Big Rivers
ELECTRIC CORPORATION

Your Touchstone Energy® Cooperative

Wilson Station

Plant Lay-up Plan

Preface

This lay-up plan has been developed to define the best method(s) to protect the maximum amount of equipment during an extended lay-up period. It is also the assumption of this plan that an idle but operationally “ready” state was preferred for the proposed lay-up period; therefore, every effort has been taken to ensure a timely return to service.

The majority of the protective efforts are based on the fundamental principal that oxidizing corrosion (rust) will not occur if the relative humidity is controlled below 35%. The relative humidity will be controlled by circulating dehumidified air through the boiler/turbine steam/water cycle and the boiler air/gas cycle. Separate circuits will be used for the generator/exciter and other selected equipment.

This technology has been utilized in several industries and has a proven track record of equipment preservation. Much of the basis for our plan was derived from *Guidelines: Long-Term Layup of Fossil Plants EPRI CS-5112 Project 1266-38* and recent articles in the February 2013 Issue of Power magazine *Layup Practices for Fossil Plants*.

LOMR INDEX

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	River Area															
River water pumps																
	Maintain and operate pumps in recirculation mode monthly	Clean, flush, drain	12			12					24			24		
		Secure gantry crane to prevent movement during storms	6													
River water intake screen																
	Maintain and operate intake screens monthly	Clean, flush and drain screens and screen wash pumps	12			12					24			24		
	Maintain and operate screen wash pumps monthly															
River water piping																
	Maintain piping drained but ready for service	Clean, flush, drain and winterize				12										
		Protect pipe by increasing normal chemical concentrations	12													
River water intake electrical building																
	Maintain and operate switchgear heaters	Protect electrical cabinets with corrosion inhibitors	6												50	
	Maintain access doors closed to eliminate bird entry															
Chlorine feed system																
	Maintain chlorine system in case river water piping is used															
	Utilize smaller chlorine storage cylinder															
Tug boat																
		Relocate to Green Station							24							
Barge unloader																
	Maintain access doors closed to eliminate bird entry	Clean, flush, drain and winterize barge unloader	40								120					
	Maintain locked gate barrier to prevent unauthorized entry	Place clamshell bucket on grate and thoroughly lubricate					24									
	Maintain and operate river water pump	Protect cables and sheaves with corrosion inhibitors					24									
		Protect gearbox oil with dispersion / stabilization chemicals					4									
		Prevent bird entry by closing all access openings	6				24									
		Install locking gate barriers to prevent unauthorized entry					24								10,000	
Barge unloader electrical building																
	Maintain and operate switchgear heaters	Protect electrical cabinets with corrosion inhibitors	6												50	
	Maintain and test batteries per current OPL	Prevent bird entry by closing all access openings	6													
	Maintain access doors closed to eliminate bird entry															
	Fuel Handling															
Conveyor 10-1																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								24					
		Protect idler bearings by thoroughly lubricating					24									
		Protect gearbox oil with dispersion / stabilization chemicals					4								50	
Conveyor 10-2																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
	Maintain runoff pond as needed, verify weekly	Protect idler bearings by thoroughly lubricating					36									
		Protect gearbox oil with dispersion / stabilization chemicals					4								50	
Conveyor 7-1																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	Maintain runoff pond as needed, verify weekly	Protect idler bearings by thoroughly lubricating					36								50	
		Protect gearbox oil with dispersion / stabilization chemicals					4									
Conveyor 7-2																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
	Maintain runoff pond as needed, verify weekly	Protect idler bearings by thoroughly lubricating					36								50	
		Protect gearbox oil with dispersion / stabilization chemicals					4									
Conveyor 7-3																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
		Protect idler bearings by thoroughly lubricating					36								50	
		Protect gearbox oil with dispersion / stabilization chemicals					4									
Conveyor 7-4																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
		Protect idler bearings by thoroughly lubricating					36								50	
		Protect gearbox oil with dispersion / stabilization chemicals					4									
Conveyor 9																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
		Protect idler bearings by thoroughly lubricating					36								50	
		Protect gearbox oil with dispersion / stabilization chemicals					4									
Conveyor 11A & 11B																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
		Protect idler bearings by thoroughly lubricating					24								50	
		Protect gearbox oil with dispersion / stabilization chemicals					4									
Conveyor 8-1																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
		Protect idler bearings by thoroughly lubricating					36									
		Protect gearbox oil with dispersion / stabilization chemicals					4								50	
Conveyor 8-2																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
		Protect idler bearings by thoroughly lubricating					36									
		Protect gearbox oil with dispersion / stabilization chemicals					4								50	
Car dumper																
	Maintain and operate sump pump as needed, verify weekly	Clean, flush, drain and winterize equipment	6								120					
	Maintain and operate seal water and associated heat trace	Protect hoppers with corrosion inhibitors					12								100	
	Isolate sump pump and seal water unless needed	Prevent bird entry by closing all access openings, build a temporary					60		60							
	Maintain access doors closed to eliminate bird entry	Protect idler bearings by thoroughly lubricating					12									
		Protect gearbox oil with dispersion / stabilization chemicals					4								50	
Car dumper electrical building																
	Maintain and operate switchgear heaters	Protect electrical cabinets with corrosion inhibitors	6												50	
	Maintain access doors closed to eliminate bird entry	Prevent bird entry by closing all access openings	6													
Conveyor 1																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment			6						48					

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
		Protect idler bearings by thoroughly lubricating							36							
		Protect gearbox oil with dispersion / stabilization chemicals							4						50	
Sample tower																
	Maintain and test batteries per current procedure	Clean, flush, drain and winterize equipment			6						48					
	Maintain access doors closed to eliminate bird entry	Protect hoppers with corrosion inhibitors							12						100	
		Prevent bird entry by closing all access openings	6				12									
		Protect gearbox oil with dispersion / stabilization chemicals							4						50	
Sample tower electrical building																
	Maintain and operate switchgear heaters	Protect electrical cabinets with corrosion inhibitors	6												50	
	Maintain access doors closed to eliminate bird entry	Prevent bird entry by closing all access openings	6													
Conveyor 2																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment			6						48					
		Protect idler bearings by thoroughly lubricating							36							
		Protect gearbox oil with dispersion / stabilization chemicals							4						50	
Stacker / Reclaimer																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment			6						48					
	Maintain and test batteries per current procedure	Protect buckets and hoppers with corrosion inhibitors							12						100	
	Maintain bird deterrents	Protect idler bearings by thoroughly lubricating							36							
		Protect gearbox oil with dispersion / stabilization chemicals							6						50	
		Prevent bird entry by closing all access openings	6													
		Protect electrical cabinets with corrosion inhibitors	6												50	
		Secure boom at the south end of track on anchor point			6				12							
Conveyor 3																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment	6								48					
		Protect idler bearings by thoroughly lubricating					36									
		Protect gearbox oil with dispersion / stabilization chemicals					4								50	
Conveyor 3A																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment			6								48			
	Maintain and operate sump pump as needed, verify weekly	Protect idler bearings by thoroughly lubricating							36							
	Maintain and operate seal water and associated heat trace	Protect gearbox oil with dispersion / stabilization chemicals							2						50	
	Isolate sump pump and seal water unless needed															
Conveyor 4																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment			6								48			
	Maintain and operate sump pump as needed, verify weekly	Protect idler bearings by thoroughly lubricating							36							
	Maintain and operate seal water and associated heat trace	Protect gearbox oil with dispersion / stabilization chemicals							2						50	
	Isolate sump pump and seal water unless needed															
Crusher tower																
	Maintain bird deterrents	Clean, flush, drain and winterize all equipment			6						24		24			
		Protect hoppers with corrosion inhibitors							12						100	
		Prevent bird entry by closing all access openings	6												5,000	
		Protect gearbox oil with dispersion / stabilization chemicals							4						50	

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
Crusher tower electrical and deluge buildings																
	Maintain and operate switchgear heaters	Protect electrical cabinets with corrosion inhibitors	6												50	
	Maintain and operate building heat															
	Maintain and operate deluge building heat															
	Maintain access doors closed to eliminate bird entry															
Conveyor 5A & 5B																
	Maintain and operate conveyors with drive motor monthly	Clean, flush, drain and winterize equipment			6						24		24			
	Maintain and operate fire protection system	Protect idler bearings by thoroughly lubricating							36							
		Protect gearbox oil with dispersion / stabilization chemicals							2						50	
Tripper tower																
	Maintain bird deterrents	Clean, flush, drain and winterize all equipment			6						24		24			
		Protect hoppers with corrosion inhibitors							12						100	
		Prevent bird entry by closing all access openings	6													
		Protect gearbox oil with dispersion / stabilization chemicals							2						50	
Tripper tower electrical building																
	Maintain and operate switchgear heaters	Protect electrical cabinets with corrosion inhibitors	6												50	
	Maintain access doors closed to eliminate bird entry															
Conveyor 6A & 6B																
	Maintain and operate conveyors with drive motor monthly	Clean, flush, drain and winterize equipment			6						24		24			
		Protect idler bearings by thoroughly lubricating							12							
		Protect gearbox oil with dispersion / stabilization chemicals							2						50	
Conveyor 12																
	Maintain and operate conveyor with drive motor monthly	Clean, flush, drain and winterize equipment									24					
		Protect idler bearings by thoroughly lubricating					6									
		Protect gearbox oil with dispersion / stabilization chemicals					2								50	
	Water Plant Area															
Site drainage (KPDES 003)																
	Maintain and operate pumps as needed, verify weekly															
	Maintain and operate seal water and associated heat trace															
	Isolate pumps and seal water unless needed															
	Continue to perform required environmental sampling															
Waste impoundment pond																
	Maintain and operate pumps as needed, verify weekly	Modify pump discharge to fill waste water pond													5,000	
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
Waste water pond																
	Maintain and operate pumps as needed, verify weekly	Modify pump discharge to fill cooling tower basin													15,000	
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
Concrete pond																

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	Maintain and operate pumps as needed, verify weekly	Pump to waste impoundment pond	6													
Make-up clarifiers and blowdown pumps																
	Rotate rake 1 ¼ turn with drive motor monthly	Clean, flush, drain and winterize clarifier and piping											48			
	Rotate blowdown pumps 1 ¼ turn by hand monthly	Protect tank from sunlight and birds with mesh screen cover								24					10,000	
		Protect pumps in place with corrosion inhibitors				6									50	
Water plant building																
	Maintain and operate building heat and fire protection	Clean, flush, drain and winterize all equipment and piping	12		12											
	Maintain access doors closed to eliminate bird entry	Remove all media from vessels and dispose of properly								24						
Cooling tower																
	Maintain basin between half and three fourths full	Refill basin from waste water ponds or truck from river														
	Maintain biological control of water as needed	Protect tower from sunlight and birds with mesh screen cover								60					20,000	
		Clean, flush, drain and winterize all chemical feed systems				12										
		Secure gantry crane to prevent movement during storms	6													
Cooling tower fans																
	Rotate fans 1 ¼ turn by hand weekly	Secure fan blades to eliminate unintended rotation of gearbox			12											
	Maintain and operate lube oil pumps weekly	Protect gearbox oil with dispersion / stabilization chemicals			12										50	
Circulating water pumps																
	Rotate pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize all circulating water pumps			12											
Circulating water piping																
		Clean, flush, drain and winterize				12										
		Protect pipe by increasing normal chemical concentrations	6													
Cooling tower electrical building																
	Maintain and operate switchgear heaters	Protect electrical cabinets with corrosion inhibitors	6													
	Maintain access doors closed to eliminate bird entry	Prevent bird entry by closing all access openings	6													
Service water pumps																
	Maintain and operate all pumps as needed, alternate monthly	Open cross-tie valve to provide firewater	6													
	Ensure heat trace and insulation are in good condition															
Electric fire water pump																
	Maintain and operate pump as needed															
Diesel fire water pump, jockey pump and water storage tank																
	Refill tank with potable water	Install winterized piping from potable water system					120									
	Maintain and operate diesel pump as needed, verify monthly	Protect diesel fuel by adding stabilizer to storage tank	6												50	
	Maintain and test batteries per current procedure															
	Maintain and operate jockey pump continuously, verify weekly															
	Maintain and operate tank winterization, verify monthly															
	Maintain and operate heat trace in good condition															
	Maintain and operate sump pump as needed, verify weekly															
Potable water building																
	Maintain and operate building heat and fire protection	Clean, flush, drain and winterize all equipment and piping	12													
	Maintain access doors closed to eliminate bird entry	Protect equipment in place with corrosion inhibitors	6												50	
Waste water clarifier																

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	Rotate rake 1 ¼ turn with drive motor monthly	Clean, flush, drain and winterize all equipment and piping												48		
	Rotate blowdown pump 1 ¼ turn by hand monthly	Protect tank from sunlight and birds with mesh screen cover								24					10,000	
Waste water discharge pumps (KPDES 001)																
	Maintain and operate pumps as needed, verify weekly	Sump can overflow to waste impoundment pond														
	Maintain and operate seal water and associated heat trace															
	Continue to perform required environmental sampling															
	Turbine Building															
Transformer area sump pumps																
	Maintain and operate pumps as needed, verify weekly															
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
Air compressor																
	Rotate Centac air compressors 1 ¼ turn by hand weekly	Install an air cooled air compressor capable of 200 CFM					240									100,000
	Maintain and operate lube oil system weekly	Protect compressors in place with corrosion inhibitors			12										50	
	Maintain and operate new compressor continuously	Protect lube oil with dispersion / stabilization chemicals			6										50	
Air dryer system																
	Maintain and operate continuously, alternate monthly															
Vacuum pumps																
	Rotate vacuum pumps 1 ¼ turns by hand monthly	Clean, flush, drain and winterize pumps and piping				12										
		Protect pumps in place with corrosion inhibitors				12									50	
		Protect coolers with corrosion inhibitor capsules				12									50	
Auxiliary BFP lube oil system																
	Maintain and operate lube oil system weekly	Open all vents and drains @ 400°F to boil water from vessel		6												
	Turn rotor 1 ¼ turn by hand weekly	Protect with dehumidification before dew point is reached		0												steam side
	May require heat or continuous operating if temp < 70°F	Protect lube oil with dispersion / stabilization chemicals		6											50	
	Test and analyze oil per established procedure	Clean, flush, drain and winterize pumps and piping			12											
Feedwater heaters, CH-J-1A and CH-J-1B																steam side
		Open all vents and drains @ 400°F to boil water from vessel		6												
		Protect with dehumidification before dew point is reached		0												
Station batteries																
	Maintain and inspect per current procedure															
Laboratory area																
		Remove and dispose of all laboratory chemicals	24													
		Clean, flush, drain and winterize boiler water sample panel	12		12											
		Protect equipment in place with corrosion inhibitors	6		6										50	
		Protect electrical cabinets with corrosion inhibitors	6												50	
Polisher area																
		Remove and dispose of all media from process vessels	6		6		24		24							
		Clean, flush, drain and winterize all process vessels					24		24							
		Protect equipment in place with corrosion inhibitors	6			6									50	

