

TECHNICAL SCOPE DOCUMENT

Presented To:

EDC

For:

**2 ea. GE Frame 7FA's/ LM 6000 PC's
420 MW CURUPAO Power Plant**

By



Proposal T-1035 Rev 1

November 3, 2010

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EDC



Electricidad de Caracas
2 ea. GE Liquid Fuel Frame 7FA
2 ea. GE Liquid Fuel LM 6000 PC's
CURUPAO Power Plant
Technical Scope Document

Section 1.0 Introduction

ProEnergy EPC Services (PES) is pleased to submit this Proposal Technical Scope Document to EDC for furnishing engineering, design and installation of two (2) liquid fueled General Electric Frame 7FA Gas Turbine Generators and two (2) liquid fueled GE LM 6000 PC Sprint Gas Turbine Generators with associated 230 KV Generator Step Up Transformers, and other Balance of Plant equipment.

This Technical Scope Document is being provided to EDC to allow a technical evaluation of our proposal. Since the Gas Turbine Generators are currently available, it should be possible to engineer, design, construct and commission the plant within a 16 – 18 month period from the receipt of an executed EPC Contract provided that the required progress payments are made on schedule.

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Section 2.0 Equipment List - Detailed Division of Responsibility between Owner and Contractor:

Note: The Owner has purchased two (2) Liquid fueled GE Frame 7FA GTG's with associated facilities and two (2) Liquid fueled LM 6000 PC Sprint GTG's for this project. These units and associated equipment are identified in the Table Below:

Material/Responsibility	Qty	Description
OWNER Provide	2	<u>Liquid Fueled GE Model Frame 7FA (60Hz) DLN Gas Turbine Generator</u>
/CONTRACTOR Install		including Water Injection for NOX for liquid fuel with Associated Equipment – See Details in Appendix
	2	Inlet Air Filter Assembly with Evaporative Cooler
	2	Water Injection Flow Center w/pumps
	2	Liquid Fuel Injection Skids – Stainless Steel piping, duplex filters, fuel atomizing module w/air compressor, motor driven fuel pump
	2	Lubricating and Hydraulic System w/pumps, filters and coolers
	2	Exhaust System Diffuser, expansion joint – no stack
	2	Fire Protection System
	2	Water Wash Cleaning System Skids
	2	GTG Cooling Water System excluding piping, pumps, motors, etc.
	2	Generator Start with load commutated inverter and isolation transformer
	2	Hydrogen Cooled Generator including Generator Gas Coolers, LO Systems
	2	18KV/4160V 12/15 MVA Aux Transformers
	2	4160 SWGR
	3	4160/480V Aux Transformers
	2	Generator Excitation Systems, Static Components, Current & Voltage Transformers
	2	PEEC Modular Building with:
	2	-Turbine Control Panels
		- Local Operator Station
	2	-Generator Protection Panel
	2 sets	- 24 VDC Batteries and Chargers
	2 sets	-125 VDC Batteries and Chargers
	2	GTG Auxiliary Cooling System with fin-fans
	2 sets	Cooling Water Circulation Pumps
	2 sets	Fuel Gas Filters
	2	<u>Liquid Fueled GE LM 6000 PC Sprint Gas Turbine Generator packages</u>
		Including Water Injection for NOx with Associated Equipment – See Details in Appendix
	2	Inlet Air Assembly
	2 sets	Turbine and Generator Control Panels
	2 sets	24 VDC Batteries and Chargers
	1 Lot	Gas Turbine Generator Technical Representatives



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Material/Responsibility	Qty	Description
OWNER Will Provide		
	1 Lot	Project Site free and clear of rock and ground water
	1 Lot	#2 Diesel Fuel delivered to site boundary by pipeline with measurement
	1 Lot	230 KV Utility connection to Plant 230KV Dead-end Towers
	1 Lot	DFO and Water for commissioning and start up
	1 Lot	Waste Water Disposal
	1 Lot	Eight (8) Telephone Circuits to Project Site
	1 Lot	Permits for Environmental, Transportation, Building, Construction, Operations, etc.
	1 Lot	Construction & Commissioning Water and 480V three phase power
	1 Lot	Access Roads to site
	1 Lot	Import Duties and Taxes
	1 Lot	Construction lay down area (3 acres) within or adjacent to project site
	1 Lot	Transportation of Owner Equipment from the US to Site
Contractor – ProEnergy		
EPC Responsibility		
Civil / Structural		
	1 Lot	Site Preparation, Rough Grading, Excavation, and final grading
	1 Lot	Plant Concrete Foundations
	1 Lot	Plant Paving, Gravel and Pads for Turbine and Generator
Buildings		
	1	Climitized Control Room and Office Building (60' x 70') with attached Maintenance / Warehouse Building (75' x 120')
	1	Water Treatment – pumps Building (100' x 60')
	1	Fuel Treatment, pumps Shed (35' x 30') and MCC Room (10' x 30')
	1	Guard House (15' x 15')
Contractor (continued)		
Mechanical		
	2	Frame 7FA - 55 Ft. tall Exhaust Stack with Silencing
	2	GE LM 6000 PC – 45 ft. tall Exhaust Stacks with silencing
	1	Lube Oil Cooling water System for GTG's including piping, pumps, etc.
	2	2 ea. 20 Hp Inlet Evap Pumps with 5 Hp sump
	1	Raw Water pipeline 500 meters from Ceauta Creek to the site boundary with pumps for a reliable 1000 gpm supply
	1	Evap water Storage Tank 300,000 gallons
	2	Evap water Pumps 20 Hp
	1	Raw water Storage Tank 1,000,000 gallon c.s.
	1	Raw water 60HP duplex forwarding Pump 940 gpm skid
	1 lot	Demin/RO/EDI Water Treatment System – 802 gpm
	1	Demin Water Forwarding Pumps Skid 650 gpm
	1	Demin Water Forwarding Pumps Skid 130 gpm
	2	Demineralized Water Storage Tank, 660,000 Gallons ea. s.s.
	2	100% Demineralized Water Forwarding Pumps for Turbine Wash
	2	Duplex Demineralized Water Filters LM 6000's
	2	Duplex Demineralized Watet Filters Fr. 7FA's
	2	Demineralized Water Injection Pumps NOx / Fogging

