

Seneca Compressed Air Energy Storage Project

MAJOR EQUIPMENT LIST (CYCLE 1)

The list below is indicative only based on Preliminary Engineering.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
PROCESS AIR COMPRESSOR EQUIPMENT AND AUXILIARIES						
	AIR COMPRESSOR (DR 5000)	1	CONFIGURATION: 1 x 60% CAPACITY: 390 lbs/sec (high amb.) POWER: 108,000 kW	Dresser Rand	Cycle 1	Datum D24A6 and D16R6B HP/IP centrifugal compressors and Frame 5000 LP Axial Compressor
	AIR COMPRESSOR (DR 4000)	1	CONFIGURATION: 1 x 40% CAPACITY: 214 lbs/sec (high amb.) POWER: 60,000 kW	Dresser Rand	Cycle 1	Datum D20A6 and D14R6B HP/IP centrifugal compressors and Frame 4000 LP Axial Compressor
	AIR COMPRESSOR TURNING GEAR	2	RATED POWER: 20 HP	Dresser Rand	Cycle 1	
	AIR INLET ANTI-ICIING SYSTEM	2		Dresser Rand	Cycle 1	
	LUBE OIL SYSTEM	2		Dresser Rand	Cycle 1	Including pumps, reservoir, heater, filters, and coolers.
	LUBE OIL HEATERS	2	RATED POWER: 30 kW			
	LUBE OIL MIST SEPARATORS	3	RATED POWER: 2.5 kW			3 x 50%
	LUBE OIL CONDITIONER	1	RATED POWER: 1 kW			
	MAIN LUBE OIL PUMPS	2	CONFIGURATION: 2 x 100% RATED POWER: 150 HP			AC Powered
	BACKUP LUBE OIL PUMPS	1	CONFIGURATION: 1 x 100% RATED POWER: 80 HP			DC Powered
	CONTROL OIL SYSTEM JACKING OIL PUMPS	1	RATED POWER: 20 HP	Dresser Rand	Cycle 1	
	INTER/AFTER COOLERS w/ MOSITURE SEPARATORS	10		Dresser Rand	Cycle 1	5 per compressor
	COMPRESSOR LCI SOFT STARTER	1		Dresser Rand	Cycle 1	Single starter for both compressors
	AIR COMPRESSOR NOISE ENCLOSURE	2		EPCM	Cycle 1	
AIR TURBINE GENERATOR EQUIPMENT AND AUXILIARIES						
	AIR TURBINE GENERATOR	1	OUTPUT: 135 MW GENERATOR: 160 MVA VOLTAGE: 13.8 kV POWER FACTOR: 0.85	Dresser Rand	Cycle 1	Includes HP and LP Section with Combustors
	AIR TURBINE TURNING GEAR	1	RATED POWER: 20 HP	Dresser Rand	Cycle 1	

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	LUBE OIL SYSTEM	1		Dresser Rand	Cycle 1	Including pumps, reservoir, heater, filters, and coolers.
	LUBE OIL HEATERS	2	RATED POWER: 30 kW			Per System
	LUBE OIL MIST SEPARATORS	3	RATED POWER: 2.5 kW			3 x 50%, Per System
	LUBE OIL CONDITIONER	1	RATED POWER: 1 kW			Per System
	MAIN LUBE OIL PUMPS	2	CONFIGURATION: 2 x 100% RATED POWER: 150 HP			AC Powered, Per System
	BACKUP LUBE OIL PUMPS	1	CONFIGURATION: 1 x 100% RATED POWER: 80 HP			DC Powered, Per System
	WATER INJECTION PUMP	1	RATED POWER: 40 HP	Dresser Rand	Cycle 1	
	CONTROL OIL SYSTEM JACKING OIL PUMPS	1	RATED POWER: 20 HP	Dresser Rand	Cycle 1	
	TURBINE NOISE ENCLOSURE	1		EPCM	Cycle 1	

RECUPERATOR EQUIPMENT AND AUXILIARIES

	AIR TURBINE WASTE HEAT RECUPERATOR	1	PRESSURE: 900 psig TEMPERATURE: 623 deg F AIR FLOW: 1,440,000 lb/hr	Dresser Rand	Cycle 1	SCR and CO Catalyst.
	INLET DUCTWORK AND EXPANSION JOINT	1		Dresser Rand	Cycle 1	
	OUTLET DUCTWORK AND EXPANSION JOINT	1		Dresser Rand	Cycle 1	
	SCR SYSTEM	1	MAX NOx AT STACK: 2.0 ppmvd NOx	Dresser Rand	Cycle 1	Including ammonia vaporization and injection skid.
	AMMONIA VAPORIZER	1				1 per system
	DILUTION AIR BLOWERS	2	RATED POWER: 15 HP			2 x 100% per system
	CO CATALYST SYSTEM	1	MAX CO AT STACK: 2.0 ppmvd CO	Dresser Rand	Cycle 1	
	EXHAUST DUCT STACK	1	STACK HEIGHT: 181 ft STACK DIAMETER: 13 ft	Dresser Rand	Cycle 1	
	EXHAUST STACK DAMPER	1		Dresser Rand	Cycle 1	

COMPRESSED GAS

	BULK NITROGEN STORAGE AND PIPING	1 LOT		EPCM	Cycle 1	Bottles, regulators, and instruments
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ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
AMMONIA STORAGE AND HANDLING SYSTEM						
	AMMONIA HANDLING & UNLOADING SYSTEM	1	DELIVERY: 1 Unloading Station	EPCM	Cycle 1	Based on 19% Aqueous Ammonia
	AQUEOUS AMMONIA STORAGE TANK	1	CAPACITY: 10,000 Gallons	EPCM	Cycle 1	Shop fabricated, horizontal tank
	AMMONIA FORWARDING PUMPS	2	CONFIGURATION: 2 x 100% CAPACITY: 4 GPM TOTAL HEAD: 200 ft RATED POWER: 1.00 HP	EPCM	Cycle 1	Positive displacement pumps
CIRCULATING WATER PUMPS AND PIPING						
	CIRCULATING WATER PUMPS	2	CONFIGURATION: 2 x 50% FLOW: 30,000 GPM TOTAL HEAD: 60 ft RATED POWER: 600 HP	EPCM	Cycle 1	Vertical, wet pit, mix flow pump.
	AUXILIARY COOLING WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 3,900 GPM TOTAL HEAD: 60 ft RATED POWER: 125 HP	EPCM	Cycle 1	Vertical, wet pit, mix flow pump.
COOLING TOWER						
	COOLING TOWER	1	DUTY: 600 MMBtu/hr FLOW: 60,000 GPM # OF FANS: 5 RATED POWER: 250 HP/fan	EPCM	Cycle 1	Plume Abatement Option
	COOLING TOWER TRASH SCREENS	2		EPCM	Cycle 1	To suit basin design
	CIRCULATING WATER FEED SYSTEM	1 LOT		EPCM	Cycle 1	Complete system with controls, pumps, and storage tanks.
	ACID METERING PUMPS AND STORAGE		RATED POWER: 1 HP			2 x 100% Pumps with storage tote
	SODIUM HYPOCHLORITE METERING PUMPS AND STORAGE		RATED POWER: 1 HP			2 x 100% Pumps with storage tote
	CORROSION INHIBITOR METERING PUMPS AND STORAGE		RATED POWER: 1 HP			2 x 100% Pumps with storage tote
	SODIUM BISULFITE METERING PUMPS AND STORAGE		RATED POWER: 1 HP			2 x 100% Pumps with storage tote
SERVICE / RAW WATER						
	RAW WATER SUPPLY PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 450 GPM TOTAL HEAD: 650 ft RATED POWER: 125 HP	EPCM	Cycle 1	Vertical, wet pit pump.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	AIR BACKWASH BLOWER	2	RATED POWER: 20 HP	EPCM	Cycle 1	2 x 100% air blower. Power to be verified by supplier.
	SERVICE / FIRE WATER STORAGE TANK	1	CAPACITY: 700,000 gallons	EPCM	Cycle 1	Field erected, carbon steel 62 ft x 32 ft (D x H)
	SERVICE WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 85 GPM TOTAL HEAD: 230 ft RATED POWER: 15.00 HP	EPCM	Cycle 1	Horizontal skid mounted centrifugal pumps

