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WNP-2 PERFORMANCE INDICATOR REPORT

March, 1987

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Prepared By Performance Evaluation

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WNP-2 PERFORMANCE INDICATOR REPORT

FOREWARD

The purpose of this report is to furnish Supply System management with performance data in selected key operational areas. The data is graphically displayed to provide visual trends and present comparisons with industry data, Supply System Corporate goals and WNP-2 plant goals. The report is anticipated to be dynamic. Indicators will be added or deleted, as appropriate, to define problem areas and display performance trends.

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NET ELECTRICAL GENERATION

The graphs below depict WNP-2's monthly and year-to-date net electrical generation in megawatt hours as reported to the Nuclear Regulatory Commission per Regulatory Guide 1.16.

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This Month: The plant generated 516,206 MWH's during the month of March, continuing to operate in single loop configuration due to excessive vibration of "A" recirculating pump. The year-to-date total electrical generation is 1,487,899 MWH's and the cumulative since commercial operation is 12,257,896 MWH's.

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UNIT AVAILABILITY FACTOR

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Unit Availability Factor is the ratio of the Unit Available Hours (i.e., the sum of the total clock hours during the period that the generator operated on line plus the total clock hours during the period that the unit was in reserve shutdown, that is capable of operating on line but for some reason did not) to the total clock hours contained in the period. The result is multiplied by 100 to express the factor as a percent.

Unit Availability Factor = $\frac{(Unit Available Hours)(100)}{Total Clock Hours in Period}$

The graph below depicts the monthly Unit Availability Factor for WNP-2 as it relates to the 1985 industry average for BWRs.



This Month: Unit availability for the month of March was 92.29%. The year-to-date unit availability is 91.43% and the cumulative since commercial operation is 77.12%.

UNIT CAPACITY FACTOR

Unit Capacity Factor is the ratio of the net electrical energy generated during a given period of time to the maximum dependable capacity (MDC), times the total number of clock hours during the period.

i.e. - Unit Capacity Factor = <u>Net Electrical Energy Generated x 100</u> Maximum Dependable Capacity x Period Hours

The first graph below depicts the monthly capacity factor as it relates to the 1985 industry averages for BWRs. The second graph depicts the cumulative capacity factor from commercial operation through the current month.



This Month:

Unit capacity factor for March was 63.36%, due to reduced power output while operating in single loop configuration because of excessive vibration of "A" recirculating pump. The year-to-date capacity factor is 62.91% and the cumulative since commercial operation is 55.64%.

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UNIT EQUIVALENT AVAILABILITY FACTOR

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The Equivalent Availability Factor is the ratio of gross available generation to gross maximum generation, expressed as a percentage. Available generation is the energy that can be produced if the unit is operated at the maximum power level permitted by equipment and regulatory limitations. Maximum generation is the energy that can be produced by a unit in a given period if operated continuously at a maximum capacity. Discretionary operations below maximum permitted power for economic reasons such as reserve shutdowns do not reduce equivalent availability.

EAF	Gross Maximum Capacity =	Available Equivalent Unit Equivalent Seasonal Hours - Derated Hours - Derated Hours	x 100%
		(Gross Maximum Capacity) x (Period Hours)	

The graph below depicts the monthly Unit Equivalent Availability Factor of WNP-2 as it relates to the plant's FY 87 goal of 70%. Per INPO, the 1985 industry average was 63.8%.



This Month: The unit equivalent availability factor for March was 66.74%, operating in single loop configuration due to excessive vibration of "A" recirculating pump. The year-to-date equivalent availability factor is 64.6% and the cumulative since commercial operation is 59.49%.

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The graphs below depict the monthly and cumulative heat rate (BTUs/Kwhr) since commercial operation. The third graph presents the plant's thermal efficiency expressed as a percent of the calculated design performance.

For FY 87, WNP-2's goal is to maintain an overall plant thermal efficiency that will be better than 96% of the design thermal efficiency.





This month:

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The cumulative heat rate since commercial operation is 10238.36 BTU/Kwhr.

