Westinghouse Energy Systems

AP1000® Plant Procurement & Delivery Model

SOPOT

June 2025

Westinghouse

Westinghouse Non-Negotiables for our Suppliers

Focus and Polices around "Zero-Accidents"
Management and personnel dedication to safety first

Dedication to Excellence
Implementation and documentation of the requirements and deviations

Procurement Integrity
Compliance and prompt reporting of violations or potential violations

AP1000 Vogtle Units 3 & 4

- Southern Nuclear currently has two operating AP1000 units at the Alvin W. Vogtle Electric Generating Plant near Waynesboro, Georgia, U.S.
- Westinghouse provided development, licensing, detailed engineering, project management, component manufacturing and commissioning/start-up support
- Unit 3 in Commercial Operations
- Unit 4 in Commercial Operations

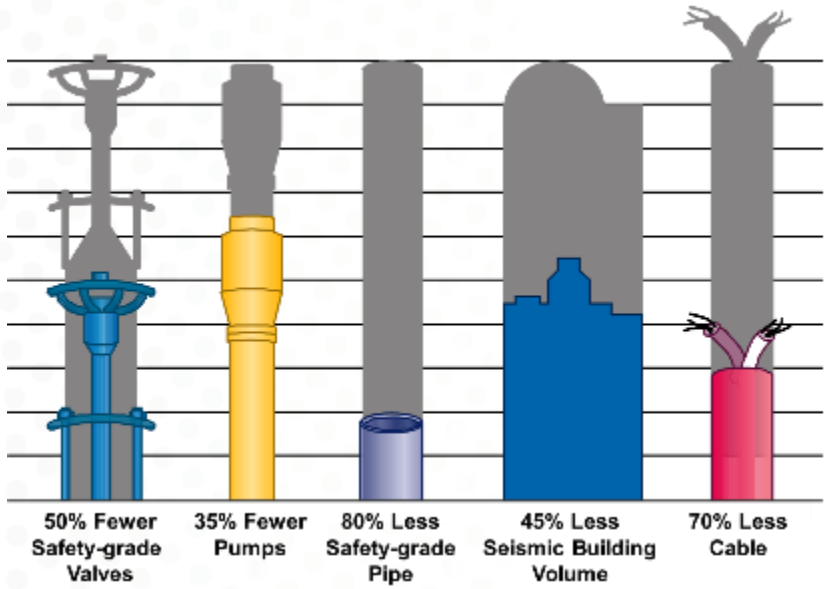
Vogtle Site, Georgia, U.S.
Image courtesy of Southern Nuclear

The AP1000® Plant Simplifications Drive

Economics and Construction Schedule

Simplified Plant Design

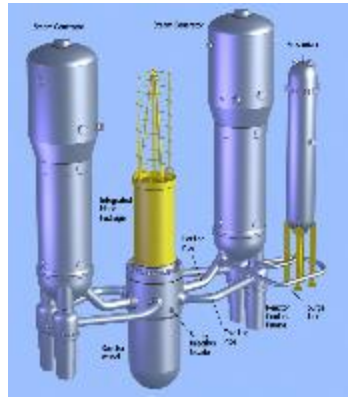
- Easier and less expensive to build, operate and maintain
- Fewer components, cable and seismic building volume, all of which contribute to considerable savings in capital investment, and lower operation and maintenance costs



The Technology

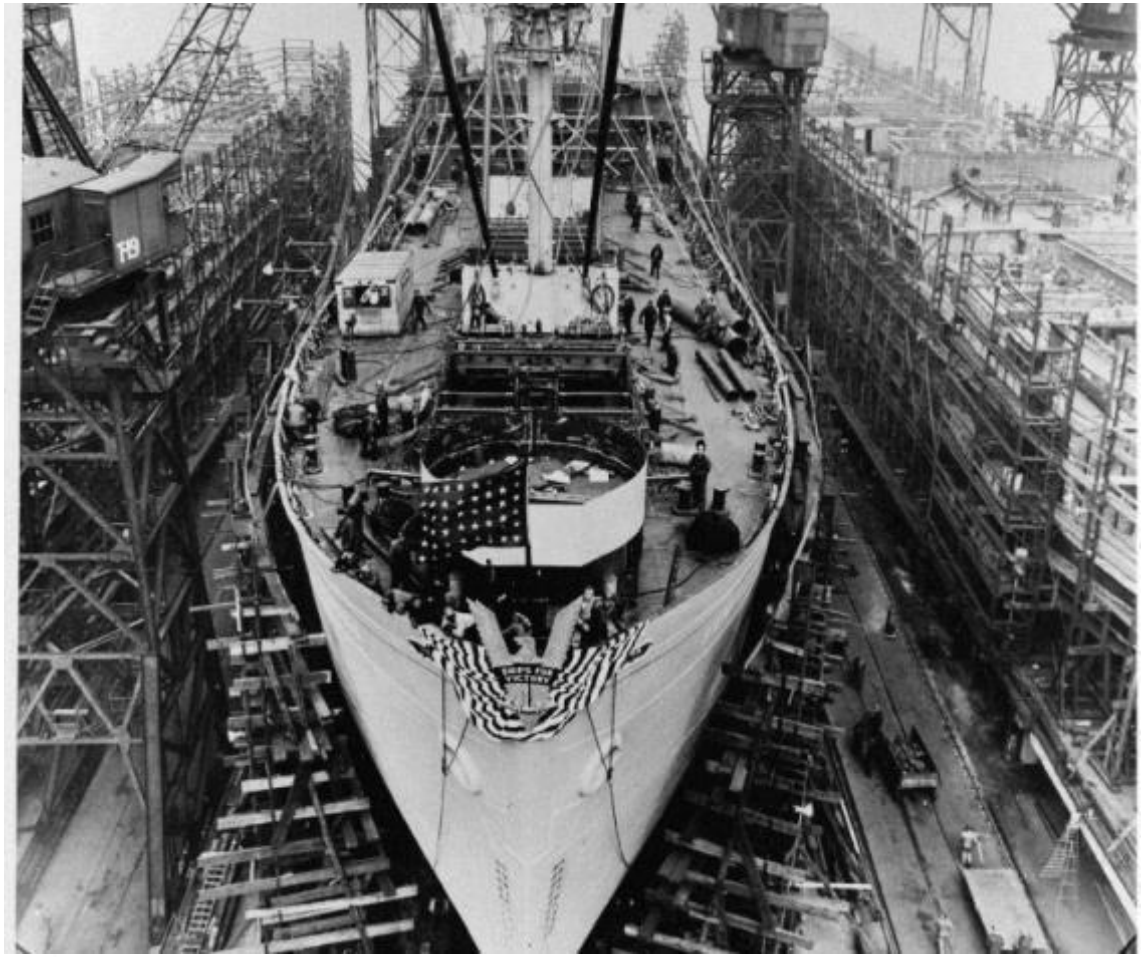
- Improved versions of reactor vessel and internals, steam generator, fuel and pressurizer designs compared those found in currently operating PWRs
- Innovative reactor coolant pumps as used in many other industrial applications where reliability and long life are paramount requirements

