Application for Air Permit

Volume 2 of 2

Dade County Resources Recovery Facility

June 15, 1996

METRO DADE
SOLIDWASTE MANAGEMENT

Metropolitan Dade County, Florida
Department of Solid Waste Management

Submitted to:

State of Florida
Department of Environmental Protection
Division of Air Resources Management

BROWN AND CALDWELL

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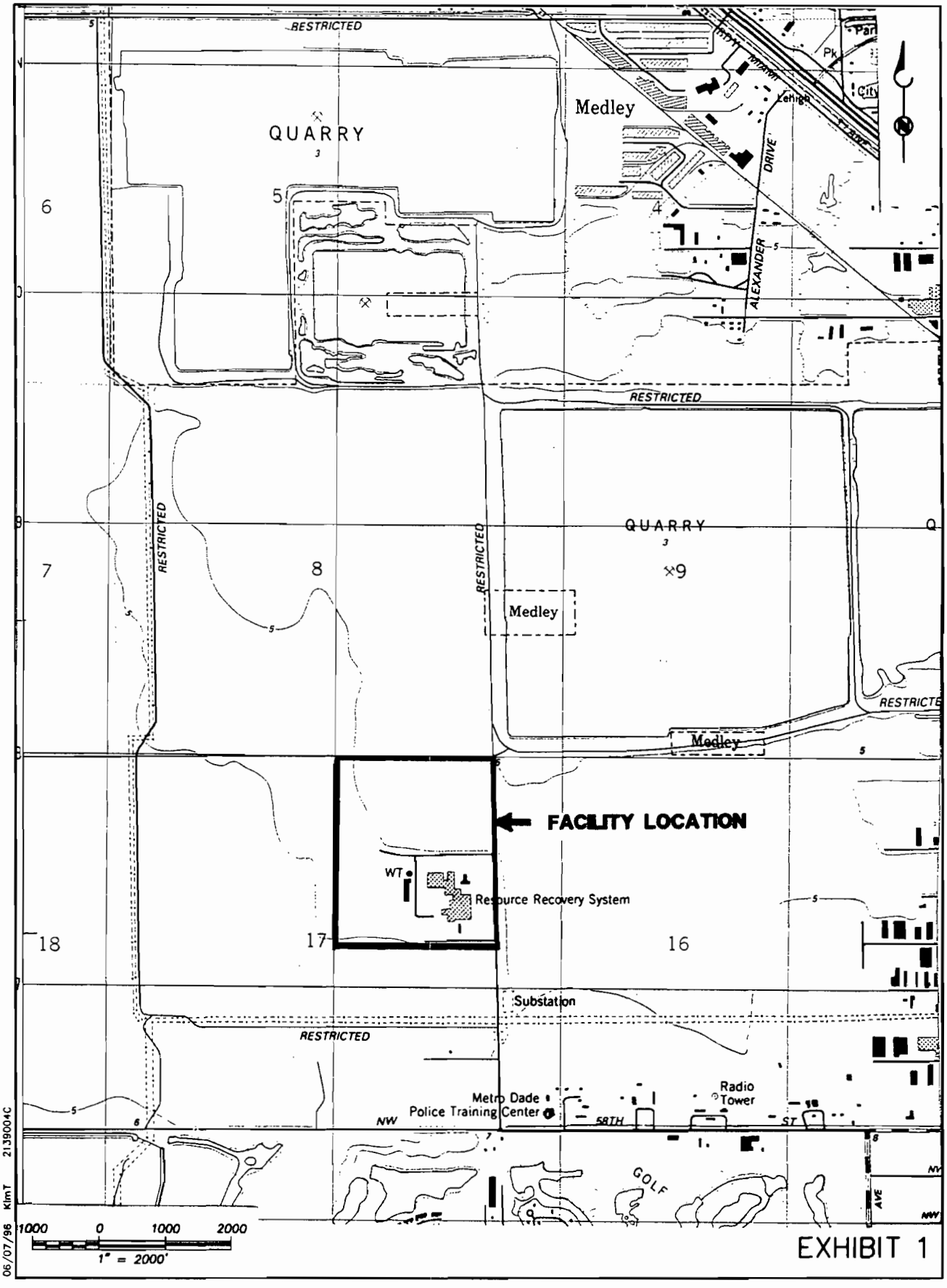
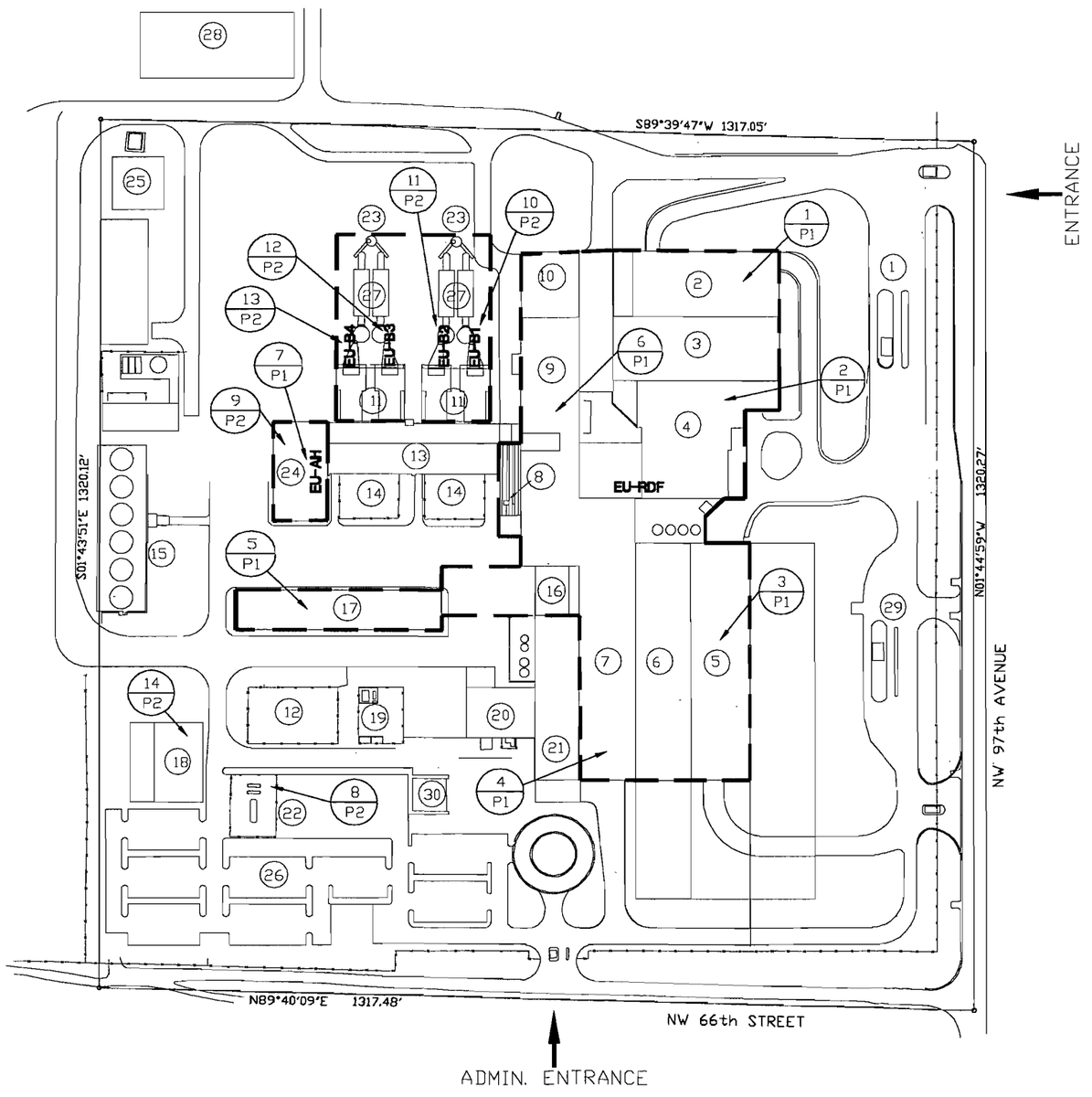


EXHIBIT 1

BROWN AND CALDWELL

Dade County Resources Recovery Facility
Site Location Map

2



LEGEND

EXISTING FACILITIES

1 SCALES
2 TRASH RECEIVING BLDG.
3 TRASH PIT
4 TRASH PROCESSING BLDG.
5 GARBAGE RECEIVING BLDG.
6 GARBAGE PIT
7 GARBAGE PROCESSING BLDG.
8 RDF FUEL FEED
9 RDF FUEL STORAGE
10 PROCESS UNDERS/BIOMASS BLDG.
11 BOILERS (4 UNITS)
12 STORE YARD
13 TURBINE HALL
14 SWITCHYARD
15 COOLING TOWER
16 AL/FE BUNKERS
17 FERROUS PROCESSING BLDG.
18 TIRE BUNKER
19 FUEL OIL DEPOT
20 HEAVY EQUIP. MAINT. BLDG.
21 OFFICES/ADMIN. BLDG.
22 PROPANE STORAGE

PROPOSED RETROFIT

23 STACKS (2 EA)
24 ASH BUILDING
25 WATER TREATMENT PLANT
26 EMPLOYEE PARKING
27 AQCS (4 UNITS)
28 WASTEWATER TREATMENT PLANT (IF REQD)
29 NEW SCALES
30 DADE COUNTY ADMINISTRATION

EU-B1-4 BOILER 1-4
EU-AH ASH HANDLING
EU-RDF REFUSE DERIVED FUEL PROCESSING

0 100 200 FT
0 50 100 m

LEGAL DESCRIPTION OF FACILITY

THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4 SECTION 17, TOWNSHIP 53 SOUTH, RANGE 40 EAST OF DADE COUNTY, FLORIDA.
CONTAINING APPROXIMATELY 40 ACRES.

2139001C 06-10-96 KMT

BROWN AND CALDWELL

SUBMITTED: _____ DATE: _____ PROJECT MANAGER
APPROVED: _____ DATE: _____ BROWN AND CALDWELL
APPROVED: _____ DATE: _____

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2"-SCALE ACCORDINGLY)

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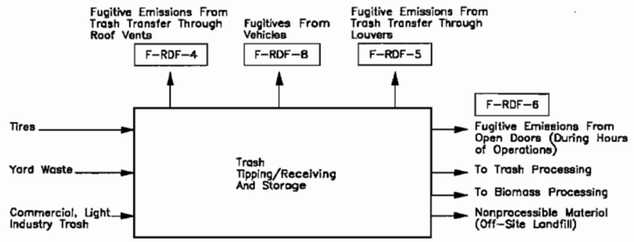
REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

DADE CO RESOURCES RECOVERY FACILITY

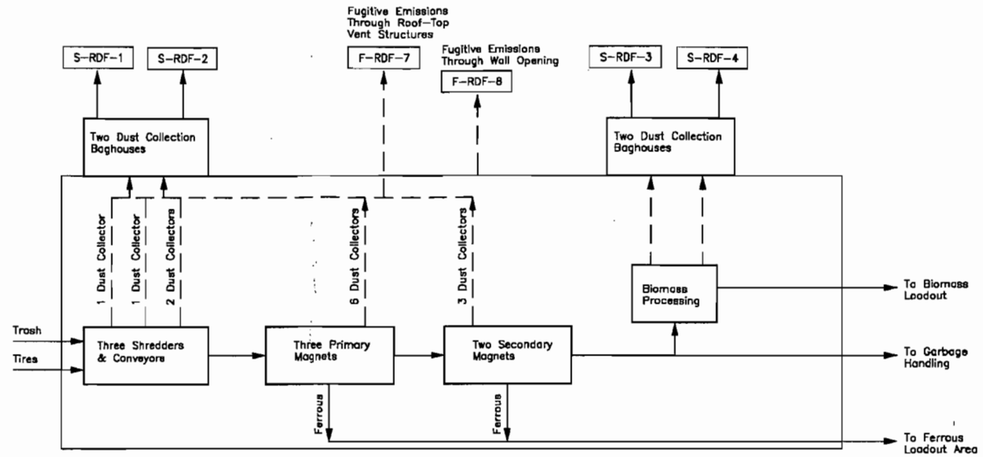
GENERAL

PLOT PLAN

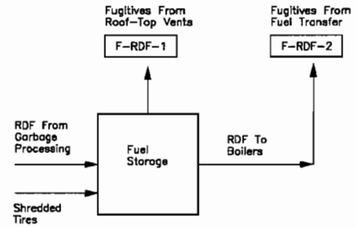
SCALE 1"=100'
DRAWING NUMBER **C1**
SHEET NUMBER _ OF _



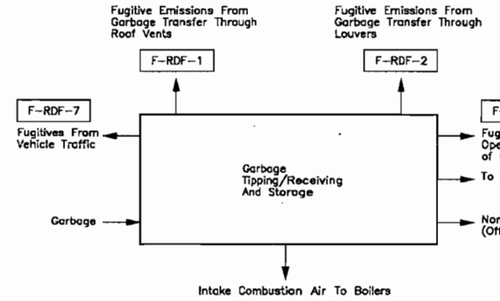
TRASH HANDLING
DETAIL 1/C1



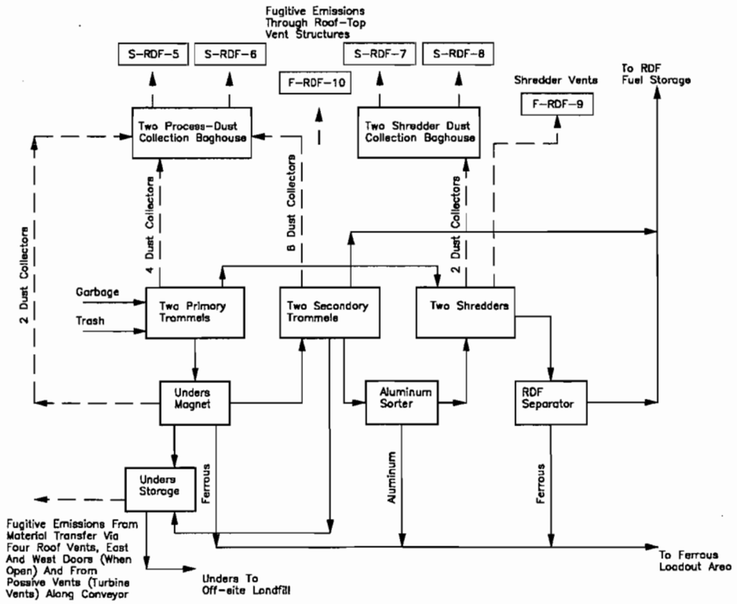
TRASH PROCESSING
DETAIL 2/C1



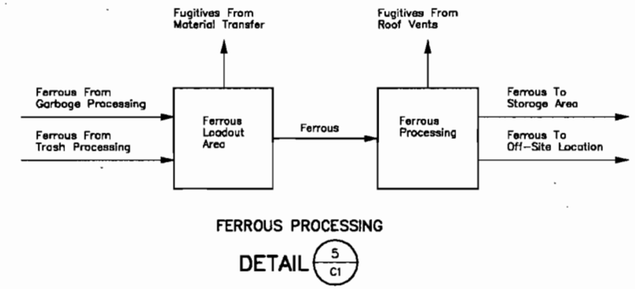
FUEL STORAGE
DETAIL 6/C1



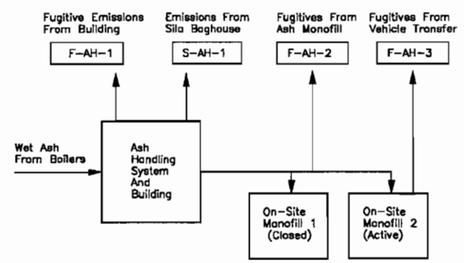
GARBAGE HANDLING
DETAIL 3/C1



GARBAGE PROCESSING
DETAIL 4/C1

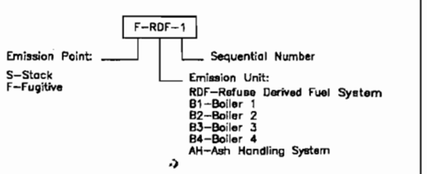


FERROUS PROCESSING
DETAIL 5/C1



ASH HANDLING
DETAIL 7/C1

Source Designation:



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BROWN AND CALDWELL

SUBMITTED: _____ DATE: _____ (PROJECT MANAGER)
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REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

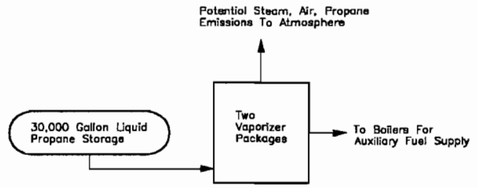
DADE CO RESOURCES RECOVERY FACILITY

PROCESS FLOW DIAGRAM DETAILS

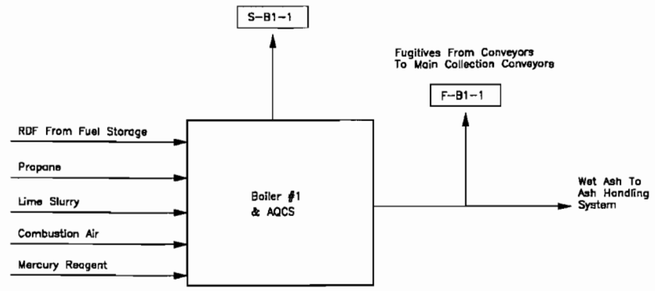
SCALE

DRAWING NUMBER
P1

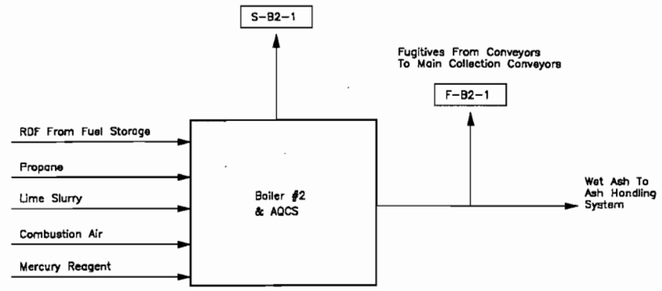
SHEET NUMBER
1 OF 2



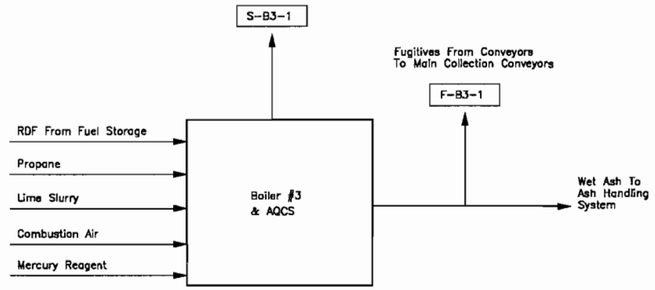
PROPANE SYSTEM
DETAIL 8/C1



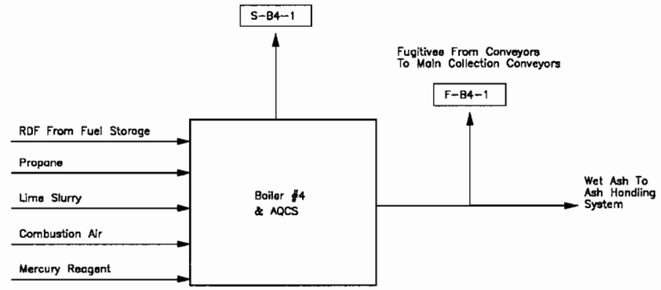
Boiler #1 System
DETAIL 10/C1



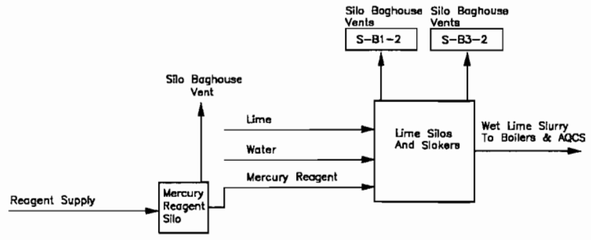
Boiler #2 System
DETAIL 11/C1



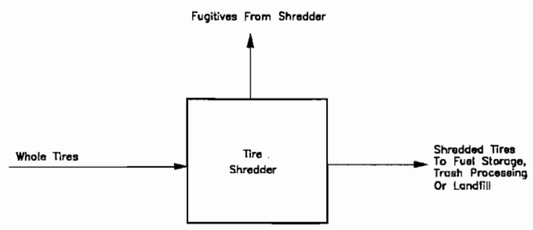
Boiler #3 System
DETAIL 12/C1



Boiler #4 System
DETAIL 13/C1



LIME SLURRY SYSTEM
DETAIL 9/C1



TIRE PROCESSING
DETAIL 14/C1

Source Designation:

F-RDF-1

Emission Point: S-Stack, F-Fugitive
Sequential Number
Emission Unit:
RDF-Refuse Derived Fuel System
B1-Boiler 1
B2-Boiler 2
B3-Boiler 3
B4-Boiler 4
AH-Ash Handling System

BROWN AND CALDWELL

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DADE CO RESOURCES RECOVERY FACILITY

PROCESS FLOW DIAGRAM DETAILS

SCALE

DRAWING NUMBER
P2

SHEET NUMBER
2 OF 2

21390D3P 06-14-96 KMT

PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

Emissions of unconfined particulate matter have the potential to occur during routine operations and maintenance activities and temporary construction activities at the Facility. Most activities occur inside buildings, which reduces the potential for fugitive emissions. Other precautions have been or will be taken at the Facility.

Facility roads, except within the ash landfill, will be adequately paved to control visible dust. Maximum 15 MPH speed limit signs are posted to minimize dust generation. Conveyors are covered or enclosed to minimize dust from waste processing and ash handling operations. Residue from the grates, grate siftings, and ash from the combustor/boiler and fabric filter hoppers during normal operations are discharged into the ash handling system to minimize fugitive dust. The fly ash will be handled by enclosed conveyors to an ash silo and then will be conditioned to minimize dust emissions. The ash/residue in the ash building will be kept sufficiently moist to minimize fugitive dust emissions during handling operations and storage.

In accordance with permit conditions, reasonable precautions during the processing of biomass may include, but shall not be limited to the following:

1) Windows and doors of the enclosed space will be kept closed except when in use.

2) Conveyor systems handling shredded trash fines and dust will be covered or enclosed.

3) Shredded trash conveyor systems have baghouse pick up points at the transfer points.

4) Wind breaks will be installed around the biomass load-out area.

5) Floors in the enclosed area will be cleaned periodically.

6) Loading areas for biomass will be cleaned or wetted as needed to minimize fugitive dust.

7) Trucks transporting biomass will be covered.

Rule 62-296.320(4)(c) refers to additional precautions that may also include the following:

1) Application of water or chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.

2) Application of asphalt, water, oil, chemicals, or other dust suppressants to roads, yards, open stock piles, and similar emissions units.

3) Confining abrasive blasting where possible.

Furthermore, doors and the building and roof openings can be closed to minimize fugitive dust. Ventilation fans can be turned off to reduce unconfined emissions, provided that safety and operations are not compromised. Water sprays can also be used to reduce unconfined particulate matter.

FUGITIVE EMISSIONS IDENTIFICATION

The source of fugitive emissions may be from the locations and activities noted below and other activities such as housekeeping. In addition to unconfined particulate matter, trace amounts of VOC, propane, methane, landfill gas, combustion by-products, and other pollutants may be emitted, but at levels below the regulatory threshold. All fugitive emissions identified below are considered to be unregulated, exempted, or below regulatory thresholds.

Trash Handling

Emissions from transfer of trash from trucks to receiving building
Emissions from road dust (tires and trash vehicles) (F-RDF-8)
Emissions from open doors (during hours of operation) (F-RDF-6)
Emissions from trash handling in pit
Emissions from trash fires in pit
Emissions from transfer of trash from pit to trash processing
Emissions from trash transfer through roof vents (F-RDF-4)
Emissions from trash transfer through louvers (F-RDF-5)

Trash handling is comprised of a trash tipping floor and trash storage pit. The tipping floor currently has 10 tipping bays and a capacity to handle up to 1,500 trucks per week during normal delivery hours. The trash storage pit contains approximately 20,000 cubic yards of storage capacity (approximately 3,000 tons).

Garbage Handling

Emissions from transfer of garbage from trucks to receiving building
Emissions from road dust (F-RDF-7)
Emissions from open doors (during hours of operation) (F-RDF-3)
Emissions from garbage handling in pit
Emissions from garbage fires in pit
Emissions from transfer of garbage from pit to garbage processing
Emissions from garbage transfer through roof vents (F-RDF-1)
Emissions from garbage transfer through louvers (F-RDF-2)
Emissions from classifiers

Garbage handling is comprised of a garbage tipping floor and garbage storage pit. The tipping floor has 12 tipping bays and a capacity to handle up to 2,000 trucks per week during normal delivery hours. The garbage storage pit has approximately 30,000 cubic yards of nominal storage capacity (approximately 6,750 tons).

Trash Processing

Emissions through roof-top vent structures (F-RDF-7)
Emissions through wall opening (F-RDF-8)
Emissions from material transfer
Emissions from dust collection conveyors
Emissions from shredder explosions

Garbage Processing

Emissions from road dust (unders material transport)
Emissions from passive vents (turbine ventilators)
Emissions from conveyors, storage pile, and material transfer to trucks
Emissions through roof-top vent structures (F-RDF-10)
Emissions through shredder vents (F-RDF-9)
Emissions from dust collection conveyors
Emissions from shredder explosions

RDF Fuel Feed Storage and Unders Building

Emissions from fuel and material transfer (F-RDF-2)
Emissions from conveyors and enclosures
Emissions from material transfer from conveyors to storage pile
Emissions from storage piles
Emissions through roof-top vents (F-RDF-1)

Ash Handling System

Emissions from the transfer of materials from the conveyors to the ash building
Emissions from the Ash Handling building (F-AH-1)
Emissions from the loading of ash into trucks (F-AH-3)
Emissions from road dust associated with the dump trucks
Emissions from ash monofill (F-AH-2)

Closed Ash Monofill

Emissions from monofill unit
Emissions from road dust caused by trucks

Active Ash Monofill

Emissions from monofill unit
Emissions from road dust caused by trucks

Water Treatment and Cooling Tower System

Emissions from above ground storage and process tanks
Emissions from water treatment lime silo and equipment
Emissions from cooling tower operation

Ferrous Processing

Emissions from shredding process
Emissions from separation processes
Emissions from material transfer
Emissions from road dust associated with vehicles
Emissions through roof-vents

Heavy Maintenance Area

Emissions from welding operations

Boilers and AQCS

Emissions from #1 boiler, AQCS, and ash conveyors FB1-1
Emissions from #2 boiler, AQCS, and ash conveyors FB2-1
Emissions from #3 boiler, AQCS, and ash conveyors FB3-1
Emissions from #4 boiler, AQCS, and ash conveyors FB4-1
Emissions from lime, and mercury reagent unloading operations

Tire Processing and Other

Emissions from tire shredding operations
Emissions from chemical and fuel unloading operations

SUPPLEMENTAL INFORMATION FOR CONSTRUCTION PERMIT APPLICATION

An air construction permit is not being applied for with this application. Therefore, this section is not applicable.

LIST OF PROPOSED EXEMPT ACTIVITIES

Combustion Emissions from Mobile Sources
Air Conditioning Units
Ventilation Systems and Related Facilities
Non-Commercial Food Operations
Plumbing Vents and Drains
Plant Operations, Maintenance and Upkeep
Repair and Maintenance Shop Activities
Portable Electric Generators
Cutting, Grinding, and Other Hand Held Equipment
Welding Equipment, Cutting Torches, and Related Equipment
Air Compressors
Batteries and UPS Systems
Storage Tanks, Vents, and Drains
Continuous Emissions Monitors and Analyzer Vents
Pressure Regulator Vents
Laboratory Equipment
Analytical Instruments
Fugitive Emissions Noted On Exhibit 5
Demineralizer and Water Treatment Systems
Cooling Towers
Deaerators
Fire Suppression Systems
Steam Vents and Safety Relief Valves
Steam Leaks
Housekeeping
Landscaping
Ash Quenching and Conveying
Ash Monofill
Plant Roads
Chemical Tanks, Vents, Drains
Lubrication Oil, Hydraulic Oil, Grease Tanks, Drums, Vents, Drains
Waste Oil Tanks
Diesel Engine Powered Generators - Cooling Tower, Lift Station, Fire Water
Degreaser, Solvents, and Other Tanks, Drums, Vents, Drains
Propane Tanks
Propane Vaporizers
LP Gas Cylinders
Acetylene and Oxygen Bottles
Portable Tire Shredder
Stormwater, Wastewater, Leachate Systems
Oil/Water Separator

Recovered Material Processing (Ferrous, Aluminum, Etc.)
Deodorizer
Electric Transformers and Equipment
Insecticides, Pesticides, and Herbcides
Paints, Cleaners
Truck Washing
Temporary Construction

The above facilities and pollutant emitting activities are eligible for exemption in accordance with the criteria of Rule 62-213.430(6), F.A.C., based upon the low levels of emissions anticipated. Additionally, activities defined in Attachment A to the U.S. EPA document entitled "White Paper for Streamlined Development of Part 70 Permit Applications", dated July 10, 1995 are assumed to be presumptively exempt whether identified specifically in this application or not.

LIST OF EQUIPMENT REGULATED UNDER TITLE VI

No individual piece of equipment at the facility contains more that 50 pounds of charge of any Class I or Class II ozone depleting substance. Air conditioners and other small quantity units are operated onsite and may be repaired onsite. No activities exist at the facility which are subject to the requirements under Title VI of the Clean Air Act.

ALTERNATIVE METHODS OF OPERATION

There are no alternative methods of operation anticipated that would significantly affect air pollutant emissions from the facility. The primary activities of garbage and trash receiving and processing, materials recovery and processing, fuel handling and storage, biomass production and export, RDF and propane combustion, ash landfilling, and all associated activities will continue as currently conducted or allowed by permit.

Two fuel segments have been identified in Section II F. Propane is proposed to be used as an auxiliary fuel only. Refuse derived fuel quality will vary based upon a wide range of characteristics of incoming trash, garbage, and tires. No biological waste, bio-medical waste, sewage sludge or hazardous waste will be combusted without obtaining proper modification to the site certification conditions. Up to three percent (by weight) of used tires may be combusted with the RDF.

Some specific operations will change following the completion of the biomass processing system and the air pollution control system upgrade. Air emissions will be further reduced following these upgrades.

It is possible that at some future date, additional activities could be initiated at the site. Examples include additional material processing, additional recycling, permanent tire shredding, and ash stabilization or recycling. If any new processes are introduced at the site in the future, their impact on air emissions will be evaluated and a permit modification will be requested, if necessary.

ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)

There are no alternative modes of operation proposed for this facility or any of the emissions units at this facility. Each of the four boilers has been identified as a separate emissions unit with limits for pollutants on a "per unit" basis. No facility-wide emissions cap is proposed and no emissions trading is requested.

IDENTIFICATION OF ADDITIONAL APPLICABLE REQUIREMENTS

1. FDEP Conditions of Certification PA77-08, revised March 2, 1994
2. FDEP/EPA Permit No. PSD-FL-006A, expires June 30, 1999
3. FDEP Settlement Agreement, dated June 3, 1992

COMPLIANCE ASSURANCE MONITORING PLAN

EPA has not yet promulgated a rule defining the requirements of Compliance Assurance Monitoring (CAM) Plans. Following promulgation of this rule, and adoption by the State of Florida, a CAM Plan will be developed, if necessary.

RISK MANAGEMENT PLAN

This facility is not required to submit a risk management plan under Section 112 (r) of the Clean Air Act. Therefore, this section is not applicable.

COMPLIANCE REPORT AND PLAN

The Dade County Resources Recovery Facility is in compliance with (or in the process of implementing changes to comply with) all currently applicable air regulations, air permits, and settlement agreements referenced in this application.

The Facility is in the process of implementing changes to meet the requirements of the Conditions of Certification revised on March 2, 1994. The Air Quality Control System (AQCS) for scrubbers and baghouses has been designed and purchased. This system is scheduled to be installed in 1997 with start-up and compliance testing in 1998. However, the new EPA Emissions Guidelines, or Maximum Achievable Control Technology (MACT) Standards, will impose a more stringent limit for NOx. It remains to be determined if additional NOx control will be required. Therefore, final compliance with all pending and anticipated requirements is December 2000.

The schedule for compliance of with the new MACT standards is as follows:

Milestone	Completion Date
Submit Upgrade Site Certification Application	September 1993
Award of Design Contract for AQCS	September 1993
Release Construction Contract for AQCS	January 1996
Begin Onsite Construction of Related Facilities	February 1996
Submit Final Control Plan	August 1996
Begin Onsite Construction of AQCS	February 1997
Completion of Onsite Construction	September 2000
Final Compliance	December 2000

Certified reports documenting progress toward satisfaction of this compliance schedule will be submitted to the FDEP on a quarterly basis following issuance of the revised conditions of certification. Additionally, by the anniversary date of permit issuance each year throughout the term of the permit, a certified compliance statement will be submitted to the FDEP.

COMPLIANCE CERTIFICATION

"I, the undersigned, am the responsible official as defined in Chapter 62-210.200, F.A.C., of the Title V source for which this report is being submitted. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made and data contained in this report are true, accurate, and complete."

Vicente Castro
Assistant Director
Department of Solid Waste Management

6-14-96
Date

FUEL ANALYSIS OR SPECIFICATION

The primary combustion fuel is refuse derived fuel (RDF). The characteristics of the RDF will vary based upon a wide range of characteristics of waste (garbage, trash, tires) processed. The processing includes shredding and the removal of metals and unders (fines, grit). The reference and expected range of values for various RDF parameters are noted below.

Parameter	Reference	Range
Moisture	29%	18-60%
Ash	10%	4-20%
Carbon	29%	17-40%
Hydrogen	7%	2-10%
Oxygen	45%	30-70%
Nitrogen	0.5%	.08-1.10%
Sulfur	0.3%	.06-.90%
Chlorine	0.3%	.09-.70%
Heating Value	5,600 Btu/lb	3,200-6,500 Btu/lb

Note: All values are on as-received basis.
Btu/lb = British thermal units per pound

Propane is to be used as an auxiliary fuel only. It is primarily used for boiler startup to raise the furnace temperature to an appropriate level prior to the introduction of RDF. Propane is assumed to have a gross heating value of about 90,800 Btu/gal and a total sulfur of 120 ppm.

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

This plant is a waste-to-energy facility consisting of four refuse derived fuel (RDF) fired boilers. Each of the four boilers has been designated a separate emissions unit. The RDF will be burned in each boiler in suspension and on a grate with a primary and secondary air system designed to provide air in varying proportions to promote the proper combustion of the RDF. The gases from the combustion process will pass through the furnace and convection sections of the boiler and then through a mechanical, centrifugal dust collector before proceeding to the spray dryer scrubber and fabric filter baghouse. An induced draft fan with related ductwork will be installed downstream of each baghouse and will exhaust the flue gases into individual flues of multiflue stacks. Continuous emissions monitoring system will be installed to monitor stack gases. Propane will be burned as an auxiliary fuel, primarily during start-up.

Pebble lime will be delivered in tank trucks and pneumatically off-loaded into lime storage silos. Pebble lime will be fed to a slaker where water will be added to slake the lime. Insoluble grit will be removed from the slaker by a degritting device and collected in portable containers for ultimate disposal. One lime slurry preparation system will be provided for each pair of boiler units.

On top of each lime silo, a small baghouse fabric filter will be installed for lime delivery and recovery. The dust collecting bag filter section will consist of stainless steel wire mesh inserted into filter envelopes. A hinged, clamped and gasketed door will be provided for bag filter access. The exhaust section will be fitted with a removable bird and insect screen. Filter section shall be of sufficient size to allow a 20 ton truck to unload in a maximum time of one hour. Emissions shall be less than 5 percent opacity (six-minute average as measured by EPA method 9).

Lime slurry will flow from the slaker to an agitated lime tank serving two process trains. A minimum of two 100% slurry feed pumps (one standby) will be installed. A monitoring and control system based on spray dryer exit temperature will be provided to control lime slurry and/or dilution water feed flow. The acid flue gas will react with the slaked lime droplets, converting SO_2 gas to calcium sulfite ($CaSO_3$) and calcium sulfate ($CaSO_4$); HCl to calcium chloride ($CaCl_2$); and HF to calcium fluoride ($CaFl_2$). Dry solids separated in the spray dryer will be removed from the bottom of the spray dryer and conveyed to an ash silo. A mercury reagent will be mixed with the lime slurry for injection into the spray dryer scrubber.

Flue gas and residual particulates leaving the spray dryer will pass through a baghouse to remove remaining particulates. Induced draft fans will discharge the clean flue gas to a common stack with separate flues (by others).

The air quality control system (AQCS) has been purchased, but final design data and drawings are not available. The AQCS vendor has guaranteed to meet or exceed all applicable emissions limitations. Based upon the vendor's guarantees, and proven experience of similar equipment in similar applications, the applicant's professional engineer is satisfied that the control devices will

be sufficient to meet any applicable emissions standards. Listed below are the design parameters for the AQCS. No control equipment for NOx is proposed with this application, but it will be determined later if it is necessary.

Parameters	Design
Spray Dryers	
Flue Gas Inlet Temperature	482°F
Quench Reactors	30 ft diameter x 83 ft high
Type	Downflow
Reagents	Lime or equivalent
Reagent Consumption	774 lb/hr (maximum)
Fabric Filters	
Cleaning Mechanism	Reverse Air
Number of Modules	10
Number of Bags per Module	121
Effective Bag Area	
Per Module	99.5 ft^2
Total Baghouse	120,342 ft^2
Air/Cloth Ratio	3.0:1
Material	Fiberglass
Weight	16 oz/yd^2
Guaranteed Bag Life	24 months
Outlet Grain Loading (@ 7% O_2)	0.011 gr/dscf
Flue Gas Outlet Temperature	270°F
Mercury Control System	
Reactant	Activated carbon or equivalent
Nox Control System	
Reactant	To be determined
Injection Point	To be determined
Overall System	
Pressure Drop	13.1 inches w.c.
Power Consumption	340 kW
Water Consumption	100gpm

Note: All data are per unit. Actual selected control equipment will be equivalent in performance to stated design but may vary from data shown.

°F = degrees Fahrenheit
ft^2 = square feet
gpm = gallons per minute
gr/dscf = grains per dry standard cubic feet
kW = kilowats
lb/hr = pounds per hour
oz/yd^2 = ounces per square yard
RDF = refuse-derived fuel
TPH = tons per hour
w.c. = water column

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

The control equipment for the refuse derived fuel and biomass processing system includes two sets of four dust collector baghouses. The dust control system for the garbage processing system is currently installed and will remain as is. The dust collection system for the trash and biomass processing systems are currently being upgraded. The data included in the application is as anticipated following these changes. All equipment numbers and data noted below and in the application is nominal data and may be replaced with similar equipment with comparable performance.

Each garbage processing line (Line Nos. 100 and 200) within the facility has two dust collection systems to control dust generated within the process line. These systems consist of a 33,000 cfm process line dust collection system and a 20,000 cfm shredder dust collection system.

The garbage processing system dust collection system for the trommels, magnets, and conveyors consists of the following major components:

1. Dust pickup hoods at the points where dust is to be controlled (seven locations).
2. Interconnecting ductwork with dampers at each pickup point.
3. MAC Model 120MWP312-256 Dust Filter
4. Chicago Blower Model 36 Fan with 100 Hp motor and outlet damper.
5. MAC 24 x 24 Airlock to remove the collected dust.
6. Common collection conveyor (Equipment No. 41-26-320) to transport the collected dust back to the process line.

The garbage shredder dust collection system consists of the following major components:

1. Dust pickup hood at the shredder discharge area on conveyors 41-26-106 and 206.
2. Interconnecting ductwork.
3. MAC Model 144MWP212-160 Dust Filter
4. Chicago Blower Model 33 Fan with 100 Hp motor and outlet damper.
5. MAC Model H96 Cyclone Collector.
6. MAC 24 x 24 Airlock (on filter) and 36 x 36 Airlock (on cyclone)

The trash and biomass processing system dust collection system is being upgraded. The proposed system includes reuse of existing filters 1 and 2 to pick up dust from three trash shredders, from all existing conveyor and magnetic separation transfer points. Filters 3 and 4 will pick up dust from the biomass process equipment and transfer points located within the trommel building. Simplex filter bags will be replaced with duplex bags to assure sufficient cloth area is available for the expected dust removal service.

Filters 1 and 2 combined will handle 43,000 cubic feet per minute and filters 3 and 4 combined will handle 70,000 cubic feet per minute.

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

The fly ash from the air quality control system will be conveyed to a fly ash silo in enclosed conveyors. The equipment has not been purchased, and therefore, design data and drawings are not available. A small baghouse fabric filter will be installed on top of the silo to contain fly ash dust. The following design parameters are anticipated:

Parameter	Anticipated Range
Connection to silo	2-5 square feet
Cloth Area	100-900 square feet
Air Volume	500-2,500 cfm
Air to Cloth Ratio	2.5 - 5.0:1

DESCRIPTION OF STACK SAMPLING FACILITIES

Only the four boiler emissions units require stack sampling. Sample ports will be provided into each unit's independent flue, inside the two concrete stack shells. The stack sampling facilities will be provided by the stack vendor. The final design data and drawings are not yet available. The stack sampling facilities will comply with 62-297. 310.6, F.A.C. as noted below.

62-297.310.6
Stack Sampling Facilities Provided by the Owner of an Emissions Unit.
Sampling facilities include sampling ports, work platforms, access to work platforms, electrical power, and sampling equipment support. All stack sampling facilities must meet any Occupational Safety and Health Administration (OSHA) Safety and Health Standards described in 29 CFR Part 1910, Subparts D and E.

(a) Permanent Test Facilities. The owner or operator of an emissions unit for which a compliance test, other than a visible emission test, is required on at least an annual basis, will install and maintain permanent stack sampling facilities.

(b) Temporary Test Facilities. The owner or operator of an emissions unit that is not required to conduct a compliance test on at least an annual basis may use permanent or temporary sampling facilities. If the owner chooses to use temporary sampling facilities on an emissions unit, such temporary facilities will be installed on the emissions unit within 5 days of a request by the Department and remain on the emissions unit until the test is completed.

(c) Sampling Ports.

1. All sampling ports will have a minimum inside diameter of 3 inches.

2. The ports will be capable of being sealed when not in use.

3. The sampling ports will be located in the stack at least 2 stack diameters or equivalent diameters downstream and at least 0.5 stack diameter or equivalent diameter upstream from any fan, bend, constriction or other flow disturbances.

4. For emissions units for which a complete application to construct has been filed prior to December 1, 1980, at least two sampling ports, 90 degrees apart, will be installed at each sampling location on all circular stacks that have an outside diameter of 15 feet or less. For stacks with a larger diameter, four sampling ports, each 90 degrees apart, will be installed. For emissions units for which a complete application to construct is filed on or after December 1, 1980, at least two sampling ports, 90 degrees apart, will be installed at each sampling location on all circular stacks that have an outside diameter of 10 feet or less. For stacks with larger diameters, four sampling ports, each 90 degrees apart, will be installed. On horizontal circular ducts, the ports will be located so that the probe can enter the stack vertically, horizontally or at a 45 degree angle.