POTABLE WATER

	POTABILIZATION SKID	1	CAPACITY: 10 gpm	Water Treatment Supplier	Cycle 1	Activated carbon filter and sodium hypochlorite dosing. 2 x 100% pumps
	SODIUM HYPOCHLORITE PUMPS	2	RATED POWER: 1 HP			
	POTABLE WATER STORAGE TANK	1	CAPACITY: 14,400 gallons	EPCM	Cycle 1	Field erected, carbon steel 14 ft 4 in x 12 ft (D x H)
	POTABLE WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 75 GPM TOTAL HEAD: 150 ft RATED POWER: 7.50 HP	EPCM	Cycle 1	Horizontal skid mounted centrifugal pumps
	EMERGENCY EYE-WASH STATIONS & SAFETY SHOWERS	3		EPCM	Cycle 1	For areas where chemical exposure is possible. Instantaneous water heaters included.

WATER TREATMENT

	MULTIMEDIA FILTER SKID	2	CONFIGURATION: 2 x 100% CAPACITY: 45 GPM	Water Treatment Supplier	Cycle 1	
	MULTIMEDIA FILTER BACKWASH PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 50 GPM TOTAL HEAD: 120 ft RATED POWER: 5 HP	Water Treatment Supplier	Cycle 1	Pump size to be verified by supplier data
	AIR SCOUR BLOWER	1	RATED POWER: 10 HP	Water Treatment Supplier	Cycle 1	1 x 100% air blower. Power to be verified by supplier.
	REVERSE OSMOSIS / ELECTRODEIONIZATION UNIT	1	CONFIGURATION: 1 x 100% PRODUCT FLOW: 25 GPM	Water Treatment Supplier	Cycle 1	
	REVERSE OSMOSIS FEED PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 30 GPM TOTAL HEAD: 450 ft RATED POWER: 10.00 HP	Water Treatment Supplier	Cycle 1	Capacity TBD by supplier
	ANTI SCALANT FEED SKID AND PUMPS	1 LOT	CONFIGURATION: 2 x 100% RATED POWER: 1 HP	Water Treatment Supplier	Cycle 1	2 x 100% pumps, including chemical storage
	SODIUM BISULFITE FEED SKID AND PUMPS	1 LOT	CONFIGURATION: 2 x 100% RATED POWER: 1 HP	Water Treatment Supplier	Cycle 1	2 x 100% pumps, including chemical storage
	CAUSTIC FEED SKID AND PUMPS	1 LOT	CONFIGURATION: 2 x 100% RATED POWER: 1 HP	Water Treatment Supplier	Cycle 1	2 x 100% pumps, including chemical storage

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	DEMINERALIZED WATER STORAGE TANK	1	CAPACITY: 30,000 gallons	EPCM	Cycle 1	Field-erected, 304 SS. 18 ft x 16 ft (D x H)
	DEMINERALIZED WATER SUPPLY PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 30 GPM TOTAL HEAD: 200 ft RATED POWER: 7.5 HP	EPCM	Cycle 1	Horizontal skid mounted centrifugal pumps

WASTE WATER TREATMENT

	MECHANICAL EQUIPMENT BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1	Reinforced concrete sump
	MECHANICAL EQUIPMENT BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 1	Submersible pumps, complete with controls.
	WAREHOUSE / MAINTENANCE BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1	Reinforced concrete sump with protective lining
	WAREHOUSE / MAINTENANCE BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 1	Submersible pumps, complete with controls.
	COOLING TOWER CHEMICAL BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1	Reinforced concrete sump
	COOLING TOWER CHEMICAL BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 1	Submersible pumps, complete with controls.
	TURBINE/COMPRESSOR BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1	Pre-cast concrete manhole
	TURBINE/COMPRESSOR BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 1	Sewage grinder pumps, complete with controls. Designed to handle sanitary waste.
	OIL/WATER SEPARATOR (API)	1	CAPACITY: 600 gpm	EPCM	Cycle 1	Horizontal, cylindrical, above ground, static separator.
	O/WS EFFLUENT TRANSFER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 600 gpm TOTAL HEAD: 75 ft 25 HP	EPCM	Cycle 1	Submersible pumps, complete with controls
	STORM WATER TRANSFER SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1	Pre-cast concrete manhole
	STORM WATER TRANSFER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 10 gpm TOTAL HEAD: 75 ft RATED POWER: 1 HP	EPCM	Cycle 1	Submersible pumps, complete with controls.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	PACKAGED SANITARY SYSTEM SEWAGE GRINDER PUMPS	1	CAPACITY: 10 gpm CONFIGURATION: 2 x 100% RATED POWER: 7.5 HP	EPCM	Cycle 1	Sewage grinder pumps, complete with controls. Designed to handle sanitary waste.

PLANT AIR EQUIPMENT

	INSTRUMENT AIR DRYER	2	FLOW: 200 scfm	EPCM	Cycle 1	Dual tower, heatless regenerated desiccant dryers with pre and after filters
	WET AIR RECIEVER	1	CAPACITY: 40 ft ³	EPCM	Cycle 1	Located directly upstream of dryers.
	TURBINE / COMPRESSOR AIR RECIEVER	1	CAPACITY: 40 ft ³	EPCM	Cycle 1	Located in turbine / compressor building.

FUEL GAS EQUIPMENT

	FUEL GAS ULTRASONIC FLOW METER	1		EPCM	Cycle 1	
	FUEL GAS CHROMATOGRAPH	1		EPCM	Cycle 1	
	FUEL GAS DEWPOINT HEATER	1	DESIGN FLOW: 31,800 lbs/hr	EPCM	Cycle 1	Natural gas fired.
	FUEL GAS REGULATION STATION	2	CONFIGURATION: 2 x 100% DESIGN FLOW: 30,000 lbs/hr	EPCM	Cycle 1	GT fuel gas supply
	FUEL GAS CONDITIONING SKID WITH FILTER / SEPARATOR VESSEL AND DRAIN TANK	1	CONFIGURATION: 1 x 100% DESIGN FLOW: 30,000 lbs/hr	EPCM	Cycle 1	
	FUEL GAS COMPRESSOR SKID	1	CONFIGURATION: 1 x 100% DESIGN FLOW: 9,500 lbs/hr DISCHARGE PRES: 943 psig SUCTION PRES: 700 psig RATED POWER: 75 HP	Dresser Rand	Cycle 1	Including lube oil and gas coolers.
	FUEL GAS COALESCING FILTER SKID (FINAL FILTERS) w/ DRAIN TANK	2 Skids	CONFIGURATION: 2 x 100% DESIGN FLOW: 30,000 lbs/hr	EPCM	Cycle 1	2 x 100% filters per skid. Vertical, carbon steel vessel per ASME Section VIII with stainless steel mesh pad, removal to 1µ. Skid is completely pre-piped.

FIRE PROTECTION

	FIRE WATER PUMP	1	CONFIGURATION: 1 x 100% FLOW: 2,000 GPM TOTAL HEAD: 350 ft RATED POWER: 200 HP	EPCM	Cycle 1	Horizontal split case pump with diesel engine.
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ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	FIRE WATER PUMP	1	CONFIGURATION: 1 x 100% FLOW: 2,000 GPM TOTAL HEAD: 350 ft RATED POWER: 200 HP	EPCM	Cycle 1	Horizontal split case pump with electric drive
	FIRE WATER JOCKEY PUMP	1	CONFIGURATION: 1 x 100% FLOW: 25 GPM TOTAL HEAD: 350 ft RATED POWER: 5 HP	EPCM	Cycle 1	Horizontal jockey pump
	FIRE EXTINGUISHERS	1 LOT		EPCM	Cycle 1	Per NFPA Standards
	FIRE EQUIPMENT ENCLOSURE	1	Electric heat, lightings, and ventilation.	EPCM	Cycle 1	Pre-Fabricated enclosure for firewater pumps and related equipment.

