring, as well as in the more traditional areas of preventive maintenance activities.

■ **Maintenance Department Goals and Objectives** - The maintenance department has established goals and objectives which include specific objectives in the area of material condition improvement. These include goals for:

- the reduction of control room deficiencies to no more than 25 total following the R-5 outage. This goal was met with the total below 15 by the end of the R-5 outage;
- reduction of the non-outage MWR backlog to a total of 600 for the period mid-December through mid-March. This goal was not achieved for the entire time period; however, it was achieved in March. (It is also important to recognize that approximately 400 work requests are generated each month which includes modifications, planned maintenance, and fabrication, as well as corrective maintenance);
- the development of a critical steam leakage list for forced outage activities; and
- the development of all the necessary pre-planning, parts and work packages necessary to ensure the plant can be successful in execution of maintenance activities for unplanned forced outage work. This goal was achieved with over 95% of the forced outage work statused "ready to work".

■ **Deferral of Long-Term Corrective Maintenance Activities** - Through the newly instituted work control process, better focus has been established on working the critical plant problems on a daily basis.

In addition, significant accomplishments have been realized over the past year including reductions in drywell leakage and condenser in-leakage, as well as main steam isolation valve modification completion, main steam relief valve rebuild program implementation, motor operated valve testing and rebuild program implementation, installation of a new relief valve test facility to better implement the plant's testing program and ongoing efforts to maintain the CRD drive system through the hydraulic control unit and control rod drive mechanism rebuild program.

- **Future Challenges** - The WNP-2 maintenance department has made significant progress in the identification of those areas where shortcomings have existed in the past. Programs have been developed to address those concerns described. The challenge remaining for the department is to complete the implementation of these initiatives and develop a method of monitoring future maintenance effectiveness making the necessary course corrections to achieve department and plant goals.

D. Emergency Preparedness

The emergency preparedness program continues to provide the necessary preparation, direction and organization to effectively resolve any plant emergency to ensure the safety of the general public and to safeguard plant personnel and property.

The emergency planning organization is aggressive in identifying program improvements and in taking corrective action on weaknesses identified by the NRC and Supply System internal assessments. During the period under evaluation, the emergency planning organization implemented the following initiatives to correct identified problem areas:

- higher power radios purchased for field teams;
- cellular phones in field team vehicles;
- procedural improvements to make classification of an emergency more "user friendly";
- improved drill controller communication network; and
- initiation of a root cause analysis to improve a communication timeliness problem at the Joint Information Center (JIC).

The emergency planning organization took the initiative to resolve a long-standing FEMA issue related to dosimeters for county emergency workers. This equipment was to have been provided by the state, but for various reasons, the purchase had been delayed. The Supply System purchased the needed dosimeters and they have been delivered to the counties.

Emergency planning continued to receive senior management support through their involvement in drills and exercises and resource allocation. During the past year, a full time JIC director has been added to the staff of the public information director in an effort to correct weaknesses in operation of the JIC. Although outside the evaluation period, the recently completed (September 11, 1990) annual emergency exercise received good review by NRC and FEMA evaluators.

E. Security

The security organization exemplified effective planning for future changes and aggressive management action to identify and correct potential problems. Significant actions taken by security during the evaluation period included:

- reducing the number of loggable events associated with equipment failure from 1,336 for fiscal year 1989 to 509 for fiscal year 1990;
- conducting quarterly meetings, based on recommendations of NRC Information Notice 90-13, "Importance of Review and Analysis of Safeguards Event Logs", to review trends and determine course of action to correct any identified problems. Event logs are reviewed on a weekly basis to identify trends and take corrective actions;
- maintaining quarterly maintenance trend analysis for WNP-2 security systems. The analysis identifies security system problems by tracking failure rates for all system components. Problem areas are then prioritized for allocation of maintenance/replacement resources;
- initiating a security system engineer and maintenance personnel work group meeting (February 1990) which is held weekly to discuss problems and/or preventive maintenance actions or modifications for enhancement of system operation;
- completing engineering review of vital area penetrations;
- reducing the number of loggable events requiring compensatory measures from 2,132 in fiscal year 1989 to 783 in fiscal year 1990;
- rotating security force lieutenants through security programs, safeguards, investigations, security training and other Supply System disciplines during a 30-day orientation period to get a better understanding of how each group supports each other;
- completing a site familiarization tour of a Region V operating nuclear power plant. This provided security force supervision an opportunity to interface with other nuclear security professionals, exchange ideas and look at different types of security equipment;
- developing a trending database which will be used for trending purposes and enhancing planning and forecast abilities. Items such as security equipment malfunctions, compensatory posting of security

officers, outage posts and hours assisting operations personnel have been entered since January 1, 1989;