5. On rectangular ducts, the cross sectional area will be divided into the number of equal areas in accordance with EPA Method 1. Sampling ports will be provided which allow access to each sampling point. The ports will be located so that the probe can be inserted perpendicular to the gas flow.

(d) Work Platforms.

1. Minimum size of the working platform will be 24 square feet in area. Platforms will be at least 3 feet wide.

2. On circular stacks with 2 sampling ports, the platform will extend at least 110 degrees around the stack.

3. On circular stacks with more than two sampling ports, the work platform will extend 360 degrees around the stack.

4. All platforms will be equipped with an adequate safety rail (ropes are not acceptable), toeboard, and hinged floor-opening cover if ladder access is used to reach the platform. The safety rail directly in line with the sampling ports will be removable so that no obstruction exists in an area 14 inches below each sample port and 6 inches on either side of the sampling port.

(e) Access.

1. Ladders to the work platform exceeding 15 feet in length will have safety cages or fall arresters with a minimum of 3 compatible safety belts available for use by sampling personnel.

2. Walkways over free fall areas will be equipped with safety rails and toeboards.

(f) Electrical Power.

1. A minimum of two 120 volts AC, 20 amps outlets will be provided at the sampling platform within 20 feet of each sampling port.

2. If extension cords are used to provide the electrical power, they will be kept on the plant's property and be available immediately upon request by sampling personnel.

(g) Sampling Equipment Support.

1. A three-quarter inch eyebolt and an angle bracket will be attached directly above each port on vertical stacks and above each row of sampling ports on the sides of horizontal ducts.

a. The bracket will be a standard 3 inch x 3 inch x one-quarter inch equal-legs bracket which is 1 and one-half inches wide. A hole that is one-half inch in diameter will be drilled through the exact center of the horizontal portion of the bracket. The horizontal portion of the bracket will be located 14 inches above the centerline of the sampling port.

b. A three-eighth inch bolt which protrudes 2 inches from the stack may be substituted for the required bracket. The bolt will be located 15 and one-half inches above the centerline of the sampling port.

c. The three-quarter inch eyebolt will be capable of supporting a 500 pound working load. For stacks that are less than 12 feet in diameter, the eyebolt will be located 48 inches above the horizontal portion of angle bracket. For stacks that are greater than or equal to 12 feet in diameter, the eyebolt will be located 60 inches above the horizontal portion of the angle bracket. If the eyebolt is more than 120 inches above the platform, a length of chain will be attached to it to bring the free end of the chain to within safe reach from the platform.

2. A complete monorail or dualrail arrangement may be substituted for the eyebolt and bracket.

3. When the sample ports are located in the top of a horizontal duct, a frame will be provided above the port to allow the sample probe to be secured during the test.

Specific Authority: 403.061, F.S.
Law Implemented: 403.021, 403.031, 403.061, 403.087, F.S.
History: Formerly 17-2.700(4), Formerly 17-297.345, Amended 11-23-94, 1-1-96.

COMPLIANCE TEST REPORT

Compliance test reports have been submitted annually only for particulate matter, which is the only pollutant currently limited by permit. The facility air quality control system is currently being upgraded. Compliance test reports will be submitted following completion as required by the Conditions of Certification and in accordance with all applicable regulations.

PROCEDURES FOR STARTUP AND SHUTDOWN

Excess emissions are possible during periods of startup, shutdown, or malfunction. The conditions of certification allow for excess emissions for up to 2 hours per 24 hour period. Attached are the normal operating checklists and start-up and shutdown procedures for the garbage processing and boilers for the existing facility. These procedures will be updated following completion of the biomass processing system and the air quality control system upgrade.

THE HEIL CO.

MONTENAY POWER CORPORATION

DADE COUNTY RESOURCES RECOVERY FACILITY
DADE COUNTY, FLORIDA

SYSTEM OPERATION INSTRUCTIONS

INDEX

I. CONTROL SYSTEM EQUIPMENT DESCRIPTION

This section describes the proper startup method and sequence of operation of the equipment in the facility. For an explanation of how each individual piece of equipment functions, see the Process Description section of this manual and the Service Manual for that piece of equipment.

The facility is controlled from the control room via a central control console, which operates the two (2) identical processing systems and the common equipment that serves both processing systems.

The major control equipment in the facility is as follows:

A. Central Control Console - The central control console is a 12 foot long console which is used to operate the two (2) processing lines (100 and 200) and the common equipment (300 line). This includes pushbuttons to start or stop equipment, indicating lights in the pushbuttons to indicate whether equipment has been started or is stopped, a mimic board to graphically indicate that the equipment is running or indicate equipment position, an annunciator to alert the operator to system problems, meters to indicate temperature, speed and amps of equipment, and closed circuit TV monitors for visual indication of plant equipment. Contained inside the console is the programmable controller equipment consisting of a Square-D Model 400 Processor (CPU), two (2) local interface modules, and three (3) local I/O racks.

   The pushbuttons and annunciators on the console are divided into three (3) separate areas for the line 100, 200 and 300 equipment.

B. Motor Control Centers - There are three (3) motor control centers (MCC's) located in the electrical equipment room. They are MCC-100, which contains the starters for all equipment solely used by line 100; MCC-200, which contains all the starters for all the equipment solely used by line 200; and MCC-300, which contains all starters for the common equipment (line 300).

   Motor control centers 100, 200 and 300 have attached to them a 3'-0" wide section which houses an I/O rack and miscellaneous controls. These I/O racks are connected to the system CPU via a remote interface card.

C. Medium Voltage Starters - The medium voltage starter line-up is located in the electrical room and consists of four (4) major sections:

1. Starter and controls for line 100 shredder 2,000 horse power motor.

2. Starter and controls for line 200 shredder 2,000 horse power motor.

3. Incoming section, with lightning arrestors, voltage monitoring and 1,000 amp bus connection.

4. Capacitor section, which contains the power factor correction capacitors for both motors.

D. North End I/O Panel - The north end I/O panel is located beneath the north end structure. The panel contains an I/O rack and is connected to the system CPU via a remote interface card. The local devices that are connected to this panel include all of the devices in the north end of the processing building. This panel also contains the hand-off-auto selector switches for equipment in this area.

E. Shredder 100 I/O Panel - The shredder 100 I/O panel is located outside the shredder 100 enclosure. The panel contains an I/O rack and is connected to the system CPU via a remote interface card. The local devices that are connected to this panel include all of the devices in the area of the line 100 shredder. This panel also contains the hand-off-auto selector switches for equipment in this area.

F. Shredder 200 I/O Panel - The shredder 200 I/O panel is located outside the shredder 200 enclosure. The panel contains an I/O rack and is connected to the system CPU via a remote interface card. The local devices that are connected to this panel include all of the devices in the area of the line 200 shredder. This panel also contains the hand-off-auto selector switches for equipment in this area.

G. Pulsort I/O Panel - The pulsort I/O panel is located beneath the discharge end of the line 100 secondary trommel. The panel contains an I/O rack and is connected to the system CPU via a remote interface card. The local devices that are connected to this panel include all of the devices in the pulsort area of the processing building. This panel also contains the hand-off-auto selector switches for equipment in this area.

H. South End I/O Panel - The south end I/O panel is located beneath the feed end of the line 100 primary trommel. The panel contains an I/O rack and is connected to the system CPU via a remote interface card. The local devices that are connected to this panel include all of the devices in the south-west end of the processing building. This panel also contains the hand-off-auto selector switches for equipment in this area.

I. Infeed Area I/O Panel - The infeed area I/O panel is located beneath the feed end of the line 200 primary trommel. The panel contains an I/O rack and is connected to the system CPU via a remote interface card. The local devices that are connected to this panel include all of the devices in the south-east end of the processing building. This panel also contains the hand-off-auto selector switches for equipment in this area.

J. Baghouse Area I/O Panel - The baghouse area I/O panel is located near the baghouse structure. The panel contains an I/O rack and is connected to the system CPU via a remote interface card. The local devices that are connected to this panel include all of the devices in the baghouse area. This panel also contains the hand-off-auto selector switches for equipment in this area.

K. Explosion Suppression Panel - There are two (2) explosion suppression panels; one for shredder 100 and one for shredder 200. They are located next to each shredder I/O panel and contain the electrical equipment for the shredder explosion suppression system. There is also an explosion suppression terminal box located near each shredder at the shredder platform level.

L. Remote Stations - Remote stations are located at each piece of equipment throughout the facility and are used to operate the equipment locally for maintenance purposes.

II. PRE-STARTUP CHECKS

The following checks must be made prior to operation of the system from the control console:

1. All motor disconnects should be made.

2. The three position HAND-OFF-AUTO selector switches on the medium voltage starter and at each I/O panel should be in the "AUTO" position.

3. The stop lockout buttons on the equipment remote stations should be unlocked.

4. All emergency pull cord switches should be in the reset position.

5. The emergency stop stations should be reset.

6. The belt training switches should not be in the tripped position.

7. All shredder and trommel access doors must be closed.

8. All personnel must be free and clear of all equipment.

9. All restricted areas are clear of personnel and locked to prevent unauthorized entry.

10. All equipment is free of obstructions.

After the above checks have been made, the following startup sequence is used:

III. SYSTEM STARTUP PROCEDURE

1. Turn the control console on via the keyed selector switch. Depress the E-Stop reset button to energize the system E-Stop circuit.

   At this time, mimic board lights indicating diverter position will be on and the annunciator will be on if any faults exist in the system. All the stop buttons for each piece of equipment should also be lit. If they are not, this indicates that the equipment is not in the "auto" position.

   If any problems exist in the system with the programmable controller or power to any of the I/O racks, the "Electrical System - Loss of Control Power" annunciator will be lit. This annunciator monitors input and output power to all I/O racks as well as communication to the remote I/O racks from the programmable controller. See rungs 9 through 14 in the programmable controller for troubleshooting.

   NOTE: To check the operation of lights on the consoles, use the "test lights" or "test annunciator" pushbuttons.

   Select which processing line (100 or 200) is to be operated and proceed to that section of the console.

2. Lube Pump (41-38-116 and 216) - Start the lube pump by depressing the start pushbutton. The stop light will go out and the "on" light will be illuminated indicating that the starter is pulled in and the motor is running. After a short delay, the mimic light will be lit indicating that there is pressure at the lube pump. If the mimic light does not come on, the annunciator will indicate low pressure. The lube pump is also equipped with a high temperature indicator.

   After the lube pump has run for twenty minutes, the lube ready light will be lit indicating that the shredder can be started.

3. Explosion Suppression System 100 and 200 - The explosion suppression system must be armed in order to start the shredder in the "auto" mode. The explosion suppression system is armed at the Fenwal Cabinet located outside each shredder room. The procedure to arm the explosion suppression system is as follows:

   A. Make sure that the shredder is free and clear of all personnel and the access doors are closed.

   B. Open the door to the Fenwal Cabinet and position the power toggle switch on the Fenwal power unit to the "on" position.

C. Turn the isolation keyswitch to the "on" position.

D. Depress the "ARM" pushbutton and hold until the ARMED light is lit and the "DISARMED" light goes out. Observe the panel meter and check that it is in the green range. For further information, see the Fenwal Service Manual.

Once the above steps have been completed, the explosion suppression system armed light on the control console will be on.

4. Cooling Air Fan (41-36-117 and 217) - Start the shredder motor cooling air fan by depressing the start pushbutton. The stop light will go out and the "on" light will be illuminated indicating that the starter is pulled in and the motor is running. After a short delay, the mimic light will be lit indicating that the fan pressure switch has pulled in.

5. Shredder Rotation - Select the desired rotation of the shredder by depressing the CW or CCW pushbutton. The pushbutton will be illuminated indicating the rotation selected. If it is desired to change the rotation selected prior to starting the shredder, depress the shredder stop button and a new rotation can be selected.

6. Shredder (41-63-105 and 205) - The shredder may then be started. In order to start the shredder, the following conditions must be met:

   A. The shredder medium voltage starter must have power, the door must be closed, the contactors racked in, the stop button not depressed, and be in the auto position.

   B. The shredder ground fault and low voltage relays must be OK.

   C. The shredder overloads must be reset.

   D. The shredder explosion vent must be in the "lowered" position.

   E. The shredder lube pump must have been running for twenty minutes.

   F. The explosion suppression system must be armed.

   G. Shredder CW or CCW rotation must be selected.

   H. No fault conditions regarding shredder bearings, motor bearings, or motor winding temperatures can exist.

I. The shredder anti-restart timer in the medium voltage starter must be timed out. This time prevents the shredder from being restarted after any shutdown until ninety minutes have passed. This interlock is required for protection of the 2,000 HP motor.

J. The shredder cooling air fan must be running.

Once all of the above conditions have been met, the shredder start button is depressed. The light in the start button will blink for fifteen seconds indicating that the warning horn in the shredder room is sounding. Once the fifteen seconds have expired, the shredder will start, which will cause the light in the start pushbutton and the mimic board light to be lit.

7. Dust Collection Conveyor (41-26-315) - The operator must now move to the common equipment (line 300) area of the console to proceed. The dust collection conveyor (41-26-315) can be started by depressing the start pushbutton. The light in the start button will blink for ten seconds indicating that the warning horn in the north end area is sounding. Once the ten seconds have expired, the conveyor will automatically start.

   The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit.

8. Dust Collection Conveyor (41-26-320) - The dust collection conveyor (41-26-320) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the dust collection conveyor (41-26-315) must be running.

9. Air Classifier Airlock (41-30-310A) - The air classifier airlock (41-30-310A) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the airlock motor starter has pulled in. Once the airlock zero speed switch pulls in, the mimic board light will be lit.

10. Air Classifier Fan (41-30-310B) - The air classifier fan (41-30-310B) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the fan motor starter has pulled in. Once the fan zero speed switch (pressure switch) pulls in, the mimic board light will be lit. In order to start the fan, the air classifier airlock (41-30-310A) must be running.

11. RDF Flow Splitter (D-321A,B) - The RDF flow splitter (D-321A,B) is located at the head end of conveyor 41-26-308. It was to be used to divert material from conveyor 41-36-308 to either RDF conveyor A, RDF conveyor B, or to split the flow between conveyors A and B. These conveyors were to be furnished by others.

    NOTE: RDF Conveyors A and B were deleted by the Owner (Montenay Power Corporation) and a single Conveyor GP-3 was installed to receive the material from Conveyor 41-26-308. For this reason, the flow splitter will be locked in one position so as to always feed onto Conveyor GP-3.

12. RDF Conveyor (41-26-308) - The RDF Conveyor (41-26-308) can be started by depressing the start pushbutton. The light in the start button will blink for ten seconds, indicating that the warning horn in the north end area is sounding. Once the ten seconds have expired, the conveyor will automatically start. The start button will be lit steadily, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, conveyor GP-3 (supplied by others) must be running.

13. Air Classifier Lights Conveyor (41-26-312) - The air classifier lights conveyor (41-26-312) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the RDF conveyor (41-26-308) must be running.

14. Air Classifier Lights Conveyor (41-26-311) - The air classifier lights conveyor (41-26-311) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the air classifier lights conveyor (41-26-312) must be running.

15. Air Classifier Heavies Conveyor (41-26-313) - The air classifier heavies conveyor (41-26-313) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the air classifier lights conveyor (41-26-311) must be running. In addition, the unders loadout conveyor (41-26-504), (which is supplied by others), must also be running.

NOTE: Should conveyor 41-26-311 stop running, conveyor 41-26-313 will continue to run. The interlock with 41-26-311 is for starting purposes only.

16. Secondary Trommel Unders Conveyor (41-26-309) - The secondary trommel unders conveyor (41-26-309) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the air classifier heavies conveyor (41-26-313) must be running. In addition, one of the following must be true:

A. The air classifier fan (41-26-310B) must not be running.

OR

B. The air classifier fan (41-26-310B) and the air classifier lights conveyor (41-26-311) must both be running.

17. Aluminum Collection Conveyor (41-26-305) - The aluminum collection conveyor (41-26-305) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the aluminum bisquitter (densifier) or bisquitter feed conveyor (both of the above supplied by others) must be running. This interlocking must be resolved by others (not within Heil's scope of supply).

18. Ferrous Loadout Conveyor (41-26-302) - The ferrous loadout conveyor (41-26-302) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the air classifier heavies conveyor (41-26-313) must be running.

NOTE: Should a ferrous transfer conveyor be added by others, the interlocking with this conveyor must be resolved by others.

19. RDF Ferrous Conveyor (41-26-301) - The RDF Ferrous Conveyor (41-26-301) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board will be lit. In order to start this conveyor, the ferrous loadout conveyor (41-26-302) must be running.

20. RDF Ferrous Collection Conveyor (41-26-300) - The RDF ferrous collection conveyor (41-26-300) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the RDF ferrous conveyor (41-26-301) must be running.

21. Unders Ferrous Conveyor (41-26-304) - The unders ferrous conveyor (41-26-304) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the ferrous loadout conveyor (41-26-302) must be running.

22. Unders Ferrous Collection Conveyor (41-26-303) - The unders ferrous collection conveyor (41-26-303) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the unders ferrous conveyor (41-26-304) must be running.

23. Shredder Dust Collection System 100 and 200 - The operator should now move back to the line 100 or 200 section of the console. The shredder dust collection system is started automatically in the proper sequence. Prior to starting the dust collection system, the following conditions must be met:

    A. The reverse air fan (41-40-125 and 225), baghouse airlock (41-40-128 and 228), fan rotator (41-40-126 and 226), cyclone airlock (41-40-127 and 227), and main fan (41-40-124 and 224) must be in auto.

    B. Dust collection conveyor (41-26-320) and air classifier lights conveyor (41-26-311) must be running.

    Once the above conditions have been met, the shredder dust collection system may be started. The start pushbutton is depressed, which initiates the following sequence:

    A. The light in the start button blinks, indicating the starting sequence has been initiated and a warning horn sounds in the baghouse area for ten seconds.

    B. Once the ten second horn has expired, the baghouse airlock (41-40-128 and 228) automatically starts, which is indicated by the light on the mimic board.

C. Ten seconds later, the cyclone airlock (41-40-127 and 227) starts, which is indicated by the light on the mimic board.

D. Ten seconds later, the fan rotator (41-40-126 and 226) starts, which is indicated by the light on the mimic board.

E. Ten seconds later, the reverse air fan (41-40-125 and 225) starts, which is indicated by the light on the mimic board.

F. Ten seconds later, the main fan (41-40-124 and 224) starts, which is indicated by the light on the mimic board.

G. Once the main fan starts, the light in the start pushbutton for the shredder dust collection system stops flashing and is illuminated steadily once the fan zero speed switch pulls in.

To stop the system, the stop pushbutton is depressed, which immediately stops the main fan (41-40-124 and 224). The reverse air fan (41-40-125 and 255) and fan rotator (41-40-126 and 226) then stop on ten second increments. The stop button then blinks for five minutes while the hopper vibrators operate until, at which point, the rest of the system equipment (airlocks) stops. If it is desired to immediately stop all dust collection system equipment, the dust collection system conveyor (41-26-320) should be stopped.

24. Process Dust Collection System 100 and 200 - The process dust collection system (100 and 200) is started automatically in the proper sequence. Prior to starting the dust collection system, the following conditions must be met:

A. The reverse air fan (41-40-121 and 221), baghouse airlock (41-40-123 and 223), fan rotator (41-40-122 and 222), and main fan (41-40-120 and 220) must be in auto.

B. Dust collection conveyor (41-26-320) and air classifier lights conveyor (41-26-311) must be running.

Once the above conditions have been met, the process dust collection system may be started. The start pushbutton is depressed, which initiates the following sequence:

A. The light in the start button blinks, indicating the starting sequence has been initiated and a warning horn sounds in the baghouse area for ten seconds.

B. Once the ten second horn has expired, the baghouse airlock (41-40-123 and 223) starts, which is indicated by the light on the mimic board.

C. Ten seconds later, the fan rotator (41-40-122 and 222) starts, which is indicated by the light on the mimic board.

D. Ten seconds later, the reverse air fan (41-40-121 and 221) starts, which is indicated by the light on the mimic board.

E. Ten seconds later, the main fan (41-40-120 and 220) starts, which is indicated by the light on the mimic board.

F. Once the main fan starts, the light in the start pushbutton for the process dust collection system stops flashing and is illuminated steadily once the fan zero speed switch pulls in.

To stop the system, the stop pushbutton is depressed, which immediately stops the main fan (41-40-120 and 220). The reverse air fan (41-40-121 and 221) and fan rotator (41-40-122 and 222) then stop on ten second increments. The stop button then blinks for five minutes while the hopper vibrator operates until, at which point, the rest of the system equipment (airlocks) stops. If it is desired to immediately stop all dust collection system equipment, the dust collection system conveyor (41-26-320) should be stopped.

25. RDF Magnet Belt (41-38-107A and 207A) - The RDF magnet belt conveyor (41-38-107A and 207A) may then be started by depressing the start pushbutton. The light in the start button will blink for ten seconds, indicating that the warning horn in the north end area is sounding. Once the ten seconds have expired, the magnet belt will automatically start. The start button will be lit, indicating that the motor starter has pulled in. Once the zero speed switch pulls in, the mimic board light will be lit. Depressing the start button also starts the RDF magnet rotary splitter (41-38-107C and 207C). Once the coil for the splitter pulls in, the mimic board light will be lit.

26. RDF Magnet Rectifier (41-38-107B and 207B) - The RDF magnet rectifier (41-38-107B and 207B) may then be turned on by depressing the "on" pushbutton. The light in the pushbutton will be lit, indicating that the rectifier starter has pulled in. Once DC power is generated by the rectifier, the mimic board light will be lit. In order to turn the magnet rectifier on, the RDF magnet belt (41-38-107A and 207A) and the RDF ferrous collection conveyor (41-26-300) must both be running.

27. Shredder Discharge Conveyor (41-26-106 and 206) - The shredder discharge conveyor (41-26-106 and 206) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, conveyor GP-1 (line 100) or GP-2 (line 200) and the RDF magnet belt (41-38-107A and 207A) must both be running. GP-1 and GP-2 conveyors are supplied by others.

28. Shredder Feed Conveyor (41-26-104 and 204) - The shredder feed conveyor (41-26-104 and 204) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order for this conveyor to be started, the following must all be true:

    A. The shredder (41-63-105 and 205) must be running and in "auto".

    AND

    B. The shredder discharge conveyor (41-26-106 and 206) must be running.

    Once the shredder feed conveyor is running, it will stop if the shredder amp draw exceeds 256 Amps for five seconds (indicates an overloaded shredder) or if the shredder level indicator is covered for ten seconds (indicates material in the shredder feed chute).

29. Aluminum Pulsorts (41-38-114A and 214A) - The three aluminum pulsort units may then be started by depressing the "run" pushbutton. Depressing this button initiates the start sequence at each pulsort cabinet; and, once the pulsort has started, the run light and mimic board light will be lit. In order to start the pulsort units, the following must be true:

    A. The aluminum collection conveyor (41-26-305) must be running.

    AND

    B. The pulsort cabinets must be "on" with the stop button reset.

    For further information regarding the starting sequence of the pulsort units, refer to the pulsort operation and maintenance manual.

    Depressing the start button for the pulsorts also starts the aluminum rotary splitter (41-38-114B and 214B). Once the coil for the splitter pulls in, the mimic board light will be lit.

30. Secondary Trommel Overs Conveyor (41-26-113 and 213) - The secondary trommel overs conveyor (41-26-113 and 213) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the shredder feed conveyor (41-26-104 and 204) must be running.

31. Secondary Trommel (41-30-112 and 212) - The secondary trommel (41-30-112 and 212) may then be started by depressing the start pushbutton. The light in the start button will be lit, indicating that the motor starter has pulled in; and, once the zero speed switch has pulled in, the mimic board light will be lit. In order to start the secondary trommel, the following must all be true:

A. Secondary trommel unders conveyor (41-26-309) is running.

AND

B. RDF conveyor (41-26-308) is running.

AND

C. Secondary trommel overs conveyor (41-26-113 and 213) is running.

AND

D. All trommel access doors must be closed.

AND

E. No faults can exist with the uphill or downhill thrust switches.

The lube solenoids on the trommel apply oil to the trommel tires for five minutes during every eight hours of operation.

32. Secondary Trommel Feed Conveyor (41-26-111 and 211) - The secondary trommel feed conveyor (41-26-111 and 211) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the secondary trommel (41-30-112 and 212) must be running.

33. Secondary Trommel Feed Conveyor (41-26-110 and 210) - The secondary trommel feed conveyor (41-26-110 and 210) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the secondary trommel feed conveyor (41-26-111 and 211) must be running.

34. Unders Magnet Belt (41-38-109A and 209A) - The unders magnet belt (41-38-109A and 209A) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. Depressing the start button also starts the unders magnet splitter (41-38-109C and 209C). Once the coil for the splitter pulls in, the mimic board light will be lit.

35. Unders Magnet Rectifier (41-38-109B and 209B) - The unders magnet rectifier (41-38-109B and 209B) may then be turned on by depressing the "on" pushbutton. The light in the pushbutton will be lit, indicating that the rectifier starter has pull in. Once DC power is generated by the rectifier, the mimic board light will be lit. In order to turn the magnet rectifier on, the unders magnet belt (41-38-109A and 209A) and the unders ferrous collection conveyor (41-26-303) must both be running.

36. Primary Trommel Unders Conveyor (41-26-108 and 208) - The primary trommel unders conveyor (41-26-108 and 208) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the conveyor motor starter has pulled in. Once the conveyor zero speed switch pulls in, the mimic board light will be lit. In order to start this conveyor, the secondary trommel feed conveyor (41-26-110 and 210) and the unders magnet belt (41-38-109A and 209A) must both be running.

37. Primary Trommel (41-30-103 and 203) - The primary trommel (41-30-103 and 203) may then be started by depressing the start pushbutton. The start button will be lit, indicating that the motor starter has pulled in. Once the trommel zero speed switch pulls in, the mimic board light will be lit. In order to start the primary trommel, the following must all be true:

A. Primary trommel unders conveyor (41-26-108 and 208) is running.

AND

B. Shredder feed conveyor (41-26-104 and 204) is running.

AND

C. All trommel access doors must be closed.

AND

D. No faults can exist with the uphill or downhill thrust switches.

The lube solenoids on the trommel apply oil to the trommel tires for five minutes during every eight hours of operation.

38. Inclined (Primary Trommel) Feed Conveyor (41-26-101 and 201)- The inclined feed conveyor (41-26-101 and 201) may then be started by depressing the start pushbutton. The light in the start pushbutton will flash for ten seconds, indicating that the warning horn by the infeed pit is sounding and the warning beacon by the grapple operator is on. After ten seconds, the light in the start pushbutton will be lit steadily, indicating that the motor starter has pulled in; and, once the zero speed switch is pulled in, the mimic board light will be lit. In order to start this conveyor, the primary trommel (41-30-103 and 203) must be running.

39. Horizontal Feed Conveyor (41-26-100 and 200) - The horizontal feed conveyor (41-26-100 and 200) can then be started by depressing the start pushbutton. The light in the start pushbutton will be lit, indicating that the motor starter has pulled in; and, once the zero speed switch has pulled in, the mimic board light will be lit. In order to start this conveyor, the inclined feed conveyor (41-26-101 and 201) must be running. This conveyor has a speed potentiometer on the control console which can vary the speed of the conveyor which is displayed digitally on the mimic board.

The horizontal and inclined conveyors (41-26-100 & 200 and 41-26-101 & 201, respectively) can also be stopped by one of the local operator's stations at the grapple. The grapple operator also has the capability to restart the inclined conveyor (41-26-101 and 201); and, after the inclined conveyor (41-26-101 and 201) has been running five seconds, the horizontal conveyor (41-26-100 and 200) will start automatically.

IV. SYSTEM OPERATION AFTER STARTUP

During system operation from the control console, the following data should be recorded in the operator's log at the intervals recommended:

ITEM	FREQUENCY OF RECORDING
Hour Meter	Before Startup and After Shutdown
Shredder Motor Amps	After Startup and Every 1/2 Hour of Operation
Shredder Bearing Temperatures (Drive and Opposite Drive)	Every 1/2 Hour of Operation
Shredder Motor Bearing Temperatures (Front and Rear)	Every 1/2 Hour of Operation
Shredder Motor Winding Temperatures	Every 1/2 Hour of Operation
Speed of Infeed Conveyors	Every 1/2 Hour of Operation

A separate log should be kept for each system that operates (line 100 or 200).

V. SYSTEM SHUTDOWN

Normal system shutdown is in the reverse order of the startup sequence listed previously. Each piece of equipment is stopped by depressing the stop pushbutton on the control console. The operator should wait at least one minute between stopping each piece of equipment in order to allow the refuse on or in that equipment to clear itself. In no case, during a normal shutdown, should all the equipment be stopped simultaneously with a load on or in the equipment.

VI. SYSTEM ELECTRICAL COMPONENTS

ANNUNCIATOR

An annunciator mounted in each section of the control console announces to the operator visually and audibly that a significant change in the operating condition has taken place. the annunciator accomplishes the following:

1. Alerts the operator to an off-normal condition.

2. Informs the operator as to the nature of that condition.

3. Requires acknowledgement by the operator.

4. Advises the operator when the condition has returned to normal.

The annunciator serves to inform the operator as to the changed operating condition - that condition may or may not be interlocked to perform an automatic shutdown of certain operating components. See the Troubleshooting/Alarm section of this description.

The annunciator board works in the following four step sequence:

1. When a condition is first annunciated, the annunciator window for that condition flashes at a fast rate and the alarm horn sounds.

2. The operator can then acknowledge the annunciator by pressing the "horn silence" pushbutton. this will cause the horn to stop and the annunciator window light will flash at a slow rate.

3. Once the condition that caused the annunciation is corrected, the window light will remain on steady. This is an automatic function and requires no action by the operator.

4. The operator can then reset the system by pressing the reset pushbutton. This will cause the light to go out in all annunciator windows that have been corrected.

MIMIC BOARD

The mimic board is the graphic display on the console showing the process flow line for the facility. Each item of equipment is identified by lights indicating the status of that particular item. The following items are displayed:

1. All equipment motion is identified by green lights. This includes the dust collection system, all conveyors, trommels, and shredders. These lights will not be lit until the zero speed switch for a piece of equipment has been closed - thus, they indicate equipment operation, not just motor operation.

2. The diverters are identified by amber lights to indicate the position of the diverter blade.

FIELD ELECTRICAL DEVICES

A. Emergency Stop Pushbuttons

There are seven (7) emergency stop pushbutton stations located throughout the facility (near each local I/O rack). Breaking the glass cover over these buttons causes them to pop out and shut down the entire facility including all conveyors, trommels, shredders, and dust collection system. These buttons are reset only by replacing the broken glass. In addition to these seven (7) emergency stop pushbutton stations, there are also two (2) emergency stop pushbuttons on the control console. Once the emergency stop buttons have all been reset, the emergency stop reset pushbutton on the control console must be depressed to reset the E-Stop circuit.

B. Equipment Remote Stations

The remote stations at each piece of equipment contain a stop lockout pushbutton and, in some cases, also a stop pushbutton. Depressing the stop pushbutton while the equipment is running in the auto mode will cause that piece of equipment to stop and all interlocked equipment to stop.

The remote stations are primarily used for maintenance purposes. With the selector switch on the local I/O panels in the hand mode, the jog or start button can be used to operate each piece of equipment individually with no system interlocks in place.

⚠WARNING

These remote stations also contain a stop lockout pushbutton which can be padlocked in the stopped position for service. IN NO CASE SHOULD SERVICE ON ANY PIECE OF EQUIPMENT BE PERFORMED WITHOUT THE MOTOR DISCONNECT PADLOCKED OFF OR THE STOP LOCKOUT BUTTON PADLOCKED.

NOTE: Stop lockout button does not disconnect 480 VAC power to the motor.

C. Safety Pull Cord Switches

A safety pull cord switch is installed on all belt conveyors. If the cord is pulled, the equipment and all electrically interlocked equipment will be shut down. These switches must be manually reset once tripped. These safety pull cord switches are "hard wired" and work in both the auto and hand modes.

D. Belt Training Switches

Belt training switches are mounted on all troughed belt conveyors. If the belt of the conveyor tracks excessively to either side, the switch will be activated, stopping that conveyor and all interlocked equipment.

NOTE: In the maintenance mode, the belt tracking switch is not active.

E. Zero Speed Switches

Zero speed switches are installed on all belt conveyors, trommels, fans, and infeed conveyors. If a piece of equipment stops due to V-belt breakage, chain breakage, conveyor belt breakage, or other jam-up, the zero speed switch will stop the motor on that piece of equipment and cause all interlocked equipment to be shut down. On startup, a five second delay is provided to allow the zero speed switch to pick up after the motor is energized.

VII. SYSTEM INTERLOCKS, ALARMS AND TROUBLESHOOTING

The equipment in the facility is electrically interlocked with one another to provide for sequential shutdown should one piece of processing equipment shut down. There are also startup interlocks to prevent a piece of equipment from being started unless all downstream equipment is running.

The following tables provide a description of the system field devices and all associated interlocks and alarms. The tables also describe corrective measures to be taken before restarting the system after a shutdown caused by the interlocks.

SYSTEM INTERLOCKS, ALARMS, AND TROUBLESHOOTING

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Shredder Lube Pump 41-63-116/216	Pressure Switch	Shredder Lube System Low Pressure	Shuts down shredder	Low oil pressure	Check switch, pump, oil level, oil lines, and oil filter. See Lube Pump Service Manual. Lube pump or pressure switch is malfunctioning.
	Temperature Switch	Shredder Lube System High Temp	Shuts down shredder	High oil temperature	
Shredder 41-63-105/205	RTD's (2) for Bearings	Shredder Bearing Temperature High	None	One or more bearings reach a predetermined set point	Operator should observe temperature meters to check for continued temperature rise. Lube system may be checked for drop in flow. Check RTD's to verify proper operation.
		Shredder Bearing Temperature High-High	Shuts down shredder and infeed conveyors	One or more bearings exceed the predetermined upper limit	Shredder bearings and lube system must be thoroughly checked and shredder run under no-load and carefully monitored before resuming normal operation. See Shredder Service Manual.

SYSTEM INTERLOCKS, ALARMS, AND TROUBLESHOOTING

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Shredder (cont'd.) 41-63-105/205	Feed Hood Photo Eye	Shredder Feed Hood Photo Eye	Stops infeed conveyor after preset time	Shredder infeed hood material level reaches photo eye.	Operator should observe annunciator to verify that level fault corrects. If not, inspect photo eye for blockage or feed hood for potential jam.
Shredder Motor	Motor Overload and Ground Fault Relay	Shredder Motor Overload/ Ground Fault	Shuts down shredder and infeed conveyors	Motor overloads tripped or ground fault condition	Check OL/ground fault relay. If overload condition, check shredder carefully for jams and clear if necessary. Restart under no-load and observe carefully before resuming operation.
	Cooling Air Fan	Shredder Motor Cooling Air Fan - Loss of Motion	Shuts down shredder and infeed conveyors	Fan failure or pressure switch failure.	Check cooling air fan and pressure switch for proper operation.

SYSTEM INTERLOCKS, ALARMS, AND TROUBLESHOOTING

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Shredder Motor (cont'd.)	Under Volt Relay	Shredder Motor Under Voltage, Over Voltage, or Phase Loss	Shuts down shredder and infeed conveyors	Under, over voltage relay tripped.	Check UV, OV Relay. See MVS Service Manual
	RTD's (2) on Motor Front and Rear Bearings	Shredder Motor Bearing Temperature High	None	One or both bearings reach a predetermined set point	Operator should observe motor bearing temperature meters to check for continued rise.
		Shredder Motor Bearing Temperature High-High	Shuts down shredder and infeed conveyors	One or both bearings exceed a predetermined upper limit	Check motor bearings and lubrication per Motor Service Manual.

SYSTEM INTERLOCKS, ALARMS, AND TROUBLESHOOTING

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Shredder Motor (cont'd.)	RTD's (3) on Motor Windings	Shredder Motor Winding Temperature High	None	One or more windings reach a predetermined set point	Operator should observe motor winding temperature meters to check for continued rise. Also check motor cooling air fan and filters for proper air flow.
		Shredder Motor Winding Temperature High-High	Shuts down shredder and infeed conveyors	One or more windings exceed a predetermined upper limit	Inspect and clean windings per Motor Service Manual.
Belt Conveyors (23 total)	Belt Alignment Switches	Belt Misalignment	Shuts down conveyor or prevents starting of conveyor	Belt alignment switch trips	Belt must be retrained to eliminate tracking problems. Also check for proper switch operation.

SYSTEM INTERLOCKS, ALARMS, AND TROUBLESHOOTING

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Belt Conveyors (23 total) (cont'd.)	Safety Pull Cord Switch	None	Shuts down conveyor	Pull cord switch tripped	Check conveyor to determine why switch was tripped and reset once condition is corrected.
	Zero Speed Switch	Loss of Motion	Shuts down conveyor	Zero speed switch not closed	Check drive belts, conveyor belt and zero speed switch.
	Remote Station	None	Stop button shuts down conveyor	Stop button pushed	Check stop button and wiring.
Diverter 41-26-321	Limit Switches	Diverter Failure to Seat	None	Diverter has not reached selected position	Check limit switches for proper operation. Check inside diverter for obstruction that could cause failure to seat. Check electrical operation of actuator.

SYSTEM INTERLOCKS, ALARMS, AND TROUBLESHOOTING

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Trommels 41-30-103/203 41-30-112/212	Thrust Limit Switches (One uphill and one downhill)	Trommel Misalignment	Shuts down trommel	Movement of trommel axially	Check trommel thrust rollers to see if trommel has shifted. Check limit switches.
	Access Door Limit Switches	Trommel Access Door Open	Shuts down trommel	Access door open	Check why access door has been opened and correct. Check limit switch.
	Zero Speed Switch	Trommel Loss of Motion	Shuts down trommel	Zero speed switch not closed	Check drive chain, switch alignment, and switch operation.
	Remote Station	None	Stop button shuts down trommel	Stop button pushed	Check stop button and wiring.
Metal Pan Feed Conveyors 41-26-100/200 41-26-101/201 41-26-104/204	Safety Pull Cord Switch	None	Shuts down conveyor	Pull cord switch tripped	Check conveyor to determine why switch was tripped and reset once condition is corrected.

SYSTEM INTERLOCKS, ALARMS, AND TROUBLESHOOTING

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Metal Pan Feed Conveyors (cont'd.)	AC Drive 41-26-100/200	AC Drive Fault	Shuts down conveyor	AC Variable Speed Drive Problem	Refer to AC Drive Service Manual.
	Zero Speed Switch	Loss of Motion	Shuts down conveyor	Zero speed switch not closed	Check drive chain, conveyor belt and zero speed switch.
	Remote Station	None	Stop button shuts down conveyor	Stop button pushed	Check stop button and wiring.
Baghouse and Cyclone Airlocks	Zero Speed Switch	Airlock Loss of Motion	Shuts down airlock	Zero speed switch not closed	Check V-belts and zero speed switch. Airlock may be plugged.
Baghouses	Level Switches	Baghouse Hopper Level High	Shuts down dust collection fan	Level switch detects material	Check baghouse hopper for fillage. Check level switch.
	Pressure Switch	Baghouse Differential Pressure High	Shuts down dust collection fan	High differential pressure across baghouse	Check baghouse cleaning system per Baghouse Service Manual.

SYSTEM INTERLOCKS, ALARMS, AND TROUBLESHOOTING

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Dust Collection Fans	Pressure Switch	Fan Loss of Motion	Shuts down fan	Pressure switch not closed	Check V-belts, drive shaft, pressure switch. See Fan Service Manual.
Explosion Suppression System	Explosively Actuated Switch in Explosion Suppression Panel	Explosion Suppression System Discharged	Shuts down all equipment in facility	Explosion suppression system discharged	Immediate attention must be given to shredder. See Fenwal Explosion Suppression System Service Manual.
Magnets 41-38-107/207 41-38-109/209	Zero Speed Switch	Magnet Loss of Motion	Shuts down magnet belt	Zero speed switch not closed	Check drive belts, magnet belt and zero speed switch.
	DC Relay	Magnet Loss of Power	Shuts down magnet rectifier	Rectifier not producing DC power	Check rectifier, DC relay and breaker feeding rectifier.

Equipment or Component	Remote Device	Annunciation	Interlocks	Problem	Corrective Measures
Aluminum Pulsort System	Pulsort Control Cabinet	Pulsort System Fault	Shuts down pulsort	Equipment problem in pulsort control cabinet	Check pulsort cabinet fault indications per Pulsort Service Manual.
Electrical System	Electrical Equipment Cabinets	Electrical System Loss of Control Power	None	Loss of control power in remote cabinets or programmable controller problem	Check for power in all I/O cabinets (fuses in MCC-300). Check processor status lights for communication fault. Check rungs 9-13 in program.
	Plant E-Stops	Plant Emergency Stop Tripped	Stops All Equipment	Plant E-Stop button tripped	Check all remote plant E-Stop buttons for operation. Also see rung 234 of program. Also check E-Stop reset circuit.

