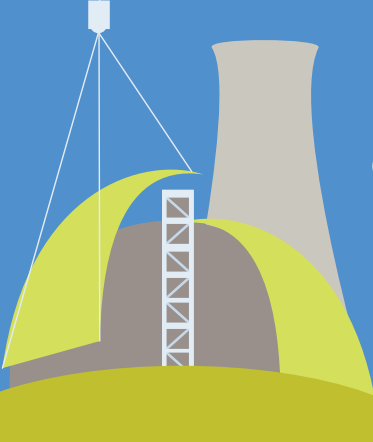


Supply Chain Map

Nuclear Reactor
Components



nuclear
manufacturing
outreach

Supply Chain Map

Nuclear Reactor Components

Climate stabilization, economic development and energy security have become increasingly important national priorities. As concern about air pollution, a desire for energy independence and the need for low-cost reliable power have grown, so has support for the construction of new nuclear plants.

There are 104 nuclear reactors operating in the United States today, and the industry has submitted license applications to the U.S. Nuclear Regulatory Commission for multiple new reactors. Several billion dollars already have been spent on new nuclear plant activities, including the ordering of long-lead components.

From the earliest stages of development, the successful construction of new nuclear plants depends on a robust supply chain of nuclear manufacturers. Nuclear plants are made up of hundreds of components and subcomponents, whose construction will require a deep and diverse supplier base. Promoting the development of this supply chain has become one of the Nuclear Energy Institute's key strategic initiatives.

As new companies are attracted to the nuclear manufacturing sector, it is our goal to provide new entrants with the information they need to integrate their products successfully into the nuclear supply chain. To this end, the Nuclear Energy Institute, with help from many of its supplier members, has created the following Supply Chain Map of Nuclear Reactor Components.

The goal of this map is to help new suppliers identify where their products fit among the components and subcomponents of a new nuclear reactor and to inform them of the quality requirements for these components. The map also is intended to promote understanding of the broad array of manufactured components required for a new plant.

The map organizes the components of a nuclear plant into four main groups: Nuclear Island, Turbine Island, Balance of Plant, and Site Development and Construction. These groups are then further broken down by system (e.g. Secondary Steam System or Electrical Equipment). From there, the groups are divided into components and subcomponents. Components whose manufacture requires a Quality Assurance program are marked with a footnote.

We hope you find the map useful.

Nuclear Manufacturing Standards and Quality Assurance Requirements

Many components of a nuclear plant, particularly those critical to reactor safety, are subject to specific manufacturing standards. These standards ensure that the structures, systems, components and controls of a facility can be relied on to remain functional and follow design basis under rigorous conditions.

Components subject to these standards are often referred to as “nuclear-grade” or “safety-related” components. Facilities that manufacture them must have Quality Assurance (QA) programs in place to ensure that the standards are met.

Throughout the document, all components have been footnoted to indicate their QA requirements:

Safety-related products

Safety-related products are marked with one asterisk. The manufacture of these components requires a Quality Assurance program. Alternately, vendors could work under the QA program of the prime vendor, utility or purchaser.

Supplemental quality products

Supplemental quality products are marked with two asterisks. The purchaser of these products will typically set the specific quality requirements that must be met.

Standard quality products

All other products are typically considered standard quality products and are not marked with an asterisk. Purchasers for these products will usually set any specific expectations or requirements that must be met. No Quality Assurance program is necessary.

Table of Contents

1	Nuclear Island
9	Turbine Island
17	Balance of Plant
26	Site Development and Construction

Nuclear Island

Primary Containment

Containment Structure

Liner*
Penetrations*
Doors and Hatches*
Tendons*

Containment Interior

Reactor Cavity*
Pool Liners*
Fuel Pool Cavity*
Fuel Pool Gates*
Interior Walls*
Shielding*
Neutron Absorbers
Stairs
Elevators
Leaded Windows

Commodities and Consumables

Adhesives*
Anchor bolts*
Bolts*
Clips*
Coatings*
Columns*
Concrete*
Dunnage
Embeds*
Fasteners*
Form Work
Girders*
Gratings*
Grout*
Insulated Concrete Panels*
Insulated Metal Panels*
Ladders
Misc Steel*
Nuts*
Paint*
Plate*
Platforms*
Ply Form Lumber
Precast Concrete Panels*
Precast Concrete, Purchase
Precast Concrete, Installation
Rebar*
Shoring
Siding
Silicone*
Stairs
Structural Bolts*
Structural Precast Concrete, Purchase
Structural Precast Concrete, Purchase*
Structural steel*
Wide-flange Beams*

