WASHINGTON PUBLIC POWER SUPPLY SYSTEM

PROCEDURE AMENDMENT

AMENDMENT NO. 1

TO: (PROCEDURE NO. AND TITLE)	REV. NO. *	DATED:
WMC-051, Appendix A Preventive Maintenance Requirements by Equip.	Type 5	01-18-91

EFFECTIVE DATE:	AFFECTED PARA./SECTION:	EXPIRATION DATE: *	APPLICABLE PROJECTS:
02-21-91	B.5.a & Table 5.1	NEXT REVISION OF Append A	WNP-3

1) Change the title of Paragraph B.5.a to Preservation Requirements

2) Modify Paragraph B.5.a, Preservation Requirements, as shown below:

- Replace Requirement 2) with the following:

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

- Replace Requirement 8) with the following:

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

- Replace Requirement 9) with the following:

  9) 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).

3) Add the following requirements to Paragraph B.5.a:

  10) The vacuum pump and air blower shafts shall be rotated during each external inspection.

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

  12) 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).

* Unless otherwise stated, amendment affects this revision and succeeding revisions.

APPROVALS			
CG Reid 2/20/91	JL Perreault 2/20/91	WK Drinkard 2/20/91	DATE
Hale 2/11/91	LT Ahlman 2/20/91	RM Taylor 2/20/91	DATE
BH Bray 2-11-91	LA Hill 2-15-91	CM Burns 2/21/91	DATE

AMENDMENT NO.	DATED:	PAGE 1 OF 2
WMC-051-A-1,5	02-21-91	

WP-675 R2 (7/89)

TABLE 5.1

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	01 year			
b. Waste Gas Compressors 1A & 1B Skids	06 month			
c. Gas Recombiner Skid	06 month			
d. Nitrogen Recycle Compressor Skid	06 month			
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.

WNP-3 PRESERVATION PROGRAM

APPENDIX A TO WMC-051

WNP-3 PREVENTIVE MAINTENANCE REQUIREMENTS
BY EQUIPMENT TYPE

PREPARED BY:

C. G. Reid 1/18/91
C. G. Reid, WNP-3 Preservation Engineering Manager

B. H. Bray 1-15-91
B. H. Bray, WNP-3 Preservation Engineering

C. G. Reid for LAH 1/18/91
L. Hale, WNP-3 Preservation Engineering

APPROVED BY:

C. G. Reid 1/18/91
C. G. Reid, WNP-3 Preservation Engineering Manager

J. L. Perreault 1/18/91
J. L. Perreault, WNP-3 Technical Manager

L. A. Hill 1-18-91
L. A. Hill, WNP-3 Plant Preservation Manager

Signature on file CGR 1/18/91
L. T. Ahlman, Ebasco Project Engineer

W. K. Drinkard 1-18-91
W. K. Drinkard, WNP-3 Quality Assurance Manager Acting

R. M. Taylor 1-18-91
R. M. Taylor, WNP-3 Deputy Site Manager

C. M. Butros 1/18/91
C. M. Butros, WNP-3 Site Manager

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PREPARED BY:

C. G. Reid 1/18/91
C. G. Reid, WNP-3 Preservation Engineering Manager

B. H. Bray 1-18-91
B. H. Bray, WNP-3 Preservation Engineering

C. G. Reid for CAH 1/18/91
L. Hale, WNP-3 Preservation Engineering

APPROVED BY:

C. G. Reid 1/18/91
C. G. Reid, WNP-3 Preservation Engineering Manager

J. L. Perreault 1/18/91
J. L. Perreault, WNP-3 Technical Manager

L. A. Hill, WNP-3 Plant Preservation Manager

James T. Ahlman 1/18/91
L. T. Ahlman, Ebasco Project Engineer

W. K. Drinkard, WNP-3 Quality Assurance Manager Acting

R. M. Taylor, WNP-3 Deputy Site Manager

C. M. Butros, WNP-3 Site Manager

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.

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

B. REQUIREMENTS BY TYPE (Cont'd)

1. Pumps (Cont'd)

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.

b. Periodic Maintenance Requirements

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

JIREMENTS BY TYPE (Cont'd)

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.

TABLE 1.1

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 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)

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. 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.

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

B. REQUIREMENTS BY TYPE (Cont'd)

2. Valves (Cont'd)

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.

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.

- o SMS external inspection to be performed every two years.
- o All exposed machined surfaces to be coated with approved preservatives.
- o Motor operated valves - Energize space heaters where provided.
- o Pneumatic cylinder actuators - No internal preservation inspections/coatings required. Note: Cylinder internals may have been previously coated with a vapor phase inhibitor.

B. REQUIREMENTS BY TYPE (Cont'd)

3. Valve Actuators (Cont'd)

3) Valve operators located in Environmental Category IV.