FORCED OUTAGES

Forced outage time includes the collective time the unit is forced into a shutdown or outage mode and is not available to generate electricity. Forced outages do not include planned load reductions or scheduled outages. The graphs below depict the time in hours during each month that the unit was in a forced outage condition and the resulting forced outage rate. For FY 87, WNP-2's goal is to not exceed 288 hours of unscheduled (forced) outage per calendar quarter.



This Month:

During the month of March, there were 57.33 forced outage hours for a forced outage rate of 8%.

UNPLANNED SCRAMS

An unplanned scram is defined as the actuation of the reactor protection system that results in a scram signal any time the reactor is critical. The signal may be automatically initiated as the result of exceeding a setpoint or manually initiated by the control room operator depressing the scram button.

The graph below depicts the number of unplanned scrams, both manual and automatic, that occurred while the reactor was critical and required the initiation of a Licensee Event Report. Scrams that are planned as part of special evolutions or tests are not included in this indicator.

For FY 87, the WNP-2 goal is to not exceed three unplanned scrams during the fiscal year. Per INPO, the 1986 industry average was 3.9 scrams per unit.



UNPLANNED SCRAMS

This Month:

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During the month of March, there was one unplanned manual scram.

UNPLANNED SAFETY SYSTEM ACTUATIONS

An Unplanned Safety System Actuation is defined as an event or condition that results in an unplanned manual or automatic actuation of an Engineered Safety Feature (ESF). The two major ESF systems included in this indicator are the Emergency Core Cooling System (ECCS) and the Emergency AC Power system.

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ECCS actuations are the result of reaching a setpoint which activates one of the following systems: automatic depressurization system, high pressure core spray, low pressure coolant injection and low pressure core spray systems. Emergency AC power actuations are a result of loss of a safeguards bus.

The graph below depicts the number of unplanned actuations of the ECCS and Emergency AC Power Systems only.

The FY 87 goal for WNP-2 is to not exceed one unplanned ECCS challenge per quarter.



UNPLANNED SAFETY SYSTEM ACTUATIONS

CONTROL ROOM INSTRUMENT OPERABILITY

This first graph below depicts the number of control room annunciators activated during plant operation while at power for a duration exceeding 24 consecutive hours. The second graph depicts the number of control room instruments that are not performing their design function, regardless of the reason. This includes instruments on control room back panels.









NUMBER OF INSTRUMENTS

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MAINTENANCE WORK REQUEST STATUS

The Maintenance Work Request (MWR) is the document control used to initiate and record maintenance activities and plant modifications performed by the Plant Maintenance staff at the plant site. The monthly status of the WNP-2 MWRs (i.e., those issued, closed, and remaining open at month's end) is graphically displayed below. Also depicted is a breakout of MWRs requiring outage conditions to complete. Preventive maintenance items are not included as a part of MWRs.



This Month:

During the month of March, 443 MWRs were issued, 342 closed, with a total of 1,442 remaining open including 686 that require an outage to complete.

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PREVENTIVE MAINTENANCE STATUS

Preventive Maintenance (PM) is maintenance which is scheduled and performed on a routine basis to preclude costly and unplanned breakdowns of operating equipment. PM is controlled by a computerized card system which lists the PM to be performed on each piece of equipment, along with the date it is due. The graph below depicts the monthly manhours of PM work scheduled, completed, and backlogged by the WNP-2 Plant Maintenance organization.



This Month:

During the month of March, 5,620 hours of PM work were scheduled, 1,987 PM hours were completed, with a total of 6,582 remaining in backlog.

Out of service equipment is categorized as that hardware which if removed from service would have an impact on Plant Availability or Plant Capacity Factors.

The graph below depict the numbers of major pieces of hardware that were out of service during each month.



This Month: Equipment out of service during March included the main turbine governor valve No. 4; recirculation pump 1A due to excessive vibration; reactor feedwater master level controller for repairs; main generator motor operated disconnect switch for repair of faulty position switch; and condensate booster pump 2C for oil pump repairs.