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
		Remove insulation from vessels to prevent exterior corrosion					12								100	
Chemical area sump pumps																
	Maintain and operate as needed, verify weekly	Clean and remove any contaminants									6					
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
Lube oil system includes storage tanks																
	Maintain and operate lube oil system weekly	Protect lube oil with dispersion / stabilization chemicals			6										50	
	Maintain and operate filtration system “bowser”															
	Maintain and operate clean and dirty storage tanks															
	May require heat or continuous operating if temp < 70°F															
	Test and analyze oil per established procedure															
	Maintain and verify operation of tank cathodic protection															
	Maintain and operate leak detection system															
Turbine building area sump																
	Maintain and operate pumps as needed, verify weekly	Clean and remove any contaminants									6					
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
Hotwell																
		Protect with dehumidification before dew point is reached		0												steam side
Condenser and waterbox																
		Protect with dehumidification before dew point is reached		0												steam side
Closed cooling water system																
	Rotate pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize pumps and piping				48										
		Protect pumps in place with corrosion inhibitors				12									50	
Boiler Feed Pump Turbine																
	Maintain and operate lube oil system weekly	Open all vents and drains @ 400°F to boil water from vessel		6												
	Rotate turbine 1 ¼ turn with turning gear weekly	Protect with dehumidification before dew point is reached		0												steam side
	May require heat or continuous operating if temp < 70°F	Protect lube oil with dispersion / stabilization chemicals			6										50	
	Test and analyze oil per established procedure	Clean, flush, drain and winterize pumps and piping		6	12											
Feedwater heater, FD-J-4																
		Open all vents and drains @ 400°F to boil water from vessel		6												
		Protect with dehumidification before dew point is reached		0												steam side
Relay room and cable pull room																
	Maintain and operate fire protection system															
EH system																
	Maintain and operate EH system weekly	Protect EH fluid with dispersion / stabilization chemicals			6										50	
	May require heat or continuous operating if temp < 70°F															
	Test and analyze oil per established procedure															
Main turbine																
	Rotate turbine for 1 hour on turning gear weekly	Open all vents and drains @ 400°F to boil water from vessel		6												

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	Position rotor 90° from start position each time	Protect with dehumidification before dew point is reached		0												200,000
		Install mechanical blocking devices to hold valves open		6												
Generator/Exciter																
	Rotate generator for 1 hour on turning gear weekly	Protect with dehumidification before dew point is reached	12	24												200,000
		Protect H2 coolers, water side, with corrosion inhibitors			12										100	
		Protect exciter coolers, water side, with corrosion inhibitors			12										100	
		Purge and remove hydrogen from site		6	6											
Feedwater heater, FD-J-2 and FD-J-3																
		Open all vents and drains @ 400°F to boil water from vessel		6												
		Protect with dehumidification before dew point is reached		0												steam side
Control room																
		Install stand-alone HVAC system					60									
Feedwater heater, FD-J-6 and FD-J-7																
		Open all vents and drains @ 400°F to boil water from vessel		6												
		Protect with dehumidification before dew point is reached		0												steam side
	Boiler Building															
PA Fan																
	Maintain and operate lube oil system weekly	Protect with dehumidification before dew point is reached					48	12								steam side
	Rotate fan 1 ¼ turn by hand weekly	Clean by dry vacuum after dry air equipment is in service												48		
	Maintain and operate hydraulic system weekly	Protect lube oil with dispersion / stabilization chemicals			6										50	
	Stroke fan blades hydraulically weekly															
	May require heat or continuous operating if temp < 70°F															
FD Fan																
	Maintain and operate lube oil system weekly	Protect with dehumidification before dew point is reached					48	12								steam side
	Rotate fan 1 ¼ turn by hand weekly	Clean by dry vacuum after dry air equipment is in service												48		
	Maintain and operate hydraulic system weekly	Protect lube oil with dispersion / stabilization chemicals			6										50	
	Stroke fan blades hydraulically weekly															
	May require heat or continuous operating if temp < 70°F															
Sump pumps																
	Maintain and operate as needed, verify weekly															
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
Drag chain and surge tank																
	Maintain and operate drag chain with drive motor monthly	Drag chain to remain in place under boiler		0												
	Maintain and operate hydraulic system monthly	Clean, flush, drain and winterize drag chain and equipment		6	12											
	Rotate surge tank recirc pumps 1 ¼ turn by hand monthly	Protect drag chain with corrosion inhibitors				12									500	
	Rotate pyrite sluice pumps 1 ¼ turn by hand monthly	Prevent bird entry by closing all access openings							24							
	Rotate economizer pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize surge tank and equipment		6									12			
		Protect surge tank with corrosion inhibitors				24									500	
		Clean, flush, drain and winterize pH control system			6											

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
Pulverizers																
	Maintain and operate lube oil system weekly	Protect with dehumidification before dew point is reached		0												gas side
	Rotate table 1 ¼ turn with turning gear monthly	Clean by dry vacuum after dry air equipment is in service												120		
		Protect lube oil with dispersion / stabilization chemicals			6										50	
CO2 System																
	Maintain and operate for fire protection															
Diesel generator																
	Maintain and operate per current OPL	Protect diesel fuel by adding stabilizer to storage tank	6												100	
	Maintain and test batteries per current procedure															
Primary air preheater																
	Maintain and operate lube oil system weekly	Protect with dehumidification before dew point is reached		0												gas side
	Rotate baskets 1 ¼ turn with air drive weekly	Clean by dry vacuum after dry air equipment is in service												48		
		Protect lube oil with dispersion / stabilization chemicals			6										50	
Secondary air preheater																
	Maintain and operate lube oil system weekly	Protect with dehumidification before dew point is reached		0												gas side
	Rotate baskets 1 ¼ turn with air drive weekly	Clean by dry vacuum after dry air equipment is in service												96		
		Protect lube oil with dispersion / stabilization chemicals			6										50	
Burners / Windbox																
	Move burner hoods by hand monthly	Protect with dehumidification before dew point is reached		0												gas side
	Rotate tertiary fans 1 ¼ turn by hand monthly	Clean by dry vacuum after dry air equipment is in service												96		
	Rotate scanner blowers 1 ¼ turn by hand monthly															
Tripper cars and bunkers																
	Rotate tripper car gearbox monthly	Clean, flush, drain and winterize equipment				12								48		
		Park both tripper cars over #3 bunker	6													
		Clean bunker internals with foam								60						
		Protect hoppers with corrosion inhibitors								24					1,000	
		Protect lube oil with dispersion / stabilization chemicals			6										50	
Sootblowers																
	Rotate sootblower gearbox monthly	Clean and remove fuel residue from all surfaces				60								120		
		Protect steam piping by removing insulation and painting														
		Protect lube oil with dispersion / stabilization chemicals			24										50	
		Protect electrical cabinets with corrosion inhibitors	12												100	
Waterwalls, superheat, reheat and economizer, fire side																
	Maintain effective sealing to minimize moisture infiltration	Deslag on-line to thoroughly remove slag									48					
		Install airtight seal at knees						12	36						10,000	
		Protect with dehumidification before dew point is reached		0												200,000
Waterwalls, superheat, reheat and economizer, water side																
	Maintain effective sealing to minimize moisture infiltration	Open all vents and drains @ 400°F to boil water from tubes		6												
		Protect with dehumidification before dew point is reached		0												steam side
Deaerator and storage tank, CH-J-5																

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	Maintain effective sealing to minimize moisture infiltration	Open all vents and drains @ 400°F to boil water from vessel		6												
		Protect with dehumidification before dew point is reached		0												steam side
Drum																
	Maintain effective sealing to minimize moisture infiltration	Open all vents and drains @ 400°F to boil water from vessel		6												
		Protect with dehumidification before dew point is reached		0												steam side
Penthouse																
	Maintain effective sealing to minimize moisture infiltration	Protect with dehumidification before dew point is reached	24	6												
	Rotate pressurization fans 1 ¼ turn by hand monthly	Clean by dry vacuum after dry air equipment is in service												120		
Dead air spaces																
	Maintain effective sealing to minimize moisture infiltration	Protect with dehumidification before dew point is reached	24	6												
		Clean by dry vacuum after dry air equipment is in service				48										
Boiler Building																
	Maintain and operate fire protection system above freezing	Construct enclosure to protect fire water headers														
		Clean by dry vacuum all fuel residue from the boiler building												240		
Ignition oil tanks																
	Maintain, inspect and drain as needed storm water in berm	Drain fuel oil to lowest level possible					12		12							
		Protect tank by leaving small amount of fuel oil in tank			6											
		Protect fuel oil with dispersion / stabilization chemicals			6										50	
Ignition oil pumps																
		Protect fuel oil with dispersion / stabilization chemicals			6										50	
Ignition oil pumps																
	Rotate pumps 1 ¼ turns by hand monthly	Clean, flush, drain and winterize pumps and piping			6											
		Protect pumps in place with corrosion inhibitors			6										50	
		Protect fuel oil with dispersion / stabilization chemicals			6										50	
Ignition oil fire protection foam system																
	Maintain and operate foam system															
	SCR															
Reactor and ductwork																
	Maintain effective sealing to minimize moisture infiltration	Protect with dehumidification before dew point is reached		0												gas side
		Clean by dry vacuum after dry air equipment is in service												24		
Catalyst																
	Maintain effective sealing to minimize moisture infiltration	Protect with dehumidification before dew point is reached		0												gas side
		Clean by dry vacuum after dry air equipment is in service												48		
Sootblowers																
	Rotate gearbox 1 ¼ turn by hand monthly	Clean all fuel residue from all surfaces	6			6										
		Protect lube oil with dispersion / stabilization chemicals			6										50	
		Protect electrical cabinets with corrosion inhibitors	6												100	
Dilution air blowers																
	Rotate blowers 1 ¼ turn by hand monthly	Protect blowers in place with corrosion inhibitors			6										50	
		Protect duct work with corrosion inhibitors				6									1,000	
		Protect electrical cabinets with corrosion inhibitors	6												100	
Ammonia																

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	Maintain residual pressure to prevent moisture infiltration	Evacuate all liquid ammonia					12		12							
		Protect pumps in place with corrosion inhibitors			6										50	
	Electrostatic Precipitator															
Reactor and ductwork																
	Maintain effective sealing to minimize moisture infiltration	Protect with dehumidification before dew point is reached	48	6												gas side
		Clean by dry vacuum after dry air equipment is in service												96		
Plates, wires and rappers																
	Maintain effective sealing to minimize moisture infiltration	Protect with dehumidification before dew point is reached		0												gas side
		Clean by dry vacuum after dry air equipment is in service												120		
		Protect rappers with corrosion inhibitors	6		6										500	
Precipitator area sump pumps																
	Clean all flyash residue from sump and surrounding area															
	Maintain and operate as needed to control level, verify weekly															
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
Flyash transport system																
	Rotate blowers 1 ¼ turn by hand weekly	Purge transport lines with blowers	6	6												
		Protect blowers in place with corrosion inhibitors			6										100	
		Protect lube oil with dispersion / stabilization chemicals			6										50	
Flyash silo and vent fans																
	Rotate vent fans 1 ¼ turn by hand monthly	Clean all flyash from silo internal surfaces												120		
	Maintain access doors closed to eliminate bird entry	Protect fans in place with corrosion inhibitors			6										100	
		Prevent bird entry by closing all access openings				6										
	Scrubber															
ID Fan																
	Maintain and operate lube oil system weekly	Protect with dehumidification before dew point is reached	24	6												gas side
	Rotate fan 1 ¼ turn with turning gear weekly	Protect lube oil with dispersion / stabilization chemicals			6										50	
	Maintain and operate louver dampers weekly	Clean by dry vacuum after dry air equipment is in service												48		
	May require heat or continuous operating if temp < 70°F	Install turning gears					120									20,000
	Maintain effective sealing to minimize moisture infiltration															
Inlet duct																
	Close and seal inlet guillotine dampers	Protect with dehumidification		0												gas side
	Maintain effective sealing to minimize moisture infiltration	High pressure wash and rinse until discharge water is > 6pH												48		
		Passivate all internal surfaces with a 5% solution of soda ash												12		
		Dry out with heaters and seal access openings								12						
		Protect seal air blowers in place with corrosion inhibitors			12										100	
Reactor vessels																
	Maintain access doors closed to eliminate bird entry	Clean, flush, drain and winterize modules and piping												120		
		Lower doors open/covered by screens, access to agitators				6										

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
		Close all other access openings				6										
Outlet duct																
	Maintain access doors closed to eliminate bird entry	Clean, flush, drain and winterize outlet duct and drain piping												60		
		Drains to remain open to allow moisture to escape				6										
		Close all other access openings				6										
		Protect seal air blowers in place with corrosion inhibitors			12										100	
Stack																
	Rotate pressurization fans 1 ¼ turn by hand monthly	Clean, flush, drain and winterize stack liner and drain piping												60		
	Stroke louver damper by hand monthly	Protect pressurization fans in place with corrosion inhibitors			6										500	
	Maintain and operate sump pump as needed, verify weekly	Protect louver dampers in place with corrosion inhibitors			6										500	
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
	Maintain access doors closed to eliminate bird entry															
Slurry circulation pumps																
	Rotate pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize pumps and piping				120										
	Maintain doors closed to eliminate bird entry to pump houses	Protect bearing cartridges by thoroughly lubricating				24										
		Release belt tension and apply corrosion inhibitors to drives				60									50	
Agitators																
	Rotate agitator impeller 1 ¼ turn by hand monthly	Clean, flush, drain and winterize agitators				12										
		Protect lubricant with dispersion / stabilization chemicals			6										50	
		Release belt tension and apply corrosion inhibitors to drives				6									50	
Blowdown																
	Rotate pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize pumps				6										
	Maintain sump level with a portable sump pump	Clean all slurry accumulations from all trenches and sumps												24		
		Protect bearing cartridges by thoroughly lubricating				6										
		Release belt tension and apply corrosion inhibitors to drives				6									50	
Thickeners																
	Rotate rake 1 ¼ turn with drive motor monthly	Clean, flush, drain and winterize thickeners				12								120		
	Maintain and operate sump pumps as needed, verify weekly	Clean all slurry accumulations from sump and trenches												60		
	Maintain and operate seal water and associated heat trace	Protect support bearing by thoroughly lubricating				6										
	Isolate sump pump and seal water unless needed	Remove pump suctions to allow rainwater to drain to sump				12										
Underflow																
	Rotate underflow pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize underflow pumps and piping				12										
	Maintain and operate sump pumps as needed, verify weekly	Protect gearbox oil with dispersion / stabilization chemicals			6											
	Maintain and operate seal water and associated heat trace	Prevent bird entry by closing all access openings				6										
	Isolate sump pump and seal water unless needed															
	Maintain access doors closed to eliminate bird entry															
	Ballmill area															
Ballmill																
	Rotate ballmill 1 ¼ turn with drive motor weekly	Build containment area and drop ball charge on floor								120						