AP1000® and AP300™ Plant is Smaller and Dramatically Simpler than Evolutionary Plants



Modular Design: Why Use Modules?

- Modular construction is not new technology
  - Early modular construction adapted by shipbuilders
    - Hog Island ships in World War I – 122 built
    - Liberty ships in World War II
  - Achieve standard prefabricated construction which allows schedule reduction
    - Liberty ships – average fabrication and construction time was 230 days, later reduced to 42 days (81% reduction)
    - Fastest completion was 5 days, 16 hours (97% reduction)
  - Used extensively in Energy and Industrial construction



https://fr.m.wikipedia.org/wiki/Fichier:Liberty_ship_construction_11_prepared_for_launch.jpg

Modular Design: Benefits and Application

- Designed to achieve a short construction schedule from first concrete to core load (n^{th} plant)
- Utilize proven fabrication and construction techniques
- Maximize use of modularization
  - Designed for rail or truck shipment for 12' x 12' x 80' (80 Ton)
  - Barge shipment where available

Modular Construction Approach

Shorter construction schedule – Improved quality – Reduced field work

Factory production of modules

Transport Modules

On-site module assembly

Plant Operation

Site Survey and Preparation

Site Construction

Construction and module assembly

Requires pre-engineering and early procurement – More work done in parallel

Division of Responsibility

(DOR)

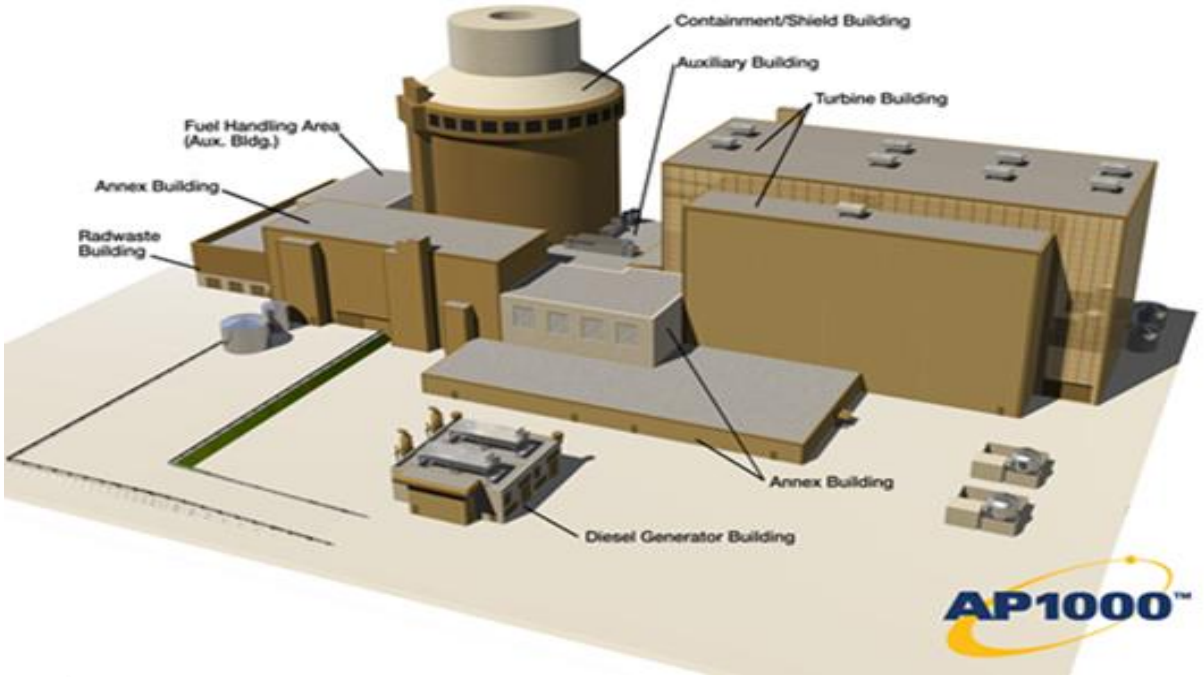
Procurement Scope Split

Westinghouse

- Augmented Nuclear Island Procurement
  - ✓ Containment (CV, Modules, NSSS Equipment, Valves, etc.)
  - ✓ Shield Building
  - ✓ Auxiliary Building (Modules, Valves, Aux. Equipment, etc.)
  - ✓ Annex Building (Valves, Cranes, Aux. Equipment, etc.)
  - ✓ Diesel Generator Building
  - ✓ Radwaste Building
- Turbine Building First Bay (Valves, Batteries, Aux. Equipment, etc.)