Cranes and Hoists

Polar Crane**
Jib Cranes
Monorail Hoists
Mobile Systems
Crane Safety Systems*

Refueling Equipment

Fuel Transfer Equipment*
Fuel Inspection Equipment
Refueling Tools

* These components are typically safety-related

** These components are typically supplemental quality

All other components are typically standard quality

Nuclear Island

Primary Support Systems

Make-up and Purification

Ion Exchangers
Resin

Heating and Ventilation

Ductwork*
Dehumidifiers*
Dampers*
Heating Units*
HEPA Filters*
Chillers*
Compressors*
Controllers*
Fans*
Blowers*
Louvers*
Filters*
Evaporative Coolers*
Expansion Joints*

Rad Monitoring

Airborne Particulate*
Inert Gas
Liquids Processing

Radwaste Processing

Off-Gas
Resin Processing
Ion Exchange Systems
Compactors

Radiochemical Lab

Monitoring Equipment
Sampling Equipment
Analysis Equipment
Sampling Sinks
Fume Hoods
Sample Changers
Titration Systems
Counting Systems

Fire Protection

Fire Barriers*
Smoke Detectors*
Temperature Detectors*
Fire Rated Structures*
Fire Water System*
Fire Alarm Panel*
CO2 & Halon Fire Suppression
Systems*

Instrument Air

Compressors*
Air Dryers*
Receivers*
Pressure Regulators*

Lighting

Normal Lighting
Emergency Lighting**

* These components are typically safety-related

** These components are typically supplemental quality

All other components are typically standard quality

Nuclear Island

Reactor Coolant Systems

Reactor Vessel and Internals

Reactor Vessel Head*
Reactor Pressure Vessel*
Nozzles*
Internals*

Fuel

Reactivity Control

Control Rods*
Control Rod Drives*
Boron Control Systems*
Emergency Shutdown Systems*

Steam Generator

Channel Heads*
Transition Cones
Wrapper Shell*
Barrels
AVBs
Tubing*
Tube Sheet*
Feed Ring
Primary Separators*
Secondary Separators*
Nozzles*
Manways*

Electrical Equipment

AC Power

Starters*
Contactors*

Power Supplies

Electrical Interlocks and Controls*
Racking Devices
Grounding Devices

Transformers

Switchgear

Instruments and Meters*
Load Centers*
Circuit Breakers*
Motor Control Centers*

Cable and Raceways

High Voltage Cable*
Medium Voltage Cable*
Low Voltage Cable*
Cable Tray Covers*

* These components are typically safety-related

** These components are typically supplemental quality

All other components are typically standard quality

Nuclear Island

Electrical Equipment (cont'd)

Cable and Raceways (cont'd)

Supports*
Conduit*
Radiation Resistant Insulation*

DC Power

Batteries*
Battery Chargers*
Inverters*

Uninterruptable Power Suppliers

Emergency Diesel Generator

Subcomponents, Commodities and Consumables

Bus Duct*
Coil*
Conduit*
Connectors*
Disconnects/Reclosures*
Electrical Switches*
Feedthroughs*
Fuses*
Greases*
Junction Boxes*
Plugs*
Programmable Logic Controllers*
Receptacles
Solenoids*
Splices*
Terminal Boards*
Unistrut*
Wiring*

Nuclear Island

Mechanical Equipment

Class 1 Piping

Piping Assemblies*
Snubbers*
Supports*

Class 2 Piping

Piping Assemblies*
Snubbers*
Supports*

Class 3 Piping

Piping Assemblies*
Snubbers*
Supports*

Pumps

Centrifugal*
Positive Displacement*
Diaphragm*
Rotary*
Vacuum*
Air Operated*
Hydraulic*
Slurry*
Reciprocating*

Valves

Containment Isolation*
Motor-operated*
Air-operated*
Hydraulic Operated*

Subcomponents, Commodities and Consumables

Bar Stock*
Bearings*
Belts*
Brackets*
Couplings*
Elbow*

Solenoid-operated*

Manual*
Check*
Stop-check*
Gate*

Water Relief*
Steam Relief*
Control*
Globe*
Throttle*
Pressure Seal*

Valve Operators

Motor-operators*
Air-operators*
Hydraulic-operators*
Solenoid-operators*
Manual*
Explosive Squib-operated*