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	Maintain and operate jacking and lube oil pumps weekly	Remove, sort and drum ball charge or sell to supplier								60						
		Clean, flush, drain and winterize ball mills				24										
		Protect lubricant with dispersion / stabilization chemicals			6										50	
Product sump and pumps																
	Rotate sump pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize sumps and pumps				6										
		Protect bearing cartridges by thoroughly lubricating				6										
		Release belt tension and apply corrosion inhibitors to drives				12									50	
Ballmill building																
	Maintain and operate floor sumps as needed, verify weekly	Clean, flush, drain and winterize building				48										
	Maintain and operate seal water and associated heat trace	Prevent bird entry by closing all access openings	6		6											
	Isolate sump pump and seal water unless needed															
	Maintain access doors closed to eliminate bird entry															
Ballmill building electrical rooms																
	Maintain and operate switchgear heaters	Protect electrical cabinets with corrosion inhibitors	6												100	
Limestone silo																
	Maintain access doors closed to eliminate bird entry	Clean all limestone from silo interior												120		
		Clean all limestone from the equipment level and ground floor												24		
		Protect conveyor idler bearings by thoroughly lubricating				12										
		Prevent bird entry by closing all access openings			6											
Limestone prep building																
	Rotate pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize sumps and pumps				24										
	Maintain access doors closed to eliminate bird entry	Protect electrical cabinets with corrosion inhibitors	6												100	
		Prevent bird entry by closing all access openings				6										
	CSI															
Vacuum filter drums																
	Rotate drums 1 ¼ turn with drive motor monthly	Clean, flush, drain and winterize drums and piping				48										
	Rotate agitator with drive motor monthly	Vats shall be left empty				6										
		Protect lube oil with dispersion / stabilization chemicals			6										50	
		Remove and dispose of filter cloth and attachment rope				12										
Surge tanks and filter feed pumps																
	Rotate pumps 1 ¼ turn by hand monthly	Clean, flush, drain and winterize pumps and piping												48		
	Rotate agitators 1 ¼ turn with drive motor monthly	Tanks shall be left empty				6										
		Protect bearing cartridges by thoroughly lubricating				6										
		Release belt tension and apply corrosion inhibitors to drives				12									50	
Filtrate return pumps																
	Rotate pumps 1 ¼ turn by hand monthly	Clean all slurry residue from all surfaces				12										
		Sump shall be left empty				6										
		Release belt tension and apply corrosion inhibitors to drives				6									50	
Solid waste area sump pumps																
	Maintain and operate as needed to control level, verify weekly	Clean all FGD residue from sump and surrounding area												48		

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
	In-service	Lay-up preparation	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	Maintain and operate seal water and associated heat trace															
	Isolate sump pump and seal water unless needed															
Conveyors																
	Maintain and operate conveyor monthly	Clean slurry from all surfaces				120										
		Protect idler bearings by thoroughly lubricating				24										
		Place stackout conveyor in the lowest possible position				6										
		Secure stackout conveyor to prevent movement during storms				6										
Building																
	Maintain and operate switchgear heaters	Clean slurry from all surfaces				120										
	Maintain access doors closed to eliminate bird entry	Floor drains and sumps shall be left empty				12										
		Prevent bird entry by closing all access openings				6										
		Protect electrical cabinets with corrosion inhibitors			6										100	
	Landfill															
Landfill cover																
	Maintain landfill mowing, permit requirement	Place temporary cover on all active areas of landfill													96,800	
	Maintain landfill erosion control, permit requirement															
Landfill sample wells																
	Continue to perform required environmental sampling															
Landfill runoff pond (KPDES 002)																
	Maintain and operate as needed to control level															
	Perform required environmental sampling															
	Buildings and Grounds															
Site Security & Communication																
	Maintain Gai-tronics for emergency alarms	Increase security patrols to minimize inventory shrinkage														
	Maintain radios/repeaters for personnel communication	Winterize above ground fire protection system or lay-up dry														
	Maintain and operate underground fire protection system															
	Maintain and operate all plant lighting for safety and security															
	Maintain and operate stack strobe lights															
	Maintain and operate all entrance gates for security															
	Maintain and operate all security cameras															
Buildings and Facilities																
	Maintain and inspect cathodic protection, 3 year inspection															
	Maintain and inspect radiation sources, twice a year inventory															
	Maintain and inspect fire extinguishers															
	Maintain and inspect eye wash stations															
	Maintain and inspect outlying restroom facilities															
	Maintain and inspect elevators, annual certification required															
	Maintain and operate all outlying HVAC systems															
	Maintain and operate all building sprinkler systems															

			BREC Labor Hours				Contract Labor Hours				Contract Cleaning Hours					
			Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	Pre lay-up	1st day	1st week	4 months	O&M Expense	Capital Expense
	In-service	Lay-up preparation														
	Maintain current mowing and weed control															
Sewage treatment plant (KPDES 007)																
	Waste water operator licensed personnel required															
	Maintain and operate sewage treatment plant, verify weekly															
	Maintain and operate sewage lift stations, verify weekly															
	Perform required environmental sampling															
Plant Vehicles																
	Maintain water truck to transport water	Heavy equipment transferred to other stations														
		Emergency response vehicle to Green Station														
		Majority of plant vehicles transferred to other stations														
			580	150	462	1,200	1,344	36	536	408	1,164	0	252	2,280		
			2,392				2,324				3,696					
			@	50		$/hr	@	75		$/hr	@	175		$/hr		
			119,600				174,300				646,800				191,700	
															1,132,400	720,000

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: POWER DISTRIBUTION

SUBSYSTEM: D.C. DISTRIBUTION SYSTEMS

REFERENCE:

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- 10-1 Building 125V system (125V batteries and chargers)

LAY-UP PROCEDURE:

1. This system will remain in operation throughout layup

OPERATION / MAINTENANCE PROCEDURE:

1. Perform regular PM schedule for batteries, measuring Voltage, specific gravity, temperature, etc. according to regular procedure
2. Perform quarterly (3 month) equalize charge of 111 hours. NOTE: Do not perform PM on battery system during equalize charge or until 2 weeks after the equalize charge has finished.

RECOVERY PROCEDURE:

1. There is no recovery procedure for this system

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: POWER DISTRIBUTION

SUBSYSTEM: D.C. DISTRIBUTION SYSTEMS

REFERENCE:

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- Main Plant 125V system (125V batteries and chargers)

LAY-UP PROCEDURE:

1. This system will remain in operation throughout layup

OPERATION / MAINTENANCE PROCEDURE:

1. Perform regular PM schedule for batteries, measuring Voltage, specific gravity, temperature, etc. according to regular procedure
2. Perform quarterly (3 month) equalize charge of 74 hours. NOTE: Do not perform PM on battery system during equalize charge or until 2 weeks after the equalize charge has finished.

RECOVERY PROCEDURE:

1. There is no recovery procedure for this system

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: POWER DISTRIBUTION

SUBSYSTEM: D.C. DISTRIBUTION SYSTEMS

REFERENCE:

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- Main Plant 250V system (250V batteries and chargers)

LAY-UP PROCEDURE:

1. This system will remain in operation throughout layup

OPERATION / MAINTENANCE PROCEDURE:

1. Perform regular PM schedule for batteries, measuring Voltage, specific gravity, temperature, etc. according to regular procedure
2. Perform quarterly (3 month) equalize charge of 70 hours. NOTE: Do not perform PM on battery system during equalize charge or until 2 weeks after the equalize charge has finished.

RECOVERY PROCEDURE:

1. There is no recovery procedure for this system

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: CONTROL/SERVICE AIR

SUBSYSTEM: Air compressors

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Install a new air cooled air compressor capable of 200 CFM.
2. Protect existing Centac air compressors with corrosion inhibitors.
3. Add water dispersion/stabilization chemicals to each lube oil system. Lube oil reservoir capacity 48 gallons.
4. Megger 6.9kV motors with 5kV DC for 10 minutes and log baseline reading.
5. Protect electrical cabinets with corrosion inhibitors.

OPERATION PROCEDURE:

1. Operate new compressor as needed.
2. Operate existing air dryers as needed.
3. With Centac air compressor gearbox lube oil system operating, rotate compressor 1 ¼ turn by hand weekly. Upon completion of rotation shut off lube oil system.
4. Megger 6.9kV motors with 5kV DC for 10 minutes and log readings monthly.
5. Inspect all equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain new compressor.
2. Maintain existing air dryers.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: UNIT DRAINS AND SUMPS

SUBSYSTEM: Waste Impoundment, Waste Water and Concrete Pond

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, periodic operation.

LAY-UP PROCEDURE:

1. Modify pump discharge to fill cooling tower basin.
2. Ensure winterization protection is in place and operational.

OPERATION PROCEDURE:

1. Operate pumps as needed, verify weekly or more often during rain storm events.
2. Operate seal water only when needed.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup see Foster Wheeler Procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: DOMESTIC WATER

SUBSYSTEM: Potable Water Building

REFERENCE: Field Experience

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion.

LAY-UP PROCEDURE:

1. Clean, washdown, drain and winterize all equipment and piping.
2. Protect equipment in place with corrosion inhibitors.
3. Protect electrical cabinets with corrosion inhibitors.
4. Protect equipment from bird damage by closing all possible entry and nesting points.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain bird deterrents.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: PRETREATMENT

SUBSYSTEM: River water pumps, intake and electrical building

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, periodic operation

LAY-UP PROCEDURE:

1. Clean, washdown, drain and winterize all equipment, pumps and piping.
2. Thoroughly lubricate all equipment grease zerts to force out any moisture accumulations.
3. Remove all chlorine storage cylinders from plant site.
4. Protect river water piping by increasing normal chemical concentrations.
5. Drain river water piping as necessary to ensure freeze protection.
6. Protect electrical cabinets with corrosion inhibitors.
7. Protect equipment from bird damage by closing all possible entry and nesting points.
8. Protect equipment from unauthorized human entry by installing locking barrier gates to restrict entry from the river.

OPERATION PROCEDURE:

1. Inspect the equipment once a month for evidence of active corrosion, if found, take corrective action.
2. Operate pumps quarterly to ensure proper operation.

MAINTENANCE PROCEDURE:

1. Maintain bird and unauthorized entry deterrents.

RECOVERY PROCEDURE:

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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1. Inspect and restart systems as necessary.
2. For startup procedure see OPL # 104.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: PRETREATMENT

SUBSYSTEM: Make-up Clarifiers

REFERENCE: Field Experience

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, potential periodic operation.

LAY-UP PROCEDURE:

1. Clean, washdown, drain and winterize both clarifiers and all associated equipment and piping.
2. Thoroughly lubricate all equipment to force out any moisture accumulations.
3. Add water dispersion/stabilization chemicals to each gearbox.
4. Protect electrical cabinets with corrosion inhibitors.
5. Protect clarifier tank from sunlight and birds by installing a mesh screen cover.
6. Protect equipment from bird damage by closing all possible entry and nesting points.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.
2. Operate clarifier rake monthly to ensure proper operation.
3. Rotate blowdown pumps 1 ¼ turn by hand monthly.

MAINTENANCE PROCEDURE:

1. Maintain bird deterrents.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup procedure see OPL # 002 System 071 Lab.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: CIRCULATING WATER

SUBSYSTEM: Cooling tower, circulating water pumps and electrical building

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Clean, flush, drain and winterize all chemical feed systems.
2. Add water dispersion/stabilization chemicals to each cooling tower fan gearbox.
3. Protect cooling tower cells from sunlight and birds with mesh screen cover.
4. Secure cooling tower fan blades to prevent unintended rotation of gearbox.
5. Protect electrical cabinets with corrosion inhibitors.
6. Secure gantry crane to prevent movement during storms.
7. Protect equipment from bird damage by closing all possible entry and nesting points.

OPERATION PROCEDURE:

1. Maintain cooling tower basin water level between half and three-quarters full for freeze protection.
2. With cooling tower fan gearbox lube oil system operating, rotate each fan blade 1 ¼ turn by hand weekly and re-secure to prevent unintentional movement. Upon completion of rotation shut off lube oil system.
3. Rotate each circulating water pump 1 ¼ turn by hand weekly.
4. Rotate each booster water pump 1 ¼ turn by hand weekly.
5. Refill cooling tower basin from waste water ponds or truck from river.
6. Maintain biological control of water in cooling tower basin as needed.
7. Operate switchgear heaters in electrical building.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

8. Inspect all equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain switchgear heaters in electrical building.
2. Maintain bird deterrents.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup procedure see OPL # 64.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: OPEN COOLING WATER SYSTEM

SUBSYSTEM: OPEN COOLING WATER SYSTEM

REFERENCE: Westinghouse & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- #1 & #2 CIRCULATING WATER BOOSTER PUMP MOTOR (like motors)

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Selected motors are to have oil preservative added.
3. Clean motor (filters, screens, and interior/exterior).
4. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
5. Replace any screens that are missing.
6. Inspect weather head condition and lead terminations.
7. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 ¼ revolutions and mark starting position to ensure shaft is ¼ turn from beginning position. No pre-lubrication is required and verify correct oil levels on bearings.

RECOVERY PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.
3. Rotate selected motors at least 12 revolutions to ensure they turn free.
4. Drain oil and fill each motor with clean oil according to OEM of motor (GST 68).
5. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: CONDENSING and CIRCULATING WATER

SUBSYSTEM: PUMP, SUMP, SCREENS, & DISCHARGE LINE

REFERENCE: Westinghouse & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- #1 & #2 CIRCULATING WATER PUMP MOTOR (like motors)
- #3 CIRCULATING WATER PUMP MOTOR

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Selected motors are to have oil preservative added.
3. Clean motor (filters, screens, and interior/exterior).
4. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
5. Replace any screens that are missing.
6. Inspect weather head condition and lead terminations.
7. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.
8. #1 & #2 motors will need water for cooling coils drained and blown out.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 revolutions. No pre-lubrication is required and verify correct oil levels on bearings.

RECOVERY PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.
3. Rotate selected motors at least 12 revolutions to ensure they turn free.
4. Drain oil and fill each motor with clean oil according to OEM of motor (GST 68).
5. #1 & #2 motor has water for cooling coils needs air bled off and water established.
6. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: CLOSED COOLING WATER

SUBSYSTEM: Closed Cooling Water System

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of increased concentration of current chemical treatment for corrosion control.

LAY-UP PROCEDURE:

1. Clean, flush, drain and winterize all equipment, pumps and piping.
2. Protect system piping by increasing normal chemical concentrations.
3. Thoroughly lubricate all equipment grease zerts to force out any moisture accumulations.

OPERATION PROCEDURE:

1. Rotate closed cooling water booster pumps 1 ¼ turn by hand monthly.
2. Inspect the equipment once a month for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup procedure see OPL #

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: WASTE WATER TREATMENT

SUBSYSTEM: Waste Water Clarifiers

REFERENCE: Field Experience

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, potential periodic operation.