Constructor

- Turbine Island Procurement
- Balance of Plant facilities and equipment (Permanent Facilities)
  - ✓ AP1000® Plant Yard
  - ✓ Circulating Water System
  - ✓ Water and Sewage Treatment
  - ✓ Switchyard
  - ✓ Warehouses
- Bulk commodities procurement – both for the Nuclear Island and Turbine Island
- Construction – all permanent and temporary works within the development area



Introduction of Westinghouse Sourcing Process for AP1000® Plant

Introduction to Westinghouse Sourcing Process for AP1000® Plant

1 - Scope Definition
Critical requirements, export control, spec globalization needs

2 - Supplier Identification
Evaluate existing supply base and potential new suppliers considering BU potential needs for localization

3 - Preliminary Supplier Assessment
Desktop supplier evaluations, issue and review RFQ's, down select to target suppliers

4 - Technical & Quality Eval.
Detailed evaluation (gap analysis) for development needs

5 - Quality Audits
Supplier audits and onboarding to ASL/QSL

6 - Supplier Development
Address supplier gap analysis, perform qualifications (as-needed), audits finalize oversight plans

7 - Supplier Management
Oversight plan execution and surveillance

8 - Product Delivery
Predictive delivery to support construction needs

AP1000® Plant Supply Base Classification

AP1000® Plant Nuclear Island – Global and Regional Standards

AP1000® Plant Supply Base Classification – Geographic Categories

Global Supplier

- Complex equipment with increased quality requirements (SR, ASME and/or EQ) and significant design impact to plant
- Large capital investment to engage in market with significant lead times (>4 yrs) driving limited global supply base
- IP constraints
- Examples include:
  - Steam Generators
  - Reactor Pressure Vessels
  - RCPs
  - RCL Piping

Regional Suppliers

- Complex equipment with increased quality requirements to non-safety or commercial fabrication
- Would require significant supplier development and qualification for some commodities
- Certain commodities would require capital investment to engage in market with significant lead times (>3 yrs)
- Examples include:
  - Structural Modules
  - Shield Building Segments
  - Fuel Handling Equipment
  - Cranes, Valves, Tanks, Pumps, etc.
  - Smaller Mechanical Modules
  - Electrical/I&C Equipment

Local Suppliers

- Typically, Non-safety or commercial fabrication requirements (limited additional qualification needed)
- Lead times allow for schedule float
- Multiple Sourcing Options
- Examples include:
  - Existing global suppliers leveraging local resources
  - Significant Construction Commodities (non-WEC scope)


Squib Valve

Steam Generator


RCP


Reactor Vessel



Large Structural Modules


Containment Vessel


Non-Safety Valve


Transformers

Developing a robust Supply Chain to serve all projects across the region

AP1000® Plant Procurement Execution Model

Procurement Program Delivery Office	Account Management	Commercial	Supplier Performance Engineering	Operations
Program Delivery Office Overall accountability for procurement execution for AP1000®/AP300™ Plant Projects	**Account Management** Close collaboration with our internal customer to help us understand and anticipate their needs and identify where we can bring value	**Commercial** Maximizes GSCS overall procurement value while minimizing risk for Westinghouse and for our customers	**SPE** Maximizes the value of a Supplier through Technical Center of Excellence, Proactive supplier evaluation and Predictive Delivery	**Operations** Provide the systems and process to deliver products and services on-time and meet Key stakeholder expectations

AP1000® Plant Procurement Execution – Functional Excellence

AP1000® Plant Procurement Services Delivery Model

WBS to Commodities - Procurement Services Breakdown Structure (WBS 1-5)

WBS	Description	Scope
1	Containment Vessel & Shield Bldg	Containment Vessel is an ASME procurement of plate, support structures, air locks, equipment hatches etc. that will be delivered to the NPP site and assembled at the site by the constructor. Shield Bldg is the procurement and transport to NPP site of modular pieces of the air inlet structure, tension ring panels, shield bldg. roof assembly, shield bldg. panels and transition joints. Assembly of the shield bldg. is at the site by the constructor.
2	Structural Modules	Procurement and transport to NPP site of truckable modular assemblies for CA01, CA02, CA03, CA05 and CA20. Assembly of the modules is at the site by the constructor.
3	Mechanical Modules & Q Modules	Procurement and transport to NPP site of Q-modules which have ASME procurement requirements as well as various non-safety modules.
4	NSSS Major Components 1 - Tanks & Heat Exchangers	Procurement and transport to NPP site of ASME NSSS major components such as Steam Generators, Reactor Vessel and other equipment including associated lifting/rigging/transportation equipment and ancillary supporting equipment.
5	NSSS Major Components 2 - Other	Procurement and transport to NPP site of ASME NSSS major components such as RCP, RVI, CRDM and Reactor Loop Piping including associated lifting/rigging/transportation equipment and ancillary supporting equipment.