Tanks

Rupture Disks*
Manways*
Gaskets*

Sumps and Drains

Equipment Drains
Floor Drains
Drain Cover Plates
Leak Detectors*

Fasteners (Bolts, Nuts, Quick Throws,
Studs, Washers)*
Filters*
Flanges, Pipe*
Flanges, Pressure Vessel*
Forgings*

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Nuclear Island

Mechanical Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Insulation, Mirror*	Seamless Carbon Steel*
Insulation, Piping*	Springs*
Limit Switch*	Stainless Steel*
Low Alloy Steel*	Tags and Labels*
Lubricants*	Unions*
Mechanical Switches*	Venturis*
Metal Bellows*	
Orifices*	
O-rings*	
Packing Materials*	
Packings*	
Piping Materials*	
Piping Wall Sleeves*	
Pulsation Dampeners*	
Pump, Air Operated*	
Pump, Centrifugal*	
Pump, Diaphragm*	
Pump, Hydraulic*	
Pump, Positive Displacement*	
Pump, Reciprocating*	
Pump, Rotary*	
Pump, Slurry*	
Pump, Vacuum*	
Refractory Materials*	
Retaining Rings*	
Rupture Disks*	
Seals*	

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Nuclear Island

Instrumentation & Controls Equipment

Process Computer

Computer*
Control Stations*
Data Point Feeds*
Display Software*

Simulator

Computers
Control Stations
Mockup Facility
Control Panels
Alarm Panels

Process Instrument Detectors

Control Rod Position*
Low Range Neutron Power*
Intermediate Range Power*
Reactor Power Range Power*
Reactivity*
Fluid Level*
Pressure*
Temperature*
Seismic Activity*
Vibration*
Fire Detection*
Fluid Flow*
Mass Flow*
Chemicals/Gas*
Contamination
Radiation

Subcomponents, Commodities and Consumables

Amplifiers*
Analyzers*
Cable Ties*
Condensing Pots*
Counters*
Fiber Optic Cable*
Fiber Optic Devices*

Meteorological
Differential Pressure*
Valve Position*
Reactor Period*

Monitors, Controls and Alarms

Meter Indicators*
Recorders*
Transmitters*
Annunciator Panels*
Protective Functions*
Alarms*
Safety Parameter Display System*

Tubing and Wiring

Tubing*
Wiring*
Terminal Blocks*
Connectors*
Splices*

Isolation Valves and Fittings

Communications Systems

Telephone
Alarms/Sirens
Announcing
Process Alarms*
Voice Communications

Fittings*
Micro Switches*
Pre-amplifiers*
Programmable Logic Controllers*
Rate Meters*
Rectifiers*
Reed Switches*

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Nuclear Island

Instrumentation & Controls Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Relays*
Resistance Temperature Detectors*
Scalars*
Semiconductor Devices*
Signal Generators*
Surge Suppression Devices*
Thermocouples*
Thermo Wells*

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Turbine Island Structural

Structural Components

Turbine Building Structure
Penetrations
Doors and Hatches
Shielding
Secondary Containment Structure
Electrical Feedthroughs

Cranes and Hoists

Turbine Building Bridge Crane
TB Secondary Bridge Crane
Monorail Hoists
Mobile Systems
Crane Safety Systems

Turbine Building Interior

Interior Walls
Shielding
Stairs
Elevators

Miscellaneous Building Materials

Adhesives	Precast Concrete, Purchase
Anchor Bolts	Precast Concrete, Installation
Bolts	Rebar
Clips	Shoring
Coatings	Siding
Columns	Silicone
Concrete	Stairs
Dunnage	Structural Bolts
Embeds	Structural Precast Concrete, Purchase
Fasteners	Structural Precast Concrete, Purchase*
Form Work	Structural Steel
Girders	Wide-flange Beams
Gratings	
Grout	
Insulated Concrete Panels	
Insulated Metal Panels	
Ladders	
Misc Steel	
Nuts	
Paint	
Plate	
Platforms	
Ply Form Lumber	
Precast Concrete Panels	

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Secondary Support Systems

Heating and Ventilation

Ductwork
Dehumidifiers
Dampers
Heating Units
HEPA Filters
Chillers
Compressors
Controllers
Fans
Blowers
Louvers
Filters
Evaporative Coolers
Expansion Joints