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Material/Responsibility	Qty	Description
	2	DFO Injection Skid's Fr 7FA's
	2	DFO Fuel Filters - Fr. 7FA's
	2	DFO Injection Skid's LM 6000 PC's
	2	DFO Fuel Filters – LM 6000 PC's
	1	Oily Water Separators
	1	Waste Oil Tank, 10,000 Gallon.
	1	Waste Oil Delivery Pump
	1	Waste Water Tank, 10,000 Gallon
	1	Waste Water Delivery Pump
	3	Instrument Air Package with two compressors, receiver, filters and dryer
	1	Raw Liquid fuel storage tank, (2,000,000 gallons) c.s.
	2	525 gpm Liquid Fuel Forwarding Pumps
	1	Liquid Fuel Treatment System (4 centrifuges) 3ea 600,000 GPD capacity
	1	2,000,000 gallons Clean Fuel Storage Tank s.s.
	1	10,000 gallons sludge storage with forwarding pump for truck removal
	2	Liquid Fuel Transfer Pumps LM 6000 PC's
	2	Liquid Fuel forwarding Pumps Fr. 7FA's
	3	Treated Liquid Fuel Forwarding Pumps LM 6000 PC's – 65 gpm ea.
	3	Treated Liquid Fuel Forwarding Pumps Fr. 7FA's - 248 gpm ea.
	1 set	Liquid Fuel Filters LM 6000 PC's
	1 Lot	Firewater System including pumps, GSU sprays, Plant Firewater Loop, Fuel tank foam systems, with controls, monitors & hydrants
	1set	Liquid Fuel Filters Frame 7FA's
Electrical 230KV Substation	2	18KV/230KV GSU 220 MVA
	2	13.8KV/230KV GSU 83 MVA
	12	230KV GSU 83 MVA
	8	230 Disconnect Switches (2 future)
	7	Dead End Towers
	3	CVT's
	1 Lot	Protective Relays
Balance of Plant Electrical	2	18 KV 8000 amp GTG Generator Breaker NEMA 3R Frame 7FA's
	1 Lot	18 KV ISO Phase Bus – Fr 7FA's Gen Breaker to GSU's
	2	18 KV / 4160V 12/15 MVA Aux Transformers
	2	13.8KV 3000 amp GTG Generator Breaker NEMA 3R LM 6000 PC's
	1 Lot	13.8KV Cable Bus LM 6000 PC's Gen Breakers to GSU's
	1	13.8KV/480V 2500 KVA Aux. Transformer
	1	4160V / 480 V 1500 KVA Station Service Transformer
	1	4160V / 480 V 1000 KVA Station Service Transformer
	2	4160 V Distribution Switchgear
	1	Diesel Black Start / Emergency Generator – 480 V -1000 KW
	2	480 V BOP MCC
	2	480 V Distribution Board
	1 Lot	BOP 480 V / 120 V Transformers, Lights, Panels etc.
	1	UPS System for Control Room



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Material/Responsibility	Qty	Description
	8	Welding Receptacles
	1	Plant Grounding Grid
	1 Lot	Lightning Protection
	1 Lot	Cathodic Protection for underground steel piping
	1 Lot	Area Lighting
I&C		
	1 Lot	Plant Instrumentation
	1	Plant DCS System
Construction		
	1 Lot	Construction Tools, Rental Equipment & Rental Cranes
	1 Lot	Relocation of Owner's Electrical Transmission Lines presently crossing over the existing site
	1 Lot	Construction Site Temporary Power Distribution
	1 Lot	Local Subcontractor(s) Electrical & Mechanical Craft Labor
	1 Lot	Transportation of all Contractor supplied BOP equipment
	1 Lot	Construction Offices, Storage, Temporary Facilities and Utilities
	1 Lot	Lubricants, Chemicals, Filters, etc. for Plant Commissioning
	1 Lot	Balance of Plant Start up and Commissioning Spare Parts
Engineering		
	1 Lot	Conceptual and Detail Design Engineering (Total Plant)
Project Management		
	1 Lot	Project Management with Scheduling, QA/QC, safety, and training
	1 Lot	Plant Start-up, Commissioning and Testing
	1 Lot	Overall Plant Training



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Section 3.0 Balance of Plant Equipment Specifications

TO BE PROVIDED LATER



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Section 4.0 Design Basis and Interconnect Points

4.1 Design Conditions

Design Conditions

Site Elevation (Meters above Mean Sea Level)	1500 ft
Design Temperature	74 F
Design relative humidity:	75%
Predominant wind direction:	Northwest
Maximum average multiannual wind velocity:	80 mph
Seismic Zone	4
Liquid Fuel Supply	by Owner's Pipeline
Liquid Fuel Consumption Rate (2) LM6000	96.6 gpm
Liquid Fuel Consumption Rate (2) Fr. 7FA's	419.4 gpm
High Voltage Interconnect @ GSU Bushings	13.8 KV /230KV & 18KV/230KV
Instrument Air System	600 scfm by Contractor
Demin Water required	548 gpm
Demin Water Storage	1,320,000 gallons s.s.
Raw Water Storage (Includes Fire water) existing	1,000,000 gallons
Evap Water Storage	300,000 Gallons
R.O. Water Storage	76,000 gallons
Raw Diesel Fuel Storage	2,000,000 gallons
Clean Diesel Fuel Storage	1,000,000 gallons

4.2 Interconnect Points

Interconnect Points

Liquid Fuel Pipeline	At Plant Boundary by Owner
Plant Waste Water	At waste water tank discharge pump
Plant Waste Oil	At waste oil tank discharge pump
230 KV	Connection to 230KV Dead end towers by owner
Raw Water Supply	Contractor to build 500 meter water line to Ceauta Creek and install pumps for 1000 gpm

THIS DOCUMENT IS CONFIDENTIAL. IT IS DESIGNED AND INTENDED FOR PDVSA'S USE. THIS DOCUMENT IS FOR THE SOLE PURPOSE OF EVALUATING PROENERGY EPC SERVICES' PROPOSAL FOR THE GE LM6000 / Fr. 7FA POWER PROJECT.



4.3 Project Design Codes and Standards

The following organization's standards and codes are applicable to design and construction practices for the project.

ANSI B31.3	Plant Piping
ASME IX	Welder Qualifications
AWS A3/0	Definitions of Welding Terminology
AWS B2.1-84	Standard for Welding Procedure and Performance Qualification
AWS D1.1	AWS Code for Structural Welding
AISC	American Institute of Steel Construction – Various sections
ASTM	American Society for Testing Materials – Various Sections
ASME	American Society for Mechanical Engineers – Various Sections
ISA S5.1	Instrumentation Symbols and Identification
NACE RP018890	Standard Recommended Practice: Discontinuity (Holiday) Testing of Protective Coatings
NEMA AB1	Molded Case Circuit Breakers
NEMA ICS1	General Standards for Industrial Control and Systems
NEMA ICS2	Industrial Control Devices, Control and Systems
NEMA ICS4	Terminal Blocks for Industrial Use
NEMA ICS6	Enclosures for Industrial Controls and Systems
MG1	Motors and Generators
PE5	Constant-Potential-Type Electric Utility (Semi-Conductor Static Converter) Battery Chargers
SG2	High Voltage Fuses
WC2	Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
NFPA70	National Electric Code
NFPA No. 1	Carbon Dioxide Extinguishing Systems
NFPA No. 37	Stationary Combustion Engines and Gas Turbines
NFPA 850	Fire Protection for Electric Generation
OSHA CFR Title 29	Occupational Safety and Health Administration