BOILER
PRE-START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ VALVE ARRANGEMENT		
. Fully open steam drum vent valves		
. Fully open valve to pressure gauges on steam drum and superheater outlet		
. Fully open attemporator vent valve		
. Fully open attemporator spray guardian valve		
. Fully open cut out valves to level transmitter, sight glass, yarway reference leg, press XMTR and STM flow XMTR		
. Close electromatic isolation valve		
. Fully open superheater vent valves (manual and automatic)		
. Fully open non- return valve		
. Fully open superheater outlet drain lines		
. Fully open chemical feed valves		
. Close continuous blowdown valve		
. Fully close screen tube header bottom blow valves		
. Fully close economizer drain valves		
. Fully open drain valves at header stop valve		
. Close root and guardian valve for sootblowers		

DESCRIPTION	VALV #	BRKR LOC
. Open sootblowers drain valves		
. Fully close furnace water wall bottom blow valves		
. Fully close low press fill valves at steam drum		
. Fully close mud drum bottom blow valves		
. Fully close mud drum sample isolation valves		
. Fully open flash tank guardian valve		
. Fully close flash tank drain valve		
☐ **ACCESS**		
Note **Ensure all personnel and equipment are clear before closing any accesses**		
. Secure penthouse access doors		
. Secure doghouse access doors		
. Secure steam drum inspection doors		
. Secure economizer inspection doors		
. Secure air pre heater inspection doors		
. Secure superheater gas pass doors		
. Secure rear pass hopper doors		
. Secure furnace inspection windows		

DESCRIPTION	VALV #	BRKR LOC
. Inspect stoker/furnace and clear of any foreign objects		
. Inspect rear stoker alarm cables		
. Check stoker trys and secure inspection doors using proper bolt pattern		
. Secure stoker doors		
. Secure dust collector hopper doors		
. Secure sifting hopper doors		
Note **All safety chains must be properly secured where applicable.**		
☐ **Boiler Feeders**		
1. Fuel Feeders		
. Clear fuel feeder chutes		
. Drive chain condition and guard in place		
. Place directional switch in forward		
. Secure feeder doors		
. Deflection plate secured in place		
2. Ash Conveyor System		
Note **Boiler ash conveyor system consist of submerge, rear pass, dust collector, sifting hopper, transfer conveyors, ash down commers and platco valves**		
. Remove ash build up from conveyors and ash down commers		
. Conveyor chain condition, alignment and speed setting		

DESCRIPTION	VALV #	BRKR LOC
. Hydraulic units oil level and hose connections		
. Secure covers and doors to prevent "In Air" leakage		
. Fill water level in submerge		
. Check zero speed coupling connection on submerge and collection		
. Check stokers hydraulic unit oil level		
. Check ash system indication lights		
3. **Continuous Blow Downtank**		
. Open fully inlet valves from the boiler Fully open top exhaust valve to D.A.		
. Close tank drain vale		
. Fully open inlet/outlet valve on tank level regulator.		
. Bypass vlv closed		
. Open fully cut out valves to sight glass		
4. **Boiler Fans and Actuators**		
. Clear intake and motor ventilation suction screens		
. Actuator arm connections		
. Lube oil level on I.D. fan bearings		
. Fully open cooling water inlet and outlet valve to I.D. fan bearings and check for flow		
. Secure inspection doors on fan ducting Coupling guards to be in place		
. Clear fan of foreign objects		

DESCRIPTION	VALV #	BRKR LOC
. Stroke dampers for corresponding movement in control room Fully open blast gates on F.D discharge ducting		
. Close air preheater and fully open preheater bypass		
BOILER EQUIPMENT		
5. **Safety valves**		
. Gags removed		
. Lead seal in place		
6. **Soot blowers**		
. Lance retracted completely		
. Drive chains condition		
. Fully open valves on aspirating air to sootblower inlet ports		
. Root and guardian valves closed to sootblowers		
. Open steam trap bypass and close steam trap isolations		
7. **Gas burner**		
. Fully open inlet/outlet valves to gas		
. Fully open pilot supply valve		
. Fully open burner cock valves		

DESCRIPTION		VALV #	BRKR LOC
.	Stroke burner fan damper to check movement of fan damper and gas regu ator		
.	Clean fire eye and path		
.	Check ignitor condition		
Note	Check for gas leaks before light off System pressure at approximately 35 PSIG		

PLANT START UP

DESCRIPTION	VALV #	BRKR LOC
PRE REQUISITES		
☐ COOLING WATER IN SERVICE		
☐ PLANT AIR IN SERVICE		
☐ WATER TREATMENT IN SERVICE		
☐ ASH SYSTEM IN SERVICE		
☐ E.S.P. PRECHECKS COMPLETED		
☐ E.S.P. ASH CONVEYOR IN SERVICE		
☐ PROPANE SYSTEM IN SERVICE		
☐ BOILER FEED WATER IN SERVICE		
☐ FUEL FEED SYSTEM IN SERVICE		
☐ STEAM SYSTEM VALVE ARRANGEMENT COMPLETED		
☐ TURBINE/GENERATOR PRE-START CHECKS COMPLETED		
☐ BOILER PRE-START CHECK COMPLETED		

DESCRIPTION	VALV #	BRKR LOC
☐ **ENERGIZE THE FOLLOWING BREAKERS**		
. Stokers, submerge, rear pass, dust collector, sifting hopper & transfer conveyors		See MCC equip. listing for location
. Platco valves		
. Aspirating fan		
. Fuel feeders		
. Soot blowers		
. Boiler fan breaker - I.D. F.D. and O.F.A		
. Burner management P.L.C. breaker		
. Burner fan		
. Burner management local circuit breaker		
☐ **START BOILER ASH CONVEYORS**		
. Platco valves on dust collectors		
. Dust collector conveyor		
. Rear pass platco valve		
. Rear pass conveyor		
. Sifting transfer platco		
. Sifting transfer conveyor		
. Sifting conveyors		
. Submerge		
Note **Check conveyor rotation to be in forward and hydraulic units for leaks Note any abnormalities including bypass mode of operation, and report to supervisor**		

DESCRIPTION	VALV #	BRKR LOC
☐ BOILER VALVE ARRANGEMENT . Fully open inlet/outlet valve on feed water regulator. Bypass valve closed . Fully open attemporator inlet isolation valve . Fully open inlet/outlet valves on attemporator regulator. Bypass valve closed . Stroke automatic regulator valves for corresponding movement on 1. Boiler feed water 2. Attemporator . Fully open the feed water cross connect valves **Note** **Cross connect valves should remain open during normal operation closed** . Fully open economizer inlet valves . Bypass valve closed . Fill and vent economizer . Fill boiler until level in steam drum reaches about 3½ inches below normal operating level		

DESCRIPTION	VALV #	BRKR LOC
Note Check steam drum level by +6 and -6 inches to check for level alarms. Verify level indications at the control room to be corresponding with level in steam drum sight glass		
☐ GAS BURNER - LITE OFF - PERMISSIVES SATISFIED * I.D. Fan Running * Furnace Pressure - 4.0" H2O/ +2.0" H2O * Combustion Air Press. 2.5"H2O * Steam Drum Water Level -6" * Steam Drum Press ≥ 690 PSIG * Gas press 7 PSIG/ 17 PSIG -"Operating limits OK" Displayed * Push Burner Start Button * Open Burner Air Pan Damper to 100% -"Purge in progress" Displayed * Hi fire limit switch made up		
Note Purge is 2 minutes in duration - "Purge complete" Displayed * Close Burner Air Fan Damper - "Ignition on" Displayed * Low Fire Switch Made up * Gas Pilot Valve Opens * Ignition XFMR Energizes * Gas Pilot Flame Establish		
Note Fire eye must recognize flame within 10 seconds or flame failure will occur and message displayed - "Fuel/Gas on" displayed * Maxon valve opens		

DESCRIPTION	VALV #	BRKR LOC
- "Firing gas released" Displayed *Fire established/gas guns firing		
- Increase firing rate to establish a heat up rate of 100° F/hr per warm up curve		
. Start F.D. Fan to begin warm up of grate. Adjust air heater dampers as necessary		
. Open isolation valves and close bypass valve on following traps; Header Lead drain Air ejector Gland seal Gland Sealing Steam		
. Throttle back on the superheater outlet drain/vent on steam line at the n/r vlv heater and steam cross connect.		
. Put E.S.P fields into service at the minimum power level necessary to maintain opacity levels.		
☐ **COMMENCE RDF FIRING (ON REACHING DEW POINT TEMPERATURE)**		
Note **ESP outlet temp. 325 F**		
. Start OFA fan damper with damper closed		
. Set overfire air to minimum 15 PSIG at the fuel distributor header		
. adjusting furnace pressure to negative (-.5) inches		
. Adjust air preheater damper as necessary		
. Start fuel feeders and establish a 6" inch RDF bed on stoker		

DESCRIPTION	VALV #	BRKR LOC
Note When RDF fire has been established start stokers and monitor fuel feed rate according to heat up rate		
. Shut down gas burner		
. Set underfire air pressure		
Note As opacity level rises, increase ESP power level to maintain minimum levels of opacity below 10		
☐ **TURBINE GENERATOR START UP**		
☐ **POWER AVAILABILITY**		
. Close the following breakers, following the plant lock out procedure		
Equipment panel Battery charger Air dryer Lube oil fluid pump North control fluid pump South control fluid pump		See MCC equip. listing for location
. At MCC room North condensate pump South condensate pump		
Oil mist fan Gland steam exhaust fan Generator heater Exciter heater Oil purification system		
☐ **CONDENSATE SYSTEM**		
Establish a level of 40 inches in the hot well.		
. Verify level on sight glass		
. Start a condensate pump		

DESCRIPTION	VALV #	BRKR LOC
. Slowly open the discharge valve to the fully open position, checking for required pressure and excessive vibration, leaks and noisy running.		
☐ **TURBINE/GENERATOR AUXILIARY EQUIPMENT START UP**		
. Position lube oil pump switch to "auto" both lube oil and emergency lube oil pump will start		
. Turn off emergency lube oil pump		
Note **Auxiliary lube oil pump operating discharge pressure is approximately 44 PSIG, check for flow at sight glass**		
. After starting lube oil pump, vent trapped air at lube oil filters		
. Start oil mist fan, check for correct rotation		
. Position control fluid pump switch to "auto" both pumps will start		
. Turn off second control fluid pump		
Note **Control fluid operating pressure is approximately 1750 PSIG at pump station**		
. Start the jacking oil pump		
. Start the shaft turning gear and visually check shaft for "barring"		
. Start the gland steam exhaust fan		
. Adjust the gland seal steam pressure to 1.5 PSIG and approximately 340 F		
. Fully open blowdown on air ejector steam piping to remove all standing water		
. Close all valves on the steam, drain and air lines of the air ejectors		

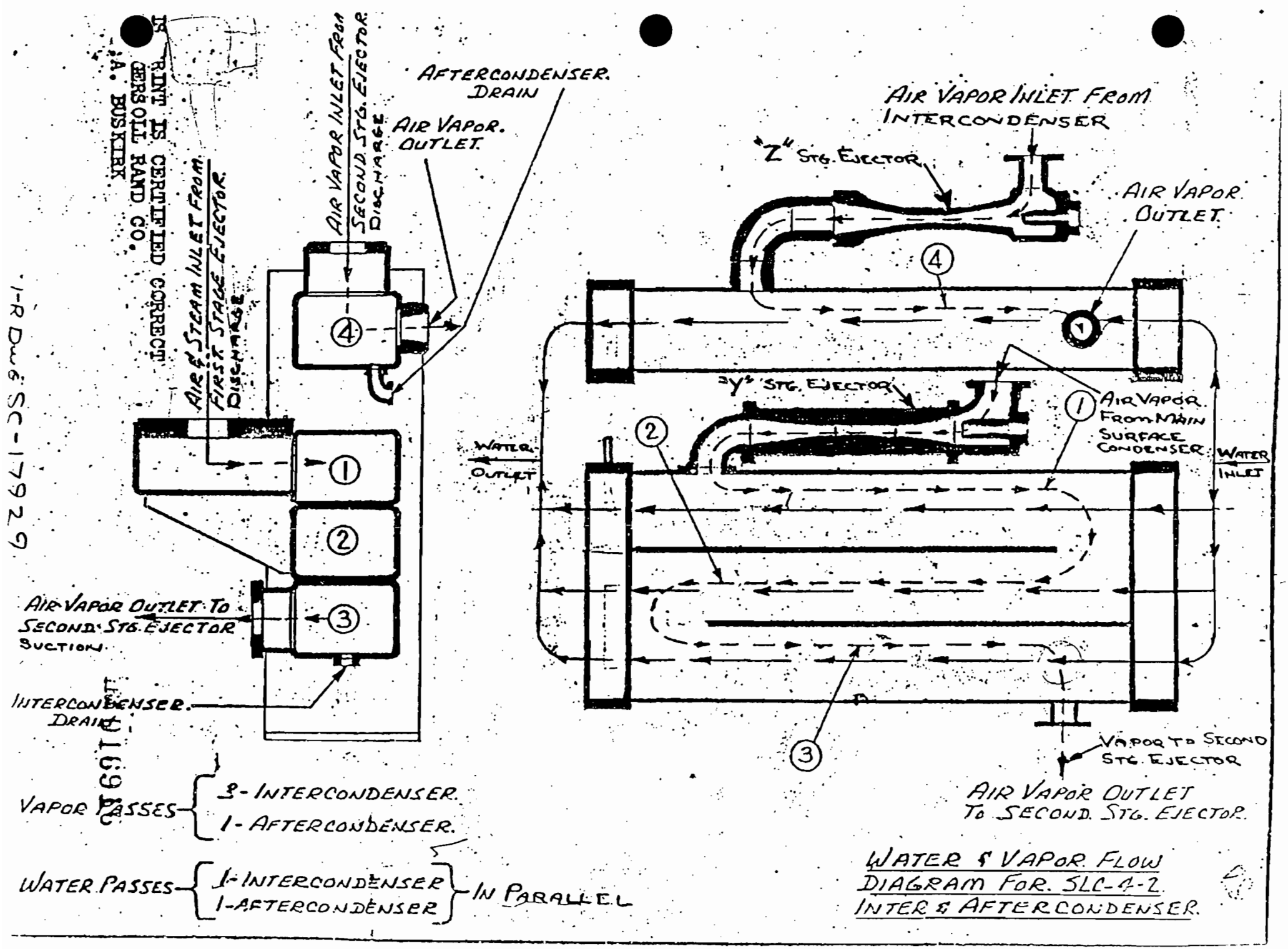
DESCRIPTION	VALV #	BRKR LOC
. At a steam pressure of approximately 250 PSIG slowly, fully open the steam supply valves to the hogger		
. Fully open the air/vapor extraction valve on the hogger		
. When the vacuum reaches 10" hg open the inlet/outlet valves on the steam supply regulator to the air ejector		
. Fully open steam to one element on the "Z" stage		
. Full open the suction valve at the "Z" stage ejector		
. Fully open the valve at the discharge of the "Y" stage ejector to be operated		
. Fully open valves between the "Y" stage suction and the air/vapor extraction valves of the condenser		
. At 20" Hg open the main steam valve to the "Y" stage ejector		
Note **Only one element on each stage of the air ejector to be operated at a time**		
. After the air ejector is service close the hogger air/vapor extraction valve then the steam supply valve		
. When a level is obtained in the loop seal open the loop seal drain valve		
Note **Maintain steam inlet pressure to air ejector at 250 PSIG**		
. Continue boiler heat up rate with turbine/generator start up procedure		

DESCRIPTION	VALV #	BRKR LOC
. When boiler steam flow increases to 9kb/hr and final steam temperature at minimum 600 F close all drain and vent valves and open the continuous blowdown valves		
Note **Control room operator inform water treatment operator of plant status**		
. Fully open inlet and outlet valve on REG (auxiliary steam to DA)		
Note DA operating pressure to be maintain at, 20 PSIG setting value on Aux steam to DA REG		
☐ BOILER LOADING AS SHOWN IN DIAGRAM....		
. Increase load to 18,000lb/hr in the first minute		
. Increase load from 18,000/hr to 100,000lb/hr in 12 minutes		
. Then increase load to 180,000 lb/hr in 5 minutes		
Note While achieving full load on the boiler the following controllers should be automated if not already.		
1. Attemporator **2. Fuel Feeders** **3. Feed Water Flow** **4. ID FD and OFA Fan Dampers** **5. Air Preheater**		

TURBINE GENERATOR

DESCRIPTION	VALV #	BRKR LOC
☐ START-UP		
Note **After full vacuum has been reached and live steam pressure at approximately 550 PSIG and temperature at least 570 F the turbine can be started**		
. Stop shaft turning gear and jacking oil pump		
. Open main stop valve		
Note **Follow cold start curve**		
. During first minute increase turbine speed to 1000 rpm then hold for 5 minutes		
* Drain LP, IP & TP extraction point through the trap bypass		
* When drain lines are sufficiently hot close by traps in service		
. Continue to increase turbine speed to 3600 rpm in 3 minutes		
Note **If during speed increase, a vibration is noted reduce to 1000 rpm and hold for ten minutes. Perform a thorough walk down and inspection of the unit. Resume speed increase if inspection is satisfactory.**		
Note **At 3000 rpm stop aux. lube oil pump**		
. Check lube oil and control fluid pressures		
. Open cooling water to generator air coolers		
☐ **GENERATOR TIE-ON**		
. At 3600 R.P.M energize the generator field breaker		
. Turn on Synchroscope		

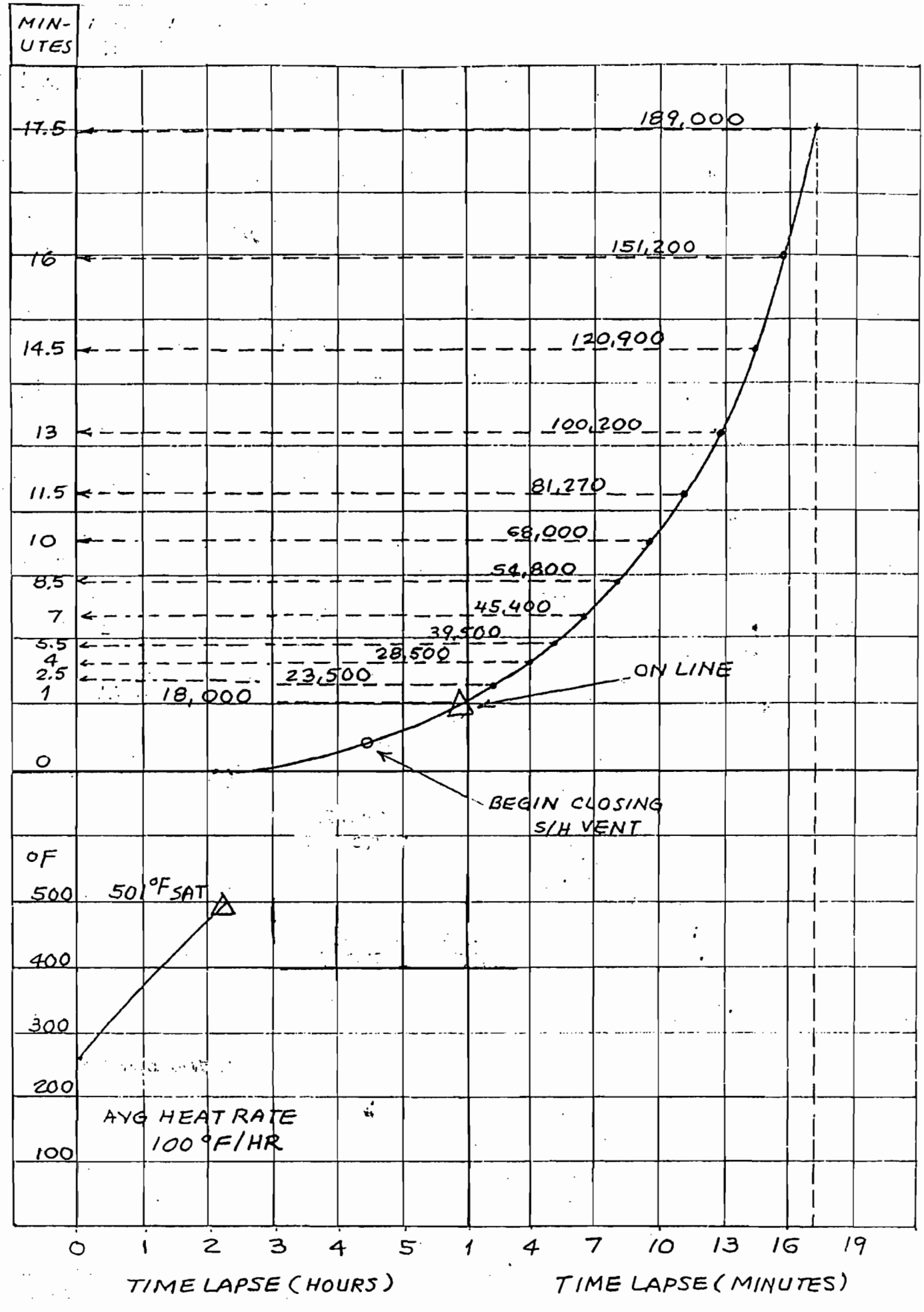
DESCRIPTION	VALV #	BRKR LOC
. Match outgoing voltage with running voltage . Synchronize generator to 60 hertz and tie on to the grid at 5 megawatts . Turn off syncroscope . Adjust mega vars to +2 . Close the regulator valves on the live steam, loop and turbine wheel chamber drain . Fully open root and guardian IP. Extraction valves to the deaerator		



PRINT IS CERTIFIED CORRECT
INGERSOLL RAND CO.
A. BUSKIRK

I-R Dwg. SC-17929

SC-17929


MIN-
UTES
17.5
16
14.5
13
11.5
10
8.5
7
5.5
4
2.5
1
0
189,000
151,200
120,900
100,200
81,270
68,000
54,800
45,400
39,500
28,500
23,500
18,000
ON LINE
BEGIN CLOSING
S/H VENT
°F
500
400
300
200
100
501°F SAT
AVG HEAT RATE
100 °F/HR
0 1 2 3 4 5 1 4 7 10 13 16 19
TIME LAPSE (HOURS)
TIME LAPSE (MINUTES)

Änd.:

Starting diagram

Miami 77 / 1, 2

WBZ-Best.: 1-311 850, 851

Fach: /

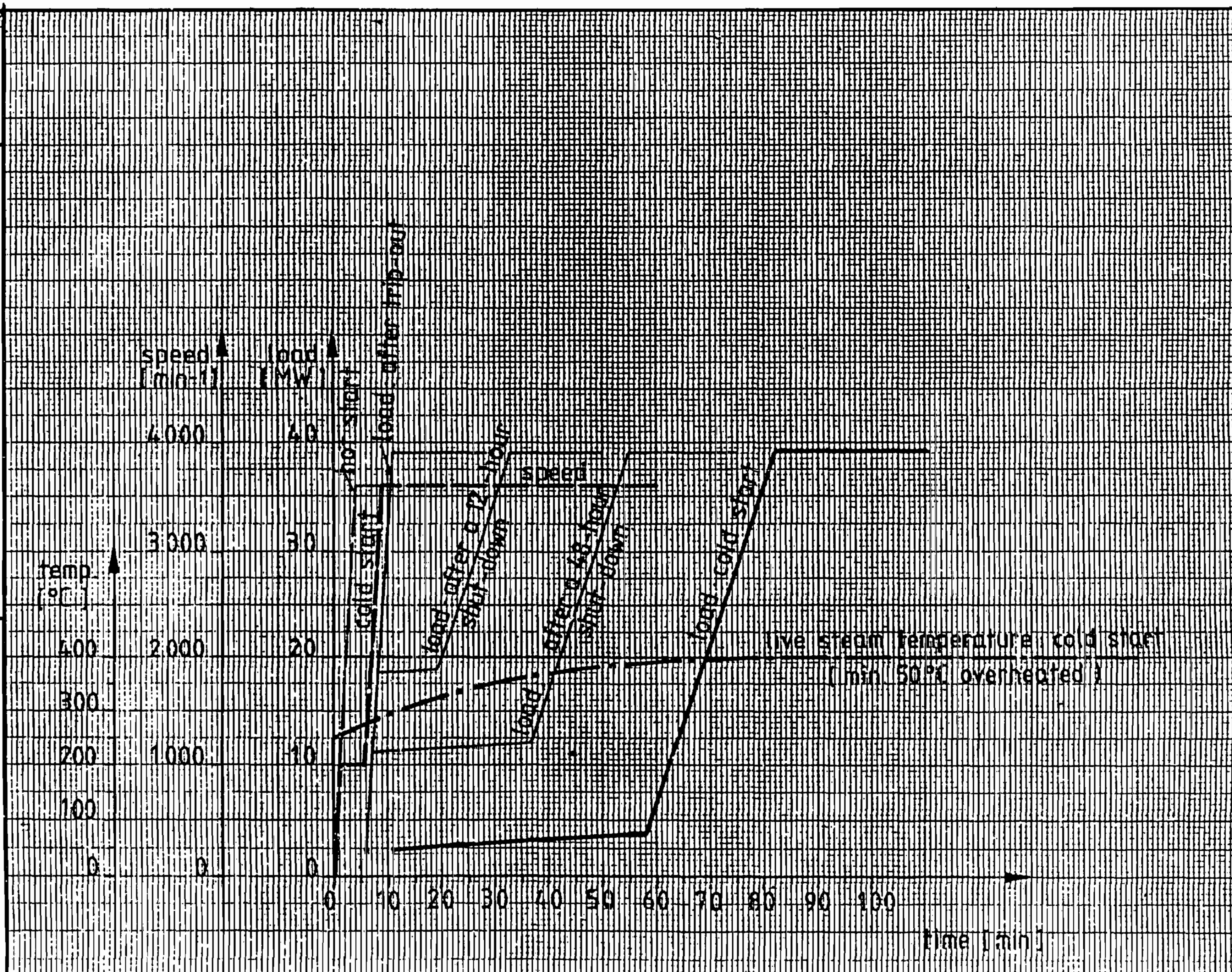
Entstand aus:

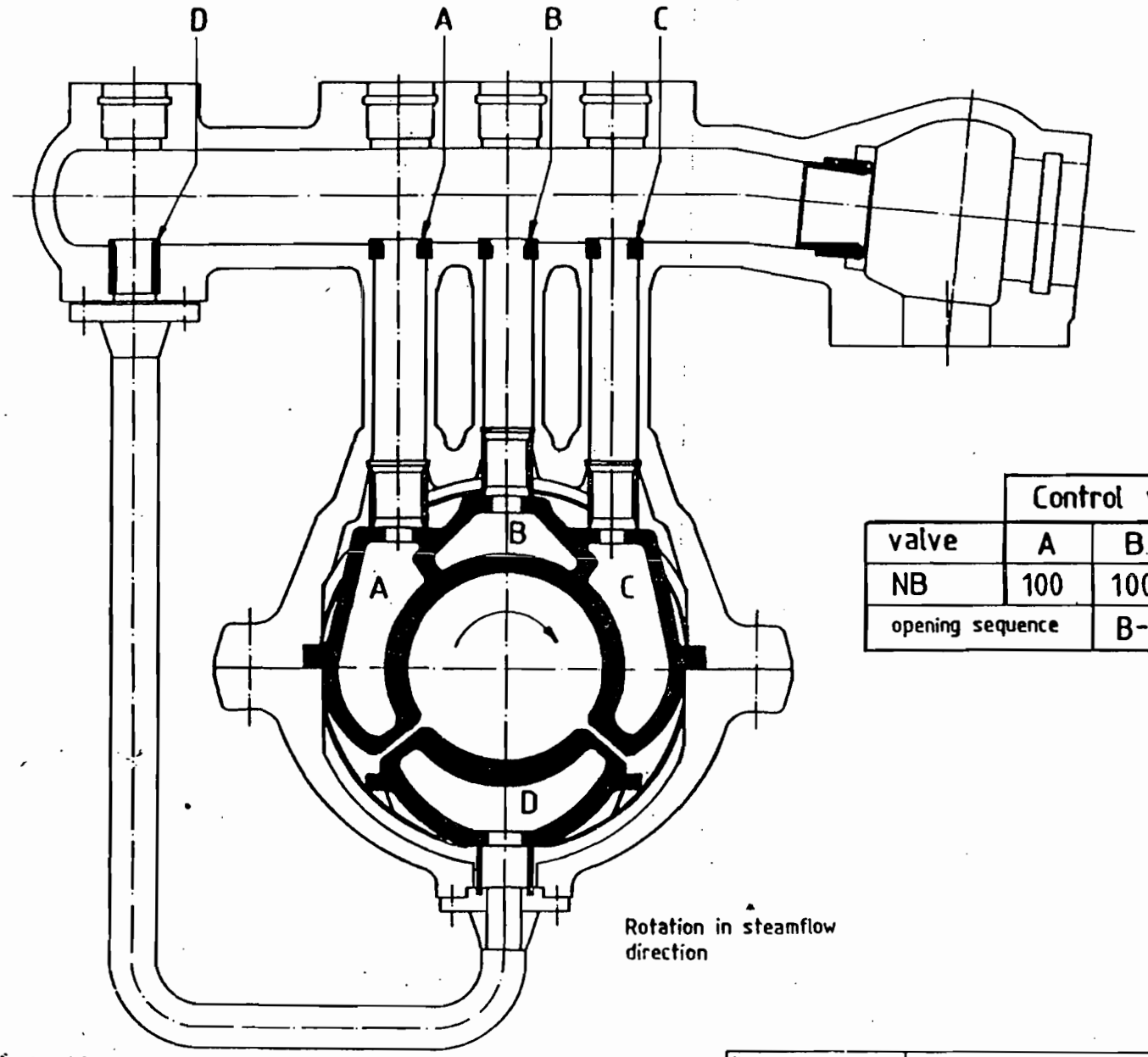
Ersatz für:

Ersetzt durch:

Gezeichnet 79-02-26 Se

Geprüft 79-02-27 [signature]





	Control valve			
valve	A	B	C	D
NB	100	100	100	112
opening sequence	B-C-A-D			

Rotation in steamflow direction

78-12-11	Clearance table Diffuser - assy.	Miami 77	Total Sheets:	Sheet N° 7
			HTMD 301 678	

ADDITIONAL BOILER START UP

PREREQUISITES

- ☐ ASH REMOVAL SYSTEM IN SERVICE
- ☐ E.S.P. PRE-START CHECK COMPLETED
- ☐ E.S.P. ASH CONVEYOR IN SERVICE
- ☐ PROPANE SYSTEM IN SERVICE
- ☐ BOILER FEED WATER IN SERVICE
- ☐ STEAM SYSTEM IN SERVICE
- ☐ BOILER PRESTART CHECK COMPLETED

DESCRIPTION	VALV #	BRKR LOC
☐ **ENERGIZE THE FOLLOWING BREAKERS**		
. Stokers, submerge, rear pass, dust collector, sifting hopper & transfer conveyors		See MCC equip. listing for location
. Platco valves		
. Aspirating fan		
. Fuel feeders		
. Soot blowers		
. Boiler fan breaker - I.D. F.D. and O.F.A		
. Burner management P.L.C. breaker		
. Burner fan		
. Burner management local circuit breaker		
☐ **START BOILER ASH CONVEYORS**		
. Platco valves on dust collectors		
. Dust collector conveyor		
. Rear pass platco valve		
. Rear pass conveyor		
. Sifting transfer platco		
. Sifting transfer conveyor		
. Sifting conveyors		
. Submerge		
Note **Check conveyor rotation to be in forward and hydraulic units for leaks Note any abnormalities including bypass mode of operation, and report to supervisor**		

DESCRIPTION	VALV #	BRKR LOC
☐ **BOILER VALVE ARRANGEMENT** . Fully open inlet/outlet valve on feed water regulator. Bypass valve closed . Fully open attemporator inlet isolation valve . Fully open inlet/outlet valves on attemporator regulator. Bypass valve closed . Stroke automatic regulator valves for corresponding movement on 1. Boiler feed water 2. Attemporator . Fully open economizer inlet valves. Bypass valve closed . Fill and vent economizer . Fill boiler until level in steam drum reaches about 3 ½ inches below normal operating level.		

DESCRIPTION	VALV #	BRKR LOC
Note: Check steam drum level by +6 and - 6 inches to check for level alarms. Verify level indications at the control room to be corresponding with level in steam drum sight glass		
☐ GAS BURNER - LITE OFF - PERMISSIVES SATISFIED * I.D. Fan Running * Furnace Pressure - 4.0" H2O/ +2.0" H2O * Combustion Air Press. 2.5"H2O * Steam Drum Water Level -6" * Steam Drum Press ≥ 690 PSIG * Gas press 7 PSIG/ 17 PSIG -"Operating limits OK" Displayed * Push Burner Start Button * Open Burner Air Pan Damper to 100% -"Purge in progress" Displayed * Hi fire limit switch made up Note Purge is 2 minutes in duration - "Purge complete" Displayed * Close Burner Air Fan Damper - "Ignition on" Displayed * Low Fire Switch Made up * Gas Pilot Valve Opens * Ignition XFMR Energizes * Gas Pilot Flame Establish Note Fire eye must recognize flame within 10 seconds or flame failure will occur and message displayed - "Fuel/Gas on" displayed * Maxon valve opens		

DESCRIPTION	VALV #	BRKR LOC
- "Firing gas released" Displayed *Fire established/gas guns firing - Increase firing rate to establish a heat up rate of 100° F/hr per warm up curve		
☐ **BOILER WARM UP**		
. Start F.D Fan to begin warm up of grate, adjust air heater dampers as necessary		
. Put ESP field into service at the minimum power level necessary to maintain opacity levels.		
. Warm up boiler line between N/R valve and Header Stop. When pressure and temperature are equalized around the header stop.		
* Open the Header Stop and close the Header Stop Bypass.		
* Throttle back on drain valve at the N/R valve as required to maintain line temperature and pressure		
* Open the boiler N/R fully		
. At 25 PSIG close		
* Drum vents		
* Atempoorator vents		
. At 200 PSIG, fully open the electromatic relief isolation valve		
☐ **COMMENCE RDF FIRING (ON REACHING DEW POINT TEMPERATURE)**		
Note ESP outlet temp. 325 F		
. Start OFA Fan with damper closed		

DESCRIPTION	VALV #	BRKR LOC
. Set overfire air to minimum 15 PSIG at the fuel distributor header		
. adjusting furnace pressure to negative (-.5) inches		
. Adjust air preheater damper as necessary		
. Start fuel feeders and establish a 6 inch RDF bed on stoker		
Note **When RDF fire has been established start stokers and monitor fuel feed rate according to heat up rate**		
. Shut down gas burner		
. Set underfire air pressure		
Note As opacity level rises, increase ESP power level to maintain minimum levels of opacity below 10.		
. When boiler superheater outlet steam temperature is 50°F of line steam temp.; bring boiler on line.		
. When boiler flow increases to 9kb/hr close all drain and vent valves		
Note **Control roomoperator inform water treatment operator of plant status**		
☐ **BOILER LOADING AS SHOWN IN DIAGRAM....**		
. Increase load to 18,000lb/hr in the first minute		
. Increase load from 18,000/hr to 100,000lb/hr in 12 minutes		
. Then increase load to 180,000 lb/hr in 5 minutes		

DESCRIPTION	VALV #	BRKR LOC
Note While achieving full load on the boiler the following controllers should be automated if not already 1. Attemporator 2. Fuel Feeders 3. Feed Water Flow 4. ID FD and OFA Fan Dampers 5. Air Preheater		

TURBINE GENERATOR START UP

☐ Pre-Startup check completed

DESCRIPTION	VALV #	BRKR LOC
☐ **POWER AVAILABILITY**		
. Close the following breakers, following the plant lock out procedure		
Equipment panel Battery charger Air dryer Lube oil fluid pump North control fluid pump South control fluid pump		See MCC equip. listing for location
. At MCC room North condensate pump South condensate pump		
Oil mist fan Gland steam exhaust fan Generator heater Exciter heater Oil purification system		
☐ **CONDENSATE SYSTEM**		
Establish a level of 40 inches in the hot well,		
. Verify level on sight glass		
. Start a condensate pump		
. Slowly open the discharge valve to the fully open position, checking for required pressure and excessive vibration, leaks and noisy running.		
☐ **TURBINE/GENERATOR AUXILIARY EQUIPMENT START UP**		
. Position lube oil pump switch to "auto" both lube oil and emergency lube oil pump will start		
. Turn off emergency lube oil pump		

DESCRIPTION	VALV #	BRKR LOC
Note **Auxiliary lube oil pump operating discharge pressure is approximately 44 PSIG, check for flow at sight glass**		
. After starting lube oil pump, vent trapped air at lube oil filters		
. Start oil mist fan, check for correct rotation		
. Position control fluid pump switch to "auto" both pumps will start		
. Turn off second control fluid pump		
Note **Control fluid operating pressure is approximately 1750 PSIG at pump station**		
. Start the jacking oil pump		
. Start the shaft turning gear and visually check shaft for "barring"		
. Start the gland steam exhaust fan		
. Adjust the gland seal steam pressure to 1.5 PSIG and approximately 340 F		
. Fully open blowdown on air ejector steam piping to remove all standing water		
. Close all valves on the steam, drain and air lines of the air ejectors		
. At a steam pressure of approximately 250 PSIG slowly, fully open the steam supply valves to the hogger		
. Fully open the air/vapor extraction valve on the hogger		

DESCRIPTION	VALV #	BRKR LOC
. When the vacuum reaches 10" hg open the inlet/outlet valves on the steam supply regulator to the air ejector		
. Fully open steam to one element on the "Z" stage		
. Full open the suction valve at the "Z" stage ejector		
. Fully open the valve at the discharge of the "Y" stage ejector to be operated		
. Fully open valves between the "Y" stage suction and the air/vapor extraction valves of the condenser		
. At 20" Hg open the main steam valve to the "Y" stage ejector		
Note **Only one element on each stage of the air ejector to be operated at a time**		
. After the air ejector is in service close the hogger air/vapor extraction valve then the steam supply valve		
. When a level is obtained in the loop seal open the loop seal drain valve		
Note **Maintain steam inlet pressure to air ejector at 250 PSIG**		

TURBINE GENERATOR

DESCRIPTION	VALV #	BRKR LOC
☐ START-UP		
Note **After full vacuum has been reached and live steam pressure at approximately 550 PSIG and temperature at least 685° F the turbine can be started**		
. Stop shaft turning gear and jacking oil pump		
. Open main stop valve		
Note **Follow cold start curve**		
. During first minute increase turbine speed to 1000 rpm then hold for 5 minutes		
* Drain LP, IP & HP extraction point through the trap bypass		
* When drain lines are sufficiently hot close bypass on traps and place traps in service		
. Continue to increase turbine speed to 3600 rpm in 3 minutes		
Note **If during speed increase, a vibration is noted reduce to 1000 rpm and hold for ten minutes. Perform a thorough walk down and inspection of the unit. Resume speed increase if inspection is satisfactory.**		
Note **At 3000 rpm stop aux. lube oil pump**		
. Check lube oil and control fluid pressures		
. Open cooling water to generator air coolers		
☐ **GENERATOR TIE-ON**		
. At 3600 R.P.M energize the generator field breaker		
. Turn on synchroscope		

DESCRIPTION	VALV #	BRKR LOC
. Match outgoing voltage with running voltage . Synchronize generator to 60 hertz and tie on to the grid at 5 megawatts . Turn off syncroscope . Adjust mega vars to +2 . Close the automataic valves on the live steam, loop and turbine wheel chamber drain . Fully open root and guardian IP extraction valves to the deaerator		

TURBINE/GENERATOR
START-UP

DESCRIPTION	VALV #	BRKR LOC
Note Put cooling tower fans into service. As per start up procedure		
☐ **LOADING COLD GENERATOR: REFER TO LOADING DIAGRAM**		
. Hold 3 MW for the first 11 minutes and then for the next 47 minutes slowly increase to 4 MW		
. Increase from 4 MW to 39 MW in 24 minutes		

WARM TURBINE GENERATOR START - UP

- ☐ Pre-Startup check completed
- ☐ Condensate System in Service
- ☐ Aux. Equipment start-up completed
- ☐ Barring gear in operation
- ☐ Follow steps as for cold start procedure

Note The hot turbine casing and the rotor should not be unnecessarily cooled down by cold steam

. Have steam temperature for running up as high as possible

. Increase turbine load as shown on hot turbine curve, in correspondence to boiler load and maximum live steam temperature

COOLING WATER SUPPLY PRE-START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ **COOLING TOWER**		
. Check Cooling Tower sump water level		
Note **Ensure water level in sump is no less than 5 feet**		
. Fully open cooling water return line valve		
. Fully open the four distribution control valves per cell.		
. Fully open service water inlet valve of the cooling water supply line.		
☐ **#1 AND #2 MODULE TURBINE AREA**		
. Fully open inlet side of condensers		
. Fully open outlet side of condensers		
. Fully open cooling water inlet valves to the module		
. Fully open cooling water outlet valves to the module		
☐ **#1 AND #2 MODULE BOILER AREA**		
. Fully open cooling water inlet valves		
. Fully open cooling water outlet valves		
. Fully open inlet valve to air conditioner unit		
. Fully open outlet valve from air conditioner unit		

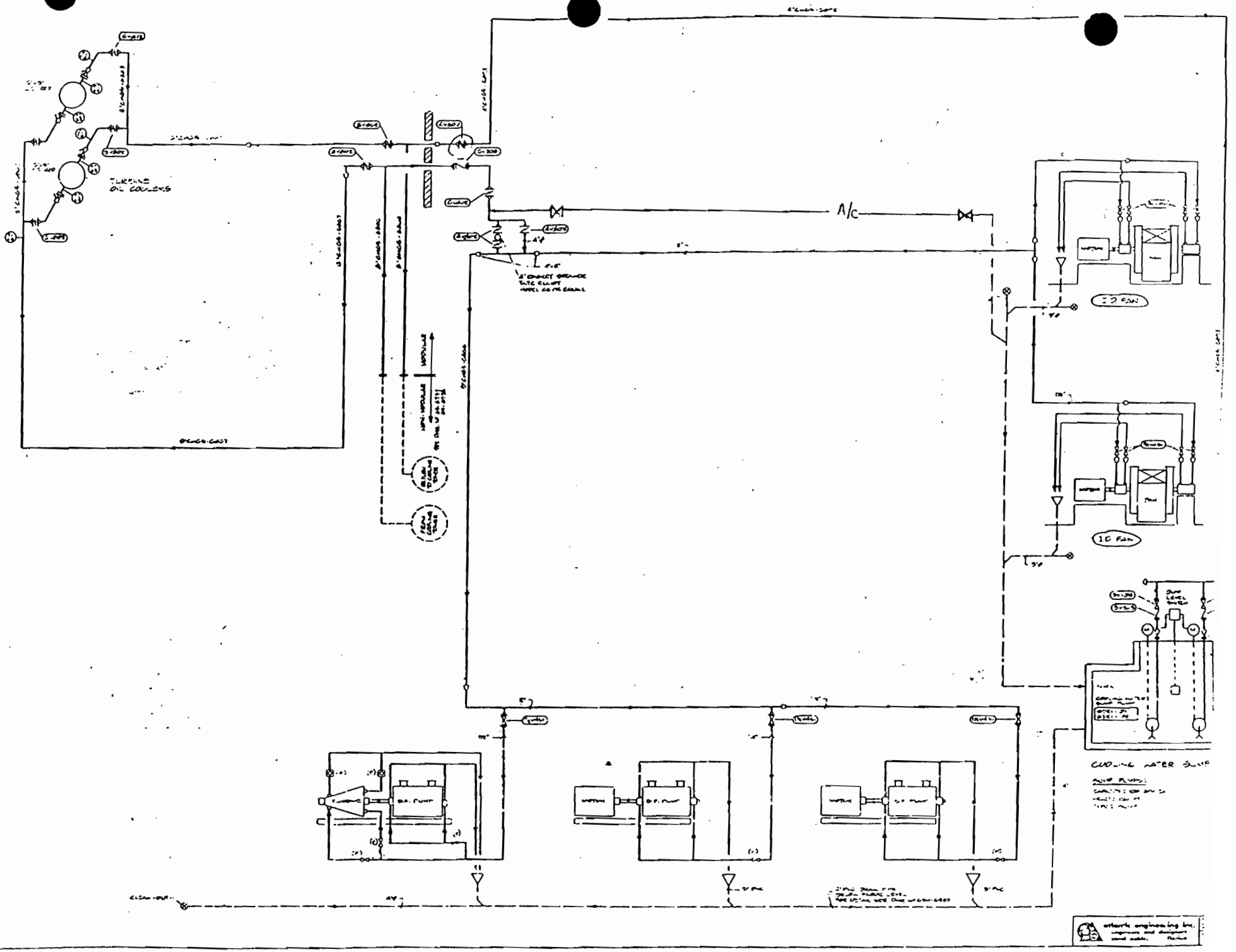
DESCRIPTION	VALV #	BRKR LOC
. Fully open inlet and outlet valve on the basket strainer Bypass valve closed		
. Bypass valve closed		
☐ **COOLING-WATER RETURN SUMP PUMPS ON #1 AND #2 MODULE**		
. Open discharge valves		
. At local control panel, set selector switch for each pump to "off" mode, set Primary Selector switch to lead pump.		
☐ **COOLING TOWER FAN**		
. Clear fan of all foreign objects		
. Check gear box condition and lubricating oil level		
. Fan stack and access door secured		