- providing advanced response team training for all security sergeants and lieutenants. Subject matter consisted of tactical weapons firing, use of response equipment and initial denial plan briefing. Also, five supervisors received additional training in dynamic building entries, team movement and concepts, planning and developing response team training, and practical exercise in the CS gas environment;
- converting an old ambulance into a mobile command center. The vehicle is equipped with tactical response gear/weapons, communications, safeguards contingency plans and wall-size drawings depicting areas of highest vulnerability. The mobile unit can be driven within close proximity of a given emergency and have command and control of the operations established;
- providing additional training for all security personnel on search area vulnerabilities identified during the RER visit in October 1989. Part of the training consisted of a video tape made to specifically point out potential weaknesses in processing personnel through the search equipment and methods of operation for the detection of someone attempting to defeat the search equipment;
- establishing cash incentives for demonstrated levels of physical fitness and annually giving a squad trophy to the squad that cumulatively scores highest on periodic unannounced tests, including written, oral and weapons proficiency;
- installing spring-loaded door hinges on the diesel generator and spray pond pumphouse cardreader doors to alleviate the air pressure problem;
- constructing and installing ramps at walk-through metal detectors to increase detection capability;
- installing a radio antenna to eliminate radio deadspots in the plant;
- designing and funding a second protected area barrier which will enhance detection, delay and assessment capabilities. Barrier installation is scheduled to begin November 1990; and
- computerizing key and lock control records for approximately 2,000 keys and locks used at WNP-2.

In addition, other improvements recommended by the RER have been implemented to improve security response to a potential threat against the plant. With the completion of the new Plant Engineering Center in the Spring of 1991, a new alternate access point using state-of-the-art equipment will be activated, improving the ability to process personnel

into and out of the protected area during outages and other peak work times.

F. Engineering/Technical Support

The engineering/technical support function has shown continued improvement during this evaluation period. A major "engineering improvement plan" (EIP) was initiated in 1988 and will be completed in 1991. In addition to the EIP, Supply System engineering is also implementing the configuration management improvement plan and the design requirements documentation program. Each of these activities represents a significant resource commitment and is aimed at improving the overall quality of engineering support for WNP-2.

A significant improvement during this evaluation period was the hiring of a technical support contractor (Bechtel) to provide additional technical resources to the engineering and technical support function. This contractor is being used to reduce the backlog of important tasks and to supplement Supply System staff in improvement areas such as the design requirements documentation program, licensing commitment log program, configuration management and setpoint program. Other recent initiatives include:

- Upgrading the 50.59 Safety Evaluation Process - A multi-directorate committee is currently finalizing procedure changes addressing improvements for compliance to NSAC-125 and implementing a comprehensive training program.
- Maintenance of Configuration Control - The major areas of current activity are in the completion of a pilot program for the standby liquid control system to identify hardware and associated documentation for configuration control, continuing the development of electrical wiring diagrams, improvement of electrical calculations, development of a licensing commitment log, correction of top tier drawings and definition of engineering backlog.
- Upgrading of Procurement Procedures - The newly formed materials and spare parts group in engineering is actively addressing procedural improvements.
- Procedural Compliance - Engineering continues to dedicate resources to the procedure advisory committee and the design review board which are both heavily involved in the various aspects of procedural compliance and related aspects of procedural improvement.
- Design Calculation Improvements - The electrical calculation improvement program, harsh environment setpoint program, the Bechtel calculation assessment, a revised calculation procedure, and development of a computerized calculation cross reference system are examples of current activities intended to further improve the calculation design data base.

- **Testing and Modification to Design Requirements** - Although testing remains primarily a technical staff responsibility, testing requirements which confirm design basis values or requirements are included in design change packages.
- **Design Verification of Engineering Products** - Design verification and checking requirements continue to be clarified and the process improved. Scheduling, for example, now includes specific time estimates and identification of verification and checking personnel as an integral part of the design process. A design input has been incorporated into the process to consolidate design input requirements which will enhance the ability of verifiers to determine adequacy of designs.

During the evaluation period, organizational changes included the formation of a spare parts engineering department to increase the focus on technical adequacy of commercial grade procurement. With the adoption of the NUMARC initiatives in this area, the Supply System will increase vendor audits and add staff and equipment in the receiving inspection area to enhance our ability to detect non-conforming components. Engineering and quality assurance personnel have maintained an active role in a number of industry groups developing guidance related to procurement issues.

A significant organizational change that occurred in July was the creation of a new projects directorate under the direction of Mr. J. P. Burn, formerly the engineering director. The director of projects will be responsible for several existing and emerging programs which had previously been a part of the engineering directorate. Mr. C. M. Powers, formerly the WNP-2 plant manager, has been assigned as the director of engineering. Mr. Powers will retain the engineering responsibility for support of WNP-2. With his extensive operational background, the addition of Mr. Powers to engineering should do much to enhance the tie between the plant and engineering.

Engineering continues to direct staff efforts to further improve the design change process and maintain the effectiveness of those improvements already implemented. The continued efforts of the procedure advisory committee directly result in many such improvements. A number of other activities such as the modification review committee (which involves all organizations affected by any design change) continues to meet at least twice on each design change - once at initial planning and again just prior to issuance of design. These ongoing efforts, along with continued training, increased system familiarity by engineers, and a continued reduction in the more serious plant operational problems experienced since plant startup, demonstrate a more thorough approach to improvements in the design change process. Performance should be expected to continually improve. The large and very visible changes which resulted from previous efforts such as the EIP should not be expected in the future; instead, minor improvements will probably be the result of the continued efforts to improve the process.