- o SMS external inspection to be performed quarterly.
- o SMS internal inspection to be performed annually.
- o All exposed machined surfaces are to be coated with an approved preservative.
- o Motor operated valves - Energize space heaters where provided.
- o Pneumatic cylinder actuators - Coat cylinder internals with an approved corrosion inhibitor.
- o Supplemental protection and heating may be required in some cases. Preservation Engineering will issue direction on a case-by-case basis.
- o 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.

c. Special Requirements

1) Motor operators - It is recognized that grease separation will occur during long-term preservation and continued oil loss can result in loss of lubrication and corrosion prevention properties. This condition will be monitored and corrective action taken as necessary on a case-by-case basis.

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.

2) A shroud and supplemental heat shall be provided if equipment is installed in a Category II, III or IV environment.

3) If in storage, equipment shall be placed in a Level B (or Level A) storage area.

4) Enclosed equipment, not protected by a shroud, shall have its enclosure maintained dust-tight. All openings, including floor 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.

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.

b. Periodic Maintenance Requirements

1) Equipment located in Category I environment -

- External visual SMS inspections per CSP-9-02 shall be performed every 12 months on equipment located outside the control room and adjoining relay rooms.

B. REQUIREMENTS BY TYPE (Cont'd)

4. Instrumentation and Computers (Cont'd)

- o External visual SMS inspections per CSP-9-02 shall be performed every 24 months on equipment located inside the control room and adjoining relay rooms.

- o Internal inspections shall be performed every two years. 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) Equipment located in Category II environment - External and internal visual SMS inspections shall be performed as required for Category I except external inspections shall be performed on a quarterly basis.

3) Equipment located in Category III and IV environments - External and internal visual SMS inspections shall be performed as required for Category I except external inspections shall be performed quarterly and internal inspections performed yearly.

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. Method(s) of Preservation

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.

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

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

5) All air compressor and vacuum pumps (except item 6 below) shall be filled to proper operating levels with recommended lubricants.

6) During the preservation period, the following equipment shall be filled up to the fill-ports with recommended oils.

- 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.

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

B. REQUIREMENTS BY TYPE (Cont'd)

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

8) A nitrogen blanket shall be maintained on the waste gas compressors 1A & 1B and also on the gas recombiner and nitrogen recycle compressors.

9) Where prudent and feasible, air compressors, vacuum pumps and air blowers shall be put into service and maintained as operational equipment.

b. Periodic Maintenance Requirements

See Table 5.1 attached.

TABLE 5.1

MAINTENANCE REQUIREMENTS

MAINTENANCE REQUIREMENTS	INSPECTION FREQUENCY	CATEGORY I ENVIRONMENT	CATEGORY II ENVIRONMENT	CATEGORY III & IV ENVIRONMENT
External Inspection - Air blowers: 1. Check operation of supplemental heat. 2. Check equipment enclosure for water leaks. 3. Inspect equipment for deleterious conditions. 4. Check oil levels & for oil leaks. 5. Rotate shafts per CSP-9-02.	03-Month			M
External Inspection - Compressors: 1. Check operation of supplemental heat. 2. Inspect equipment for deleterious conditions. 3. Check oil levels & for oil leaks. CSP-9-02	06-Month		M	
External Inspection - Compressors, vacuum pumps & air blowers: 1. Inspect equipment for deleterious conditions. 2. Check oil levels and for oil leaks. CSP-9-02	06-Month	M		
Internal Inspection - Air compressors: 1. Inspect electrical junction boxes and instrumentation for deleterious conditions. 2. Open access covers and expose cylinders, valves and connecting rod areas and inspect for corrosion. Coat all "wet areas" (IE) rod bearings, valves, gears and cylinder walls, if splash lubricated, with recommended lubricants, then rotate compressor and motor per CSP-9-02.	01-Year		M	

M = Maintenance Function

MAINTENANCE REQUIREMENTS

MAINTENANCE REQUIREMENTS	INSPECTION FREQUENCY	CATEGORY I ENVIRONMENT	CATEGORY II ENVIRONMENT	CATEGORY III & IV ENVIRONMENT
Internal Inspection - Air compressors: 1. Inspect electrical junction boxes and instrumentation for deleterious conditions. CSP-9-02	02-Year	M		
External Inspection - Vacuum pumps: 1. Check all oil levels. 2. Check operation of supplemental heat. 3. Inspect equipment for deleterious conditions. 4. Rotate gear reducer and pump shafts per CSP-9-02.	03-Month		M	
External Inspection - Waste gas compressor 1A & 1B, gas recombinder and nitrogen recycle compressors: 1. Check oil levels (should be above sight glass). 2. Check that fly wheels are blocked. 3. Check nitrogen blanket MIN 5 PSI, MAX 25 PSI.	06-Month	M		
Internal Inspection - Waste gas compressor 1A & 1B, gas recombinder and nitrogen recycle compressor: 1. Check local control cabinets and instrumentation for deleterious conditions. 2. Inspect for broken or damaged components.	02-Year	M		

M = Maintenance Function

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.