Rad Monitoring

Airborne Particulate
Inert Gas
Liquids Processing

Radwaste Processing

Off-gas
Resin Processing
Ion Exchange Systems
Compactors
Standby Gas Treatment
Main Stack Discharge

Radiochemical Lab

Monitoring Equipment
Sampling Equipment
Analysis Equipment
Sampling Sinks
Fume Hoods
Sample Changers
Titration Systems

Fire Protection

Fire Barriers**
Smoke Detectors**
Temperature Detectors**
Fire Rated Structures**
Fire Water System**
Fire Alarm Panel**
CO2 & Halon Fire Suppression Systems**

Oil Mitigation and Recovery System

Oil Separators
Oil Interceptors

General Area Lighting

Normal Lighting
Emergency Lighting**

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Secondary Steam Cycle

Main Turbine

Main Steam Piping
Reflective Metal Insulation
Control Valves
Turbine Bypass Valves (Steam Dump)
Exciter Cabinet
High Pressure Rotors
Low Pressure Rotors
Shaft Journal Bearings
Lub Oil System
Turbine Gland and Shaft Seals
Shaft Thrust Bearing

Main Generator

Stator
Rotor
Isophase Bus Duct
Isophase Cooling
Stator Water Cooling
Electrical Output
Main Transformer

Main Condenser

Condenser Tubing
Air Ejectors
Exhaust Boot
Vacuum Breaker Valves
Condensate Booster Pumps
Hotwell Level Control
Condensate Pumps
Condensate Polishing Filters

Moisture Separator-Reheater

Safety/Relief Valves

Feedwater Heaters

Feed Pumps

Main Feed Pump
Start-up/Shutdown Feedwater Pump

Feedwater Regulating Valves

Feedwater Control System

Automatic Recirc Valves

Health Physics Equipment and Supplies

Anti-contamination Clothing
Respiratory Protection
Personal Dosimetry
Portable Radiation Survey Instruments
Area Rad Monitors
Personal Communications Devices