BUILDING HVAC AND VENTILATION

	COMPLETE HVAC SYSTEM	2	NUMBER OF BUILDINGS: 1 RATING: 25 TON per system	EPCM	Cycle 1	Grade mounted, redundant systems for Administration Building / Visitors Center
	VENTILATION SYSTEMS	6	NUMBER OF BUILDINGS: 3 FLOW: 38000 CFM for 6 Fans FLOW: 13,000 CFM for 2 Fans NUMBER OF LOUVERS: 14 (10 FT height x 7 FT width)	EPCM	Cycle 1	For Mechanical Equipment Building, Maintenance Building, Turbine / Compressor Building.
	ELECTRIC UNIT HEATERS	12	NUMBER OF BUILDINGS: 3 POWER USAGE: 50 kW per unit	EPCM	Cycle 1	For Mechanical Equipment Building, Maintenance Building, Turbine / Compressor Building.

TRANSFORMERS

	GENERATOR STEP UP TRANSFORMER	1	Rating: 90/150 MVA 115-13.8 kV	EPCM	Cycle 1	GSU
	STATION AUXILLIARY TRANSFORMER	1	Rating: 45/75 MVA 115-13.8 kV	EPCM	Cycle 1	5000 Train transformer
	STATION AUXILLIARY TRANSFORMER	1	Rating: 78/130 MVA 115-13.8 kV	EPCM	Cycle 1	4000 Train transformer
	STATION AUXILLIARY TRANSFORMER	1	Rating: 7.5-9.375 MVA 115-13.8 kV	EPCM	Cycle 1	4.16kV loads

NON-SEGREGATED PHASE BUS DUCT

	NON SEGREGATED PHASE BUS DUCT	1 Lot	Rating: 8000 A 15 kV 100 KA	EPCM	Cycle 1	For generator to Step-up transformer
	NON SEGREGATED PHASE BUS DUCT	1 Lot	Rating: 8000 A 15 kV 63 KA	EPCM	Cycle 1	For 5000 Train to transformer
	NON SEGREGATED PHASE BUS DUCT	1 Lot	Rating: 4000 A 15 kV 63 KA	EPCM	Cycle 1	For 4000 Train to transformer

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	NON SEGREGATED PHASE BUS DUCT OR CABLE BUS	1 Lot	Rating: 1200 A 15 kV 50 KA	EPCM	Cycle 1	For 4.16kV switchgear to transformer

POWER DISTRIBUTION CENTERS

	MAIN PDC	1 Lot		EPCM	Cycle 1	Includes all MV Switchgear 480v Transformers, LV Switchgear, MCCs, DC equipment, batteries, UPS equipment except that relating to the Cooling Tower.
	COOLING TOWER PDC	1 Lot		EPCM	Cycle 1	Includes all 480v Transformers, MCCs, DC equipment, UPS equipment relating to the Cooling Tower.

MISCELLANEOUS

	EMERGENCY NATURAL GAS GENERATOR	1	RATED POWER: 1500 kW	EPCM	Cycle 1	937.5 kVA
	OVERHEAD CRANE - TURBINE / COMPRESSOR BUILDING	1	CAPACITY: 35 ton	EPCM	Cycle 1	With a 15 ton auxiliary hook.
	HOIST - MECHANICAL EQUIPMENT BUILDING	1	CAPACITY: 5 ton	EPCM	Cycle 1	Monorail, underhung.
	HOIST - GAS COMPRESSOR STATION	1	CAPACITY: 3 ton	EPCM	Cycle 1	Fuel gas compressor building. Monorail, underhung.
	ELEVATOR	1	CAPACITY: 2500 lbs RATED POWER: 25 HP	EPCM	Cycle 1	Office Elevator

CONTINUOUS EMISSIONS MONITORING SYSTEM

	CEMS, EQUIPMENT, ANALYZERS, SHELTER, SAMPLE LINES, PROBES, HMI'S, PLC'S, ETC.	1 LOT		EPCM	Cycle 1	CEMS, equipment, analyzers, shelter, sample lines, probes, HMI's, PLC's, ect.
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DISTRIBUTED CONTROL SYSTEM

	COMPLETE DISTRIBUTED CONTROL SYSTEM FOR THE BALANCE OF PLANT EQUIPMENT	1 LOT		Dresser Rand	Cycle 1	
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MAJOR EQUIPMENT LIST (Cycle 1A)

The list below is indicative only based on Preliminary Engineering.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
PROCESS AIR COMPRESSOR EQUIPMENT AND AUXILIARIES						
	AIR COMPRESSOR (DR 5000)	2	CONFIGURATION: 2 x 50% CAPACITY: 323 lbs/sec (avg amb.) POWER: 85,000 kW	Dresser Rand	Cycle 1A	Datum D22R6B and D18R6B HP/IP centrifugal compressors and Frame 5000 LP Axial Compressor
	AIR COMPRESSOR TURNING GEAR	2	RATED POWER: 20 HP	Dresser Rand	Cycle 1A	
	AIR INLET ANTI-ICIING SYSTEM	2		Dresser Rand	Cycle 1A	
	LUBE OIL SYSTEM	2		Dresser Rand	Cycle 1A	Including pumps, reservoir, heater, filters, and coolers.
	LUBE OIL HEATERS	2	RATED POWER: 30 kW			
	LUBE OIL MIST SEPARATORS	3	RATED POWER: 2.5 kW			3 x 50%
	LUBE OIL CONDITIONER	1	RATED POWER: 1 kW			
	MAIN LUBE OIL PUMPS	2	CONFIGURATION: 2 x 100% RATED POWER: 150 HP			AC Powered
	BACKUP LUBE OIL PUMPS	1	CONFIGURATION: 1 x 100% RATED POWER: 80 HP			DC Powered
	CONTROL OIL SYSTEM JACKING OIL PUMPS	1	RATED POWER: 20 HP	Dresser Rand	Cycle 1A	
	INTER/AFTER COOLERS w/ MOSITURE SEPARATORS	10		Dresser Rand	Cycle 1A	5 per compressor
	COMPRESSOR LCI SOFT STARTER	1		Dresser Rand	Cycle 1A	Single starter for both compressors
	AIR COMPRESSOR NOISE ENCLOSURE	2		EPCM	Cycle 1A	

AIR TURBINE GENERATOR EQUIPMENT AND AUXILIARIES						
	AIR TURBINE GENERATOR	2	OUTPUT: 105 MW GENERATOR: 130 MVA VOLTAGE: 13.8 kV POWER FACTOR: 0.85	Dresser Rand	Cycle 1A	Includes HP and LP Section with Combustors and a single common generator
	AIR TURBINE TURNING GEAR	2	RATED POWER: 20 HP	Dresser Rand	Cycle 1A	

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	LUBE OIL SYSTEM	2		Dresser Rand	Cycle 1A	Including pumps, reservoir, heater, filters, and coolers.
	LUBE OIL HEATERS	2	RATED POWER: 30 kW			Per System
	LUBE OIL MIST SEPARATORS	3	RATED POWER: 2.5 kW			3 x 50%, Per System
	LUBE OIL CONDITIONER	1	RATED POWER: 1 kW			Per System
	MAIN LUBE OIL PUMPS	2	CONFIGURATION: 2 x 100% RATED POWER: 150 HP			AC Powered, Per System
	BACKUP LUBE OIL PUMPS	1	CONFIGURATION: 1 x 100% RATED POWER: 80 HP			DC Powered, Per System
	WATER INJECTION PUMP	2	RATED POWER: 40 HP	Dresser Rand	Cycle 1A	
	CONTROL OIL SYSTEM JACKING OIL PUMPS	2	RATED POWER: 20 HP	Dresser Rand	Cycle 1A	
	TURBINE NOISE ENCLOSURE	2		EPCM	Cycle 1A	

