WNP-3

PRESERVATION OF ASSETS PROGRAM

WMC-051

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PROCEDURE ERRATA

PROCEDURE WMC-051 Program Statement	REVISION 6 AMENDMENT N/A	DATE 7/28/93

The following errata is issued against the above procedure. Please insert this sheet in front of the applicable procedure, and make any changes as directed below.

ERRATA

Paragraph 3.3.4 (Page 7) - Change ANSI Standard N45.2.2 date reference from 1978 to 1972.

APPROVALS

REQUESTOR [signature] 8/31/93 QUALITY ASSURANCE [signature] 8-31-93

WNP-3 PRESERVATION OF ASSETS PROGRAM STATEMENT

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WNP-3 PRESERVATION OF ASSETS PROGRAM STATEMENT

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1.0 INTRODUCTION

The WNP-3 Preservation of Assets Program for the preservation period, was developed to ensure that permanent plant and construction facility structures, systems and components, are preserved and maintained, with the required records stored, such that plant licensability is retained and economic risk is minimized.

The Preservation of Assets Program at the WNP-3 Project falls under the Quality Assurance Program Descriptions as delineated in Chapter 17 of the FSAR. Preservation Engineering has the overall responsibility for the Program.

This program was initiated in 1983, when construction was delayed. It has been refined periodically as the project "ramped down" and a steady state preservation mode was attained. The program was revised in 1988, 1989, 1990, 1992 and 1993 to incorporate the following changes:

- A clarification of how preservation and preventive maintenance tasks are established and controlled.
- Implementation of a Combined Site Organization Program (Supply System and Ebasco).
- Inclusion of assets which are in operating status.
- Improved permanent building environmental conditions as a result of improved building closures and heat additions.
- Experience gained since the start of the program, including the need for, and effectiveness of, vapor phase inhibitors (VPIs).
- Establishment of the Corrosion Monitoring Program (CMP) as quality affecting and requiring more rigid requirements for documenting, tracking, and closing CMP walkdown inspection items.
- Establishment of a Program to evaluate the condition of oils and lubricants and their ability to continue to protect equipment oil and grease cavities from corrosion.
- Prior to April 1992, the relative humidity within the RAB/RB superstructure, a Category I environment, was controlled by elevating its interior temperature relative to the outdoors. In April 1992, two desiccant type dehumidifiers were placed into

service and they now control relative humidity within the RAB/RB superstructure. Since heat addition is no longer required to control humidity, the Project has de-energized space heaters in all but very sensitive equipment within the dehumidified space.

This program covers all permanent plant assets and selected nonpermanent property and equipment that is required for construction completion.

WMC-051 consists of this Program Statement and five appendices which provide detailed direction on implementing the overall program.

The appendices are:

Appendix A Preventive Maintenance Requirements by Equipment Type

Appendix B WNP-3 Structural Material Corrosion Monitoring Program (CMP)

Appendix C Hygrothermograph Plant Monitoring

Appendix D Electrical and Electronic Components

Appendix E Oil and Lubricant Analysis and Trending During Plant Preservation

2.0 OBJECTIVE

2.1 The objective of this document and its appendices is to define a Preservation of Assets Program which will optimize the preservation of plant equipment and structures while considering the preservation period constraints. The program is designed to protect materials, equipment, components, systems, and structures from adverse environmental conditions whether in storage or installed. The program is also designed to maintain the life and reliability of equipment within operating systems.

2.2 The program objective will be achieved by implementing the following basic actions.

2.2.1 Establishing and maintaining procedures for controlling and documenting changes to the preventive maintenance and inspection requirements carried over from the Construction phase.

2.2.2 Establishing standardized long term preservation requirements by equipment type.

2.2.3 Improving the environment of permanent buildings and equipment enclosures to minimize corrosion induced by atmospheric conditions and prevent condensation. This is accomplished by heat additions, dehumidification or a combination of both to lower relative humidity and stabilize building temperatures.

2.2.4 Monitoring building temperature and humidity conditions and implementing adjustments necessary to achieve an optimum environment.

2.2.5 Performing inspections of plant equipment and structures for corrosion degradation or conditions conducive to corrosion.

2.2.6 Monitoring indoor and outdoor corrosion rates by placing corrosion test coupons of actual or typical plant materials at selected locations at WNP-3.

2.2.7 Modifying Construction Phase preventive maintenance actions or inspections where supported by preservation results and engineering review.

3.0 PRESERVATION PROGRAM CONSIDERATIONS

3.1 Status of Plant Completion

Buildings with installed equipment are essentially weather tight. Most of the plant components are in place and systems are partially complete. Portions of the Fire Protection System, the Nitrogen System, the HVAC System, Turbine Lube Oil System, Electrical Distribution System and Makeup Water System have been placed in operation.

3.2 Duration of Preservation Period

This maintenance program is predicated on an extended preservation period and with an ongoing review is considered adequate for an indefinate period.

3.3 Site/Plant Environmental Conditions and Preservation Philosophy

Local weather is characteristic of a mid-latitude coastal environment. Temperatures are stable with mild seasonal and diurnal temperature variations. The site experiences approximately 60 inches rainfall per year and high humidity levels approximately 9 months of the year. During the preservation period the environment within the plant structures is more benign than that encountered in the construction phase. It is intended that doors and outside openings be closed and areas be draft free with clean floors, resulting in no appreciable airborne contamination. This environment has also improved since the first years of the preservation period as a result of better closures of openings to the outside environment, the addition of electrical unit heaters and dehumidifiers, and less activity within the buildings. As part of the Preservation Program, the temperature and humidity conditions in the plant buildings are monitored and documented (See Appendix C). Also through the Corrosion Monitoring Program (See Appendix B) the plant is monitored for the potential for or actual occurrence of corrosion induced by atmospheric conditions. In order to optimize the Preventive Maintenance Program and to assure maintenance efforts are directed at areas of greatest concern, the permanent plant building and yard/roof areas have been classified with regard to the need for protection from the environment. This is primarily protection of equipment and structures from moisture caused corrosion and electrical equipment insulation degradation. The four environmental categories that have been established are:

- Category I - Inside the RAB/RB Superstructure. No protection from the environment required.
- Category II - Inside Heated Buildings Other Than the RAB/RB Superstructure. Minimal protection from the environment required.
- Category III - Inside Unheated Buildings. Protection required to preserve sensitive items.
- Category IV - Outdoors (any area which is directly exposed to the outside environment). Significant protection required to preserve most items.

3.3.1 Category I, Inside the RAB/RB Superstructure

Most of the plant's installed QCI equipment is located in this area, and during suspension special emphasis has been placed on stabilizing this environment. The preservation goal has been to establish stable daily temperatures and average relative humidities of 50% or less. In 1989 the Project recognized the achievement of this preservation goal and the resulting benign environment. Supporting this assessment were results from Corrosion Monitoring Program walkdowns and supplemental assessments that had not found any indication that corrosion is active. Similarly, polished carbon steel surfaces throughout the superstructure showed no signs of corrosion. The evaluation of this data and the observations, inspections, and tests made to date indicates that corrosion will not progress and electrical insulation will not degrade in the RAB/RB superstructure with its current environmental conditions. This evaluation for atmospheric corrosion is consistent with the position established in Appendix B that atmospheric corrosion will usually not be observed at relative humidities below 50% (Ref. Paragraph II, 1)).

In recognition of this benign environment, the preservation philosophy within the RAB/RB superstructure was adjusted. Periodic equipment inspections/tests for moisture induced degradation were curtailed, deleted or transferred to surveillances under the Corrosion Monitoring Program. Air exchange between the equipment internals and the area environment were promoted. Access openings were screened instead of being sealed. The need for most supplemental corrosion protection measures was eliminated. However, based on manufacturer's recommendations and a conservative approach some previously established measures were continued. Examples are; supplemental heat for the diesel generator, nitrogen purge for the Primary NSSS system, air conditioning for the control room and relay rooms and application of preservatives to machined surfaces.

The Category I environment is similar to a Level A storage environment as defined in ANSI N45.2.2 - 1972 (Regulatory Guide 1.38, dated May 1977).

3.3.2 Category II, Inside Heated Buildings Other Than the RAB/RB Superstructure

Like the RAB/RB, efforts made during preservation have significantly improved the environment within other heated buildings from that which was present during construction. Corrosion Monitoring Program Walkdowns and the supplemental assessments of these areas have not found any indication that corrosion is active. Polished carbon steel surfaces show no signs of corrosion. Hygrothermograph data for the Turbine Building shows that temperatures and relative humidity fluctuate closely with respect to changes in the outdoor environment. However, relative humidity remains controlled relative to the outdoors with monthly mean relative humidity averaging 62%. Other heated buildings in this category should exhibit similar environmental conditions.

The preservation philosophy for Category II environments is similar to the RAB/RB except there is greater use of supplemental heat and shrouds to protect sensitive equipment. In the Turbine Building special measures (nitrogen and dehumidified air) are used to protect the Turbine, the Main Generator and the Exciter.

The Category II environment is similar to a Level B storage environment as defined in ANSI N45.2.2 - 1972 (Regulatory Guide 1.38, dated May 1977).

3.3.3 Category III, Inside Unheated Buildings

Inside unheated buildings, temperature and humidity mirror the outdoor environment. Atmospheric corrosion of carbon steel will occur if not prevented by use of preservatives or coatings. In most cases, light atmospheric corrosion is not damaging. Formation of oxide films tend to slow corrosion on most materials. Sensitive equipment and unprotected machined surfaces must be protected from this environment by use of preservatives, coatings, heat addition and shrouding as appropriate.

The category III environment is similar to a Level C storage environment as defined in ANSI N45.2.2 - 1972 (Regulatory Guide 1.38, dated May 1977). Usually, protective measures are necessary for equipment requiring heated Level B storage as described in ANSI N45.2.2 - 1972 (Regulatory Guide 1.38, dated May 1977).

3.3.4 Category IV, Outdoor

It has been found that most equipment and structures exposed to WNP-3's outdoor environment require protection through coverings, coatings, heat and preservatives. Periodic inspections are made of the plant buildings, roofs and drainage systems to identify problems and initiate corrective action. As the preservation period has lengthened, the need for more extensive preservation measures has been recognized. The current preservation philosophy is focused on preventing standing water in equipment and on structures and stored materials. Also, as a result of inspection findings, more frequent and extensive internal inspections of equipment have been implemented. Similarly, a program for periodic reapplication of coatings and preservatives has been established. Shrouds have been upgraded or added to provide additional protection for equipment. For some items, low replacement costs do not justify the extensive preservation measures that would be required to maintain them in this environment. Items falling in this category have been removed from the maintenance program.

The Category IV environment is similar to a Level D storage environment as defined in ANSI N45.2.2 - 1978 (Regulatory Guide 1.38, dated May 1977). Protective measures are required for installed equipment which would require inside storage, Level B or C.

3.4 Use of Vapor Phase Inhibitors (VPIs)

Vapor Phase Inhibitors are placed within closed atmospheres of equipment to inhibit corrosion. Use of Cortec 309 and 319 inhibitors was discontinued in 1989 and these inhibitors are now being removed or allowed to vaporize as equipment is inspected and vented to the atmosphere.

Vapor phase inhibitors are not approved for use on NSSS primary coolant wetted systems or the secondary side of the steam generator. Use of VPI on any component which may feed into either of the above systems requires that the component be isolatable from the restricted areas of these systems, both during use and during future flushing of the components at the end of the preservation period.

3.5 Manufacturers and ANSI N45.2.2-1972 (Regulatory Guide 1.38, dated May, 1977) Recommendations:

Maintenance recommendations furnished by the manufacturer or included in ANSI Standard N45.2.2-1972 (Regulatory Guide 1.38, dated 5/77) provide a basis for the development of preventive maintenance plan for any equipment. These recommendations have been established primarily to prevent or detect moisture induced corrosion damage or insulation degradation. The preventive maintenance specified by the Manufacturer or contained within the Standard are generally very conservative due to the assumption that worst case ANSI N45.2.2 Level B Storage conditions could prevail at the storage location. At WNP-3, equipment located indoors is being maintained in an environment that is in most cases better than that assumed by the Manufacturer or those who prepared the Standard. In the case of the RAB/RB superstructure, the environment is substantially more benign than that projected. In fact, in this Category I environment, as discussed in Paragraph 3.3.1, moisture induced degradation has been shown to be no concern. Accordingly, preventive maintenance measures required to prevent equipment deterioration at WNP-3 are less stringent than those requirements specified by the Manufacturer or contained within the Standard.

In Appendix A, standard mainterance requirements are specified by equipment type. The maintenance specified is commensurate with the need for protection from the environment. For the reasons discussed above, the requirements contained within Appendix A and implemented through the Scheduled Maintenance System will differ from those of the manufacturer or the standard. For example, if the basis for a maintenance recommendation is to prevent/detect carbon steel corrosion or insulation degradation, this recommendation may not be followed for equipment within Category I or II areas where it has been shown that these inspection/protection measures are not warranted.

4.0 MAINTENANCE REQUIREMENTS

4.1 Preventive Maintenance - Preventive maintenance consists of those activities which inspect, monitor, surveil, or perform work to preserve equipment and structures. These activities include such items as visual checks, shaft rotations, insulation resistance testing, instrument surveillance, application of internal and external preservatives, etc.

4.2 Preventive Maintenance Requirements

4.2.1 The preventive maintenance required for any equipment or structure is the sum of the tasks which are contained within the Scheduled Maintenance System (SMS) for that equipment or structure. These tasks are developed from:

a) Manufacturers' requirements.

b) Appendix A, Preventive Maintenance Requirements by Equipment Type (Applicable only as a guideline to non-permanent plant).

c) Documented engineering evaluations of the preservation requirements for permanent plant and selected construction assets.

d) Plant Preservation Manager/Supervisors evaluation of the preservation and operating requirements of any piece of equipment or structure.