LAY-UP PROCEDURE:

1. Clean, washdown, drain and winterize all associated equipment and piping.
2. Thoroughly lubricate all equipment grease zerts to force out any moisture accumulations.
3. Add water dispersion/stabilization chemicals to each gearbox.
4. Protect electrical cabinets with corrosion inhibitors.
5. Protect clarifier tank from sunlight and birds by installing a mesh screen cover.
6. Protect equipment from bird damage by closing all possible entry and nesting points.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.
2. Operate clarifier rake monthly to ensure proper operation.
3. Rotate blowdown pumps 1 ¼ turn by hand monthly.

MAINTENANCE PROCEDURE:

1. Maintain bird deterrents.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup procedure see OPL # 5 System 71 Lab.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: WATER TREATMENT

SUBSYSTEM: Water Plant Building

REFERENCE: Field Experience

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion.

LAY-UP PROCEDURE:

1. Clean, washdown, drain and winterize all equipment and piping.
2. Remove all media from vessels and dispose of properly.
3. Protect equipment in place with corrosion inhibitors.
4. Protect electrical cabinets with corrosion inhibitors.
5. Protect equipment from bird damage by closing all possible entry and nesting points.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain bird deterrents.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: CONDENSATE

SUBSYSTEM: Condensate System

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant Integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Condensate system shall be protected by dehumidified air (see procedure # 40.1).

2. Once unit is off line and heater temperature has dropped to 400°F and pressure is below 35 psi open all vents and drains. This shall promote natural drying by utilizing the latent heat of the metal.

3. All drains must remain open to drain away any moisture accumulations. Take all precautions to prevent water from backing up into components via drain lines.

4. Open all critical drain valves until heater is cooled to ambient temperature; then close tightly.

OPERATION PROCEDURE:

1. Rotate condensate pumps 1 ¼ turn by hand weekly.
2. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: CONDENSATE SYSTEM COMPONENTS

SUBSYSTEM: CONDENSATE PUMPS

REFERENCE: Westinghouse & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- #1, #2, & #3 CONDENSATE PUMP MOTOR (like motors)

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Selected motors are to have oil preservative added.
3. Clean motor (filters, screens, and interior/exterior).
4. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
5. Replace any screens that are missing.
6. Inspect weather head condition and lead terminations.
7. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 revolutions. No pre-lubrication is required and verify correct oil levels on bearings.

RECOVERY PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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3. Rotate selected motors at least 12 revolutions to ensure they turn free.
4. Drain oil and fill each motor with clean oil according to OEM of motor (AW 220).
5. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: CONDENSATE POLISHING

SUBSYSTEM: Condensate polishing system

REFERENCE: Field Experience

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion.

LAY-UP PROCEDURE:

1. Clean, flush, drain and winterize all process vessels.
2. Remove and properly dispose of all media from process vessels.
3. Protect equipment in place with corrosion inhibitors.
4. Protect electrical cabinets with corrosion inhibitors.
5. Remove insulation from caustic storage tank and neutralize to prevent corrosion.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FEED WATER

SUBSYSTEM: BOILER FEED PUMP TURBINE (BS-U-1 & BS-U-2)

REFERENCE: Field Experience & OPL

LOMR OBJECTIVE: Maintain plant Integrity during extended lay-up

DESCRIPTION: This procedure is based on BFP turbine storage with conditioned air circulation and lube oil system operational. Serial # 708055 and 708056

LAY-UP PROCEDURE:

1. Steam supply source and electrical isolation to be red tagged per standard operating procedure, see OPL # _____.

2. Drying of turbine shall begin as soon as practical after shutdown. Initial drying will occur naturally by latent heat. All steam lead, casing drains and stop valve seat drains must remain open to drain away any moisture accumulations. Take all precautions to prevent water from backing up into components via drain lines.

3. Turbine to remain on turning gear until cooled to ambient temperature.

4. Steam supply source and electrical isolation to be red tagged per standard operating procedure, see OPL # _____.

5. The lube oil reservoir shall be filled with a rust inhibiting, turbine-type, lube oil with a viscosity of approximately 150 to 160 Saybolt Universal Seconds at 100°F.

6. The auxiliary oil pump and reservoir heater shall be wired to allow manual operation.

7. All steam valves should be kept tight, and oil should be pumped through the unit for a few minutes every day.

OPERATION PROCEDURE:

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

1. Weekly rotate the turbine one and one-fourth (1 ¼) revolutions. NOTE: auxiliary oil pump shall be operated during any shaft rotation.

2. Monthly the lube oil shall be examined periodically and replaced if it loses its effectiveness or if it has dissipated the rust inhibitor.

3. Monthly operate the auxiliary oil pump and reservoir heater (if furnished) long enough to heat the lube oil in the pump reservoir to approximately 110 °F.

MAINTENANCE PROCEDURE:

1. Maintain systems as necessary to ensure functionality.

RECOVERY PROCEDURE:

1. The lube oil system shall be drained, flushed and filled with the proper lube oil just prior to start-up.

2. The temporary fine mesh strainers shall be installed on the HP and IP stop valves.

3. Inspect and restart systems as necessary.

4. For startup procedure see OPL # 87 System 25.

1. Weekly rotate the pump rotor one and one-fourth (1 ¼) revolutions. NOTE: auxiliary oil pump shall be operated during any shaft rotation.

2. Monthly the lube oil shall be examined periodically and replaced if it loses its effectiveness or if it has dissipated the rust inhibitor.

3. Monthly operate the auxiliary oil pump and reservoir heater long enough to heat the lube oil in the pump reservoir to approximately 110 °F.

Maintenance Procedure:

1. Maintain systems as necessary to ensure functionality.

Recovery Procedure:

1. The lube oil system shall be drained, flushed and filled with the proper lube oil just prior to start-up.

2. Release red tags.

3. For start-up procedure see OPL # _____.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

System: AUXILIARY BOILER FEED PUMP (FD-P-3)

References: Ingersoll Rand Manual (Contract 604)

Objective: Protect auxiliary boiler feed pump from deterioration during 12 month lay-up

Description: I-R 65 CHTA – 9 Stage Auxiliary Boiler Feed Pump

This procedure is based on pump storage with lube oil system operational.

Lay-up Procedure:

1. Water supply source and electrical isolation to be red tagged per standard operating procedure, see OPL # _____.

2. Isolate pump with valving and seal all valves.

3. Fill pump with a one percent (1%) solution of Immunol 1809 and water.

4. Immunol is a water-phase corrosion inhibitor for ferrous and mixed metal couples and is composed of five percent (5%) sodium nitrate with polyglycols, copper corrosion inhibitor and other organic materials.

5. The pump should be filled to the highest level possible, affording the greatest protection possible to all internal parts of the pump.

6. This solution, when drained, will result in a thin residual oil film (less than 0.0005) on all internals after the water has evaporated.

7. This residue provides added corrosion protection until pump is again filled with liquid or put into service.

8. The lube oil reservoir shall be filled with a rust inhibiting, turbine-type, lube oil with a viscosity of approximately 150 to 160 Saybolt Universal Seconds at 100°F.

9. The lube oil pipes to pump and driver bearings shall be capped.

10. The auxiliary oil pump and reservoir heater (if furnished) shall be wired to allow manual operation.

11. Megger motor at 5kV DC for 10 minutes and record readings.

12. Check motor heater for proper operation.

Operation Procedure:

1. Weekly rotate the pump rotor one and one-fourth (1 ¼) revolutions. NOTE: auxiliary oil pump shall be operated during any shaft rotation.

2. Monthly the lube oil shall be examined periodically and replaced if it loses its effectiveness or if it has dissipated the rust inhibitor.

3. Monthly operate the auxiliary oil pump and reservoir heater (if furnished) long enough to heat the lube oil in the pump reservoir to approximately 110 °F.

Maintenance Procedure:

1. Maintain systems as necessary to ensure functionality.

2. Monthly intervals megger motor at 5kV DC for 10 minutes and record readings. Where moisture build-up is expected us radiant heat to dry out windings and verify motor heater operation.

Recovery Procedure:

1. The lube oil system shall be drained, flushed and filled with the proper lube oil just prior to start-up.

2. Megger motor at 5kV DC for 10 minutes and log readings.

3. Rotate motor to verify turning free.

4. Release red tags.

5. For start-up procedure see OPL # _____.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FEED WATER

SUBSYSTEM: BOILER FEED PUMP (FD-P-1 & FD-P-2)

REFERENCE: Ingersoll Rand Manual (Contract 604)

LOMR OBJECTIVE: Maintain plant Integrity during extended lay-up

DESCRIPTION: I-R 65 CHTA - 4 Stage Boiler Feed Pump This procedure is based on pump storage with lube oil system operational.

LAY-UP PROCEDURE:

1. Water supply source and electrical isolation to be red tagged per standard operating procedure, see OPL # _____.

2. Fill pump with a one percent (1%) solution of Immunol 1809 and water.

3. Immunol is a water-phase corrosion inhibitor for ferrous and mixed metal couples and is composed of five percent (5%) sodium nitrate with polyglycols, copper corrosion inhibitor and other organic materials.

4. The pump should be filled to the highest level possible, affording the greatest protection possible to all internal parts of the pump.

5. This solution, when drained, will result in a thin residual oil film (less than 0.0005) on all internals after the water has evaporated.

6. This residue provides added corrosion protection until pump is again filled with liquid or put into service.

7. The lube oil reservoir shall be filled with a rust inhibiting, turbine-type, lube oil with a viscosity of approximately 150 to 160 Saybolt Universal Seconds at 100°F.

8. The lube oil pipes to pump and driver bearings shall be capped.

9. The auxiliary oil pump and reservoir heater shall be wired to allow manual operation.

Operation Procedure:

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FEED WATER

SUBSYSTEM: Feedwater Heaters

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant Integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Feedwater heaters shall be protected by dehumidified air (see procedure # 40.1).

2. Once unit is off line and heater temperature has dropped to 400°F and pressure is below 35 psi open all vents and drains. This shall promote natural drying by utilizing the latent heat of the metal.

3. All drains must remain open to drain away any moisture accumulations. Take all precautions to prevent water from backing up into components via drain lines.

4. Open all critical drain valves until heater is cooled to ambient temperature; then close tightly.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: SAMPLING

SUBSYSTEM: Laboratory and Sample Panel

REFERENCE: Field Experience

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion.

LAY-UP PROCEDURE:

1. Clean, flush, drain and winterize boiler water sample panel and piping.
2. Remove and properly dispose of all laboratory chemicals.
3. Protect equipment in place with corrosion inhibitors.
4. Protect electrical cabinets with corrosion inhibitors.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain bird deterrents.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FUEL HANDLING SYSTEM

SUBSYSTEM: Barge Unloader

REFERENCE: Field Experience & OPL

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, periodic operation.

LAY-UP PROCEDURE:

1. Clean, washdown, drain and winterize all equipment, pumps and piping.
2. Securly place clamshell bucket on hopper grate.
3. Thoroughly lubricate all cables and sheaves to minimize corrosion.
4. Thoroughly lubricate all equipment grease zerts to force out any moisture accumulations.
5. Add water dispersion/stabilization chemicals to each gearbox.
6. Protect equipment from bird damage by closing all possible entry and nesting points.
7. Protect equipment from unauthorized human entry by installing locking barrier gates to restrict entry from the river and access to the upper levels.

OPERATION PROCEDURE:

1. Inspect the equipment once a month for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain bird and unauthorized entry deterrents.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup procedure see OPL # 89 System 29.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FUEL HANDLING SYSTEM

SUBSYSTEM: Conveyors, transfer towers, stacker reclaimer and electrical buildings

REFERENCE: Field Experience

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, periodic operation

LAY-UP PROCEDURE:

1. Clean, washdown, drain and winterize all conveyor belts, equipment and piping.
2. Thoroughly lubricate all conveyor idler grease zerts to force out any moisture accumulations.
3. Add water dispersion/stabilization chemicals to each gearbox.
4. Protect hoppers and stacker buckets with corrosion inhibitors.
5. Protect electrical cabinets with corrosion inhibitors.
6. Park stacker/reclaimer at the south end of the track and secure boom to anchor point.
7. Protect equipment from bird damage by closing all possible entry and nesting points.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.
2. Operate conveyors monthly to ensure proper operation.

MAINTENANCE PROCEDURE:

1. Maintain bird deterrents.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup procedure see OPL's System 29.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: IGNITION OIL

SUBSYSTEM: Ignition oil tanks and pumps

REFERENCE: EPRI Guidelines, OEM Recommendations, Field Experience & OPL

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation.

LAY-UP PROCEDURE:

1. Drain ignition oil to lowest possible level.
2. Tanks will be protected by the ignition oil remaining in the tank after draining.
3. Protect ignition oil by adding stabilization chemicals.
4. Protect ignition oil pumps by leaving them flooded with ignition oil.

OPERATION PROCEDURE:

1. Inspect ignition oil tank berms as needed, especially after each rain event, and drain as appropriate.
2. Rotate ignition oil pumps 1 ¼ turn monthly by hand.
3. Inspect the ignition oil system monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: STEAM GENERATING UNIT

SUBSYSTEM: Boiler Waterwalls, Drum and Associated Piping

REFERENCE: EPRI Guidelines, OEM Recommendations, Field Experience & OPL

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Dehumidification equipment to be set in position, electrically connected, adaptors fabricated, connection hoses fitted and operationally tested prior to unit shutdown.
2. Prior to removing the unit from service, perform on-line deslag to remove as much slag as possible. Monitor ash accumulation in the drag chain during deslag to ensure that it does not become overloaded or otherwise damaged.
3. Purge and verify that the car dumper hopper is empty.
4. Purge and verify that conveyor belt #1 is empty.
5. Purge and verify that conveyor belt #2 is empty.
6. Purge and verify that the surge bin is empty.
7. Purge and verify that conveyor belts #5A, 5B and #6A, 6B are empty.
8. Prior to removing fire from the boiler, operate all sootblowers, starting with the ones farthest from the stack.
9. Purge and verify that all five bunkers and pulverizes are operated until empty.
10. Once unit is off line and boiler temperature has dropped to 400°F and pressure is below 35 psi open all boiler vents and drains. This shall promote natural drying by utilizing the latent heat of the tube metal. Take all precautions to prevent water from backing up into components via drain lines.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

11. Install blanks and adaptors, fabricated prior to shut-down, in primary air and forced draft fan inlet ducts. Connect and start dehumidification equipment inlet piping on the gas/air cycle as soon as practical.
12. Close all drains once no evidence of liquid is present.
13. Close all vents once no evidence of steam is present. This process is intended to leave all superheat tubes dry and free of liquid water.
14. All external vent standpipes should be capped securely to prevent entry of rainwater.
15. Seal boiler lower throat opening at knees.
16. Close SCR bypass damper.
17. Connect dehumidification equipment return piping from the air heater hoppers.
18. Dehumidification equipment should be connected to the steam/water cycle at the hotwell and started as soon as possible. See turbine lay-up procedure.
19. Clean external surfaces of all sootblowers and apply corrosion inhibitors.

OPERATION PROCEDURE:

1. Inspect the boiler waterside once a month for evidence of active corrosion, if found, take corrective action.

2. Inspect the boiler fireside once a month for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain dehumidification equipment as necessary.