RECUPERATOR EQUIPMENT AND AUXILIARIES

	AIR TURBINE WASTE HEAT RECUPERATOR	2	PRESSURE: 900 psig TEMPERATURE: 623 deg F AIR FLOW: 1,440,000 lb/hr	Dresser Rand	Cycle 1A	SCR and CO Catalyst.
	INLET DUCTWORK AND EXPANSION JOINT	2		Dresser Rand	Cycle 1A	
	OUTLET DUCTWORK AND EXPANSION JOINT	2		Dresser Rand	Cycle 1A	
	SCR SYSTEM	2	MAX NOx AT STACK: 2.0 ppmvd NOx	Dresser Rand	Cycle 1A	Including ammonia vaporization and injection skid.
	AMMONIA VAPORIZER	1				1 per system
	DILUTION AIR BLOWERS	2	RATED POWER: 15 HP			2 x 100% per system
	CO CATALYST SYSTEM	2	MAX CO AT STACK: 2.0 ppmvd CO	Dresser Rand	Cycle 1A	
	EXHAUST DUCT STACK	2	STACK HEIGHT: 181 ft STACK DIAMETER: 13 ft	Dresser Rand	Cycle 1A	
	EXHAUST STACK DAMPER	2		Dresser Rand	Cycle 1A	

COMPRESSED GAS

	BULK NITROGEN STORAGE AND PIPING	1 LOT		EPCM	Cycle 1A	Bottles, regulators, and instruments
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ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
AMMONIA STORAGE AND HANDLING SYSTEM						
	AMMONIA HANDLING & UNLOADING SYSTEM	1	DELIVERY: 1 Unloading Station	EPCM	Cycle 1A	Based on 19% Aqueous Ammonia
	AQUEOUS AMMONIA STORAGE TANK	1	CAPACITY: 10,000 Gallons	EPCM	Cycle 1A	Shop fabricated, horizontal tank
	AMMONIA FORWARDING PUMPS	2	CONFIGURATION: 2 x 100% CAPACITY: 4 GPM TOTAL HEAD: 200 ft RATED POWER: 1.00 HP	EPCM	Cycle 1A	Positive displacement pumps
CIRCULATING WATER PUMPS AND PIPING						
	CIRCULATING WATER PUMPS	2	CONFIGURATION: 2 x 50% FLOW: 30,000 GPM TOTAL HEAD: 60 ft RATED POWER: 600 HP	EPCM	Cycle 1A	Vertical, wet pit, mix flow pump.
	AUXILIARY COOLING WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 3,900 GPM TOTAL HEAD: 60 ft RATED POWER: 125 HP	EPCM	Cycle 1A	Vertical, wet pit, mix flow pump.
COOLING TOWER						
	COOLING TOWER	1	DUTY: 600 MMBtu/hr FLOW: 60,000 GPM # OF FANS: 5 RATED POWER: 250 HP/fan	EPCM	Cycle 1A	Plume Abatement Option
	COOLING TOWER TRASH SCREENS	2		EPCM	Cycle 1A	To suit basin design
	CIRCULATING WATER FEED SYSTEM	1 LOT	RATED POWER: 1 HP RATED POWER: 1 HP RATED POWER: 1 HP RATED POWER: 1 HP	EPCM	Cycle 1A	Complete system with controls, pumps, and storage tanks. 2 x 100% Pumps with storage tote 2 x 100% Pumps with storage tote 2 x 100% Pumps with storage tote 2 x 100% Pumps with storage tote
SERVICE / RAW WATER						
	RAW WATER SUPPLY PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 450 GPM TOTAL HEAD: 650 ft RATED POWER: 125 HP	EPCM	Cycle 1A	Vertical, wet pit pump.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	AIR BACKWASH BLOWER	2	RATED POWER: 20 HP	EPCM	Cycle 1A	2 x 100% air blower. Power to be verified by supplier.
	SERVICE / FIRE WATER STORAGE TANK	1	CAPACITY: 700,000 gallons	EPCM	Cycle 1A	Field erected, carbon steel 62 ft x 32 ft (D x H)
	SERVICE WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 85 GPM TOTAL HEAD: 230 ft RATED POWER: 15.00 HP	EPCM	Cycle 1A	Horizontal skid mounted centrifugal pumps

POTABLE WATER

	POTABILIZATION SKID	1	CAPACITY: 10 gpm	Water Treatment Supplier	Cycle 1A	Activated carbon filter and sodium hypochlorite dosing. 2 x 100% pumps
	SODIUM HYPOCHLORITE PUMPS	2	RATED POWER: 1 HP			
	POTABLE WATER STORAGE TANK	1	CAPACITY: 14,400 gallons	EPCM	Cycle 1A	Field erected, carbon steel 14 ft 4 in x 12 ft (D x H)
	POTABLE WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 75 GPM TOTAL HEAD: 150 ft RATED POWER: 7.50 HP	EPCM	Cycle 1A	Horizontal skid mounted centrifugal pumps
	EMERGENCY EYE-WASH STATIONS & SAFETY SHOWERS	3		EPCM	Cycle 1A	For areas where chemical exposure is possible. Instantaneous water heaters included.

WATER TREATMENT

	MULTIMEDIA FILTER SKID	2	CONFIGURATION: 2 x 100% CAPACITY: 45 GPM	Water Treatment Supplier	Cycle 1A	
	MULTIMEDIA FILTER BACKWASH PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 50 GPM TOTAL HEAD: 120 ft RATED POWER: 5 HP	Water Treatment Supplier	Cycle 1A	Pump size to be verified by supplier data
	AIR SCOUR BLOWER	1	RATED POWER: 10 HP	Water Treatment Supplier	Cycle 1A	1 x 100% air blower. Power to be verified by supplier.
	REVERSE OSMOSIS / ELECTRODEIONIZATION UNIT	1	CONFIGURATION: 1 x 100% PRODUCT FLOW: 25 GPM	Water Treatment Supplier	Cycle 1A	
	REVERSE OSMOSIS FEED PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 30 GPM TOTAL HEAD: 450 ft RATED POWER: 10.00 HP	Water Treatment Supplier	Cycle 1A	Capacity TBD by supplier
	ANTI SCALANT FEED SKID AND PUMPS	1 LOT	CONFIGURATION: 2 x 100% RATED POWER: 1 HP	Water Treatment Supplier	Cycle 1A	2 x 100% pumps, including chemical storage
	SODIUM BISULFITE FEED SKID AND PUMPS	1 LOT	CONFIGURATION: 2 x 100% RATED POWER: 1 HP	Water Treatment Supplier	Cycle 1A	2 x 100% pumps, including chemical storage
	CAUSTIC FEED SKID AND PUMPS	1 LOT	CONFIGURATION: 2 x 100% RATED POWER: 1 HP	Water Treatment Supplier	Cycle 1A	2 x 100% pumps, including chemical storage

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	DEMINERALIZED WATER STORAGE TANK	1	CAPACITY: 30,000 gallons	EPCM	Cycle 1A	Field-erected, 304 SS. 18 ft x 16 ft (D x H)
	DEMINERALIZED WATER SUPPLY PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 30 GPM TOTAL HEAD: 200 ft RATED POWER: 7.5 HP	EPCM	Cycle 1A	Horizontal skid mounted centrifugal pumps