AP1000® Plant Procurement Services Delivery Model

WBS to Commodities - Procurement Services Breakdown Structure (WBS 6-12)

WBS	Description	Scope
6	Cranes & FHME	Procurement and transport to NPP site of various cranes and fuel handling equipment
7	Auxiliary Equipment	Procurement and transport to NPP site of various auxiliary equipment to differing procurement classes (ASME, SR, non-SR) such as heat exchangers, pumps, tanks, etc.
8	Valves	Procurement and transport to NPP site of >7,000 valves of various type and procurement class (ASME, SR, non-SR)
9	Electrical	Procurement and transport to NPP site of various electrical to differing procurement classes (Class 1E and non-Class 1E) equipment such as batteries, MCC's, transformers, electrical penetrations, etc.
10	Instrumentation & Controls (I&C)	Procurement and transport to GICP of various I&C equipment to support the assembly, testing and shipment to the NPP site.
11	Turbine Island Major Equipment	Procurement and transport to NPP site of Turbine Generator Set, Condenser, Feedwater Pumps, Heaters, etc.
12	Spare Parts	Supporting the development of AP1000 spare parts program including commissioning , start-up and operational spares

From WBS to Commodities

- AP1000®/AP300™ Plant is composed of > 700 commodities, each commodities is constituted by an individual element or a group of element i.e. MP01, Reactor Coolant Pump, etc.
- Each commodity is identified by a 2 letters and 2 digits number
- Each commodity belongs to a WBS (Electrical, Mechanical, Aux, etc.)
- Each commodity is either under Westinghouse responsibility or constructor responsibility for procurement

Commodity Locator Code	Description	WBS	WBS Name
			Building
MN03	Reactor Vessel Head Reflective Metal Insulation (Includes IHP and RV Flange	4	NSSS Major Components 1 - Tanks & Heat Exchangers
MN20	Reactor Vessel Insulation System (also Called Rx Cavity Insulation) Including Rx	4	NSSS Major Components 1 - Tanks & Heat Exchangers
MP01	Reactor Coolant Pumps - ASME Section III	5	NSSS Major Components 2 - Other
MP06	CVS Makeup Pumps (Horizontal Multi-Stage Centrifugal)	7	Auxiliary Equipment
MP08	RNS Centrifugal Normal RHR Pumps – ASME Section III	7	Auxiliary Equipment
MP1J	CCS Component Cooling Water Pumps	7	Auxiliary Equipment
MP1K	SFS Spent Fuel System Cooling Pumps	7	Auxiliary Equipment
MP1Q	BDS Stm Gen Drain & Recirc Pump	7	Auxiliary Equipment
MP1R*	VWS High Capacity Air-Cooled Chiller Pumps	7	Auxiliary Equipment

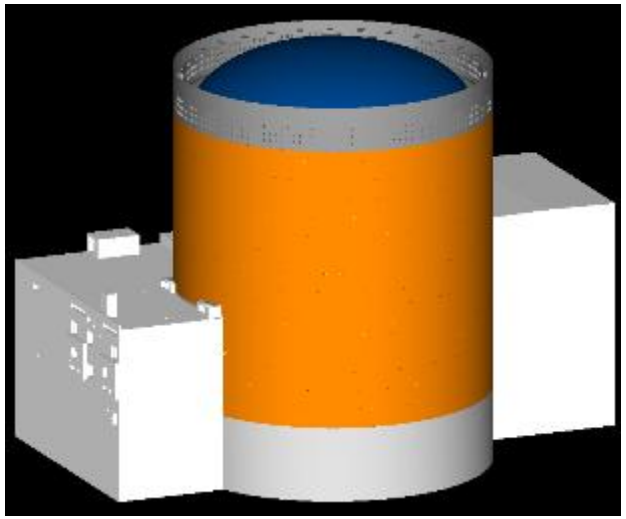
WBS 1 - Containment Vessel & Shield Bldg

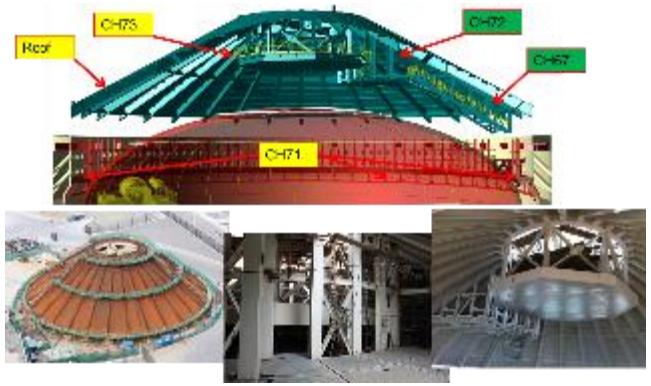
- Containment Vessel (MV50)

Overall Height:	**215'-4" (65.6 m)**
Inside Diameter:	130'-0" (39.6 m)
Thickness	Heads: 1 5/8" (41.3 mm) Rings: 1 3/4" (44.5 mm) First Course: 1 7/8" (47.6 mm)
Head geometry:	Ellipsoid
Material:	SA738 Grade B
Design Code:	ASME Section III Division 1, Subsection NE, Class MC 2001 Edition with 2002 Addenda
Features:	1. Mechanical (piping) Penetrations (39) 2. Electrical Penetrations (29) 3. Airlocks (2) 4. Equipment Hatches (2) 5. Stub Columns (16) 6. Stiffeners (2) 7. Fuel Transfer Tube <u>Not Shown:</u> Girder for Polar Crane Shear Studs (~5520) Weir System U-Support Brackets (582) Attachment Plates for piping/equipment