PLANT MODIFICATIONS

Modifications to plant structures, systems, components and computer systems software are initiated by submitting modification requests to applicable plant management. After evaluation and review by the plant staff, approved proposals requiring design packages are forwarded to the Site Engineering Manager.

The graphs below depict the status of the total number of PMR's written for WNP-2 and a breakout of those PMR's assigned to Engineering.







A total of 725 PMR's remain backlogged of which 401 are in Engineering.

PLANT DRAWING REVISION

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The Plant is responsible for implementing design changes within the plant prior to drawing revision, and Engineering is responsible for drawing revision once the associated design changes have been implemented within the plant. The first graph depicts the total number of drawings received by Engineering for revision, the drawings revised, and those awaiting revision. The second graph depicts the number of drawing revisions received by the Plant for implementation, the drawing revisions implemented within the plant, and those which remain to be revised once design changes have been implemented.



This Month:

For the month of March the total drawing revision backlog is 5,607 drawings.

The graphs below depict the composition of the total drawing revision backlog for Top Tier and a^{11} ther drawings and the revision status of those drawings. (Top Tier drawings are those used by the Control Room Operators to perform the day-to-day operation of the plant.) The drawing revision backlog is comprised of the number of drawings awaiting revision by Engineering and drawings to be revised once Plant has implemented associated design changes within the plant.





This Month:

For the month of March the total drawing revision backlog consists of 5,607 drawings.

	Plant	Engineering	Total
Top Tier	470	0	470
All Others	4,855	282	5,137
Total	5,325	282	5,607

NONCONFORMANCE REPORTS

Nonconformance reports (NCRs) may be issued by any employee to identify a hardware or nonhardware-related deficiency. The first graph depicts the number of WNP-2 NCRs issued, closed, and in backlog for each month. The second and third graphs depict cumulative year-to-date NCR's and a breakout of the monthly NCR's by category (i.e., administrative/hardware).



<u>This Month</u>:

In the month of March there were 24 NCRs issued, 38 closed, leaving a backlog of 332. Of the backlog, 122 were administrative and 210 related to hardware failures, malfunctions or deficiencies. · · · · • • -

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LICENSEE EVENT REPORTS

Reactor licensees are required to report all unusual occurrences to the Nuclear Regulatory Commission (NRC). These reports are called Licensee Event Reports (LERs) and cover a wide range of occurrences, including equipment failures, personnel errors and plant emergencies. The graph below tracks the LERs as they are approved by the plant operating committee and transmitted to the NRC by WNP-2 each month, and a cumulative total for the year, along with a breakdown by category.



This Month: A total of zero LERs were submitted in the month of March.

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PERSONNEL EXPOSURE

The Supply System is committed to operating WNP-2 in a manner which minimizes employee radiation exposure. For CY 87, an upper bound radiation exposure goal of 230 man-rem was established. The following graphs depict the monthly and cumulative mem-rem exposure levels for all workers at the WNP-2 plant. The bottom graph depicts exposure distribution.





This Month:

The monthly exposure for all radiation workers at WNP-2 in March was 4.653 man-rem.

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SOLID RADWASTE

Solid radwaste includes two products: (1) solidified radioactive waste which is the accumulation of radioactive products (sludge, resins, filter cake) removed by liquid and gaseous processing systems; and (2) contaminated solid materials (disposable gloves, smears, trash) generated as a result of maintenance activities. These graphs depict the monthly and cumulative cubic feet of solidified radioactive waste and dry active waste generated at WNP-2 and subsequently shipped off site.

For FY 87, WNP-2's goal is to limit the volume of solid radwaste shipped from the plant to 25,000 cubic feet.



<u>This Month</u>: Total radioactive waste (i.e., solidified and dry active) generated during March was 720 cubic feet.

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LIQUID RADWASTE

Operation and maintenance of WNP-2 results in the production of radioactive liquid waste. Processing systems are operated to minimize the radioactive content of these liquids. The following graph depicts, the gallons of liquid discharged (without dilution) to the river from WNP-2, and also the liquid effluent whole body dose.