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 leak tight, 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.

2) Tanks located in Environmental Category IV -

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

B. REQUIREMENTS BY TYPE (Cont'd)

6. Tanks (Cont'd)

- 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., and all unprotected carbon steel machined surfaces coated with an approved preservative.

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.

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.

B. REQUIREMENTS BY TYPE (Cont'd)

7. Piping (Cont'd)

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.

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.

a. Preservation Requirements

1) All openings are to be sealed utilizing caps, plugs, tape, etc. Heat exchangers located in Environmental Category I, should have the main access openings screened.

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

b. Periodic Maintenance Requirements

1) Heat exchangers not on a nitrogen gas purge and located in environmental Category I should be ventilated for natural circulation. No SMS inspections are required. 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. These vessels will be stored in a "sealed" condition.

3) Heat exchangers under a nitrogen gas blanket will have SMS inspections as required to assure specified positive pressure is maintained.

B. REQUIREMENTS BY TYPE (Cont'd)

8. Heat Exchangers (Cont'd)

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.

2) 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, unless space heaters are energized and the enclosure is suitable for the environment in which it is located.

3) Uninstalled equipment shall be placed in a Level B (or Level A) 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, air space should be maintained between the equipment and the shroud.

6) Equipment located in the control room and adjoining relay rooms are 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 panels located in a Category IV environment.

B. REQUIREMENTS BY TYPE (Cont'd)

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

b. Periodic Maintenance Requirements

1) Equipment (except lighting and power panels) located in Category I environment -

- External visual SMS inspections per CSP-9-02 shall be performed once every year on equipment located outside the control room and adjoining relay rooms.

- External visual inspections per CSP-9-02 shall be performed every 24 months on equipment located inside the control room and adjoining relay rooms.

- Internal inspections shall be performed every two years. 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) Equipment (except lighting and power panels) located in a Category II environment - External and internal visual SMS inspections shall be performed as required for Category I except external inspections shall be performed on a quarterly basis.

3) Equipment (except lighting and power panels) located in a Category III and IV environment - External and internal visual SMS inspections shall be performed as required for Category I except external inspections shall be performed quarterly and internal inspections performed yearly.

4) Lighting and power panels located in a Category III environment - External and internal inspections per CSP-9-02 shall be performed once every two years. Note: No periodic preservation inspections are required for panels located in Category I and II environments.

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 TRANSFORMERS 1, 2, 3, & 4	* STANDBY TRANSFORMERS ST1, ST2A, ST2B	AUX BOILER TRANSFORMERS ABT1	UNIT AUX TRANSFORMERS UA1, UA2A, UA2B	* MAKEUP WATER TRANSFORMERS A4 & B4	* TRANSFORMERS B2T	TRANSFORMERS B24	* OIL FILLED GROUNDING TRANSFORMERS	OIL FILLED GROUNDING TRANSFORMERS
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 recoat 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		

M = Maintenance function

O = Operations function

* = Energized Equipment

TABLE 10.1

EQUIPMENT TYPE

INSPECTION TASKS	TASK FREQUENCY	MAIN TRANSFORMERS 1, 2, 3, & 4	* STANDBY TRANSFORMERS ST1, ST2A, ST2B	AUX BOILER TRANSFORMERS ABT1	UNIT AUX TRANSFORMERS UA1, UA2A, UA2B	* MAKEUP WATER TRANSFORMERS A4 & B4	* TRANSFORMERS B21	TRANSFORMERS B24	* OIL FILLED GROUNDING TRANSFORMERS	OIL FILLED GROUNDING TRANSFORMERS
Sample transformer oil for dielectric tests. PPM 10.300.59 Section A, C, D, E.	01-Year	M	M	M	M	M	M	M		
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					
Inspect transformer per PPM 10.300.30.	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						

M = Maintenance Function

O = Operations Function

* = Energized Equipment

EQUIPMENT TYPE

INSPECTION TASKS	TASK FREQUENCY	MAIN TRANSFORMERS 1, 2, 3, & 4	* STANDBY TRANSFORMERS ST1, ST2A, ST2B	AUX BOILER TRANSFORMERS ABT1	UNIT AUX TRANSFORMERS UA1, UA2A, UA2B	* MAKEUP WATER TRANSFORMERS A4 & B4	* TRANSFORMERS B21	TRANSFORMERS B24	* OIL FILLED GROUNDING TRANSFORMERS	OIL FILLED GROUNDING TRANSFORMERS
Inspect atmoseal expansion tank, pressure vaccum relief valve and breather openings to insure they are not obstructed. PPM 10.337.2	01-Year	M	M							
Inspect transiormer 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, when provided by manufacturer, shall be made operational in both energized and non-energized transformers.