WBS 1 - Containment Vessel & Shield Bldg

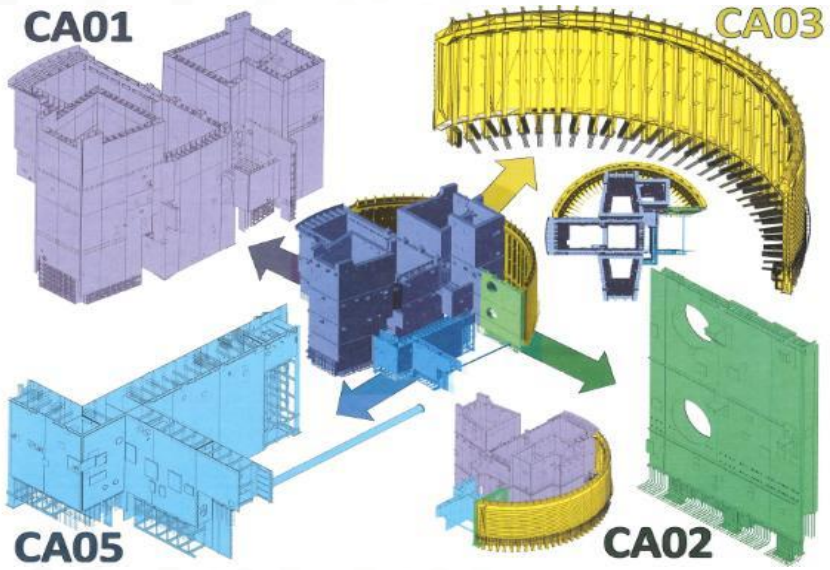
- Shield Building (SB003, SB005 & SB008)

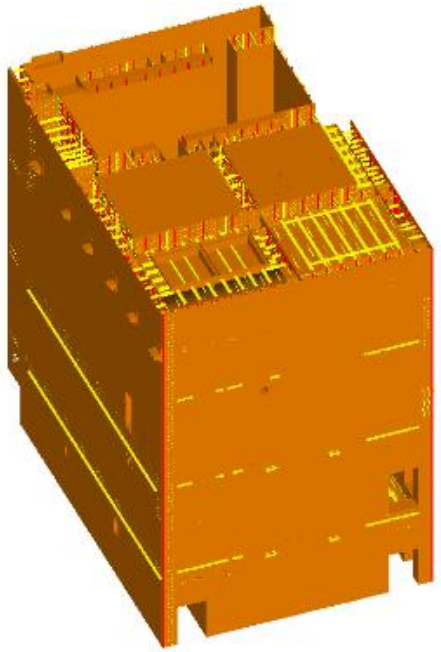


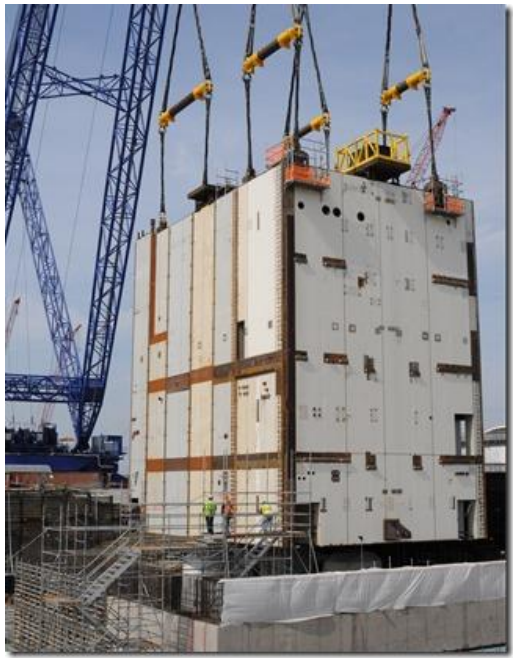


WBS 2 – Structural module (CA01,CA02, CA03, CA05, CA20*)

Containment Building







CA01 Steam Generator & Refueling Canal Composition:

- Submodules: 47
  - Largest plate width 10.5ft (3.2m)
- Size: 92’ x 96’ x 76’ Height
- ASTM Duplex Stainless Steel and Carbon Steel
- Dry Weight: 2,357,000 lbs. (1,069 MT)

CA20 Auxiliary Bldg Area 5 & 6 Composition:

- Submodules: 72
  - Largest submodule 3.6 m x 3.10m x 21 m at 47.5MT(104,720 lbs)
- Size: 67’ x 46’ x 69’
- Dry Weight: 1,996,000 lbs. (905 MT)
- ASTM Duplex SST & Carbon steel