COOLING WATER SUPPLY
START UP

DESCRIPTION	VALV #	BRKR LOC
☐ **POWER AVAILABILITY:**		
. Cooling tower MCC		
Note **When energizing breakers follow plant lock out procedure**		
. Close all available cooling tower pump breakers		
#1 MN CIRC PP		6521-010
#2 MN CIRC PP		6521-020
#3 MM CIRC PP		6521-030
#4 MN CIRC PP		6521-040
#5 MN CIRC PP		6521-050
☐ **STARTING DESIGNATED COOLING PUMP**		
. Ensure pump is clear to start		
. fully open the suction valve and the five (5) bleed lines on the pump casing		
. Fully close discharge valve		
Note **Check cooling tower sump at least 5 foot level**		
. Depress the local start button for approximately five seconds to bring the motor up to normal running speed		
. After the trapped air in the pump casing has been vented, slowly open the disch. valve to the fully open position		
. As the discharge valve is being opened and the pump pressure is approximately 40 PSIG, close the pump casing vent valves		
Note **With the pump on line note any abnormal conditions and report them to the supv.**		

DESCRIPTION	VALV #	BRKR LOC
Note **Start only one cooling tower pump at this time additional pumps may be started as needs demand**		
☐ . **ADJUSTING COOLING TOWER FLOW**		
. When cooling water line is charged vent #1 and #2 condensers of trapped air Throttle back three or four turns on the first two or three cells at the riser end of the tower		
. Stabilize flow for one hour before proceeding to balance distribution flow in each cell basin		
. Wait for water level to steady throughout the tower before adjusting again		
Note **All levels in the individual cells should be the same**		
☐ **STARTING COOLING WATER RETURN SUMP PUMPS**		
. Energize breakers on cooling water sump pumps.		
- #1 Module North Pump South Pump		6757-021 7C 7D
- #2 Module North Pump South Pump		6757-022 7C 7P
. Place local switches in auto mode		
☐ **COOLING TOWER FANS**		
Note **Follow lock out procedure for locked out breakers**		

DESCRIPTION	VALV #	BRKR LOC
Note **Fan to be started in accordance to cooling water temperature increase** . Energize cooling tower fan breakers - #1 c/t Fan - #2 c/t Fan - #3 c/t Fan - #4 c/t Fan - #5 c/t Fan - #6 c/t Fan . Locally start fan on low speed . Check vibration and excessive noise **Note** **Pending cooling water temperature rise, increase fan speed by depressing local high speed button** **Refer to shift supervisor for cooling tower fan operating sequence**		



COMPRESSED AIR PRE START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ **COOLING WATER SUPPLY**		
. Fully open service water inlet and outlet valves		
. Fully open inlet. outlet and all intermediate flow valves on the air compressor. bleed valves closed		
. Fully open inlet valve to the service water tank		
. Fully open suction and discharge valves on No. 1 and No. 2 service water pumps		
☐ **AIR SUPPLY SYSTEM INSTRUMENT AIR**		
. Close the air receivers outlet valve		
. Fully open inlet and outlet valves on the mill air tank		
. Fully open inlet and outlet valves on coalescing filters. Bypass valve closed		
. Fully open inlet and outlet valves on the "K" filter Bypass and drain valves closed		
. Fully open inlet valve on air dryer tank		
☐ **POWERHOUSE MILL AND INSTRUMENT AIR SUPPLY**		
. Fully open main isolation valves #1 module		
. Fully open supply isolation valves for #1 and #2 boilers		
. Fully open instrument air isolation valves for #1 turbine area		

DESCRIPTION	VALV #	BRKR LOC
. Fully open main isolation valves for #2 module		
. Fully open instrument air isolation valve for #2 turbine area		
. Fully instrument air isolation valve for #3 and #4 boilers		
. Fully open main isolation valve for water treatment		
. Fully open instrument air isolation valve and inlet and outlet valves to moisture collectors and pressure regulator to the		
. Boiler control panel and the bypass valve colsed		
AIR COMPRESSOR		
. Check compressors crankcase oil level		
. Inspect compressors intake air filters		
. Fully open inlet/outlet valves on the air compressor automatic drain.		
. Bypass vlv fully closed		

COMPRESSED AIR START-UP

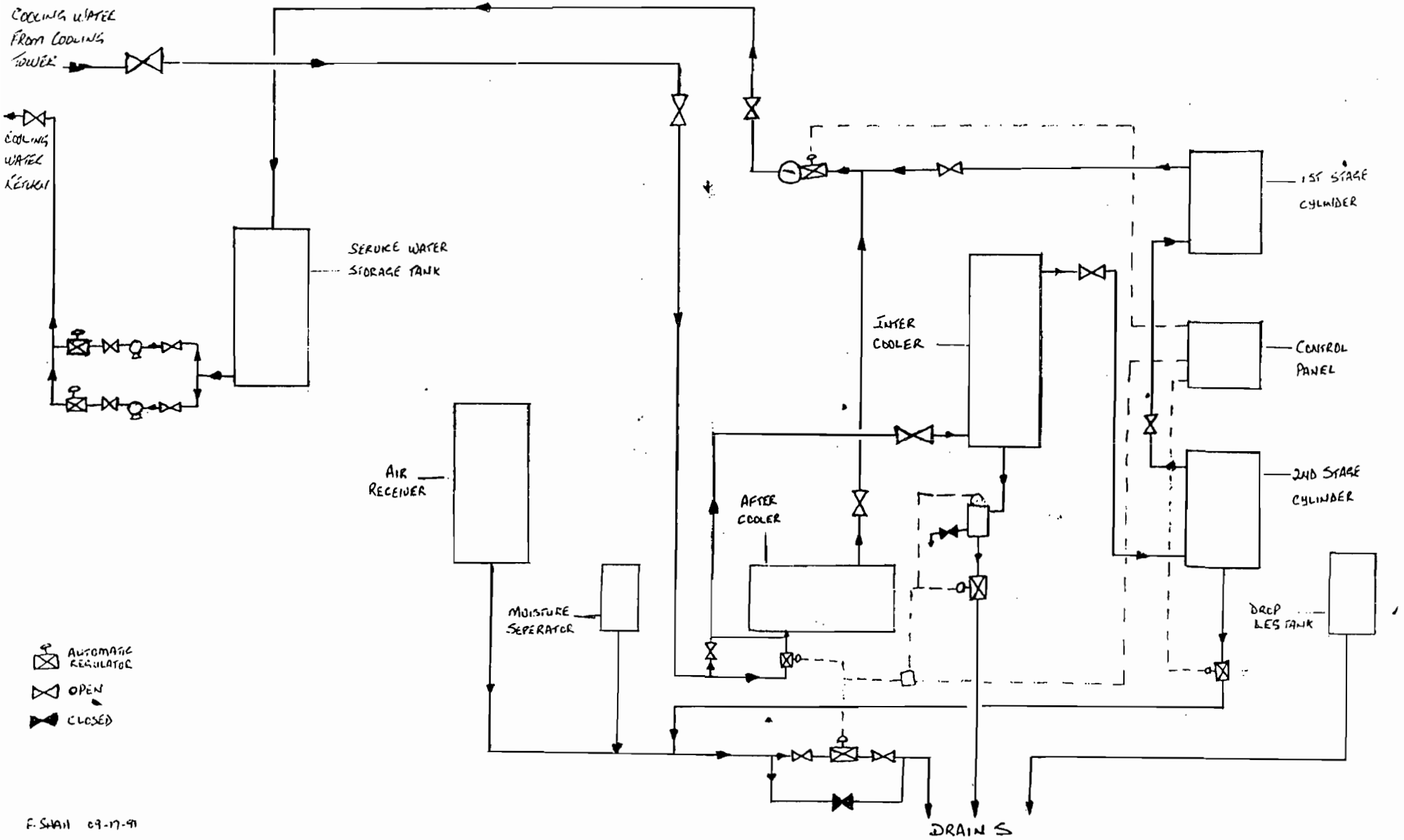
DESCRIPTION	VALV #	BRKR LOC
☐ **POWER AVAILABILITY**		
Note **Follow plant lock out procedure for locked out breakers**		
. Close the 480v main feeder breaker		MR-1
. Close breaker		
#1 Air Compressor		I-3
#2 Air Compressor		H-3
#3 Air Compressor		J-3
. Close breakers to service water return pumps		MR-1
- #1 Service water return pumps		I-1
- #2 Service water return pumps		I-2
☐ **START UP OF LEAD COMPRESSOR**		
Note **When the air receiver pressure is at zero 0 PS1G**		
. Push the unload button. This is to ensure that when it is started it will not be subjected to a load compression		
. Push the start button		
. Manually, fully open the suction total closure butterfly valve, using crescent wrench		
. Place the control knob in the load position, the compressor will start loading and a cooling water flow will be established		

DESCRIPTION	VALV #	BRKR LOC
. When the air receiver pressure increases to approximately 100 PSIG slowly open the outlet valve to the fully open position . Push the automatic control knob to set the unit in automatic "run"		
STARTING A TRIM AIR COMPRESSOR . Put in the unload position . Push the start button . Slowly, fully open the air receiver outlet valve . Put in the automatic control mode . The suction valve should open and compressor will start loading A cooling water flow should then be established		

COMPRESSED AIR START-UP

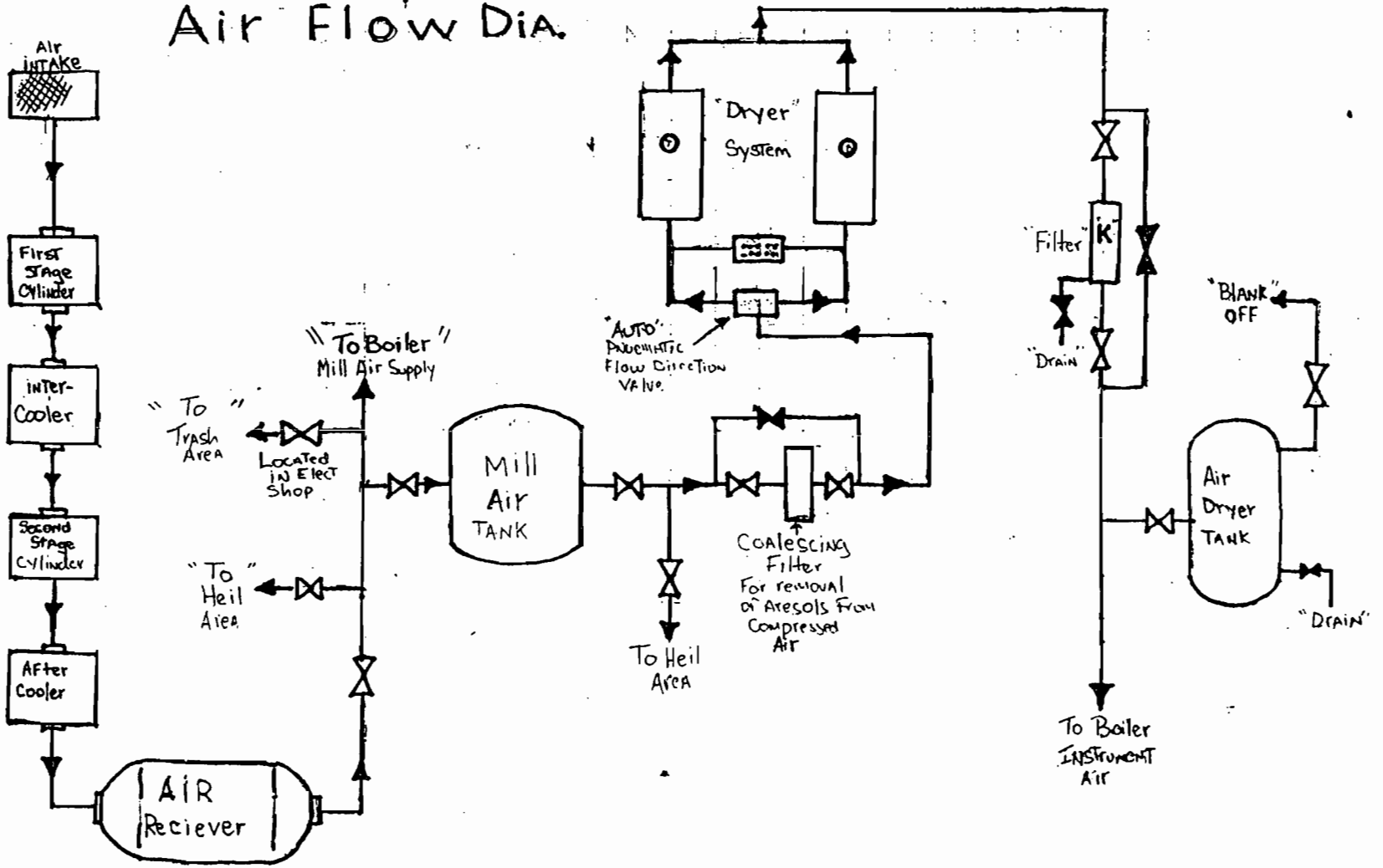
DESCRIPTION	VALV #	BRKR LOC
SEQUENCAIR CONTROL		
☐ POWER UP		
. Pull main disconnect switch to de-energize compressors		
. Turn the run-program switch to run position		
. Turn secquencair power on		
. The power LED will come on and air pressure will be displayed		
. Apply power to the compressors		
Note **All compressors will be waiting for sequencair to be programmed**		
☐ PRESSURE SETTING		
. Lead Compressor — LOAD 104 PSI — UNLOAD 112 PSI		
. Trim (2nd compressor) — LOAD 100 PSI — UNLOAD 108 PSI		
. 2nd Trim (3rd Compressor) — LOAD 96 PSI — UNLOAD 104 PSI		
☐ IN SERVICE		
. Turn the key switch back to run when programmed		
. LED will come on.		
. The compressors will restart. Then load and unload systematically		

AIR COMPRESSOR COOLING WATER FLOW



F. SHAH 09-17-91

Air Compress Air Flow Dia.



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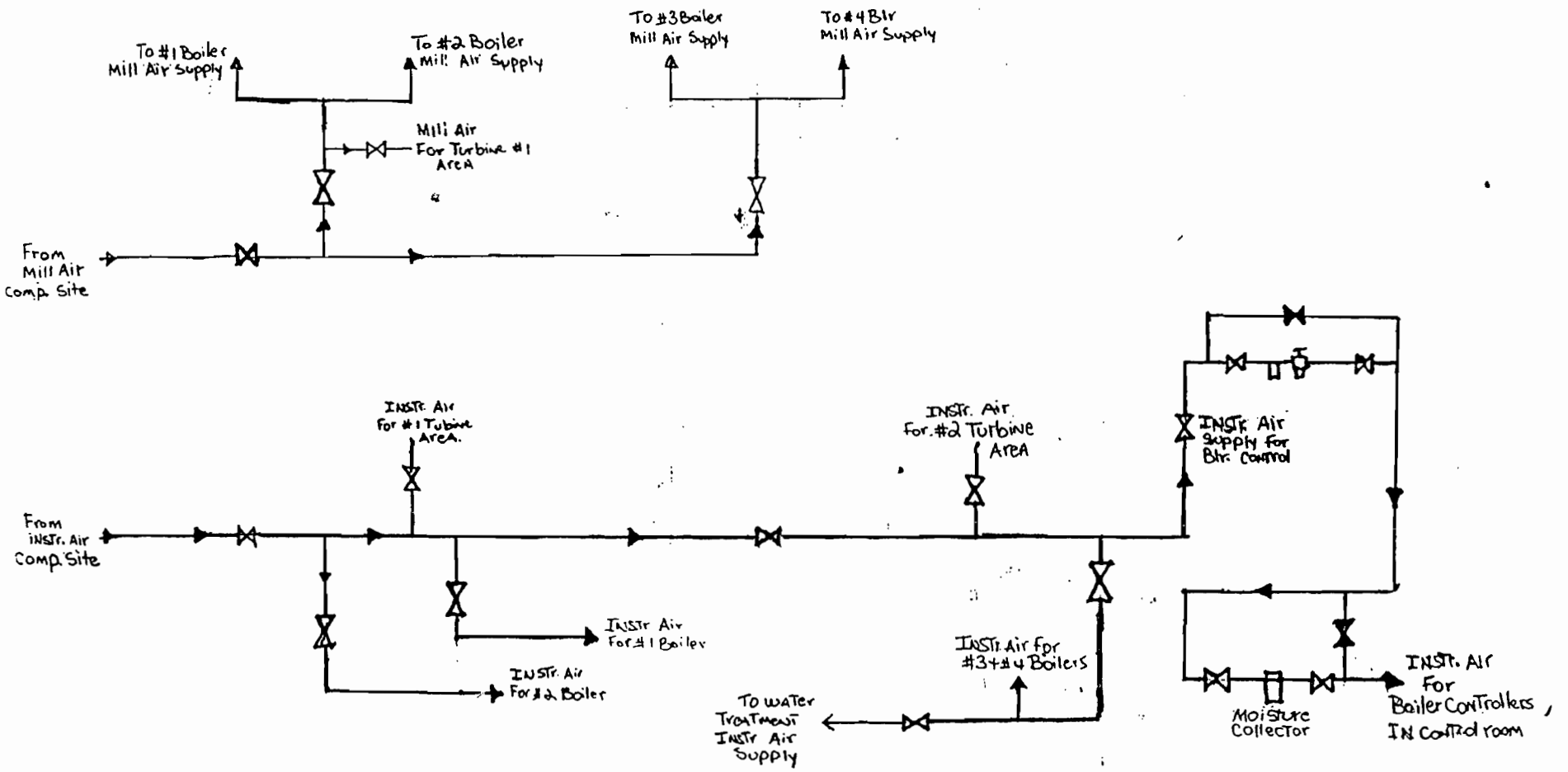


Mill AND iNStr. Air Supply Blr.

INdicATes vALVe POSITION

OPeN Close

L. Hernandez
9-13

WATER TREATMENT
BOILER WATER MAKE UP SYSTEM
PRE START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ POWER AVAILABLE FROM 480V FEEDER BREAKER PANEL FROM FEEDER BREAKER AT #2 MCC		#2MCC
☐ DOMESTIC LIGHTING: ENERGIZE BREAKER LP-P504 AND INDIVIDUAL BREAKERS ON LPP504 AND DPP504 PANEL		
☐ INSTRUMENT AIR AVAILABLE		
☐ CITY WATER AVAILABLE		
☐ SUFFICIENT VOLUME OF SULFURIC ACID AND SODIUM HYDROXIDE ARE IN EACH TANK. OPEN OUTLET VALVES TO RESPECTIVE PUMPS		
☐ PROPER BED LEVEL IN DEMINERALIZER TRAIN VESSELS		
☐ **DESIGNATED DEMINERALIZER TRAIN**		

VALVES	**SAND FILTER**	**CARBON FILTER**	**CATION**	**ANION**
Service Inlet	OPEN	OPEN	OPEN	OPEN
Service Outlet	OPEN	OPEN	OPEN	OPEN
Back wash inlet	CLOSE	CLOSE	CLOSE	CLOSE
Backwash outlet	CLOSE	CLOSE	CLOSE	CLOSE
Regeneration inlet			CLOSE	CLOSE
Regeneration outlet			CLOSE	CLOSE
Fast Rinse	OPEN	OPEN	OPEN	OPEN
Vent	OPEN	OPEN	OPEN	OPEN

DESCRIPTION	VALV #	BRKR LOC
. Fully close inlet and outlet valves on the two other trains		
. Fully close the main isolation outlet valve on the train to storage		
. Fully close inlet valves to the caustic dilution heater		
. Fully open the inlet valve on the acid diluting water line to the controller valve A.D		
. Fully close valve AD		
. Fully open suction valves, and discharge valves (to controller CP) on the caustic pumps		
. Fully close controller valve CP		
. Fully close AP1 +2 controllers		
. Fully open suction valves and discharge valves (to two controllers AP1-2 on acid pumps		
. Fully open inlet valve on demin. storage tank from trains		
. Fully open city water inlet valves to booster pump. Bypass valve closed		
. Close discharge valve on booster pump		

WATER TREATMENT
BOILER WATER MAKE UP SYSTEM
START-UP

DESCRIPTION	VALV #	BRKR LOC
☐ **POWER AVAILABILITY**		
ENERGIZE THE FOLLOWING BREAKERS		
Note Follow plant lock out procedure for all locked out breakers		
. West side scale house		
. LPP 504 individual breakers		
. On panel 6231; P820, P821, P823, P824, P826, P827		
. Regeneration sump pump		
. Control panel		
☐ **START UP OF DESIGNATED DEMINERALIZER**		
. Start the demineralizer booster pump		
. Open the discharge valve slowly to the fully open position		
. Vent, fill and pressurize the sand filter carbon filter, cation and anion respectively		
. Close the fast rinse valve on the sand filter and carbon filter		
. Place the demineralizer train on "semi" mode		
. Rinse the cation and anion until the water quality is in the proper range. Then close fast rinse valves		

DESCRIPTION	VALV #	BRKR LOC
. Throttle the demineralization train main outlet valve to storage to maintain req. flow . Fully open inlet water valve to caustic diluting water heater . Vent and fill heater, then energize breaker . Place demineralizer train and all pump switches in "auto" mode		

WATER TREATMENT
BOILER MAKE UP WATER SYSTEM
CATION AND ANION DEMINERALIZER REGENERATION

DESCRIPTION	VALV #	BRKR LOC
☐ STEP NO. 0 STEP DURATION 20 MINUTES CATION FUNCTION: SERVICE ANION FUNCTION: BACKWASH AUTOMATIC VALVES OPEN: 1A2, 1A5, 1C1, 1C3 . Cation-1 vessel remains in Service, to supply backwash water to the anion-1 vessel. . Backwash water enters vessels through Valve 1A2 and flows up and out via Valve 1A5. . Backwash rate of 13 GPM is set on Valve 1A5.		
☐ STEP NO. 1 STEP DURATION 60.0 SECONDS CATION FUNCTION: BACKWASH ANION FUNCTION: CAUSTIC DILUTION WATER AUTOMATIC VALVES OPEN: 1C2, 1C5, 1A6, 1A4A, SV-CD, SV-TCV . Cation-1 begins backwashing by its inlet valve 1C2 and backwash outlet Valve 1C5 opening. Cation backwash rate of 27 GPM is set on Valve 1C5. . Anion Caustic Dilution Water flow is established by Valve CD opening. Set water flow rate of 5.5 GPM on Valve CD.		

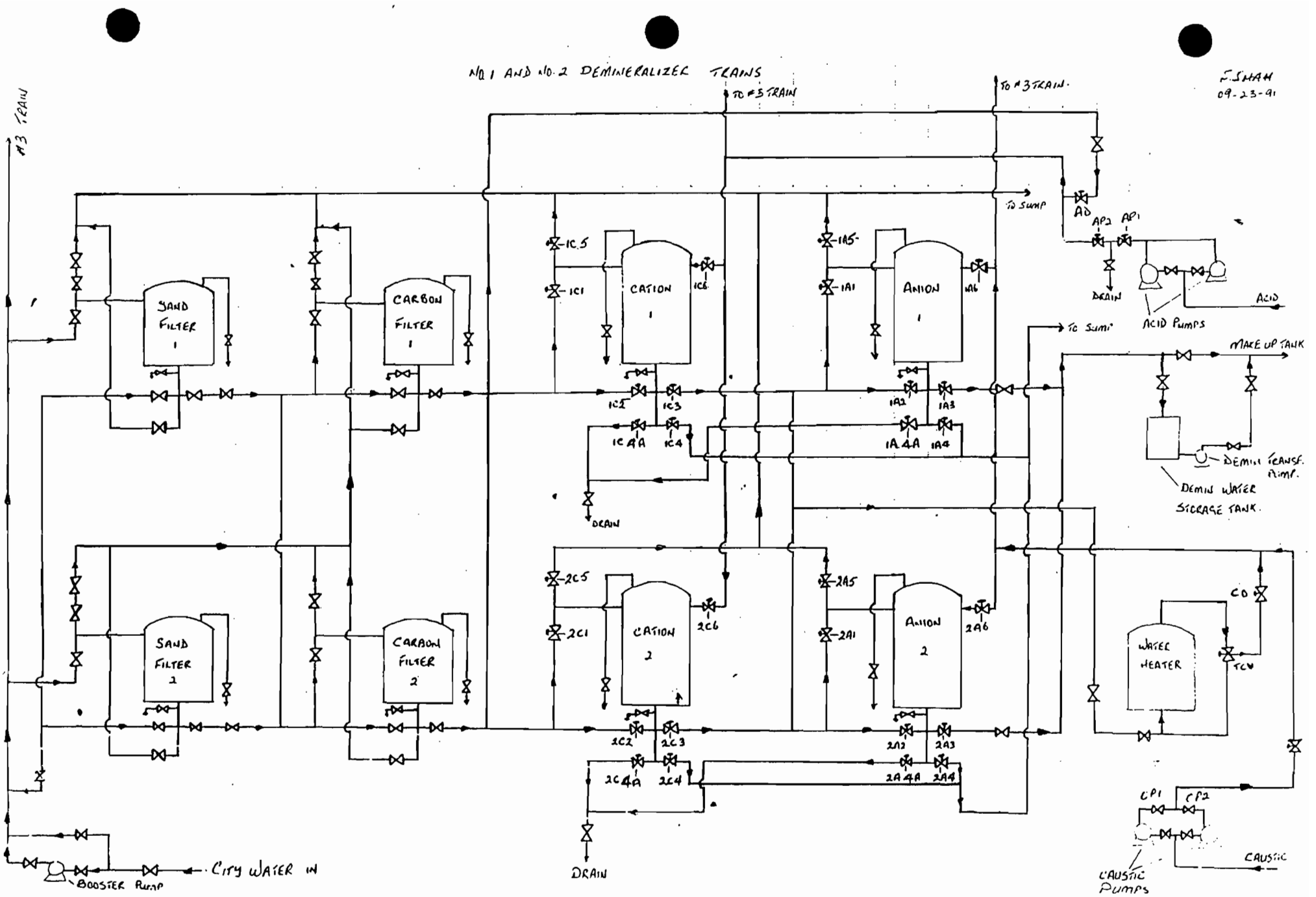
DESCRIPTION	VALV #	BRKR LOC
. Temperature control solenoid Valve TCV opens to permit heating of caustic dilution water. ☐ STEP NO. 2 STEP DURATION 14 MINUTES CATION FUNCTION: BACKWASH ANION FUNCTION: CAUSTIC INTRODUCTION AUTOMATIC VALVES OPEN: 1C2, 1C5, 1A6, 1A4A, CD, SV-TCV, CP . Cation-1 remains in backwash. . Caustic pump block Valve CP opens and caustic pump starts to deliver .31 GPM of NaOH via Valve 1A6 opening. ☐ STEP NO. 3 STEP DURATION 60 SECONDS CATION FUNCTION: ACID DILUTION WATER ANION FUNCTION: CAUSTIC INTRODUCTION AUTOMATIC VALVES OPEN: 1C6, 1C4a, 1A6, 1A4A, SV-AD, SV-CD SV-TCV . Caustic introduction continues. . Acid dilution water flow is established by valve AD opening to deliver 22.6 GPM into vessel through Valves 1C6 and out to waste via Valve 1C4A. ☐ STEP NO. 4 STEP DURATION 11.0 MINUTES		

DESCRIPTION	VALV #	BRKR LOC
CATION FUNCTION: 2% ACID INTRODUCTION ANION FUNCTION: CAUSTIC INTRODUCTION AUTOMATIC VALVES OPEN: 1C6, 1C4A, 1A6, 1A4A, SV-AD, SV-AS1, SV-CD, SV-TCV, CP, AP-1, AP-2 . Caustic introduction continues. . Acid pump block Valves AP-1 and AP-2 open and Acid pump starts to deliver .27 GPM of 66% H SO via cation acid rate set Valve AS-1 opening. ☐ STEP NO. 5 STEP DURATION 6.0 MINUTES CATION FUNCTION: 4% ACID INTRODUCTION ION FUNCTION: CAUSTIC INTRODUCTION UTOMATIC VALVES OPEN: 1C6, 1C4A, 1A6, 1A4A, SV-AD, SV-AS2, SV-CD, SV-TCV, AP-1, AP-2, CP . Caustic introduction continues. . Acid concentration is increased to 4% by increasing acid flow rate via closing off Valve AS-1 and opening of Valve AS-2 to a rate of 0.55 GPM. ☐ STEP NO. 6 STEP DURATION 2.0 MINUTES CATION FUNCTION: 6% ACID INTRODUCTION ANION FUNCTION: CAUSTIC INTRODUCTION AUTOMATIC VALVES OPEN: 1C6, 1C4A, 1A6, 1A4A, SV-AD, SV-AS3, SV-CD, SV-TCV, AP-1, AP-2, CP . Caustic introduction continues.		

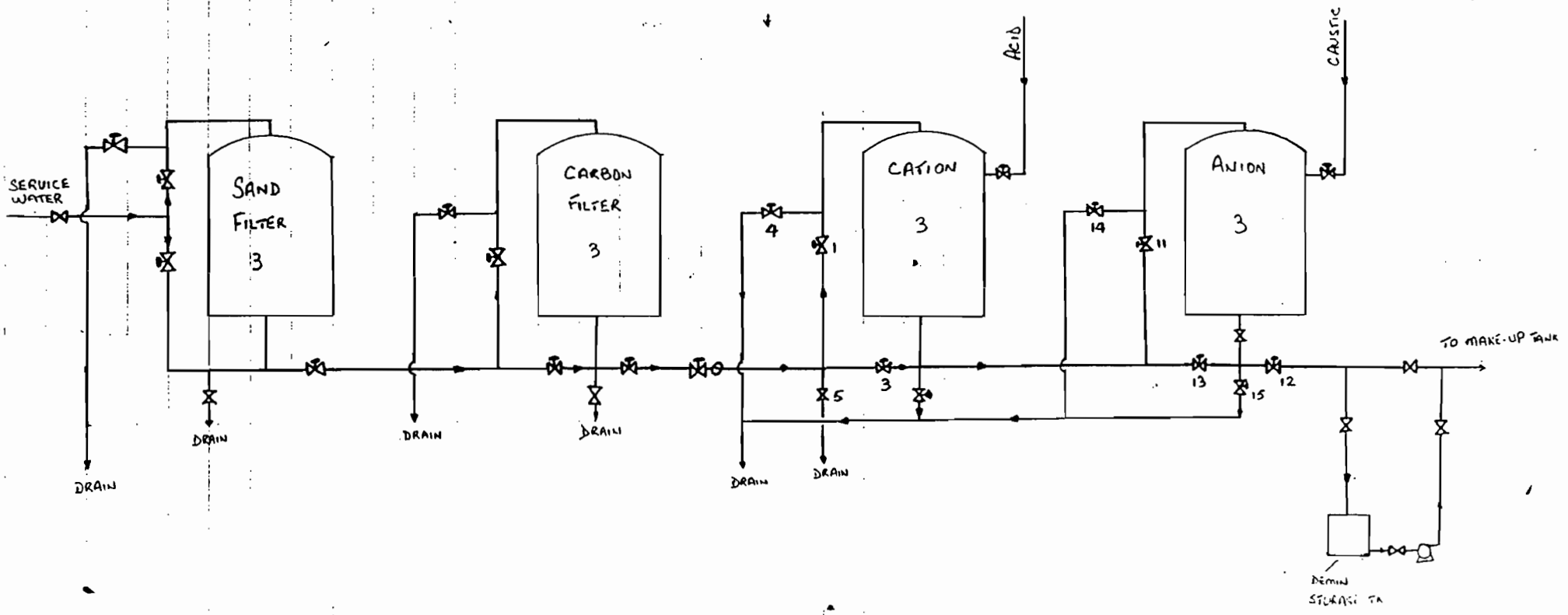
DESCRIPTION	VALV #	BRKR LOC
. Acid concentration is increased to 6% by increasing acid flow rate via closing of Valve AS-2 and opening of Valve AS-3 to a rate of 53.3 GPM. ☐ STEP NO. 7 STEP DURATION 11.0 MINUTES CATION FUNCTION: SLOW RINSE ANION FUNCTION: CAUSTIC INTRODUCTION AUTOMATIC VALVES OPEN: 1C6, 1C4A, 1A6, 1A4A, SV-AD, SV-CD,CV-TCV, CP . Caustic introduction continues. . Acid pump stops and block Valves AP-1 and AP-2 close to permit slow rinsing via maintained acid dilution water flow of 22.6 GPM. ☐ STEP NO. 8 STEP DURATION 15.0 MINUTES CATION FUNCTION: HOLD ANION FUNCTION: CAUSTIC INTRODUCTION AUTOMATIC VALVES OPEN: 1A6, 1A4A, SV-CD, SV-TCV, CP . Cation vessel is placed in a HOLD position to allow for Anion-1 vessel to continue caustic introduction. ☐ STEP NO. 9 STEP DURATION 23.0 MINUTES CATION FUNCTION: HOLD ANION FUNCTION: SLOW RINSE AUTOMATIC VALVES OPEN: 1A6, 1A4A, SV-CD, SV-TCV		

DESCRIPTION	VALV #	BRKR LOC
. Cation-1 vessel remains in HOLD . Caustic pump stops and caustic block Valves CP-1 and CP-2 close while caustic dilution water flow is maintained to rinse the caustic from the Anion vessel. ☐ STEP NO. 10 STEP DURATION 20.0 MINUTES CATION FUNCTION: FAST RINSE ANION FUNCTION: SLOW RINSE AUTOMATIC VALVES OPEN: 1C1, 1C4, 1A41, SV-CD, SV-TCV . Anion slow rinse continues. As acid dilution water stops, inlet Valve 1C1 opens to establish a fast rinse flow of 35 GPM. Water flows through top of bed and out Valve 1C4 to waste. ☐ STEP NO. 11 STEP DURATION 52.0 MINUTES CATION FUNCTION: SERVICE ANION FUNCTION: FAST RINSE AUTOMATIC VALVES OPEN: 1A4, 1C1, 1C3, 1A1 . Cation vessel is placed into service via inlet Valve 1C1 and outlet Valve 1C3 opening. . Cation-1 vessel, therefore, starts to deliver fast rinse water to Anion vessel at a rate of 35 GPM.		

DESCRIPTION	VALV #	BRKR LOC
☐ STEP NO. 12 STEP DURATION 10.0 MINUTES CATION FUNCTION: SERVICE ANION FUNCTION: FAST RINSE AUTOMATIC VALVES OPEN: 1A4, 1C1, 1C3, 1A1 . Vessel's remain in same status as in previous step.		
☐ STEP NO. 13 STEP DURATION 60.0 MINUTES CATION FUNCTION: SERVICE ANION FUNCTION: FAST RINSE TOMATIC VALVES OPEN: 1A4, 1C1, 1C3, 1A1		
☐ STEP NO. 14 CATION FUNCTION: SERVICE ANION FUNCTION: ON STAND-BY AUTOMATIC VALVES OPEN: 1C1, 1C3, 1A1		
☐ STEP NO. 15 CATION FUNCTION: IN SERVICE ANION FUNCTION: IN SERVICE AUTOMATIC VALVES OPEN: 1C1, 1C3, 1A1, 1A3, RECYCLE VALVE-R-1. COMMON EFFLUENTVALVE-R3 Note At the high level silica or conductivity from ion exchanger take relative train out of serv. (with alternate trains in service) for regeneration		


NO 1 AND NO 2 DEMINERALIZER TRAINS
F. SHAH
09-23-91
#3 TRAIN
TO #3 TRAIN
TO #3 TRAIN
TO SUMP
TO SUMP
AD
AP2
AP1
DRAIN
ACID
ACID PUMPS
SAND FILTER 1
CARBON FILTER 1
CATION 1
ANION 1
IC5
IC1
IC6
IA5
IA1
IA6
IC2
IC3
IC4A
IC4
IA2
IA3
IA4A
IA4
DRAIN
MAKE UP TANK
DEMIN TRANSF. PUMP
DEMIN WATER STORAGE TANK
SAND FILTER 2
CARBON FILTER 2
CATION 2
ANION 2
2C5
2C1
2C6
2A5
2A1
2A6
2C2
2C3
2C4A
2C4
2A2
2A3
2A4A
2A4
CO
WATER HEATER
TCV
CP1
CP2
CAUSTIC
CAUSTIC PUMPS
DRAIN
CITY WATER IN
BOOSTER PUMP

NO. 3 DEMINERALIZER TRAIN



F. SHAH 9-20-9

CHLORINATOR PRE-START CHECK

DESCRIPTION	VALV #	BRKR LOC
Caution: **Before attempt is made to place the equipment in operation, the operator should be familiar with the** characteristics of chlorine.		
☐ CHLORINE AVAILABLE		
☐ WATER SUPPLY AVAILABLE		
☐ CHLORINE DETECTOR AND EMERGENCY APPARATUS AVAILABLE		
☐ CHECK CHLORINE LINES FOR PROPER CONNECTION		
☐ VALVE LINE UP		
. Open suction and discharge of water supply booster pump		
. Close isolation valve on chlorine tank		
. Open all other valves in sequence from chlorine supply to injection point on water supply line		

CHLORINATOR START-UP

DESCRIPTION	VALV #	BRKR LOC
☐ PRE START CHECK COMPLETED		
. Start the water supply booster pump.		
. Open chlorine tank isolation valve one turn (it's then open fully)		
Note **This will supply sufficient gas to operate and can be quickly turned off**		
. Turn the injector shut off valve to the on position, any other valves in the injector water supply line must be opened		
Note **Proper injector action may be determined by observation of at least five inch vacuum on the injector vacuum gauge on** the chlorinator		
. Shut off the injector and test the chlorinator supply line for leaks with ammonia tester		
. Start at the source of chlorine supply and valves in sequence, test each valve and connection for leaks		
. If no leaks present, turn injector back on and adjust chlorine feed on rotameter as required		
Note **Test chlorinating system for leaks at least once per shift**		

CHLORINE SAFETY PRECAUTIONS

Before starting on the rules and recommendations for handling chlorine, let us review its properties. By knowing these properties, we can understand the reasons behind the safety rules to follow:

Under atmospheric conditions, chlorine is a greenish gas 2 1/2 times as heavy as air. At low concentrations, it is colorless.

When cooled and/or compressed, it forms a viscous, honey colored liquid 1 1/2 times as heavy as water. If you see it at atmospheric pressures, it will be very cold,-30 F or below.

One volume of liquid chlorine expands to form 460 volumes of gas.

It is only slightly soluble in water, less than 1 in 200 parts.

Chlorine will not burn, like oxygen, it will support combustion. At high temperatures, many metals will ignite in chlorine (steel burn at 483 F.).

Chlorine is nonexplosive. But it will react violently with greases, turpentine, other ammonia, hydrocarbons, finely divided metal and other flammable.

Chlorine is electrically nonconductive.

It is corrosive to most metals in the presence of moisture.

Its presence can be detected by its smell from 0.3 ppm on up.

Pressure in a chlorine cylinder and ton container vary with the temperature.

HEALTH HAZARDS

It is important to know the health hazards of long-time exposure to chlorine:

Since chlorine is detectable at low (0.3ppm), exposure can be minimized by moving away from a chlorine source.

Exposure to the gas does not have a cumulative effect.

Eyes and skin are easily irritated.

The respiratory system is most vulnerable; its impairment causes a pneumonia-type condition.

Damage to health is usually temporary if exposure was moderate.

GENERAL

In the event of an accident:

Be cautious---do not become a casualty yourself.

Prompt treatment is essential. Firmness and assurance to exposed persons will assist in alleviating anxiety.

Immediately remove exposed person to an uncontaminated area.

Check victim's respiration <u>first</u>.

Remove any contaminated clothing and wash contaminated parts of the body.

Never give anything by mouth to an unconscious patient.

Call a physician --- obtain medical assistance.

CHLORINE GAS INHALATION
IF BREATHING HAS CEASED

Commence artificial respiration immediately.

Administer oxygen as soon as possible.

CHLORINE GAS INHALATION IF BREATHING HAS NOT CEASED

Place patient in a comfortable position.
Administer oxygen as soon as possible.

Keep patient warm and at rest.

Render any other necessary first aid.

LIQUID CHLORINE CONTACT WITH THE EYES

Flush eyes immediately with copious amount of running water for 15 minutes.

Forcibly hold eyelids apart to ensure complete irrigation of all eye and lid tissue.

Do not attempt chemical neutralization of any kind.

LIQUID CHLORINE SKIN CONTACT

Emergency shower, removing clothes in shower.

Wash well with copious amount of soap and water.

Apply no greases unless ordered by a physician.

LOCATING AND HANDLING LEAKS

Leaks must be taken care of immediately, they always get worse with time.

Evacuate the area of release. If it's a big leak, evacuate more than just the immediate area.

Give first-aid to any who are overcome. Arrange for hospitalization, if necessary. Call physician.

Call fire rescue department 911.

Use breathing apparatus (SCBA).

To locate the source of the leak with ammonia water, either spray its vapors or pass an ammonia-soaked rag in the general leak area; white fumes will show exact location of leak.
They then position themselves upwind, so gas being blown away from them.

If chlorine is leaking as a liquid from the container, turn container so leak is on top and only gas escapes. (only 1/15 as much chlorine will escape)

Never put water on a leaking chlorine container or place it in water. The leak will get worse, and the container may float when partially full of liquid chlorine, allowing gas to evolve at the surface.

If the leak is at the container, and more specifically at the valve stem, it can often be stopped by closing the valve or tightening the packing gland nut. (clockwise)

Leaks at the valve discharge outlet can often be stopped replacing the gasket or the adaptor connection.

Pinhole leaks in a container's walls can generally be stopped by driving a hardwood peg or metal drift pin into the hole. This is a temporary measure only until the container can be emptied.

If emergency occurs at a treatment plant, try to cap leak and arrange for removal of container.

SAFE HANDLING DO'S AND DON'TS

As with any product requiring safe handling, there are certain "do's: and "don'ts" to follow. Chlorine is no exception. Learn and practice the following:

THINGS TO DO:

Use the standard chlorine wrench on the container valve stem.

Always use a new gasket to make a connection.

Always open a ton container valve one turn (it's then open fully).

Always check a new connection with ammonia vapors to detect any leaks. Learn to use the Chlorine Institute Emergency Kits A,B, and C with new Viton gaskets. Be sure the parts are checked periodically.

Keep your emergency escape respiratory device available at all times.

THINGS NOT TO DO

Never apply heat to cylinder or ton containers.

Never put water on the source of the leak.

Do not pressurize ton containers.

Never use a container valve to control flow rate.

Do not store flammable solvents or gasoline-operated equipment close to chlorine area.

Do not store self-contained breathing apparatus or other safety equipment in a chlorine room.

Do not use rubber hose for process chlorine lines.

Never use pipe wrenches on chlorine valve stems.