Section 5.0 Expected Performance

CURAPAO

Power Plant

(2)7FA

1500

Site Elevation

Feet

Design Temperature

74 F

Relative Humidity

75%

Line Frequency

60 Hz

ID GTPRO

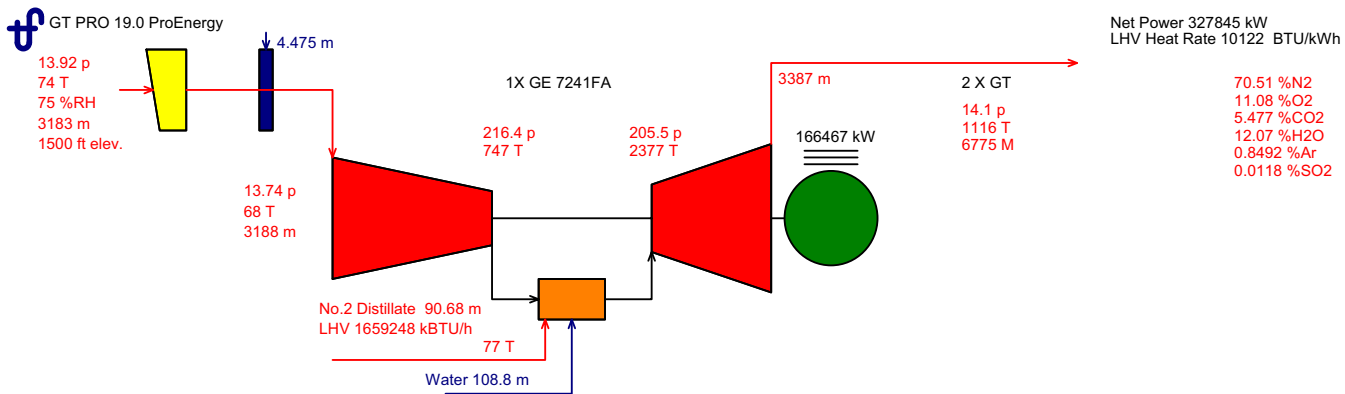
135

	(2) 7FA	(2) LM6000	TOTAL
CC & SC	DFO	DFO	GF EV
Gross Power KW	332935	87419	420,354
Net Power KW	327845	85888	336,433
Aux & Losses KW	5090	1531.2	6,621
LHV Gross Heat Rate (BTU/kWh)	9967	8742	9,355
LHV Net Heat Rate (BTU/kWh)	10122	8898	9,510
LHV Gross Electric Eff %	34.23	39.03	37
LHV Net Electric Eff %	33.71	38.35	36
LHV Fuel (kBTU/h)	3318495	764260	4,082,755
HHV Fuel (kBTU/h)	3534647	814040	4,348,687
Diesel (KPPH)	181.4	41.8	223.2
Diesel (GPM)	419.4	96.6	516.0
Water for Nox (KPPH)	217.6	38.7	256.3
Water for Nox (GPM)	435.2	77.4	512.6
SPT Water (KPPH)	0.0	17.8	17.8
SPT Water (GPM)	0.0	35.6	35.6
Evap Water (KPPH)	8.95	2.638	11.588
Evap Water (GPM)	18	5	23

TOTAL

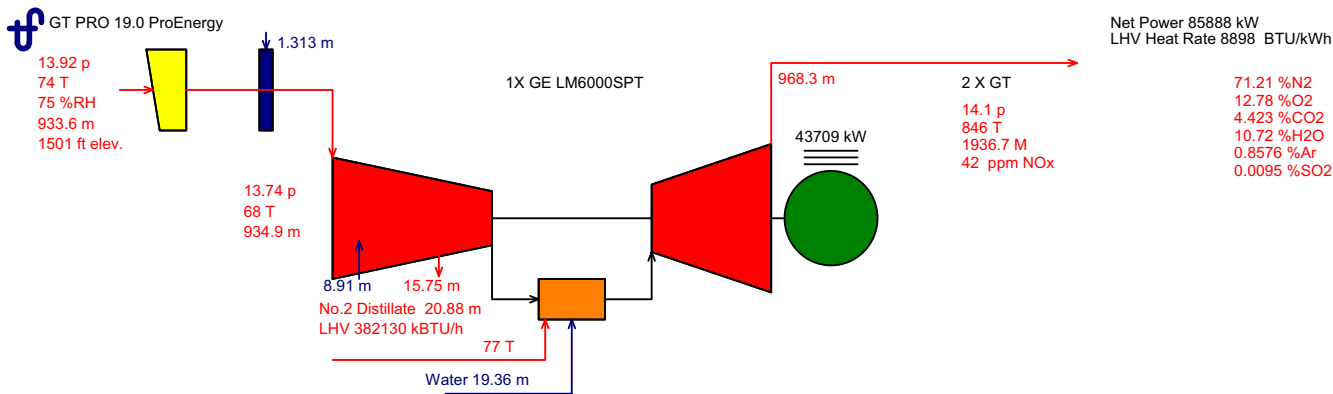
(3) Days

Liquid Fuel	516	GPM	742,994	GPD	2,228,981
Demin Water	548	GPM	789,494	GPD	2,368,483
RAW Water	985	GPM	1,418,868	GPD	4,256,604



p[psia], T[F], M[kpph], Steam Properties: Thermoflow - STQUIK

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p[psia], T[F], M[kpph], Steam Properties: Thermoflow - STQUIK

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Section 6.0 Project QA/QC Plan

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PART 2 PROJECT SPECIFIC TEST AND INSPECTION PROCEDURES

I. SCOPE

The following civil, mechanical and electrical test and inspection requirements have been developed for the project.

The civil, mechanical and electrical tasks on this project shall comply with the standards set forth in this document to ensure both the safety and quality of the installation. This document stipulates the inspections and tests that will be performed on the project.

II. TESTS / INSPECTIONS - CIVIL

Inspections will be undertaken throughout the civil portion of the project. The site dimensions will be confirmed. Topographical elevations will be confirmed following grading. All concrete slab and wall dimensions will be confirmed prior to concrete pouring. All concrete will be confirmed to be compliant with design specifications. A qualified third party inspection agency will be retained to conduct slump tests prior to and during concrete pours. All concrete will be strength-tested intervals per ASTM standards. Grouting of mechanical equipment skids will be performed per the developed specifications.

lii. TESTS / INSPECTIONS - GROUND GRID

The ground grid will be inspected throughout installation to ensure that materials used are per design specifications and that installation splices, junctions, and taps are made properly. Depth and dimensional boundaries will be measured and recorded. At the conclusion of installation, the grounding grid will be tested using a test instrument specifically for the task to confirm acceptable impedance levels.

IV. TESTS / INSPECTIONS - MECHANICAL

Several elements of the project will require welding during fabrication and installation. These elements include:

- Structural Steel
- Fuel System - Natural Gas Fuel System Piping
- Fuel System - Liquid Fuel System Storage Tank and Piping
- Process Water Systems
 - Raw Water System Storage Tank and Piping
 - Waste Water System Piping
 - Firewater System Piping (HDPE piping Thermal Welding Inspections)
- Oily Waste System
- Lube Oil System

The welding inspection criteria for each of these tasks will be based upon the applicable codes and standards. The following paragraphs briefly describe each task and stipulate the specific code and/or standard(s) that apply.



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A. Structural Steel

The structural steel aspects of the project will consist of the building related structural steel and various supports of racks. Design and erection of these assemblies shall be in accordance with the latest edition of the AISC. All welding will be visually inspected per AWS applicable codes and standards.

B. Welding Inspections/Tests

All welders are required to have current certification of their qualifications. Current certifications should indicate the welder has been tested to the project welding procedures within one year prior to welding on project piping.

All visual-welding inspections will be performed by persons who have current certification from AWS or ASNT-TC-1A. All NDE will be performed and approved by persons holding current ASNT-TC-1A Level II certification for the specific test processes implemented. All visual welding inspections will be performed based on the criteria established in ANSI B31.1 and AWS D1.1.

Radiographic Testing (RT) where necessary will be performed in accordance with standards established by ASME Boiler and Pressure Vessel Code, Article 2, Section V, except as stipulated in the applicable code, ANSI B31.3 (Pipe welding inside Plant Battery Limits).

All radiographs of full penetration welds must be accepted by a certified Level II inspector with current certification under ASNT-TC-1A. Accept/Reject criteria for all welds shall be in accordance with criteria established as well as applicable codes. Any rejections will require two (2) weld penalty shots on that welder. If in the judgment of the Site QA/QC Manager that a welder or welders have excessive rejections; may demand the welder be removed from the project or certified to weld on only non critical piping.

C. Natural Gas Piping

Piping from the supply source to the Fuel Filter/Separators will be Carbon Steel. The piping on the downstream side of the filter/separators to the will change to Stainless Steel piping. All Natural Gas piping will be designed and constructed to ANSI B31.3.

A total of 100% of the pipeline welds (100% of each weld) will be subjected to Radiographic Testing (RT).