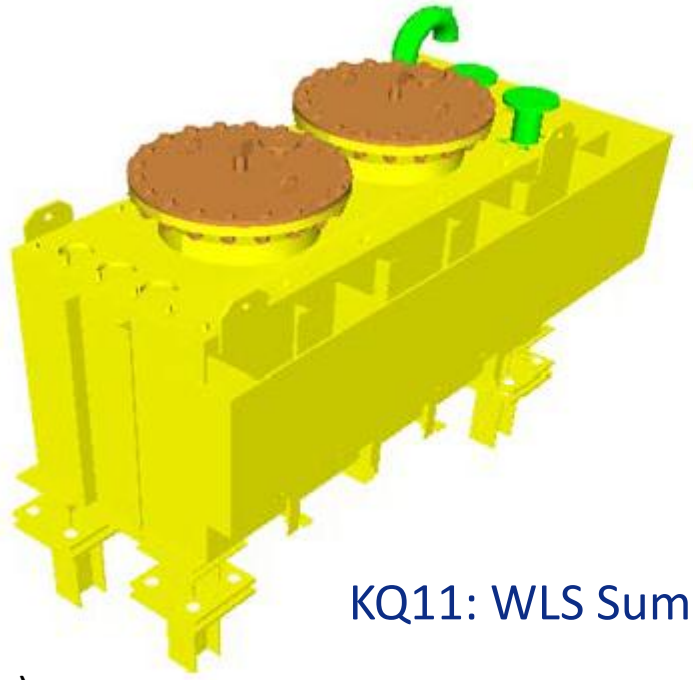
WBS 3 – Mechanical Module/Room Module

Module Types & Locations – Nuclear Island

- Equipment
  - KQ,KU-Inside Containment
  - KB,KU-Auxiliary Building
- Piping
  - Q-Inside Containment
  - R-Auxiliary Building

- 12 inside containment
  - (6 piping , 6 equipment)
- 40 In Auxiliary Building
  - (14 piping / Composite, 26 equipment)

- Only 7 out of 52 are ASME Section III



KQ11: WLS Sump Pump

Size (L x W x Height):
9'-2"x 4'-6" x 4'-1"

Lift Weight:
8,437 lbs.

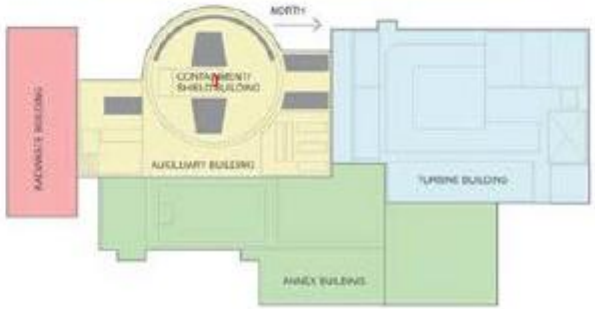
Room (Area):
11104 (1110)

Plant Elevation:
71'-6"

Classification:
D

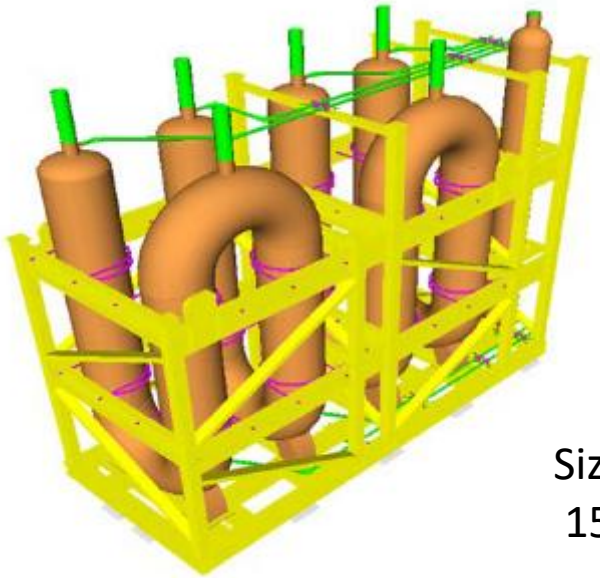
Non-Safety

Non-Seismic



WBS 3 – Mechanical Module/Room Module

- KB04 – WGS Delay and Guard Bed



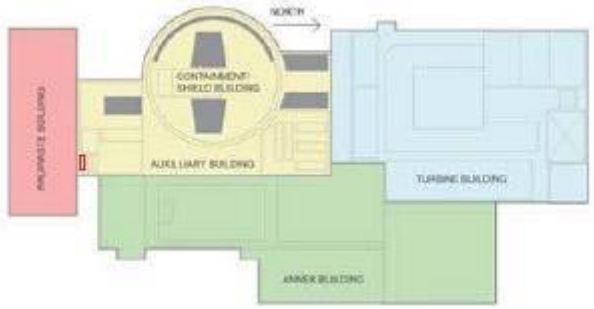
Size (L x W x Height):
15’-2” x 6’-2” x 14’-11”

[4.62m x 1.88m x 4.55m]

Weight :
15,217 lbs. **[6,9 T]**

Non-Safety - Class D

Non-Seismic



- R216 – Room 12271 WLS Valve Module

Size (L x W x Height):
12’-1” x 4’-1” x 12’-9”

[3.68m x 1.24m x 3.89m]