The best way to prevent an emergency is to know how to handle one. But an emergency can always happen, so be prepared:

Have an emergency exit plan.

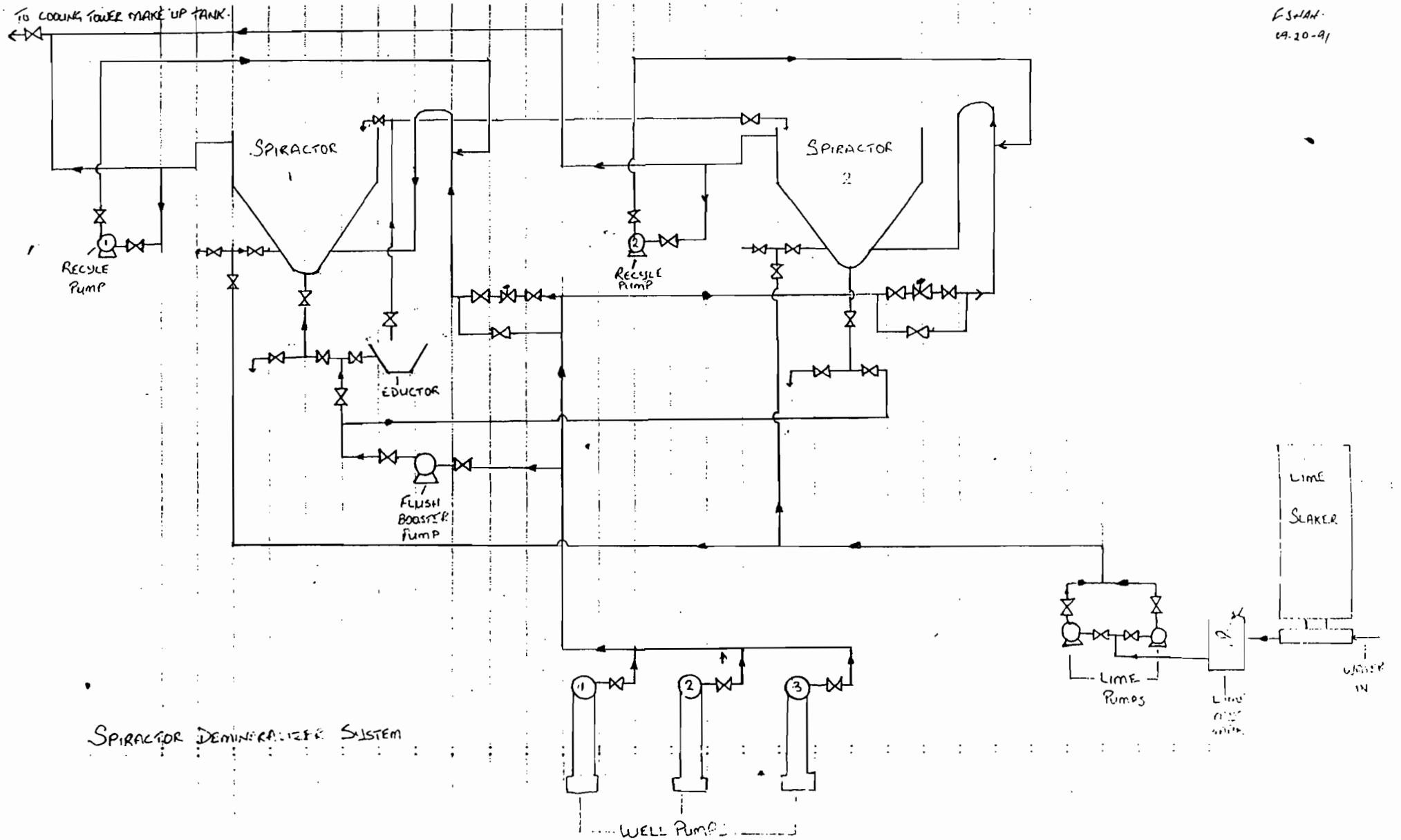
Have proper safety equipment and make sure employees know how to use it. Emergency kits are a must.

Everyone to be responsible for maintaining respiratory protection gear.

WATER TREATMENT
COOLING WATER MAKE UP SYSTEM
START-UP

DESCRIPTION	VALV #	BRKR LOC
☐ **POWER AVAILABILITY** **ENERGY THE FOLLOWING BREAKERS**		
Note Follow plant lock out procedure for all locked out breakers		
. On panel 6531; P806 and P808		
. On panel 6231; P813, P825, P829, P830, P831		
. Distribution breaker on panels LPP505 and DPP505		
. Power to spiractor controls		
☐ **LOADING SPIRATOR WITH CATALYST SAND**		
. Start a well pump and open discharge valve fully		
. Start flush booster pump and open the discharge and supply valves fully		
. Throttle inlet valve to sand eductor to fill to approximately 1/2 full and maintain level		
. Fill an empty spiractor with 120 cubic feet of silica sand Hydro-5		
. Secure flush pump, eductor and loading valve		
☐ **SPIRACTOR START-UP**		
. Turn selector switch on spirator to be run		

DESCRIPTION		VALV #	BRKR LOC
	. Open fully inlet/outlet valves on feed water regulator. Bypass valve closed		
	. Fill spirator to operating water level		
	. Fully open suction and discharge valves on recirculation pump		
	. Start recirculation pump		
	. Slide the flow controller on the W.T. panel to about 50% full scale		
	. Immediately start a lime pump and open the inlet valve to the spirator, then discharge valve to the cooling tower make-up tank		
	. Secure the spirator recirculation pump		
	. Start up lime slaker as per slaker operations section		
	. Start up chlorinator as per chlorinator operation section		
	. Ensure that water supply is secured to lime slurry tank and start agitator		
Note	**After 20 minutes, sample the spirator effluent for alkalinity, PH and calcium**		
Note	**Adjust feed water flow to maintain a proper catalyst bed, preventing sand carry over to make up tank and spirator overflow**		



SPIRACTOR DEMINERALIZER SYSTEM

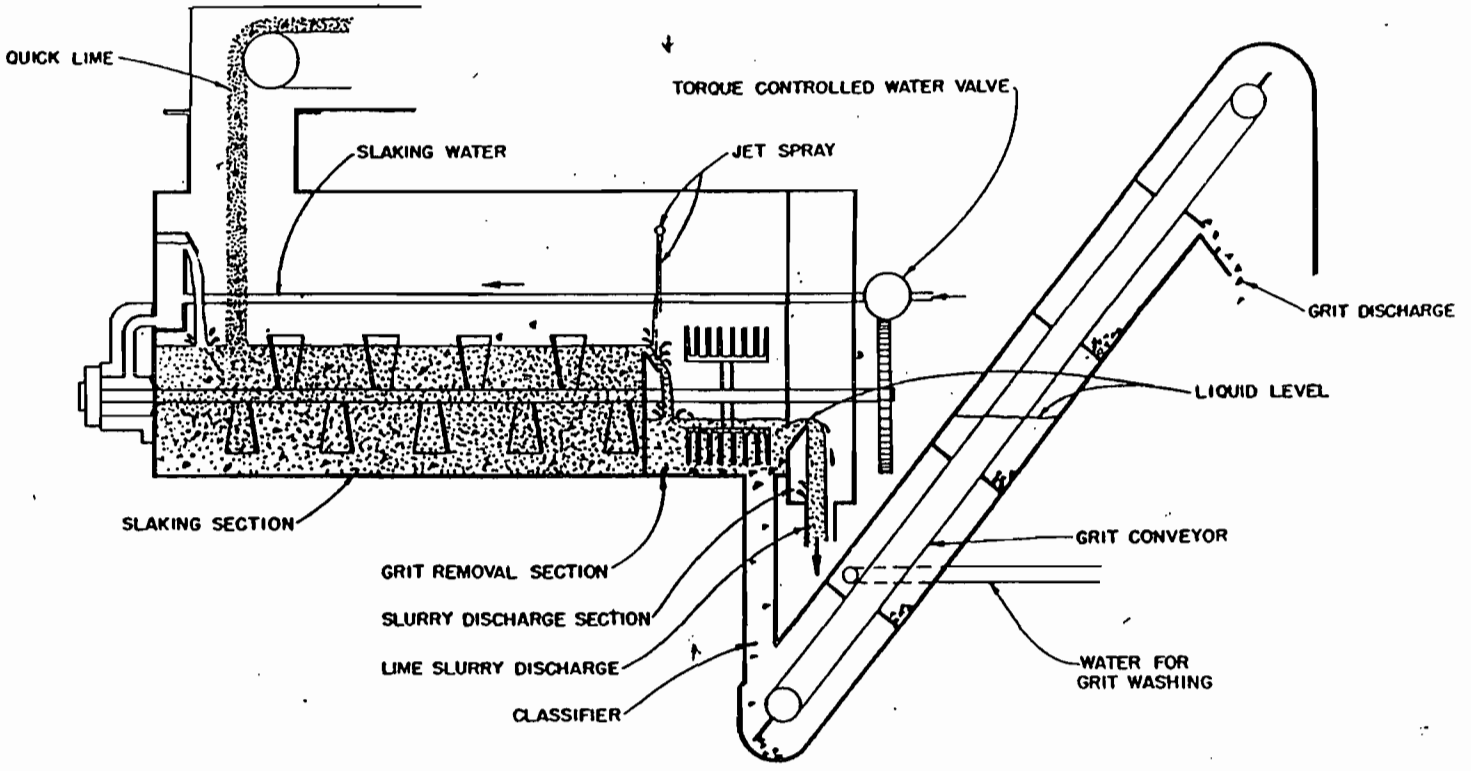
C. SWAN
09-20-91

LIME SLAKING SYSTEM START-UP

DESCRIPTION	VALV #	BRKR LOC
☐ **PRE REQUISITES**		
. Pebble lime available, 92-94% purity		
. Power available		
. Water supply available		
. Grit discharge container in place		
. Ensure that all belt guards and the screens over the slaking compartment are installed		
☐ **START-UP**		
. Turn off the main electrical power supply to the control panel		
. Open the manual torque control bypass valve		
. Fully open the main water supply valve		
. Close the manual solenoid valve bypass		
. With no power supply to the panel, the bypass solenoid valve SV2 will open and water be permitted to the slaking chamber		
. Fully open the water supply valve to the vapor and dust arrestor		
. Fill the slaking chamber to approximately 1/4 filled with water		
. Turn on the main electric power supply to the control panel		
. Close the torque supply valve upstream of the pressure reducing valve		

DESCRIPTION		VALV #	BRKR LOC
.	Fully open the supply valve to the jet spray nozzles		
Note	**These nozzles should be directed along the center of the separator weirs and not extended beyond either of the weir**		
.	Start the grid conveyor by on or hand position		
.	Slowly open the water valves at the varea-meter to the fully open position		
.	Adjust the valve at the top of the slaker to the required water flow		
Note	**Optimum water quantity varies with the grade of lime and the size of grid particles that are to be removed this must be determined locally**		
.	Start the paddle shaft		
.	Open the rotary valve to admit lime to the feeder		
.	Fully open the torque supply valve		
.	Adjust the potentiometer to set the desired feed rate value		
.	Start the feeder which starts feeding lime to the slaking chamber and delivered through the slaker discharge, to the slurry tank.		
.	After operation has been stabilized, adjust the torque control water valve to obtain the desired paste consistency		
Note	**After slaker has been operational for 15 minutes, examine the grit being discharge from the grid remover**		
Note	**Keep hands and loose clothing clear of moving weigh belt. Replace covers after inspection and servicing**		

LIME SLAKER


QUICK LIME
SLAKING WATER
TORQUE CONTROLLED WATER VALVE
JET SPRAY
GRIT DISCHARGE
LIQUID LEVEL
SLAKING SECTION
GRIT REMOVAL SECTION
GRIT CONVEYOR
SLURRY DISCHARGE SECTION
LIME SLURRY DISCHARGE
WATER FOR GRIT WASHING
CLASSIFIER

WATER TREATMENT
COOLING WATER MAKE UP SYSTEM
PRE START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ PREPARATION PRIOR TO SAND LOADING . Drain entire spiractor of all water and residual catalyst. . Inspect outlet collection at top of spiractor, and ensure that PH probe is in the proper position. . Clear out and then shut all sample valves . Shut all three (3) blowdown valves . Open instrument air to unit . Inspect lime supply and line from pump, ensure cut-out valve functions properly . Fully open flush booster pump suction valve and designated spirator loading valve		

HORIZONTAL FILTERS

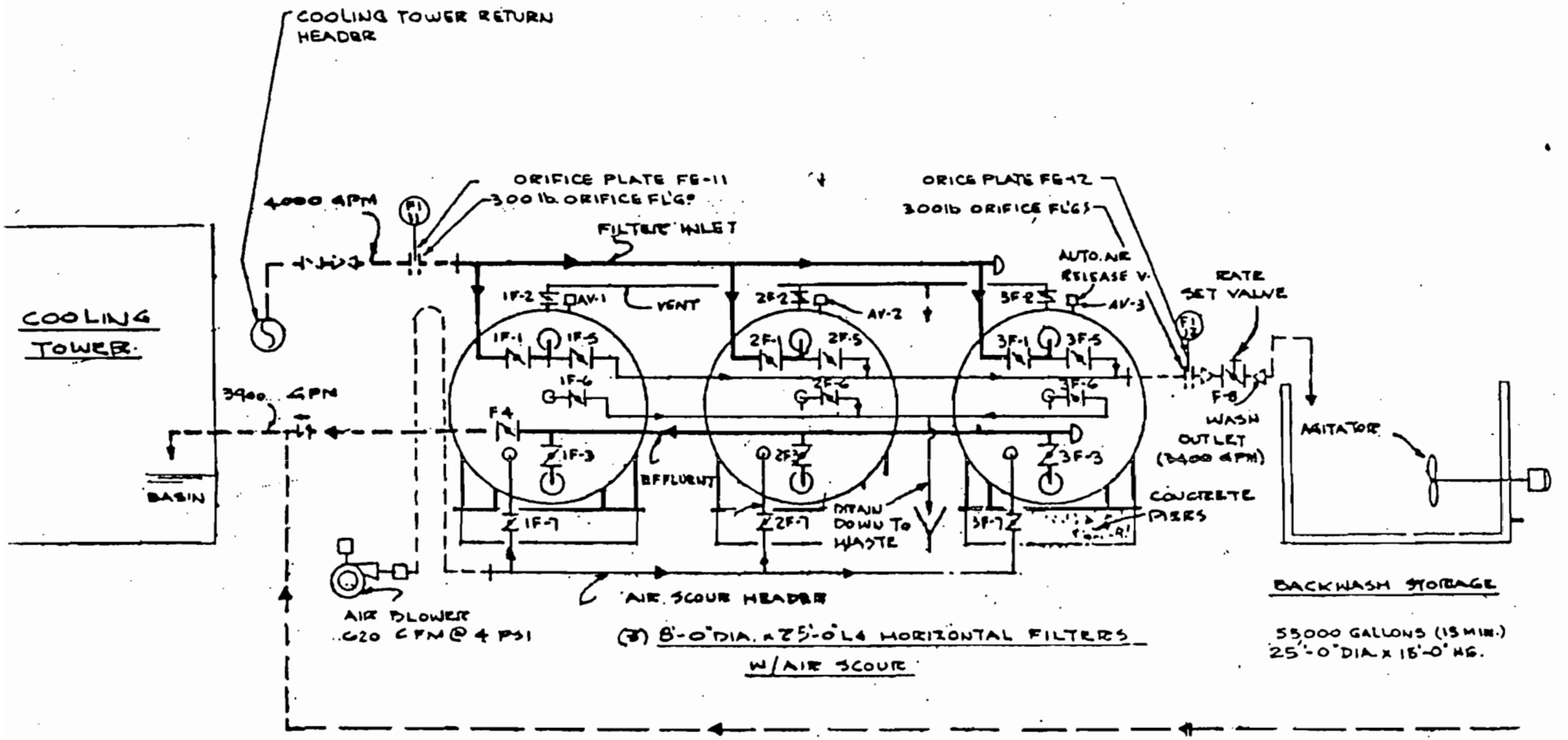
DESCRIPTION	VALV #	BRKR LOC
• Fill each filter very slowly. This is necessary to prevent upsetting of the bed. • Once all filters are filled with water, start with Unit #1 and backwash for approximately ten (10) minutes. • Proceed to backwash Units #2 and #3. • Note that after a filter is backwash, it then supplies water to backwash the next unit and is actually rinsing. This applies to all units but the last one to be washed. • System is ready to be placed in service. • Open valve to place filters into service **NOTE** **Normal operating flow is at 4000 GPM**		

HORIZONTAL FILTER

DESCRIPTION	VALV #	BRKR LOC
Note The filters are washed sequentially with the water from two (2) units in service position supplying the backwash flow.		
☐ **DRAINDOWN**		
. Close the inlet Valve on the filter to be cleaned.		
. Fully open the drainage Valve and vent Valve		
. When water ceases to drain from the drainage outlet, close Valve		
☐ **AIR SCOUR**		
. Start air blower		
. Fully open air inlet Valve		
. Air scour for about five (5) minutes.		
. Stop air pump		
. Close vent Valve and air inlet		
☐ **BACKWASH**		
. Close outlet header Valve		
. Open backwash inlet		
. Slowly open back wash outlet valve		
. Set backwash rate (3400 gpm) by wash outlet header Valve		
. Backwash for about ten (10) minutes.		

DESCRIPTION	VALV #	BRKR LOC
☐ **PROCEED TO NEXT FILTER** Close backwash inlet and backwash outlet on filter just washed . Fully open inlet valve . Proceed to draindown, air scour and backwash next filter. . When done, return that filter to service position and proceed to the last filter. ☐ When all filters have been cleaned, return the battery to service by opening outlet header vlv **Note** **Experience will dictate if an air scour is necessary every backwash. If it is not then use the above backwash information only to refurbish the filter bed.**		

COOLING TOWER HORIZONTAL FILTERS.



ASH REMOVAL SYSTEM
PRE START-UP CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ **POWER AVAILABILITY TO ASH BUILDING**		
. Close ash building main feeder breaker in water treatment M.C.C. room		
. Turn distribution breakers on		
. Turn vent fans on		
☐ **ASH CRANE**		
. Hydraulic unit condition and oil level to be at normal		
. Hoist cable condition		
. Power supply cables		
. Trolley gearbox condition and oil level to be at normal		
. Wear on trolley brake pads		
. Remove foreign objects from crane		
☐ **INCLINE AND COLLECTION CONVEYOR**		
. Gear box condition and lube oil level to be at normal		
. Drive belt condition and tension		
. Drive chain condition and guard in place		
. Transitions point to be clear		
. Conveyor chain condition and alignment		
. Secure all covers on conveyor		
. Zero speed coupling connection		

ASH REMOVAL SYSTEM START - UP

DESCRIPTION	VALV #	BRKR LOC
☐ **ASH BUILDING CRANE**		
. Energize breaker to combination starter, grapple starter, bridge lights		
. At crane pulpit, turn power on and test operation		
Note Report any abnormalities to supervisor		
☐ **ASH REMOVAL SYSTEM**		
Note Clear conveyors before energizing breakers		
Note Energize the following breakers in "auto mode" with directional switch in forward		
. Close incline conveyor breaker		
. Close collection conveyor breaker		
. Start respective conveyor at local ash panel and check for forward rotation and smooth operation		
Note . Report any abnormalities to supervisor.		

ELECTROSTATIC PRECIP. SYSTEM PRE START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ **PRECIPITATOR CONVEYOR AND ROTARY SEALS**		
. Drive chain condition		
. Drive chain guard in place		
. Check conveyor to be free of ash build up		
. Hydraulic unit, lubricating oil level at normal and hose connection		
. Secure covers and seal to prevent "In Air" leakage during operation		
☐ **ELECTROSTATIC PRECIPITATOR**		
Note Ground out with grounding rod before entering precipitator fields		
. foreign objects removed from gas pass		
. Hopper clear of any build-up		
. Emitting electrodes securely fastened		
. Collecting plates securely fastened		
. Inspect insulator coupling from rapper's drive unit		
. Inspect shock bars, hammers and anvils		
Note **When internal inspection is completed, close "general switch" and distribution breakers on control panel**		control room
. Turn on insulator heaters		
Note **Heaters are to be turned on 24 hour prior expected lite off of boiler**		

DESCRIPTION	VALV #	BRKR LOC
. Turn on rappers individually and check for correct rotation **Rappers** — **Clock Wise** — **Counter Clock Wise** Emitting — C+A — B Collecting. — A — B+C **Note** After check is completed turn off rapper until ready for operation **Note** **In accordance to the safety interlock system** . Secure inspection and insulator doors . Secure ESP covers . Lock in transformer rectifiers		

ELECTROSTATIC PRECIPITATOR SYSTEM START-UP

DESCRIPTION	VALV #	BRKR LOC
☐ PRECIPITATOR CONVEYOR AND ROTARY SEAL		
. Close precipitator rotary seals and conveyors breaker		6757-031
- 1 on 1 ESP Conv R.V.		3-A
- 2 on 1 ESP Conv R.V.		4-A
- 3 on 1 ESP Conv R.V.		5-A
- 1 on 2 ESP Conv. R.V.		13-A
- 2 on 2 ESP Conv. R.V.		14-A
- 3 on 2 ESP Conv. R.V.		15-A
- 1 on 3 ESP Conv. R.V.		6757-032 3-A
- 2 on 3 ESP Conv. R.V.		4-A
- 3 on 3 ESP Conv. R.V.		5-A
- 1 on 4 esp Conv. R.V.		13-A
- 2 on 4 ESP Conv. R.V.		14-A
- 3 on 4 ESP Conv. R.V.		15-A
. Start precipitator rotary seals and conveyors at local ash system panel		
Note Check conveyors for forward rotation, hydraulic leaks and abnormality		
☐ ELECTROSTATIC PRECIPITATOR		
. Lock in field at control panel		

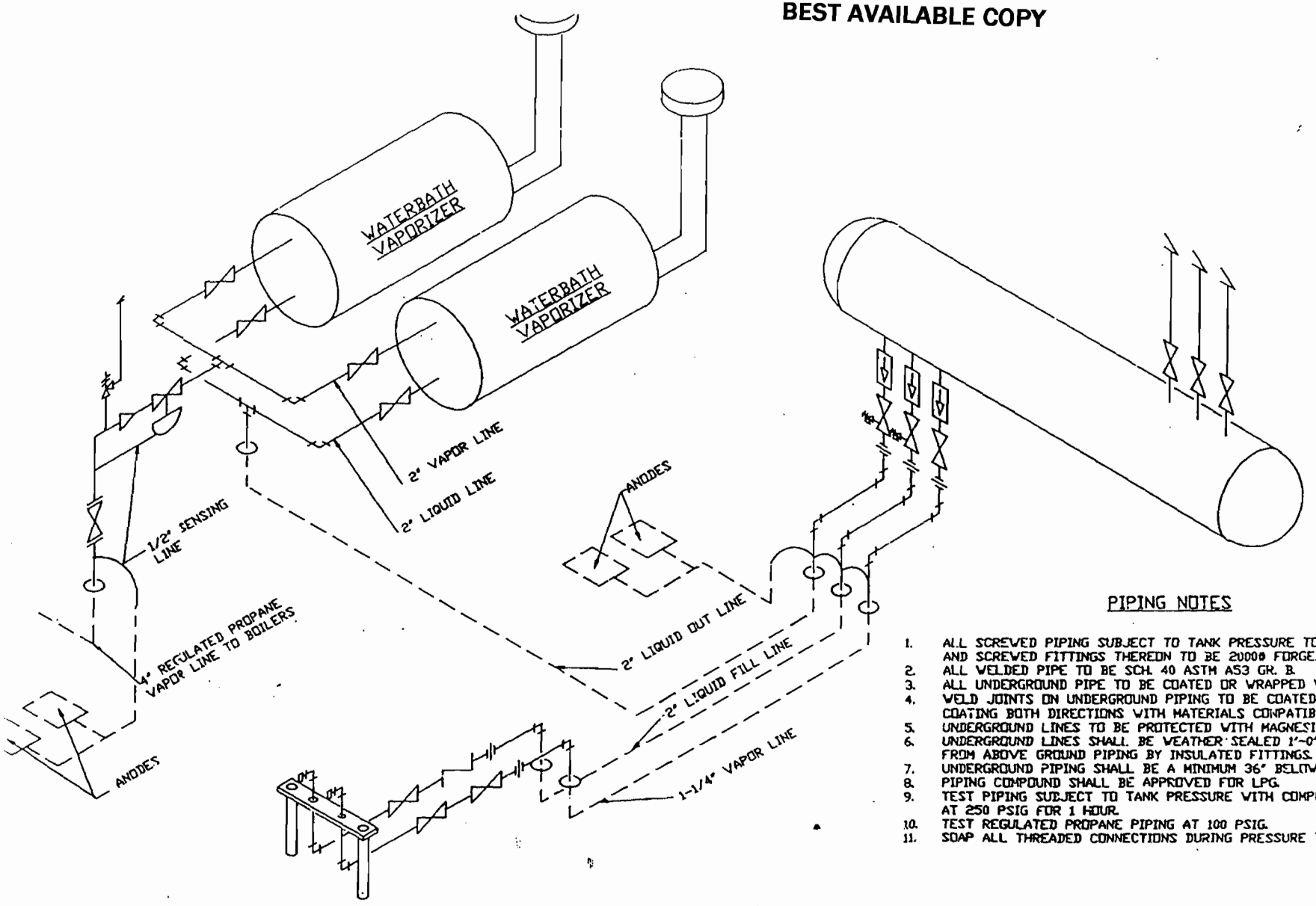
DESCRIPTION		VALV #	BRKR LOC
	. Energize A,B + C field breaker		
	. Turn power on at "epic" controller, at minimum		
Note	Observe for a few minutes to verify fault free operation		
	. Turn rappers on, in automatic mode		
	. Secure power to fields when checks are completed		
Note	**Verify ESP rapping sequence and timing IAW consent order posted on cabiner door**		

PROPANE SYSTEM PRE START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ VAPORIZER		
. Propane available, minimum 15% in storage tank		
. Close ball valve on gas supply line to plant from vaporizer		
. Fully open outlet valve from propane storage tank		
. Close vapor and fill valve on propane storage tank		
. Fully open burner valve		
. Fully open inlet and outlet valve "on" vaporizer		
. Fill vaporizer with clean water		
Note **Flow valves on each burner management system should be closed**		

PROPANE SYSTEM START UP

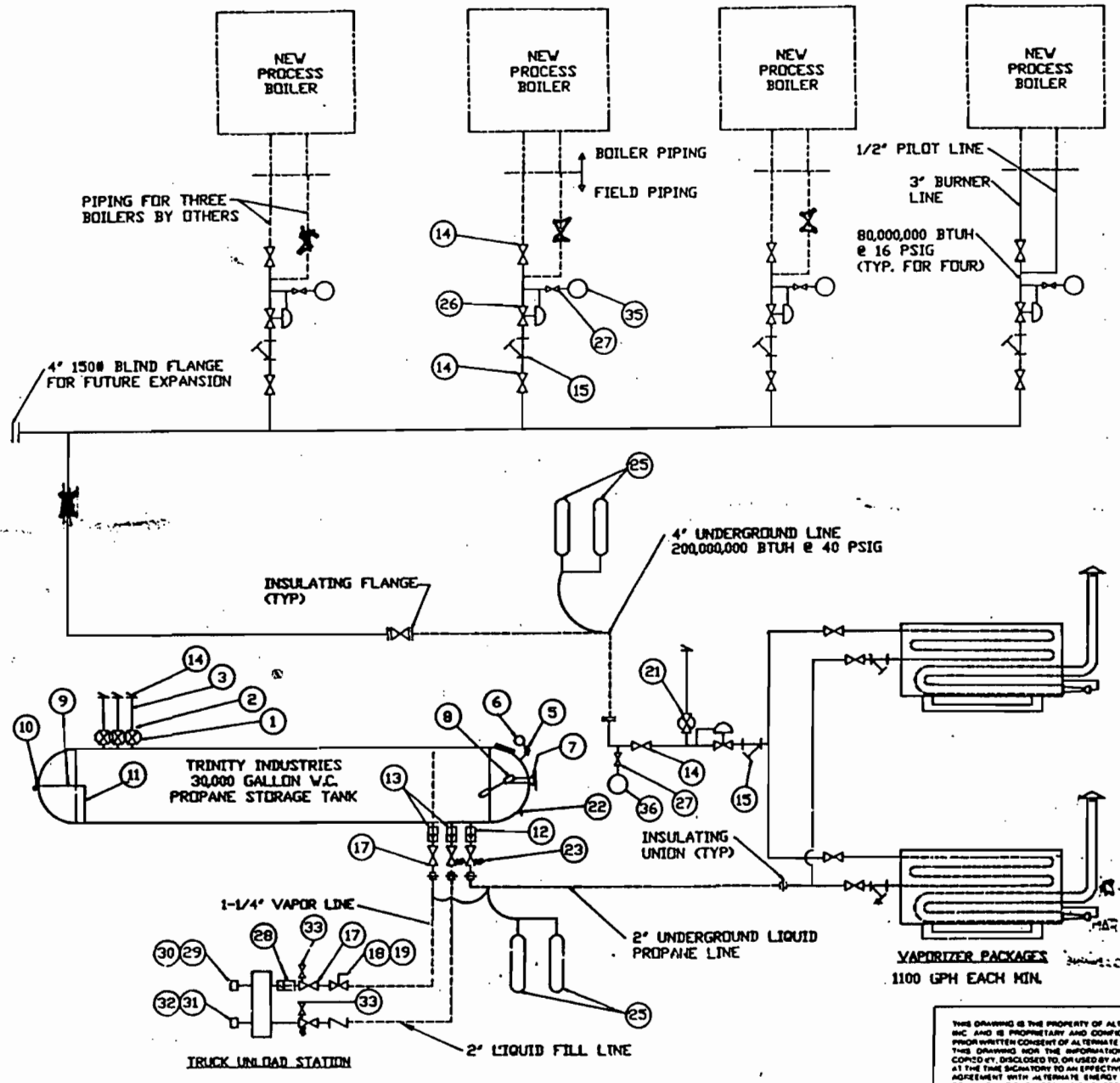
DESCRIPTION	VALV #	BRKR LOC
☐ **POWER AVAILABILITY**		
. Close local breaker		
. Turn power on to local control panel		
. Open needle valve on pilot line		
. Simultaneous push pilot and charge button to ignite pilot flame and energize maxon valve respectively		
. Move lever on maxon valve to "open" position to establish flame on vaporizer burner		
. Set temperature setting to 170 F		
. Fully open the two 4 inch ball valve for gas supply to boiler burner systems		
Note **Check emergency shut off pull cord for system shutdown. Restart system after check is cmpleted report discrepancies immediately**		



PIPING NOTES

1. ALL SCREWED PIPING SUBJECT TO TANK PRESSURE TO BE SCH. 80 ASTM A53 GR.B AND SCREWED FITTINGS THEREON TO BE 2000# FORGED STEEL.
2. ALL WELDED PIPE TO BE SCH. 40 ASTM A53 GR. B.
3. ALL UNDERGROUND PIPE TO BE COATED OR WRAPPED WITH WELDED JOINTS.
4. WELD JOINTS ON UNDERGROUND PIPING TO BE COATED AND WRAPPED MINIMUM 6" OVER COATING BOTH DIRECTIONS WITH MATERIALS COMPATIBLE WITH COATING.
5. UNDERGROUND LINES TO BE PROTECTED WITH MAGNESIUM ANODES.
6. UNDERGROUND LINES SHALL BE WEATHER SEALED 1'-0" ABOVE GRADE AND SEPERATED FROM ABOVE GROUND PIPING BY INSULATED FITTINGS.
7. UNDERGROUND PIPING SHALL BE A MINIMUM 36" BELOW FINISH GRADE.
8. PIPING COMPOUND SHALL BE APPROVED FOR LPG.
9. TEST PIPING SUBJECT TO TANK PRESSURE WITH COMPRESSED AIR OR NITROGEN AT 250 PSIG FOR 1 HOUR.
10. TEST REGULATED PROPANE PIPING AT 100 PSIG.
11. SOAP ALL THREADED CONNECTIONS DURING PRESSURE TEST.

NO.	REVI	BY	DATE



BILL OF MATERIALS

REF.	NO.	DESCRIPTION
1	3	REGO 7534G RELIEF VALVE 250 PSIG
2	3	REGO 7534-20 ADAPTER
3	3	3" SCH. 40 PIPE 7'-0" OAL
4	3	ANTHES #10 3-1/2" RAIN CAP
5	1	REGO 2805C COMBINATION VALVE
6	1	0-300# 4-1/2" PRESSURE GAUGE
7	1	ROCHESTER MAGNETEL 22-29 ADAPTER
8	1	ROCHESTER 6342-11LP MAGNETIC GAUGE
9	1	REGO A9095RS ROTO-GAUGE
10	1	REGO A9091-18LX DIAL
11	1	REGO A9091-M60.0 TUBE
12	1	FISHER F194 3"X 2" EXCESS FLOW VALVE
13	2	REGO A7537N4 2" EXCESS FLOW VALVE
14	11	2" FULL PORT SV BALL VALVE
15	5	2" SV STRAINER
16	1	FISHER 1098 2" 250# FLG. REGULATOR
17	2	REGO A7509BP 1-1/4" GLOBE VALVE
18	1	REGO 7781AF 1-1/4" EMERGENCY SHUTOFF VALVE
19	1	REGO 7606RM CABLE KIT
20	2	4" FP BALL VALVE
21	1	FISHER 63EG 2" RELIEF VALVE
22	1	FISHER J701 THERMOMETER
23	3	REGO 3127U RELIEF W/RAINCAP
24	3	REGO A7513AP 2" GLOBE VALVE
25	2	17# ANODE
26	4	FISHER 1098 2" 125# FLG. REGULATOR
27	5	1/4" NEEDLE VALVE
28	1	REGO 3282C 1-1/4" EXCESS FLOW VALVE
29	1	REGO 5765F ADAPTER
30	1	REGO A8016-93 CAP & CHAIN
31	1	REGO 5769H ADAPTER
32	1	REGO 3194-90 CAP & CHAIN
33	2	REGO 3165 1/4" VENT VALVE
34	1	REGO 6586B 2" BACKFLOW CHECK VALVE
35	4	0-30 PSIG 2" PRESSURE GAUGE
36	1	0-60 PSIG 2" PRESSURE GAUGE
37	1	ANTHES #8 2" ID RAINCAP

Alternate Energy Installations, Inc.
Strongsville, OH 44136
world-wide sales / engineering / installation

SCALE: NONE	APPROVED BY:	DRAWN BY: WJY
DATE: 4-29-88		REVISED

PROPANE SYSTEM FLOW SCHEMATIC

RESOURCES RECOVERY DADE CO. INC.
MIAMI, FLORIDA

DRAWING NUMBER: 8901-03

BOILER FEED WATER SYSTEM
PRE START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ **MAKE UP WATER TANK**		
. Close tank drain valves		
. Fully open both inlet isolation valves on supply line from water treatment demineralizer. Bypass valve closed		
. Fully close make up cross over valve		
. Fully open isolation valve to make up water pumps		
. Fully open suction valve on make up water pumps #1 m/u pp #2 m/u pp #3 m/u pp		
. Close discharge valve make up water pumps #1 m/u pp #2 m/u pp #3 m/u pp		
. Fully open recirc vlv on make up pumps		
. Fully open cut out valves to sight glass		
. Fill tank to required level.		
. Fully close root vlv of low press fill line to steam drums		
☐ **DEAERATOR VESSEL**		
. Remove any foreign objects from vessel interior		
. Close and secure access door		

DESCRIPTION	VALV #	BRKR LOC
. Fully open 1/2 inch and 2 inch vent valves.		
. Close vent valve from H.P. heater (not in use)		
. Inspect vacuum breaker for proper operation		
. Fully open valve from boiler feed pump recirculating line		
. Fully open chemical feed inlet valve		
. Close D.A. drain valve		
. Fully open outlet valve from DA to boiler feed pumps		
. Fully open inlet/outlet valves on Reg (make up to D.A.) Bypass valve closed		
. Close inlet and outlet valves on Reg (auxiliary steam to DA) Bypass valve closed		
. Fully open inlet and outlet valves on Reg (IP steam to DA) Bypass valve closed		
. Fully open isolation valve on make up to D.A.		
. Fully open isolation valve on condensate to D.A.		
ELECTRIC BOILER FEED WATER PUMP		
. Fully open cooling water inlet valve. To designated pump		
. Throttle cooling water valve on inlet to pump to regulate flow		
. Fully open recirculating valve		

DESCRIPTION	VALV #	BRKR LOC
. Fully open suction valve . Close discharge valve . Check lubricating oil levels to be normal **Note** **Clear motor ventilation screen of any debris**		

BOILER FEED WATER SUPPLY START-UP

DESCRIPTION	VALV #	BRKR LOC
☐ **POWER AVAILABILITY**		
Note Follow plant lock out procedure for locked out breakers		
ENERGIZE THE FOLLOWING BREAKERS		
. At #1 module		6757-041
#1 m/u pp		1-B
#2 m/u pp		4-B
#3 m/u pp		7-A
NBFP		5KV CAB
SBFP		5KV CAB
. At #2 Module		6757-042
#1 m/u pp		4B
#2 m/u pp		1B
#3 m/u pp		7A
NBFP		5KV-CAB
SBFP		5KV-CAB
☐ **START A MAKE UP WATER PUMP IN "HAND" POSITION**		
. Slowly open discharge valve on the designated pump to the fully open position		
. Fully open discharge vlv on standby pumps		
. Fill D.A. level to nine(9) feet and then make up pump in "auto" mode		
. Place the third pump in the hand position		
Note **General arrangement on an operating module will be one pump running continuously in hand one pump in auto standy and one pump in hand on standby**		
☐ **START AN ELECTRIC BOILER FEED WATER PUMP**		
. Slowly open discharge valve to the fully open position, charging the feed water line		

DESCRIPTION	VALV #	BRKR LOC
. Fully open the feed water header valve to the boiler with feed water regulator valve closed		
NOTE **Prior to switching pumps, the alternate pump has to be put into service before stopping the operating pump. This is to maintain the system pressure at normal.**		

FUEL FEED SYSTEM

DESCRIPTION	VALV #	BRKR LOC
☐ CONVEYOR TYPES AND SAFETY DEVICES		
☐ **APRON CONVEYOR:**		
. Current limiter, local start/stop button, emergency trip cord, quick disconnect		
☐ **BELT CONVEYOR**		
. Zero speed switch, local start/stop button, emergency trip cord, quick disconnect, belt tracking switch		
☐ **DRAG CONVEYOR**		
. Board counter, ride up limit switch, emergency trip cord, zero speed switch, quick disconnect		
☐ **START UP CHECKS ON CONVEYORS**		
. Gearbox condition and oil level		
. Drive belts and guard in place		
. Clean drive motor		
. Clear transitions		
. All safety devices functional		
. Idlers free of material buildup		
. Inspect skirting to avoid spillage		
. Support roller condition		
. Diverter roller clear of build up		

DESCRIPTION	VALV #	BRKR LOC
. Secure transition doors . Conveyor clear for start up . Reset trip cords . Close the local disconnect		

FUEL FEED SYSTEM

DESCRIPTION	VALV #	BRKR LOC
☐ POWER AVAILABILITY		
. Energize the following breakers:		
.D-2 Conveyor		XFER 2C
.D-2 Slide gate		030-1B
.C Conveyor		XFER 1A
C Switch in forward		
.B Conveyor		XFER -1B
B Switch in forward		
.A-1 Conveyor		041-2B
A-1 Switch in forward		
.A-2 Conveyor		041-3C
A-2 Switch in forward		
.J-1 Conveyor		041-5C
J-1 Switch in forward		
.J-2 Conveyor		041-5D
.J-2 Switch in forward		
.H-1 Conveyor		030-2B
H-1 Swich Conveyor		
.H-1 Diverter roller		030-4C
.G-1 Conveyor		030-2A
.F-1 Conveyor		030-IC
F-1 Switch in forward		
.F-1 Slide gate		030-4A
.S-1 Conveyor		030-3B
.SS-1 Conveyor		030-3C
.SF-1 Conveyor		030-2C
.SF-1 Servo motor		030-1A
.A-3 Conveyor		042-2B
A-3 Switch in forward		
.A-4 Conveyor		042-3C
A-4 Switch in forward		
.J-3 Conveyor		042-5C
J-3 Switch in forward		
.J-4 Conveyor		042-5D
J-4 Switch in forward		
.H-2 Conveyor		042-2B
H-2 Swich in forward		
.H-2 Diverter roller		040-1C
.G-3 Conveyor		022-6D

DESCRIPTION	VALV #	BRKR LOC
.G-3 Diverter roller		
.G-2 Conveyor		040-2A
.SS-2 Conveyor		040-3B
.SF-2 Conveyor		040-3A
.SF-2 Servo motor		040-4A
P-1 Switch in forward		
P-2 Conveyor		
ST-2 Conveyor		
ST-2 Switch in forward		
ST-1 Conveyor		
ST-1 Swich in forward		

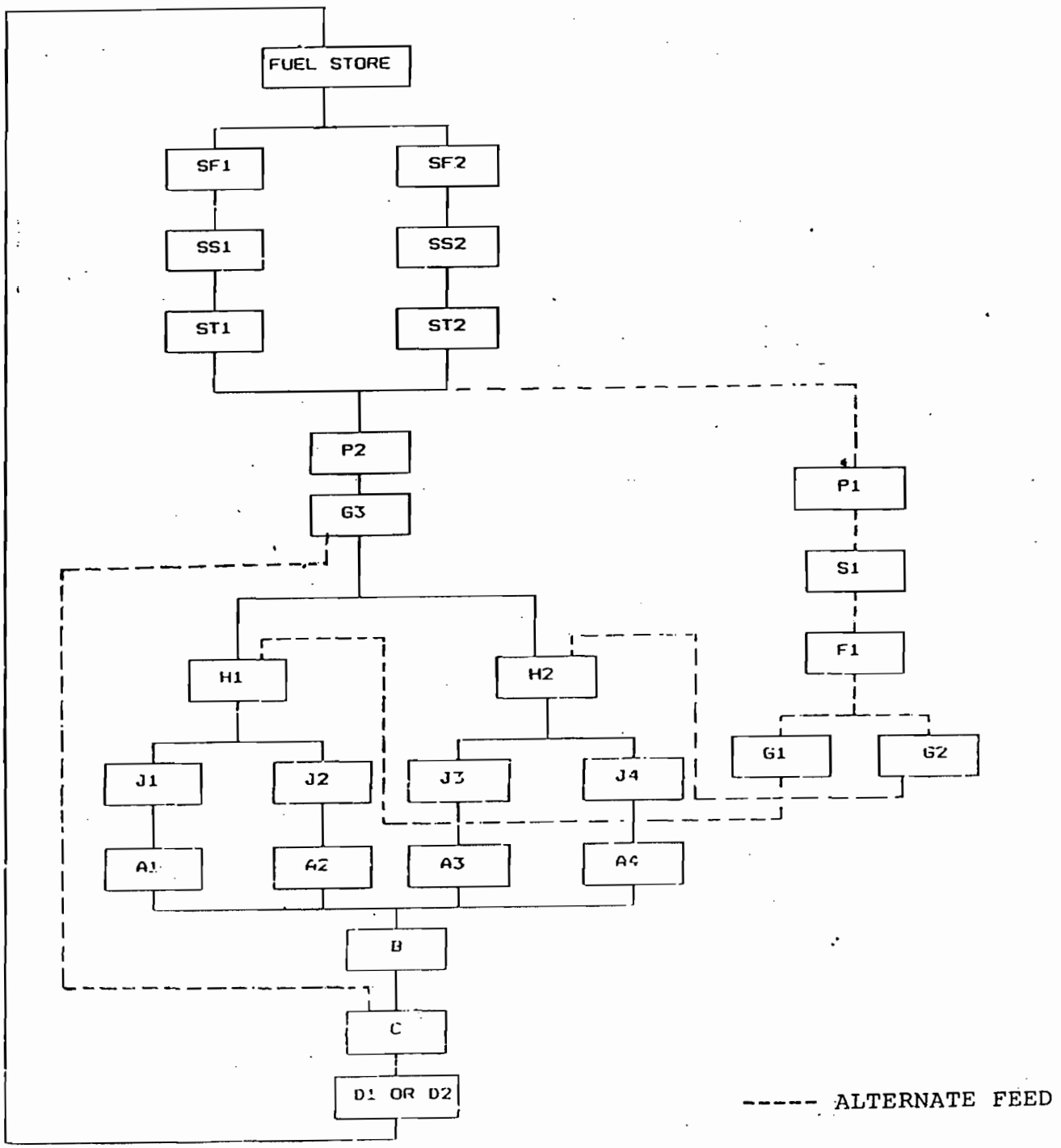
FUEL FEED SYSTEM ALTERNATE CONVEYOR START UP