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Turbine Island

Electrical Equipment

Class 1E Electrical System

Engineered Equipment

AC Power

Power Supplies

Transformers

Switchgear

Instruments and Meters

Load Centers

Circuit Breakers

Motor Control Centers

Starters

Contactors

Electrical Interlocks and Controls

Racking Devices

Grounding Devices

Fast Transfer Devices

Automatic Bus Transfer Devices

AC Ground Detection System

Cable and Raceways

High Voltage Cable

Medium Voltage Cable

Low Voltage Cable

Cable Tray Covers

Supports

Conduit

Insulation

Uninterruptable Power Suppliers

DC Power

Batteries

Battery Chargers

Inverters

DC Ground Detection System

Non-Class 1E Electrical Equipment

Subcomponents, Commodities and Consumables

Bus Duct

Coil

Conduit

Connectors

Disconnects/Reclosures

Electrical Switches

Feedthroughs

Fuses

Greases

Junction Boxes

Plugs

Programmable Logic Controllers

Receptacles

Solenoids

Splices

Terminal Boards

Unistrut

Wiring

* These components are typically safety-related

** These components are typically supplemental quality

All other components are typically standard quality

Turbine Island

Mechanical Equipment

Class 1 Piping

Piping Assemblies*

Snubbers*

Supports*

Class 2 Piping

Piping Assemblies*

Snubbers*

Supports*

Class 3 Piping

Piping Assemblies*

Snubbers*

Supports*

Pumps

Heater Drain

Sump Pumps

Chilled Water Transfer Pumps

Booster Feedwater Pump Pkg

Make-up Pumps

Sample Pumps

Rotary Gear Pump

Vertical Heat Exchangers

Horizontal Heat Exchangers

Valves

Air-operated

Automatic Recirc

Auxiliary Relief

Ball

Butterfly

Containment Isolation Valves*

Control

Explosive Charges

Extraction Steam Non-return

Globe

Hydraulic-operated

Manual

Motor-operated Gate

NFPA Code Valves

Plug

Pressure Regulating Globe

Pressure Seal

Solenoid-operated

Steam Relief

Stop-check

Three-way

Throttle

Valve Operators

Motor-operators

Air-operators

Hydraulic-operators

Solenoid-operators

Manual

Tanks

Rupture Disks

Manways

Gaskets

Sumps and Drains

Equipment Drains

Floor Drains

Drain Cover Plates

Leak Detectors

* These components are typically safety-related

** These components are typically supplemental quality

All other components are typically standard quality

Mechanical Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

- Couplings
- Elbow
- Fasteners (Bolts, Nuts, Quick Throws, Studs, Washers)
- Filters
- Flanges, Pipe
- Flanges, Pressure Vessel
- Forgings
- Insulation, Mirror
- Insulation, Piping
- Limit Switch
- Low Alloy Steel
- Lubricants
- Mechanical Switches
- Metal Bellows
- Orifices
- O-rings
- Packing Materials
- Packings
- Piping Materials
- Piping Wall Sleeves
- Pulsation Dampeners
- Pump, Air Operated
- Pump, Centrifugal
- Pump, Diaphragm
- Pump, Hydraulic
- Pump, Positive Displacement
- Pump, Reciprocating
- Pump, Rotary
- Pump, Slurry
- Pump, Vacuum
- Refractory Materials
- Retaining Rings
- Rupture Disks
- Seals
- Seamless Carbon Steel
- Springs
- Stainless Steel
- Tags and Labels
- Unions
- Venturis

* These components are typically safety-related
 ** These components are typically supplemental quality
 All other components are typically standard quality

Instrumentation & Controls Equipment

Local Control Stations

Local Alarm Panels

Process Instrument Detectors

- Fluid Level
- Pressure
- Temperature
- Seismic Activity
- Vibration
- Fire Detection
- Fluid Flow
- Mass Flow
- Chemicals/Gas
- Contamination
- Radiation
- Meteorological
- Differential Pressure
- Valve Position
- Strain Gages

Monitors, Controls and Alarms

- Meter Indicators
- Recorders
- Transmitters
- Annunciator Panels
- Protective Functions
- Alarms
- Safety Parameter Display System

Subcomponents, Commodities and Consumables

- Amplifiers
- Analyzers
- Cable Ties
- Condensing Pots
- Counters
- Fiber Optic Cable
- Fiber Optic Devices
- Fittings

Tubing and Wiring

- Tubing
- Wiring
- Terminal Blocks
- Connectors
- Splices

Instrument Isolation Valves & Fittings

Communications Systems

- Telephone
- Alarms/Sirens
- Announcing
- Process Alarms
- Voice Communications

Control Room Instrument Panels

- Micro Switches
- Pre-amplifiers
- Programmable Logic Controllers
- Rate Meters
- Rectifiers
- Reed Switches
- Relays
- Resistance Temperature Detectors

* These components are typically safety-related
 ** These components are typically supplemental quality
 All other components are typically standard quality

Turbine Island

Instrumentation & Controls Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Scalars
Semiconductor Devices
Signal Generators
Surge Suppression Devices
Thermocouples
Thermowells
Transducers
Tubing

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

BOP Island Structural

Structural Components

Circ Water Intake & Discharge
Structure
Penetrations
Doors and Hatches
Shielding
Secondary Containment Structure
Electrical Feedthroughs

Misc Building Interior

Interior Walls
Shielding
Stairs
Elevators

Intake Canal Earthwork

Discharge Canal Earthwork

Cranes and Hoists

Bridge Cranes
Secondary Bridge Crane
Monorail Hoists
Mobile Systems
Crane Safety Systems

Switchyard Structural

Roads
Pads
High Voltage Towers
Control Houses
Paint (Electrical Spec)
Substation Security Fencing
Substation Security Alarms

Subcomponents, Commodities and Consumables

Adhesives	Clips
Anchor Bolts	Coatings
Bolts	Columns

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

BOP Island Structural (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Concrete	Ply Form Lumber
Dunnage	Precast Concrete Panels
Embeds	Precast Concrete, Purchase
Fasteners	Precast Concrete, Installation
Form Work	Rebar
Girders	Shoring
Gratings	Siding
Grout	Silicone
Insulated Concrete Panels	Stairs
Insulated Metal Panels	Structural Bolts
Ladders	Structural Precast Concrete, Purchase
Misc Steel	Structural Precast Concrete, Purchase*
Nuts	Structural Steel
Paint	Wide-flange Beams
Plate	
Platforms	

BOP Support Systems

Heating and Ventilation

Blowers
Chillers
Compressors
Controllers
Dampers
Dehumidifiers
Ductwork
Evaporative Coolers
Expansion Joints
Fans
Filters
Heating Units
HEPA Filters
Louvers
Plenums