Weight :
5,042 lbs. **[2,3 T]**

Non-Safety - Class D

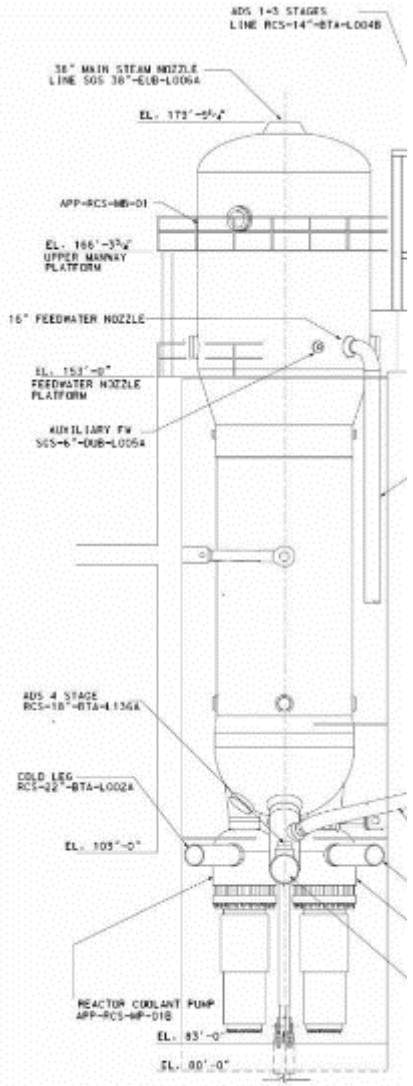
Non-Seismic

WBS 4 – NSSS Major Components 1 - Tanks & Heat Exchangers

Major components such as Steam Generators, Reactor Vessel, Passive Residual Heat Exchanger, Core Makeup Tank, Accumulator Tank and Pressurizer and other equipment including associated lifting/rigging/transportation.

- MB01 – Steam Generator

https://www.georgiapower.com/company/plant-vogtle/vogtle-news/2018-articles/unit4-steam-generator-placed.html



https://www.nrc.gov/docs/ML0715/ML071580904.pdf

Size (L x W x Height):
79'- 5" x 21'-0" dia.

[24.20m x 6.40m dia.]

Weight :
1,376,170 lbs **[624 MTon]**

Build to Print Design

ASME Section III

Safety Class A

Seismic Class 1

WBS 5 – NSSS Major Components 2 - Other

Procurement and transport to NPP site of ASME NSSS major components such as RCP, RVI, CRDM and Reactor Loop Piping including associated.

- MP01 – Reactor Coolant Pumps

  Size (L x W x Height):
  6’-9” x 6’-9” x 19’-3”

  [2.06x 2.06m x 5.87m]

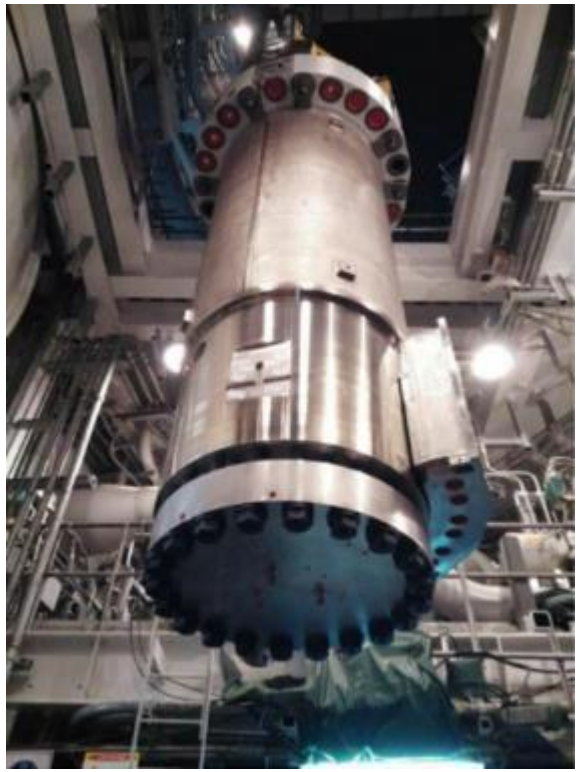
  Weight :
  202,050 lbs. **[~92,000 kg]**

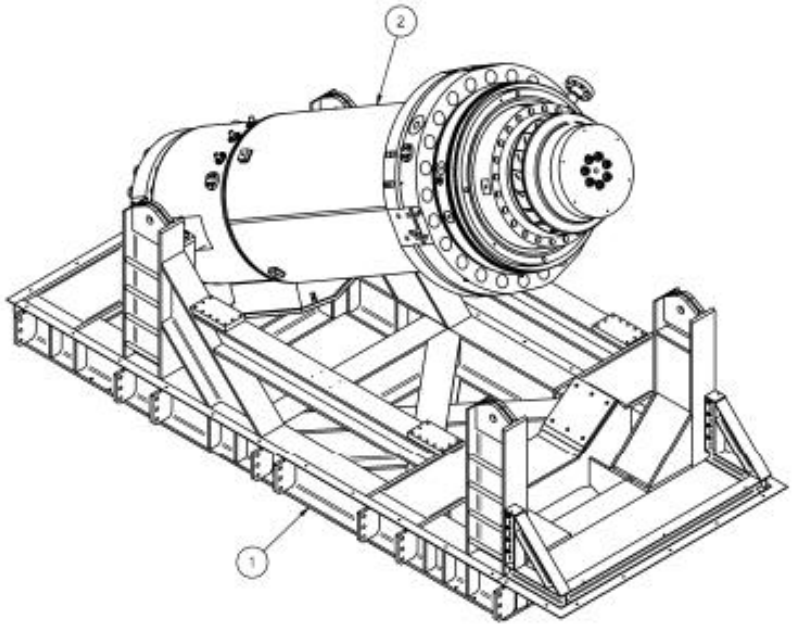
  Design and Spec

  ASME Section III

  Safety Class A

  Seismic Class 1





https://www.nrc.gov/docs/ML0715/ML071580904.pdf

WBS 6 – Cranes & FHME

Procurement and transport to NPP site of various cranes and fuel handling equipment.