RECOVERY PROCEDURE:

1. Remove all dehumidification equipment, connection hoses and adaptors.
2. Remove all caps previously installed on boiler vents.
3. Inspect and restart system as necessary.
4. For startup see Foster Wheeler System Start-up Procedure, Cold Start.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: STEAM GENERATING UNIT

SUBSYSTEM: Boiler Steam Side / Water Side

REFERENCE: Foster Wheeler / OPL

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1 & 2 INDUCED DRAFT FAN (like fans)
- DAMPER AND DRIVES

LAY-UP PROCEDURE:

1. **Safety: Ensure Fans are properly tagged out.**
2. HOUSING INTERIOR:
   a. Ensure that all inlet box and housing drains are fully functional.
   b. Clean all fly ash deposits from internal of fan housing.
   c. Power wash the housing interior.

3. FAN WHEEL
   a. Clean all deposits from fan wheel.
   b. Power wash the fan wheel.
   c. Inspect the fan wheel for cracks, erosions & corrosion at the welds.

4. FAN BEARING HOUSINGS
   a. Drain & clean all deposits from housings

5. FAN ROTOR
   a. Option 1: (Turning gear assembly is mounted to the end of the main rotor shaft). A stub shaft should be bolted to the outboard end of the fan shaft. An over running clutch coupling is mounted between the stub shaft and gear reducer. An expansion type gear coupling is coupled to the shaft on the gear reducer, and to an electric motor.
   b. Option 2: (Turning gear assembly is mounted to the end of the main rotor shaft). A belt drive and motor sized for 20-50 rpm.

c. Note: The rotor weight and WR^2 value of the rotor assembly will be required for proper sizing of either drive method. (Ref. fan assy. Drawing or spec. sheet)

6. LOUVER DAMPERS
   a. Stroke, lubricate inlet & discharge louver dampers.

MAINTENANCE PROCEDURE:

1. LUBE OIL PUMPS
   a. It is highly recommended to run the circulating oil system continuously to help prevent condensation from forming inside the bearing housing. (Ref. Fan Services Associates)

2. FAN ROTOR
   a. Ideally the fan should be run at 20-50 rpm for 10 minutes. This schedule will help prevent a bow in the fan shaft. This will also help keep the bearing liner lubricated with oil. (One Week intervals)

3. DISCHARGE LOUVER DAMPERS
   a. Stroke and lubricate discharge louver dampers at (one week intervals)

4. DUCT DRAINS
   a. Open & Close housing Drains to allow any trapped condensate to exit duct (one week intervals).

RECOVERY PROCEDURE:

1. **Safety: Ensure Fans are properly tagged out.**
2. DUCT DRAINS:
   a. Open & Close Duct Drains to allow any trapped condensate to exit duct.

3. DISCHARGE LOUVER DAMPERS
   a. Stroke dampers several times to ensure dampers will operate.

4. FAN ROTOR

a. Remove Turning Gear Assembly from rotor shaft

5. LUBE OIL PUMPS
   a. Drain oil from reservoir.
   b. Install new oil. TURBINE OIL GST 32 or HYDRO TEX 46 (Ref. Lube Manual)

6. FAN WHEEL
   a. Inspect fan wheel for cracks and corrosion

7. FAN PERMITS
   a. Release permit on the specific fan of choice.
   b. Test run fan for vibration monitoring.
   c. Release to Operations.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: STEAM GENERATING UNIT

SUBSYSTEM: Penthouse and Dead Air Space

REFERENCE: EPRI Guidelines, OEM Recommendations, Field Experience & OPL

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Dehumidification equipment to be set in position, electrically connected, adaptors fabricated, connection hoses fitted and operationally tested prior to unit shutdown.
2. Once unit is off line and penthouse temperature has dropped to 400°F, install adaptors, fabricated prior to shut-down, onto access doors. Connect and start dehumidification equipment before dew point is reached.
3. Close all unused access doors to prevent moisture ingress.

OPERATION PROCEDURE:

1. Clean precipitator internals by dry vacuuming after dehumidification equipment is in service.
2. Inspect the penthouse and dead air spaces once a month for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain dehumidification equipment as necessary.

RECOVERY PROCEDURE:

1. Remove all dehumidification equipment, connection hoses and adaptors.
2. For startup see Foster Wheeler System Start-up Procedure, Cold Start.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: COMBUSTION AIR & FLUE GAS

SUBSYSTEM: PA Fans

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. PA Fans shall be protected by dehumidified air (see procedure # 31.1)
2. Protect lube oil and hydraulic oil with water dispersion/stabilization chemicals.

OPERATION PROCEDURE:

1. With PA fan lube oil system operating, rotate fan shaft 1 ¼ turn by hand weekly. Upon completion of rotation shut off lube oil system.
2. With PA fan hydraulic system operating, stroke fan blades weekly. Upon completion of fan blade stroking shut off the hydraulic system.
3. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup see Foster Wheeler and Novenco Fan Procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FUEL BURNING EQUIPMENT

SUBSYSTEM: Pulverizers, Burners, Coal Pipes and Windbox

REFERENCE: EPRI Guidelines, OEM Recommendations, Field Experience & OPL

LOMR OBJECTIVE: To Maintain Plant Integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Pulverizers, burners, coal pipes and windbox shall be protected by dehumidified air (see procedure # 31.1)
2. Add water dispersion/stabilization chemicals to each gearbox.

OPERATION PROCEDURE:

1. Clean equipment internals by dry vacuuming after dehumidification equipment is in service.
2. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain dehumidification equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FANS & DRAFT EQUIPMENT

SUBSYSTEM: PA FAN & DAMPERS

REFERENCE: Fan Services Associates & Field Experience / OPL

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1 & 2 PRIMARY AIR FAN (like fans)
- DAMPER AND DRIVES

LAY-UP PROCEDURE:

1. **Safety: Ensure Fans are properly tagged out.**
2. THOMAS FLEX COUPLING:
   a. Remove Thomas Flex coupling.
   b. Clean & lubricate each shim with a thin coat of oil, bolt shim pack to coupling spool piece so that shims are not misplaced during storage, store coupling (spool & shims) in a clean and dry environment. (store in maintenance shop upstairs tool room)

3. MAIN SHAFT BEARING RESERVOIR:
   a. Fill Main Bearing Reservoir, just above the bottom of main bearings with Hydro Tex 46 lube oil. (Ref. lube manual)

4. MAIN SHAFT:
   a. Install anti-rotation device on main shaft to prevent wind milling.

5. FAN BLADES & HUB ASSEMBLY:

   a. Disassemble all hubs, clean and coat ferrous parts with anti-rust chemical and store in clean dry building. (store in maintenance shop upstairs tool room)
   b. All fan blades should be visually inspected and cleaned of any residue before lay-up.

6. LOUVER DAMPERS:
   a. Stroke, lubricate, & close discharge louver dampers. DURA-LITH EP-2 Grease (Ref. lube manual)

b. Open & Close Duct Drain to allow any trapped condensate to exit duct.

7. LUBE & HYDRAULIC SYSTEMS
   a. Drain oil from both systems, change all filters and refill with fresh oil prior to lay-up.(Ref. Lube Manual)

8. DIFFUSER & INLET BOX
   a. Place desiccant packs in diffuser and inlet box inner tubes for corrosion protection.

MAINTENANCE PROCEDURE:

1. LUBE OIL & HYDRAULC PUMPS
   a. Continue to run lube oil & hydraulic pumps (recommended by fan services).

2. MAIN SHAFT:
   a. Rotate Fan Main shaft 360 degrees, then 90 degrees (one and one quarter revolutions) at (one month intervals).

3. FAN BLADES & HUB ASSEMBLY:
   a. Inspect stored blades & Hubs to be free from corrosion. Recoat if necessary.(one month intervals)

4. DISCHARGE LOUVER DAMPERS:
   a. Stroke and lubricate discharge louver dampers at (one month intervals) DURA-LITH EP-2 Grease (Ref. lube manual).

5. DUCT DRAINS
   a. Open & Close Duct Drain to allow any trapped condensate to exit duct (one month intervals

6. DIFFUSER & INLET BOX:
   a. Inspect desiccant packs in diffuser and inlet box inner tubes, replace if needed. (one month intervals)

RECOVERY PROCEDURE:

1. **Safety: Ensure Fans are properly tagged out.**

2. DUCT DRAINS:

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: COMBUSTION AIR & FLUE GAS

SUBSYSTEM: FD Fans

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. FD Fans shall be protected by dehumidified air (see procedure # 31.1)
2. Protect lube oil and hydraulic oil with water dispersion/stabilization chemicals.

OPERATION PROCEDURE:

1. With FD fan lube oil system operating, rotate fan shaft 1 ¼ turn by hand weekly. Upon completion of rotation shut off lube oil system.
2. With FD fan hydraulic system operating, stroke fan blades weekly. Upon completion of fan blade stroking shut off the hydraulic system.
3. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup see Foster Wheeler and Novenco Fan Procedures.

a. Open & Close Duct Drains to allow any trapped condensate to exit duct.

3. DISCHARGE LOUVER DAMPERS
   a. Stroke dampers several times to ensure dampers will operate. Lubricate with DURA-LITH EP-2 Grease. (Ref. lube manual).

4. MAIN SHAFT BEARING RESERVOIR:
   a. Drain all oil from main bearing reservoir.
   b. Reinstall new oil to proper level (Hydro Tex 46).(ref. lube manual)

5. LUBE OIL & HYDRAULIC PUMPS:
   a. Drain and fill both systems with fresh oil and install new filters. (Ref. Lube Manual)
   b. Start lube oil and hydraulic pumps.

6. FAN BLADES & HUB ASSEMBLY:
   a. Clean and reinstall hub and blade assembly. (Ref. work package)

7. MAIN SHAFT:
   a. Remove anti-rotation device.
   b. Rotate Main Shaft several times to ensure rotation.
   c. Clean, align and install Thomas flex coupling. Ref. work package

8. FAN PERMITS
   a. Release permit on the specific fan of choice.
   b. Test run fan for vibration monitoring.
   c. Release to Operations.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

Procedure # 21-SGU-XX **UPDATED:** 11-19-2012

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FANS & DRAFT EQUIPMENT

SUBSYSTEM: P.A. FAN & DRIVES

REFERENCE: General Electric & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1 & # 2 PRIMARY AIR FAN MOTOR (like motors)

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Selected motors are to have oil preservative added.
3. Clean motor (filters, screens, and interior/exterior).
4. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
5. Replace any screens that are missing.
6. Inspect weather head condition and lead terminations.
7. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 ¼ revolutions and mark starting position to ensure shaft is ¼ turn from beginning position. No pre-lubrication is required and verify correct oil levels on bearings.

RECOVERY PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: COMBUSTION AIR & FLUE GAS

SUBSYSTEM: ID Fans

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. ID Fans shall be protected by dehumidified air (see procedure # 38.1)
2. Protect lube oil with water dispersion/stabilization chemicals.
3. Install turning gear on each fan for periodic rotation.

OPERATION PROCEDURE:

1. With ID fan lube oil system operating, rotate fan shaft 1 ¼ turn with turning gear weekly. Upon completion of rotation shut off lube oil system.
2. Clean fan housing and duct by dry vacuuming after dehumidification equipment is in service.
3. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.
3. Rotate selected motors at least 12 revolutions to ensure they turn free.
4. Drain oil and fill each motor with clean oil according to OEM of motor (GST 32).
5. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: COMBUSTION AIR & FLUE GAS

SUBSYSTEM: Primary and Secondary Air Heaters

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Air heaters shall be protected by dehumidified air (see procedure # 31.1)
2. Add water dispersion/stabilization chemicals to each gearbox.

OPERATION PROCEDURE:

1. Clean combustion residue from catalyst layers by dry vacuuming after dehumidification equipment is in service
2. With air heater bearing lube oil system operating, rotate air heater 1 ¼ turn with air drive monthly. Upon completion of rotation shut off lube oil system.
3. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.
2. For startup see Foster Wheeler Procedures.

Procedure # 21-SGU-XX **UPDATED:** 11-19-2012

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FANS & DRAFT EQUIPMENT

SUBSYSTEM: F.D. FAN & DRIVES

REFERENCE: General Electric & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1 & # 2 FORCED DRAFT FAN MOTOR (like motors)

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Selected motors are to have oil preservative added.
3. Clean motor (filters, screens, and interior/exterior).
4. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
5. Replace any screens that are missing.
6. Inspect weather head condition and lead terminations.
7. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 ¼ revolutions and mark starting position to ensure shaft is ¼ turn from beginning position. No pre-lubrication is required and verify correct oil levels on bearings.

RECOVERY PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.
3. Rotate selected motors at least 12 revolutions to ensure they turn free.
4. Drain oil and fill each motor with clean oil according to OEM of motor (GST 68).
5. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FANS & DRAFT EQUIPMENT

SUBSYSTEM: FD FAN & DAMPERS

REFERENCE: Fan Services Associates & Field Experience / OPL

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1 & 2 FURNACE DRAFT FAN (like fans)
- DAMPER AND DRIVES

LAY-UP PROCEDURE:

1. **Safety: Ensure Fans are properly tagged out.**
2. THOMAS FLEX COUPLING:
   a. Remove Thomas Flex coupling.
   b. Clean &lubricate each shim with a thin coat of oil, bolt shim pack to coupling spool piece so that shims are not misplaced during storage, store coupling (spool & shims) in a clean and dry environment. (store in maintenance shop upstairs tool room)

3. MAIN SHAFT BEARING RESERVOIR:
   a. Fill Main Bearing Reservoir, just above the bottom of main bearings with Hydro Tex 46 lube oil. (Ref. lube manual)

4. MAIN SHAFT:
   a. Install anti-rotation device on main shaft to prevent wind milling.

5. FAN BLADES & HUB ASSEMBLY:

   a. Disassemble all hubs, clean and coat ferrous parts with anti-rust chemical and store in clean dry building. (store in maintenance shop upstairs tool room)
   b. All fan blades should be visually inspected and cleaned of any residue before lay-up.

6. LOUVER DAMPERS:
   a. Stroke, lubricate, & close discharge louver dampers. DURA-LITH EP-2 Grease (Ref. lube manual)

b. Open & Close Duct Drain to allow any trapped condensate to exit duct.

7. LUBE & HYDRAULIC SYSTEMS
   a. Drain oil from both systems, change all filters and refill with fresh oil prior to lay-up.(Ref. Lube Manual)

8. DIFFUSER & INLET BOX
   a. Place desiccant packs in diffuser and inlet box inner tubes for corrosion protection.

MAINTENANCE PROCEDURE:

1. LUBE OIL & HYDRAULC PUMPS
   a. Continue to run lube oil & hydraulic pumps (recommended by fan services).

2. MAIN SHAFT:
   a. Rotate Fan Main shaft 360 degrees, then 90 degrees (one and one quarter revolutions) at (one month intervals).

3. FAN BLADES & HUB ASSEMBLY:
   a. Inspect stored blades & Hubs to be free from corrosion. Recoat if necessary.(one month intervals)

4. DISCHARGE LOUVER DAMPERS:
   a. Stroke and lubricate discharge louver dampers at (one month intervals) DURA-LITH EP-2 Grease (Ref. lube manual).

