

DIVISION 1 - GENERAL REQUIREMENTS

PART 1 - SECTION 011100 - SUMMARY OF WORK

1.01 GENERAL:

- A. This Section includes basic identification of the Work covered under the Agreement..
- B. These Specifications were prepared by the Engineer

1.02 PROJECT DESCRIPTION:

- A. The Project is a natural gas fired reciprocating engine power plant designed for 112 MWe (nominal) gross electric power output.
- B. The following Project Site will be developed:
 - 1. Pioneer Generating Station:
 - Northwest of Williston, ND
 - a. Plant shall be designed for natural gas operation based on the fuel composition described in Exhibit H.
- C. Supplier is responsible for final design of equipment. Engineer is responsible for final design of the Project, including arrangement of Supplier's Equipment.

1.03 CODES AND STANDARDS

- A. Design specifications and construction of the Project shall be in accordance with (1) applicable laws, regulations, codes and standards of the Federal Government and State of North Dakota, including those set forth below and, (2) applicable local (including county and city) laws, regulations, codes and ordinances, including those set forth below. Publications from the following nationally recognized organizations are applicable to the engineering, design, manufacture, and testing of the Equipment included in the Specifications to the extent referenced in these Specifications. All references to publications are to the latest issue of each together with all latest addenda, amendments, or additions thereto as of the Effective Date. References shall be made in accordance with the abbreviations listed below. Other codes not listed herein that the Equipment is manufactured in accordance with, are listed in Attachment A1 "Codes and Standards", attached to this Exhibit as A1. In the event that conflicts arise between the codes, standards of practice, specifications or manufacturer recommendations described and referred to herein and codes, laws, rules, decrees, regulations, standards, etc., of the locality where the equipment is to be installed, the more stringent code shall apply. Supplier shall provide a written position of any such conflict clarifications to Owner in writing.

B. Federal Codes:

CFR	Code of Federal Regulations
FERC	Federal Energy Regulatory Commission
NERC	North American Electric Reliability Corporation
Title 29	Code of Federal Regulations (CFR), Part 1910 Occupational Safety and Health Standards.

- 1. Supplier shall not be responsible for air or operating permits but shall be required to meet the performance guarantees required by the Agreement under Exhibit D.
- C. Supplier shall comply with any legally required code or standard applicable to the equipment or services provided. Equipment shall be designed and built accordingly.

D. County / City Codes:

Fire Marshall / AHJ	2012 International Fire Code
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E. Manufacturers Standards:

SECTION 011100 - SUMMARY OF WORK: continued

Equipment, goods, and/or material provided by Seller procured from Europe will be designed and manufactured in accordance with those codes and standards listed in Attachment A1 "Codes and Standards", attached to Exhibit A.

1.04 PROJECT SITE CONDITIONS:

- A. Site Elevation:
 - 1. Pioneer Generating Station: 2,385 ft amsl
- B. The Project Site has the following Site Conditions:
 - 1. Design Temperatures (Indoor Installation):
 - a. Maximum Dry Bulb: 122°F
 - b. Minimum Dry Bulb: 50°F
 - c. 1% Design Wet Bulb: 66.4°F
 - 2. Design Temperatures (Outdoor Installation):
 - a. Maximum Dry Bulb: 90.9°F
 - b. Minimum Dry Bulb: -23.5°F
 - c. 1% Design Wet Bulb: 66.4°F
 - 3. Design Temperatures (Outdoor Extremes):
 - a. Maximum Dry Bulb: 105°F
 - b. Minimum Dry Bulb: -38°F
 - c. 1% Design Wet Bulb: 79.0°F
- C. IBC:
 - 1. Risk Category: III
 - 2. Seismic loads (IBC 2012, Section 1613 & ASCE 7-10 Chapter 12):
 - a. Design Spectral Response Accelerations:
 - (1) Short period, S_{DS} : 0.106g
 - (2) 1-second period, S_{D1} : 0.045g
 - b. Site Class: D
 - c. Importance Factor, I_E : 1.25
 - d. Seismic Design Category: A
 - 3. Snow loads (IBC 2012, Section 1608 & ASCE 7-10 Chapter 74):
 - a. Ground snow load, p_g : 30 psf
 - b. Flat Roof Snow Load, p_f : 25 psf
 - c. Terrain Category: C
 - d. Exposure Factor, C_e :
 - (1) Fully Exposed 1.0
 - (2) Partially exposed 0.9
 - (3) Sheltered
 - e. Thermal Factor, C_t :
 - (1) Structures Kept Above Freezing 1.0
 - (2) Unheated Structures 1.2
 - f. Importance Factor, I_s : 1.10
Drift Load shall be considered when applicable
 - 4. Wind Loads (IBC 2012, Section 1609 & ASCE 7-10 Chapter 26):
 - a. Basic Wind Speed: V_{3s} 120 mph
 - b. Exposure Category, C_e : D