WASTE WATER TREATMENT

	MECHANICAL EQUIPMENT BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1A	Reinforced concrete sump
	MECHANICAL EQUIPMENT BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 1A	Submersible pumps, complete with controls.
	WAREHOUSE / MAINTENANCE BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1A	Reinforced concrete sump with protective lining
	WAREHOUSE / MAINTENANCE BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 1A	Submersible pumps, complete with controls.
	COOLING TOWER CHEMICAL BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1A	Reinforced concrete sump
	COOLING TOWER CHEMICAL BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 1A	Submersible pumps, complete with controls.
	TURBINE/COMPRESSOR BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1A	Pre-cast concrete manhole
	TURBINE/COMPRESSOR BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 1A	Sewage grinder pumps, complete with controls. Designed to handle sanitary waste.
	OIL/WATER SEPARATOR (API)	1	CAPACITY: 600 gpm	EPCM	Cycle 1A	Horizontal, cylindrical, above ground, static separator.
	O/W/S EFFLUENT TRANSFER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 600 gpm TOTAL HEAD: 75 ft 25 HP	EPCM	Cycle 1A	Submersible pumps, complete with controls
	STORM WATER TRANSFER SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 1A	Pre-cast concrete manhole
	STORM WATER TRANSFER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 10 gpm TOTAL HEAD: 75 ft RATED POWER: 1 HP	EPCM	Cycle 1A	Submersible pumps, complete with controls.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	PACKAGED SANITARY SYSTEM SEWAGE GRINDER PUMPS	1	CAPACITY: 10 gpm CONFIGURATION: 2 x 100% RATED POWER: 7.5 HP	EPCM	Cycle 1A	Sewage grinder pumps, complete with controls. Designed to handle sanitary waste.

PLANT AIR EQUIPMENT

	INSTRUMENT AIR DRYER	2	FLOW: 200 scfm	EPCM	Cycle 1A	Dual tower, heatless regenerated desiccant dryers with pre and after filters
	WET AIR RECIEVER	1	CAPACITY: 40 ft ³	EPCM	Cycle 1A	Located directly upstream of dryers.
	TURBINE / COMPRESSOR AIR RECIEVER	1	CAPACITY: 40 ft ³	EPCM	Cycle 1A	Located in turbine / compressor building.

FUEL GAS EQUIPMENT

	FUEL GAS ULTRASONIC FLOW METER	1		EPCM	Cycle 1A	
	FUEL GAS CHROMATOGRAPH	1		EPCM	Cycle 1A	
	FUEL GAS DEWPOINT HEATER	1	DESIGN FLOW: 31,800 lbs/hr	EPCM	Cycle 1A	Natural gas fired.
	FUEL GAS REGULATION STATION	2	CONFIGURATION: 2 x 100% DESIGN FLOW: 30,000 lbs/hr	EPCM	Cycle 1A	GT fuel gas supply
	FUEL GAS CONDITIONING SKID WITH FILTER / SEPARATOR VESSEL AND DRAIN TANK	1	CONFIGURATION: 1 x 100% DESIGN FLOW: 30,000 lbs/hr	EPCM	Cycle 1A	
	FUEL GAS COMPRESSOR SKID	1	CONFIGURATION: 1 x 100% DESIGN FLOW: 9,500 lbs/hr DISCHARGE PRES: 943 psig SUCTION PRES: 700 psig RATED POWER: 75 HP	Dresser Rand	Cycle 1A	Including lube oil and gas coolers.
	FUEL GAS COALESCING FILTER SKID (FINAL FILTERS) w/ DRAIN TANK	2 Skids	CONFIGURATION: 2 x 100% DESIGN FLOW: 30,000 lbs/hr	EPCM	Cycle 1A	2 x 100% filters per skid. Vertical, carbon steel vessel per ASME Section VIII with stainless steel mesh pad, removal to 1µ. Skid is completely pre-piped.

FIRE PROTECTION

	FIRE WATER PUMP	1	CONFIGURATION: 1 x 100% FLOW: 2,000 GPM TOTAL HEAD: 350 ft RATED POWER: 200 HP	EPCM	Cycle 1A	Horizontal split case pump with diesel engine.
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ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	FIRE WATER PUMP	1	CONFIGURATION: 1 x 100% FLOW: 2,000 GPM TOTAL HEAD: 350 ft RATED POWER: 200 HP	EPCM	Cycle 1A	Horizontal split case pump with electric drive
	FIRE WATER JOCKEY PUMP	1	CONFIGURATION: 1 x 100% FLOW: 25 GPM TOTAL HEAD: 350 ft RATED POWER: 5 HP	EPCM	Cycle 1A	Horizontal jockey pump
	FIRE EXTINGUISHERS	1 LOT		EPCM	Cycle 1A	Per NFPA Standards
	FIRE EQUIPMENT ENCLOSURE	1	Electric heat, lightings, and ventilation.	EPCM	Cycle 1A	Pre-Fabricated enclosure for firewater pumps and related equipment.

BUILDING HVAC AND VENTILATION

	COMPLETE HVAC SYSTEM	2	NUMBER OF BUILDINGS: 1 RATING: 25 TON per system	EPCM	Cycle 1A	Grade mounted, redundant systems for Administration Building / Visitors Center
	VENTILATION SYSTEMS	6	NUMBER OF BUILDINGS: 3 FLOW: 38000 CFM for 6 Fans FLOW: 13,000 CFM for 2 Fans NUMBER OF LOUVERS: 14 (10 FT height x 7 FT width)	EPCM	Cycle 1A	For Mechanical Equipment Building, Maintenance Building, Turbine / Compressor Building.
	ELECTRIC UNIT HEATERS	12	NUMBER OF BUILDINGS: 3 POWER USAGE: 50 kW per unit	EPCM	Cycle 1A	For Mechanical Equipment Building, Maintenance Building, Turbine / Compressor Building.

TRANSFORMERS

	GENERATOR STEP UP TRANSFORMER	1	Rating: 144/240 MVA 115-13.8 kV	EPCM	Cycle 1A	GSU
	STATION AUXILLIARY TRANSFORMER	1	Rating: 45/75 MVA 115-13.8 kV	EPCM	Cycle 1A	5000 Train transformer
	STATION AUXILLIARY TRANSFORMER	1	Rating: 78/130 MVA 115-13.8 kV	EPCM	Cycle 1A	4000 Train transformer
	STATION AUXILLIARY TRANSFORMER	1	Rating: 7.5-9.375 MVA 115-13.8 kV	EPCM	Cycle 1A	4.16kV loads

NON-SEGREGATED PHASE BUS DUCT

	NON SEGREGATED PHASE BUS DUCT	1 Lot	Rating: 8000 A 15 kV 100 KA	EPCM	Cycle 1A	For generator to Step-up transformer
	NON SEGREGATED PHASE BUS DUCT	1 Lot	Rating: 8000 A 15 kV 63 KA	EPCM	Cycle 1A	For 5000 Train to transformer
	NON SEGREGATED PHASE BUS DUCT	1 Lot	Rating: 4000 A 15 kV 63 KA	EPCM	Cycle 1A	For 4000 Train to transformer

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	NON SEGREGATED PHASE BUS DUCT OR CABLE BUS	1 Lot	Rating: 1200 A 15 kV 50 KA	EPCM	Cycle 1A	For 4.16kV switchgear to transformer

POWER DISTRIBUTION CENTERS

	MAIN PDC	1 Lot		EPCM	Cycle 1A	Includes all MV Switchgear 480v Transformers, LV Switchgear, MCCs, DC equipment, batteries, UPS equipment except that relating to the Cooling Tower.
	COOLING TOWER PDC	1 Lot		EPCM	Cycle 1A	Includes all 480v Transformers, MCCs, DC equipment, UPS equipment relating to the Cooling Tower.