5. DUCT DRAINS
   a. Open & Close Duct Drain to allow any trapped condensate to exit duct (one month intervals

6. DIFFUSER & INLET BOX:
   a. Inspect desiccant packs in diffuser and inlet box inner tubes, replace if needed. (one month intervals)

RECOVERY PROCEDURE:

1. **Safety: Ensure Fans are properly tagged out.**

2. DUCT DRAINS:

a. Open & Close Duct Drains to allow any trapped condensate to exit duct.

3. DISCHARGE LOUVER DAMPERS
   a. Stroke dampers several times to ensure dampers will operate. Lubricate with DURA-LITH EP-2 Grease. (Ref. lube manual).

4. MAIN SHAFT BEARING RESERVOIR:
   a. Drain all oil from main bearing reservoir.
   b. Reinstall new oil to proper level (Hydro Tex 46).(ref. lube manual)

5. LUBE OIL & HYDRAULIC PUMPS:
   a. Drain and fill both systems with fresh oil and install new filters. (Ref. Lube Manual)
   b. Start lube oil and hydraulic pumps.

6. FAN BLADES & HUB ASSEMBLY:
   a. Clean and reinstall hub and blade assembly. (Ref. work package)

7. MAIN SHAFT:
   a. Remove anti-rotation device.
   b. Rotate Main Shaft several times to ensure rotation.
   c. Clean, align and install Thomas flex coupling. Ref. work package

8. FAN PERMITS
   a. Release permit on the specific fan of choice.
   b. Test run fan for vibration monitoring.
   c. Release to Operations.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FANS & DRAFT EQUIPMENT

SUBSYSTEM: I.D. FAN & DRIVES

REFERENCE: Westinghouse & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1 & # 2 INDUCED DRAFT FAN MOTOR (like motors)

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Uncouple selected motors.
3. Selected motors have a circulating oil system and it is recommended to keep oil system active. This will help keep oil clean.
4. Clean motor (filters, screens, and interior/exterior).
5. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
6. Replace any screens that are missing.
7. Inspect weather head condition and lead terminations.
8. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 ¼ revolutions and mark starting position to ensure shaft is ¼ turn from beginning position. No pre-lubrication is required and verify correct oil levels on bearings.

RECOVERY PROCEDURE:

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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1. **Safety: Ensure Motors are properly tagged out.**
2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.
3. Rotate selected motors at least 12 revolutions to ensure they turn free.
4. Verify oil level.
5. Run selected motors uncoupled to record current and vibration readings.
6. Couple selected motors.
7. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FANS & DRAFT EQUIPMENT

SUBSYSTEM: I.D. FAN & DAMPERS

REFERENCE: Fan Services Associates & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1 & 2 INDUCED DRAFT FAN (like fans)
- DAMPER AND DRIVES

LAY-UP & OPERATION PROCEDURE:

1. **Safety: Ensure Fans are properly tagged out.**

2. HOUSING INTERIOR:
   a. Ensure that all inlet box and housing drains are fully functional.
   b. Clean all fly ash deposits from internal of fan housing.
   c. Power wash the housing interior.

3. FAN WHEEL:
   a. Clean all deposits from fan wheel.
   b. Power wash the fan wheel.
   c. Inspect the fan wheel for cracks, erosions & corrosion at the welds.

4. FAN BEARING HOUSINGS:
   a. Drain & clean all deposits from housings

5. FAN ROTOR:
   a. Option 1: (Turning gear assembly is mounted to the end of the main rotor shaft). A stub shaft should be bolted to the outboard end of the fan shaft. An over running clutch coupling is mounted between the stub shaft and gear reducer. An expansion type gear coupling is coupled to the shaft on the gear reducer, and to an electric motor.
   b. Option 2: (Turning gear assembly is mounted to the end of the main rotor shaft). A belt drive and motor sized for 20-50 rpm.
   c. Note: The rotor weight and WR^2 value of the rotor assembly will be required for proper sizing of either drive method. (Ref. fan assy. Drawing or spec. sheet)

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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6. LOUVER DAMPERS:
   a. Stroke, lubricate inlet & discharge louver dampers.

MAINTENANCE PROCEDURE:

1. LUBE OIL PUMPS:
   a. It is highly recommended to run the circulating oil system continuously to help prevent condensation from forming inside the bearing housing. (Ref. Fan Services Associates)

2. FAN ROTOR:
   a. Ideally the fan should be run at 20-50 rpm for 10 minutes. This schedule will help prevent a bow in the fan shaft. This will also help keep the bearing liner lubricated with oil. (One Week intervals)

3. DISCHARGE LOUVER DAMPERS:
   a. Stroke and lubricate discharge louver dampers at (one week intervals)

4. DUCT DRAINS
   a. Open & Close housing Drains to allow any trapped condensate to exit duct (one week intervals).

RECOVERY PROCEDURE:

1. **Safety: Ensure Fans are properly tagged out.**

2. DUCT DRAINS:
   a. Open & Close Duct Drains to allow any trapped condensate to exit duct.

3. DISCHARGE LOUVER DAMPERS:
   a. Stroke dampers several times to ensure dampers will operate.

4. FAN ROTOR:
   a. Remove Turning Gear Assembly from rotor shaft.

5. LUBE OIL PUMPS:
   a. Drain oil from reservoir.
   b. Install new oil. TURBINE OIL GST 32 or HYDRO TEX 46 (Ref. Lube Manual)

6. FAN WHEEL:
   a. Inspect fan wheel for cracks and corrosion

7. FAN PERMITS:

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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a. Release permit on the specific fan of choice.
b. Test run fan for vibration monitoring.
c. Release to Operations.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FUEL PROCESSING EQUIPMENT

SUBSYSTEM: PULVERIZERS INCLUDING PA DUCT & DAMPER DRIVES

REFERENCE: General Electric & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1, # 2, # 3, # 4, & # 5 COAL PULVERIZER MOTOR (like motors)

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Selected motors are to have oil preservative added.
3. Clean motor (filters, screens, and interior/exterior).
4. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
5. Replace any screens that are missing.
6. Inspect weather head condition and lead terminations.
7. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 ¼ revolutions and mark starting position to ensure shaft is ¼ turn from beginning position. No pre-lubrication is required and verify correct oil levels on bearings.

RECOVERY PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**

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Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.
3. Rotate selected motors at least 12 revolutions to ensure they turn free.
4. Drain oil and fill each motor with clean oil according to OEM of motor (GST 68).
5. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: FUEL BURNING EQUIPMENT

SUBSYSTEM: Tripper Cars and Bunkers

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, periodic operation.

LAY-UP PROCEDURE:

1. Clean, washdown, drain and winterize all conveyor belts, equipment and piping.
2. Thoroughly lubricate all conveyor idler grease zerts to force out any moisture accumulations.
3. Add water dispersion/stabilization chemicals to each gearbox.
4. Protect hoppers and bunkers with corrosion inhibitors.
5. Protect electrical cabinets with corrosion inhibitors.
6. Park both tripper cars over #3 bunker, any debris from periodic conveyor belt operation would be deposited in it, and it would most likely be the last one returned to service.
7. Protect equipment from bird damage by closing all possible entry and nesting points.

OPERATION PROCEDURE:

1. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: PRECIPITATOR

SUBSYSTEM: Precipitator, flyash system and flyash silos

REFERENCE: EPRI Guidelines, OEM Recommendations, Field Experience & OPL

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Dehumidification equipment to be set in position, electrically connected, adaptors fabricated, connection hoses fitted and operationally tested prior to unit shutdown.
2. Precipitator layup shall begin after all boiler and SCR sootblowers have been operated.
3. Prior to removing the unit from service, operate all rappers in manual, purge and verify that all hoppers and transport pips are empty.
4. Once unit is off line and precipitator temperature has dropped to 400°F, install adaptors in access doors and connect and start dehumidification equipment inlet piping on the gas/air cycle, before dew point is reached.
5. Connect dehumidification equipment return piping from induced draft fan access doors.
6. Install blank at air heater outlet.
7. Close scrubber inlet guillotines.
8. Protect rappers with corrosion inhibitors.
9. Protect flyash blower gear boxes with water dispersion additives and corrosion inhibitors.
10. Clean all flyash from silos.

OPERATION PROCEDURE:

1. Clean precipitator internals by dry vacuuming after dehumidification equipment is in service.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

2. Inspect the precipitator monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain dehumidification equipment as necessary.

RECOVERY PROCEDURE:

1. Remove all dehumidification equipment, connection hoses and adaptors.
2. Remove all duct blanks previously installed.
3. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: ASH REMOVAL SYSTEMS

SUBSYSTEM: FLYASH CONVEYANCE SYSTEM

REFERENCE: Westinghouse & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1, #2, & #3 FLYASH BLOWER MOTORS (like motors)

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Selected motors are to have oil preservative added.
3. Clean motor (filters, screens, and interior/exterior).
4. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
5. Replace any screens that are missing.
6. Inspect weather head condition and lead terminations.
7. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 ¼ revolutions and mark starting position to ensure shaft is ¼ turn from beginning position. No pre-lubrication is required and verify correct oil levels on bearings.

RECOVERY PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.
3. Rotate selected motors at least 12 revolutions to ensure they turn free.
4. Drain oil and fill each motor with clean oil according to OEM of motor (GST 32).
5. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: TURBINE

SUBSYSTEM: Turbine

REFERENCE: EPRI Guidelines, Westinghouse Manual

LOMR OBJECTIVE: Maintain plant Integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Dehumidification equipment to be set in position, electrically connected, adaptors fabricated, connection hoses fitted and operationally tested prior to unit shutdown.

2. Once unit is off line and turbine temperature has dropped to 400°F and pressure is below 35 psi open all turbine vents and drains. This shall promote natural drying by utilizing the latent heat of the turbine metal.

3. All steam lead, casing drains and stop valve seat drains must remain open to drain away any moisture accumulations. Take all precautions to prevent water from backing up into components via drain lines.

4. Open all critical drain valves until turbine is cooled to ambient temperature; then close tightly. Critical drains include:

    a. Main steam system drains

    b. Main steam bypass system drains

    c. Extraction piping drains

    d. Gland system drains

    e. Turbine and turbine piping drains

    f. Drains from all pipes to turbine and feedwater heater cycle that could be a source of moist air, water or steam to the turbine.

5. Turbine to remain on turning gear until cooled to ambient temperature.

6. Drain and dry the hotwell. There should be no water in the condenser/feedwater system, or this system should be completely isolated from the turbine and related systems. Do not introduce water or steam into the condenser/feedwater system before or during lay-up.

7. Dehumidification equipment shall be connected to the hotwell access doors with custom adaptors. The equipment shall be placed in service as soon as practical to minimize corrosion potential.

8. Dehumidified air shall circulate through both low pressure turbines. The air pressure shall be maintained at 0.5 psig to 1 psig at the condenser outlet; this pressure is sufficient to ensure adequate air circulation and keep atmospheric air from entering the gland seals steam path. Pressure shall be maintained well below 5 psig to avoid rupturing the LP turbine pressure relief devices.

9. Dehumidified air shall circulate through the crossover pipes to the intermediate turbine and out through the hot reheat piping. This requires that the intercept and hot reheat stop valves be blocked open, ideally at approximately 80% travel.

10. Dehumidified air shall return through the cold reheat piping, through the high pressure turbine and out through the main seam lines. This requires that the governor and throttle valves be blocked open, ideally at approximately 80% travel.

11. Once the turbine valves have been blocked open the EH system can be removed from service and depressurized.

12. Upon removing the unit from service, the turbine shall be electrically isolated and red tagged per standard operating procedure, see OPL # _____.

13. Open the following valves, then close them tightly, these valves are actuated to verify that no water is trapped upstream and to isolate the turbine from possible sources of moist air:

    a. Main steam bypass valves to condenser

    b. Extraction line shutoff valves

c. Gland regulator and spillover valves (regulator valves open on loss of air; close shutoff valves)

d. Vacuum breaker valves

e. Heater vent valves (blank off if not valved)

f. Valves in any line connected between a possible source of moist air, steam, or water and the turbine, condenser, drain tanks, or feedwater heaters.

14. Drain, dry and isolate the gland steam condenser from the gland steam system.

15. Satisfactorily complete flushing of lubricating oil system and equipment before lay-up begins. Consult lube oil and EH fluid suppliers for precautions to take for protecting these oils. The lubrication oil purification system must be available and must be used for normal removal of impurities and moisture.

16. Apply M53535CG to all exposed machined or unpainted surfaces, including but not limited to, throttle, governor, hot reheat and intercept valves. Coat the internals of all main steam relief valves, including pilot valves with M54545HU. It is recommended that external machined surfaces and horizontal joints be coated with M54545HU.

17. Establish written records of all areas where preservatives are used to ensure that during the recovery procedure they are removed and that all valves are properly positioned as needed to restore turbine and operating cycle to normal status for safe operation.

OPERATION PROCEDURE:

1. The following procedures, tests and inspections are needed during lay-up to verify proper preservation.

2. Daily monitor the turbine outlet pressure of the conditioned air to ensure adequate flow, pressure to be greater than 0.5 psig.

3. Daily monitor turbine humidity conditions to ensure twenty (20) percent or less relative humidity in the turbine and valves.

4. Weekly operate the AC bearing oil pump and lubricating oil system for one (1) hour, during which time the turbine / generator shall be operated on turning gear. Maintain the temperature on the lube oil reservoir between 50°F and 90°F during the one (1) hour circulation period. The lubricating oil purification system must be in operation long enough to verify that the oil is free of moisture. Bearing oil lift pumps must be in operation prior to engaging turning gear. Plant fire protection systems must be operational.

5. Weekly operate the EH system for one (1) hour, operate each EH pump for at least five (5) minutes. CAUTION: Verify that fluid temperatures are above 50°F before starting pump motors. Heavy oil at low temperatures can overload and damage the motors.

6. Weekly exercise, actuate or test all control devices such as the overspeed, low vacuum, low bearing oil pressure and low EH fluid pressure trips and others that can be manipulated during the one (1) hour period of EH fluid and lube oil circulation.

7. Monthly during operation on turning gear, operate the emergency DC oil pump for five (5) minutes.

8. Monthly test the EH fluid to verify that condition is adequate for continued use.

9. Monthly, do not operate but, rotate the gland exhauster motor.

10. Monthly exercise the valves listed below and check exposed stems, springs, linkages, etc. for indications of corrosion, also check valve action for indications of internal corrosion:

    a. All critical drain valves, including those for turbine components and piping, gland system and main steam bypass and extraction piping.

    b. Extraction line shutoff and non-return valves

    c. Gland regulating and spillover valves

11. Keep records of all inspections, tests and maintenance done on the equipment. The purpose of these records is to help detect deterioration over a period of time and verify proper storage.