4.2.2 Documented Engineering review is required for variations from manufacturer's requirements for permanent plant assets. When preventive maintenance is performed in accordance with the standardized requirements of Appendix A, the review and approval of Appendix A satisfies this requirement. For construction assets, selected review will be provided as defined by the implementing procedures.

4.2.3 Most of the initial preventive maintenance requirements included in the SMS system were developed during the construction phase of the Project. When construction was delayed, the construction preventive maintenance requirements were transformed into the Scheduled Maintenance System (SMS). During preservation SMS requirements have been modified to reflect the improved building environments and to adjust maintenance based on experience gained since the start of preservation. Currently the SMS system schedules all preventive maintenance activities, generates hard copy task cards to initiate the performance of the activity and provides documentation of the completed task. Discrepancies noted are transferred to MWRs for review and disposition. All new, revised or deleted SMS tasks affecting permanent plant and selected construction

assets (as defined by the implementing procedures) have Preservation Engineering review and concurrence. In addition, Preservation Engineering performs selected reviews of SMS tasks and performance thereof to monitor program effectiveness.

4.3 Preventive Maintenance Requirements by Equipment Type - Appendix A provides the standardized requirements for preservation and preventive maintenance of stored or installed permanent plant equipment by type. Appendix A covers only general equipment types, i.e. tanks, pumps, panels, motors, etc. which usually have been supplied by multiple manufacturers. Appendix A was originally established to standardize preventive maintenance requirements implemented in the construction phase and to provide supplemental requirements for long-term preservation. Over time, these standardized requirements have been modified to reflect:

- o The establishment of improved building environments,
- o Inspection results (both positive and negative),
- o Lessons learned,
- o Engineering evaluations performed.

In 1990, Appendix A requirements were significantly revised to reestablish standardized maintenance requirements commensurate with the environments being maintained at the equipment locations, i.e. Category I to Category IV environments (Ref. Paragraph 3.3).

4.4 Criteria for Preventive Maintenance Development - Listed below are the general factors considered by Engineering when developing or revising SMS tasks or standardized requirements in Appendix A.

4.4.1 Importance to safety and related regulatory requirements.

4.4.2 Vulnerability of the equipment to degradation during the preservation period, with significant consideration given to the materials and the environmental category in which the component is located.

4.4.3 Sensitivity of the equipment to PM and evaluation of the potential for significantly improving equipment operational life by PM actions.

4.4.4 Estimated risks considering procurement, replacement, and repair coats.

4.4.5 Vendor warranties when in effect and the potential for any significant monetary recovery. Vendor warranty requirements and/or recommendations are a primary factor for the diesel generator, NSSS and T/G components.

4.5 Corrective Maintenance Program - Corrective maintenance is the activity which performs work to correct discrepancies in equipment and/or systems. These activities include such items as corrosion removal, instrument repair, protective enclosure repair, component overhaul, etc.

Minor items, such as replacement of contact preservatives, repair of protective enclosures, etc., are generally performed during the visual checks on the PM program and documented on the SMS task card.

4.5.1 Maintenance Work Request (MWR) System - The Maintenance Work Request is the document used to control corrective maintenance activities. The MWR System tracks all open or completed work and provides for interim status, such as "in-progress" or "awaiting parts", etc. MWRs and changes thereto affecting permanent plant and selected construction assets, as defined by the implementing procedures, are reviewed by Preservation Engineering prior to issue.

a) The MWR may be initiated by any individual who identifies a problem.

b) The MWR is entered into the MWR system for tracking and routed to the applicable supervisor for implementation.

c) The supervisor determines the work to be performed and includes it on the MWR. The work may be simple in nature and fully stated on the MWR, or require the use of detailed procedures. Quality Class I and II Augmented MWRs are reviewed by Quality Assurance and hold points established, if required.

4.6 Master Equipment List (MEL) - The Master Equipment List is the master data base and lists each component in the plant by Equipment Piece Number (EPN). Included in each EPN file, is nameplate data (i.e., manufacturer, model, serial number, location, etc. and the design quality class of the item). Updates of the MEL Quality Class are made only by the WNP-3 Engineering Manager.

4.7 Equipment History (EQH) System - The EQH is the filing system for all completed work performed under the SMS and MWR systems.

4.8 Nonconformance Reporting - Nonconforming materials, parts, or components are controlled in accordance with CSPs.

5.0 CORROSION MONITORING PROGRAM

5.1 The Corrosion Monitoring Program as described in Appendix B consists of the following activities:

5.1.1 The establishment of corrosion baseline data by visually inspecting plant equipment and documenting current conditions for future reference points. Preventive maintenance inspections by the preservation maintenance group also provide baseline data for use in evaluating the effectiveness of corrosion prevention.

5.1.2 Corrosion test racks have been placed in the field and in the buildings. The corrosion coupon materials used are representative of actual plant components (i.e., NSSS vessels and piping, anchor bolting, equipment bolts, reinforcement bar, tanks, pumps and stiff clamps). Coupons are monitored for both uniform galvanic and pitting types of corrosion. The results of the qualitative and quantitative corrosion sampling shall be considered in the on-going review of preventive maintenance practices.

5.1.3 Periodic inspections (CMP Walkdowns). These inspections are performed in order to monitor the effectiveness of corrosion prevention as well as to identify atmospheric conditions within the plant conducive to corrosion and the effectiveness of closures to the outside environment. In addition, test coupons and plant components/materials are inspected for corrosion degradation.

5.1.4 The plant cathodic protection systems are monitored on a regular basis to assure their effectiveness. The monitoring includes rectifier checks and benchmark potential checks, a cathodic protection survey of the underground piping systems is also performed periodically.

5.2 Findings from the above activities are documented to provide input to the Plant Preservation Program.

6.0 HYGROTHERMOGRAPH PLANT MONITORING

6.1 Temperature/humidity monitoring is an integral part of the overall preservation and preventive maintenance requirements. The record of actual temperature/humidity conditions encountered aid in providing assurance that the objectives of the Preservation Program are being met.

6.2 Hygrothermograph plant monitoring as described in Appendix C, provides data to indicate the environment the equipment, systems, components and structures have experienced during the preservation period. The monitoring program also provides a warning of changes in environmental conditions with the potential to lead to equipment damage. Corrective measures, such as changes in preventive maintenance requirements, will then be taken.

6.3 The records of the monitoring program are also available as evidence of the environment during the preservation period which may be used in part to justify changes to intervals in equipment overhaul periods.

7.0 ELECTRICAL AND ELECTRONIC COMPONENT MONITORING

The Preservation Program for electrical and electronic components is described in Appendix D and as such, is an integral part of the WNP-3 Preservation of Assets Program. The basic concept adopted is to maintain the components warm, dry and clean, consistent with ANSI Level B requirements.

8.0 OIL AND LUBRICANT ANALYSIS AND TRENDING DURING PLANT PRESERVATION

The Preservation Program for evaluating the condition of oils and lubricants is described in Appendix E. The purpose of this evaluation is to determine if they continue to be capable of protecting equipment bearing/gear cavities from corrosion. Other oil and lubricant properties, such as friction reduction, are of interest only for equipment that is in operation.

9.0 SUPPLEMENTAL ASSESSMENTS

Supplemental assessments of the Preservation Program may also be performed on a periodic basis utilizing technical personnel separate from the Project Site.

10.0 PROCEDURES

10.1 The implementation and control of those preservation activities as delineated in this program are described in Combined Site Procedures (CSPs). Preservation procedures have been reviewed and approved by Preservation Engineering and Quality Assurance. The review/approval process assures that the specific maintenance requirements have been incorporated into the procedures.

10.2 The procurement of items and materials utilized in the Preservation Program is implemented and controlled in accordance with Combined Site Procedures.

10.3 All procedures, instructions and drawings used for preventive maintenance and preservation are controlled in accordance with the descriptions in Chapter 17 of the FSAR.

11.0 QUALITY ASSURANCE

11.1 The Project Quality Assurance Group has responsibility for conducting overview surveillances of all activities of the Preventive Maintenance and Preservation Program as described in Chapter 17 of the FSAR. In addition, all Quality Affecting procedures and instructions utilized in implementing this program are reviewed and approved by Quality Assurance prior to issuance.

11.2 All Quality Class I and II Augmented MWRs are reviewed and signed by Quality Assurance. Mandatory hold points for inspections are then established, as required, and documented on the MWR.

11.3 Independent Quality Assurance audits are conducted by Ebasco and Supply System corporate auditors.

12.0 REPORTING REQUIREMENTS

12.1 A report on the status of the Preservation Program shall be prepared quarterly by the Preservation Engineering Manager and submitted to the WNP-3 Site Manager. The reports shall describe preservation activities, discuss any major problems encountered, and the corrective actions taken. The report shall also include humidity and temperature data and graphs (re: Appendix C).

12.2 The Corrosion Engineer shall issue a report following each CMP walkdown, containing the results of the walkdown, providing a status of the corrosion prevention program and listing any findings identified during the walkdown.

12.3 A tracking system shall be established and maintained by Preservation Engineering to assure adequate review and closeout of the concerns, deviations and discrepancies identified during the Corrosion Monitoring Program Walkdown.

12.4 Preservation Engineering shall issue a yearly assessment of the Appendix D Program in a report to the WNP-3 Site Manager.

WNP-3 PRESERVATION PROGRAM

APPENDIX A TO WMC-051

WNP-3 PREVENTIVE MAINTENANCE REQUIREMENTS
BY EQUIPMENT TYPE

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WNP-3 PREVENTIVE MAINTENANCE REQUIREMENTS BY EQUIPMENT TYPE

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WNP-3 PREVENTIVE MAINTENANCE REQUIREMENTS BY EQUIPMENT TYPE

I. INTRODUCTION

Appendix A, Preventive Maintenance Requirements By Equipment Type, is an integral part of WNP-3's Preservation of Assets Program. It has been developed to establish standardized preventive maintenance requirements for generic classes of permanent plant equipment. Appendix A primarily addresses preventive maintenance requirements for equipment which is in storage or installed, but for some equipment types, operational maintenance requirements are also included. In 1990, Appendix A was expanded to cover more equipment types and to provide the basis for and greater detail on the requirements necessary for preservation.

In addition, different levels of maintenance were established by equipment type. These levels of maintenance are commensurate with the specific need imposed by each different environmental condition in the plant and outdoor areas to which the equipment is exposed.

II. OBJECTIVES

The objective of this appendix is to establish standardized maintenance requirements for the general types of permanent plant equipment. Implementation of these standardized requirements for maintenance in conjunction with other attributes of the WMC-051 Program will maximize the continuing functionality of the equipment while minimizing the economic risk.

III. APPLICATION

The standardized requirements included in Appendix A are the basis for preventive maintenance for all equipment contained within each equipment type. However, in accordance with the Program Statement, Paragraph 4.2, deviations are permitted for specific equipment from those requirements specified in Appendix A. Also, when applying Appendix A requirements, care must be taken to assure the equipment is compatible with the standard maintenance direction. This review is particularly important for non-standard, unique equipment.

All external and internal inspections required by this document shall be performed per the requirements of CSP-9-02 and any supplemental direction contained herein.

IV. REQUIREMENTS BY EQUIPMENT TYPE

A. BASIS FOR THE STANDARDIZED REQUIREMENTS

For each equipment type included in this Appendix, the basis for the standardized maintenance is noted. In most applications protection of the equipment from corrosion or other moisture caused degradation is the paramount concern. Accordingly, the level of preventive maintenance specified in Appendix A is directly proportional to the severity of the environment in which the equipment is located. The Program Statement, Paragraph 3.3, has classified the plant areas into four environmental categories. These categories are used throughout Appendix A to specify preventive maintenance requirements. The four categories are:

Category I - Inside the RAB/RB Superstructure. No protection from the environment required.

Category II - Inside Heated Buildings Other Than the RAB/RB Superstructures. Minimal protection from the environment required.

Category III - Inside Unheated Buildings. Protection required for sensitive items.

Category IV - Outdoors (any area which is directly exposed to the outside environment). Significant protection required for most items.

B. REQUIREMENTS BY TYPE

1. Pumps

The basis for the pump preservation methods specified below is the prevention of corrosion on all machined and bearing surfaces and the maintenance of adequate corrosion inhibitors, oil film and/or grease coatings on critical pump components.

a. Preservation Requirements

1) All openings are to be sealed utilizing caps, plugs, tape, etc. In Environmental Category I, equipment openings may be screened to allow ventilation if specified by Preservation Engineering.

B. REQUIREMENTS BY TYPE (Cont'd)

1. Pumps (Cont'd)

2) Pump cavities require no preservation activity unless a corrosion concern is identified, at which time specific instructions will be issued by Preservation Engineering.

3) Unpainted external machined surfaces shall be coated with an approved preservative (Ref. CSP-9-04).

4) The lubrication coating on bearing surfaces shall be replenished by periodic shaft rotation except for the following cases where shaft rotation can be deleted.

a) Vertical pumps (including submersible type); after a review by Preservation Engineering on a case-by-case basis.

b) Any pump where the corrosion inhibitor Vaportec has been added to the oil and the resulting coating on bearing surfaces prevents normal shaft rotation.

c) Small pumps located in Environmental Categories I, II and III for which periodic inspections have been deleted as indicated in Table 1.1.

d) Self-lubricating pumps (For these pumps, shaft rotation is not desirable, since the bearings are not grease or oil lubricated).

5) The addition of supplemental corrosion inhibitors or the overfilling/immersion of machine surfaces with oil may be utilized if specified by Preservation Engineering.