SECTION 011100 - SUMMARY OF WORK: continued

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| | c. | Gust Effect Factor, G: | 0.85 |
| 5. | | Ice Loads (Chapter 10 of ASCE 7-05): | |
| | a. | Nominal Ice Thickness, t: | 0.25 in |
| | b. | Concurrent Wind Speed, V_C : | 30 mph |
| | c. | Importance Factor (ice thickness), I_I : | 1.25 |
| | d. | Importance Factor (concurrent wind pressure), I_W : | 1.00 |
| 6. | | Rain Loads (IBC 2012, Section 1611 & ASCE 7-10 Chapter 8): | |
| | a. | Max 25-year, 24-hour rainfall: | 3.5 In |
| 7. | | Prevailing Wind Direction: | |
| | a. | Winter & Fall: | NW |
| | b. | Spring & Summer: | SE |
- 1.05 SITE UTILITIES:
- A. Mechanical:
1. Charge Air: outdoor ambient
 2. Fuel Gas: minimum 80 psig; maximum 125 psig
 3. Liquid Petroleum Gas (LPG): pressures per Supplier's recommendation
 4. Lubricating Oil: quality per Supplier's recommendation
 5. Instrument Air: ISO 8573:2001 Class 1.2.3; minimum 65 psig; maximum 120 psig
 6. Starting Air: ISO 8573:2001 Class 4.6.5; minimum 220 psig; maximum 435 psig
 7. Treated Water: quality per Supplier's recommendation
 8. Emissions Control Reagent: 40% urea solution
- B. Electrical:
1. AC Power: 480VAC, 3-phase, 60 Hz; 120VAC, single phase, 60 Hz
- 1.06 WORK COVERED BY CONTRACT DOCUMENTS:
- A. The Supplier shall be responsible for furnishing all material, tools, equipment, labor, supervision, and any other incidental items or services necessary to perform all Work described herein. The Work under this Contract includes the responsibility of Supplier as indicated in Exhibit B.
- B. Supplier shall arrange and be responsible for transport of the auxiliary equipment and engine generators to their final set location within the building. Supplier shall provide support staff to assist with identifying the final set location and advise in installing the spring packs.
- C. Supplier shall deliver all other items (modules, panels, etc.) DDP Project Site.
- 1.07 WORK BY OTHERS:
- A. Owner shall be responsible for all Balance of Plant work including the design, supply, installation, and testing of all piping, tanks, instruments, pumps, wiring, transformers, 13.8kV and 480V switchgear, MCCs, panelboards, DCS, communications, foundations, buildings, and ventilation which are not furnished under this Contract but are required for a fully-functional power generating station.
- 1.08 SPARE PARTS:
- A. Supplier shall include all spare parts required for commissioning of all supplied Equipment.
1. Construction tools are in the installation contractor's scope and are excluded.
- B. Supplier shall also provide a separately priced list of recommended spare parts for each piece of equipment.