VOLUME OF LIQUID RADIOACTIVE WASTE

FUEL RELIABILITY

This indicator depicts the average monthly dose equivalent iodine activity found in the primary coolant and is a precursor method for identifying fuel failure. WNP-2's Technical Specification 3/4.4.5 states that the specific activity of the primary coolant system shall be less than or equal to 0.2 (2.0E-01) microcuries per gram dose equivalent I-131.

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This Month: Present monthly readings are greater than 3 decades below the Technical Specification limit.

PLANT CONTAMINATED AREAS

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Operation and maintenance of WNP-2 results in the gradual buildup of low level contamination. This is caused by requirements to repair equipment, to take samples, and to operate systems. Good operation and health physics practices are required to minimize the size of these areas. The graph below depicts the square footage of surface area contaminated during the month. This does not necessarily mean that the total area was contaminated all month because cleanup crews are continually working to maintain contaminated areas at a minimum.



PERSONNEL CONTAMINATIONS

This graph depicts the monthly number of skin contaminations incurred by all personnel working at the plant. Good work and health physics practices will be utilized to administratively limit skin contaminations.



This Month:

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There were five personnel skin contaminations during the month of March.

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WATER CHEMISTRY

This indicator includes three water chemistry parameters referenced in the BWR Owner's Group Water Chemistry Guidelines; i.e., Reactor Water Conductivity, Feedwater Dissolved Oxygen, and Feedwater Total Copper. The three top graphs depict the average monthly activity of these parameters relative to guideline achievable levels with an upper and lower guide for dissolved oxygen. The fourth parameter, Air-In-Leakage, depicts the average monthly activity relative to design criteria.



The graph below depicts the total WNP-2 plant staff on-board (permanent and temporary) as compared to positions budgeted and approved.



This Month: Budgeted staff for FY 87 is 467, the actual for March was 464.

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PLANT PERSONNEL TURNOVER

The graphs below reflect the monthly and cumulative turnover of the WNP-2 plant staff. This includes personnel transferring internally (i.e., from one department to another within the 52000 organization) or transferring out of the plant organization as well as personnel terminating or retiring. The second graph identifies the department from which the turnover occurred.



This Month:

During March the plant experienced a turnover of three employees.

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PLANT OVERTIME

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The graphs below display the regular and overtime hours worked by plant staff personnel (52000 organization) and the overtime as a percent of the regular hours.



This Month:

A total of 6.72% overtime was worked by the plant staff in March.

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PLANT PROCEDURE DEVIATIONS

A procedural deviation is an approved modification to a procedure which does not change or compromise its intent. Approved deviations occur (1) when the plant has undergone modification and the original procedure must be updated to reflect the change, (2) when procedures are being used for the first time during initial equipment and process startup, and (3) when the plant systems are in a testing mode and require temporary procedure modifications to complete the tests. The graph below depicts all safety-related, approved plant procedure deviations by month.



PLANT PROCEDURE DEVIATIONS

This Month:

NUMBER OF DEVIATIONS

During the month of March there were 34 plant procedure deviations.

NRC VIOLATIONS

The graph below depicts NRC violations issued each month as related to WNP-2 operational activities, along with the cumulative yearly total. The table below the graph provides a breakout of the severity levels assigned by the NRC to each violation. The FY 87 goal for WNP-2 is zero violations of Levels I, II or III severity.



This Month:

For the month of March, there were zero violations issued against WNP-2 by the NRC.

STUDENT HOURS OF TRAINING

The graphs below depict the student hours of training provided for Licensed Operator, Non-Licensed Operator, Maintenance, General Employee Training (GET), and Simulator training by the Technical Training organization.



<u>This Month</u>: For the month of March, a total of 8,716.25 student hours of training were provided for Supply System and contractor personnel.

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The graphs below depict the total number of classroom (instructor) hours scheduled and the total number of classroom (instructor) hours actually provided for Maintenance, General Employee Training (GET) and other, Licensed, Non-Licensed, and Simulator training.