DESCRIPTION	VALV #	BRKR LOC
Note In the event of G-3 or P-2 conveyor break down the following are alternate fuel conveyors		
☐ START-UP CHECKS COMPLETED		
. Start G-1 conveyor		
. Start G-2 conveyor		
Note **G-2 flop gate positioned to supply H-2 conveyor**		
. Start F-1 conveyor with F-1 to G-1 50% slide gate open and F-1 to G-2 100% slide gate open		
. Start S-1 conveyor		
. Start P-1 conveyor		
. Flop ST-1 and ST-2 gate over to P-1 conveyor		
Note **Inform Heil control of fuel conveyor status**		

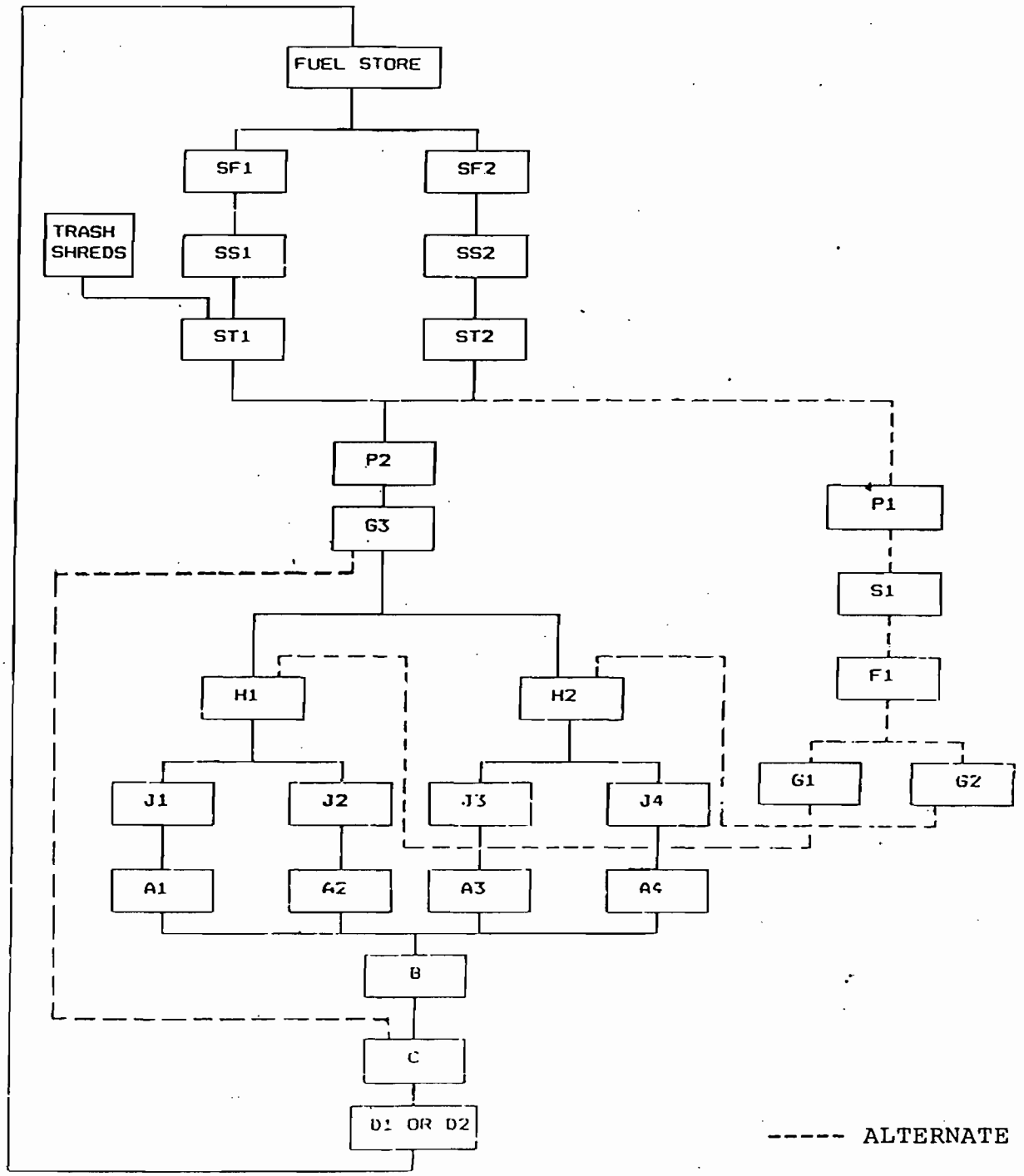
FUEL FEED SYSTEM
FUEL STORAGE

DESCRIPTION	VALV #	BRKR LOC
☐ **FUEL STORAGE BUILDING**		
NOTE **Access areas must kept clear of fuel Building doors must be kept closed Otherwise used as an access for:**		
. Emergency (first aid, fire etc.)		
. Maintenance personnel/equipment		
. Front loader		
☐ **PRE START UP CHECK ON CRANE**		
. Gear box condition and oil level		
. Brake pads and fluid level		
. remove all foreign objects		
. Inspect condition of holding and closing cables		
☐ **START UP ON CRANE**		
POWER AVAILABILITY		
. Energize main breaker on crane bridge		
. Energize holding, closing, bridge and trolly breakers		
. Turn on distribution breaker		
. Turn power on in "Cab" to crane control		
NOTE **Test operate crane and report any abnormalities immediately to the shift supervisor.**		

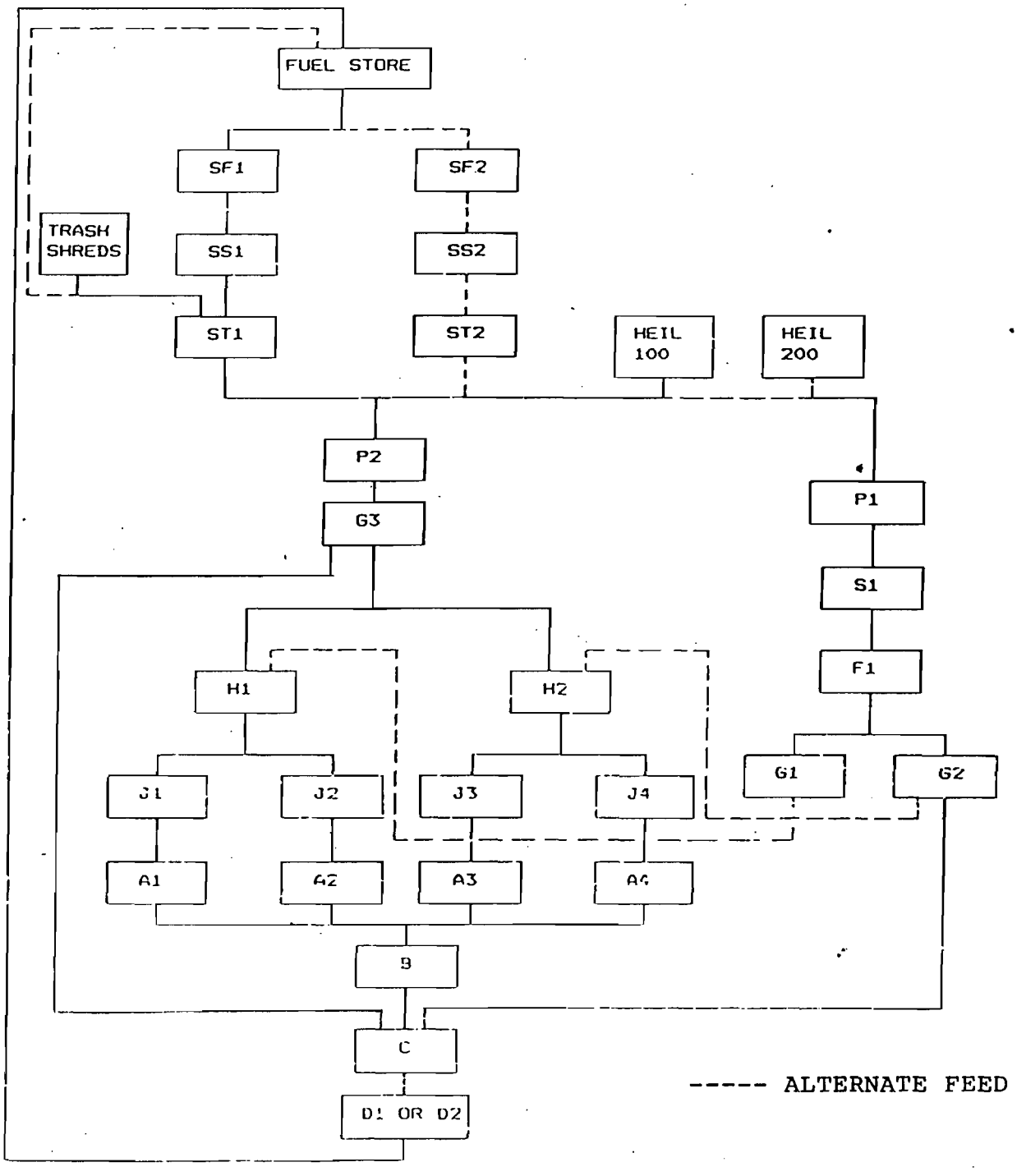
SF-1 / SF-2
NO HEIL
NO TRASH



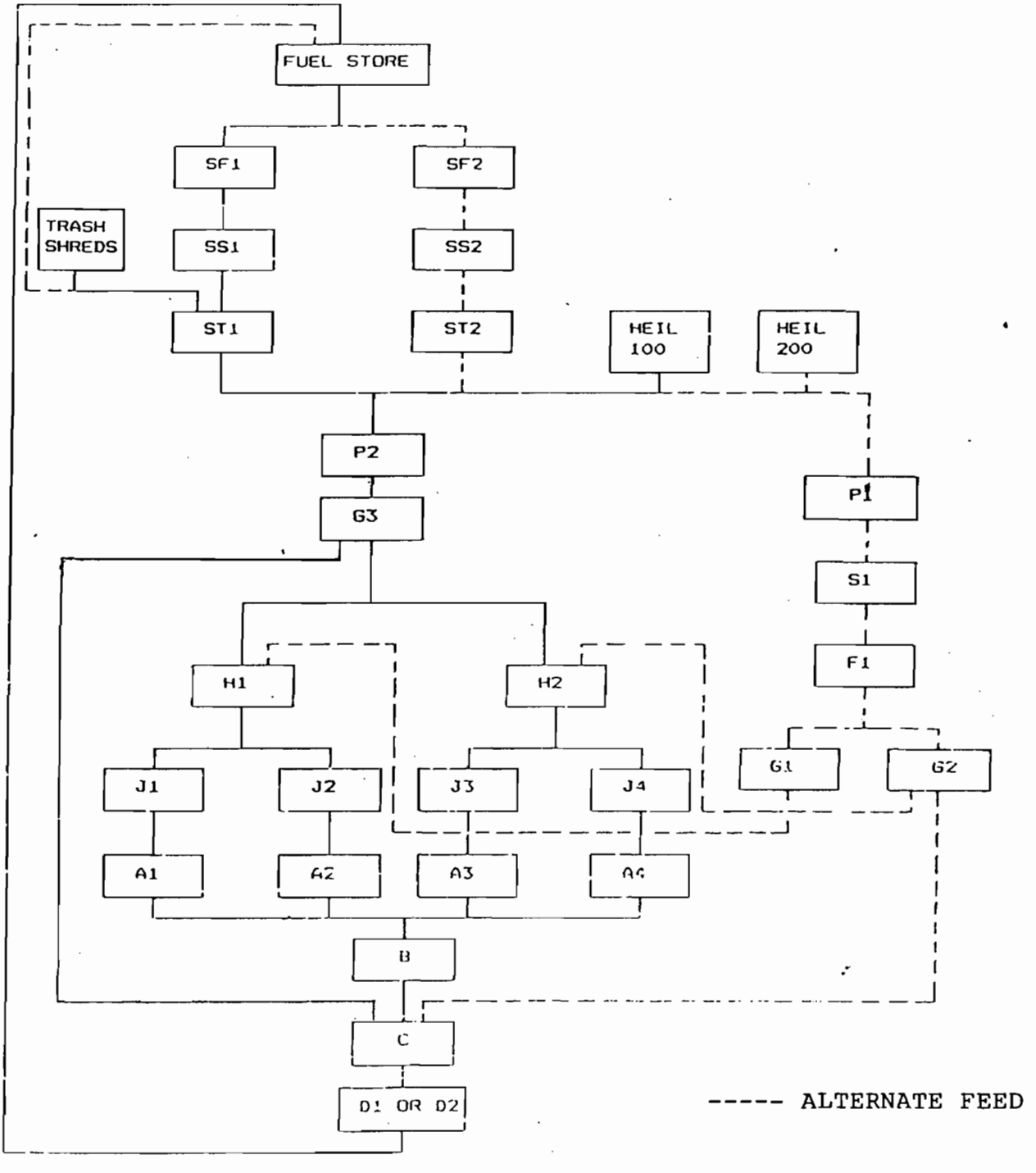
SF-1 / SF-2
NO HEIL
2 TRASH ON ST-1



SF-1
2 HEIL
2 TRASH



SF-1
1 HEIL
2 TRASH



STEAM SYSTEM

DESCRIPTION	VALV #	BRKR LOC
☐ COLD START UP ON STEAM SYSTEM . Fully open header stop valve . Close isolation valves on header traps. Bypass valve fully opened . Close target line isolation valve . Fully open both cross connect valves . Fully open drain valve on cross connect line . Fully open turbine isolation valve . Open four turns on root valve on steam to turbine lead drain line . Fully open inlet valve to regulator on lead drain line . Fully open lead drain regulator valve . Fully open isolation valve to gland steam condenser and air ejector . Fully open auxiliary steam root valve . Close steam inlet valve to "Terry" turbine pump . Closeinlet/outlet valve on steam supply regulator to air ejector Bypass valve closed . Close inlet/outlet valve on gland steam regulator. Bypass valve closed		

TURBINE GENERATOR PRE START CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ POWER SUPPLY		
Energize the following breakers:		
Note Follow plant lock out procedure for locked out breakers		
. On turbine/generator equipment panel; main breaker, primary breaker for distribution panel transformer, distribution lights and heaters breaker, generator and exciter heaters. Main transformers for #1 and #2 cooling equipment breakers		
. Turbine panel breaker at 6757-041 panel, #1 MCC		
☐ PRE CHECK		
. Fully open the turbine loop, live steam and wheel chamber drains and regulator valves		
. Fully open cut out valves to condenser sight glass, level transmitters and condenser leg		
. Close all drain valves on condenser		
. Close steam extraction valves and drains on H.P, I.P and L.P lines.		
. Fully open air extraction isolation valves from condenser		
. Close the following traps isolation valves with fully opening the bypass vlv		
1. H.P., I.P and L.P extraction lines 2. Air ejector exhaust line 3. Steam line to air ejector 4. Lead steam drain line 5. Steam line to gland seal		

DESCRIPTION	VALV #	BRKR LOC
. Fully open cut out valves on glands steam condenser sight glass		
. Fully open inlet and outlet cooling water valves on lube oil coolers		
. Fully open inlet and outlet cooling water valve on control fluid tank.		
. Pressurize and vent coolers		
. Fully open lube oil supply valve to lube oil cooler		
. Line up one lube oil filter for service Fill lube oil tank to 90% and control fluid tank to 100% minimum level of 55% on both tanks		
. Fully open inlet/outlet valves on gland steam attemporator regulator. Bypass valve closed		
. Fully open ejector steam vent valve and drain		
. Close vacuum breaker valve		
. Fully open valves to all gauges		
CONDENSATE SYSTEM		
. Fully open vacuum drag isolation valve to hot well (m/u tank)		
. Fully open inlet/outlet valve on vacuum drag regulator, CV2 Bypass valve closed		
. Fully open suction and minimum flow valves on condensate pumps and hotwell		
. Close discharge valve on condensate pumps		
. Check lube oil on condensate pump motor		

DESCRIPTION	VALV #	BRKR LOC
. Fully open inlet/outlet valves on REG (Condensate to make up tank) Bypass valve closed		
. Fully open inlet/outlet valves on REG (recirculation to condenser hotwell)		
. Bypass valve closed		
. Fully open condensate inlet and outlet valve on gland steam condenser. Bypass valve closed		
. Fully open condensate inlet and outlet valve to the air ejector		
. Fully open inlet/outlet valves to on REG (condensate to DA) Bypass valve closed		
. Fully open bypass valve on LP heater (L.P.heater isolated)		
. Fully open condensate isolation valve to D.A.		

DESCRIPTION	VALV #	BRKR LOC
☐ SAFETY AND FIRE AWARENESS		
. Fire extinguishers charged and in place		
. Fire hose stationed and ready for use		
. Report poor grating areas on walkways		
. Pre cautionary watch to be taken as to prevent fire liability in fuel storage		
. Debris cleared from around boiler and equipment		
. Walkway and exits should be kept clear of debris and foreign objects		
Note Be alert to potential hazards and report and correct them as they are found		
. Ensure that all flammable and poisonous material are properly stored		
. Do not operate any circuit breaker valve or component that has a warning tag on it until the warning is fully understood		
. Ensure power supplies are deenergized and properly tagged and locked to commence work on electrical components		
. Stay clear of revolving equipment parts hot piping and steam leaks		

BOILER OPERATING DATA

DESCRIPTION		VALV #	BRKR LOC
☐	STEAM FLOW AT 180 KLBS/HR		
☐	RDF FUEL		
☐	QUANTITIES — K LBS/HR		
	. Fuel — 56.07		
	. Combustion — 336.3		
	. Flue gas exit — 386.9		
☐	PRESSURES — LBS/SQ. IN		
	. Steam at superheater outlet — 625		
	. Boiler drum — 675		
	. Drop from drum to superheater outlet — 50		
	. Drop through economizer — 33		
☐	TEMPERATURES — O F		
	. Superheated steam — 721		
	. Flue gas leaving furnace — 1600		
	. Flue gas leaving boiler — 795		
	. Flue gas leaving economizer — 613		
	. Water entering economizer — 350		
	. Water entering boiler — 454		
	. Air entering air preheater — 100		
	. Air leaving air preheater — 450		
	. Flue gas leaving air preheater — 482		
☐	AIR RESISTANCE DRAFT LOSS — IN OF WATER		
	. Furnace — 0.15		
	. Superheater — 0.02		
	. Economizer — 0.65		

BOILER-NORMAL OPERATION
PERIODIC CHECKS

DESCRIPTION	VALV #	BRKR LOC
☐ **WATER LEVEL**		
. Blow down steamdrum sight glass to insure free operation and clarity		
. Verify water level to Bailey, eye-hye and		
. Check water column to be free of leaks which may cause false water level indication		
Note **One steam drum sight glass to be in service at a time**		
. Verify deaerator level		
☐ **FUEL FEEDERS**		
. Doors secured		
. Monitor for consistent fuel feed		
. Replace broken feeder glass		
. Secure deflector plates in place and replace defective ones		
. Verify distribution air pressure. Minimum 15 PSIG		
☐ **FURNACE**		
. Secure inspection windows		
. Check stoker bed for even distribution and complete combustion of fuel		
. Verify furnace draft		
. Inspect stoker to submerge transition to be clear		

DESCRIPTION		VALV #	BRKR LOC
.	Secure stoker doors		
Note	Stoker checks to be made at least every 30 minutes		
Note	Report "In Air" leakage around furnace to supervisor		
☐	**FANS**		
.	Check bearing temperature and vibration		
.	Verify damper position		
.	Clear motor ventilation screen		
.	Check ID bearing for normal oil level and adequate cooling water flow		

BOILER NORMAL OPERATION PERIODIC CHECKS

DESCRIPTION	VALV #	BRKR LOC
☐ SOOTBLOWER WHEN OUT OF SERVICE		
. Inspect lance for complete retraction		
. Steam supply isolated		
☐ GAS BURNERS		
. Propane gas supply isolated to boiler		
. Burner fan in service with damper position at 20%		
☐ ASH CONVEYORS		
. Submerge water level at normal		
. Hydraulic units oil level at normal		
. Ash conveyor to remain closed and fully sealed		
Note Conveyor will only be opened with the expressed permission of the shift supervisor and then only one conveyor per boiler at a time on an operating unit.		
. Use water spray to minimize ash dust		
. Conveyors are to be in automatic mode Ash conveyor speeds and hydraulic pressure are not to altered or adjusted in any way by operating personnel		

BOILER NORMAL OPERATION PERIODIC CHECKS

DESCRIPTION	VALV #	BRKR LOC
☐ **BOILER FEED PUMPS**		
. Check pump packing for excessive leaks		
. Monitor pump bearing temp. and vibration		
. Clean debris from motor ventilation screen		
. Check for sufficient cooling water flow		
. Check oil levels to be normal		
. Suction,disch, balance press and suction temp.		

TURBINE/GENERATOR TECHNICAL DATA

DESCRIPTION		VALV #	BRKR LOC
TURBINE			
Live steam pressure	600 psig		
Live steam temperature	750 F		
Live steam flow, max.	402 000 lbs/hr (630 psig)		
Exhaust pressure	2.5" Hg		
Speed	3600 rpm		
Turbine generator output, nom.	38 000 KW		
Turbine generator output, max.	39 900 KW		
GENERATOR			
Apparent output	45,625		
Power factor	0.85		
Frequency	60 Hz		
Rated voltage	13.8 KV		
Rated current	1909 A		
Efficiency (pf=0,85 4/4 load	97.60 %		
EXCITATION			
No load	62 V= / 351 A		
Full load	190 V= / 890 A		
Short time (10") operation	285 V= /1340 A		
EXCITER			
Rated voltage (continuous operation)	213 V=		
Rated current (continuous operation)	1000 V=		
Rated output (continuous operation)	213 KW		
Short time (10") operation:			
Voltage	1340 A		
Current	285 V		
Output	382 KW		

DESCRIPTION	VALV #	BRKR LOC
☐ **FIELD EXCITATION:** No load 24 V= / 4.1 A Full load 86 V= /14.9 A Short time (10") operation 119 V= /20.5 A		

AUXILIARY EQUIPMENT
NORMAL OPERATION

DESCRIPTION		VALV #	BRKR LOC
LUBE OIL SYSTEM			
Oil tank:			
First filling	1160 gallons		
Full	1060 gallons		
Operating capacity	950 gallons		
Minimum	640 gallons		
OIL PUMPS:			
Discharge of oil pumps (...) psig:			
Main oil pump	133 gpm (44)		
Aux. oil pump	136 gpm (44)		
Emergency oil pump	63 gpm (9)		
LUBE OIL COOLER			
Oil flow	114 gpm		
Cooling water flow	380 gpm		
Oil inlet temperature	140 F		
Oil outlet temperature	113 F 105 per P-CHG		
Water inlet temperature	95 F		
Water outlet temperature	98.5 F		
Heat losses	191 KW		
CONTROL FLUID TANK			
Capacity	100 gallons		
Control fluid	Fyrquel EHC		
CONTROL FLUID PUMPS			
Number of pumps	2		
Discharge at 1740 psig	3-7 GPM		
Pump in operation	1		

DESCRIPTION		VALV #	BRKR LOC
☐ GENERATOR AIR COOLER			
Air flow	992 cuft/s		
Cooling water flow	491 US GPM		
Air inlet temperature	153 F		
Air outlet temperature	104 F		
Water inlet temperature	95 F		
Water outlet temperature	106 F		
Heat losses	800 KW		
☐ GLAND STEAM CONDENSER			
Cooling water flow (condensate)	628 US gpm		
Water inlet temperature	109 F		
Water outlet temperature	110-112 F		
Max. steam temperature	356 F		

TURBINE-GENERATOR SETTING VALUE

OBJECT		SETTING VALUE	ACTION
			A= Alarm T= Trip LL= Load Limitation Limitation
Live steam pressure	low 1	540 psig	A + LL
	low 2	510 psig	A + T
Turbine outlet, vacuum			
	< 60%	5.8 psia	A + T
	< 90%	1.9 psia	A
	< 80%	3.3 psia	A + LL
Temperature turbine outlet	high	210 F	
Temperature gland steam after condensate injection	high	410 F	A
Lube oil tank level	low	18" from tank cover	A
	high	6" from tank cover	A
Lube oil filter, differential pressure high		6 psig	A
Lube oil pressure before bearing	< 30 %	7 psig	A for barring gear operation
	< 40%	9 psig	A + T Start DC-oil pump
	< 60%	13 psig	A + T start AC-Oil Pump
Lube oil temperature before bearings	high	122 F	

OBJECT		SETTING VALUE	ACTION
Drain oil temperature after turbine thrust bearing front side	high	158 F	A
Drain oil temperature after turbine thrust bearing rear side	high	158 F	A
Control fluid tank level	low	7" from tank cover	A
Diff. pressure control fluid filter 1	high	72.5 psi	A
Diff. pressure control fluid filter 2	high	72.5 psi	A
Control fluid pressure after pump station	low	1305 psig	A
Control fluid pressure accumulator system 2	low	1090 psig	A
Control fluid pressure accumulator system 2	low	1090 psig	A Trip if flow pressure on both systems
Turbine overspeed		3960 rpm	A + T
Shaft vibration at thrust bearing	high	1 mil	A
Turbine shaft position displacement displacement		16 mils 32 mils	A A + T
Generator, warm air Temperature	high	170 F	A
Oil drain temp. generator bearing turbine side	high	158 F	A

OBJECT		SETTING VALUE	ACTION
Oil drain temp. generator bearing exciter side	high	158 F	A
Oil drain temp. exciter bearing	high	158 F	A
Generator shaft vibration at bearing turbine side	high	1 mil	A
Generator shaft vibration at bearing exciter side	high	1 mil	A

TURBINE GENERATOR
NORMAL OPERATION

DESCRIPTION	VALV #	BRKR LOC
Note Keep a log in which all the pressures, temperatures and other important data are noted every two hours. The variation of the noted figures gives a picture of the performance of the machine and allows a quick detection of any abnormality		
☐ ALLOWABLE LIVE STEAM PRESSURE VARIATION		
. The average pressure at the turbine inlet over any twelve months of operation shall not exceed the rated pressure 600 psig. In maintaining this average, the pressure shall not exceed 660 psig, except that swings to 720 psig shall be admissible, provided the aggregate duration of such swings over any twelve months of operation shall not exceed 12 hours.		
☐ ALLOWABLE LIVE STEAM TEMPERATURE VARIATIONS		
. Under usual conditions of operation, the average steam temperature at the inlet flange of the turbine stop valve, over any 12 months operating period, shall not exceed 750 F. By maintaining this average during abnormal conditions.		
. During abnormal conditions, the temperature shall not exceed 775 F for operating periods aggregating not more than 400 hours in a 12 months operating period, nor by more than 800F for swings of 15 minutes duration or less aggregating not more than 80 hours in any 12 months operating period.		
. Temperature variations from steady condition of more than 55 F should not exceed 5.5 F/min.		

DESCRIPTION	VALV #	BRKR LOC
☐ ALLOWABLE LOAD VARIATION		
. Load variation from steady condition of more than 10 MW should not exceed 1MW/min		
. In emergency causes allowable load reduction may exceed these values.		
☐ LUBRICATING OIL TEMPERATURE 113F per OPS-9		
. The lubricating oil temperature is maintained constant at 105 F by the AMOT controller. The temperature rise of the oil through the bearing should not exceed 35 F. If the return oil temperature from a bearing rises suddenly by 10 F while the oil inlet temperature the same, the set must be shut down as soon as possible and the reason for the temperature increase must be investigated (bearing check).		
☐ LUBRICATING OIL FILTER		
. The pressure drop across the filter should be checked regularly and the filter changed over and cleaned if necessary.		
☐ CONTROL OIL FILTER		
. The pressure drop across the filter is supervised by alarm. The filter has to be changed at alarm signal by switching over to the second control oil pump and exchanging the filter element for cleaning.		
☐ SHAFT POSITION SUPERVISOR		
. Alarm will be given if the shaft displacement reaches 16 mils		
. The set will be tripped if the displacement reaches 32 mils		
. If the shaft displacement remains for a longer period at or above 12 mils, the following inspection must be made:		

DESCRIPTION	VALV #	BRKR LOC
1. Check the wheel chamber pressure. Compare them with former readings at the same live steam quantity. 2. Check the temperatures before and after the thrust bearing and compare them with former reading at the same load . In the case of considerable differences shut down the set and check the thrust bearing. PERIODIC INSPECTIONS . All the safety and signalling devices should be checked regularly EVERY TWO HOUR . All pressures and temperatures. BI-WEEKLY . Check the main stop valve by closing it partially by means of the test device . D.C. lube oil test operation . Vacuum test operation ONCE A DAY . During normal operation the oil separator (bowser) should be kept in service for 2 hours once every day shift MANUAL TRIP The turbine can be manually tripped locally or from instrument board. The set must be tripped in the following cases: Excessive vibrations of the turbine, abnormal noise Sudden increase of lubrication oil temperature by 10 F		

DESCRIPTION	VALV #	BRKR LOC
Abnormal high live steam temperature Sudden drop of live steam temperature than 10% (if the live steam pressure limiter does not intervene) Fire in the plant. Latest when the rotor is at standstill, shut down auxiliary oil pump		

TURBINE GENERATOR NORMAL OPERATION PERIODIC CHECK

☐ LUBE OIL SYSTEM

Visually inspect unit for oil leaks

. Tank level, minimum of 18 inches from top cover

. Oil mist fan in service

. Lube oil flow at bearing sight glasses

. Filter differential, maximum of 6 PSIG

. Bearing oil temperature, not to exceed Alarm 158 F (Drain oil)

. Bowser for scheduled operation

. Lube oil pressure minimum 20 PSIG

Note Monitor lube oil cooler for any abnormal differential temperature increase

☐ CONTROL FLUID SYSTEM

. Accumulators pressure., minimum of 1090 psig

. Fluid tank level 7 inches from tank top

. Pump pressure approximately 1750 PSIG

. Earth filter valved in service

. Maintain a drip flow through earthting filter

. Inspect the "Blue Gel" moisture absorber

Note Discoloration indicates that it has become saturated and has to be changed

☐ GENERATOR

. Replace clogged generator and exciter air filters

. 20 PSIG minimum cooling water pressure to generator air coolers

. Generator pit to be clear of water and oil leakage accumulation

. Inspect condition of grounding strap on turbine shaft

AIR EJECTOR

- Vacuum is maintained above 26" HG
- Steam supply pressure to ejector held at approximately 250 PSIG
- One element to be in service, on each stage at a time

GLAND STEAM SYSTEM

- Steam pressure to be maintained at 1.5 psig
- Gland steam condenser exhaust fan in service
- Gland steam temperature to be maintained at approximately 340 F

CONDENSATE SYSTEM

- Single pump pressure no less than 100 psig
- Hot well level maintained approximately 40 inch
- Check "In Air" leakage around the pump flange
- Cooling water pressure to condenser to be maintained above 20 psig

Note Monitor cooling water outlet temperature from condenser for any abnormal increases

Note Report any excessive noise or vibration on operating units

- Work order to be submitted for on defective equipment or component

AIR COMPRESSOR NORMAL OPERATION

DESCRIPTION	VALV #	BRKR LOC
☐ PERIODIC CHECKS		
. Keep unit clean		
. Drain accumulated moisture from the strainer in the control piping		
. Check crank case oil pressure and oil level		
. Perform valve inspection		
. Check cooling water temperature frequently to be sure that the compressor is being properly cooled		
Note Be sure that proper circulation is maintained		
. Investigate unusual noise in the compressor promptly		
. Check the entire unit for air leaks		
. Drain all condensate traps regularly		
. Check intercooler pressure to be within normal range.		
. Maintain an inspection record at four hour intervals		

ASH CONVEYOR SPEEDS AND PRESSURE SETTING

Note To be adjusted by maintenance personnel only

CONVEYOR	RECOMMENDED SPEED	HYDRAULIC UNIT PRESSURE SETTING
Rear Pass	3 RPM	400 PSIG
Dust collector	3 RPM	400 PSIG
East Sifting	3 RPM	400 PSIG
West Sifting	3 RPM	400 PSIG
Sifting Transfer	3 RPM	400 PSIG
#1 Precipitator	3 RPM	400 PSIG
#2 Precipitator	3 RPM	400 PSIG
#3 Precipitator	3 RPM	400 PSIG
Submerged (width=3Ft)	1.2 RPM	600-800 PSIG
Collection (width=4Ft)	0.9 RPM	
Incline (width=5Ft)	1.5 RPM	
Stoker	D9	

ASH SYSTEM
NORMAL OPERATION

DESCRIPTION	VALV #	BRKR LOC
☐ ASH BUILDING		
. Check building storage status		
. Clear discharge chute area		
. Keep drive thru clean of spillage		
☐ **INCLINE AND COLLECTION CONVEYORS**		
. Conveyor running in automatic		
. Transitions clear of build-up		
. Check conveyors for travel rotation		
. Clear tail shaft for material build-up		
. Covers secured in place		
. Check chain condition and pins		

FUEL FEED CONVEYORS PERIODIC CHECKS

DESCRIPTION	VALV #	BRKR LOC
. Observe for fire on fuel feed conveyors		
. Secure transition doors		
. Secure belt conveyor covers		
. Report loose skirting and holes in transition chutes		
. Check belt conveyor alignment		
. Blowout motors and check number of drive belts and their condition		
. Check hydraulic units for leaks and oil level to be normal		
. Remove spillage around tracking limit switch, rollers and zero speed coupling		
. <u>Drag conveyors:</u> replace missing and defective boards, clean material build up on idlers, feeder chutes and transition		
. <u>Belt conveyors:</u> check belt and support rollers condition clean material build up from transition and diverter roller. Check for rotation on diverter roller		
. <u>Apron conveyors:</u> checks flights, brackets and bolt condition		
Note Keep conveyors clean of spillage		

FUEL FEED SYSTEM

DRIVE BELT REPLACEMENT

CONVEYOR	SIZE	# BELTS
ST 1/2	3VX580	3
P-1	3VX530	3
P-2	5VX1120	2
S-1	5VX850	3
G-1/2	A-136	3
G-3	5VX1000	3
H-1/2	5VX800	3
A-1/2/3/4	3VX600	2
B	5	3
C	A-133	3

WATER TREATMENT OPERATION PERIODIC CHECKS

DESCRIPTION	VALV #	BRKR LOC
☐ **STORAGE TANKS**		
. Check levels to be normal and verify with instrument indication		
. Access door secured		
. Report any leakage		
☐ **COOLING TOWER**		
. Verify sump level		
. Even distribution of water flow across cooling tower cells		
. Check chlorinator to be leak free using testing kit		
. Fire pump in automatic and ready for service		
. Monitor flow through side stream horizontal filters		
. Back wash horizontal filter as scheduled		
. Fan and pump bearing temperatures and vibrations normal		
. Fan rotation normal		
☐ **CHEMICAL FEED**		
. Check for leaks		
. Chemical tanks level and pumps pressure at normal		
. Chemicals stored safely		
. Chemical availability		

DESCRIPTION	VALV #	BRKR LOC
. Slaker for proper operation		
. Monitoring water test results to chemicals feed rate		
. Water testing equipment in proper working order		
. Spiractor bed level to be at normal		
. Chemical tanks agitator in service		
☐ **TREATMENT FACILITY**		
. Waste water sump pump in working order		
. Check caustic and acid lines for leaks		
. Status of demineralizer trains, spiractors, pumps and systems		

PRINCIPAL OF ELECTROSTATIC PRECIPITATION

DESCRIPTION	VALV #	BRKR LOC
☐ Principles of Electrostatic Precipitator . A high uni-directional voltage is applied between the emitting electrodes (negatively charged) and the collecting plates (positively charged) with the use of a rectifier. This causes an ionization of the gas molecules adjacent to the emitting electrodes which referred to as "corona discharge". The positive ions migrate toward the collecting plate. . During their migration dust particles in the flue gas collide with the ion and take on the charge of the ion. The now negatively charged dust particles move toward the collecting plates where they deposit. Periodically, then the collecting plates are rapped and the dust particles fall down into the hoppers. The positively charged dust particles similarly move toward the emitting electrode where they deposit and for this reason the emitting electrodes are also periodically raped. ☐ **Theory of Precipitator Operation** . A precipitator is basically built up of a number of electrodes located inside a casing where flue gas is cleaned by means of an electrical charge of the dust particles in the gas. Figure illustrates the basic design of a precipitator. . The dust-laden flue gas is drawn into the casing at Point A and is passed through the emitting electrodes and the collectin plates with the use of an induced draft fan (D)		

ELECTROSTATIC PRECIPITATOR NORMAL OPERATION

DESCRIPTION	VALV #	BRKR LOC
☐ During normal operation of the precipitator equipment it is advisable and necessary to monitor certain vital functions on a scheduled basis. (several times a shift). Log sheets should be kept as indicators of trends in behavior of precipitation equipment.		
. At normal operation the rectifier kilovolt and ampmeters are operating and fault signal lights are extinguished		
. The rectifier instruments indicate: a) Higher voltage (KV-value) with higher load b) Lower voltage (KB-value) with lower load c) Lower voltage (KV-value) at unsteady operation		
Note When the ampmeter (A-meter) for the rectifier primary side shows a value within the red limit, the rectifier is overloaded		
. During normal operation, all the "ON" push buttons should be lighted		
. Check the gas temperature in the precipitator inlet		
. Normal flue gas temperature before the precipitator		
. Maximum temperature in regards to the construction		
Note Keep the precipitator current at the highest suitable Ma-value in spite of varying operating condition		
The higher the current (Ma-value), the better the collecting efficiency. If unsteady operation, the current (Ma-value) should be reduced		

DESCRIPTION	VALV #	BRKR LOC
☐ Check at least twice, every shift, that: . Indicating lights are lighting . The rapping mechanisms for the emitting collecting systems are functioning . All the dust handling equipment is functioning and the dust is transported in a normal way		
☐ The following should be recorded on the log for the precipitator, at least twice a shift: . Gas inlet temperature, if this information is not available at the precipitator inlet the first gas temp. indicating upstream of the precipitator may be used . Inlet pressure to the precipitator . Primary A-C voltage of the transformer-rectifier sets . Primary A-C current of the transformer-rectifier sets . Secondary D-C milliamperes of the transformer-rectifier sets . Secondary kilovolts		
☐ The items that need to be checked at least once every shift period are: . Visually check the electrode cleaning (rapping drive motors for both emitting and collecting electrodes) systems to insure that they are functioning correctly . Check for any "burned-out" pilot lamps and replace as necessary on the H.V. control cabinets and auxiliary equipment cabinets		

SOOT BLOWER SYSTEM START-UP

DESCRIPTION	VALV #	BRKR LOC
Note Refer to supervisor for sootblowing schedule		
☐ **POWER AVAILABILITY**		
. Energize distribution breaker		
☐ **VALVE ARRANGEMENT (PRIOR TO CHARGING)**		
. Fully open sootblower drain line valves		
. Isolate traps and open by-pass		
☐ **CHARGING SYSTEM**		
. Slowly, open root valve for steam to sootblower allowing condensate to drain and line to warm up		
. Slowly, fully open guardian valve allowing condensate to drain and line to warm up		
. Close sootblower drain valves		
. Fully open inlet and outlet valve on trap. Close the by-pass valve		
☐ **FLOW SWITCH**		
. Fully open both cut-off valves at orifice flange for flow switch		
. Fully open by-pass valve on flow switch		
. Slowly fully open bottom low pressure valve on flow switch		
Note It is not necessary to close any of the valves to this unit when the system is out of service		
. At control board for sootblowers energize panel by turning "on" switch		

DESCRIPTION	VALV #	BRKR LOC
. Perform program check . Depress sequence set button and program sootblowers . Push sequence Start button to activate sootblowers . After completion, sequence finished will acknowledge		
☐ ISOLATE SOOTBLOWERS		
. Visually inspect sootblower for retraction before isolating. . Close root and guardian valves . Fully open sootblower drain valves . Isolate steam traps		

BOILER FEED WATER SWITCHING TO ALTERNATE PUMP

DESCRIPTION	VALV #	BRKR LOC
☐ **PREREQUISITES ON ALTERNATE PUMP**		
. Prestart up checks completed		
. Fully open the suction valve on the electric pump		
. Fully open the suction valve on the steam turbine pump		
. Close the discharge valve on the steam turbine pump		
. Power available.		
☐ **FROM STEAM TURBINE TO ELECTRIC PUMP**		
. Unseat valve disc. from seat on discharge vlv		
. Start the electric pump		
. Open the discharge valve fully		
. After the discharge pressure and running conditions of the electric pump checks satisfactory, close the discharge valve on the steam turbine pump		
. Close the steam inlet valve to the steam turbine bringing it to a complete stop		
. Close the turbine exhaust valve		
☐ **FROM ELECTRIC TO STEAM TURBINE PUMP**		
. Follow start up procedure for steam turbine		
. Slowly open the steam turbine pump discharge valve to the full open position		

DESCRIPTION	VALV #	BRKR LOC
. Close the discharge valve on the electric pump		
. After the discharge pressure and running condition of the turbine pump checks satisfactory, shut down the electric pump		
Note **The suction and discharge valves on the electric standby pump should be left fully open for emergency start up**		