2) All non-energized dry transformers in Category III & IV storage areas without space heaters 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. CSP-9-02	03-Months			M
Inspect external of transformer for deleterious conditions and status of space heaters. CSP-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.

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.

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.

B. REQUIREMENTS BY TYPE (Cont'd)

12. Motors (Cont'd)

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

- o 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.
- o Category IV environment
  - High Voltage Motors - 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

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

The basis for the preservation of cranes and hoists 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 functional and that is operated on a routine basis shall be maintained as in-service equipment.

2) Equipment that is in storage or lay-up shall be maintained in accordance with the manufacturers' requirements.

3) Specific maintenance requirements for cranes and hoists, both operational and stored, are shown in Table 13.1.

TABLE 13.1

MAINTENANCE REQUIREMENTS FOR CRANES AND HOISTS

MAINTENANCE REQUIREMENTS	INSPECTION FREQUENCY	* POLAR CRANE 3-RC-CRN-1	* TURBINE BLDG. CRANE 3-TBB-CRN-1	FHB CRANE 3-RST-CRN-2	INTAKE CRANE 3-CW-CRN-1	* ADMIN. BLDG. CRANE 3-ASB-CRN-1	ELECTRIC HOISTS LOCATED IN UNHEATED AREAS	ELECTRIC HOISTS LOCATED IN HEATED AREAS
Check oil 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	M	M		
Verify permanent installed space heaters in cabinets and panels are operational.	03-Month	M	M	M	M	M		
External inspection - inspect exterior surfaces for deleterious conditions, repaint areas as required.	01-Year			M	M			
Internally inspect all cabinets, panels for deleterious conditions, check operation of space heaters.	01-Year			M		M		
Grease all Zerk fittings on wheels and carriage assemblies.	03-Month		M			M		
Replace desiccant bags in main control cabinet.	06-Month				M			
Internally inspect all cabinets, panels for deleterious conditions, check operation of space heaters.	06-Month				M			

M = Maintenance Function

* = Operational Equipment

MAINTENANCE REQUIREMENTS FOR CRANES AND HOISTS

MAINTENANCE REQUIREMENTS	INSPECTION FREQUENCY	* POLAR CRANE 3-RC-CRN-1	* TURBINE BLDG. CRANE 3-TBB-CRN-1	FHB CRANE 3-RST-CRN-2	INTAKE CRANE 3-CW-CRN-1	* ADMIN. BLDG. CRANE 3-ASB-CRN-1	ELECTRIC HOISTS LOCATED IN UNHEATED AREAS	ELECTRIC HOISTS LOCATED IN HEATED AREAS
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		
Inspect external and internal components for deleterious conditions. Fill gear box to the top with manufacturer recommended oils and check level annually.	01-Year						M	
Inspect external and internal components for deleterious conditions, check oil level in gear box.	01-Year							M

M = Maintenance Function

* = Operational Equipment

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 shall 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 other SMS inspections are required. Water chillers will be monitored as part of the Corrosion Monitoring Program (CMP) Walkdowns.

3) For equipment located in a Category III environment -

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

- Annual internal inspection of electrical enclosures and Zerust replacement 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

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 06 month based on specific environmental conditions at equipment locations, HP size and bearing type.

B. REQUIREMENTS BY TYPE (Cont'd)

16. Mechanical Penetration 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 1 environment. (Stored penetration 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) Area Inspection - The penetration area above El. 417 in the RAB is susceptible to building closure problems and water inleakage at the RAB/RB interface area. Inspect this area on a quarterly basis looking for evidence of water inleakage and outside air exchange. If either concern is identified, the problem shall be documented and corrective action initiated.

2) 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.

B. REQUIREMENTS BY TYPE (Cont'd)

18. Rebar, Embeds and Structural Steel

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) Ventilation of blockouts - Blockouts that will retain moisture must not be sealed, but covered whenever possible to reduce moisture infiltration.

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

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. 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 motors (Ref. Table 12.1).

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) Every 2 years, the dry cooling tower gear reducers shall have a random unit selected, oil drained and internal inspection performed during CMP walkdowns 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 supplied by Contract 3240-02 shall be maintained in accordance with vendor's requirements.

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.

2) 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 voltage and performing a periodic equalization charge. The extent of battery maintenance is to be minimized. This is assumed for undetected conditions that cause 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.

3) Maintain cell specific gravity gradient at less than .01 from top to bottom of cell. At completion of the equalization charge, gradient from top to bottom of cell should be .002 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. 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.

B. REQUIREMENTS BY TYPE (Cont'd)

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

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 for after the 230KV system outage.

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).