Fire Protection

Fire Barriers**
Smoke Detectors**
Temperature Detectors**
Fire Rated Structures**
Smoke Detectors**
Temperature Detectors**
Fire Rated Structures**
Fire Water System**
Fire Water Pump (Centrifugal)**
Fire Water Pump (Diesel)**

Switch Yard (Substation)

Circuit Breakers

Air Circuit Breakers
Oil Circuit Breakers

High Voltage Insulators

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

BOP Support Systems (cont'd)

High Voltage Disconnect Switches

Ground Switches

Transformers

Large
Current
Potential
Step-Up 230 KVA
Step-Up 345 KVA
Step-Up 500 KVA
Auxiliary Transformers (Unit, Station, Reserve)*

Control Panels

SCADA Controls System
Local Control System

Communications Systems

Switchyard Security Fencing

Switchyard Security Alarms

High Voltage Fuses

Sudden Pressure Relays

Lightning Arrestors

Physical Security System

Structural Road and Gate Barriers
Fencing
Monitoring and Alarm Systems
Security Control Structures
Alternate Security Control Structure
Security Staff
Armed Guard Force Equipment
Electronic Detection Systems

Water Treatment System

Waste Treatment System

Oil Mitigation and Recovery System

Oil Separators
Oil Interceptors

General Area Lighting

Normal Lighting
Emergency Lighting**

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

Mechanical Equipment

Safety-Related Piping

Piping Assemblies*
Snubbers*
Pipe Supports*

Pumps

General Purpose Pump (Water)
Sump Pumps
Chilled Water Transfer Pumps
Jockey Pumps
Make-up Pumps
Sample Pumps
Rotary Gear Pump
Vertical Make-up Pumps

Non-Safety-Related Pumps

Non-Safety-Related Piping

Piping Assemblies
Snubbers
Pipe Supports

Vertical Heat Exchangers

Horizontal Heat Exchangers

Valves

Air-operated
Auxiliary Relief
Ball
Butterfly
Check
Containment Isolation Valves*
Control
Extraction Steam Non-return
Globe
Hydraulic Operated
Manual
Manually Operated Gate
Motor-operated Gate

NFPA Code Valves**

Plug
Pressure Regulating Globe
Pressure Seal
Solenoid-Operated
Steam relief
Stop-check
Three-way
Throttle
Vacuum Breaker Valves

Valve Operators

Motor-operators
Air-operators
Hydraulic-operators
Solenoid-operators
Manual

Tanks

Rupture Disks
Manways
Gaskets

Compressed Gas Storage and Transfer

Sumps and Drains

Equipment Drains
Floor Drains
Drain Cover Plates
Leak Detectors

Balance of Plant

Mechanical Equipment (cont'd)

Subcomponents, Commodities and Consumables

Bar Stock
Bearings
Belts
Brackets
Couplings
Elbow
Fasteners (Bolts, Nuts, Quick Throws, Studs, Washers)
Filters
Flanges, Pipe
Flanges, Pressure Vessel
Forgings
Insulation, Mirror
Insulation, Piping
Limit Switch
Low Alloy Steel
Lubricants
Mechanical Switches
Metal Bellows
Orifices
O-rings
Packing Materials
Packings
Piping Materials
Piping Wall Sleeves
Pulsation Dampeners
Pump, Air Operated
Pump, Centrifugal
Pump, Diaphragm
Pump, Hydraulic
Pump, Positive Displacement
Pump, Reciprocating
Pump, Rotary
Pump, Slurry
Pump, Vacuum
Refractory Materials
Retaining Rings
Rupture Disks
Seals
Seamless Carbon Steel
Springs
Stainless Steel
Tags and Labels
Unions
Venturis

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

Circulating Water Cycle

Ultimate Heat Sink

Traveling Screens

Motors
Controls

Trash Rakes

Motors
Controls

Circ Water System

Circ Water Pumps
Strainers
Butterfly Valves
Other Circ Water Valves
Circ Water Piping

Service Water System

Service Water Pumps
Heat Exchangers
Coolers

High Pressure Service Water

High Pressure Service Water Pumps*
Heat Exchangers*

Emergency Service Water

Emergency Service Water Pumps*
Heat Exchangers*

Tanks

Condensate Storage Tank
Refueling Water Storage Tank*
Diesel Fuel Oil Storage Tank*
Emergency Service Water
Reservoir/Tank*