MISCELLANEOUS

	EMERGENCY NATURAL GAS GENERATOR	1	RATED POWER: 1500 kW	EPCM	Cycle 1A	937.5 kVA
	OVERHEAD CRANE - TURBINE / COMPRESSOR BUILDING	1	CAPACITY: 35 ton	EPCM	Cycle 1A	With a 15 ton auxiliary hook.
	HOIST - MECHANICAL EQUIPMENT BUILDING	1	CAPACITY: 5 ton	EPCM	Cycle 1A	Monorail, underhung.
	HOIST - GAS COMPRESSOR STATION	1	CAPACITY: 3 ton	EPCM	Cycle 1A	Fuel gas compressor building. Monorail, underhung.
	ELEVATOR	1	CAPACITY: 2500 lbs RATED POWER: 25 HP	EPCM	Cycle 1A	Office Elevator

CONTINUOUS EMISSIONS MONITORING SYSTEM

	CEMS, EQUIPMENT, ANALYZERS, SHELTER, SAMPLE LINES, PROBES, HMI'S, PLC'S, ETC.	1 LOT		EPCM	Cycle 1A	CEMS, equipment, analyzers, shelter, sample lines, probes, HMI's, PLC's, ect.
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DISTRIBUTED CONTROL SYSTEM

	COMPLETE DISTRIBUTED CONTROL SYSTEM FOR THE BALANCE OF PLANT EQUIPMENT	1 LOT		Dresser Rand	Cycle 1A	
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Seneca Compressed Air Energy Storage Project

MAJOR EQUIPMENT LIST (CYCLE 2)

The list below is indicative only based on Preliminary Engineering.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
COMBUSTION TURBINE EQUIPMENT AND AUXILIARIES						
	COMBUSTION TURBINE AND GENERATOR	1	OUTPUT: 85 MW (45 deg F) NO_x EMISSIONS: 9 ppmvd @ 15% O ₂ VOLTAGE: 13.8 kV POWER FACTOR: 0.90	GE	Cycle 2	GE 7EA Natural Gas Fuel TEWAC Generator
	COMBUSTION TURBINE ENCLOSURE	1		GE	Cycle 2	
	COMBUSTION TURBINE AIR INLET FILTER	1		GE	Cycle 2	Pulse Air Self Cleaning with silencer.
	COMBUSTION TURBINE MECHANICAL PACKAGE	1		GE	Cycle 2	
	COMBUSTION TURBINE ELECTRICAL PACKAGE	1		GE	Cycle 2	
	CT AIR INLET EVAPORATIVE COOLER	1		GE	Cycle 2	Recirculation Type
	CT AIR INLET ANTI-ICING SYSTEM	1		GE	Cycle 2	
	CT START UP SYSTEM	1		GE	Cycle 2	Static frequency converter system with turning gear
	COMPRESSOR WATER WASH SYSTEM	1		GE	Cycle 2	Washing water tank and pumps
	TURBINE CONTROL PANEL	1		GE	Cycle 2	
	GENERATOR PROTECTION PANEL	1		GE	Cycle 2	
	LUBE OIL SYSTEM	1		GE	Cycle 2	Lube oil reservoir, pumps, cooler, heater, vapor extractor, filter accumulator, PT control and regulating valves.
	CONTROL OIL SYSTEM	1		GE	Cycle 2	Control oil reservoir, pumps, cooler, heater, vapor extractor, filter accumulator, PT control and cleaner.
	GT FUEL GAS UNIT	1		GE	Cycle 2	Enclosed
	FUEL GAS PURGE AIR SYSTEM	1		GE	Cycle 2	Purge air unit and valves.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	CASING COOLING AIR SYSTEM	1		GE	Cycle 2	Cooling fan
	VIBRATION CONTROL PANELS	1		GE	Cycle 2	
	CT CO2 FIRE PROTECTION SYSTEM	1		GE	Cycle 2	Tank and Control Panel

PROCESS AIR COMPRESSOR EQUIPMENT AND AUXILIARIES

	AIR COMPRESSOR (MDT HP)	2	CONFIGURATION: 2 x 50% CAPACITY: 309 lbs/sec RATED POWER: 48.3 MW	Man Diesel and Turbo	Cycle 2	Man Diesel-Turbo Model RBZ71
	AIR COMPRESSOR (MDT LP)	2	CONFIGURATION: 2 x 50% CAPACITY: 309 lbs/sec RATED POWER: 44.3 MW	Man Diesel and Turbo	Cycle 2	Man Diesel-Turbo Model RIKT140
	AIR COMPRESSOR TURNING GEAR	2	RATED POWER: 20 HP	Man Diesel and Turbo	Cycle 2	
	AIR INLET ANTI-ICIING SYSTEM	2		Man Diesel and Turbo	Cycle 2	
	LUBE OIL SYSTEM	1		Man Diesel and Turbo	Cycle 2	Including pumps, reservoir, heater, filters, and coolers.
	LUBE OIL HEATERS	2	RATED POWER: 30 kW			
	LUBE OIL MIST SEPARATORS	3	RATED POWER: 2.5 kW			3 x 50%
	LUBE OIL CONDITIONER	1	RATED POWER: 1 kW			
	MAIN LUBE OIL PUMPS	2	CONFIGURATION: 2 x 100% RATED POWER: 150 HP			AC Powered
	BACKUP LUBE OIL PUMPS	1	CONFIGURATION: 1 x 100% RATED POWER: 80 HP			DC Powered
	CONTROL OIL SYSTEM JACKING OIL PUMPS	1	RATED POWER: 20 HP	Man Diesel and Turbo	Cycle 2	
	INTER/AFTER COOLERS w/ MOSITURE SEPARATORS	8		Man Diesel and Turbo	Cycle 2	4 per compressor
	COMPRESSOR LCI SOFT STARTER	1		Man Diesel and Turbo	Cycle 2	Single starter for both compressors
	AIR COMPRESSOR NOISE ENCLOSURE	4		EPCM	Cycle 2	

AIR TURBINE GENERATOR EQUIPMENT AND AUXILIARIES

	AIR TURBINE GENERATOR	2	OUTPUT: 65 MW GENERATOR: 80 MVA VOLTAGE: 13.8 kV MAX CO AT STACK: 0.8 ppmvd CO	Man Diesel and Turbo	Cycle 2	MAN Diesel-Turbo DK100/220RA1, single casing, single flow axial turbine.
	AIR TURBINE TURNING GEAR	2	RATED POWER: 20 HP	Man Diesel and Turbo	Cycle 2	

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	LUBE OIL SYSTEM	2		Man Diesel and Turbo	Cycle 2	Including pumps, reservoir, heater, filters, and coolers.
	LUBE OIL HEATERS	2	RATED POWER: 30 kW			Per System
	LUBE OIL MIST SEPARATORS	3	RATED POWER: 2.5 kW			3 x 50%, Per System
	LUBE OIL CONDITIONER	1	RATED POWER: 1 kW			Per System
	MAIN LUBE OIL PUMPS	2	CONFIGURATION: 2 x 100% RATED POWER: 150 HP			AC Powered, Per System
	BACKUP LUBE OIL PUMPS	1	CONFIGURATION: 1 x 100% RATED POWER: 80 HP			DC Powered, Per System
	CONTROL OIL SYSTEM JACKING OIL PUMPS	1	RATED POWER: 20 HP	Man Diesel and Turbo	Cycle 2	Bottles, regulators, and instruments
	TURBINE NOISE ENCLOSURE	2		Man Diesel and Turbo	Cycle 2	
	EXIT AIR STACK	1	STACK HEIGHT: 50 ft	Man Diesel and Turbo	Cycle 2	