6) A vented, water-proof protective shroud and/or supplemental heat shall be provided if specified by Preservation Engineering. SMS task cards should indicate pumps with shrouds and/or supplemental heat.

B. REQUIREMENTS BY TYPE (Cont'd)

1. Pumps (Cont'd)

b. Periodic Maintenance Requirements

Shaft rotation and external inspection shall be performed per CSP-9-02 and as specified in Table 1.1.

c. Special Requirements

1) Oil and/or grease sampling, if applicable, will be specified and schedules established by Preservation Engineering under separate instructions (Ref. Appendix E).

2) Pumps with special vendor storage/maintenance requirements will be addressed by Preservation Engineering on a case-by-case basis and noted on the SMS card(s).

3) Any required cleaning or internal inspections of pumps preserved with Vaprotec will be addressed by Preservation Engineering on an MWR.

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PUMP ROTATION AND/OR EXTERNAL INSPECTION SCHEDULE

	ENVIRONMENTAL CATEGORY/STORAGE LEVEL			
1) SAFETY RELATED PUMPS	I	B		
a. 7.5 HP or less	None	02 year		
b. Greater than 7.5 HP up to 25 HP	02 year	01 year		
c. Greater than 25 HP up to 100 HP	01 year	06 month		
d. Greater than 100 HP up to 250 HP	06 month	06 month		
e. Greater than 250 HP	03 month *	03 month *		
2) NON-SAFETY RELATED PUMPS	I	II & B	III	IV
a. 3 HP or less	None	None	None	03 month
b. Greater than 3 HP up to 15 HP	None	None	06 month	03 month
c. Greater than 15 HP up to 25 HP	02 year	02 year	03 month *	03 month
d. Greater than 25 HP up to 100 HP	01 year	01 year	03 month *	03 mo
e. Greater than 100 HP up to 250 HP	06 month	06 month	03 month	03 mo
f. Greater than 250 HP	03 month *	03 month *	03 month	03 month

* Inspection frequency may be extended to 06 month based on specific environmental conditions at equipment locations, HP size and bearing type.

B. REQUIREMENTS BY TYPE (Cont'd)

2. Valves

The basis for the valve preservation methods specified below is the prevention of corrosion attack on valve internals and all machined surfaces.

a. Valves located in Environmental Category I, II & III - No SMS inspections required. Valve condition will be monitored as part of the Corrosion Monitoring Program (CMP) walkdowns.

1) Valve operation is not required except as specified by Preservation Engineering.

2) Preservatives on unprotected carbon steel machined surfaces should be maintained.

3) It is preferred that installed valves (butteryfly type in particular) be left in an open (or partially opened) condition to allow for air circulation within the piping system. Note: Valves providing a corrosion inhibitor (nitrogen gas, desiccant, Cortec, etc.) or environmental/system boundary shall be maintained closed.

4) Non-installed valves shall have their openings sealed to maintain cleanliness.

b. Valves located in Environmental Category IV - SMS inspections of non-manual valves are to be performed at 3 month intervals, if designated for inspection by Preservation Engineering. Note: Inspections should be coordinated with valve actuator inspections when applicable. Valve condition will also be monitored as part of the Corrosion Monitoring Program (CMP) walkdowns.

1) Valve operation is not required except as specified by Preservation Engineering.

2) Preservatives shall be maintained on carbon steel machined surfaces and other carbon steel surfaces which collect water.

B. REQUIREMENTS BY TYPE (Cont'd)

2. Valves (Cont'd)

3) All exposed valve openings shall be covered to prevent entrance of debris and water.

4) Shrouds should be used in cases where environmental exposure may be detrimental to the long-term preservation of the valve. Shrouds must allow air circulation to the valve.

5) Algae growth shall be removed from the exterior surfaces of stainless steel valves.

c. Special Requirements

1) The use of desiccants or other corrosion inhibitors on valve internals will be specified by Preservation Engineering on a case-by-case basis.

2) Specific vendor requirements for specialty valves shall not be deleted without written authorization by Preservation Engineering.

3) See Section B.3. "Valve Actuators" for additional valve maintenance requirements.

B. REQUIREMENTS BY TYPE (Cont'd)

3. Valve Actuators

The basis for the valve actuator preservation methods specified below is the prevention of corrosion attack on critical operator parts and machined surfaces.

a. Methods of Preservation

1) Operation of actuator.

2) Overfilling/immersion of machined surfaces with lubrication.

3) Application of internal corrosion inhibitors as directed by Preservation Engineering.

4) Coating of machined surfaces with an approved preservative.

5) Utilization of space heaters or addition of supplemental heating.

b. Periodic Maintenance Requirements

1) Valve operators located in Environmental Categories I & II - No SMS inspections required. The condition of valve operators will be monitored as part of the Corrosion Monitoring Program (CMP) Walkdowns.

2) Valve operators located in Environmental Category III.

- SMS external inspection to be performed every two years, if designated by Preservation Engineering.
- All exposed machined surfaces to be coated with approved preservatives.
- Motor operated valves - Energize space heaters where provided.

B. REQUIREMENTS BY TYPE (Cont'd)

3. Valve Actuators (Cont'd)

- Pneumatic cylinder actuators - No internal preservation inspections/coatings required. Note: Cylinder internals may have been previously coated with a vapor phase inhibitor.

3) Valve operators located in Environmental Category IV.

- SMS external inspection to be performed quarterly, if designated by Preservation Engineering.
- SMS internal inspection to be performed annually, if designated by Preservation Engineering.
- All exposed machined surfaces are to be coated with an approved preservative.
- Motor operated valves - Energize space heaters where provided.
- Pneumatic cylinder actuators - No SMS required. (Note: Operator internals may have been previously protected with Cortec 309/319 corrosion inhibitor.)
- Supplemental protection and heating may be required in some cases. Preservation Engineering will issue direction on a case-by-case basis.
- An insulation resistance test per CSP-9-02 shall be performed on two motor operated valve motors selected by Preservation Engineering on an annual basis.

B. REQUIREMENTS BY TYPE (Cont'd)

3. Valve Actuators (Cont'd)

c. Special Requirements

1) Motor operators - It is recognized that grease separation will occur during long-term preservation and although oil loss can result in a loss of its lubrication property, the grease will continue to provide corrosion protection. Preservation Engineering has investigated this issue and recommends no action be taken at this time. Grease condition will continue to be monitored per Appendix E. (Reference Memo 3-PEM-93-005, dated February 23, 1993.)

2) Manual actuators - No preventive maintenance required.

3) Solenoid actuators - May be periodically energized as part of the preservation program if stipulated by Preservation Engineering.

4) Oil and/or grease sampling, if applicable, will be specified and schedules established by Preservation Engineering under separate instructions (Ref. Appendix E).

B. REQUIREMENTS BY TYPE (Cont'd)

4. Instrumentation and Computers

Appendix D identifies the elements which can cause degradation of electrical and electronic components. The elements of primary concern during preservation are moisture/humidity and airborne contamination. This section implements, as its basis, the concept of preventing degradation by keeping these components warm, dry and clean.

a. Preservation Requirements

1) Space heaters contained within installed equipment shall be energized unless the equipment is located in a Category I environment.

2) If equipment does not contain space heaters, then a shroud and supplemental heat shall be provided if equipment is installed in a Category III or IV environment. (Note: A shroud is not required if equipment enclosure is maintained as Nema 4 or 12.)

3) If in storage, equipment shall be placed in a Level A or B storage area. In storage, space heater energization is not required.

4) Equipment not protected by a shroud shall have its enclosure maintained dust-tight. All openings, including floor and raceway openings, shall be sealed to maintain a low dust environment.

5) If required, the shroud should provide a waterproof dust resistant covering over the equipment. Where feasible, an air space should be maintained between the equipment and the shroud.

B. REQUIREMENTS BY TYPE (Cont'd)

4. Instrumentation and Computers (Cont'd)

6) Equipment located in the control room and the adjoining relay rooms is protected from temperature variation and humidity by a temporary heating and air conditioning system. A positive inflow of filtered air is also maintained into this area to reduce dust accumulation.

7) External and internal visual inspections shall be performed per CSP-9-02.

b. Periodic Maintenance Requirements

1) Equipment located in Category I environment -

- o External and internal visual inspections shall be performed every 24 months. Included with the internal visual inspection shall be an inspection of subassemblies for evidence of corrosion, loss of dust tight seal, and dust accumulation. Dust, if observed, shall be wiped or vacuumed from components and cabinets. Filters covering panel openings shall be cleaned or replaced if dirty.

2) Category II and III Environment

- o External inspections shall be performed every 12 months unless equipment preservation requires supplemental heat (heat not provided by space heaters). If supplemental heat is required, inspections shall be performed every 3 months.

- o Internal inspections shall be performed every 24 months.

B. REQUIREMENTS BY TYPE (Cont'd)

4. Instrumentation and Computers (Cont'd)

3) Category IV Environment

- o External inspections shall be performed every 3 months.
- o Internal inspections shall be performed every 12 months.

B. REQUIREMENTS BY TYPE (Cont'd)

5. Air and Gas Compressors, Vacuum Pumps & Air Blowers

The basis for the preservation methods specified below is the prevention of corrosion attack on moving parts and machined surfaces. This is critical because of the material makeup and close machine tolerances of this equipment. To prevent moisture caused degradation, this equipment is maintained in a low humidity environment and/or supplemental corrosion protection is provided. Inspection and preventive maintenance frequencies are based on the severity of the environment maintained at the equipment location. In addition, air compressors, vacuum pumps and air blowers are periodically rotated to maintain a protective coating of oil over oil lubricated internal components and to insure that the components continue to operate freely.

a. Preservation Requirements

1) Category I Areas - Equipment covers and supplemental heat is not required.

2) Category II Areas - Equipment covers are not required. Supplemental heat is required, if directed by Preservation Engineering.

3) Category III & IV - Equipment covers and supplemental heat are required.

Note: Supplemental heat shall consist of heat tape and insulation wrapped around the cylinders and valve assemblies or other methods as directed by Preservation Engineering.

4) All air compressor and vacuum pumps (except item 5 below) shall be filled with oil to proper operating levels.

B. REQUIREMENTS BY TYPE (Cont'd)

5. Air and Gas Compressors, Vacuum Pumps & Air Blowers (Cont'd)

5) During the preservation period, the following equipment shall be filled with oil up to the fill-ports:

- o Roots/Dresser rotary lobe blower impeller cases.
- o Nash vacuum pump 1st & 2nd stage pump housings.
- o Waste gas compressor 1A & 1B.
- o Gas recombiner.
- o Nitrogen recycle compressor.

6) Oil and/or grease sampling, if applicable, will be specified and schedules established by Preservation Engineering under separate instructions (See Appendix E).

7) A nitrogen blanket (min. 5 PSI, max 25 PSI) shall be maintained on the Waste Gas Compressors 1A & 1B and also on the Gas Recombiner and Nitrogen Recycle Compressors.

8) The gas compressor fly wheels shall be blocked to prevent rotation (applies to Waste Gas Compressor 1A and 1B, Gas Recombiner and the Nitrogen Recycle Compressor).

9) The Vacuum Pump and Air Blower shafts shall be rotated during each external inspection.

10) Shafts of motor drivers and gear reducers shall be rotated during each external inspection (Reference Appendix A, Sections 12 and 19).

11) Control and instrument boxes mounted on equipment skids require periodic internal inspections if the skid is located in a Category IV environment (Reference Appendix A, Section 21).

12) Internal inspections will be performed when specified by Preservation Engineering on a case-by-case basis.

b. Periodic Maintenance Requirements

See Table 5.1 attached.

TABLE 5.1 PAGE 1 OF 1

AIR AND GAS COMPRESSORS, VACUUM PUMPS AND
AIR BLOWERS EXTERNAL INSPECTION SCHEDULE

	ENVIRONMENTAL CATEGORY/STORAGE LEVEL			
1) SAFETY RELATED EQUIPMENT	I			
a. DG Air Start Compressor Skids	02 year			
b. Waste Gas Compressors 1A & 1B Skids	02 year			
c. Gas Recombiner Skid	02 year			
d. Nitrogen Recycle Compressor Skid	02 year			
2) NON-SAFETY RELATED EQUIPMENT	I	II & B	III	IV
a. Air Compressor Skid (greater than 3 HP to 25 HP)	02 year	02 year	06 month	03 month
b. Air Compressor Skid (greater than 25 HP)	01 year	01 year	06 month	03 month
c. Vacuum Pump Skid (greater than 100 HP)	06 month	06 month	03 month *	03 month
d. Air Blower Skid (greater than 3 HP to 25 HP)	02 year	02 year	03 month *	03 month
e. Air Blower Skid (greater than 25 HP)	01 year	01 year	03 month	03 month

* Inspection frequency may be extended to 06 month based on specific environmental conditions at equipment locations, HP size and bearing type.

B. REQUIREMENTS BY TYPE (Cont'd)

6. Tanks

The basis for the tank preservation methods specified below, is the prevention of corrosion attack on interior and exterior tank surfaces. For carbon steel, elimination of the potential for standing water is the primary concern. For stainless steel, maintaining surfaces free of organic and/or carbon contamination is the primary concern.

a. Preservation Requirements

1) All openings are to be sealed utilizing caps, plugs, tape, etc. Tanks located in Environmental Category I, should have the main access openings screened. Tanks located in Category II, III and IV environments may have their openings screened. Preservation Engineering will issue direction on a case-by-case basis.

2) Unpainted external machined surfaces shall be coated with an approved preservative (Ref. CSP-9-04).

3) The addition of supplemental corrosion inhibitors may be utilized if specified by Preservation Engineering.

4) Stainless steel surfaces shall be maintained free of carbon contamination and organic growth.

5) Vendor or project installed coatings and linings shall be maintained.