This Month:

A total of 790 classroom (instructor) hours were scheduled for the month of March, and a total of 1,020.25 classroom (instructor) hours were actually provided. p. ٠

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NRC EXAM PERFORMANCE

The results of the NRC licensing examinations including requalification, Hot License and exam retakes for reactor operators and senior reactor operators are depicted in the graphs below.



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QUALITY ASSURANCE AUDIT DEFICIENCIES

Corporate Quality Assurance (QA) audits provide an objective evaluation of plant QA processes and indicate the effectiveness and degree of implementation of the plant QA programs.

This graph depicts the number of audit deficiencies identified during each quarter, as well as those deficiencies closed and remaining open in backlog.



QUALITY ASSURANCE SURVEILLANCE DEFICIENCIES

Plant Quality Assurance (QA) Surveillance Programs are established by the Plant QA Manager and provide a means of reviewing and observing work progress and plant conditions to verify that actions have been, or are being accomplished as specified.

This graph depicts the number of plant surveillance deficiencies identified during the respective quarters, as well as those deficiencies that were closed and remaining as backlog.



OPERATING EXPERIENCE REVIEW STATUS

Review of industry operating experiences pertinent to WNP-2 is accomplished by the Nuclear Safety Assurance Group (NSAG). This includes Significant Event Reports and Significant Operating Event Reports from INPO, information letters from the NSSS supplier, and notices, circulars and bulletins from the NRC and industry. The graphs below depict the status of all reviews assigned, closed or backlogged per month on a monthly and a cumulative basis. The backlog is broken into two categories, awaiting review and/or awaiting plant implementation.



This Month: In the month of March, there were 37 reviews assigned, 38 reviews closed, with a backlog of 245. The backlog is comprised of 79 awaiting review by NSAG and 166 awaiting plant implementation.

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EZZZ AWAITING SEVIEW

The graphs below are a break out of the Significant Event Report (SER) and Significant Operating Event Report (SOER) status on a monthly and cumulative basis.



<u>This Month</u>: For the month of March: 5 SERs were assigned, zero closed and 75 backlogged. Two SOERs were assigned, zero closed, and 18 backlogged.

Effective operations result from, among other things, good work practices, including maintaining a conscientious attitude towards industrial safety. The graphs below present two personnel safety indicators: (1) the number of recordable injuries that occur at the plant per month by the plant staff (52000 organization) along with a recordable injury rate, and (2) the number and rate of lost time accidents by the plant staff per month.

For FY 87, the goal for WNP-2 is to not exceed 12 recordable injuries, of which no more than three will be lost time accidents thus maintaining a recordable injury rate of 3.0 and a lost time accident rate of 0.7.





This Month:

During the month of March there was one recordable injury at WNP-2 which was a lost time accident.

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SITE SUPPORT CONTRACT

Support for outage and nonroutine maintenance activities are being provided by a site support contract. The graphs below depict the monthly contracted manpower, the regular hours versus overtime hours worked by contracted employees per month, the number of tasks being worked on per month, and the cumulative personnel exposure.





This Month:

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In March the contractor headcount was 98.

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SECURITY

Security compensatory time is required to provide escort service inside vital areas and guard coverage for failed security equipment. The first graph depicts the number of hours that security officers were assigned to compensate for failed security access equipment and to escort non-cleared maintenance and outside service personnel inside vital areas.

The second graph depicts the number of Supply System employees and all other personnel (i.e., contractor, BPA, and NRC) that have been screened and granted unescorted access to WNP-2.





A total of 705.7 hours were expended in March by the Security organization in compensatory support. Unescorted access to WNP-2 for Supply System personnel during March was 1,170 and for all others was 213.

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SPARE PARTS

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The graphs below depict the line items of operational spare parts identified to be carried in inventory for WNP-2 and line items currently available in inventory. It is estimated that 25,000 line items will eventually be carried in the WNP-2 spare parts inventory.



SPARE PARTS IDENTIFICATION

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