All radiographs of full penetration welds must be approved and accepted per criteria established in Section B above.

D. Liquid Fuel System

All piping systems will be visually inspected by Craft Inspectors qualified to visually inspect these systems. 10% carbon steel piping welds will undergo RT, 100% of the weld. RTs will be examined and approved by a Level II or III ANSTC-1A qualified technician.

PE or RTR lines will undergo hydro or pneumatic testing. If Hydrotest is used, water as the test medium hydro will be 1.5 times design pressure up to a maximum of 150 PSI. If a pneumatic test is decided upon, the test pressure will be 1.2 times design pressure.



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E. Lube Oil System

The Lube Oil system consists of a skid and interconnecting stainless steel piping to the Gas Turbine Package. All interconnecting pipe welds shall be in accordance with ANSI B31.3. All Lube Oil system welds will undergo visual inspection or testing in accordance with ANSI B31.3. Ten percent (10%) of these welds will undergo RT testing (100% of the weld)

F. Hydraulic System

The Hydraulic System consists of a skid and interconnecting stainless steel piping to the Gas Turbine Package. All interconnecting pipe welds shall be in accordance with ANSI B31.3. All Hydraulic system welds will undergo visual inspection or testing in accordance with ANSI B31.3. Ten percent (10%) of these welds will undergo RT testing (100% of the weld)

All radiographs of full penetration welds must be approved and accepted per criteria established in Section B above.

G. Raw Water System

The Raw Water System consists of Carbon Steel Piping.

Raw Water System piping welds will be visually inspected.

H. Process Water Systems

All welded steel piping will be visually inspected as welds are completed. All PVC piping joints will be inspected as they are made up. The Process water systems will be inspected prior to startup. All pumps will be balanced. Remaining components will be inspected and confirmed that they are supplied and installed per specifications.

J. Pump Testing

All pumps supplied will be balanced and confirmed as fully operational prior to startup.

V. WELDER QUALIFICATIONS

Welders qualified according to the appropriate codes shall make all welds on the project:

- | | |
|-----------------------------------|---------------|
| • Structural Steel | AWS CODE D1.1 |
| • Fuel System Piping | ANSI B31.3 |
| • Lube Oil System Piping | ANSI B31.3 |
| • Hydraulic Startup System Piping | ANSI B31.3 |

All welders will be required to provide certification of their qualification to the appropriate standard. Each welder's certified qualifications will be reviewed and approved by the welding inspector prior to the welder's beginning work on the project. Applicable welding procedure specifications (WPS) and Procedure Qualification Reports (PQRs) will be required. All reports and certifications will be in accordance with ASME Section IX Article II.



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VI. AREA DESIGNATION

Areas where combustible fluids, gases or vapors might be present shall be classified as hazardous areas or hot areas. Guidelines for welding in these areas will be drawn from ANSI Z49.1. Areas designated as safe areas will be those areas on site remote from hazardous areas and where no contact with combustible fluids, gases and vapors are present. Welding in these safe areas, as well as on-site welding fabrication, will be subject to the same standards and codes listed in the previous paragraphs. The welding inspector shall designate an area classification for the project.

VII. SUB-SYSTEMS MECHANICAL TESTS

The test requirements for the various tasks on the project are defined in the following paragraphs. Tests are defined in this case to be "system" centered, i.e., hydrostatic tests, vacuum tests, etc., versus inspections which are "component" centered. All tests shall be performed in the presence of a QA/QC inspector or his designate. All tests shall be documented with a written test report. The test report shall include a description of the test, the item or items tested, the procedure used, the date and time of the test and the test results. All test documentation shall be signed by the inspector.

A. Fuel System Tests

All fuel system piping shall be subjected to hydrostatic leak testing to 1.5 times the design pressure. Non-pipe components of the system shall be isolated from the test. The hydrostatic leak test pressure shall be held for a minimum of 1 Hour and then reduced in accordance with ANSI B31.3 to conduct examination for leakage. Pneumatic tests on the PE or RTR may be substituted at 1.2 times design pressure.

B. Lube Oil System Tests

All Lube Oil System piping shall be subjected to hydrostatic leak testing to 1.5 times the design pressure. Non-pipe components of the system shall be isolated from the test. The hydrostatic leak test pressure shall be held for a minimum of 1 Hour and then reduced in accordance with ANSI B31.3.

C. Hydraulic Starter System Tests

All Hydraulic Starter System piping will be subjected to hydrostatic leak testing to 1.5 time the design pressure. Non-Pipe components of the system shall be isolated from the test. The hydrostatic leak test pressure shall be held for a minimum of 1 Hour and then reduced in accordance with ANSI B31.3.

D. Process Water System Tests

All metallic process water system piping will be leak service tested prior to commissioning. The piping systems under test will be brought up to Normal Operating Pressure and this pressure will be held for 10 minutes or as long as it takes to check each joint or fitting on the line under test. Test shall be conducted in accordance with ANSI B31.3 to conduct examination for leakage. Piping Systems which will be tested in this manner are the following:

- Cooling Water Systems (New Piping)



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- Oily Water Piping

E. Instrument Air System Leak Tests

Instrument air piping systems will be subjected to a Pneumatic leak test following installation. Pressures will be raised to Normal Operating Pressures levels for each system and held for a minimum of 10 minutes.

VIII. SPECIFIC TESTS – ELECTRICAL

A. Ground Grid Integrity Test

The new installed grounding cables/rods will be attached to the existing system. Installed Ground Grid will be tested using a suitable multimeter to measure integrity prior to startup. Continuity and resistance will be confirmed for the new installed cables/rods. The readings will be recorded for record.

B. Cable Insulation Testing - Megger

All 600 Volt and above wire and cable to be used on this project will undergo an insulation test or tests to ensure cable is suitable for intended usage and has structural integrity for installation. All low voltage cables, below 600 volts, will be tested for continuity prior to being energized.

All medium and high voltage cable and wire will undergo Megger testing. Cables will be tested to levels established not to exceed the rated voltage of the cables. Megger testing will be performed with a calibrated test instrument certified to national standards.

The results will be recorded and maintained for record. A cable failing a Megger test will be tagged, segregated and removed from the job site.

C. Cable Insulation Testing - Hi Potential Test

Medium and high voltage cables will undergo Hi-Potential testing to detect any insulation breakdown in these cables.

Testing will be accomplished with a calibrated instrument certified to national standards. Results will be recorded and maintained for record.

D. Cable and Conduit Installation - Inspections

All cable, conduit and associated fittings will be checked to ensure compliance to specifications developed for this project. Conduit, fittings and cable installation will be monitored during construction to ensure compliance to NEC codes.



Electricidad de Caracas
2 ea. GE Liquid Fuel Frame 7FA
2 ea. GE Liquid Fuel LM 6000 PC's
CURUPAO Power Plant
Technical Scope Document

E. Point to Point Testing

All installed cables shall be point-to-point tested prior to being energized. The point-to-point test shall confirm cables are installed as designed and phased properly.

F. Switchgear, Motor Control Centers, Breakers, and other Electrical Components, Instrumentation

All switchgear, motor control centers, breakers and other electrical components, will be inspected and tested prior to and following installation. Specific test procedures will be developed for each major piece of equipment to be installed. Electrical components will be inspected prior to installation and, in most cases, will be tested as part of a larger sub-system. Instrumentation will be inspected prior to installation and calibrated following installation. Instrumentation will be tested as part of a larger sub-system.

IX. FACTORY ACCEPTANCE TESTS / INSPECTIONS

The Client has the right to request the contractor an inspection of the equipment and witness all factory tests prior to shipment to the Project site if schedule allows. Tests will be undertaken at the manufacturer or fabricator's facility prior to being shipped to site.