6) Tanks or vessels under a nitrogen purge shall be maintained in a positive pressure condition.

b. Periodic Maintenance Requirements

1) Tanks located in Environmental Categories I, II and III - No SMS inspections required. Tank condition will be monitored as part of the Corrosion Monitoring Program (CMP) Walkdowns.

B. REQUIREMENTS BY TYPE (Cont'd)

6. Tanks (Cont'd)

2) Tanks located in Environmental Category IV -

- Carbon Steel - Internal surface bare. Perform an external and internal visual SMS inspection per CSP-9-02 on six-month intervals.

- Carbon Steel - Internal surfaces lined or coated. No SMS inspections required. Tank condition will be monitored as part of the Corrosion Monitoring Program (CMP) Walkdowns.

- Stainless Steel - No SMS inspections required. Tank condition will be monitored as part of the Corrosion Monitoring Program (CMP) Walkdowns.

B. REQUIREMENTS BY TYPE (Cont'd)

7. Piping

The basis for the preservation methods specified below is the prevention of water, dirt and/or corrosion by-product accumulations in the interior of pipe and fabricated piping assemblies and the protection of machined surfaces. For piping materials stored outdoors, maintaining traceability of heat and/or identification numbers is of prime importance.

a. Pipe and fabricated piping assemblies located in Environmental Category I, II & III.

1) No SMS inspections required. The condition of pipe materials and installed piping systems will be monitored as part of the Corrosion Monitoring Program (CMP) Walkdowns.

2) Installed piping should have openings sealed/screened utilizing caps, plugs, tape, etc.

3) Uninstalled straight pipe lengths, fittings and pre-fabricated pipe spools require no preservation activities and may be stored open or sealed.

b. Pipe and fabricated piping assemblies located in Environmental Category IV.

1) No SMS inspections required. Installed piping will be monitored as part of the Corrosion Monitoring Program (CMP) Walkdowns or as determined by Preservation Engineering. Stored piping spools and pipe materials shall be surveilled per CPS-9-19.

2) Pipe internals should be kept clean of standing water, dirt and corrosion by-products.

B. REQUIREMENTS BY TYPE (Cont'd)

7. Piping (Cont'd)

3) Pipe and fabricated pipe spools stored outdoors on dunnage shall be sloped to allow drainage. The lower end shall be open with the upper end capped or covered. Note: Small pipe assemblies and fittings may be exempt from these requirements if their configuration and storage position prevents the accumulation of water, dirt and/or corrosion by-products. Preservation Engineering to address exceptions of the slope and cap requirements of the above on a case-by-case basis.

4) Class I pipe stored outdoors on racks shall have caps at both ends. Class II and G pipe stored outdoors on racks should be stored with caps at both ends. Exceptions to these requirements will be handled on a case-by-case basis.

5) Installed piping shall have openings sealed utilizing caps, plugs, tape, etc. Stored and installed piping located outdoors shall have unprotected carbon steel machined surfaces coated with an approved preservative.

6) Stored and installed stainless steel piping located outdoors shall be inspected for algae growth and algae removed, if determined necessary by Preservation Engineering. (Note: Inspections are performed by Preservation Engineering during CMP Walkdowns or through Preservation Engineering SMS task.)

B. REQUIREMENTS BY TYPE (Cont'd)

8. Heat Exchangers

The basis for the heat exchanger preservation methods specified below is the prevention of corrosion attack on the interior and external surfaces of the vessels. For carbon steel, the elimination of internal condensation is the primary concern.

Note: This section applies to all heat exchangers and to equipment water coolers where designated by Preservation Engineering on a case-by-case basis.

a. Preservation Requirements

1) All openings are to be sealed utilizing caps, plugs, tape, etc. Heat exchangers not on a nitrogen gas purge and located in Environmental Category I, should have the main access openings screened to provide natural circulation. Heat exchangers located in Environmental Category II and III may also have their openings screened. Preservation Engineering will issue direction on a case-by-case basis.

2) Unpainted external machined surfaces shall be coated with an approved preservative (Ref. CSP-9-04).

3) Stainless steel surfaces shall be maintained free of carbon contamination and organic growth.

4) Vendor or project installed coatings and linings shall be maintained.

5) Heat exchangers under a nitrogen purge shall be maintained in a leak tight, positive pressure condition.

B. REQUIREMENTS BY TYPE (Cont'd)

8. Heat Exchangers (Cont'd)

b. Periodic Maintenance Requirements

1) Heat exchangers located in Environmental Category I require no SMS inspections. Vessels will be monitored as part of the Corrosion Monitoring Program (CMP) walkdowns.

2) Heat exchangers not on a nitrogen gas purge and located in Environmental Category II and III will have internal and external SMS inspections performed once every two years per CSP-9-02.

Note: Heat exchangers under a nitrogen gas blanket receive periodic checks to assure positive gas pressure is maintained.

c. Special Requirements

1) Condenser - Water box manway hatches shall be screened and left open for natural air circulation. No SMS inspections required. Condenser internal and external conditions will be monitored as part of the Corrosion Monitoring Program (CMP) walkdowns.

2) Inspection and maintenance requirements for the Dry Cooling Tower Heat Exchangers are not addressed in this appendix. Separate specific preservation requirements will be issued by Preservation Engineering for these units.

B. REQUIREMENTS BY TYPE (Cont'd)

9. Switchgear, Motor Control Centers, Control Panels and Miscellaneous Electrical Panels

The basic plan for the preservation of this electrical equipment is the maintenance of the equipment in a temperature stable, low-to-moderate humidity and low dust environment through the actions listed below. The maintenance of this environment will prevent the absorption of moisture by electrical insulating materials, corrosion of electrical contact surfaces and accumulation of dust on and within the panel.

a. Preservation Requirements

1) Space heaters contained within installed equipment shall be energized unless the equipment is located in a Category I environment.

2) If equipment does not contain space heaters, then a shroud and supplemental heat shall be provided for non-operational equipment (excluding lighting and power panels) installed in a Category III or IV environment. (Note: A shroud is not required if equipment enclosure is maintained as Nema 4 or Nema 12.)

3) If in storage, equipment shall be placed in a Level A or B storage area. In storage, space heater energization is not required.

4) Equipment not protected by a shroud shall have its enclosure maintained dust-tight. All openings, including raceway openings, shall be sealed to maintain a low dust environment.

5) If required, the shroud should provide a waterproof/dust resistant covering over the equipment. Where feasible, an air space should be maintained between the equipment and the shroud.

B. REQUIREMENTS BY TYPE (Cont'd)

9. Switchgear, Motor Control Centers, Control Panels and Miscellaneous Electrical Panels (Cont'd)

6) Equipment located in the control room and adjoining relay rooms is protected from temperature variation and humidity by a temporary heating and air conditioning system. A positive inflow of filtered air is also maintained into this area to reduce dust accumulation.

7) Lighting and power panels do not require supplemental protection. Note: There are no lighting and power panels located in a Category IV environment.

8) External and internal visual inspections shall be performed per CSP-9-02.

b. Periodic Maintenance Requirements

1) Equipment (except lighting and power panels)

a) Category I Environment

o External and internal visual inspections shall be performed every 24 months. Included with the internal visual inspection shall be an inspection of subassemblies for evidence of corrosion, loss of dust tight seal, and dust accumulation. Dust, if observed, shall be wiped or vacuumed from components and cabinets. Filters covering panel openings shall be cleaned or replaced if dirty.

B. REQUIREMENTS BY TYPE (Cont'd)

9. Switchgear, Motor Control Centers, Control Panels and Miscellaneous Electrical Panels (Cont'd)

b) Category II and III Environment

- o External inspections shall be performed every 12 months unless equipment preservation requires supplemental heat (heat not provided by space heaters). If supplemented heat is required, inspections shall be performed every 3 months.
- o Internal inspections shall be performed every 24 months.

c) Category IV Environment

- o External inspections shall be performed every 3 months.
- o Internal inspections shall be performed every 12 months.

2) Lighting and Power Panels (non-operational)

a) Category III Environment

- o External and internal inspections shall be performed every 2 years.

B. REQUIREMENTS BY TYPE (Cont'd)

10. Outdoor Oil Filled Transformers

The basic premise for the preservation of outdoor oil filled transformers is to preclude the affects of moisture/corrosion both internal and external to the transformers.

a. Preservation Requirements

1) Space heaters provided in control cabinets shall be energized.

2) Transformers without atmoseal expansion tanks shall be pressurized with nitrogen.

3) Because of minimal loading, testing the terminal connections of energized transformers by means of infrared scanning is not required during the preservation period.

4) Specific maintenance requirements for energized and non-energized oil filled transformers are set forth in Table 10.1.

TABLE 10.1

EQUIPMENT TYPE

INSPECTION TASKS	TASK FREQUENCY	MAIN TRANSF. 1,2,3,& 4	* STANDBY TRANSF. ST1, ST2A, ST2B	AUX BOILER TRANSF. ABT1	UNIT AUX TRANSF. UA1, UA2A UA2B	* MAKEUP WATER TRANSF. A4 & B4	* TRANSF. B21	TRANSF. B24	* OIL FILLED GROUNDING TRANSF.	OIL FILLED GROUNDING TRANSF.
Inspection & Maintenance of standby transformers per PPM 10.337.2.	01 year		M							
Inspection & Maintenance of transformers per PPM 10.337.3T.	01 year					M				
Inspection & Maintenance of transformers with the exception of areas relating to energized portions of the transformers. PPM 10.337.3T	01 year	M		M	M					
Inspection & Maintenance of transformer with the exception of areas relating to energized portions of the transformer. PPM 10.300.30	01 year							M		
Inspect external resin exposed carbon steel machined surfaces and bolting hardware with Tectyl 506 as required. CSP.9.02	01 year								M	M
Inspect internals - All control cabinets, instrumentation and attached equipment. CSP.9.02	03 month	M	M	M	M	M	M	M		
Sample transformer oil for dielectric tests. PPM 10.300.59 Section A, C, D, E.	01 year	M	M	M	M	M	M	M		

M = Maintenance Function

O = Operations Function

* = Energized Equipment

EQUIPMENT TYPE

INSPECTION TASKS	TASK FREQUENCY	MAIN TRANSF. 1,2,3,& 4	* STANDBY TRANSF. ST1, ST2A, ST2B	AUX BOILER TRANSF. ABT1	UNIT AUX TRANSF. UA1, UA2A UA2B	* MAKEUP WATER TRANSF. A4 & B4	* TRANSF. B21	TRANSF. B24	* OIL FILLED GROUNDING TRANSF.	OIL FILLED GROUNDING TRANSF.
External inspection of in-service transformer. Check for deleterious conditions.	03 month		M			M	M		M	
Operate transformer cooling fans for 30 minutes.	03 month	O	O	O	O	O	O	O		
Operate transformer oil circulation pumps for 30 minutes.	03 month	O	O	O	O					
Inspection transformer per PPM 10-309-30.	01 year						M			
Inspect transformer tank nitrogen pressure. Min 1/2 PSI, Max 3 PSI. Check nitrogen bottle pressure.	01 week				O	O	O	O		
Inspect transformer tank auto nitrogen pressure system. Min 1/2 PSI, Max 6 1/2 PSI.	01 month			O						
Inspect sintomeal expansion tank, pressure vacuum relief valve and breather openings to ensure they are not obstructed. PPM 10-337-2.	01 year	M	M							
Inspect transformer for oil leaks and check status of space heaters in transformer enclosure.	01 year								M	M
Inspect transformer to bus connections. Insure connections are tight. PPM 10-337-2.	01 year								M	

M = Maintenance Function

O = Operations Function

* = Energized Equipment

B. REQUIREMENTS BY TYPE (Cont'd)

11. Indoor Dry Type Transformers (Power Center and Lighting and Power Panel Transformers)

The basis for the preservation of dry type transformers is preventing moisture/dust caused deterioration of the transformer's insulation or cooling capability. This is accomplished by maintaining the proper environment at their installed or stored location and performing periodic maintenance. An environment with stable temperatures, moderate humidity levels and low dust accumulations is perfect for preservation. The actions listed below will insure that these preservation requirements are meet.

a. Preservation Requirements

1) Space heaters in power center transformers shall be energized unless the transformer is located in a Category I environment and is energized.

2) All non-energized dry type lighting or power panel transformers in Category III & IV environment shall have supplemental heat added.

3) Dry transformers shall not be covered to the point where the cover interferes with free air circulation.

b. Periodic Maintenance Requirements

Periodic maintenance requirements are shown in Table 11.1.

TABLE 11.1

EQUIPMENT TYPE

TASK DESCRIPTION	TASK FREQUENCY	ENERGIZED DRY TRANSFORMERS	NON-ENERGIZED DRY TRANSFORMERS WITH SPACE HEATERS	NON-ENERGIZED DRY TRANSFORMERS WITH SUPPLEMENTAL HEAT (LIGHT BULBS)
Inspect external of transformer for deleterious conditions and status of supplemental heat. (SP-9-02	03 months			M
Inspect external of transformer for deleterious conditions and status of space heaters. (SP-9-02	06 months	M	M	
Inspect internal of transformer and perform maintenance per PPM 10.300.40	01 year	M		
Inspect internal of transformer and perform maintenance in accordance with the cleaning portions only of PPM 10.300.40.	02 year		M	M

M = Maintenance Function

B. REQUIREMENTS BY TYPE (Cont'd)

12. Motors

The basis for the preservation of motors is the prevention of corrosion on external machined and internal bearing surfaces and moisture degradation of winding insulation. Prevention of moisture caused degradation is accomplished by heating and environmental controls as well as through maintenance of lubricant coatings on machine and bearing surfaces. This section does not apply to motors which are part of motor operated valves (see Section B.3).

a. Preservation Requirements

1) Space heaters contained within installed motors shall be energized unless the motor is located in a Category I environment and is rated at 480 volts or less.