BOILER FEED WATER STEAM TURBINE/PUMP
PRE START UP CHECK

DESCRIPTION	VALV #	BRKR LOC
☐ VALVE CONFIGURATION		
. Fully open main cooling water inlet valve		
. Throttle individual cooling water supply valve to regulate the flows through the pump and packing stuffing box		
. Check for normal lube oil levels		
. Fully open all the drain valves on the steam inlet/exhausr lines and turbine casing		
. Close the inlet/outlet valves on the trap of the turbine steam inlet and fully open the bypass valve		
. Close the steam inlet valve to the turbine		
. Fully open the steam exhaust valve from the turbine		
. Reset the turbine overspeed trip		
. Fully open the pump suction valve		
. Close the pump discharge valve		
. Fully open recirc valve from the pumps		

BOILER FEED WATER STEAM TURBINE/PUMP
START - UP

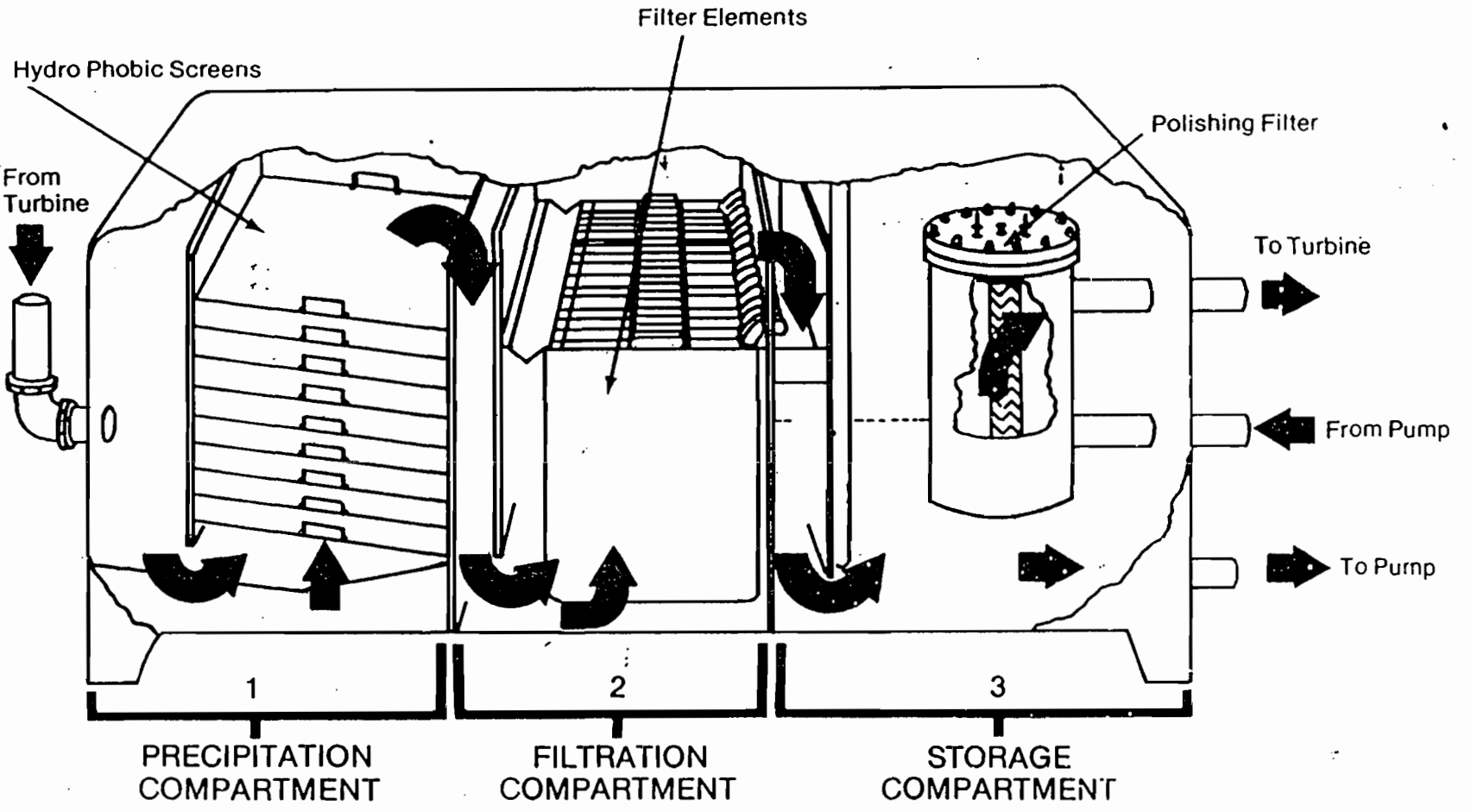
DESCRIPTION	VALV #	BRKR LOC
. Manual crack open the steam inlet valve to a point where sufficient steam will be admitted to turn the rotor slowly		
Note Check for rubbing noises at bearing and seals, check for shaft vibration		
. Manual trip the turbine and note that rotor slows down		
. Close steam inlet line and reset trip mechanism		
. Slowly crack steam inlet and follow through with first step		
. When the drain blows dry close off the drain valves		
. Fully open inlet/outlet valve on the steam trap close of the bypass valve. Gradually increase turbine speed to the governor low speed setting. The governor should come into action smoothly		
. When the governor has control, continue to open steam inlet valve to the full open position		
. Slowly open the pump discharge valve to the full open position		
Note **Governor** on turbine maintains a speed of 3600 RPM		
Note Check pump discharge pressure and note any vibration and noisy running, inspect oil system for leaks		

TURBINE OIL CONDITIONER PRE START UP CHECKS

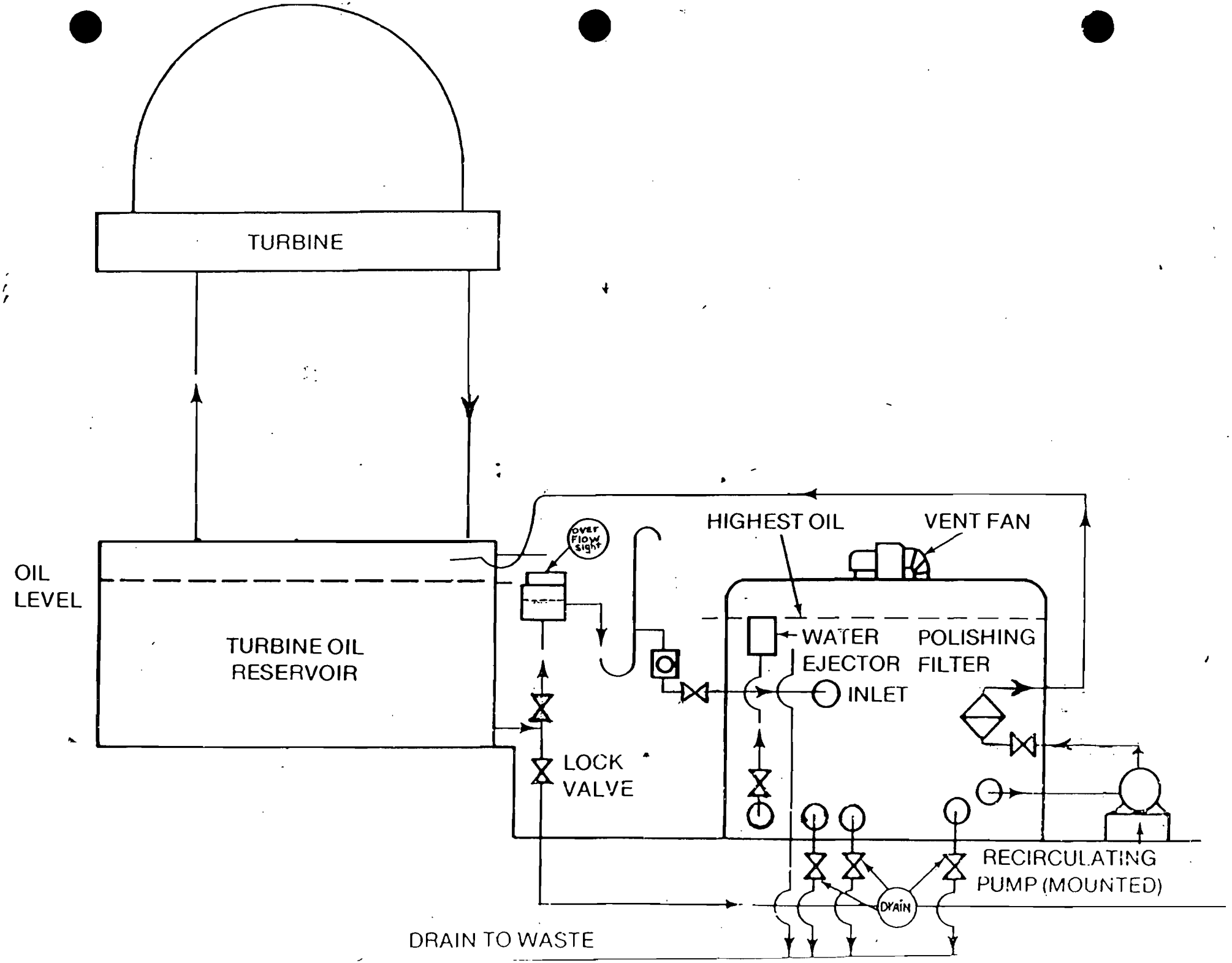
DESCRIPTION	VALV #	BRKR LOC
. Fully open all sight glass cut off valves and close the drains		
. Fill the bottom of the precipitation compartment with clean water until it fills the water level sight glass to G		
. Fully open isolation valve to water ejector		
. Fill precipitator compartment with oil until it overflows into the filter compartment		
. Fill the filtration compartment and permit the oil to flow through the filtering elements until the clean oil compartment is half full on the upper sight glass.		
. Fully open the discharge valve on the recirculating pump to the polishing filter		
. Fully open the polishing filter vent valve		
. Fully open inlet and outlet isolation valves of the turbine reservoir to the oil conditioner		

TURBINE OIL CONDITIONER START UP

DESCRIPTION	VALV #	BRKR LOC
. Energize the breaker to the recirculating pump		
. Start the recirculating pump and put switch in "Auto"		
. Vent the polishing filter of trapped air before closing the vent valve		
☐ **THE OPERATION WITHIN THE CONDITIONER IS AS FOLLOWS:**		
. The oil flows into the inlet. And under the baffle plate		
. Then into the precipitation compartment and up through the wire screen plates		
. "Free Water" is precipitated into the hopper bottom and ejected through the automatic water ejector		
. After passing over the weir the oil flows downward and enters the bottom of the gravity filter compartment		
. The oil then passes through the cloth filter element		
. Then through nozzles into a horizontal tray with down spout located in storage compartment		
. The oil is then pumped through the polishing filter out through the discharge line to the turbine reservoir		
Note Put oil conditioner into service as scheduled		



SCHEMATIC DRAWING SHOWING OIL FLOW THROUGH 832-P CONDITIONER


TURBINE
OIL
LEVEL
TURBINE OIL
RESERVOIR
OVER
FLOW
SIGHT
HIGHEST OIL
VENT FAN
WATER
EJECTOR
INLET
POLISHING
FILTER
LOCK
VALVE
RECIRCULATING
PUMP (MOUNTED)
DYAIN
DRAIN TO WASTE

HORIZONTAL FILTERS START-UP

- Fill each filter very slowly. This is necessary to prevent upsetting of the bed.
- Once all filters are filled with water, start with Unit #1 and backwash for approximately ten (10) minutes.
- Proceed to backwash Units #2 and #3.
- Note that after a filter is backwashed, it then supplies water to backwash the next unit and is actually rinsing. This applies to all units but the last one to be washed.
- System is ready to be placed in service.
- Open valve F4 to place filters into service

Note Normal operating flow is at 4000 GPM

BOILER
NORMAL SHUT DOWN

DESCRIPTION	VALV #	BRKR LOC
☐ **ASH CONVEYOR SHUT DOWN**		
. As stokers and ash conveyors run clear of ash deposit proceed to shut down		
☐ **Blow Soot 2 hrs. Prior to Scheduled Shutdown**		
☐ **E.S.P. SHUT DOWN**		
. Do not turn off esp's until I.D. fan is stopped		
. Turn rappers on in continuous for 10 minutes		
. Reduce power level on fields to 10% before turning power off		
. Then turn power off to rappers		
. De-energize fields following safety interlock sequence		
. At least one inspection door should be open for ventilation when precipitator is removed from service for more than one day		
Note **This will prevent condensation of moisture in a cooling precipitator**		
. Run conveyor out and secure RV conveyors		

DESCRIPTION	VALV #	BRKR LOC
☐ **GAS BURNER - LITE OFF** **- PERMISSIVES SATISFIED** * I.D. Fan Running * Furnace Pressure - 4.0" H2O/ +2.0" H2O * Combustion Air Press. 2.5"H2O * Steam Drum Water Level -6" * Steam Drum Press ≥ 690 PSIG * Gas press 7 PSIG/ 17 PSIG -"Operating limits OK" Displayed * Push Burner Start Button * Open Burner Air Pan Damper to 100% -"Purge in progress" Displayed * Hi fire limit switch made up **Note** Purge is 2 minutes in duration - "Purge complete" Displayed * Close Burner Air Fan Damper - "Ignition on" Displayed * Low Fire Switch Made up * Gas Pilot Valve Opens * Ignition XFMR Energizes * Gas Pilot Flame Establish **Note** Fire eye must recognize flame within 10 seconds or flame failure will occur and message displayed - "Fuel/Gas on" displayed * Maxon valve opens		

DESCRIPTION	VALV #	BRKR LOC
- "Firing gas released" Displayed *Fire established/gas guns firing - Increase firing rate to establish a heat up rate of 100° F/hr per warm up curve - Operator to verify flame pattern and furnace conditions		
☐ Boiler . Slowly reduce boiler steam flow rate from 180 Klbs to 60 Klbs over a 25 minute period by reducing solid fuel to the boiler furnace . Boiler at 60 Klbs stop solid fuel feed to the furnace and clear chutes . Allow solid fuel to burn out - Secure Gas Burner when fuel bed is burned away - Verify maxon valve closed - Close pilot gas line manual isolation valve and main gas isolation vlv for the boiler - Set furnace draft set point to -.25" H20 - Maintain normal water level - Roll stoker clean of ash . Close header and boiler stop valves and drain pressure from line . Stop OFA Fan . Reduce FD fan damper to maintain air flow through air preheater and across stoker . Clear J conveyor, rotary drums and F.F. chutes		

DESCRIPTION	VALV #	BRKR LOC
. When drum press reaches 500 PSIG place superheater vent in manual and close - Blow down bottom blow drains on muddrum, furnace and screen tube headers **Note Accomplish this by opening the blow valve fully and closing the blow valve fully as quickly as possible** . Accomplish this twice thru with a fifteen minute interval between cycles . Close attemporator isolation valves at the regulator and superheater . Close feed water regulator, bypass and economizer inlet valves . Stop I.D. fan . Open drum vents when boiler drum pressure reaches 25 PSIG		

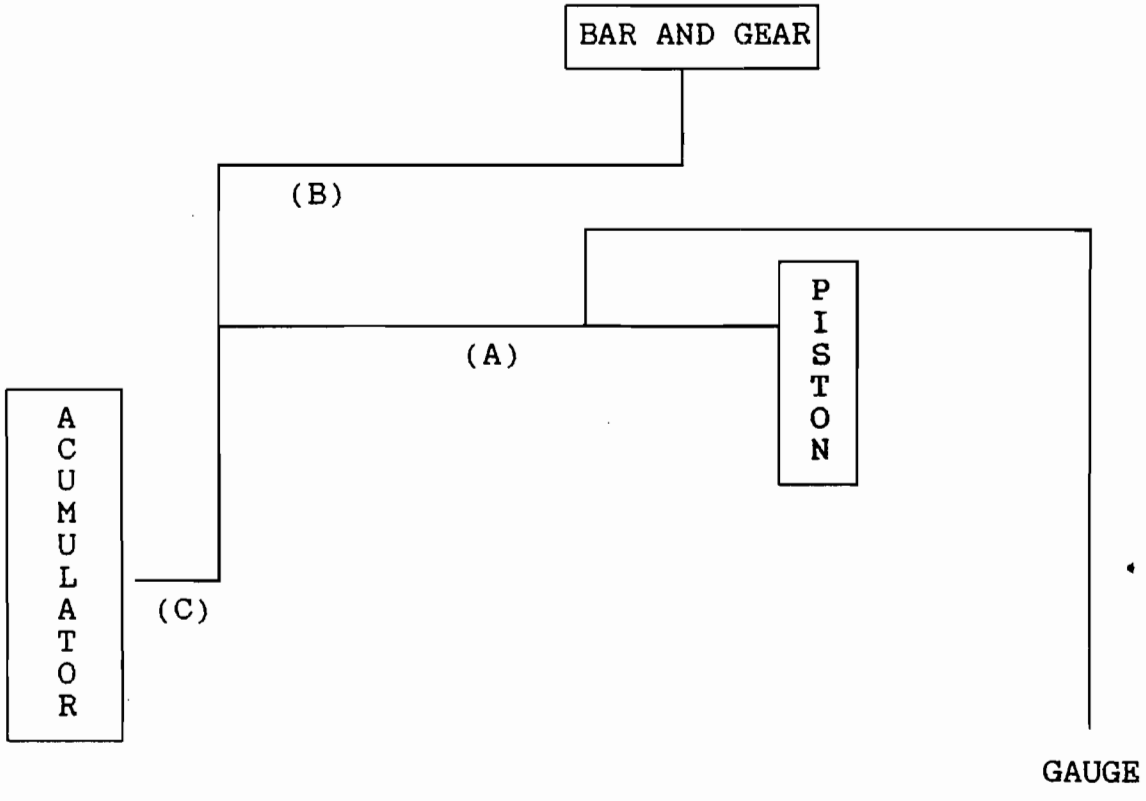
TURBINE GENERATOR SHUT DOWN

SHUT DOWN ON THE UNIT

- Unload the unit by pressing the push button "lower" of the speed controller
- As soon as the generator load has dropped below 3 MW trip the turbine. Check that the generator has been disconnected automatically from the grid by the reverse power relay.
- Check that the auxiliary oil pump has started automatically at approx. 2500 rpm
- Close the loop seal valve
- Close the valve at the suction of the "y" stage ejector
- Close the steam stop valves in the holding ejector "y" and "z" stage ejector steam supply lines
- Close the valve at the suction of the "Z" stage ejector
- As soon as vacuum has been shut down, by means of the vacuum breaker valve, close steam supply valve to the gland seal system
- Close valves on the live steam system
- Switch off the gland steam exhaust fan
- Immediately after standstill of the turbine start shaft turning gear operation as follows:
  - Auxiliary oil pump and one control oil pump must be in operation
  - Start jacking oil pump
  - Start shaft turning gear
- Open all drains
- Switch off condensate pump, close cooling water to condenser, gland steam condenser, oil and air cooler
- As soon as the casing temperature has dropped below 210 F shut down the barring gear by switching to "automatic off"
- Shut down the auxiliary oil pump and jacking pump. shut down the oil mist fan

Note When the set is not running, make absolutely sure that no steam enters the turbine through leaking valves (danger of corrosion).

OPERATION OF THE MANUAL BARRING GEAR
USE FOLLOWING DIAGRAM:



A is normally closed
C is normally open

- To operate close "C" and "B" valves then open "A" valve. Pump up to approximately 1450 PSIG
- Open "B" which bars over the rotor
- Repeat every 10 minutes until temperature drops to 200 F. or automatic can be used.

NOTE: The D.C. oil pump must be running to prevent damage to bearings while barring over the rotor.

Have someone watch to ensure that the rotor is turning.

GENERATOR DRYING DEVICE

DESCRIPTION	VALV #	BRKR LOC
☐ **START-UP** . Set the damper for reactivation air in the fully open position . Check that the inlet and outlet openings of the duct system is not blocked . Start up the dehumidifier using the switch. When the switch is on, the integral light is on . Remove the plastic plug at the side of the dehumidifier and check that the rotor is in motion (aprox. 10 revs per hour) . Read the reactivation air temperature on the thermometer when this has attained a steady value. The correct reactivation air temperature is shown in the diagram below. If the temperature is too low, the damper is to be gradually closed until the correct reactivation temperature is reached		

FUEL FEED SYSTEM SHUT DOWN

DESCRIPTION	VALV #	BRKR LOC
☐ DESIGNATED CONVEYOR		
. Adjust fuel quantity as per load requirements		
. Redirect fuel to alternate conveyor/s		
. Run conveyor clear of fuel		
. Stop conveyor from control room		
. De-energize conveyor by opening the local quick disconnect and/or trip cord		
Note **Follow lock out procedure before entering or begin working on conveyor**		
☐ **FUEL STORAGE CRANE**		
Note **Access door area should be kept clear of fuel**		
. Park crane to far end of fuel storage		
. Move trolley to access door area		
. In open position, lower the crane bucket onto the floor near the access door		
. Stop the crane by pushing the stop button on the cab chair		
. Open the main breaker to the crane located on the bridge		
Note **During maintenance, power to crane remain "on" only when operator is readjusting crane/ trolley or bucket position At the direction of the maintenance craftman only**		

COOLING TOWER SHUT DOWN

DESCRIPTION	VALV #	BRKR LOC
☐ PRIOR TO SHUT DOWN		
. All flow control valves should be left fully open. This will help reduce any excessive vacuum that would result from back siphoning effects		
☐ **SHUT DOWN**		
. As load is decreased, turn off fans to maintain return water temperature above 80 F		
. Close cooling tower pump discharge valves to approximately 60% full closure		
. Shut off cooling tower pumps and close the discharge valves		
Note **Fans should be tied off for extended shutdown periods. This will prevent damage to interval gear parts**		

AIR COMPRESSOR SYSTEM SHUTDOWN

DESCRIPTION	VALV #	BRKR LOC
☐ **NORMAL SHUTDOWN**		
. "Unload" the compressor		
. Stop the drive motor		
Note **With "Auto" The above steps are automatic when selector switch is placed in "off" position**		
. De-energize circuit breaker. Follow plant lock out procedure		
. Close inlet and outlet valve on cooling water to compressor		
. Close isolation valve on air receiver tank		
. Relieve pressure on receiver tank by opening the drain valve		
☐ **EMERGENCY SHUT DOWN**		
. In an emergency situation stop the drive motor first		
. The control may be moved to the unload position and the compressor relieved of pressure afterwards		

LOSS OF VACUUM

RESPONS	SYMPTOMS:
SHIFT SUPV CRO TURB OP	o Exhaust Pressure > 1.8 PSIA (26.3" Hg)
	o Exhaust Pressure > 3.3 PSIA (23" Hg)
	o Exhaust Pressure ≥ 5.8 (18" Hg)
	o Exhaust Temperature > 156°F
	o Turbine Hood Temperature > 190°F
	o Limiters Operating
	o High Hotwell Level
	IMMEDIATE ACTION:
CRO/TURB OP	o Notify Control Room Operator of the Condition
	o Vacuum ≥ 1.8 PSIA
TURB OP	- Check air ejector steam supply pressure @ 250 ~ 300 PSI
TURB OP	- Check Air Ejector for Proper Valve Arrangement
TURB OP	- Check Condensate Temperature * Cond. PP Inlet * Gland Seal Steam Condenser * Air Ejector Condenser
TURB OP	- Check Main Condenser * CLG WTR In/Out Press * CLG WTR In/Out Temp.
	- Report conditions found to Control Room Operator
	NOTE: Seasonal conditions may cause turbine exhaust pressure to be at 1.5 ~ 2.0 PSIA
	o Vacuum ≥ 3.3 PSIA

RESPON	
	NOTE: Limiters operating at this time, turbine control valves automatically reduced to 10%.
TURB OP	- Notify Control Room Operator of Conditions
CRO	- Reduce Boiler Load Accordingly
TURB OP	- Check Hotwell Sightglass for leaks
TURB OP	- Check Condensate PP Base and Packing Gland for leaks
TURB OP	- Check condensate Flow - Minimum 300 GPM
TURB OP	- Check all instrumentation and tubing connections for leaks
TURB OP	- Verify instrument readings with mechanical gauges
	o Vacuum ≥ 5.8 PSIG
	NOTE: Turbine will trip automatically
TURB OP	- Notify Control Room Operator of Condition
TURB OP	- Trip the Turbine
TURB OP	- Open the Generator Breaker
TURB OP	- Open the Field Breaker
TURB OP	- Verify a decreasing RPM on Turbine with Generator under no load

RESPON	SUPPLEMENTARY ACTION:
SHIFT SUPV	o Notify Senior Shift Supervisor
S/S TURB OP	o Thorough Walkdown of Turbine and Auxiliary systems checking for malfunctioning control valves, verifying all remote indicating devices against mechanical devices (level, temp, etc) check all vacuum connections for leaks
TURBO OP	o Place turbine on turning gear

UNUSUAL NOISE/VIBRATION/INDICATION ON TURBINE-GENERATOR SET

RESPON	SYMPTOMS
SHIFT SUPV CRO TURB OP	o Metallic Noise o Rumbling, Banging o TSI alarm or trip indication
	IMMEDIATE ACTION:
TURB OP	o Notify Control Room Operator
CRO	o Reduce Boiler Load Accordingly
TURB OP	o Trip the Turbine
TURB OP	o Open Generator Breaker
TURB OP	o Open Field Breaker
TURB OP	o Start and verify Aux or D.C. Lube Oil Pump running
TURB OP	o Observe Lube Oil Pressure Indication 25 ~ 28 PSIG to the bearings **NOTE: If lube oil pressure indicated < 20 PSIG carry out EMERGENCY PROCEDURE "LOSS OF LUBE OIL PRESSURE"**
TURB OP	o Report the status of the turbine generator set to the control room operator
	SUPPLEMENTARY ACTION:
SHIFT SUPV	o Notify Senior Shift Supervisor and Power House Manager
TURB OP	o Verify the following: - Turbine RPM Decreasing - Generator Indicates "0" volts and Amps - Field Volts Indicate "0" - Lube Oil Pressure to the Bearing ≥ 15 PSIG - Sigh Flow Glass Indicates Lube Oil Flow

:SPON		DESCRIPTION
		- Bearing Vibration Levels
		- Shaft Displacement Levels
		- Live Steam Temperature
		- Open Atmosphere Drain from HP, IP and LP extraction turbine ports Objective for large amounts of condensate
TURB OP	o	Report conditions found to the control room operator
TURB OP	o	Start turning gear when turbine shaft is at a stand still.

LOSS OF LUBE OIL PRESSURE

RESPON	SYMPTOMS:
SHIFT SUPV	o Lube Oil Pressure < 60%
CRO	o Lube Oil Pressure < 40%
TURB OP	o Lube Oil Pressure < 30%
	o Auxiliary Lube Oil Pump Running
	o D.C. Lube Oil Pump Running
	o Lube Oil Pressure < 15 PSIG
	o Lube Oil Tank Level Low
	o High Bearing Temperature
	o High Oil Drain Temperature
	IMMEDIATE ACTION:
TURB OP	o Notify Control Room Operator of the Condition
CRO	o Reduce Boiler Load Accordingly
TURB OP	o Trip the Turbine
TURB OP	o Open Generator Breaker
TURB OP	o Open Field Breaker
TURB OP	o Start and/or verify back up Lube Oil Pump(s) running
	- A/C Auxiliary Lube Oil Pump
	- D.C. Emergency Lube Oil Pump
TURB OP	o Observe Lube Oil Pressure indication 25 ~ 28 PSIG TO the bearings
	NOTE: Lube oil pressure to the bearings at < 20 PSIG with pumps running may indicate a major leak. If lube oil pressure ≥ 20 PSIG proceed to "Supplementary Actions". Lube oil pressure < 20 PSIG continue to next step.
TURB OP	o Report "Low Lube Oil Pressure with pump running" to Control Room Operator and request assistance.

RESPON	
TURB OP	o Walk down Turbine Generator and Lube Oil System observing for major leaks. - If major leak is found report condition and location to Control Room Operator and carry out emergency procedure "Major Oil Leak".
TURB OP	o Check filter differential pressure and shift filters, observe lube oil pressure to the bearings.
TURB OP	o Report status to the Control Room Operator
	SUPPLEMENTARY ACTION:
SHIFT SUPV	o Notify Senior Shift Supervisor and Power House Manager
TURB OP	o Verify the following: - Turbine RPM decreasing - Generator indicates "0" Volts and Amps - Field volts indicate "0" - Lube Oil Pressure to the bearings ≤ 15 PSIG - Sight flow glass indicates Lube Oil Flow
	NOTE: Report conditions to the Control Room Operator
TURB OP	o Lube Oil Tank Level
TURB OP	o Lube Oil Filter Differential < 6PSIG
TURB OP	o Shift Lube Oil Filters
TURB OP	o Start Jacking Oil Pump
TURB OP	o Close Turbine Root Steam Valve
TURB OP	o Place Turbine on turning gear when shaft is at a stand still
TURB OP	o Remove dirty lube oil strainer for inspection by Power House Manager - Return strainer to standby service - Shift Lube Oil strainer after 30 minutes - Remove dirty lube oil strainer for inspection by the Power House Manager.

RUPTURED TUBE - SUPERHEATER

RESPON	SYMPTOMS:
SHIFT SUPV CRO TURB OP	o Increased Feedwater Flow o Loud hissing or Blowing Noise from the Boiler area
BLR OP	o Decrease in steam flow o Decrease in Steam Drum Pressure o Increase in Fuel Feed Demand
	IMMEDIATE ACTION:
BLR OP	o Notify Control Room Operator of the condition
CRO	o If normal Boiler parameters can be maintained (water level, steam drum press and steam flow), effect a normal controlled shutdown of the boiler
CRO	o If a steam drum water level, steam pressure and/or steam flow cannot be maintained effect an emergency shutdown of the boiler in accordance with the immediate action procedures for a "ruptured tube water tube"
	SUPPLEMENTARY ACTION:
	o Perform actions in accordance with the supplementary action procedures for a "Ruptured Tube Water Tube"

LOW WATER

RESPON	SYMPTOMS:
SHIFT SUPV	o Low or Low-low water alarm
CRO	o PLC Indication Flashing
TURB OP	o Electronic Eye-Hye Indication ≤ - 4"
BLR OP	o Bailey/Yarway Indication ≤ - 4"
	o Water Level in Steam Drum Gage Glass ≤ - 4"
	o Decrease in Steam Drum Pressure
	o Decrease in Steam Flow
	IMMEDIATE ACTION:
BLR OP	o Notify Control Room Operator of the Condition
CRO/BLR OP	o ≤ - 4" Water Level in Steam Drum
	- Check Boiler FeedWater Pressure 800~1000 PSI
	- Check Feedwater Flow Indication
	- Check Position of Boiler FeedWater Regulator
	- Place Boiler Feedwater Regulator DCS to manual and open Feedwater Regulator
CRO	o ≤ - 6" Water Level in Steam Drum
	- Stop Fuel Feeders
	- Place PLC Bypass to the "ON" position
CRO	o - 8" Water Level in Steam Drum
	- Close the Boiler Feedwater Regulator
	- Stop I.D. Fan and O.F.A. Fan
	- Place F.D. Fan in manual and decrease draft to 0.25" H_2O

RESPON	SUPPLEMENTARY ACTION
BLR OP	o Close Header Stop Valve
CRO/BLR OP	o Open Automatic Superheater Vent and Drum Vents
BLR OP	o Walk down Boiler Feedwater System looking for major leaks or closed valves
BLR OP	o Close Boiler FeedWater Regulator Isolation Valves
BLR OP	o Close Economizer Inlet Valve
CRO/BLR OP	o Check Boiler Feedwater Regulator Action
SHIFT SUPV	o Notify Senior Shift Supervisor and Power House Manager
CRO/BLR OP	o Roll off the Stoker
CRO	o Stop the F.D. Fan

HIGH WATER

RESPON	SYMPTOMS
SHIFT SUPV	o High Water Alarm +4"
CRO	o Electronic Eye-Eye Indication ≥ + 4
TURB OP	o Bailey/Yarway Indication ≥ + 4"
BLR OP	o Water level in Steam drum Gage Glass ≥ + 4"
	o Decreasing Superheater Outlet Temperature
	IMMEDIATE ACTION:
BLR OP	o Notify Control Room Operator of the condition
CRO/BLR OP	o ≥ 4" Water Level in Steam Drum
	- Check Feedwater Flow Indication
	- Check Position of Boiler FeedWater Regulator
	- Check Bailey set point at "0"
	- Place Boiler FeedWater Regulator DCS to manual and start closing down on the Valve
	- Stop #2 and 4 Fuel Feeders
CRO/BLR OP	o + 8" Water Level in Steam Drum
	- Close the Boiler FeedWater Regulator
	- Stop all Fuel Feeders
	- Close the Boiler Header Stop Valve
	- Check Superheater Outlet Temperature for indication of Carryover
	NOTE: If Carryover is occurring perform action in accordance with Immediate Action Procedures for "Carryover"

ESPON	SUPPLEMENTARY ACTION:	
CRO/BLR OP	o	Roll off the Stoker
BLR OP	o	Close Boiler FeedWater Regulator Isolation Valves and Economizer Inlet Valve
BLR OP	o	Open Mud Drum Bottom Blow to Restore Drum level to normal
BLR OP	o	Open S/H Outlet Drains
CRO/BLR OP	o	Check Boiler FeedWater Regulator Valve Action
SHIFT SUPV	o	Notify Senior Shift Supervisor and Power House Manager

CARRYOVER

RESPON	SYMPTOMS
SHIFT SUPV	o Low Superheater Temperature
CRO	o Steam Drum Level > + 8"
TURB OP	- Gage Glass
BLR OP	- Bailey
	- Yarway
	- Electronic Eye-Eye
	o Water Hammers in Steam System
	IMMEDIATE ACTION:
TURB OP	o Trip Turbine Generators in Service
TURB OP	o Open Lead, Wheel and loop drains on Turbine Generators
CRO	o Stop all Fuel Feeders on Boiler in service
	o Open all Electromatics on Boilers in service
CRO	o Close the Boiler Feedwater Regulator Valve on the effected Boiler/s
CRO	o Open the Automatic Superheater vents on all Boilers in service
CRO	o Close the Electromatic valves on all in service boilers when steam drum pressure is dropped to 500 PSI
	NOTE: Activate electromatics as often as necessary to keep Boiler Safeties from lifting
CRO	o Maintain normal water levels on the unaffected Boilers

RESPON	SUPPLEMENTARY ACTION:
BLR OP	o Close the Header Stop Valve on the affected Boiler(s)
BLROP/TURBOP	o Open all Atmosphere drains on Steam Headers and turbine extraction points
BLR OP	o Open Boiler line drain at the non-return valve on the affected Boiler(s)
	NOTE: Observe all Atmosphere drains upon initial opening and report amount of water draining to the Shift Supervisor
SHIFT SUPV	o Notify Senior Shift Supervisor and Power House Manager
BLR OP	o Close Boiler Feedwater Regulator Isolation Valves and Economizer Inlet Valve on the affected Boiler(s)
SHIFT SUPV	o When Shift Supervisor determines that all steam lines on the unaffected Boiler(s), main steam Header and turbine lead lines are free of water and no water indication to the turbine has occurred restart the unaffected Plant equipment.
	NOTE: Turbine Monitoring Equipment should be closely checked for any deviation in Shaft Displacement and machine vibration just prior to and during the occurrence.
	NOTE: If water hammers occurred a thorough walk down of system must be made prior to and during the Plant start-up for identification of damage

FURNACE EXPLOSION

RESPON	
	SYMPTOMS:
SHIFT SUPV	o Loud bang from the furnace area
CRO	o Temporary increase in furnace pressure
TURB OP BLR OP	o Smoke/fire/ash forced out of furnace and boiler access/opening
	NOTE: If severe enough ruptured tubes may occur.
	IMMEDIATE ACTION:
BLR OP	o Notify Control Room Operator of the condition
CRO	o Stop "C" Conveyor and the Boiler Fuel Feeders
CRO	o Stop all Fans on the affected Boiler
CRO	o Maintain a normal water level in the Steam Drum
ALL PERSONNEL	o Unreel and charge fire hoses on the J, Control and basements levels
ALL PERSONNEL	o Inspect for fires on all levels and report same as found - Ash man-basement - Conveyor spotter-J level (A, B, C & J Conveyor) - Aux I-H Level and J Level - Aux II-Control Deck and Stoker Levels - Crane Operator - Fuel Storage
	NOTE: Shift supervisor to re-assign personnel as initial reports come in. Request assistance from process as situation warrants.
	NOTE: Keep all personnel clear of the immediate vicinity of the furnace until the Stoker is clear.

RESPON	SUPPLEMENTARY
	NOTE: Do not restart conveyor systems until thorough inspection are completed and no open flame or smoldering material has been reported for 30 minutes.
SHIFT SUPV	o Notify Senior Shift Supervisor and Power House Manager
BLR OP	o Close Boiler Feedwater regulator isolation valves and Economizer inlet
BLR OP	o Close Header stop and non-return valves
CRO/BLR OP	o Roll off stoker on the affected boiler(s)
SHIFT SUPV/ BLR OP	o Inspect collection for signs of the cause
SHIFT SUPV	o Restart unaffected units as situation dictates

LOSS OF FEEDWATER PRESSURE/FLOW (BOILER)

RESPON	
	NOTE: **This condition is the boiler feedwater piping and valves from the regulator to Boiler Steam Drum.**
	SYMPTOMS:
SHIFT SUPV	o Malfunctioning or stuck Feedwater regulator
CRO TURB OP BLR OP	o Ruptured piping
	o Economizer tube failure
	o Low/Low-Low Steam Drum water level indication
	IMMEDIATE ACTIONS:
	NOTE: **If at anytime the low low alarm indicates for the steam drum water level while the Boiler is still being fed, carryout immediate actions for "LOW WATER"**
CRO	o Notify the Shift Supervisor of the condition
CRO/BLR OP	o Place the Boiler Feedwater regulator DCS in manual operation - Increase flow to the Boiler to maintain Water level - Obtain a visual verification of the valve position locally
BLR OP	o Initiate a visual inspection of the Boiler Feedwater piping, flanges and valving for integrity and arrangement. Report abnormalities immediately.
CRO/BLR OP	o Ruptured piping or blown flange gaskets - Stop Fuel Feed to the Boiler - Close the Boiler Feedwater Regulator and isolation valves - Close the Feedwater Header isolation valve

RESPON	SUPPLEMENTARY ACTION:
CRO	o Steam Drum Water level returns to normal, attempt to place in auto - Observe operation for smooth action and ability to hold set point - Any abnormalities in the regulator, operate in manual if possible, notify Instrumentation technician. - Remove Boiler from service if condition will not allow for safe operation
CRO/BLR OP	o Ruptured piping or blown flange gasket - Close Steam Header stop and non-return valves - Open Superheater and Drum vents o Notify Senior Shift Supervisor and Power House Manager

HIGH SUPERHEATER OUTLET STEAM TEMPERATURE

RESPON	SYMPTOMS:
SHIFT SUPV	o Annunciator alarm indication
CRO	o Bailey indication ≤ 750°F
TURB OP	o Live Steam Temp @ Turb-Gen Set
	IMMEDIATE ACTION:
CRO/BLR OP	o Check the following - Check Boiler Load set point and process variable, 180 k/lb - Attemporator valve position indication, set point and process variable, 720°F - Check attemporator flow indication - Check piping valve arrangement, ensure all manual isolation valves are fully open
CRO	o Attemporation regulator malfunction - Place DCS in manual control to increase spraywater flow - Monitor Superheater Steam outlet temperature to ensure a drop in temperature - Place attemporator regulator valve back in automatic and monitor for proper set point control
CRO	o Superheater outlet steam temperature ≤ 765°F - Reduce Boiler load to 135K/lb - Monitor steam outlet temperature for a decrease
CRO	o Superheater outlet steam temperature ≥ 765°F - Reduce Boiler Load to 135 k/lb - Monitor steam outlet temperature for a decrease

RESPON	
CRO	o Superheater outlet steam temperature ≥ 775°F - Reduce Boiler Load to 90 k/lb steam flow - Monitor Steam outlet temperature for a decrease
CRO	o Superheater outlet steam temperature ≥ 780°F - Remove Boiler from service
	SUPPLEMENTARY ACTION:
CRO/BLR OP	o Stroke attemporator regulator, observe the valve action locally
BLR OP	o Close Header stop valve and boiler non return valve
SHIFT SUPV	o Notify Senior Shift Supervisor

RUPTURED TUBE - WATER TUBE

RESPON	SYMPTOMS:
SHIFT SUPV CRO	o Loud blowing noise from furnace or boiler generation area
TURB OP	o Escaping steam/water from boiler access/openings
BLR OP	o Steam rising from stacks
	o Feedwater flow increase
	o Low water level in steam drum
	o Decrease in steam drum pressure
	o Decrease in steam flow
	IMMEDIATE ACTION:
BLR OP	o Notify Control Room Operator of the condition
CRO	o Stop Fuel Feed to the Furnace
CRO	o Open Electromatic relief valve & automatic S/H Vent
CRO	o Maintain a water level in the steam between +8"/-8"
	NOTE: If a drum level cannot be maintained between +8"/-8" close the automatic Boiler Feedwater regulator **When lo-lo alarm activates place PLC bypass in "on" position to keep I.D. Fan running**
CRO	o De-energize ESP fields
CRO	o Maintain a negative draft of -2.0" H_2O
BLR OP	o Open drum vents
BLR OP	o Close the Header Stop Valve
CRO	o Stop the OFA Fan

RESPON	SUPPLEMENTARY ACTION:
CRO	o Close Electromatic relief valve when steam drum pressure reaches "300" PSI
BLR OP	o Close Boiler non-return valve
BLR OP	o Close Boiler Feedwater Regulator Isolation Valves and Economizer Inlet Valve
CRO	o Stop F.D. Fan
CRO	o Stop I.D. Fan
SHIFT SUPV	o Notify Senior Shift Supervisor and Power House Manager
SHIFT SUPV	o Lockout the Boiler IAW Lockout Procedures

HOT BEARING

RESPON	SYMPTOMS:
SHIFT SUPV	o Alarm indication on TSI
CRO	o 50°F difference on L.O. HT exch. inlet and outlet temp.
TURB OP	o 5°F rise p/minute for 10 minutes on the bearing or bearing drain oil temperature
	o Drain Oil Temp ≥ 180°F
	o Bearing Temp ≥ 190°F
	IMMEDIATE ACTION
TURB OP	o Notify Control Room Operator of the Condition
CRO	o Reduce BLR load accordingly
TURB OP	o Trip the Turbine
TURB OP	o Open Generator Breaker
TURB OP	o Open Field Breaker
TURB OP	o Verify Decreasing RPM and Generator "No load" condition
TURB OP	o Check Cooling Water Supply Temperature from the Tower
TURB OP	o Check Lube Oil Pressure - > 15 PSIG
	- Start Auxiliary Lo, Pump if necessary
TURB OP	o Check Lube Oil Pressure at the Bearings
TURB OP	o Check return and supply lube oil pressure and temp at the heat exchanger
TURB OP	o Vent cooling side of lube oil heat exchanger
TURB OP	o Check bearing temperature for a decreasing condition
TURB OP	o Report conditions found to Control Room Operator

RESPON	SUPPLEMENTARY ACTION
SHIFT SUPV	o Notify Senior Shift Supervisor and Power House Manager
TURB OP	o Shift Lube Oil strainers and remove basket for Power House Manager inspection

HIGH HOTWELL LEVEL

RESPON	SYMPTOMS
SHIFT SUPV	o Hi Hotwell Alarm
CRO	o Decreasing Vacuum
TURB OP	o Level Indication ≥ 50 inches
	o Increased Exhaust Heat Temperature
	IMMEDIATE ACTION
TURB OP	o Verify Hotwell Level at Gage Glass
TURB OP	o Verify the Proper sequencing and operation of the following control valves: - Hotwell Level - Hotwell Dumpback - Vacuum Drag Make up
TURB OP	o Verify Hotwell Level Setpoint (42-46")
CRO/TURB OP	o Verify Recirc. Control Setpoint (300 GPM)
	NOTE: **Ensure a minimum condensate flow of 300 GPM** is maintained through gland seal and air ejector condenser
TURB OP	o Hotwell Level ≥ 96 inches - Trip the Turbine - Open the Generator Breaker - Open the Field Breaker - Verify a Decreasing RPM on the Turbine and "No Load" Generator condition
TURB OP	o Isolate/control a malfunctioning automatic valve by closing a manual isolation valve

SPON	SUPPLEMENTARY ACTION
SHIFT SUPV	o Notify Senior Shift Supervisor and Power House Manager
TURB OP	o Isolate Control Valve problem
TURB OP	o Return Hotwell level to normal

OPERATIONS AND MAINTENANCE PLAN

The operations and maintenance plan submitted in the Site Certification Application is attached. The plan will be updated following completion of the biomass processing and air pollution control system upgrade.