X. STARTUP TESTING AND COMMISSIONING

Startup testing and commissioning will involve integration of all sub-systems into a complete system-wide test of operation. Testing will involve operation of all sub-systems listed below:

- Process Water Systems – Raw Water Supply System and Firewater System
- Fuel Gas Delivery System
- Gas Turbine Startup
- Gas Turbine Electrical Transmission
- Breaker Operation
- Protective Relays, Breaker Testing

XI. REPORTS

A copy of all inspection and test reports shall be maintained in a file at the project site. These reports shall be made available for review and reference as may be required throughout the project. The original copies of all inspection and test reports shall be forwarded periodically to the Quality Assurance Manager for review and safekeeping. Quality related problems that cannot be readily corrected at the project site will be immediately referred to the Quality Assurance Manager for resolution.



Electricidad de Caracas
2 ea. GE Liquid Fuel Frame 7FA
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CURUPAO Power Plant
Technical Scope Document

Section 7.0 Drawings

PLOT PLAN

10-001

10-002

PROCESS FLOW DIAGRAM

50-001

50-002

50-003

50-004

50-005

50-006

ELECTRICAL ONE LINE

60-000

60-011

60-012

60-013

60-014 480V & Lower to be provided later

60-015 "

60-016 "

60-017 "

60-018 "

60-019 "

60-020 "

60-021 "

60-022 "


60-023 "

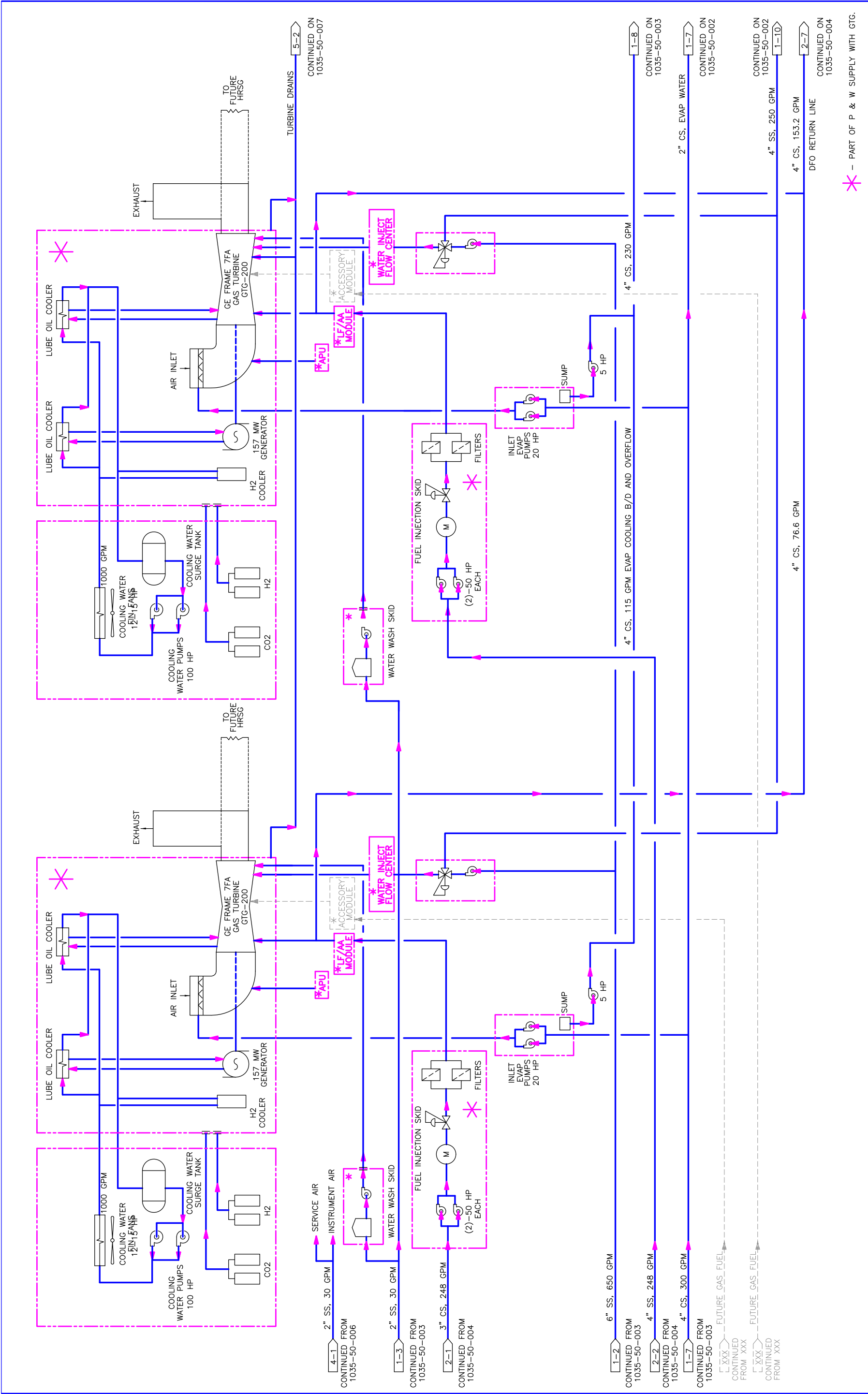
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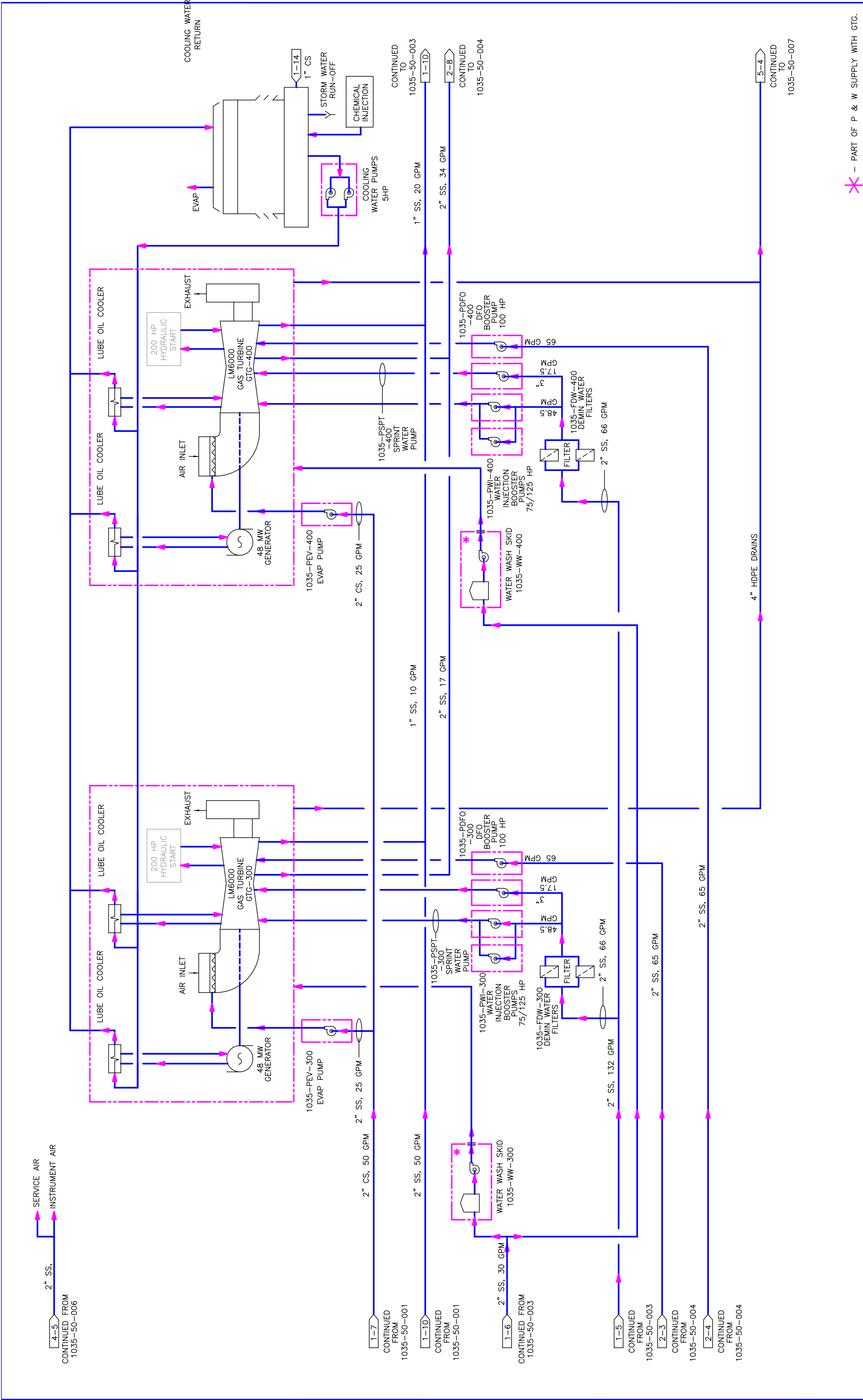
The image shows two vertical measurement scales. The left scale is labeled 'METRIC SYSTEM - METERS' and has markings at 0, 10M, 20M, 30M, 40M, 50M, and 60M. The right scale is labeled 'USA SYSTEM - FEET' and has markings at 0, 20', 40', 60', 80', 100', and 200'. Both scales are represented by vertical bars with horizontal tick marks at the specified intervals.