2) A shroud and supplemental heat shall be provided if the motor is not installed in a Category I environment except as follows:

- o Category II environments - A shroud and supplemental heat are not required if the motor is either rated 25 HP or less or has energized space heaters.

- o Category III and IV environments - A shroud and supplemental heat are not required for totally enclosed motors with built-in space heaters that are designed for outdoor service or for motors rated 3HP or less in a Category III environment.

3) If required, the shroud shall provide a waterproof, dust resistant covering over the motor. Air space shall be provided between the motor and the shroud.

4) If the motor is not installed, it shall be maintained in Level B (or Level A) storage. In storage, use of shrouds and supplemental heat is not required for motor protection. However, installed space heaters shall be energized in motors rated above 480 volts.

B. REQUIREMENTS BY TYPE (Cont'd)

12. Motors (Cont'd)

5) Machined surfaces shall be coated with an approved preservative.

6) Lubricant coating on bearing surfaces shall be periodically replenished by shaft rotation, except for oil lubricated vertical motors which have their shafts lifted and small motors for which periodic inspections have been deleted as indicated in Table 12.1.

7) Oil and/or grease sampling, if applicable, will be specified and schedules established by Preservation Engineering under separate instructions (Ref. Appendix E).

8) Vertical motors with Kingsbury bearings may have shafts lifted. This eliminates metal to metal contact, allows oil to reach all bearing surfaces and eliminates the need for shaft rotation. Shafts are lifted so the bearing is positioned midway between the bearing plates.

b. Periodic Requirements

1) Shaft rotation and external inspection shall be performed per CSP-9-02 and Table 12.1.

2) Insulation Resistance Testing per CSP-9-02

- Category I, II and III environments - Testing to be performed on a sample basis. Each quarter, 2 motors in each category will be selected by Preservation Engineering for testing. Emphasis will be placed on testing high voltage motors.

B. REQUIREMENTS BY TYPE (Cont'd)

12. Motors (Cont'd)

o Category IV environment

- Medium Voltage Motors (4.16KV and 13.8KV) - Test each motor every 6 months.

- 480 Volt Motors - Test each motor every 12 months.

- Less than 480 volt motors - Random testing only - to be covered as part of the CMP walkdowns.

TABLE 12.1 PAGE 1 OF 1

MOTOR ROTATION AND/OR EXTERNAL INSPECTION SCHEDULE

	ENVIRONMENTAL CATEGORY/STORAGE LEVEL			
1) SAFETY RELATED MOTORS	I	B		
a. 7.5 HP or less	None	02 year		
b. Greater than 7.5 HP up to 25 HP	02 year	01 year		
c. Greater than 25 HP up to 100 HP	01 year	06 month		
d. Greater than 100 HP up to 250 HP	06 month	06 month		
e. Greater than 250 HP	03 month *	03 month *		
2) NON SAFETY RELATED MOTORS	I	II & B	III	IV
a. 3 HP or less	None	None	None	03 month
b. Greater than 3 HP up to 15 HP	None	None	06 month	03 month
c. Greater than 15 HP up to 25 HP	02 year	02 year	03 month *	03 month
d. Greater than 25 HP up to 100 HP	01 year	01 year	03 month *	03 month
e. Greater than 100 HP up to 250 HP	06 month	06 month	03 month	03 month
f. Greater than 250 HP	03 month *	03 month *	03 month	03 month

* Inspection frequency may be extended to 06 month based on specific environmental conditions at equipment locations, HP size and bearing type.

B. REQUIREMENTS BY TYPE (Cont'd)

13. Cranes and Hoists

13.1 Cranes

The basis for the preservation of cranes is the prevention of moisture induced corrosion of bearings and machined surfaces and degradation of electrical insulation properties. The preservation requirements for equipment in this category generally follow standard practices for preserving large mechanical equipment. However, some of the maintenance activities will vary due to the operational status of the individual pieces of equipment.

a. Preservation Requirements

1) Equipment that is operational shall be maintained as specified in Table 13.1.

2) Cranes that cannot be operated do not require SMS unless specified by Preservation Engineering.

13.2 Hoists (Manual or Electrical Powered)

The basis for the preservation of hoists is the prevention of moisture induced corrosion of gears and machined surfaces and degradation of electrical insulation properties. For hoists, this is achieved through control of the building environment in which the hoist is located. SMS inspections of these components are not required.

Oil leakage may occur from these units due to grease separation or failures of oil seals. If this occurs, specific SMS tasks shall be established to contain the leakage by use of absorbent.

TABLE 13.1

PAGE 1 OF 1

MAINTENANCE REQUIREMENTS FOR OPERATING CRANES

MAINTENANCE REQUIREMENTS	INSPECTION FREQUENCY	POLAR CRANE 3-RC-CRN-1	TURBINE BLDG. CRANE 3-TBB-CRN-1	ADMIN. BLDG. CRANE 3-ASB-CRN-1
Check all level in all gear boxes for proper level and fill as needed. Check all greased components and add grease as directed by supervisor. Inspect all wire lubricated rope and redress as necessary.	01 year	M	M	M
Verify permanent installed space heaters in cabinets and panels are operational.	03 month	M	M	M
External Inspection - inspect exterior surfaces for deleterious conditions, repaint areas as required.	01 year			
Internally inspect all cabinets, panels for deleterious conditions, Check operation of space heaters.	01 year			M
Grease all Zerk fittings on wheels and carriage assemblies.	03 month		M	M
Replace desiccant bags in main control cabinet.	06 month			
Internally inspect all cabinets, panels for deleterious conditions, check operation of space heaters.	06 month			
Monthly maintenance checks per PPM 10.400.10.	01 month	M	M	M
Annual maintenance checks per PPM 10.400.10.	01 year	M	M	M
Check adjustment of aux. hoist solenoid brakes per PPM 10.334.1	03 month	M	M	M
Inspection, PM & testing per PPM 10.334.1.	01 year	M	M	M
Sample oil in gear reducers for visual color and water analysis per PPM 10.400.10.	01 year	M	M	M

M = Maintenance Function

B. REQUIREMENTS BY TYPE (Cont'd)

14. HVAC Water Chillers

The basis for the preservation methods specified below is the prevention of moisture induced degradation on the chiller internals, external machined surfaces and electrical components.

a. Preservation Requirements

1) Chiller internals - Refrigerant side and the cooler and condenser water side shall be protected by purging with dry nitrogen. Pressure to be maintained between 5 and 15 pounds.

2) Exterior machined surfaces shall be protected with an approved preservative.

3) Electrical enclosures - Maintain a dust-tight cabinet closure (NEMA 12). For equipment located in a Category I and II environment, no other action is required. For equipment located in a Category III environment, Zerust VC2-1 vapor phase inhibitor may be placed within the enclosure per CSP-9-02.

b. Periodic Maintenance Requirements

1) Nitrogen purge to be verified on periodic basis as part of the scheduled SMS purge inspection.

2) For equipment located in a Category I and II environment - No SMS inspections are required. Water chillers will be monitored as part of the Corrosion Monitoring Program (CMP) Walkdowns.

B. REQUIREMENTS BY TYPE (Cont'd)

14. HVAC Water Chillers (Cont'd)

3) For equipment located in a Category III environment -

- o Annual external and internal SMS inspections shall be performed per CSP-9-02.

B. REQUIREMENTS BY TYPE (Cont'd)

15. Evaporative Air Coolers, Air Handling Units, Air Cleaning Units, Air Conditioning Units, Cooling Towers and Fans

The basis for the preservation methods specified below is the prevention of corrosion attack on equipment, particularly internals and machined surfaces. (Note: The preservation of motors, electrical enclosures, pumps, valves, valve actuators, instruments and tanks contained within these HVAC units shall be preserved in accordance with the requirements established for that equipment type.)

a) Preservation Requirements

1) A water-tight enclosure shall be maintained for equipment located in a Category IV environment.

2) Stainless steel surfaces shall be maintained free of contamination and organic growth.

3) Vendor installed exterior coatings shall be maintained.

4) Machined surfaces shall be coated with an approved preservative.

5) Lubricant coatings on bearing surfaces of fan shafts shall be replenished by periodic shaft rotation except for small fans for which periodic inspections have been deleted as indicated in Table 15.1.

b) Periodic Requirements

1) External inspection and internal inspection of HVAC equipment and shaft rotation of fans per CSP-9-02 and Table 15.1. (Note: Inspection frequency for HVAC equipment is established by the size of the fans contained within the equipment and the environmental category in which it is located.)

TABLE 15.1 PAGE 1 OF 1

FAN ROTATION AND/OR EXTERNAL INSPECTION SCHEDULE

	ENVIRONMENTAL CATEGORY/STORAGE LEVEL			
1) SAFETY RELATED FANS	I	B		
a. 7.5 HP or less	None	02 year		
b. Greater than 7.5 HP up to 25 HP	02 year	01 year		
c. Greater than 25 HP up to 100 HP	01 year	06 month		
d. Greater than 100 HP up to 250 HP	06 month	06 month		
e. Greater than 250 HP	03 month *	03 month *		
2) NON-SAFETY RELATED FANS	I	II & B	III	IV
a. 3 HP or less	None	None	None	03 month
b. Greater than 3 HP up to 15 HP	None	None	06 month	03 month
c. Greater than 15 HP up to 25 HP	02 year	02 year	03 month *	03 month
d. Greater than 25 HP up to 100 HP	01 year	01 year	03 month *	03 month
e. Greater than 100 HP up to 250 HP	06 month	06 month	03 month	03 month
f. Greater than 250 HP	03 month *	03 month *	03 month	03 month

* Inspection frequency may be extended to 6 months based on specific environmental conditions at equipment locations, HP size and bearing type.

B. REQUIREMENTS BY TYPE (Cont'd)

16. Mechanical Penetr tion Assemblies

a. Except as described in "b" below, no preservation activity is required for mechanical penetrations.

b. The mechanical penetrations exposed to the outside atmosphere (north and south steam tunnels) shall be externally inspected annually for any deleterious conditions including corrosion and temporary closure seal failure. Unpiped penetrations shall have the closure removed and an internal inspection performed once every two years. Penetrations which contain a stainless steel bellows to carbon steel pipe connection shall have that joint coated with an approved corrosion inhibitor per CSP-9-04. Note: The protective covers over the bellows may remain off to facilitate the inspection of the bellows and the application of the inhibitor.

B. REQUIREMENTS BY TYPE (Cont'd)

17. Electrical Penetrations

The basis for the electrical penetration preservation methods specified below is the prevention of moisture induced degradation. The environment in which electrical penetrations are located should be dry and the penetration internals shall be protected with a nitrogen purge.

a. Preservation Requirements

1) Maintain installed penetrations in a Category I environment. (Stored penetrations may be maintained in a Level B storage area.)

2) Maintain the penetration purge with dry nitrogen, minimum pressure 10 psig, maximum pressure 40 psig.

b. Periodic Maintenance Requirements

1) External Visual Inspection - The exterior of the inboard and outboard penetration assemblies and terminal boxes shall be inspected per CSP-9-02. At this time the nitrogen purge shall be verified to be within acceptable limits. This inspection shall be performed on an annual basis.

2) Internal Visual Inspection of Terminal Boxes - Perform an internal inspection of the penetration terminal boxes. Look for physical or rodent damage or other deleterious conditions. Penetration terminal boxes not readily accessible will be inspected only, if designated by Preservation Engineering. This inspection shall be performed every three years.

B. REQUIREMENTS BY TYPE (Cont'd)

18. Rebar, Embeds and Structural Steel (Category IV Environment)

The basis for rebar, embeds, and structural steel preservation methods specified below, is the prevention of corrosion attack on the carbon steel surfaces that are exposed to an outdoor environment. Elimination of the potential for free standing water and entrapment of moisture are the primary concerns.

a. Methods of Preservation

1) Concrete floor/slab blockouts - If the floor blockouts can be sealed to prevent moisture entry, then sealing is the preferred preservation method. If the blockouts can not be sealed to prevent moisture entry, then they should be covered and ventilated.

2) Storage orientation - Whenever possible, structural shapes shall be stored so as to not allow free standing water.

3) Rebar dowels - Area of concrete interface with the dowels shall be kept clean to avoid moisture entrapment. Dowels subject to corrosion degradation shall be coated at the concrete interface using Rustoleum 769 damp-proof primer (Ref. QFPCP-35Q 21194). The primer shall be reapplied as necessary based on CMP walkdown findings.

4) Maintenance of vendor or construction applied coatings.

5) A temporary preservative (Tectyl) may be used to protect carbon steel surfaces when the application of permanent coatings is not practical.

B. REQUIREMENTS BY TYPE (Cont'd)

18. Rebar, Embeds and Structural Steel (Category IV Environment) (Cont'd)

b. Periodic Maintenance Requirements

1) The condition of rebar, embeds and structural steel will be monitored as part of the Corrosion Monitoring Program (CMP) walkdowns.

2) Stored rebar, embeds and structural steel shall be surveilled per CSP-9-19.

B. REQUIREMENTS BY TYPE (Cont'd)

19. Gear Drives/Gear Reducers

The basis for the preservation methods specified below is the prevention of corrosion attack on all machined and gear surfaces.

a. Preservation Requirements

1) All openings are to be sealed utilizing caps, plugs, tape etc. to prevent dust and/or water contamination.

2) Unpainted external machined surfaces shall be coated with an approved preservative (Ref. CSP-9-04).

3) Lubrication coating on bearing/gear surfaces shall be replenished by rotation unless specified otherwise by Preservation Engineering.