RECUPERATOR EQUIPMENT AND AUXILIARIES

	COMBUSTION TURBINE WASTE HEAT RECUPERATOR	1	PRESSURE: 1150 psig TEMPERATURE: 940 deg F AIR FLOW: 2,125,800 lb/hr	RECUPERATOR SUPPLIER	Cycle 2	SCR and CO Catalyst.
	INLET DUCTWORK AND EXPANSION JOINT	1		RECUPERATOR SUPPLIER	Cycle 2	
	OUTLET DUCTWORK AND EXPANSION JOINT	1		RECUPERATOR SUPPLIER	Cycle 2	
	SCR SYSTEM	1	MAX NO_x AT STACK: 2.0 ppmvd NO _x	RECUPERATOR SUPPLIER	Cycle 2	Including ammonia vaporization and injection skid.
	TEMPERING AIR FANS	2	RATED POWER: 400 HP			2 x 100% per system
	AMMONIA VAPORIZER	1				1 per system
	DILUTION AIR BLOWERS	2	RATED POWER: 15 HP			2 x 100% per system
	CO CATALYST SYSTEM	1	MAX CO AT STACK: 2.0 ppmvd CO	RECUPERATOR SUPPLIER	Cycle 2	
	EXHAUST DUCT STACK	1	STACK HEIGHT: 190 ft STACK DIAMETER: 17 ft	RECUPERATOR SUPPLIER	Cycle 2	
	EXHAUST STACK DAMPER	1		RECUPERATOR SUPPLIER	Cycle 2	

COMPRESSED GAS

	BULK NITROGEN STORAGE AND PIPING	1 LOT		EPCM	Cycle 2	Bottles, regulators, and instruments (Piping by EPC)
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ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
AMMONIA STORAGE AND HANDLING SYSTEM						
	AMMONIA HANDLING & UNLOADING SYSTEM	1	DELIVERY: 1 Unloading Station	EPCM	Cycle 2	Based on 19% Aqueous Ammonia
	AQUEOUS AMMONIA STORAGE TANK	1	CAPACITY: 10,000 Gallons	EPCM	Cycle 2	Shop fabricated, horizontal tank
	AMMONIA FORWARDING PUMPS	2	CONFIGURATION: 2 x 100% CAPACITY: 4 GPM TOTAL HEAD: 200 ft RATED POWER: 1.00 HP	EPCM	Cycle 2	Positive displacement pumps
CIRCULATING WATER PUMPS AND PIPING						
	CIRCULATING WATER PUMPS	2	CONFIGURATION: 2 x 50% FLOW: 30,000 GPM TOTAL HEAD: 60 ft RATED POWER: 600 HP	EPCM	Cycle 2	Vertical, wet pit, mix flow pump.
	AUXILIARY COOLING WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 3,900 GPM TOTAL HEAD: 80 ft RATED POWER: 125 HP	EPCM	Cycle 2	Vertical, wet pit, mix flow pump.
COOLING TOWER						
	COOLING TOWER	1	DUTY: 600 MMBtu/hr FLOW: 60,000 GPM # OF FANS: 5 RATED POWER: 250 HP/fan	EPCM	Cycle 2	Plume Abatement Option
	COOLING TOWER TRASH SCREENS	2		EPCM	Cycle 2	To suit basin design
	CIRCULATING WATER FEED SYSTEM	1 LOT		EPCM	Cycle 2	Complete system with controls, pumps, and storage tanks.
	ACID METERING PUMPS AND STORAGE		RATED POWER: 1 HP			2 x 100% Pumps with storage tote
	SODIUM HYPOCHLORITE METERING PUMPS AND STORAGE		RATED POWER: 1 HP			2 x 100% Pumps with storage tote
	CORROSION INHIBITOR METERING PUMPS AND STORAGE		RATED POWER: 1 HP			2 x 100% Pumps with storage tote
	SODIUM BISULFITE METERING PUMPS AND STORAGE		RATED POWER: 1 HP			2 x 100% Pumps with storage tote
SERVICE / RAW WATER						
	RAW WATER SUPPLY PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 428 GPM TOTAL HEAD: 650 ft RATED POWER: 125 HP	EPCM	Cycle 2	Vertical, wet pit pump.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	AIR BACKWASH BLOWER	2	RATED POWER: 20 HP	EPCM	Cycle 2	2 x 100% air blower. Power to be verified by supplier.
	SERVICE / FIRE WATER STORAGE TANK	1	CAPACITY: 700,000 gallons	EPCM	Cycle 2	Field erected, carbon steel 62 ft x 32 ft (D x H)
	SERVICE WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 85 GPM TOTAL HEAD: 230 ft RATED POWER: 15.00 HP	EPCM	Cycle 2	Horizontal skid mounted centrifugal pumps

POTABLE WATER

	POTABILIZATION SKID	1	CAPACITY: 10 gpm	Water Treatment Supplier	Cycle 2	Activated carbon filter and sodium hypochlorite dosing. 2 x 100% pumps
	SODIUM HYPOCHLORITE PUMPS	2	RATED POWER: 1 HP			
	POTABLE WATER STORAGE TANK	1	CAPACITY: 14,400 gallons	EPCM	Cycle 2	Field erected, carbon steel 14 ft 4 in x 12 ft (D x H)
	POTABLE WATER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 75 GPM TOTAL HEAD: 150 ft RATED POWER: 7.50 HP	EPCM	Cycle 2	Horizontal skid mounted centrifugal pumps
	EMERGENCY EYE-WASH STATIONS & SAFETY SHOWERS	3		EPCM	Cycle 2	For areas where chemical exposure is possible. Instantaneous water heaters included.

WATER TREATMENT

	MULTIMEDIA FILTER SKID	2	CONFIGURATION: 2 x 100% CAPACITY: 45 GPM	Water Treatment Supplier	Cycle 2	
	MULTIMEDIA FILTER BACKWASH PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 50 GPM TOTAL HEAD: 120 ft RATED POWER: 5 HP	Water Treatment Supplier	Cycle 2	Pump size to be verified by supplier data
	AIR SCOUR BLOWER	1	RATED POWER: 10 HP	Water Treatment Supplier	Cycle 2	1 x 100% air blower. Power to be verified by supplier.

WASTE WATER TREATMENT

	CTG WATER WASH DRAIN TANK	1	CAPACITY: 1,600 gallons	EPCM	Cycle 2	Double wall, carbon steel.
	MECHANICAL EQUIPMENT BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 2	Reinforced concrete sump
	MECHANICAL EQUIPMENT BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 2	Submersible pumps, complete with controls.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	WAREHOUSE / MAINTENANCE BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 2	Reinforced concrete sump with protective lining
	WAREHOUSE / MAINTENANCE BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 2	Submersible pumps, complete with controls.
	COOLING TOWER CHEMICAL BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 2	Reinforced concrete sump
	COOLING TOWER CHEMICAL BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 2	Submersible pumps, complete with controls.
	TURBINE/COMPRESSOR BUILDING SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 2	Pre-cast concrete manhole
	TURBINE/COMPRESSOR BUILDING SUMP PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 100 gpm TOTAL HEAD: 75 ft RATED POWER: 7.5 HP	EPCM	Cycle 2	Sewage grinder pumps, complete with controls. Designed to handle sanitary waste.
	OIL/WATER SEPARATOR (API)	1	CAPACITY: 600 gpm	EPCM	Cycle 2	Horizontal, cylindrical, above ground, static separator.
	O/WS EFFLUENT TRANSFER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 600 gpm TOTAL HEAD: 75 ft RATED POWER: 30 HP	EPCM	Cycle 2	Submersible pumps, complete with controls
	STORM WATER TRANSFER SUMP	1	SIZE: 3 x 10 ft (Dia x Height)	EPCM	Cycle 2	Pre-cast concrete manhole
	STORM WATER TRANSFER PUMPS	2	CONFIGURATION: 2 x 100% FLOW: 10 gpm TOTAL HEAD: 75 ft RATED POWER: 1 HP	EPCM	Cycle 2	Submersible pumps, complete with controls
	PACKAGED SANITARY SYSTEM SEWAGE GRINDER PUMPS	1	CAPACITY: 10 gpm CONFIGURATION: 2 x 100% RATED POWER: 7.5 HP	EPCM	Cycle 2	Sewage grinder pumps, complete with controls. Designed to handle sanitary waste.