GRAPHIC SCALE

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ProEnergy EPC Services, LLC GENERAL ARRANGEMENT PLOT PLAN TWO 7FA & TWO LM-6000 GTG UNITS CURAPAO POWER PLANT VENEZUELA																													



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ProEnergy

EPC SERVICES

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ProEnergy EPC Services, LLC

PROCESS FLOW DIAGRAM-WATER SYSTEM
TWO 7FA & TWO LM-6000 GTG UNITS
CURUPAO POWER PLANT

JOB NO.

DWG NO.

SH NO.

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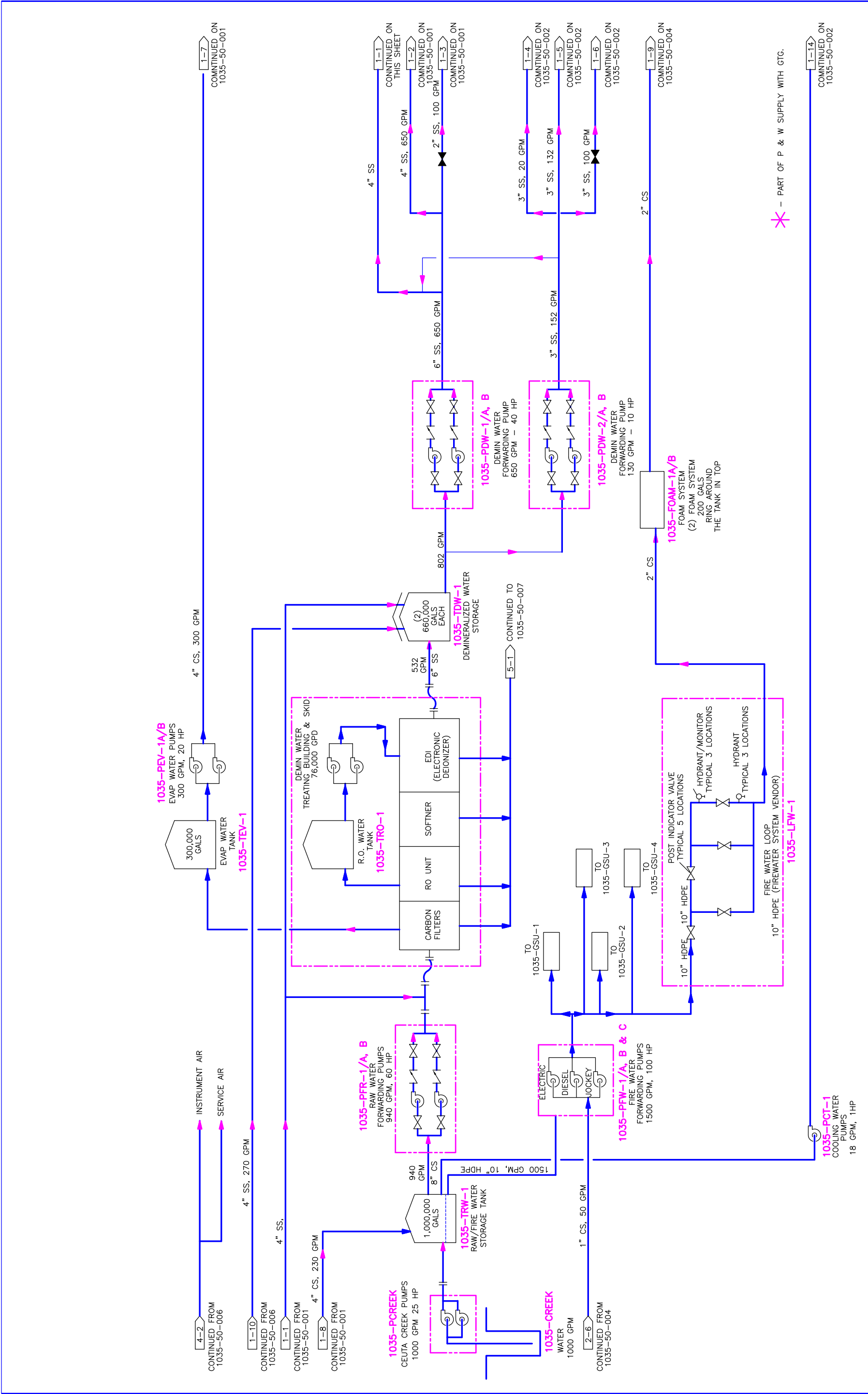
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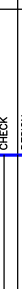
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* - PART OF P & W SUPPLY WITH GTG.