4) The addition of supplemental corrosion inhibitors or the overfilling/immersion of machine surfaces with oil may be utilized if specified by Preservation Engineering.

b. Periodic Maintenance Requirements

1) External inspections and/or shaft rotations are to be performed per the requirements of CSP-9-02 and at the same frequency as established for the motor driver (Ref. Table 12.1).

c. Special Requirements

1) Oil and/or grease sampling, if applicable, will be specified and scheduled by Preservation Engineering under separate instructions (Ref. Appendix E).

2) The Dry Cooling Tower Gear Reducers will have their internal condition monitored through CMP walkdown inspectons or as directed by Preservation Engineering.

B. REQUIREMENTS BY TYPE (Cont'd)

20. Pipe Supports - Snubbers, Struts and Spring Cans

The basis for the pipe support preservation methods specified below is the prevention of corrosion attack on critical support components (springs, threaded adjustment rods, etc.).

a. No scheduled inspection or maintenance is required for snubbers, struts or spring cans which are located in Environmental Cateogory I, II and III.

b. Support components stored or installed outdoors will not have a specific SMS inspection. However, a random inspection will be made during Corrosion Monitoring Program (CMP) walkdowns, with directions issued for any maintenance required.

Pipe support components (snubbers, struts & spring cans) located in an environmental Category IV shall be maintained without the use of plastic wraps.

c) Special Requirements

1) Hydraulic snubbers will be preserved in accordance with direction issued by Preservation Engineering on a case-by-case basis.

B. REQUIREMENTS BY TYPE (Cont'd)

21. Locally Mounted Electrical/Instrumentation Equipment

This category includes all locally mounted instruments and electrical components within the plant such as sump pump controls, limit switches, local controllers, level switches, thermostats and terminal boxes. For many of these items, low replacement costs do not justify extensive preservation efforts. The basis for preserving this equipment is preventing moisture caused degradation by maintaining the interior of the enclosures dry and/or protecting interior components with a preservative or vapor phase inhibitor. Accordingly, the preservation efforts will be directed at equipment located outdoors or in areas exposed to the outdoor environment.

a. Preservation Requirements

1) For equipment located in Category I, II and III environments, no preservation actions are required.

2) For equipment located in Category IV, one or more of the following preservation actions should be considered.

- o Protect electrical contact and terminals with CRC electra-shield.
- o Protect enclosure with a shroud.
- o Perform a periodic check to assure Nema 4 & Nema 3R enclosure conditions are being maintained.
- o Protect enclosure with energized space heaters or supplemental heat.
- o Protect with a vapor phase inhibitor.

b. Periodic Maintenance Requirements

1) Equipment located in Category I, II and III environments - no periodic SMS inspections are required.

B. REQUIREMENTS BY TYPE (Cont'd)

21. Locally Mounted Electrical/Instrumentation Equipment (Cont'd)

2) If designated by Preservation Engineering for equipment located in Category IV environment - Perform an external and internal SMS inspection on a yearly basis. An internal SMS inspection of equipment protected by a shroud is required every two years.

B. REQUIREMENTS BY TYPE (Cont'd)

22. Preservation Requirements For Non-Safety Related Station Batteries

The basis for preservation of these batteries is to maintain each battery cell in a fully charged condition without excessive specific gravity gradient. This will be accomplished by maintaining each cell at the proper float charge and by performing a periodic equalization charge. The frequency and extent of battery maintenance is to be minimized and some risk is assumed for undetected conditions that could cause battery deterioration (see memo 3-PEM-90-012).

a. Preservation Requirements

1) Maintain float charge at 2.25 volts/cell. Minimum individual cell voltage to be maintained above 2.13 volts per cell.

2) Perform a periodic equalization charge/freshing charge to restore battery cells to a full charge condition, to remove sulfate from negative cell plates and to reduce specific gravity gradient.

3) Minimize cell specific gravity gradient from top to bottom of cell. At the end of an equalization charge, the gradient from top to bottom should be .01 or less.

4) Maintain cell electrolyte levels between low and high marks.

5) Maintain cell connections torqued and free of corrosion.

6) Maintain cell negative plates free of excessive sulfating (glitter).

B. REQUIREMENTS BY TYPE (Cont'd)

22. Preservation Requirements For Non-Safety Related Station Batteries (Cont'd)

b. Periodic Maintenance Requirements

1) Twice weekly operational checks/visual inspections.

- o Verify charger operating with correct output voltage (float charge at 2.25 volts/cell).
- o Visually inspect battery room and battery cells for evidence of physical damage/deterioration.
- o Verify ventilation fan operating.

2) Monthly inspection.

- o Perform per PPM 10.300.16. (No battery cell measurements are required.)

3) Quarterly inspection.

- o Perform per PPM 10.300.21. (Specific gravity and voltage measurements taken on pilot cells only.)

4) Annual inspection. (Full set of specific gravity and voltage measurements taken).

- o Perform an annual inspection per PPM 10.300.17.

5) Annual and for cause equalization charge.

- o Perform an annual equalization charge per PPM 10.300.22. An equalization charge shall also be performed after any discharge of a battery. To avoid repeated equalization charges, the annual equalization charge should be scheduled after the 230KV system outage.

B. REQUIREMENTS BY TYPE (Cont'd)

22. Preservation Requirements For Non-Safety Related Station Batteries (Cont'd)

c. Special Requirements

1) Any battery cell with copper contamination that can not maintain a cell voltage above 2.13 volts is to be isolated from other cells of the battery. When this is done, float voltage shall be adjusted so the balance of the cells maintain a float voltage of 2.25 volts/cell (Reference Exide Corp. Letter GI3-89-024).

WNP-3 PRESERVATION PROGRAM

APPENDIX B TO WMC-051

WNP-3 STRUCTURAL MATERIAL CORROSION MONITORING PROGRAM (CMP)

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WNP-3 STRUCTURAL MATERIAL CORROSION MONITORING PROGRAM

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WNP-3 STRUCTURAL MATERIAL CORROSION MONITORING PROGRAM

I. INTRODUCTION

The WNP-3 structural material Corrosion Monitoring Program (CMP) is an integral part of the WNP-3 Preservation of Assets Program. The implementation of the Corrosion Monitoring Program provides both qualitative and quantitative data on the structural material changes due to the environment during the period of construction delay. Coupons of actual or typical plant materials are mounted and placed at selected locations at WNP-3 to obtain corrosion rate data. Photographs are also used to document the appearance of the plant equipment and test coupons. Together the coupons and the photographs provide a corrosion baseline. Upon restart, additional photographs and inspections by material engineers will compare the current conditions to the baseline conditions. Evaluations as to the extent of corrosion caused degradation during the preservation period can then be made.

The CMP will be performed in accordance with the applicable criteria of 10CFR50, Appendix B, to establish and assure traceability and credibility. The data will be used to support technical decisions related to the ongoing preservation program and to the acceptability of the plant.

The CMP also includes a periodic walkdown of the plant. The purpose of this walkdown is to:

1) Inspect test coupons and plant components/materials for corrosion degradation including conditions within the plant which are conducive for corrosion.

2) Evaluate atmospheric conditions within the plant and the effectiveness of humidity control and closures to the outside environment.

3) Perform special tests and inspections as determined by the Corrosion Engineer or Preservation Engineering.

An inspection report is issued at completion of the walkdown to provide input to the Plant Preservation Program.

II. DEFINITIONS

1) Atmospheric corrosion - Electrochemical corrosion reactions occurring on metallic surfaces in the presence of atmospheric moisture, usually not observed at relative humidities below 50%.

2) Corrosion - The chemical or electrochemical reaction between a material, (usually a metal) and its environment that produces a deterioration of the material and subsequently its properties.

3) Galvanic Corrosion - Corrosion caused by differences in electrochemical conditions between contacting metals (one either in contact with a more noble metal or with a non-metallic conductor in a corrosive electrolyte) or between metals and their environment.

4) Galvanic Couple - A pair of dissimilar conductors, usually metals, in electrical contact. (See galvanic corrosion.)

5) Inhibitor - A chemical substance or combination of substances that, when present in the proper concentration in the environment, prevents or reduces corrosion.

6) Pitting - Cavities caused by the corrosion of a metal surface, confined to a point or small area.

7) Corrosion Engineer - The engineer from the Supply System, Corporate Materials and Welding Department, who is responsible for the technical adequacy of the CMP. The Corrosion Engineer leads the CMP walkdown, defines and conducts the Corrosion Test Coupon Program and prepares CMP reports required by this specification.

8) Preservation Engineering - The Site engineering group that is primary interface with the Corrosion Engineer. Preservation Engineering participates in the CMP walkdown. Preservation Engineering also tracks closure of items contained within the CMP Walkdown Inspection Report.

9) Rust - A corrosion product consisting primarily of hydrated iron oxide. (A term properly applied only to ferrous alloys.)

10) Uniform Corrosion - Corrosion that is distributed uniformly over the metal surface, and is not localized.

III. APPLICABLE STANDARD METHODS

The following standards are applicable to the corrosion testing of WNP-3 structural materials:

1) ASTM G1, Recommended Practice for Preparing, Cleaning and Evaluation of Corrosion Test Specimens.

2) ASTM G4, Recommended Practice for Conducting Plant Corrosion Tests.

3) ASTM G33, Recommended Practice for Recording Data from Atmospheric Corrosion Tests of Metallic/Coated Steel Specimens.

4) ASTM G46, Recommended Practice for Examination and Evaluation of Pitting Corrosion.

5) ASTM G50, Conducting Atmospheric Corrosion Tests on Materials.

6) 10CFR50, Appendix B (Applicable Controls).

IV. OBJECTIVES

The objectives of the CMP are to:

1) Reduce the potential for corrosion within the plant.

2) Establish a baseline condition of the corrosion on plant structural materials and components. The extent of corrosion degradation is then determined by comparisons to the baseline conditions. Documentation of corrosion degradation will be used to support the project's technical evaluation of the impact of preservation on plant materials.

3) Provide timely notification of degrading conditions during preservation, such that corrective actions can be taken.

4) To establish and maintain traceability of the records in accordance with the criteria of 10CFR50 Appendix B.

V. CORROSION TEST COUPON PROGRAM

The Corrosion Test Coupon Program involves placing weight loss test coupons of actual or typical plant materials in the plant and outdoors. Corrosion rate data is obtained through monitoring and testing of the coupons. Coupons are monitored and/or tested for uniform, crevice, galvanic and pitting types of corrosion. Coupon materials and test rack locations are shown on Tables I and III. Supplemental test coupons for two special studies have also been placed. The supplemental test coupon locations are shown in Table II. Test results from this program will provide quantitative data on corrosion degradation during the preservation period. Test equipment identification and calibration expiration dates shall be noted on data sheets.

A. Coupon Material Selection

Considering general atmospheric conditions inside plant buildings and outdoors, published literature, and the plant materials being monitored, the carbon steel alloys rank the highest in expected corrosion rates. Therefore, the bulk of the coupons are carbon steel alloys.

The coupons are prepared from metals selected to represent actual plant structural steel and piping, NSSS vessels, rebar and nuts, anchor bolting and structural bolting. The alloys used in the coupons testing are A-105, A-36, A-533 Gr. B Class 2, C-1045, C-1141 and C-4140, 17-4 PH, type 304-SS, A-527 and A-471 Cl 5.

Plain carbon steel atmospheric corrosion rates are expected to range between 0.6 and 1.3 mpy (mils per year) where the relative average humidity is greater than 60%. High-strength low-alloy carbon steels are expected to corrode at a rate of 0.3 mpy. Atmospheric corrosion rates for stainless steel, aluminum, copper, and zinc coated materials are approximately 0.011, 0.03, 0.023, 0.08 mpy respectively.

B. Corrosion Monitoring Methods

Carbon steel uniform corrosion rate data and galvanic couple between two dissimilar metal corrosion rate data will be determined for site specific conditions using weight loss methods. Coupons, selected and fabricated from alloys representative of plant materials, are mounted on racks which are placed within the construction site and inside selected buildings. All coupons are prepared, initially

identified, photographed, weighed and installed on a rack for long term exposure. At the end of their exposure period, as determined by the Corrosion Engineer, the coupon is removed, tested and examined for type and depth of corrosion.

Reinforcement bar corrosion is a difficult condition to model and it is further complicated by the fact that the acceptance criteria is not based on a minimum wall thickness. ASTM acceptance standards for this product form are based on tensile and bend tests. To avoid problems with non-standard qualitative data, reinforcement bar corrosion evaluation uses both weight loss corrosion rate determinations and actual acceptance testing of exposed rebar.

Supplemental test coupons have been placed to monitor corrosion under the following special conditions:

1) Steam Generator Corrosion Internal Surfaces

Coupons are placed in the primary side of both steam generators attached to the temporary seals on each inlet nozzle. The coupons are made from high strength low alloy plate similar to the vessel material.

2) Rebar Corrosion

Rebar has been placed in the Field Test Rack No. 2. Small diameter rebar is used to produce worst case data due to the higher surface area to mass ratio.

C. Coupon Preparation and Identification

Standard size test coupons are selected for the corrosion study. Dissimiliar metal coupons are made from carbon steel to stainess steel weld samples. The coupons nominally measure 3" x 1" and vary between 1/8 and 1/4 inch thickness. The size is selected by the Corrosion Engineer to optimize the accuracy of the data, ease of data collection and coupon cost. A hole drilled in one end is used to attach the coupon to the rack. Coupons for weight loss and corrosion rate measurements are ground to approximately a 120 grit surface finish. All burrs are removed and edges lightly rounded.

Coupons are identified with stamped numbers and/or letters and the unique identification shall appear on the data sheet establishing the initial coupon conditions. The identification measures used shall insure traceability of the coupons for the duration of the program. The pre-exposure preparation of the coupons follows the standard recommended practices established by the American

Society for Testing Materials (Section III). Coupons shall be mounted on the test racks in a manner to provide electrical isolation as determined by the Corrosion Engineer.