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ATTACHMENT A1

Codes and Standards Cross-reference

Ref	Directive	Field	Standard/code	Required in US projects	Title/description	Note
2		Civil	UBC 1997	IBC (2006, 2009, 2012)	Wind load, seismic load	
7		Civil		ASCE 7-05	For loads	used with IBC2006 and IBC2009
7		Civil		ASCE 7-10	For loads	used with IBC2012
7		Civil		AISC 360-05	For steel design	used with IBC2006 and IBC2009
7		Civil		AISC 360-10	For steel design	used with IBC2012
7		Civil		AISC 341-05	For seismic provisions	used with IBC2006 and IBC2009
7		Civil		AISC 341-10	For seismic provisions	used with IBC2012
7		Civil	EN 1991	ASCE 7-05, -10	Eurocode 1: Actions on structures	
2		Civil	EN 1997		Geotechnical design	Eurocode 7
2, 7		Civil	SFS-EN 1992-1-1	ACI 318	Reinforced concrete structures	Eurocode 2
2, 7		Civil	SFS-EN 1993-1-1...4	AISC 341-05, -10 and 360-05, -10	Steel structures	Eurocode 3
2, 7		Civil	EC3 SFS-EN 1993-1-1, EC2 SFS-EN 1992-1-1	ACI 318	Embedded anchor bolts	
2		Civil	EN 14509		Self supporting double skin metal faced insulating panels-Factory made products-Specifications (wall panels)	
2		Civil	AASHTO 2001		Road dimensions (road structural design follows AASHTO Low Volume Road Design procedure)	Vehicle WB-15M
2		Civil	Applicable ASTM standards		Subsurface site works and substructures	
2		Civil	European Norms and ISO standards		Installation of pre-manufactured buildings	
2		Civil	ASHRAE 62.1-2004, ASHRAE 55-2004		Ventilation & Air conditioning	
2		Civil	SFS-EN1451-1		Sewage pipes (polypropylene)	Or local equivalent
2		Civil	SFS-EN1401		Sewage pipes (polyvinylchloride)	Or local equivalent
2		Civil	SFS-EN12201		Water pipes (polyethylene)	Or local equivalent
2		Civil	FEM		Crane classification and design	
2		Civil	NFPA 30		Day and storage tank areas	
2		Civil	EN ISO 12944		Painting of steel structures	
2		Civil	EN ISO 1461		Galvanization	
2, 7		Civil	EN ISO 14122	OSHA PART 1910	Stairs and platforms (standard)	Fixed stairs and platforms
2		Civil	NFPA 101		Exit routes (means of egress)	Safe exit routes (means of egress) from fire or similar emergencies
2		Civil	ISO 1996		Acoustics Description, measurements and assessment of environmental noise, Part 1-3	Noise measurement
3	1	Doc.			Machinery Directive	Manuals for W checked against the Machinery Directive
3		Doc.	EN 82079-1		Preparation of instructions for use. Structuring, content and presentation. Part 1: General principles and detailed requirements	
3		Doc.	DITA		OASIS Darwin Information Typing Architecture	
2		El.	IEC 60034		Generator	
2		El.	IEC 60076		Transformer, oil type	
2		El.	IEC 60076		Transformer, dry type	
2		El.	IEC 62271-200 or IEC 62271		MV switchgear	
2, 8		El.	IEC 61439-2		LV switchgear	
2, 8		El.	IEC 60529		Enclosure protection	
2		El.	IEC 60950		WOIS workstation hardware	
2		El.	VDE 3699		WOIS workstation software	Applicable parts

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Codes and Standards Cross-reference *DM*