EXHIBIT "H"

Facility General Operating and
Maintenance Description

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
RESOURCE RECOVERY AND MANAGEMENT FACILITY INSPECTION REPORT

GMS ID. NO._____ INSPECTION DATE:_____

FACILITY NAME:_____

PERMIT NO.:_____ EXPIRATION DATE:_____

ADDRESS:(or Sec/Twn/Rg)_____

CITY:_____ STATE:_____ ZIP:_____

PERMITTEE or OPERATING AUTHORITY:_____

MAILING ADDRESS:_____

CITY:_____ STATE:_____ ZIP:_____

TELEPHONE NUMBER (Permittee or Operating Authority):__(_____)_____

INSPECTION PARTICIPANTS: (Include all Landfill and Department employees specifying titles; indicate principal inspector):_____

_____

TYPE OF INSPECTION:

_____ Construction completion(_____ phase)
_____ Operation
_____ Closure
_____ Post closure
_____ Reinspection
_____ Complaint response
_____ Plant Facility
_____ Other

Exhibit "H"
Page 1 of 36

PAGE 1

A	CONSTRUCTION VERIFICATION	YES	NO	UNK	N/A
1.	Subgrade or foundation adequately prepared				
2.	Liner construction/installation according to plans				
3.	Leachate control system installation to plans				
4.	Surface water system/construction to plans				
5.	Gas control system installation per plans				
6.	Groundwater monitoring system constructed per plans				
	Comments				
B	OPERATIONS				
7.	Copy of approved drawings/plans/permit onsite				
8.	All permit conditions complied with				
9.	Only permitted waste types disposed of				
10.	Waste quantity records kept/forwarded as required				
11.	Weighing of incoming waste				
12.	Method and sequence of filling waste per plans				
13.	Waste compaction as required				
14.	Working face/grades - slope <= 30 degree				
15.	Attendant present				
16.	Sufficient operating equipment				
17.	Sufficient reserve equipment or other arrangements				
18.	Adequate communication facilites				
19.	Salvaging/res. recovery under operating authority				
	Comments				
C	MAINTENANCE				
20.	Effective barrier preventing unauthorized entry				
21.	Disposal area easily accessible				
22.	Retention/detention pond/ditch/culvert maintained				
23.	Adequate approved dust control methods				
24.	Adequate vector control by approved methods				
25.	Litter control maintained				
26.	Fire protection/fighting facilities operational				

		YES	NO	UNK	N/A
C	MAINTENANCE (Cont.)				
27.	Groudwater wells intact and functioning properly				
	Comments				
D	WATER MANAGEMENT AND MONITORING				
28.	Groundwater sampling/testing at required frequency				
29.	Groundwater compliance free-from's, PDWS & SDWS				
30.	Mixing of leachate/stormwater prevented/minimized				
31.	Stormwater runon/off controlled, collected, treated				
	Comments				
E	COVER				
32.	Adequate quantity of cover material on hand				
33.	Frequency, amount of initial cover as required				
34.	Frequency, amount of intermediate cover as required				
35.	Frequency, amount of final cover as required				
36.	Adequate erosion control				
	Comments				
F	CLOSURE				
37.	Final cover installation per plans				
38.	Facility closure prohibits unauthorized dumping				
39.	All actions for closure per approved plans				
40.	Final survey/as-built report with survey monuments				
41.	Survey monuments and permanent markers installed				
42.	Long term care performed adequately				

		YES	NO	UNK	N/A
F	CLOSURE (Cont.)				
	Comments				
G	RDF PLANT/STRUCTURES-WASTE RECEIVING AREAS 40T/41T				
43.	Building Damages and Tipping Floors				
	(Accessibility/Repair/Cleanliness-O & M Manual)				
44.	Vector control (Bait Traps/Fogging-O & M Manual)				
45.	Dust control(Contained within building)				
46.	Fire protection systems evident				
	(Eg. fire hose/fire cannon/overhead sprinklers)				
47.	Operating Equipment while receiving				
	(rolling stock/overhead cranes)				
48.	Hazardous waste staging area designated				
	Comments				
H	WASTE PROCESSING PLANT AREAS 40 & 41				
49.	Drain and sump pump/operational in trash Alley				
50	Fire protection systems evident				
	(Eg. fire hose/fire cannon/overhead sprinklers)				
51	Dust collectors				
	(baghouses-fugitive dust emissions observed)				
52.	Vector control (Bait traps/Fogging-O & M Manual)				
53.	RDF/Spillage control inside building-O & M Manual)				
54.	Operational Equipment (trommel/shredder/conveyor/				
	cherry pickers-O & M Manual)				
55.	Damage that allows fugitive emissions/leachate/				
	litter to building exterior				
	Comments				

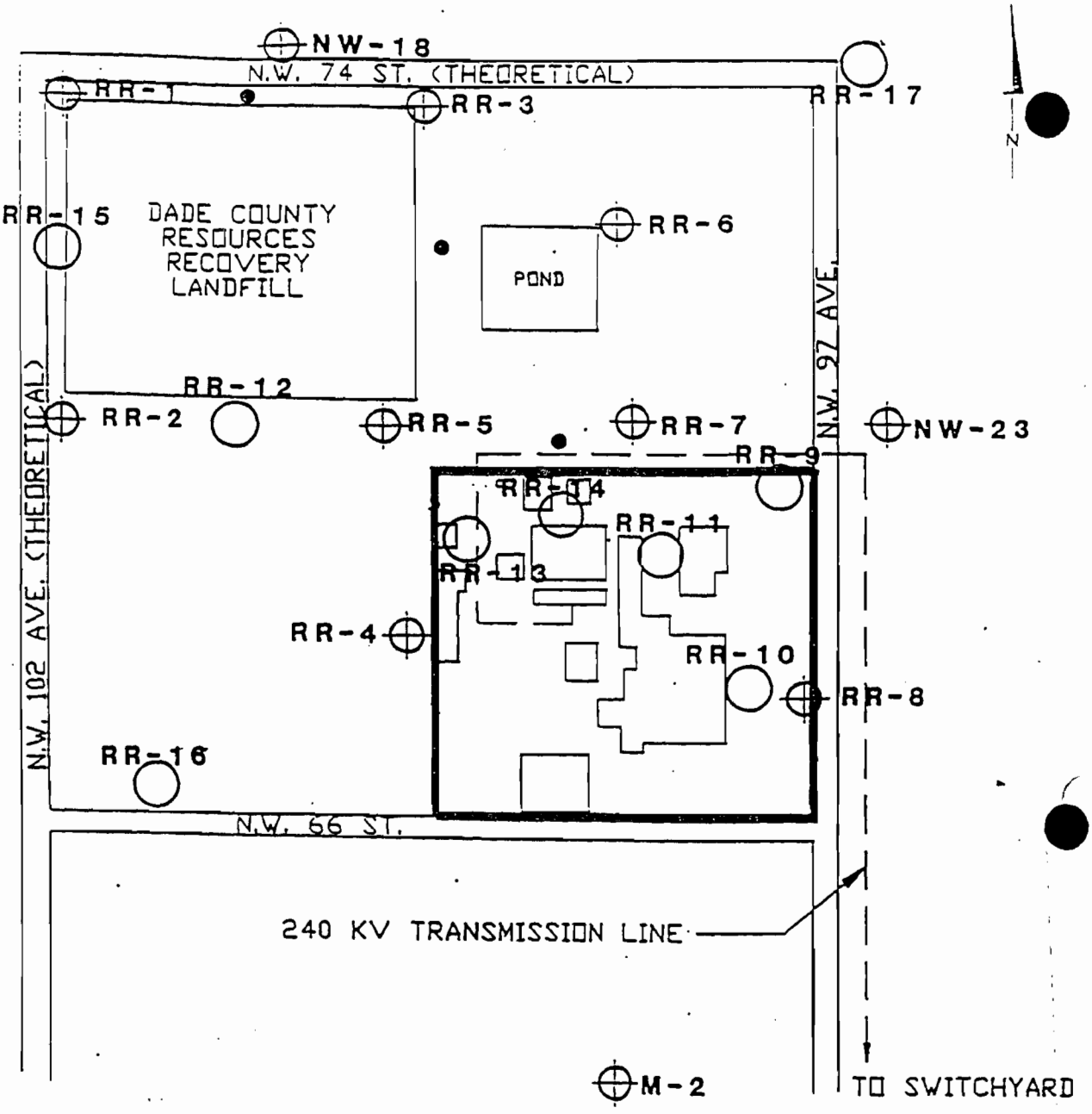
		YES	NO	UNK	N/A
I	RDF STORAGE BUILDING - AREA 61				
56.	Fire protection systems (Eg. fire hose/fire cannon/				
	overhead sprinklers)				
57.	RDF contained in building				
58.	RDF building doors (open/closed-O & M Manual)				
J	UNDERS STORAGE BUILDING - AREA 41U				
59.	Unders contained in building (excluding truck				
	traffic-O & M Manual)				
60.	Vector control (Bait traps/Fogging-O & M Manual)				
	Comments				
K	POWER PLANT (INCLUDING BREEZEWAYS & ALLEYS)				
	AREAS 63, 66 & 67				
61.	Fire protection systems (Eg. fire hoses, portable				
	extinguishers)				
62.	RDF/litter control (not under roof; alleys- O & M				
	Manual)				
63.	Grease and lubricating oil storage (Area 07)				
	Designated - storage & removal procedures - O & M				
	Manual				
64.	Ash contaned in ash incline conveyer systems-O & M				
	Manual				
65.	Chemical storage (boiler feed chemicals-Area 63)				
	Designated storage & removal procedures - O & M				
	Manual				
	Comments				
L	AIR EMISSION CONTROL UNITS/ASH - AREAS 64 & 64S Pending Clean Air Act Ammendments				
66.	Electrostatic precipitators/baghouses operational				
	(stack emissions) - O & M Manual				
67.	Dry scrubbers				
68.	Drains and sumps operational (wastewater contained				
	in sump structure) - O & M Manual				

		YES	NO	UNK	N/A
L	AIR EMISSION CONTROL UNITS/ASH - AREAS 64 & 64S Pending Clean Air Act Ammendments (Cont.)				
69.	Lime slaker residue				
70.	Fire protection system (Eg. portable extinguishers)				
71.	Stacks sealed				
	CONTINUOUS EMISSION MONITORS				
72.	Opacity				
73.	Sulphur dioxide				
74.	Nitrogen oxides				
75.	Carbon monoxide				
76.	Other				
	Comments				
	ASH HANDLING AREA				
77.	Ash containment in ash building				
	Comments				
M	PERIMETER COMMONS & PLANT COMMONS - AREAS 20 & 68				
78.	Litter control evident - O & M Manual				
79.	Perimeter fence maintained inside contract area as designated				
80.	Signage (hours of operation, owner/operation, tipping fees)				
	Comments				

		YES	NO	UNK	N/A
N	EQUIPMENT MAINTENANCE AREAS 50 & 55				
81.	Drains and sump pumps in fuel depot & washdown rack				
82.	Grease and lubricating oil storage designated				
	(storage & removal procedures - O & M Manual)				
83.	Vehicle washdown				
	Comments				
O.	TIRE & FERROUS STORAGE - AREAS 45				
84.	Dust collectors (cyclones) fugitive dust & visible				
	emissions - O & M Manual				
85.	Ferrous metals and waste tires contained in roofed				
	bunker				
86.	Roof damage to ferrous storages & waste tires				
	storage				
87.	Operation equipment while processing/receiving				
	(rolling stock - O & M Manual)				
88.	Fire protection system (Eg. fire hose/fire				
	extinguisher)				
	Comments				
P	COOLING TOWERS - AREA 65				
89.	Fire protection systems(Eg. fire extinguisher/				
	deluge system)				
90.	Chemical storage (chlorine) - storage & removal -				
	O & M Manual				
	Comments				

		YES	NO	UNK	N/A
Q	WATER TREATMENT - AREA 62				
91.	Chemical storage - Sulphuric Acid & Caustic tank				
	above ground - storage & removal - O & M Manual				
92.	Lime slakers slurry contained within structure				
93.	Lime silo dust control (filter bag) visible				
	emissions during truck loading operation				
94.	Wastewater neutralization (applicable until new				
	storm water/wastewater treatment plant/surge pond				
	area on line				
95.	Fire protection (Eg. fire extinguisher)				
	Comments				
	Signed: Date				
	Site Representative				
cc:					

Exhibit "H"
Page 8 of 36



METRO·DADE

RESOURCES RECOVERY FACILITY

SITE PLAN

• Proposed Soil Borings

⊕ Existing Monitoring Wells

○ Proposed Monitoring Wells

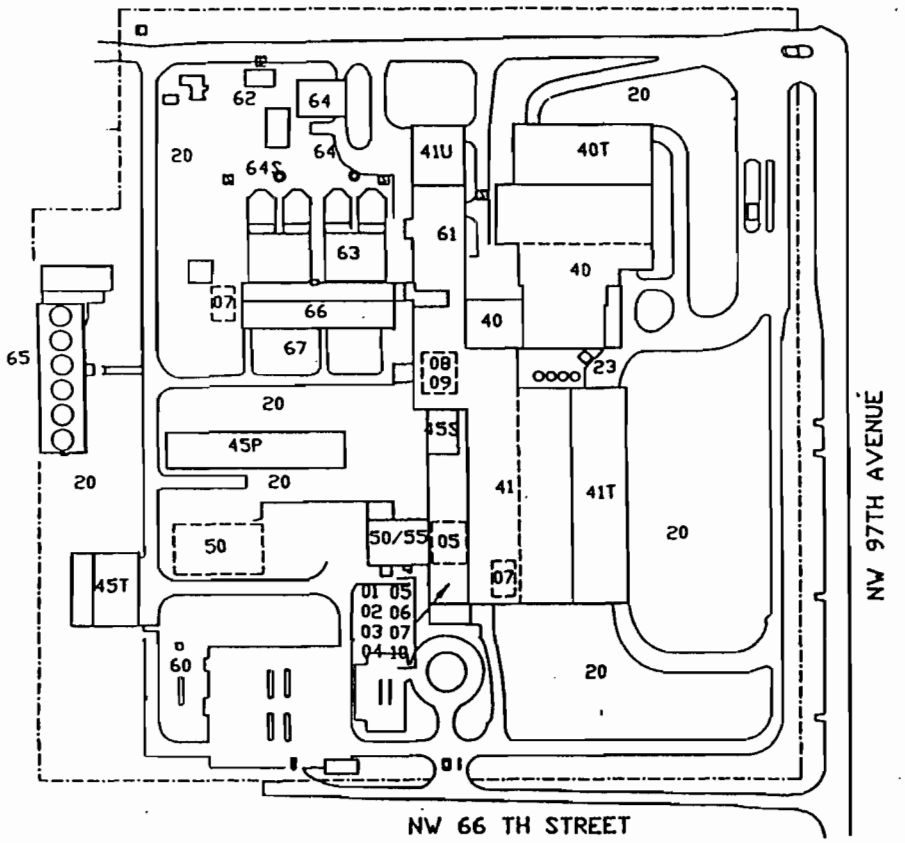
FIGURE 5

Not To Scale

Exhibit "H"
Page 9 of 36

EXHIBIT "H"

Inspection Reference Manual to be used as a reference manual for the Inspection Report Form



II 00 000 AREA CODE

01 - PREVENTIVE MAINTENANCE
02 - ADMINISTRATION
03 - ACCOUNTING
04 - ENGINEERING
05 - PURCHASING/STORES
06 - TECHNICAL SERVICES
07 - MECHANICAL MAINTENANCE
08 - ELECTRICAL MAINTENANCE
09 - INSTRUMENTATION MAINTENANCE
10 - OPERATIONS
20 - OPEN AREAS
21 - AIR CONDITIONING/REFRIGERATION
23 - FIRE PROTECTION
40 - TRASH PROCESSING
41 - GARBAGE PROCESSING
43 - TIRE/SCRAP HANDLING
50 - YARD OPERATIONS
55 - HEAVY EQUIPMENT MAINTENANCE
60 - POWER HOUSE
61 - FUEL FEED CONVEYORS
62 - WATER TREATMENT
63 - STEAM GENERATION/BOILERS
64 - ASH COLLECTION SYSTEM
65 - COOLING TOWER
66 - EGF POWER GENERATION
67 - POWER DISTRIBUTION
68 - PROPANE FACILITY
69 - ODOR CONTROL

41U - UNDERS BUILDING
40T - TRASH TIPPING
41T - GARBAGE TIPPING
45S - METALS STORAGE
45P - FERROUS PROCESSING
45T - TIRE STORAGE
64S - STACKS

SUMPS/PUMPS

MAIN LIFT STATION

00 II 000 EQUIPMENT CODE

02 - TEST EQUIPMENT
03 - HEAVY EQUIPMENT/TRANSPORTATION
04 - BUILDING & STRUCTURES
05 - WALLS & CEILINGS
06 - DOORS & WINDOWS
07 - ROOFING & ROOF DRAINS
08 - FLOORING
09 - SEWER EFFLUENT
10 - TOOLS
11 - OIL SEPARATOR
13 - FIRE PROTECTION
15 - LIGHTING
16 - CRANES & HOISTS
17 - MANLIFT
18 - FURNITURE & FIXTURES
19 - OFFICE EQUIPMENT
20 - COMPUTERS & COMPUTER EQUIPMENT
21 - PUMPS
22 - TANKS
23 - VALVES, FITTINGS & PIPING
25 - HVAC
26 - CONVEYOR EQUIPMENT
27 - SCALES
29 - AIR COMPRESSORS
30 - TROMMELS
31 - MOTORS
32 - FANS/BLOWERS
33 - AIR CLASSIFIER
35 - COMMUNICATION SYSTEMS
38 - MAGNETS
40 - DUST COLLECTOR/BAG HOUSES
50 - INSULATORS
52 - BREAKERS
53 - TRANSFORMERS
54 - SWITCHGEAR
61 - SCOTBLOWER
63 - SHREDDERS
64 - BOILERS/DISCUITING MACHINES
68 - SPIRACTOR
69 - DEAERATOR
70 - DEMINERALIZER
71 - BURNER SYSTEM/PROPANE
72 - VAPORIZER
73 - BOILER/ECONOMIZER
74 - ELECTROSTATIC PRECIPITATORS
75 - AIR HEATER/BYPASS DAMPER
76 - PROGRAMMABLE LOGIC CONTROLLER PLC
77 - ILC/CONTROL PANEL/BAILEY SYSTEM
78 - CONDENSERS
79 - COOLING TOWER
80 - STEAM TURBINES
81 - GENERATOR/EXCITER

DADE COUNTY RESOURCE RECOVERY FACILITY

OWNER: METROPOLITAN DADE COUNTY, FLORIDA
OPERATOR: MONTENAY POWER CORP. TEL (305) 593-7000

Exhibit "H"

G-RDF Plant/Structures-Waste Receiving Areas 40T/41T

* tipping floors accessible for waste delivery
* floors smooth and easily cleanable
* floors cleaned per O & M Manual
* building damage that allows solid waste to spill outside of building onto tarmac or grass
* hazardous waste(s) temporarily stored in designated area

H-Waste Processing Plant Areas 40 & 41

* leachate flows into the sump/drain area
* RDF spillage controlled inside of building

I-RDF Storage Building - Area 61

* Doors closed when receiving RDF

J-Unders Storage Building - Area 41U

* Unders contained inside of building
* bait traps evident
* fogging per O & M Manual

K-Power Plant - Areas 63, 66 & 67

* RDF/litter mixing with rain water which is discharging into surface waters/ground water or into surface water management system

* Grease & oil spillage maintained inside designated curbed area

L-Air Emission Control Units/Ash - Areas 64 & 64S

* Any stack emissions per FACR 17-2, visible emissions readings and EPA method 9

* Wastewater drains by gravity towards/contained in sump structure. Pump is operational.

* Flue gas conveyance system is sealed to stacks

M-Perimeter Commons & Plant Commons - Areas 20 & 68

* Litter contained within fenced property and being collected per O & M Manual schedule

* Perimeter fence prevents unauthorized entry or promiscuous dumping of solid waste inside of commons areas

DADE COUNTY RESOURCES RECOVERY FACILITY

GENERAL OPERATING AND MAINTENANCE DESCRIPTION

INTRODUCTION

Operation and Maintenance of the facility is briefly described in this document for the purpose of identifying the general practices at the facility with regards to the control of environmental cleanliness. All areas of the plant are operated in a manner that prevents environmental problems from fugitive air emissions, leachate, and other contamination.

TIPPING FLOORS #43, 47, 48

Trash and garbage tipping floors which are inside an enclosed building and are available to receive trash and garbage respectively, at the Resources Recovery, Monday through Friday between the hours of 4:00 a.m. to 6:00 p.m. and Saturdays between the hours of 7:00 a.m. and 12:00 p.m. or as otherwise requested by Dade County Solid Waste Management.

Depending on the municipal solid waste (MSW) split, (garbage to trash) a front-end loader is available on either floor to control refuse flow from the floor to the pit.

Usually by Friday afternoon, there is some refuse stockpiled on the floor inside the building(s) and it is normally pushed into the receiving pit by Saturday afternoon. It is not uncommon, however, to have some stockpiled material on the floor Monday through Friday as well.

During all non-delivery hours all man doors and overhead doors are secured in the closed position and remain closed until the floors are opened again for deliveries.

A designated area on the end of each tipping floor is used for hazardous waste temporary storage until Dade County can remove from the facility.

DUST CONTROL #45, 51,54,57,58

When dusty conditions occur within the garbage or trash tipping floor areas, due to incoming waste all man doors and overhead doors are closed to prevent dust from leaving the areas.

If possible light fraction material or the material that is causing the dust problem is mixed in the receiving pit with the more dense material and the natural moisture content of the denser material is used to control the dust problem.

Processing equipment in both areas 40 and 41 are equipped with baghouses to control dust emissions. Pick-up points for the dust collectors are at conveyor transition points and at the shredders as well. This will keep operationable equipment in these areas controlled within the buildings.

Each processing line is fitted with water spray systems at each infeed conveyor to add additional moisture to help control dust at the shredder.

Conveyor covers are kept in the closed position during operational hours and conveyor side skirting is inspected daily, repairs if necessary.

RDF will be contained in the fuel storage building and both east and west doors will be kept closed unless maintenance is being done in the building.

There is a pressurized air system which removes the air from the garbage pit and the fuel storage building and ducts it to the boilers for makeup air. This is primarily designed for odor control but also gives some dust control.

VECTOR CONTROL #44,52,60

Two types of vector control are used by Montenay Power Inc.

Rat bait is distributed around the outside areas of the garbage trash tipping floors, outside the unders building and in the trash breezeway leading into the trash shredder basement. The dead rats are removed daily as part of the clean up in these areas.

The rat bait is distributed weekly and a log is kept of this activity.

The yard manager collects and files this log which is filled out by the yard operations leadman.

The second type of vector control used is an insecticide which is used Monday through Friday in the Heil process area, trash process area, in the unders building, heavy equipment shop, the ferrous shredder area, the SS conveyor pit and the lunch area. A log is also kept on this activity and a copy of both logs are attached.

In addition, once per week, usually on Sunday, Montenay spreads powdered lime into the garbage pit. This is done at the lowest pit level possible so that dispersion will occur in the lower portions of the pit.

FIRE PROTECTION #46,50,56,61,70,88,89,95

Fire extinguishers are inventoried and located for each area of the plant. They are checked weekly by designated inspectors and serviced as necessary. Also see attached inspection form for fire system and hose designations by area.

Fire extinguishers are placed at strategic locations around the operating areas and in the offices. There are thirty two units placed to cover the offices, garbage receiving, garbage processing, stores, heavy equipment maintenance, and receiving. In addition there are twenty one extinguishers distributed throughout the trash receiving and processing areas. These numbers may increase as a need is identified.

In the powerhouse there are extinguishers located on all levels around the boilers and the fuel feed system. Thirty four of the eighty eight extinguishers are located on the J conveyor, H conveyor, and control levels of the powerhouse. The rest are located to adequately cover the remaining powerhouse levels, water treatment, cooling tower, and the ash building.

FIRE PROTECTION: #46, 50, 56, 64, 70, 88, 89, 95 FACTORY MUTUAL SYSTEM

INSTRUCTIONS FILL OUT FORM WHILE MAKING INSPECTION. SEND COMPLETED FORM TO YOUR SUPERVISOR FOR NECESSARY ACTION. REPORT SHOULD BE HELD FOR REVIEW BY THE NEXT FACTORY MUTUAL ENGINEER.

PLANT	LOCATION	
MONTENAY	MIAMI	

VALVE INSPECTIONS

PHYSICALLY TRY LOCKED VALVES AT LEAST MONTHLY AND UNLOCKED VALVES WEEKLY, IN ADDITION, VISUALLY INSPECT ALL LOCKED VALVES WEEKLY. RECORD BOTH WEEKLY AND MONTHLY INSPECTIONS.

ALL INSIDE AND OUTSIDE VALVES CONTROLLING SPRINKLERS OR FIRE PROTECTION WATER SUPPLIES AS LISTED BELOW. CHECK CONDITION OF VALVE AS FOUND. PHYSICALLY "TRY" GATE VALVES INCLUDING NONINDICATING AND INDICATOR POST GATE VALVES. DO NOT REPORT A VALVE OPEN UNLESS YOU PERSONALLY HAVE TRIED IT. FM APPROVED PIVA'S (POST-INDICATOR-VALVE ASSEMBLIES), IBV'S (INDICATING BUTTERFLY VALVES) AND STANDARD OUTSIDE SCREW & YOKE VALVES DO NOT HAVE TO BE TRIED BUT SHOULD BE VISUALLY CHECKED AT CLOSE RANGE.

NO.	VALVE LOCATION	AREA CONTROLLED	OPEN	SHUT	LOCKED	SEA
1	20 FT. SE OF MAIN OFFICE	SHOP SPRINKLER SYSTEM HEIL				
2	50 FT. S. OF RECEIVING BLDG.	RECEIVING BLDG. S. END SPRINKLER				
3.	OUTSIDE N END RECEIVING BLDG.	RECEIVING BLDG. N. END SPRINKLER				
4.	OUTSIDE N. END RECEIVING BLDG.	BAG HOUSE TRASH SIDE				
5.	VALV IN PIT OUTSIDE PUMP HOUSE	SUPPLY TO DETECTOR CHECK VALVE				
6.	VALV IN PIT OUTSIDE PUMP HOUSE	DISCHARGE FROM DETECTOR OK VALV				
7.	35 FT. SE PUMP HOUSE CUB BOX	1 DIVISIONAL VALVE MAIN LINE				
8.	CURB BOX E. OF PUMP SHREDDER CITY WATER INLET TO LOOP	A: DIVISIONAL VALVE MAIN LINE				
		B: DIVISIONAL VALVE MAIN LINE				
9.	SE CORNER OF TRASH BLDG.	S. SIDE OF BLDG. & CONVEYOR				
10.	SE CORNER OF TRASH BLDG.	WATER CANNON				
11.	SE CORNER OF TRASH BLDG.	N. SIDE OF BLDG. SPRINKLERS				
12.	NE CORNER OF UNDERS BLDG.	A: DIVISIONAL VALVE				
		B: DIVISIONAL VALVE				
		C: DIVISIONAL VALVE				
13.	OUTSIDE E WALL FUEL STOR. BLDG	FUEL STORAGE BLDG. SPRINKLERS				
14.	80 FT. NE OF BOILER NO. 1	POWER HOUSE PROTECTION				
15.	SE CORNER OF BOILER NO. 1	LUBE OIL SPRINKLER AND FIRE HOSE STATIONS				
16.	OUTSIDE NE DOOR OF TURB. DECK	LUBE OIL SPRINKLERS 2" LINE				
17.	NE CORNER COOLING TOWER	N. 2 CELLS OF COOLING TOWER				
18.	CENTER COOLING TOWER E. SIDE	CENTER 2 CELLS COOLING TOWER				
19.	SE CORNER COOLING TOWER	S. 2 CELLS COOLING TOWER				
20.	NORTH OF HEIL BAG HOUSE	HEIL SPRINKLER SYSTEM				
21.	NORTH OF HEIL BAG HOUSE	HEIL CONVEYOR SYSTEM				
22.	NORTH OF HEIL BAG HOUSE	HEIL BAG HOUSE				
23.	NORTH OF HEIL BAG HOUSE	MAIN SHUT OFF VALVE HEIL				

TRASH FIRE HOSE REPORT

LOCATION:		#	50'	100'	NOTES:
"TP4":	EAST	1			
	WEST	2			
MILL DECK:	SW SIDE #2 MILL	3			
	SW SIDE #1 MILL	4			
	NW SIDE #3 MILL	5			
"ST" CONVEYORS:	HEAD SECTION	6			
	TAIL SECTION	7			
INFEED DECK:	#1 INFEED E. SIDE	8			
	#2 INFEED W. SIDE	9			
	#3 INFEED E. SIDE	10			
	E. SIDE BY MCC ROOM	11			
	NW BY EXIT DOOR	12			
	NEXT TO PULPIT LADDER	13			
NORTH SIDE MOTOR ROOM TOWARD INFEED DECK		14			
TIPPING FLOOR NORTH WALL	EAST	15			
	WEST	16			
"FR1" BASEMENT LEVEL	EAST	17			
	WEST	18			
N.W. COLUMN N. EXIT OF BASEMENT		19			
BETWEEN MAGS OVER NON-FERROUS TRANSFER CONV.		20			
S.E. SIDE OF #3 MILL BASEMENT LEVEL		21			

REMARKS:

NUMBER OF SCOTT PACKS
SPARE BOTTLES

DATE: : SIGNATURE:

Exhibit "H"
Page 19 of 36

POWER HOUSE FIRE HOSE REPORT

LOCATION			#	50'	100'	NOTES:
"H1&2" DECK:	WEST		1			
	CENTER		2			
	NORTHEAST		3			
	EAST		4			
"G1&G2":	NORTH		5			
	SOUTH		6			
"D1&D2":	CENTER		7			
	SOUTH		8			
	NORTH		9			
"J1&J2":	EAST	1	10			
		2	11			
		3	12			
	WEST	4	13			
CONTROL ROOM LEVER	EAST		14			
	WEST		15			
S.W. CORNER INSIDE FUEL STORAGE			16			
BREEZEWAY - MEZZANINE			17			

REMARKS:

1. NUMBER OF SCOTT PACKS
2. SPARE BOTTLES
3. CRANE EMERGENCY BREATHING APPARATUS

DATE: - : SIGNATURE:

HEIL FIRE HOSE REPORT

LOCATION	#	50'	100'	NOTES:
TIPPING FLOOR EAST WALL	1			
	2			
"S.P." DECK NE BY DOOR	3			
"P1" NORTH WALL BY OPENING	4			
"S" CONVEYOR NEXT TO STEPS	5			
EAST WALL PROCESS BUILDING	6			
	7			
	8			
	9			
EAST OF RECEIVING DOOR	10			
PICKER STATIONS N.	11			
S.	12			
S.W. EXIT DOOR HEIL TIPPING FLOOR	13			
N.W. LEVEL BY CRANE LADDER	14			
N. WALL FERROUS BUNKER	15			

1. NUMBER OF SCOTT PACKS
2. SPARE BOTTLES
3. CRANE EMERGENCY BREATHING APPARATUS

DATE: SIGNATURE:

The fire pump should be automatically started and run weekly for a period of not less than 30 minutes to attain normal operating temperatures. The pressure relief valve should be set to flow approximately 20 gpm during the test to ensure adequate cooling of the pump casing.

FIRE PUMP RATING (gpm @ psi)	TYPE OF PUMP DRIVE	TESTED SUCTION PRESSURE	TESTED DISCHARGE PRESSURE	OPERATING TEMPERATURE (diesel)	RPM
1500 @ 80	Diesel				
3000 @ 100	Diesel				

DIESEL ENGINE CHECKLIST

(1) Lubricating Oil Level Adequate?	YES	NO
(2) Intercooler Coolant Level Adequate?	YES	NO
(3) Intercooler Water Supply Valves Open?	YES	NO
(4) Intercooler Water Supply Bypass Valve Shut?	YES	NO
(5) Fuel Tank More Than 3/4 Full?	YES	NO

Remarks: | Location:

Date: | Signature:

montenay power corp.
6990 n.w. 97th avenue • miami, florida 33178
telephone (305) 593-7000

HEIL EXTINGUISHER LOCATION LIST

1. Office entrance to Visitors Center
2. East front office hallway
3. Receiving area (west wall)
4. Pit entrance ramp (south wall)
5. Machine shop (north wall)
6. Machine shop (west wall)
7. Heil process system, south entrance way (concrete pillar)
8. Magnet house
9. Magnet house
10. Picker hydraulic pumps (concrete pillar)
11. Picker control level
12. Compressor area (west wall)
13. Heavy Equipment shop (east wall)
14. H.E Shop (south wall)
15. H.E. Shop (west wall) by bay door
16. H.E. Shop (west wall) by door way
17. H.E. Shop (north east) corner
18. Bag house deck
19. Heil control room (north wall) by air conditioning unit
20. Heil control (north exit door exterior)
21. Fan level (north steel column)
22. M.C.C. room (south wall from exit door)
23. M.C.C. room (west wall by exit door
24. Exterior of electric shop entrance door
25. Interior of electric shop (north wall partition)
26. "GP" level (west wall)
27. "GP" deck (north wall)
28. N.A.
29. Mill deck (exterior "105")
30. Mill deck (exterior "205")
31. Instrumentation deck (below pulsort)
32. Instrumentation deck (below pulsort)

montenay power corp.
6990 n.w. 97th avenue • miami, florida 33178
telephone (305) 593-7000

TRASH_PROCESS_EXTINGUISHER_LOCATION_LIST

33. Instrumentation Shed
34. Dust Collection deck (south wall)
35. Pumphouse (interior)
36. North wall (west of #2 mill)
37. East wall of #1 mill
38. Motor room exterior (south wall)
39. Motor room exterior (north wall)
40. Motor roof interior (west wall)
41. Motor room exterior (north wall)
42. Storage room entrance
43. Control room entrance
43A. Control room interior
44. Crane pulpit (support beam)
45. Crane control room
46. MCC room exterior
47. MCC room (north wall)
48. MCC room (west wall)
49. Transformer area (south wall)
50. Trash tipping floor (north west) wall
51. Trash tipping floor (north center) on wall
52. Trash tipping (north east) wall

OTHERS\EXTINGUI.RL

Exhibit "H"
Page 24 of 36

Dust suppression is kept to a minimum by ensuring that all conveyors are covered, transition inspection doors are kept closed and the conveyor skirting is maintained to minimize leakage. It becomes necessary on occasion to remove dust and grit build up from the areas of the conveyor rollers and pans to minimize damage and inspect the proper operation of the rollers through use of compressed air. This operation is performed within the confines of the building and on the outside conveyors only over paved areas. The paved areas are then cleaned up immediately following the blowdown. Water usage is restricted in cleaning due to the inherent electrical problems that could be encountered.

TRASH ALLEY SUMP #49

The drainage of the alley into a new sump located on the east side eliminates standing water in the alley. This water is pumped from the sump to the sanitary sewer system.

BUILDING DAMAGE #55

When damage to the building occurs, an incident report is written, describing what sort of damage transpired, the location where the incident happened, the time the damage occurred, and who was responsible.

A work order is also prepared for the repair of the damage, and depending on the nature of the damage, the correct priority is assigned to the work order.

In the case of a damaged entrance or exit door on the tipping floors, every effort is made to repair them immediately, even if the repair is temporary so the door can be closed. This same procedure would be followed for the fuel storage area doors.

If damage occurs in an area where repairs do not have to be handled on an emergency basis, a work order is prepared and turned over to the Resources Recovery engineering department for scheduling.

Any material that has the potential to generate leachate, is removed to a controlled area as soon as possible. An ash loading ramp is located on the west side of the power house for containing ash or RDF will be promptly disposed of or relocated so as not to generate a leachate problem.

UNDERS BUILDING #59

Unders is stored in a building at the north end of the fuel-storage structure.

The unders are kept against the rear wall away from the truck entrance and exit.

Any leachate from the unders is captured in a sump inside the building against the eastwall and pumped into the sewer system.

Concrete beams across the entrance and exit also contain any water in the building and aid in clean up operations by keeping in the building material on the floor by the doorways.

Clean up is carried out daily inside and outside the unders building.

The unders building is inspected daily by the yard manager and the yard supervisor to ensure no material escapes the building especially during loadout operations.

During loadout of unders material the county truck drivers are instructed to close their nets inside the building and clean off the outside of their trucks i.e... body and wheels to prevent spillage on the roads.

The work order system is used whenever the unders building or unders conveyors are worked on for repairs.

OIL AND CHEMICALS STORAGE #63,65,82,90,91

There is a central fuel depot and oil storage area west of the vehicle maintenance shop where full and empty drums are kept plus storage tanks. The area is equipped with an oil/water separator. Used oil and empty drums are disposed of by approved methods through licensed vendors. Covered storage for oil also exists at the powerhouse and in the Trash processing area. This is for current drum supplies for the operating areas.

Chemicals for water treatment are stored in approved tank storage at the water treatment area as well as at the cooling tower. These materials are handled in a safe manner and in accordance with manufacturers suggested procedures.

ASH CONVEYANCE & EMISSIONS CONTROL
#64,66,71,72,77

Incline Conveyors

The incline conveyance system consists of two (2) outside enclosed conveyors for the removal of the ash from the powerhouse boiler area to the ash storage/containment building. These conveyors are of a 3 sided box conveyor design with removable top covers for routine inspection and preventative maintenance. On the floor of each conveyor exists a single slide gate which can be operated for removal of ash through a drop chute to a box container or dump truck in the event of the ash containment building being out of service or other emergency situation. There is a concrete pad directly below the drop chute to eliminate the possibility of any spilled ash lying on the open ground.

Any spilled ash is picked up as soon as practicable and removed to a box container. All box containers are stored on only concreted areas and removed as they are filled. In the event that ash is spilled onto the concrete pad it is lightly watered through a fog applicator to suppress the dust. Water is limited to prevent a slurry from being formed. Any leachate goes into boiler drains which go to a sump where it is dumped to sanitary sewer.

Boiler Area

It is occasionally necessary to dump boiler pass hoppers or precipitators hoppers on the concrete slab under the boilers. This practice is done only when the ash material is bridged or plugged in the hoppers. Once the particular conveyor is opened the material falls out on a concrete pad under these boilers, where it is wetted down with water to control dust generation. The ash is then promptly removed within 24 hours and taken to the landfill. Water drains under boilers take water to sump connected with the sanitary sewer.

Electrostatic precipitators are used to remove the particulate from the flue gas when the boilers are running. This controls the opacity of the stack emissions. The opacity monitors, one on each stack indicate the level of opacity. There is also a continuous opacity chart recorder which produces a permanent emissions record.

POWERHOUSE DRAINS AND SUMPS #68,69

On the north side of the powerhouse there are two sumps, east for module #1 and west for module #2. The drains underneath the boiler drain into these two sumps. The east sump is larger than the west one and has a solid separator. Both sumps have pumps to the sanitary sewer system for eventual treatment.

The solids separator is cleaned out every 2-3 weeks or on an as needed basis. The sumps are checked on a daily basis.

In case of emergency failure of the sump pumps Montenay will provide portable pumps that pump into the sewer system and prevent any overflow onto the ground.

Lime slacker residue is collected in a surfaced sump in the middle of the water treatment area and is pumped to the sanitary sewer system.

PERIMETER COMMONS AND PLANT COMMONS
#78,79,80

Litter control shall be done on a continuing basis with daily cleanup crews. A perimeter fence encloses the 40 acres of the plant. A sign designating the owner/operator is located on the southeast corner of the property on 97th Avenue. Another sign at the 97th Avenue truck entrance shall continue to specify the hours of operation and the tipping fees.

EQUIPMENT MAINTENANCE AREA #81,83

The drain and sumps in the fuel depot and the vehicle wash down areas all drain through an oil/water separator and into the sanitary sewer. The oil shall continue to be disposed of on a scheduled regular basis by a licensed used oil dealer. The washdown area is roofed and shall be cleaned regularly with a surfaced floor and walls for containment.

FERROUS AND TIRE BUNKERS #84,85,86,87

Ferrous removed from the garbage processing building is stored in a roofed bunker on the westside of the Heil processing area. From this bunker the material is carried by front and loader to the inside of the reprocessing building where it is reprocessed.

Reprocessing of material is generally done on Monday, Wednesday and Friday, however, certain maintenance activities may dictate this schedule be amended from time to time.

Cleaning of the bunker and the area between them is done after the bunker has been emptied and the loader is no longer working in the area.

The yard supervisor monitors and controls the transfer of ferrous and the clean up operation.

Waste tires (whole tires) are delivered to the tire bunker directly south of the cooling tower. An employee is stationed at the bunker to direct the trucks delivering tires and to make sure all waste tires remain under the bunker roof.

The yard supervisor monitors the bunker and the clean up around the bunker. Clean up shall continue to be conducted daily.

WATER TREATMENT #92,93,94

Lime slacker slurry is contained within the building and handled according to accepted procedures. The lime silo filter bag is checked periodically to maintain dust control of visible emissions. The neutralization system for demineralizer backwash water is controlled to pump the resultant liquids to the wastewater sanitary sewer system for treatment.

WORK ORDER PRIORITY CLASSIFICATIONS

Priority 1:

Emergency - Life or equipment is in danger. Do the work immediately. This work takes precedence over all other work.

Priority 2:

Mandatory for successful plant operation. Lost production is created. This work begins with the next available person. Paperwork and/or work is started the same day.

Priority 3:

Planned and scheduled for backlog within each craft.

Priority 4:

Scheduled for shutdown.