Cooling Towers

Bulk Concrete**
Cooling Tower Fill Material**
Spray Pond
Spray Nozzles

Discharge Canal

Canal Discharge Gate Monitors

Environmental Monitoring System

Analysis
Analyzers
Counters
Data Loggers
Detectors
Filters
Indicators
Meteorological Equipment
Meters
Pumps
Radiation Monitors
Sampling Systems
Seismic Monitoring
Separators
Skimmers
Transducers

Control and Service Air

Accumulators
Compressors
Air Dryers
Receivers
Pressure Regulators
Filters
Flex Hose

Balance of Plant

Electrical Equipment

Safety-Related Class 1E Electrical System*

Engineered Equipment

AC Power

Power Supplies

Transformers

Switchgear

Instruments and Meters
Load Centers
Circuit Breakers
Motor Control Centers
Starters
Contactors
Electrical Interlocks & Controls
Racking Devices
Grounding Devices
Fast Transfer Devices
Automatic Bus Transfer Devices
AC Ground Detection System

Cable and Raceways

High Voltage Cable
Medium Voltage Cable
Low Voltage Cable
Cable Tray Covers
Supports
Conduit
Insulation

Subcomponents, Commodities and Consumables

Bus Duct
Coil
Conduit
Connectors
Disconnects/Reclosures
Electrical Switches
Feedthroughs
Fuses

Uninterruptable Power Suppliers

DC Power

Batteries

Battery Chargers

Inverters

DC Ground Detection System

Indoor Lighting

Outdoor Lighting

Normal Lighting
Emergency Lighting**

Non-Class 1E Electrical Equipment

Normal Lighting
Emergency Lighting**

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

* These components are typically safety-related

** These components are typically supplemental quality
All other components are typically standard quality

Balance of Plant

Electrical Equipment (cont'd)

Subcomponents, Commodities and Consumables (cont'd)

Greases	Solenoids
Junction Boxes	Splices
Plugs	Terminal Boards
Programmable Logic Controllers	Unistrut
Receptacles	Wiring

Instrumentation & Controls Equipment

Local Control Stations

Local Alarm Panels

Process Instrument Detectors

Fluid Level
Pressure
Temperature
Seismic Activity
Vibration
Fire Detection
Fluid Flow
Mass Flow
Chemicals/Gas
Contamination
Radiation
Meteorological
Differential Pressure
Valve Position
Strain Gages

Monitors, Controls and Alarms

Meter Indicators
Recorders
Transmitters
Annunciator Panels
Protective Functions
Alarms
Safety Parameter Display System*

Tubing and Wiring

Tubing
Wiring
Terminal Blocks
Connectors
Splices

Instrument Isolation Valves & Fittings

Communications Systems

Telephone
Alarms/Sirens
Announcing
Process Alarms
Voice Communications

Control Room Instrument Panels

Balance of Plant

Instrumentation & Controls Equipment (cont'd)

Subcomponents, Commodities and Consumables

Amplifiers
Analyzers
Cable Ties
Condensing Pots
Counters
Fiber Optic Cable
Fiber Optic Devices
Fittings
Micro Switches
Pre-amplifiers
Programmable Logic Controllers
Rate Meters
Rectifiers
Reed Switches
Relays
Resistance Temperature Detectors
Scalars
Semiconductor Devices
Signal Generators
Surge Suppression Devices
Thermocouples
Thermowells
Transducers
Tubing

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Site Development & Construction

Site Preparation & Structures

Transportation Infrastructure	Excavation, Backfill and Compaction Of Trenches/Pipe and Elec. Duct*
Railway	Grading and Site Prep
Road - Ballast	Piles and Caissons*
Road - Base Course	Piers, Drilled*
Road - Top Surface	Intake Structure and Tunnel
Parking Areas	Concrete and Earthwork*
Waterway	Concrete and Earthwork
Marinework	
Barges	
Barge Slips	
Airports	

Construction Equipment

Concrete Batch Plants

Batch Plant-Concrete** ¹	Armed Guard Force Facility
Batch Plant-Concrete	Construction Buildings
Concrete Works** ¹	Fabrications Shop
Concrete Works	First Aid Building

Blowers

Portland Cement Concrete*	Materials Assembly Areas
Portland Cement Concrete	Materials Lay Down Areas

Portable Tanks and Pumps

Material Testing Services for Concrete and Earthwork*	Prefabricated Buildings
Material Testing Services for Concrete and Earthwork	Testing Shop

Earthwork Infrastructure

Slope Protection and Stabilization	Trailers
Pond and Reservoir Construction	Warehouses
Furnishing Water Wells	Welding Shop
Security Fencing and Installing	
Temporary Fencing	
Earthwork, Grading and Structural Backfill*	

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** These components are typically supplemental quality

¹ The plant would be non-safety-related, the cement and aggregate for safety-related structures and foundations would be safety-related material.