In addition to the day-to-day involvement of engineers in plant operation, the well established practice of involving as much engineering staff as necessary on any specific problem continues. Normally, the technical staff takes the lead in requesting specific engineering help and the assignment of work tasks. This relationship ensures that as much resource as needed is dedicated to any one task. The process also ensures that the roles and responsibilities are well defined. Engineering management involvement in the daily review of plant problems as a member of the management review committee and engineering's role on the technical review committee for root cause activities has improved overall plant support. Specific recent examples of this practice include the turbine generator rotor repairs, inspections, replacement and testing; diesel generator bearing and rotor repairs; splice evaluation and repairs on the containment monitoring system temperature elements; spray pond corrosion repairs and preventive action designs; secondary containment design basis issues, related plant testing and operational procedure changes; redesign of the CRD repair/rebuild facility; and the acoustic monitor evaluation and calibration.

G. Safety Assessment/Quality Verification

This functional area has implemented a number of improvement initiatives during the evaluation period. Notable improvement initiatives include:

- **Assessment Planning/Coordination** - The three departments within licensing and assurance that perform verification activities have instituted a mutual planning process to insure coverage of all areas, to minimize overlap and to focus activities on the most important issues/areas. The process involves quarterly planning meetings and will provide the platform for use of reliability/risk based assessment planning methods.
- **FSAR Text Search** - A full text computer search capability of the FSAR and tech specs has been placed on a local area network (LAN). This system provides a rapid search of the entire FSAR and tech specs for any word or combination of words to assist in the performance of 50.59 evaluations, identifies licensing commitments and assists in FSAR updates. Work is now proceeding to place the docket file on this same system.
- **Annual Report** - The licensing and assurance organization initiated an annual report, providing a summary of plant and organizational performance based on internal quality assessments and data analysis. The main purpose of this report is to identify areas for management action which will result in improved future performance.
- **Tech Spec Improvement Program** - The Supply System has initiated work on improved technical specifications for WNP-2, following the generic work performed by the BWR owner's group. The improved tech specs are scheduled to be submitted for NRC review in March 1991.

- **Quality Improvement Program** - Supply System management has initiated a quality improvement program which has several features that have been already implemented or are in process to improve the quality culture of Supply System employees. This program involves training for all Supply System employees, the formation of quality action teams, the formation of a quality council consisting of senior management and a process to evaluate and measure the effectiveness of the overall program.
- **Effectiveness Assessment Program** - Supply System senior management implemented an effectiveness assessment process which reviews performance in 13 key functional areas on a periodic basis. Effectiveness assessment plans are routinely approved by the quality council (i.e. Supply System senior management) and assessment results are reviewed by the council when assessments are completed.

Actions have also been taken to correct weaknesses identified in prior NRC SALP reports as follows:

- **Quality of Licensing Submittals** - A review was performed of all licensing submittals from the start of the previous SALP period (June 1, 1988) through the end of calendar year 1989. The purpose of this review was to identify any issues or concerns raised by NRC reviewers and determine what lessons could be learned to apply to future submittals. In addition, the WNP-2 licensing manager has held regular (~ quarterly) meetings with the NRC project manager to discuss, among other things, the quality of licensing submittals. To date, we have received no negative indications through these discussions.
- **Effectiveness of the Root Cause Assessment Program** - An organizational change in August 1989 combined the functions of industry operating experience review, human performance enhancement and WNP-2 event assessment under a single manager. The stability of the organization has also improved as evidenced by a low turnover rate during the past year. This organizational alignment is consistent with the INPO guidelines. We believe these changes have assisted in improving the timeliness and thoroughness of root cause analyses.

A training program was developed and initiated for training staff of line organizations for performance of category 3 root causes on a consistent and thorough basis. To date, approximately 100 staff have been trained with additional staff scheduled to be trained.

- **More Aggressive in Performance of Safety Oversight Activities** - Combining the operational assessment and engineering assessments staff under a single manager has helped provide more focus on performance of assessments in priority areas, including team activities involving interfaces between engineering design and operational and maintenance activities. A second self-initiated SSFI (AC electrical distribution system) was completed and outage

modification inspections during R-4 and R-5 were completed using inspection teams. Additional attention is now being focused on evaluating whether the plant is being maintained in a safe condition during outage maintenance and modification installation conditions.

Two personnel were added to plant QA who have operational experience at other nuclear plants. In addition, the staff of licensing and assurance was upgraded in other organizations to include WNP-2 operational experience which can be used to supplement the plant QA staff as needed. Additional staff were added in the plant QA area to also add expertise in health physics and chemistry areas.

- **Quality of the NSAG Monthly Report** - The report content was modified to provide additional technical detail concerning reviews and evaluations performed by this organization. This concern was closed with issuance of NRC Inspection Report 89-31 which indicated improvement in providing additional technical detail.

This functional area has received substantial management support in providing resources to become more involved and encouraged aggressiveness in identifying and resolving problems. Monthly meetings between the director of licensing and assurance, the assistant managing director for operations, the plant manager and the director of engineering have improved the responsiveness to quality findings and enhanced the working relationships.