PLANT AIR EQUIPMENT

	INSTRUMENT AIR DRYER	1	FLOW: 200 scfm	EPCM	Cycle 2	Dual tower, heatless regenerated desiccant dryers with pre and after filters
	WET AIR RECIEVER	1	CAPACITY 40 ft ³	EPCM	Cycle 2	Located directly upstream of dryers.
	TURBINE / COMPRESSOR AIR RECIEVER	1	CAPACITY 40 ft ³	EPCM	Cycle 2	Located in turbine / compressor building.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
FUEL GAS EQUIPMENT						
	FUEL GAS ULTRASONIC FLOW METER	1		EPCM	Cycle 2	
	FUEL GAS CHROMATOGRAPH	1		EPCM	Cycle 2	
	FUEL GAS DEWPOINT HEATER	1	DESIGN FLOW: 31,800 lbs/hr	EPCM	Cycle 2	Natural gas fired.
	FUEL GAS REGULATION STATION	2	CONFIGURATION: 2 x 100% DESIGN FLOW (CYCLE 2): 50,000 lbs/hr	EPCM	Cycle 2	GT fuel gas supply
	FUEL GAS CONDITIONING SKID WITH FILTER / SEPARATOR VESSEL AND DRAIN TANK	1	CONFIGURATION: 1 x 100% DESIGN FLOW (CYCLE 2): 50,000 lbs/hr	EPCM	Cycle 2	
	FUEL GAS COALESCING FILTER SKID (FINAL FILTERS) w/ DRAIN TANK	2 Skids	DESIGN FLOW: 2 x 100% DESIGN FLOW (CYCLE 2): 50,000 lbs/hr	EPCM	Cycle 2	2 x 100% filters per skid. Vertical, carbon steel vessel per ASME Section VIII with stainless steel mesh pad, removal to 1µ. Skid is completely pre-piped.

FIRE PROTECTION						
	FIRE WATER PUMP	1	CONFIGURATION: 1 x 100% FLOW: 2,000 GPM TOTAL HEAD: 350 ft RATED POWER: 200 HP	EPCM	Cycle 2	Horizontal split case pump with diesel engine.
	FIRE WATER PUMP	1	CONFIGURATION: 1 x 100% FLOW: 2,000 GPM TOTAL HEAD: 350 ft RATED POWER: 200 HP	EPCM	Cycle 2	Horizontal split case pump with electric drive
	FIRE WATER JOCKEY PUMP	1	CONFIGURATION: 1 x 100% FLOW: 25 GPM TOTAL HEAD: 350 ft RATED POWER: 5 HP	EPCM	Cycle 2	Horizontal jockey pump
	FIRE EXTINGUISHERS	1 LOT		EPCM	Cycle 2	Per NFPA Standards
	FIRE EQUIPMENT ENCLOSURE	1	Electric heat, lightings, and ventilation.	EPCM	Cycle 2	Pre-Fabricated enclosure for firewater pumps and related equipment.

BUILDING HVAC AND VENTILATION						
	COMPLETE HVAC SYSTEM	2	NUMBER OF BUILDINGS: 1 RATING: 25 TON per system	EPCM	Cycle 2	Grade mounted, redundant systems for Administration Building / Visitors Center
	VENTILATION SYSTEMS	6	NUMBER OF BUILDINGS: 3 FLOW: 38000 CFM for 6 Fans FLOW: 13,000 CFM for 2 Fans NUMBER OF LOUVERS: 14 (10 ft h x 7 ft w)	EPCM	Cycle 2	For Mechanical Equipment Building, Maintenance Building, Turbine / Compressor Building.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
	ELECTRIC UNIT HEATERS	18	NUMBER OF BUILDINGS: 3 kW per unit POWER USAGE: 50 KW per unit	EPCM	Cycle 2	For Mechanical Equipment Building, Maintenance Building, Turbine / Compressor Building.

TRANSFORMERS

	GENERATOR STEP UP TRANSFORMER	1	Rating: 144/240 MVA 115-13.8 kV	EPCM	Cycle 2	GSU for 3 generators
	STATION AUXILLIARY TRANSFORMER	2	Rating: 78/130 MVA 115-13.8 kV	EPCM	Cycle 2	Compressor train transformers
	STATION AUXILLIARY TRANSFORMER	1	Rating: 7.5-9.375 MVA 115-13.8 kV	EPCM	Cycle 2	4.16kV loads

ISOLATED PHASE BUS DUCT

	GENERATOR ISOLATED PHASE BUS DUCT	1 Lot	Rating: 12000 A 15 kV 150 KA	EPCM	Cycle 2	For generators to Step-up transformer
	GENERATOR ISOLATED PHASE BUS DUCT, HORIZONTAL 90 DEGREE	6	Rating: 12000 A 15 kV 150 KA	EPCM	Cycle 2	For generators to Step-up transformer
	GENERATOR ISOLATED PHASE BUS DUCT, VERTICAL 90 DEGREE	3	Rating: 12000 A 15 kV 150 KA	EPCM	Cycle 2	For generators to Step-up transformer
	GENERATOR ISOLATED PHASE BUS DUCT, HORIZONTAL TEE	6	Rating: 12000 A 15 kV 150 KA	EPCM	Cycle 2	For generators to Step-up transformer

NON-SEGREGATED PHASE BUS DUCT

	NON SEGREGATED PHASE BUS DUCT OR CABLE BUS	1 Lot	Rating: 1200 A 15 kV 50 KA	EPCM	Cycle 2	For 4.16kV switchgear to transformer
	NON SEGREGATED PHASE BUS DUCT	2 Lots	Rating: 5000 A 15 kV 80 KA	EPCM	Cycle 2	For compressor trains to transformers

POWER DISTRIBUTION CENTERS

	MAIN PDC	1 Lot		EPCM	Cycle 2	Includes all MV Switchgear 480v Transformers, LV Switchgear, MCCs, DC equipment, batteries, UPS equipment except that relating to the Cooling Tower.
	COOLING TOWER PDC	1 Lot		EPCM	Cycle 2	Includes all 480v Transformers, MCCs, DC equipment, UPS equipment relating to the Cooling Tower.

ITEM	EQUIPMENT SCOPE	QTY	CAPACITY BASIS / DATA	SCOPE	OPTION	REMARKS
MISCELLANEOUS						
	EMERGENCY NATURAL GAS GENERATOR	1	RATED POWER: 1500 kW	EPCM	Cycle 2	937.5 kVA
	OVERHEAD CRANE - TURBINE / COMPRESSOR BUILDING	1	CAPACITY: 80 ton	EPCM	Cycle 2	With a 15 ton auxiliary hook.
	HOIST - MECHANICAL EQUIPMENT BUILDING	1	CAPACITY: 5 ton	EPCM	Cycle 2	Monorail, underhung.
	ELEVATOR	1	CAPACITY: 2500 lbs RATED POWER: 25 HP	EPCM	Cycle 2	Office Elevator
CONTINUOUS EMISSIONS MONITORING SYSTEM						
	CEMS, EQUIPMENT, ANALYZERS, SHELTER, SAMPLE LINES, PROBES, HMI'S, PLC'S, ETC.	1 LOT		EPCM	Cycle 2	CEMS, equipment, analyzers, shelter, sample lines, probes, HMI's, PLC's, ect.
DISTRIBUTED CONTROL SYSTEM						
	COMPLETE DISTRIBUTED CONTROL SYSTEM FOR THE BALANCE OF PLANT EQUIPMENT	1 LOT		EPCM	Cycle 2	