MAINTENANCE PROCEDURE:

1. Maintain systems as necessary to ensure functionality.

RECOVERY PROCEDURE:

1. Remove circulating air equipment from hotwell access opening and clean gasket sealing surface.

2. Remove throttle valves and install temporary strainer screens (stock # 221-18-017).

3. Reinstall throttle valves with new bonnet gaskets (stock # 221-22-330).

4. Remove all valve blocking devices from the throttle, governor, reheat stop and intercept valves.

5. Before start-up, verify that oil-type preservatives are removed from areas of the turbine that get hot during operation. If not, the preservatives will burn off, possibly causing fumes, smoke or flames, which can be hazardous to personnel working in the area. Also, do not allow oil-type preservatives to come in contact with insulation. Insulation readily soaks up oil and saturated insulation is a fire hazard.

6. Release red tags.

7. For start-up procedure see OPL # _____.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: EXCITER

SUBSYSTEM: Exciter

REFERENCE: EPRI Guidelines, Westinghouse Manual

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: This procedure is based on generator storage with conditioned air circulation, lube oil system operational.

LAY-UP PROCEDURE:

1. Dehumidification equipment to be set in position, electrically connected, adaptors fabricated, connection hoses fitted and operationally tested prior to unit shutdown.

2. Upon removing the unit from service, the generator shall be electrically isolated and red tagged per standard operating procedure, see OPL # _____.

3. Turbine/generator shall remain on turning gear until cooled to recommended oil temperature.

4. Generator and hydrogen dryer shall be purged from hydrogen to carbon dioxide then to atmosphere while on turning gear. The seal oil system must remain in operation to minimize gas loss, see OPL # _____.

5. Remove components as necessary to allow access to generator inspection covers.

6. Once generator has been successfully purged to a safe condition the governor end access plate shall be removed and an adaptor installed to allow connection of the dehumidification equipment.

7. Reinstall the exciter house, insuring that all seals are in place and effective.

8. Install a hygrometer in the generator drain lines and another inside the exciter enclosure, positioned to be seen through one of the windows.

9. Generator windings shall be monitored during lay-up. This can be accomplished by drilling and tapping a hole in the lead box and inserting a new automobile type sparkplug into the opening and connecting the insulated electrode to the windings for use in taking megger readings. The ground electrode can be removed for

convenience. If insulation resistance of rotor windings is below 10 meg-ohms, the windings should be dried out (see Westinghouse procedure) before restarting the generator.

10. Hydrogen coolers shall be drained, red tagged, opened, cleaned, dried and preservative added as follows, also see OPL # _____:

    a. Remove the outer and inner heads from the top of the coolers.

    b. Remove all eight (8) ten (10) inch supply/return lines from the bottom of the coolers.

    c. Cooler tube bundles shall be thoroughly cleaned and dried with forced air.

    d. Once the cooler tubes are completely dry install Zerust VC6-1 capsules in each end of each cooler. Place capsules as near the tube bundle as possible and note location for future removal.

    e. Install eight (8) ten (10) inch 150# blind flanges with gaskets on the cooler inlet/outlet piping.

    f. Install the cooler upper heads, outer gasket (stock # 221-22-505) and inner gasket (stock # 221-22-508).

11. Clean and inspect all machined surfaces and coat with Mobilarma 245.

12. Exciter coolers shall be drained, red tagged, opened, cleaned, dried and preservative added and reassembled as follows also see OPL # _____:

    a. Remove all eight (8) two and one-half (2 ½) inch grooved pipe “Victaulic” water supply/return lines from the coolers.

    b. Remove the heads from the each end of the coolers.

    c. Cooler tube bundles shall be thoroughly cleaned and dried with forced air.

    d. Once the cooler tubes are completely dry install one (1) Zerust VC6-1 capsule in each end of each cooler. Place capsules on the inside of the cooler head and note location for future removal.

    e. Install the cooler heads with eight (8) new gaskets (stock# 221-22-022).

f. Install sixteen (16) two and one half (2 ½) inch groove type pipe caps on the cooler and piping inlet/outlet connections.

g. Close drain valves from internal drip pans to prevent moisture ingress.

Operation Procedure:

1. Daily monitor and log humidity conditions to ensure twenty (20) percent or less relative humidity in the generator housing and the exciter enclosure.

2. Weekly operate the main turbine on turning gear for one (1) hour.

3. Every ninety (90) days, remove stator grounds and megger all windings 10 minutes at 5 KV. If any deterioration of insulation is noted, adjust dehumidification conditions to correct. Log all test readings.

4. Every ninety (90) days, make 500 volt 10 minute megger test on rotor. Adjust dehumidification to correct any deterioration of readings. Log all test readings.

Maintenance Procedure:

1. Maintain systems as necessary to ensure functionality.

Recovery Procedure:

1. Shutdown and remove dehumidification equipment from generator and exciter.

2. If insulation resistance of rotor windings is below 10 meg-ohms, the windings should be dried out (see Westinghouse procedure) before restarting the generator.

3. Disconnect and remove dehumidifier and associated equipment from exciter.

4. Reconnect exciter cooler drip pan drain line.

5. Remove Zerust VC6-1 capsules from water side of hydrogen coolers.

6. Restore hydrogen cooling system, check for water leaks, see OPL # _____.

7. Remove Zerust VC6-1 capsules from water side of exciter coolers.

8. Restore exciter cooling system, check for water leaks, see OPL# _____.

9. Clean Mobilarma 245 from all applied locations with denatured alcohol.

10. Purge from nitrogen to hydrogen with unit on turning gear. Hydrogen cooler should be purged and filled with hydrogen prior to start-up per OPL # _____.

11. Release red tags.

12. For start-up procedure see OPL # _____.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

System: GENERATOR

References: EPRI Guidelines, Westinghouse Manual

Objective: Protect generator/exciter during extended lay-up.

Description: Westinghouse Generator Serial# 1-S-90P0935

This procedure is based on generator storage with conditioned air circulation, lube oil and seal oil system operational.

Lay-up Procedure:

1. Dehumidification equipment to be set in position, electrically connected, adaptors fabricated, connection hoses fitted and operationally tested prior to unit shutdown.

2. Upon removing the unit from service, the generator shall be electrically isolated and red tagged per standard operating procedure, see OPL # _____.

3. Turbine/generator shall remain on turning gear until cooled to recommended oil temperature.

4. Generator and hydrogen dryer shall be purged from hydrogen to carbon dioxide then to atmosphere while on turning gear. The seal oil system must remain in operation to minimize gas loss, see OPL # _____.

5. Remove components as necessary to allow access to generator inspection covers.

6. Once generator has been successfully purged to a safe condition the governor end access plate shall be removed and an adaptor installed to allow connection of the dehumidification equipment.

7. Reinstall the exciter house, insuring that all seals are in place and effective.

8. Install a hygrometer in the generator drain lines and another inside the exciter enclosure, positioned to be seen through one of the windows.

9. Generator windings shall be monitored during lay-up. This can be accomplished by drilling and tapping a hole in the lead box and inserting a new automobile type sparkplug into the opening and connecting the insulated electrode to the windings for use in taking megger readings. The ground electrode can be removed for convenience. If insulation resistance of rotor windings is below 10 meg-ohms, the

windings should be dried out (see Westinghouse procedure) before restarting the generator.

10. Hydrogen coolers shall be drained, red tagged, opened, cleaned, dried and preservative added as follows, also see OPL # _____:

    a. Remove the outer and inner heads from the top of the coolers.

    b. Remove all eight (8) ten (10) inch supply/return lines from the bottom of the coolers.

    c. Cooler tube bundles shall be thoroughly cleaned and dried with forced air.

    d. Once the cooler tubes are completely dry install Zerust VC6-1 capsules in each end of each cooler. Place capsules as near the tube bundle as possible and note location for future removal.

    e. Install eight (8) ten (10) inch 150# blind flanges with gaskets on the cooler inlet/outlet piping.

    f. Install the cooler upper heads, outer gasket (stock # 221-22-505) and inner gasket (stock # 221-22-508).

11. Clean and inspect all machined surfaces and coat with Mobilarma 245.

12. Exciter coolers shall be drained, red tagged, opened, cleaned, dried and preservative added and reassembled as follows also see OPL # _____:

    a. Remove all eight (8) two and one-half (2 ½) inch grooved pipe “Victaulic” water supply/return lines from the coolers.

    b. Remove the heads from the each end of the coolers.

    c. Cooler tube bundles shall be thoroughly cleaned and dried with forced air.

    d. Once the cooler tubes are completely dry install one (1) Zerust VC6-1 capsule in each end of each cooler. Place capsules on the inside of the cooler head and note location for future removal.

    e. Install the cooler heads with eight (8) new gaskets (stock# 221-22-022).

    f. Install sixteen (16) two and one half (2 ½) inch groove type pipe caps on the cooler and piping inlet/outlet connections.

g. Close drain valves from internal drip pans to prevent moisture ingress.

Operation Procedure:

1. Daily monitor and log humidity conditions to ensure twenty (20) percent or less relative humidity in the generator housing and the exciter enclosure.

2. Weekly operate the main turbine on turning gear for one (1) hour.

3. Every ninety (90) days, remove stator grounds and megger all windings 10 minutes at 5 KV. If any deterioration of insulation is noted, adjust dehumidification conditions to correct. Log all test readings.

4. Every ninety (90) days, make 500 volt 10 minute megger test on rotor. Adjust dehumidification to correct any deterioration of readings. Log all test readings.

Maintenance Procedure:

1. Maintain systems as necessary to ensure functionality.

Recovery Procedure:

1. Shutdown and remove dehumidification equipment from generator and exciter.

2. If insulation resistance of rotor windings is below 10 meg-ohms, the windings should be dried out (see Westinghouse procedure) before restarting the generator.

3. Disconnect and remove dehumidifier and associated equipment from exciter.

4. Reconnect exciter cooler drip pan drain line.

5. Remove Zerust VC6-1 capsules from water side of hydrogen coolers.

6. Restore hydrogen cooling system, check for water leaks, see OPL # _____.

7. Remove Zerust VC6-1 capsules from water side of exciter coolers.

8. Restore exciter cooling system, check for water leaks, see OPL# _____.

9. Clean Mobilarma 245 from all applied locations with denatured alcohol.

10. Purge from nitrogen to hydrogen with unit on turning gear. Hydrogen cooler should be purged and filled with hydrogen prior to start-up per OPL # _____.

11. Release red tags.

12. For start-up procedure see OPL # _____.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: BOTTOM ASH / FLY ASH HANDLING

SUBSYSTEM: Bottom Ash Drag Chain and Surge Tank

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on neutralization and passivation of metal surfaces to minimize corrosion potential.

LAY-UP PROCEDURE:

1. Drag chain shall remain in place under boiler.
2. Clean, flush, drain and winterize drag chain, surge tank, pH control system and all equipment and associated piping.
3. Once unit is off line and temperature has dropped sufficient to allow entry, the drag chain and surge tank shall be high pressure washed until discharge water >6 pH.
4. After wash, all internal drag chain and surge tank surfaces shall be passivated with a 5% solution of soda ash.
5. After passivation, heaters shall be used to speed drying, once dry, corrosion inhibitors shall be applied.
6. Pillow block, submerged, return & tension idler bearing
    a. Unbolt and slide back the bearing housing covers. Apply a heavy coat of grease to All parts of the anti-friction bearings. Rotate the shaft to distribute the grease throughout the bearings. Be sure the housings are l/3 full of grease and replace the bearing housing cover. EP-2 Grease (Ref. Lube Manual)

7. Drag chain tension block and guides
    a. Ensure that 8 ¾" tension is remaining on tension springs so that chain does not jump off during monthly inspections.
    b. Apply a thin coat of open gear & wire rope spray to the blocks and guide tracks. Open Gear SP. (Ref. Lube Manual)

8. Drag chain drive and sprockets
    a. Ensure lower half of chain is submerged in oil bath. Rotate chain so that entire chain is covered in lubricate. AW MACHINE OIL AW 100 (Ref. Lube Manual)

9. Hydraulic unit
    b. Ensure lower half of chain is submerged in oil bath. Rotate chain so that entire chain is covered in lubricate. AW MACHINE OIL AW 100 (Ref. Lube Manual)
10.
11. Ensure hydraulic drive unit has sufficient oil level. TURBINE OIL GST 68 (Ref. Lube Manual)
12. Protect pump bearing cartridges by thoroughly lubricating to eliminate moisture.
13. Release tension on belt drives and apply corrosion inhibitors to drive sheaves.
14. Add water dispersion/stabilization chemicals to each gearbox.
15. Clean all ash accumulations from all trenches and sumps.
16. Protect equipment from bird damage by closing all possible entry and nesting points.

OPERATION PROCEDURE:

1. Drag chain drive chain and sprocket:
    a. Check oil level in drive chain reservoir ensure proper level of oil. MACHINE OIL AW 100 (Ref. Lube Manual) at one month intervals.

2. HYDRAULIC UNIT
    a. Check oil level in hydraulic unit. TURBINE OIL GST 68 (Ref. Lube Manual) one month intervals.

3. WET BOTTOM:
        a. Release Permits on drag chain. One month intervals

4. DRAG CHAIN PILLOW BLOCK, SUBMERGED, RETURN & TENSION IDLER BEARING
    a. Mark chain to ensure starting point. One month intervals
    b. Run chain one complete revolution. One month intervals
    c. Lubricate bearings while running chain. Two shots with hand gun in each bearing. EP-2 GREASE (Ref. Lube Manual) one month intervals.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

5. DRAG CHAIN TENSION BLOCK AND GUIDES
    a. Ensure that 8 ¾" tension is remaining on tension springs. One month intervals
    b. Apply a thin coat of open gear & wire rope spray to the blocks and guide tracks. Open Gear SP. (Ref. Lube Manual) one month intervals

6. With drag chain hydraulic system operating, rotate drag chain with drive motor monthly. Upon completion of rotation shut off hydraulic system.
7. Rotate surge tank recirculation pumps 1 ¼ turns by hand monthly.
8. Rotate pyrite sluice pumps 1 ¼ turns by hand monthly.
9. Rotate economizer pumps 1 ¼ turns by hand monthly.
10. Inspect the equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: ASH REMOVAL SYSTEMS

SUBSYSTEM: BOTTOM ASH DRAG CHAIN

REFERENCE: Manual & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- Wet Bottom
- Wet Bottom drag chain pillow block, submerged, return & tension idler bearings.
- Wet Bottom drag chain tension block & guides
- Hydraulic Unit

LAY-UP PROCEDURE:

1. WET BOTTOM:
   a. Drain Wet Bottom, run chain and empty any ash that may be contained in Wet Bottom.
   b. Clean out all ash contain on return side of chain and housing.