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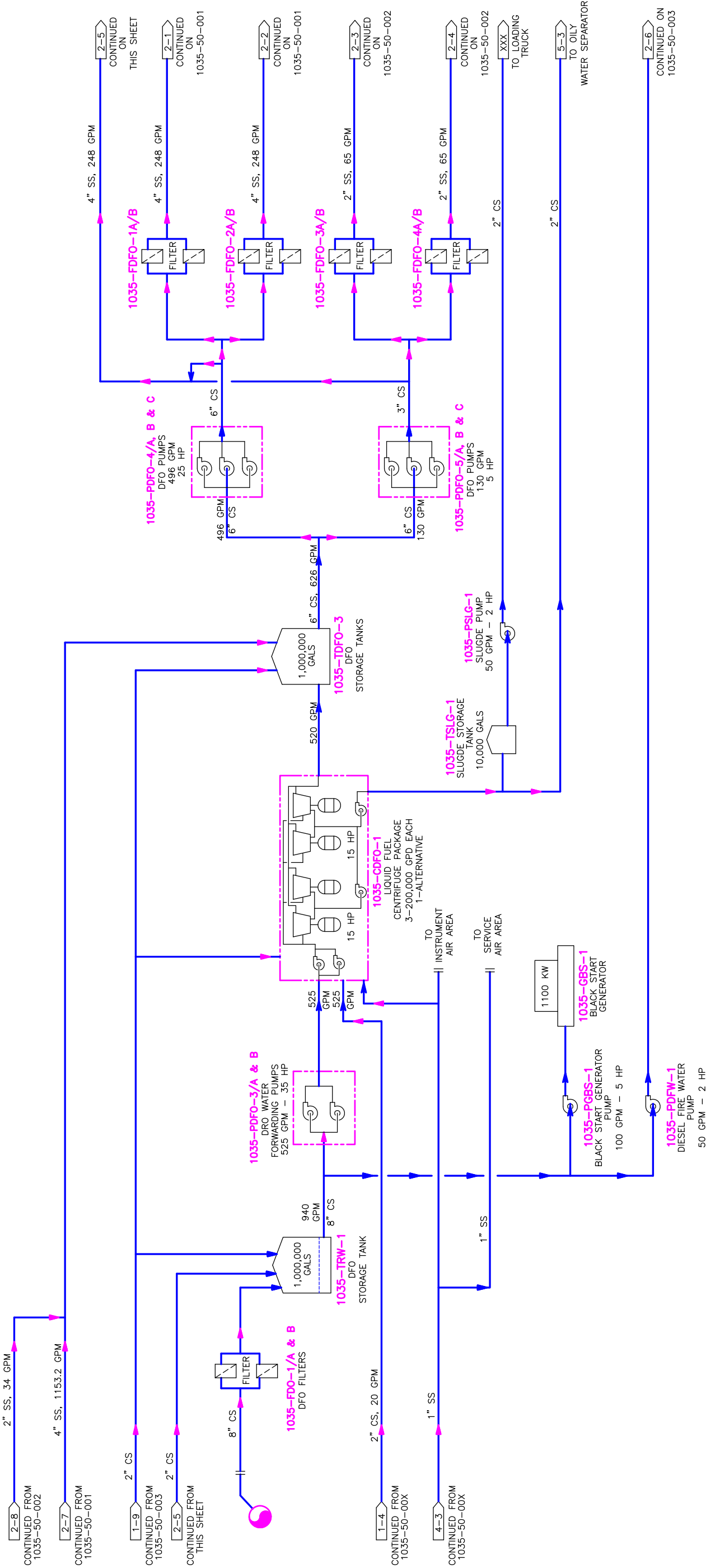
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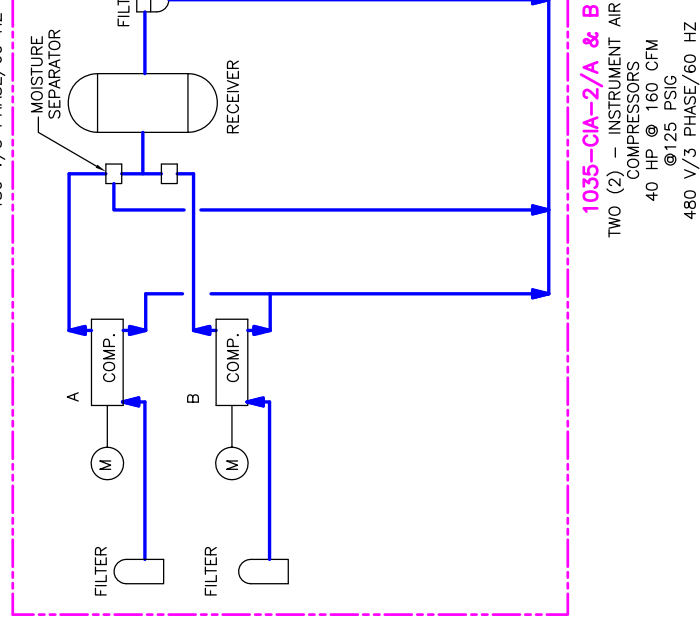
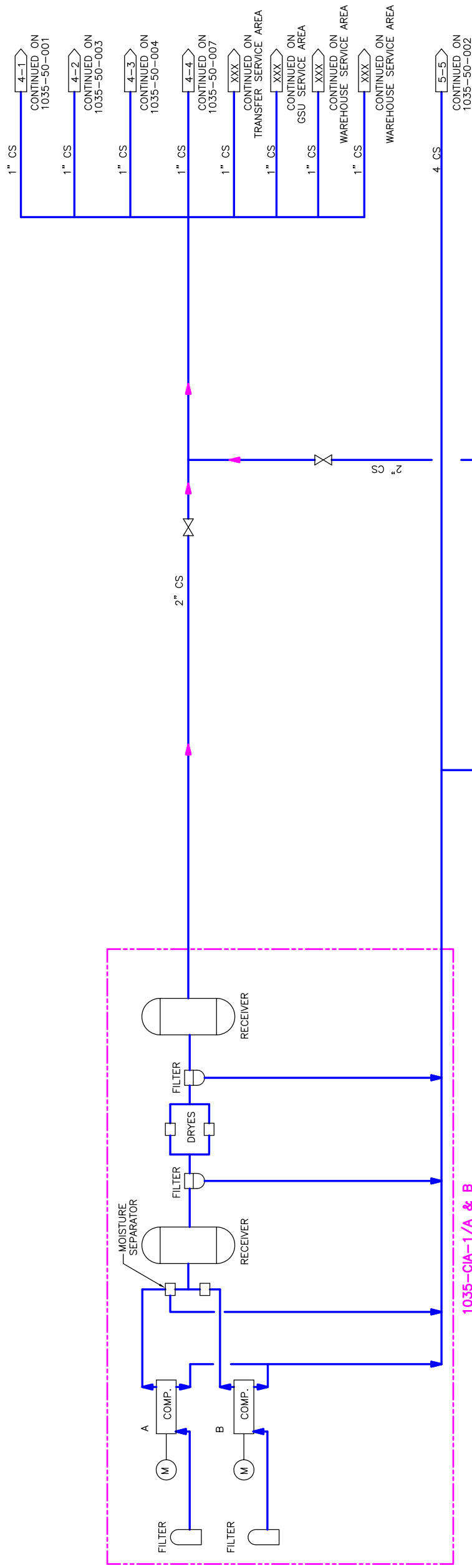
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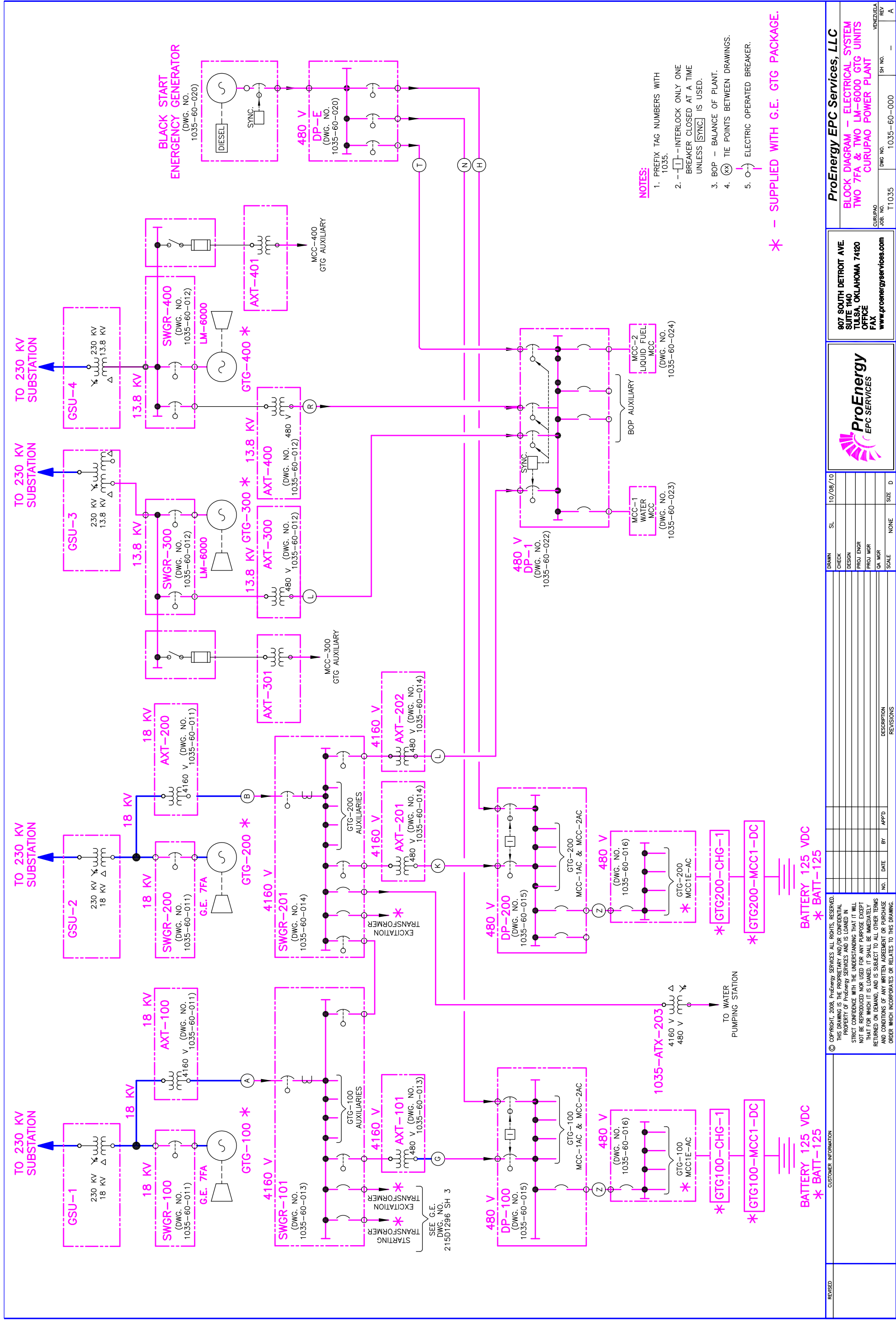