² If the SSC is safety-related, the fire detection and protection equipment may be safety-related, most of the equipment will be supplemental quality.
All other components are typically standard quality.

Site Development & Construction

Construction Equipment & Supplies

Concrete Batch Plants

Batch Plant-Concrete** ¹
Batch Plant-Concrete

Concrete Works

Concrete Works** ¹
Concrete Works
Portland Cement Concrete*
Portland Cement Concrete
Material Testing Services for Concrete and Earthwork*
Material Testing Services for Concrete and Earthwork

Safety Items

Fire Watch Staff
Fire Detection** ²
Fire Alarms** ²
Fire Barriers** ²
Fire Extinguishers
Fire Rated Structures** ²

Consumables

Welding Gas Supplies
Welding Rods*
Cleaning Agents

Site Logistics

Emergency Electricity Supply
Fuels
Internet
Lubricants
Normal Electricity Supply
Portable Electric Generators
Telephone
Water Supply
Sanitation Services

Temporary Ventilation

Blowers
Portable Ventilation Hoses

Heavy Equipment

Excavating Equipment
Lifting Equipment
Chains and Hoists
Earth Rolling Equipment
Flatbed Trucks
Dump Trucks
Cement Trucks

Equipment

Portable Tanks and Pumps
Scaffolding
Tools

Construction Materials

Adhesives	Dunnage
Anchor bolts	Embeds
Bolts	Fasteners
Clips	Form Work
Coatings	Girders
Columns	Gratings
Concrete	Grout

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Site Development & Construction

Construction Materials (cont'd)

Insulated Concrete Panels	Rebar
Insulated Metal Panels	Shoring
Ladders	Siding
Misc Steel	Silicone
Nuts	Stairs
Paint	Structural Bolts
Plate	Structural Precast Concrete, Purchase
Platforms	Structural Precast Concrete, Purchase*
Ply Form Lumber	Structural Steel
Precast Concrete Panels	Wide-flange Beams
Precast Concrete, Purchase	Structural Precast Concrete, Purchase*
Precast Concrete, Installation	

Construction Support Services

Geotech Services

Bathymetry / Hydrographic Survey*
Surveying
Dewatering/Monitoring
Seismic Data Collection and Analysis*
Technical Specification for Sheet Piling (Provide and Install)

Quality Assurance

Quality Assurance*
Nondestructive Examination (NDE)*

Rigging and Heavy Hauling

Freight Services

Ocean Freight Services
Air Freight Services
Inland Freight Services

Agents

Agents, Freight Forwarding
Agents, Export Packing
Agents, Customs Clearance
Agents, Port Handling

Leased Equipment

Scaffolding (Leased/Job Owned)
Shoring, Furnish (Leased/Job Owned)

Transportation/Logistics Services

Freight Services
Ocean Freight Services
Air Freight Services
Inland Freight Services
Agents, Freight Forwarding
Agents, Export Packing
Agents, Customs Clearance
Agents, Port Handling

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Site Development & Construction

Construction Supply Services (cont'd)

Temp Labor, Staff Augmentation and Engineering

Background Investigation, Screening
Configuration Management*
Drug Screening
Materials Testing Services*

Purchasing

Buying
Commercial Dedication*

Other

Records Management*
Rodent & Insect Control
Security Service
Janitorial Service
Temporary Food Services
Training*

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Acknowledgments

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ASME

AREVA

Babcock & Wilcox Co.

Bechtel Power Corp.

Dominion

Duke Energy

Exelon Corp.

Fluor Corp.

GE/Hitachi Nuclear Energy

Public Service Enterprise Group

Sargent & Lundy

Tennessee Valley Authority

The Shaw Group

URS Washington Division

Westinghouse Electric Co.



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