2. **SAFETY: ENSURE THE EQUIPMENT IS PROPERLY TAGGED OUT.**

3. DRAG CHAIN PILLOW BLOCK, SUBMERGED, RETURN & TENSION IDLER BEARING
   a. Unbolt and slide back the bearing housing covers. Apply a heavy coat of grease to All parts of the anti-friction bearings. Rotate the shaft to distribute the grease throughout the bearings. Be sure the housings are l/3 full of grease and replace the bearing housing cover. EP-2 Grease (Ref. Lube Manual)

4. DRAG CHAIN TENSION BLOCK AND GUIDES
   a. Ensure that 8 ¾" tension is remaining on tension springs so that chain does not jump off during monthly inspections.
   b. Apply a thin coat of open gear & wire rope spray to the blocks and guide tracks. Open Gear SP. (Ref. Lube Manual)

5. DRAG CHAIN DRIVE CHAIN & SPROCKETS

a. Ensure lower half of chain is submerged in oil bath. Rotate chain so that entire chain is covered in lubricate. AW MACHINE OIL AW 100 (Ref. Lube Manual)

6. HYDRAULIC UNIT
   a. Ensure hydraulic drive unit has sufficient oil level. TURBINE OIL GST 68 (Ref. Lube Manual)

MAINTENANCE PROCEDURE:

1. **SAFETY: ENSURE ALL EQUIPMENT IS PROPERLY TAGGED OUT.**

2. DRAG CHAIN DRIVE CHAIN & SPROCKET:
   a. Check oil level in drive chain reservoir ensure proper level of oil. MACHINE OIL AW 100 (Ref. Lube Manual) at one month intervals.

3. HYDRAULIC UNIT
   a. Check oil level in hydraulic unit. TURBINE OIL GST 68 (Ref. Lube Manual) one month intervals.

4. WET BOTTOM:
   a. Release Permits on drag chain. One month intervals

5. DRAG CHAIN PILLOW BLOCK, SUBMERGED, RETURN & TENSION IDLER BEARING
   a. Mark chain to ensure starting point. One month intervals
   b. Run chain one complete revolution. One month intervals
   c. Lubricate bearings while running chain. Two shots with hand gun in each bearing. EP-2 GREASE (Ref. Lube Manual) one month intervals.

7. DRAG CHAIN TENSION BLOCK AND GUIDES
   a. Ensure that 8 ¾" tension is remaining on tension springs. One month intervals
   b. Apply a thin coat of open gear & wire rope spray to the blocks and guide tracks. Open Gear SP. (Ref. Lube Manual) one month intervals

8. **SAFETY: REQUEST EQUIPMENT TO BE TAGGED BACK OUT.**

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

RECOVERY PROCEDURE:

1. **SAFETY: ENSURE ALL EQUIPMENT IS PROPERLY TAGGED OUT.**
2.
   a.
3.
   a.
4.
   a.
5.
   a.
   b.
6.
   a.
7.
   a.
   b.
   c.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: SCRUBBER

SUBSYSTEM: Scrubber Inlet Duct

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Scrubber inlet duct shall be protected by dehumidified air (see procedure # 38.1)
2. Once unit is off line and temperature has dropped sufficient to allow entry, the inlet duct shall be high pressure washed until discharge water >6 pH.
3. After wash, all internal duct surfaces shall be passivated with a 5% solution of soda ash.
4. After passivation, heaters shall be used to speed drying, once dry, duct shall be sealed and dehumidification protection shall continue.
5. Protect inlet guillotine seal air blowers in place with corrosion inhibitors.

OPERATION PROCEDURE:

1. Inspect equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: SCRUBBER

SUBSYSTEM: Scrubber Modules, Outlet Duct and Stack

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Clean, flush, drain and winterize all equipment and associated piping.
2. Once unit is off line and temperature has dropped sufficient to allow entry, the modules, outlet duct and stack pan shall be high pressure washed until all slurry accumulations are removed.
3. Module lower doors shall be left open, but covered with screens, to allow access to agitators.
4. Close all other module, outlet duct and stack access openings.
5. Protect stack pressurization fans in place with corrosion inhibitors.
6. Protect outlet guillotine damper seal air blowers in place with corrosion inhibitors.

OPERATION PROCEDURE:

1. Inspect equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: SCRUBBER

SUBSYSTEM: Scrubber Circulation Pumps, Agitators and Blowdown Pumps

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Clean, flush, drain and winterize all equipment and associated piping.
2. Protect bearing cartridges by thoroughly lubricating to eliminate moisture.
3. Release tension on belt drives and apply corrosion inhibitors to drive sheaves.
4. Add water dispersion/stabilization chemicals to each gearbox.
5. Clean all slurry accumulations from all trenches and sumps.

OPERATION PROCEDURE:

1. Rotate circulation pumps 1 ¼ turn by hand weekly.
2. Rotate agitator impellers 1 ¼ turn by hand weekly.
3. Rotate blowdown pumps 1 ¼ turn by hand weekly.
4. Inspect equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: SCRUBBER

SUBSYSTEM: Thickeners and Underflow

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Clean, flush, drain and winterize all equipment and associated piping.
2. Protect bearing cartridges by thoroughly lubricating to eliminate moisture.
3. Release tension on belt drives and apply corrosion inhibitors to drive sheaves.
4. Add water dispersion/stabilization chemicals to each gearbox.
5. Clean all slurry accumulations from all trenches and sumps.
6. Open underflow pump suction piping drain valves to allow rainwater collected in thickener to drain to floor sump.

OPERATION PROCEDURE:

1. Rotate thickener rake 1 ¼ turn with drive motor monthly.
2. Rotate underflow pumps 1 ¼ turn by hand weekly.
3. Inspect equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: CSI

SUBSYSTEM: CSI Building

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Clean, flush, drain and winterize all equipment and associated piping.
2. Vacuum filter vats shall be emptied and thoroughly cleaned.
3. Remove and dispose of filter cloth and attachment rope.
4. Surge tanks shall be emptied and thoroughly cleaned.
5. Filtrate return sumps shall be emptied and thoroughly cleaned.
6. Protect pump bearing cartridges and conveyor idlers by thoroughly lubricating to eliminate moisture.
7. Release tension on belt drives and apply corrosion inhibitors to drive sheaves.
8. Add water dispersion/stabilization chemicals to each gearbox.
9. Clean all slurry accumulations from all trenches and sumps.
10. Protect electrical cabinets with corrosion inhibitors.
11. Place stackout conveyor in lowest possible position and secure to prevent movement during storms.
12. Close all access openings to prevent damage from birds.

OPERATION PROCEDURE:

1. Rotate vacuum filter drums 1 ¼ turn with drive motor monthly.
2. Rotate agitator rake arm with drive arm monthly.
3. Rotate surge tank agitators with drive motor monthly.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

4. Rotate filter feed pumps 1 ¼ turn by hand monthly.
5. Rotate filtrate return pumps 1 ¼ turn by hand monthly.
6. Operate conveyor belts monthly.
7. Inspect equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: LIMESTONE PROCESSING

SUBSYSTEM: LIME SLAKERS & BALL MILLS, BELT FEEDERS & DUST COLL.

REFERENCE: General Electric & Field Experience

LOMR OBJECTIVE: To Maintain Equipment Integrity during Lay-up

DESCRIPTION:

- # 1 & # 2 BALL MILL MOTOR (like motors)

LAY-UP PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**
2. Selected motors to have bearing grease (SRI Grease 2) checked and filled if need be.
3. Clean motor (filters, screens, and interior/exterior).
4. Inspect condition and placement of motor space heaters. Clean away any dirt around space heaters. Check and/or repair for proper operation.
5. Replace any screens that are missing.
6. Inspect weather head condition and lead terminations.
7. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings.

MAINTENANCE PROCEDURE:

1. 30 day intervals, megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is expected use radiant heat to dry out windings.
2. Verify motor space heaters working, if not repair or use alternate heat source.
3. Selected motors will be rotated every 4 weeks. Coordinate with mechanical maintenance to avoid duplication. Rotate each motor at least 12 ¼ revolutions and mark starting position to ensure shaft is ¼ turn from beginning position. No pre-lubrication is required and verify grease on bearings.

RECOVERY PROCEDURE:

1. **Safety: Ensure Motors are properly tagged out.**

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

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2. Megger selected 6.9kV motors with 5kV DC for 10 minutes and log readings. Where moisture build-up is present use radiant heat to dry out windings.
3. Selected motors to have bearing grease checked.
4. Start each motor according to start-up procedures.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: LIMESTONE

SUBSYSTEM: Ballmill Building

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Remove and drum ball charge to be returned to supplier for credit.
2. Clean, flush, drain and winterize all equipment and associated piping.
3. Protect pump bearing cartridges by thoroughly lubricating to eliminate moisture.
4. Release tension on belt drives and apply corrosion inhibitors to drive sheaves.
5. Add water dispersion/stabilization chemicals to each gearbox.
6. Clean all slurry accumulations from all trenches and sumps.
7. Operate all switchgear heaters.
8. Protect electrical cabinets with corrosion inhibitors.
9. Close all access openings to prevent damage from birds.

OPERATION PROCEDURE:

1. With ballmill jacking and lube oil systems operating, rotate ballmills 1 ¼ turn with drive motor monthly. Upon completion of rotation shut off jacking and lube oil systems.
2. Rotate product sump pumps 1 ¼ turn by hand weekly.
3. Inspect equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: LIMESTONE

SUBSYSTEM: Limestone Silo and Prep Building

REFERENCE: Field Experience

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Purge vibratory feeders and conveyor belts.
2. Clean, flush, drain and winterize all equipment and associated piping.
3. Protect product sump pump bearing cartridges by thoroughly lubricating to eliminate moisture.
4. Release tension on belt drives and apply corrosion inhibitors to drive sheaves.
5. Add water dispersion/stabilization chemicals to each gearbox.
6. Clean all slurry accumulations from all trenches and sumps.
7. Protect electrical cabinets with corrosion inhibitors.
8. Close all access openings to prevent damage from birds.

OPERATION PROCEDURE:

1. Operate conveyor belts monthly.
2. Rotate pumps 1 ¼ turn by hand monthly.
3. Inspect equipment monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: SCR

SUBSYSTEM: SCR Reactor, catalyst and sootblowers

REFERENCE: EPRI Guidelines, OEM Recommendations, Field Experience & OPL

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Protection based on circulation of conditioned air to control relative humidity thus eliminating corrosion potential.

LAY-UP PROCEDURE:

1. Dehumidification equipment to be set in position, electrically connected, adaptors fabricated, connection hoses fitted and operationally tested prior to unit shutdown.
2. Prior to removing the unit from service, purge and verify that all ammonia supply piping has been purged and depressurized.
3. Prior to removing fire from the boiler, operate all sootblowers, starting with the ones farthest from the stack.
4. Once unit is off line and SCR temperature has dropped to 400°F, install adaptors in upper access doors and connect and start dehumidification equipment inlet piping on the gas/air cycle, before dew point is reached.
5. Close SCR bypass damper.
6. Install blank at perforated screen prior to air heater inlet.
7. Connect dehumidification equipment return piping from lower access doors.
8. Clean external surfaces of all sootblowers and apply corrosion inhibitors.
9. Protect electrical cabinets with corrosion inhibitors.

OPERATION PROCEDURE:

1. Clean combustion residue from catalyst layers by dry vacuuming after dehumidification equipment is in service.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

2. Inspect the SCR once a month for evidence of active corrosion, if found, take corrective action.
3. Rotate sootblower gearbox 1 ¼ turn monthly by hand.

MAINTENANCE PROCEDURE:

1. Maintain dehumidification equipment as necessary.

RECOVERY PROCEDURE:

1. Remove all dehumidification equipment, connection hoses and adaptors.
2. Open SCR bypass damper.
3. Remove all duct blanks previously installed.
4. Inspect and restart system as necessary.

D.B. WILSON STATION

Lay-up, Operation, Maintenance and Recovery (LOMR) Procedure

SYSTEM: SCR

SUBSYSTEM: Ammonia storage tanks, pump skid and electrical building

REFERENCE: Field Experience & OPL

LOMR OBJECTIVE: Maintain plant integrity during extended lay-up

DESCRIPTION: Minimal lay-up preparation, materials of construction impervious to atmospheric corrosion

LAY-UP PROCEDURE:

1. Ammonia supplier shall evacuate and remove from plant site all liquid ammonia.
2. Sufficient pressure shall be maintained on tanks to prevent moisture infiltration.
3. Piping and pumps shall be evacuated and depressurized before unit is taken off line.

OPERATION PROCEDURE:

1. Inspect ammonia tanks monthly to ensure internal pressure is maintained.
2. Inspect the ammonia system monthly for evidence of active corrosion, if found, take corrective action.

MAINTENANCE PROCEDURE:

1. Maintain equipment and tank coatings as necessary.

RECOVERY PROCEDURE:

1. Inspect and restart systems as necessary.

Big Rivers
ELECTRIC CORPORATION

D.B. Wilson Station
5663 State Route 85 West
Centertown, KY 42328
www.bigrivers.com

TO: All Guards

From: Dennis Durbin

Date: February15, 2013

Subject: Conduct of a Guard

Visitors:

1. All visitors must have permission to enter the plant site, from a BREC supervisor.

2. All visitors must sign in on gate log, with arrival time and departure time.

3. All visitors must receive a visitor tag to wear inside the plant. Tag number to be entered on the gate log.

4. All emergency personal must have an escort to emergency site by a Big Rivers Employee.

Contractors:

1. All contractors will be signed in and out each time they enter or leave the plant sight.

2. All contractors will show C-scape card at the beginning of each shift.

3. Contractors not providing a C-Scape card may only enter the plant sight with the permission of the plant manager.

4. All contractors will have a Big Rivers Electric Safety Card before being allowed on plant sight.

5. Any contractor not able to show proof of a Big Rivers Electric Safety Card will be shown the safety video. After the completion and passing of a test a card will be issued before allowing contractor on plant site. This card is valid for all three plants

6. All contractors' vehicles will be inspected before leaving the plant site.

7. When chlorine trucks deliver, they must go through coal handling to the river, unless they have bleach that must be unloaded first. Someone from the Lab shall escort them and stay with them while they are on site.

8. Hydrogen trucks cannot go into plant without an escort. Someone from the Scrubbers or a supervisor shall come to the gate to take them around to the Hydrogen tanks. They should not be by themselves at any time.

9. Ammonia drivers and Fire Extinguisher delivery contractors shall be given a two-way radio when they come on plant site, in case of an emergency.

BREC Employees:

1. All BREC employees will be checked in and out with time in and out on employee sheet.

2. When an employee requests the key to the red safety trailer, write his/her name down and what they are taking out of the trailer. Make sure they bring the key back and that they locked the trailer when leaving. Make sure the items have been returned to the trailer.

Off Shift Guards

1. Guards make two random rounds per shift if possible.

2. Check all perimeter gates, all out-lying warehouses, outside storage area gates, Burns and Roe Building, the red safety trailer to make sure they are locked.

3. Check the chain gate going across HWY 85, make sure the electric gate at fuels is closed.

4. Always ensure that you have radio communication with the Control Room when making rounds.

5. Always have a neat and orderly appearance when on duty.

6. Obey all safety rules and policies while on Big Rivers Plant Site.

7. When you distribute any key be sure to log the name in and out on the log sheet.

8. Whenever the plant announces a “head count” the shift supervisors and contractors will contact the guard and the guard will check the names off the logs and report his/her findings to the control room.