2		El.	IEEE 80		Earthing network	
2		El.	IEC 60439-1		Control panels	
2		El.	IEC 61131-3		PLC software	
2		El.	IEC 60598		Lighting installation	
2		El.	EN 54		Fire detection	
2		El.	IEC 62305		Protection against lightning	
6		El.		NEMA	The National Electrical Manufacturers Association	
6		El.		IEC	Electrical, electronic and related standards - International Electrotechnical Commission	
6		El.		NEC	Installation of electrical wiring and equipment - National Electric Code	
6		El.		IEEE	Institute of Electrical and Electronics Engineers	
6		El.		UL	Safety standards for electrical devices and components - Underwriters Laboratories	
8		El.	CENELEC HD 364, IEC60364		Installation	
8		El.	IEC 60092-353		Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	Used in modules
8		El.	IEC 60092-376		Electrical installations in ships - Part 376: Cables for control and instrumentation	Used in modules
6		General	ISO 9001:2000 and ISO 14001:2004		Quality and environmental management	
6		General		NIST	National Institute of Standards and Technology	
1-2	1	Mech.	EN ISO 12100		Safety of machinery. General principles for design. Risk assessment and risk reduction.	
1	1	Mech.	EN 547-1		Safety of machinery Human body measurements Part 1: Principles for determining the dimensions required for openings for whole body access into machinery	
1	1	Mech.	EN 547-2		Safety of machinery Human body measurements Part 2: Principles for determining the dimensions required for access openings	
1	1	Mech.	EN 547-3		Safety of machinery Human body measurements Part 3: Anthropometric data	
1	1	Mech.	EN ISO 13732-1		Ergonomics of the thermal environment Methods for the assessment of human responses to contact with surfaces Part 1: Hot surfaces	
1	1	Mech.	EN 809		Pumps and pump units for liquids Common safety requirements	
1	1	Mech.	EN ISO 14122-1		Safety of machinery Permanent means of access to machinery Part 1: Choice of fixed means of access between two levels	
1	1	Mech.	EN ISO 14122-2		Safety of machinery Permanent means of access to machinery Part 2: Working platforms and walkways	
1	1	Mech.	EN ISO 14122-3		Safety of machinery Permanent means of access to machinery Part 3: Stairs, stepladders and guard-rails	
1	1	Mech.	EN ISO 14122-4:		Safety of machinery - Permanent means of access to machinery - Part 4: Fixed Ladders	
2		Mech.	ISO 15550		Engine test run	
2		Mech.	ISO 8528 part 9		Vibrations	
2		Mech.	EN 1011		Welding	
2		Mech.	API 650 or EN 14015		Vertical tanks	
2		Mech.	EN 12285		Horizontal tanks	Excluding nozzle location
2		Mech.	ISO	OSHA, NFPA101	Stair and platforms	
2		Mech.	DIN, ISO, SFS and EN	ASME	Dimensional standards for installation materials (pipes, beams, etcetera)	
1-2	2	Mech.	EN 13480-1	ASME	Metallic industrial piping General	
1-2	2	Mech.	EN 13480-2	ASTM	Metallic industrial piping Materials	
1-2	2	Mech.	EN 13480-3	ASME	Metallic industrial piping Design and calculations	
1-2	2	Mech.	EN 13480-4	ASME	Metallic industrial piping Fabrication and installation	
1-2	2	Mech.	EN 13480-5	ASME	Metallic industrial piping Inspection and testing	
1	5	Mech.	EN 1127-1		Explosive atmospheres Explosion prevention and protection Part 1: Basic concepts and methodology	

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Codes and Standards Cross-reference

1	5	Mech.	EN 60079-10-1	Explosive atmospheres. Classification of areas. Explosive gas atmospheres	
1	5	Mech.	EN 60079-20:2010	Explosive atmospheres Part 20-1	
4	2	Mech.	EN 1591-1	Flanges and their joints - Design rules for gasketed circular flange connections - Part 1: Calculation	
4	2	Mech.	EN 1092-1	Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges	
4	2	Mech.	EN 10273	Hot rolled weldable steel bars for pressure purposes with specified elevated temperature properties	
4	2	Mech.	EN 10204	Metallic products - Types of inspection documents	Test certificate
4	2	Mech.	EN 10216-2	Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties	
4	2	Mech.	EN 10217-1	Welded steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties	
4	2	Mech.	EN 10220	Seamless and welded steel tubes - Dimensions and masses per unit length	
4	2	Mech.	EN 10253-2	Butt-welding pipe fittings - Part 2: Non alloy and ferritic alloy steels with specific inspection requirements	
4	2	Mech.	EN 10305-1	Steel tubes for precision applications - Technical delivery conditions - Part 1: Seamless cold drawn tubes	
4	2	Mech.	EN ISO 1127	Stainless steel tubes - Dimensions, tolerances and conventional masses per unit length	
4	2	Mech.	EN 10217-7 (DIN 17457)	Welded steel tubes for pressure purposes - Technical delivery conditions - Part 7: Stainless steel tubes	
4	2	Mech.	EN 10305-4	Steel tubes for precision applications - Technical delivery conditions - Part 4: Seamless cold drawn tubes for hydraulic and pneumatic power systems	
3		Mech.	NFPA	Fire protection system	National Fire Protection Association (parts 10, 14, 24, 30, 850..)
6		Mech.	ASME B31.3	Process Piping	
6		Mech.	ASME BPVC Section VIII	Rules for Construction of Pressure Vessels	
6		Mech.	OSHA	Health and safety standards - Occupational Safety and Health Administration	
6		Mech.	AGA	Design, installation and maintenance of natural gas operations - American Gas Association	
6		Mech.	ISO	International Organization for Standardization	