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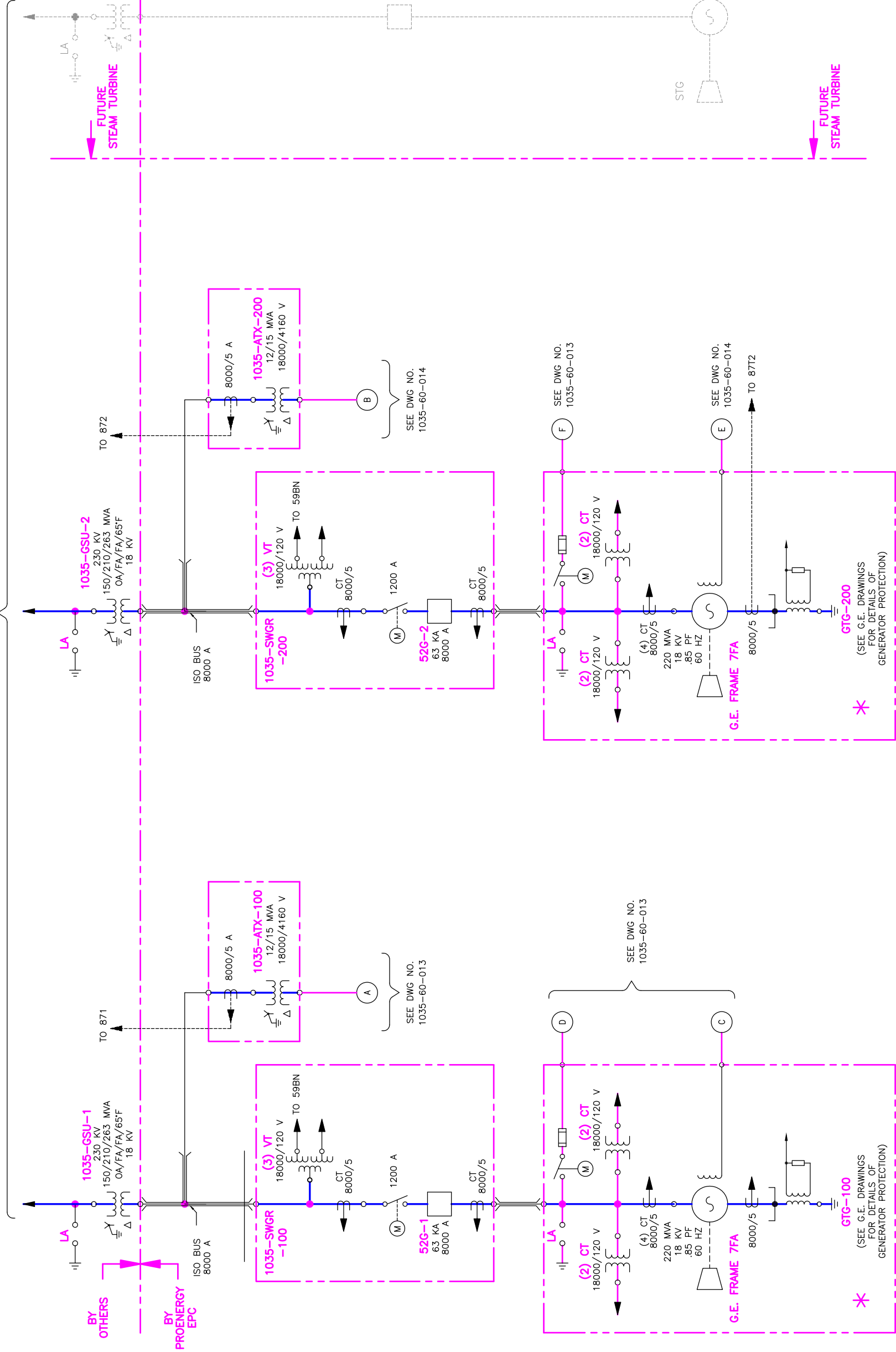
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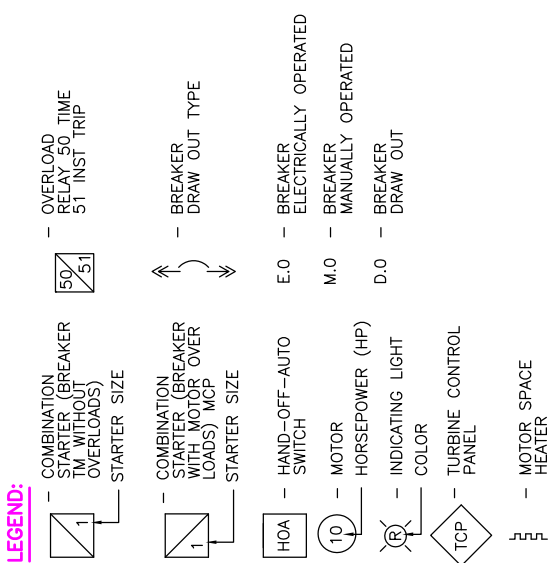
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* – SUPPLIED WITH G.E. GTG PACKAGE

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