D. Test Rack Description

Test racks are classified as either field racks, building racks or supplemental locations for coupon holders. The racks are either secured to a permanent wall attachment (as in the case of most building racks) or are temporarily positioned inside plant equipment, which has been tagged on the outside.

Initially, field test racks contain up to 40 coupons and building test racks contain up to 6 coupons. Tables I and III identify the initial field and building test rack coupon materials and the rack locations. Supplemental test coupons are described and test racks locations identified in Table II.

The outdoor field test racks are designed to keep the lowest specimens at least 30 inches above the ground and clear of weeds, brush and debris. Since most of the published data on atmospheric corrosion is based on a 30 degree angle with the horizontal, an approximately 30 degree angle is used on the field test racks. One field test rack is modified with a hanger to suspend 12 inch lengths of reinforcement bar. Two additional coupon racks are placed inside a capped spool piece on a length of angle iron. In addition to the field and building test racks, four pipe plugs are modified with a nylon post to support a corrosion coupon.

E. Corrosion Coupon Evaluation

Corrosion coupons are removed periodically, as determined by the Corrosion Engineer, for evaluation and corrosion rate determination. The coupons are weighed, washed and reweighed in accordance with recommended practice ASTM (Section III). Corrosion rates are calculated from the pre-test to final weight loss data.

Samples are examined for evidence of pitting and galvanic corrosion. Areas of maximum attack are measured for pit depth using a gauge and/or sectioned for metallographic examination, as determined by the Corrosion Engineer.

Coupons need not be maintained after final examination, testing and documentation thereof.

F. Supplemental corrosion test programs may be set up by the Corrosion Engineer/Preservation Engineer, as required, for gathering information on plant corrosion. At the discretion of the Corrosion Engineer/Preservation Engineer, these test programs may be included in the CMP.

VI. THE PHOTO-LOG PROGRAM

In conjunction with the actual coupon testing, areas in the plant have been selected for visual examination and photographic documentation. This documentation can be used to show changes in the surface appearance of the items photgraphed. The items to be photcgraphed include, but are not limited to:

1) Embed plates
2) Stiff clamps
3) Water storage tanks
4) Floor drain tanks
5) Diesel generator room
6) Turbine materials
7) Piping
8) Reinforcement bar (including Dome and Dry Cooling Tower bar)
9) Dry cooling heat exchangers and other heat exchanger
10) Corrosion Test Coupons

The photographs are maintained in a photo log, complete with descriptions and date taken.

VII. THE CMP WALKDOWN

The Corrosion Engineer shall perform a CMP walkdown of the WNP-3 Site annually. Preservation Engineering and Quality Assurance usually accompany the Corrosion Engineer as members of the walkdown team but are not required to be present at all times.

This walkdown may include:

1) An inspection and/or removal for testing of corrosion coupons as determined by the Corrosion Engineer.

2) An inspection of selected plant components for corrosion degradation.

3) The identification of plant conditions which may be conducive for corrosion degradation.

4) An evaluation of atmospheric conditions found within the plant and the effectiveness of closures to the outside environment.

5) The photographic documentation of the appearance of, or change in appearances of, selected plant metal surfaces.

6) A review/inspection of other attributes of the Preservation Program.

7) A review of corrective actions taken on open items contained in previous reports.

8) The taking of grease samples for evaluation of condition in accordance with Appendix E.

VIII. DOCUMENTATION AND REPORTS

The documentation required by this Appendix is the file of reports and documentation described below. The Corrosion Engineer's logbook is used to record activities associated with the Corrosion Monitoring Program. These notes will be used for preparation of CMP written reports and as backup for clarification purposes. The logbook, however, shall not be considered a quality document.

A. Corrosion Engineer's Report

The Corrosion Engineer shall issue a report, following each CMP walkdown, containing the results of walkdown, providing status of the plant's corrosion prevention program and listing any findings identified during the walkdown. Results of the corrosion coupon testing, if coupons are removed during the walkdown, shall be submitted and will be filed with the report. The report shall also include a description of the coupons on the racks and any assessments or conclusions as to changes, if any, identified from the corrosion baseline.

B. Initial and Final Coupon Documentation

The Corrosion Engineer has provided to WNP-3 the initial conditions of all existing coupons and the results of testing performed to date. Should additional test coupons be added to the test racks or supplemental coupon locations, the documentation of the initial conditions shall be included in the next issued report. Future coupon data on removed coupons shall be reported similarly.

C. Final Report

Upon completion of the preservation period and/or upon direction from WNP-3, a final report documentating the CMP results will be issued by the Corrosion Engineer.

D. Disposition of Corrosion Engineer Report - Open Items

The Preservation Engineer is responsible to status and document closure of open items contained within the Corrosion Engineer's Report. Closure can be obtained by performing one or more of the following actions:

1) Completing and documenting the corrective action.

2) Determining, justifying and documenting that no corrective action is required.

3) Issuance of a MWR or Work Package for corrective action.

4) Determining a nonconformance exists and issuing an NCR.

5) Entry into SMS for ongoing preventive maintenance and/or periodic observation.

Note: Corrective actions which do not require immediate action, may be postponed until restart. This postponement will be determined on a case-by-case basis. In these cases, the issuance of the NCR, MWR or Work Package closes the finding and tracks the problem until it can be corrected.

IX. QUALITY ASSURANCE REQUIREMENTS

Quality affecting activities performed under this appendix shall be in accordance with the applicable portions of 10CFR50, Appendix B, as outlined in the approved WNP-3 Supply System Quality Program Manual (WMC-015). The CMP documentation file shall be maintained as QA records at the WNP-3 Site.

TABLE 1
GENERAL TEST MATRIX

ACTUAL TEST MATERIALS	A-36	A-533	C-1045	C-1141	C-4140	17-4 pH	CS TO SS	A-527	A-471 C1.5
TO REPRESENT THESE PLANT MATERIALS	STRUCTURAL STEELS PIPING	NSSS PIPING & VESSELS	REBAR, NUTS	ANCHOR BOLTING	HIGH STRENGTH TOOL STEELS, BOLTING	STIFF CLAMP	DISSIMILAR METAL WELD	GALVANIZED SHEET	TURBINE DISK
Field Rack 1 Test Sets 8 thru 14	X	X	X	X	X				
Field Rack 2 Test Sets 1 thru 7	X	X	X	X	X				
Field Rack 3 Test Sets 15 thru 17	X	X				X			
Building Locations:									
1 Test Set 19	X								
2 Test Set 18	X								
3 Test Set 20	X								
4 Test Set 21	X								
5 Test Set 26							X		
6 Test Set 29								X	
7 Test Set 27							X		
8 Test Set 30									X
9 Test Set 31									X

TABLE II

SUPPLEMENTAL TEST COUPON QUANTITIES AND LOCATION

TEST	LOCATION	NUMBER OF COUPONS
Reinforcement Bar Acceptability Test Test Set 22	Field Test Rack #2, South Side WNP-3 Turbine Building	9
Steam Generator Layup Effectiveness		
SG(A) A-533 Test Set 25	Top Inlet Nozzle on Both Steam Generators Attached to Nozzle Purge Dam	2
SG(B) A-533 Test Set 24		2

TABLE III

LOCATIONS OF FIELD AND BUILDING TEST RACKS

FIELD TEST RACK NO.	TEST SETS NO.	APPROXIMATE LOCATION
1	8 thru 14	200 feet south of Unit 3 Cooling Tower.
2	1 thru 7	Adjacent to WNP-3 Turbine Building south side in transformer yard.
3	15 thru 17	Inside sealed diesel generator pipe spool (piece No. 7AG49-20) adjacent to WNP-3 refueling water storage tank south side.

BLDG. LOC. NO.	TEST SET NO.	APPROXIMATE LOCATION
1)	19	335' level of the Reactor Auxiliary Building in the high pressure safety injection pump no. 2 room, attached to a unistrut on the north wall. Space A-139, G-3117, (D10).
2)	18	362' level of the Reactor Auxiliary Building in an open area on the southeast corner, attached to piping on the south wall. Space A-311, G-3112, (E2).
3)	20	425' level of the Reactor Building on the outside of the steam generator shield wall, attached to a piece of unistrut at 130° azimuth (operating floor level).
4)	21	380' level of the Turbine Building on the south wall in the condensate pump pit, attached to a piece of unistrut. G-3108 (H13).
5)	26	425' level of the Reactor Building on the outside of the steam generator shield wall, attached to a piece of unistrut at 130° azimuth (operating floor level).
6)	29	417' level of the Reactor Auxiliary Building, beside the Side Air Cleanup Unit CU3 attached to the input duct support. South G-3109 (L6) space A747.

TABLE III

LOCATIONS OF FIELD AND BUILDING TEST RACKS

BLDG LOC. NO.	TEST SETS NO.	APPROXIMATE LOCATION
7)	27	390' level of the North Tank Farm, Plant Reuse Water tank (middle tank) mounted on a level indicator support.
8)	30	455' level of the Turbine Building, Low Pressure Turbine C, generator end. Inside vapor barrier G-3110 (H18).
9)	31	455' level of the Turbine Building, Low Pressure Turbine A, high pressure turbine end. Inside vapor barrier G-3110 (H15).

WNP-3 PRESERVATION PROGRAM

APPENDIX C TO WMC-051

HYGROTHERMOGRAPH PLANT MONITORING

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HYGROTHERMOGRAPH PLANT MONITORING

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HYGROTHERMOGRAPH PLANT MONITORING

I. INTRODUCTION

The temperature - humidity monitoring requirements of this appendix are an integral part of the overall Preservation of Assets Preventative Maintenance requirements. The record of actual temperature - humidity conditions encountered aid in providing assurance that the objectives of the Preservation of Assets Program are met.

The primary use of the temperature - humidity records is to indicate the environment the equipment, systems, components and structures have experienced during the preservation period. The monitoring program is also utilized to provide an early warning of less than acceptable conditions which might lead to equipment damage. The records are also available as evidence of the environment during the preservation period which may be used in part to justify an extended interval in calendar based equipment overhaul periods.

II. RECORDER LOCATIONS

Hygrothermograph recorders are located in the permanent plant buildings and Level A warehouses. Temperature only recorders are located in Level B warehouses. Recorder locations in permanent plant buildings are shown in Table I.

III. RECORDER CHARTS

Charts removed from recorders are maintained in the WNP-3 Environmental Files.

IV. REPORTS

The relative humidity data from each recorder, located in permanent plant buildings, will be summarized in WNP-3's Quarterly Preservation Status Report.

The Corrosion Engineer, during the CMP Walkdown, evaluates the atmospheric conditions found within the plant and documents any concerns in the Corrosion Engineer's Report (see Appendix B).

TABLE I

HYGROTHERMOGRAPH LOCATIONS

RECORDER NO.	LOCATION
RAB 22	RAB 335 - No. 1, LPSI Pump Room
RAB 28	RAB 362 - Next to Shield Building, South Side
RAB 19	RAB 390 - Diesel Generator A
RAB 31	RAB 417 - In Hallway adjacent to Electrical Penetration Room A
RAB 5	RAB 417 - Control Room near west wall
RB 5	RB 357 - Pipe Tunnel
TB 1	TB 390 - North Side near Condenser C
TB 4	TB 425 - Northwest Area
TB 7	TB 455 - West of MSR B

WNP-3 PRESERVATION PROGRAM

APPENDIX D TO WMC-051

ELECTRICAL AND ELECTRONIC COMPONENTS

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ELECTRICAL AND ELECTRONIC COMPONENTS

TABLE OF CONTENTS

I. INTRODUCTION

The Preservation Program for Electrical and Electronic Components is an integral part of the WNP-3 Preservation of Assets Program. Consideration within this program for these components is based upon the uncertainty relative to the length of time associated with the preservation period and the effect that time in layup status may have on the efficiency of the associated Instrumentation and Control (I&C) elements. The components under consideration are those electrical and electronic components which have been installed in the plant and are in a layup status.

The four elements that lead to degradation of electrical and electronic components are:

a) Physical damage, including direct impingement by water, and exposure to electrical power surges.

b) Airborne contaminates such as dust, grit, and corrosive chemicals.

c) Excessive temperatures, either high or low, and associated thermal stresses.

d) Excessive humidity which can lead to moisture deposition through condensation.

The basic concept adopted is to maintain the components warm, dry and clean consistent with ANSI Level B requirements. This coupled with a limited monitoring activity forms the basis of this program.

Normal aging of components from the passage of time cannot be prevented. Some normal maintenance components such as "O" ring seals can be expected to harden and become brittle and will require replacement during the calibration phase of the startup activities.

It is recognized that individual protection of each component is not cost effective. It should also be noted that this program addresses only the preservation activities required as a minimum and sound engineering judgement should be employed in the implementation of certified vendors' recommendations that go beyond this program.

II. OBJECTIVE

The objective of this program is to improve and maintain the environmental conditions for the electrical and electronic components during the preservation period. In addition to this, the limited monitoring program is intended to provide indication as to the adequacy of such efforts.

The implementation of this program is intended to minimize the adverse effects of the preservation period on the electrical and electronic components and provide adequate assurance by way of documentation that such components are adequately preserved.

III. REFERENCE STANDARD

ANSI Standard N45.2.2-1972, Packaging, Shipping, Receiving Storage, and Handling of Items for Nuclear Power Plants (Regulatory Guide 1.38, dated May 1977).

IV. PROGRAM

A. Scope of Program

1) Environment

The program shall minimize the effect of non-operational environment on electrical and electronic components by:

a) Providing heat and shroud where the local environment is not considered equivalent to level B storage. This provides additional protection for open faced instrument racks located in Category III environments. (Reference WMC-051, Appendix A, Paragraph IV, Section B.)

b) Providing internal heat for panels subject to environmental conditions which could cause degradation as established in WMC-051, Appendix A, Paragraph IV, Section B.

2) Monitoring and Inspection

An important aspect of any program is the monitoring of the program's results and the analysis of the data to determine if modifications are necessary to the program to assure continued acceptable results or conditions. The instruments used for the monitoring program are shown in Attachment 1 and were developed using the following criteria:

a) The instruments are distributed throughout the buildings to provide geographic coverage.

b) The instruments encompass the major instrument types.

c) The instruments are selected from a cross section of the vendors with preference for major vendors.

d) The instruments are selected from various plant systems with preference given to those instruments identified as Nuclear Safety Related.

Periodically calibrate the selected sample of plant instrumentation (see Attachment 1) to verify the adequacy of plant preservation activities. These instruments shall be calibrated once every two (2) years and the calibration should be scheduled evenly throughout the 24 month cycle.

NOTE: If an instrument is placed in service, it is removed from this program and its calibration frequency and reporting will be governed by the in-service requirements.

3) Additional Inspection

a) Plant instruments, other than the selected sample, may be designated for initial inspection and calibration by the Plant Maintenance I&C Supervisor. Findings from these inspections shall be included in the I&C Supervisor's report to Preservation Engineering.

b) Instrument power supplies shall be evaluated by the Plant Maintenance I&C Supervisor for periodic energization based on the following:

(1) Requirements of specific vendor manuals.

(2) Power supplies that are of sufficient size to warrant their energization (those in excess of approximately 200 watts or have large electrolytic capacitors installed).

(3) Those power supplies that fail during the construction delay shall be evaluated on a cost-effectiveness basis for immediate or future repair/replacement.

B. Preservation Requirements

Electrical and electronic components shall be preserved in accordance with Appendix A, Sections IV. B. 4., IV. B. 9. and IV. B. 21.

Special actions have been taken in the Control Room in recognition of the high concentration of electrical and electronic equipment located in the room. These actions consist of the following:

a) Maintaining a positive inflow of filtered conditioned air.

b) Protecting sensitive connections by installation of caps, plugs or other dust seals, as determined necessary by the Preservation Engineer.

c) Installation of temporary dust seals between the cabinets and the cable rooms below in the absence of the completed installation, as determined necessary by the Preservation Engineer.

d) Other dust and cleanliness controls as appropriate.

C. Reports

The Plant Maintenance I&C Supervisor shall send a quarterly report of instruments checked to Preservation Engineering. This report shall include the status of each instrument checked, and a copy of the calibration check for those instruments found to be out of specification showing the nature of the condition.

Preservation Engineering shall issue a yearly assessment of the program in a report to the WNP-3/5 Site Manager.

ATTACHMENT 1 (1 of 5)
PRESERVATION PROGRAM SAMPLE
INSTRUMENT LIST

Item No.	MEL EPN	Instrument Number	Bldg.	El.	Nearest Column	Manufacturer & Model
1	3-CD-PT-2340/A	PT-CD-2340A	TB	390	T_2G	Rosemount 1151GPTE22MB
2	3-AS-IK-1900	IK-AS-1900	TB	390	T_3H	Conoflow GT25CD
3	3-HD-LC-0451/B2	LC-HD-0451B2	TB	423	T_8K	Fisher M5453
4	3-HD-LC-1551/B	LC-HD-1551B	TB	423	T_7K	Fisher 2502R-249B
	Installation Problem (SPR-85-004) Deleted from Program		-			
5	3-CD-TE-1870	TE-CD-1870	TB	423	T_5L	Temtex Type E2G
6	3-HD-LS-1151/B	LS-HD-1151B	TB	423	T_5E	Magnetrol BCS-751-SIMD4DC
7	3-ES-PT-1341/A	PT-ES-1341A	TB	455	$T_{10}D$	Rosemount 1151GP7322MB
8	3-MS-EK-RCV/4	IK/RCV-4 (XD-RCV4)W	TB	455	T_84	Fisher 546
9	3-TA-PS-63/1/LV1	TA-PS-63-1-LVD	TB	455	T_5H	United Electric 302MD612
10	3-FS-PI-5151/A	PI-FS-5151A	FHB	362	K_53	Ashcroft 45-1279SS

ATTACHMENT 1 (2 of 5)
PRESERVATION PROGRAM SAMPLE
INSTRUMENT LIST

Item No.	MEL EPN	Instrument Number	Bldg.	El.	Nearest Column	Manufacturer & Model
11	3-CC-FT-7020/B1S	FT-CC-7020B1S	FHB	335	H3	Rosemount 1153DBS
12	3-CC-PI-7021/B1S	PI-CC-7020B1S	FHB	335	H3	Ashcroft 1279
13	3-RC-FT-156	FT-RC-0156	RB	365	CR-13	Rosemount 1153HA4
14	3-FW-LT-0211	LT-FW-0211AS	RB	395	CR-10	Rosemount 1153DB5
15	3-WM-LIT-762	LIT-762	RAB	335	P2	Rosemount 1151DP5E22LMMB
16	3-CH-PIT-206	PIT-206	RAB	335	P9	Rosemount 1153
17	3-WM-PDIT-302	PDIT-302	RAB	335	H9	Rosemount 1151DP
18	3-WM-LS-6432/A	LS-WM-6432A	RAB	335	B1	Mercoid DSW7233
19	3-WM-PI-6433/A	PI-WM-6433A	RAB	335	B1	Ashcroft 45-1279SSW/1106S
20	3-GM-TT-0003	TT-3	RAB	362	B10	Taylor X211TG02
21	3-CH-FT-281	FT-281	RAB	362	L4	Moore 13AMS2L

ATTACHMENT 1 (3 of 5)
PRESERVATION PROGRAM SAMPLE
INSTRUMENT LIST

Item No.	MEL EPN	Instrument Number	Bldg.	El.	Nearest Column	Manufacturer & Model
22	3-CH-FIC-292	FIC-292	RAB	362	L_y4_y	Moore 5205M
23	3-WS-PS-5/01	PS-5.01	RAB	417	P7	Mercoid D57241
24	3-WS-PI-5/01	PI-5.01	RAB	417	P7	Marsh PG-73
25	3-WS-FT-0014	FT-14	RAB	442	P4	Foxboro 13DM
26	3-HV-PDT-5032/A	PDT-HV-5032	RAB	425	C4	Rosemount 1153DB3
27	3-FF-LS-7203	LS-FF-7203	RAB	335	F_z9	Magnetrol FLS-SIMD4DC
28	3-CC-FT-5161/B	FT-CC-5161B	FHB	362	H3	Rosemount 1153DB5
29	3-MS-PT-0301/A1	PT-MS-0301A	RAB	417	C4	Rosemount 1153GB9
30	3-FP-FS-8623	FS-FP-8623	Water Trtmt. Bldg.	390	-	FCI FR72-4
31	3-FP-FI-01	FP-FI-FI	Fire Pump House	390	-	DIET FP-3500-4583

Placed in service - Deleted from Program

ATTACHMENT 1 (4 of 5)
PRESERVATION PROGRAM SAMPLE
INSTRUMENT LIST

Item No.	MEL EPN	Instrument Number	Bldg.	El.	Nearest Column	Manufacturer & Model
32	3-FP-PI-8604	PI-FP-8604	Fire Pump House	390	-	Ashcroft 1279SS
	Placed in service - Deleted from Program					
33	3-MW-TE-9514	TE-MW-9514	Cooling & Chlor. Facility	375	-	Temtex E2G
34	3-BD-FI-0671/A	BD-FI-0671	TB	390	T-J	MRI 1124GL13111
35	3-CC-FA-4951/1AS	FA-1-CC4951AS	RAB	417	Control Room	Foxboro 2A0-L2C-R
36	3-CC-FA-6951/1AS	FA-1-CC6951AS	RAB	417	Control Room	Foxboro 2A0-L2C-R
37	3-CC-FA-5551/1AS	FA-1-CC5551AS	RAB	417	Control Room	Foxboro 2A0-L2C-R
38	3-SI-PA-0390/1AS	PA-1-SI0390AS	RAB	417	Control Room	Foxboro 2A0-L2C-R
39	3-CS-FS-0318/1AS	FS-1-CS0318AS	RAB	417	Control Room	Foxboro 2AP+ALM-AS
40	3-CS-FS-0318/2AS	FS-1-CS0318AS	RAB	417	Control Room	Foxboro 2AP+ALM-AS
41	3-CS-FY-0318/1AS	FY-1-CS0318AS	RAB	417	Control Room	Foxboro 2AP+SQE

ATTACHMENT 1 (5 of 5)
PRESERVATION PROGRAM SAMPLE
INSTRUMENT LIST

Item No.	MEL EPN	Instrument Number	Bldg.	El.	Nearest Column	Manufacturer & Model
42	3-SI-FI-0390/AS	FI-SI-0390AS	RAB	417	Control Room	International 1151
43	3-FW-FIC-1111	FIC-1111	RAB	417	Control Room	Foxboro 250
44	3-TA-XR-REC/ VXCD	M414	RAB	417	Control Room	Westronics M5E

WNP-3 PRESERVATION PROGRAM

APPENDIX E TO WMC-051

OIL AND LUBRICANT ANALYSIS AND TRENDING DURING PLANT PRESERVATION

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OIL AND LUBRICANT ANALYSIS AND TRENDING DURING PLANT PRESERVATION

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OIL AND LUBRICANT ANALYSIS AND TRENDING DURING PLANT PRESERVATION

I. INTRODUCTION

Oils and lubricants installed in WNP-3 rotating equipment have been in place since the early 1980's. Therefore, there is a need to evaluate their condition and their ability to continue to protect equipment bearing and gear cavities during preservation. The oil and lubricant's primary purpose during the preservation period is to prevent corrosion of the machine parts in the oil or lubricant cavity. Since degradation of the oil or lubricant over time could result in the loss of its corrosion prevention properties, a sampling program is established by this appendix to determine their continuing acceptability. The sampling program consists of both standard samples (oil only) and random/selected samples. The standard sample represents a cross section of oil lubricated equipment that contain large quantities of oil.

II. REFERENCES

a) Position Paper, "Oil and Lubricant Analysis and Trending During Plant Preservation." Author R. B. Davis WPPSS, December 1989, MFI 3513.6.5.2.

b) Memorandum 3-PEM-93-05, dated February 23, 1993, Grease Degradation.

III. OILS

a) Oil Testing

The condition of oils will be monitored primarily by taking standard oil samples from the equipment listed in Attachment 1. In addition, random/selected samples may be initiated by Preservation Engineering to obtain further information on the condition of oil in the Plant's equipment. The standard sampling will be implemented by SMS tasks and the random/selected samples will be implemented through the MWR process.

Oil samples will be tested in accordance with the "Oil and Lubricant Analysis and Trending During Plant Preservation" position paper by R. B. Davis [Reference a)]. The tests are designed to determine the corrosion resistance and water content of the oil samples.

Oil samples are to be obtained from the equipment and forwarded to the WNP-3 Project Scientist. The Project Scientist will split sample and perform or have performed a corrosion resistance and a water content test. Preservation Engineering will evaluate these test results and may have the Project Scientist run additional tests in accordance with Reference II.a) from the balance of the sample if further evaluation of the oil appears warranted.

If random samples are taken from operational equipment, additional testing may be performed to complete the environmental and plant support chemistry laboratory oil chemistry report requirements.

The WNP-3 Project Scientist may use the Supply System Corporate environmental and plant support chemistry laboratory, a commercial laboratory, or on-site facilities as appropriate for the oil testing. Oil test results will be maintained in both the equipment history file and the Preservation Engineering MFI (Section 3513) file.

IV. LUBRICANTS (Greases)

a) Grease testing, (i.e., monitoring of the condition of the grease in various plant components) will be conducted as part of the Corrosion Monitoring Program Walkdown (See Appendix B) or separately by Preservation Engineering. Preservation Engineering investigated grease separation/potential degradation in valve operators in 1992 and issued a report on their findings (Reference II.b). The investigation found that grease separation and resulting oil leakage from the operator has not become detrimental to the operator's preservation and no corrective action was required at this time. Continued monitoring of the grease per Appendix E was recommended.

Initially 1 to 3 grease samples per year will be analyzed. Grease samples will be obtained from the equipment and forwarded to the WNP-3 Project Scientist. As a minimum, samples will be visually inspected and tested for oil to binder percentage and water and bacterial presence. Preservation Engineering may vary the number of samples and frequency upon review of results. The grease sample program will be implemented by the MWR process.

V. EVALUATION OF TEST DATA

Because many unknowns exist regarding oil and lubricant degradation, evaluating test results and establishing optimum test frequency requires considerable engineering judgement. If test data indicates a deteriorating trend in the condition of the oil or grease in specific equipment, in specific types of equipment or in specific environmental categories and it is found that this deterioration is likely to cause or allow the equipment to deteriorate, then this condition shall be corrected or documented.

OIL AND LUBRICANT ANALYSIS AND TRENDING
DURING PLANT PRESERVATION

ATTACHMENT 1

PRESERVATION PROGRAM LIST OF EQUIPMENT
FOR STANDARD OIL TESTING

EQUIPMENT PIECE NUMBER	DESCRIPTION	ENVIRONMENT
03-MW-MTR-3A	Makeup Water Supply Pump Motor 3A	PCB, Cat II
03-CW-MTR-1C	Circulating Water Pump Motor 1C	YD, Cat IV
03-CD-MTR-2A	High Pressure Condensate Pump Motor 2A	TB, Cat II
03-FW-PP-2	Motor Driven Steam Generator Feed Pump	TB, Cat II
03-IC-GR-3A	ICW Evaporator A Recirculation Pump 3A Gear Reducer	AB, Cat I