- MH01 – Polar Crane

Size (L x W):
[38m x 13.5m]

Weight :
[450 T]

Build to Print Design

10 CFR50 & 10CFR21 applicable

ASME NOG-1

Safety Class NNS – Class D

Seismic Class 1

WBS 7 – Auxiliary Equipment

Procurement and transport to NPP site of various auxiliary equipment to differing procurement classes (ASME, SR, non-SR) such as heat exchangers, pumps, tanks, etc.

- ME2Q – CVS Makeup Pump Hx

Size (L x W x Height):
[2280mm x 578mm x 578mm]

Weight :
[450 kg Wet, 349 kg Dry]

ASME VIII, Division 1

Safety Class NNS – Class E

Non-Seismic

WBS 8 – Valves

Procurement and transport to NPP site of >7,000 valves of various type and procurement class (ASME, SR, non-SR)

PV32 Data Sheet 183

PV33 Data Sheet 106

PV40 Data Sheet 095

PV54 Data Sheet 109

WBS 9 – Electrical

Procurement and transport to NPP site of various electrical items to differing procurement classes (Class 1E and non-Class 1E) equipment such as batteries, MCC's, transformers, electrical penetrations, etc. This includes variations of seismic classifications.

- ET01 – Main Step up Transformer

10 CFR50 & 10CFR21 applicable

Class 1E

Non-Class 1E

Safety Class NNS – Class D, Class E

Seismic Class 1 or 2 or Non-Seismic Class

WBS 10 – Instrumentation & Controls (I&C)

Procurement and transport to NPP site of various I&C items to differing procurement classes (Class 1E and non-Class 1E) equipment such as RTDs, cabinets, full systems (PMS/PLS), Rotameters, etc. This includes variations of seismic classifications

- JE27– Non-Class 1E Radar Level Transmitters, ANSI/ASME B31.1

10 CFR50 & 10CFR21 applicable

Non-Class 1E

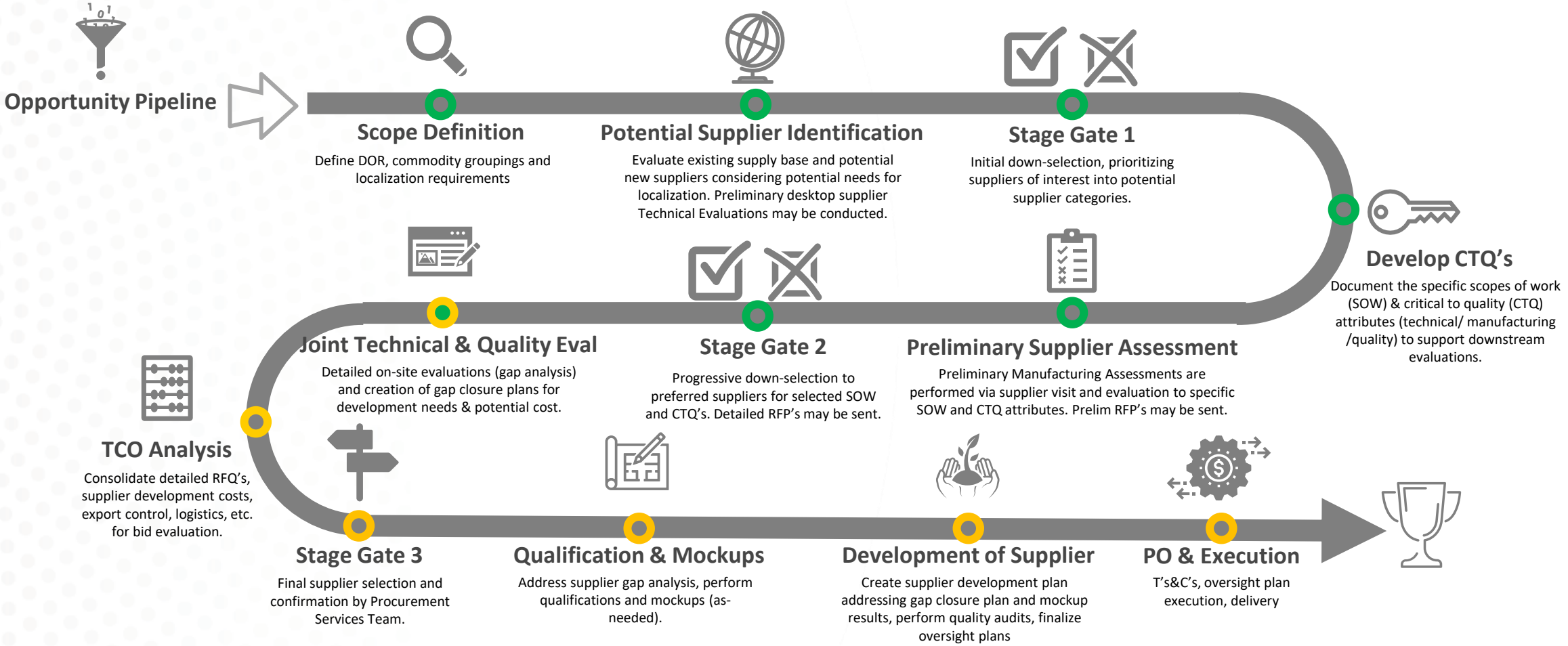
Safety Class NNS – Class D

Various Seismic Class per Tag

- Various Data Sheets & Configurations
- Various performance requirements within Data Sheets
- There are similar commodity codes that fall under these categories and are manufactured at Krohne.

AP1000® Supplier Assessment Process

Supplier Evaluation Process Map

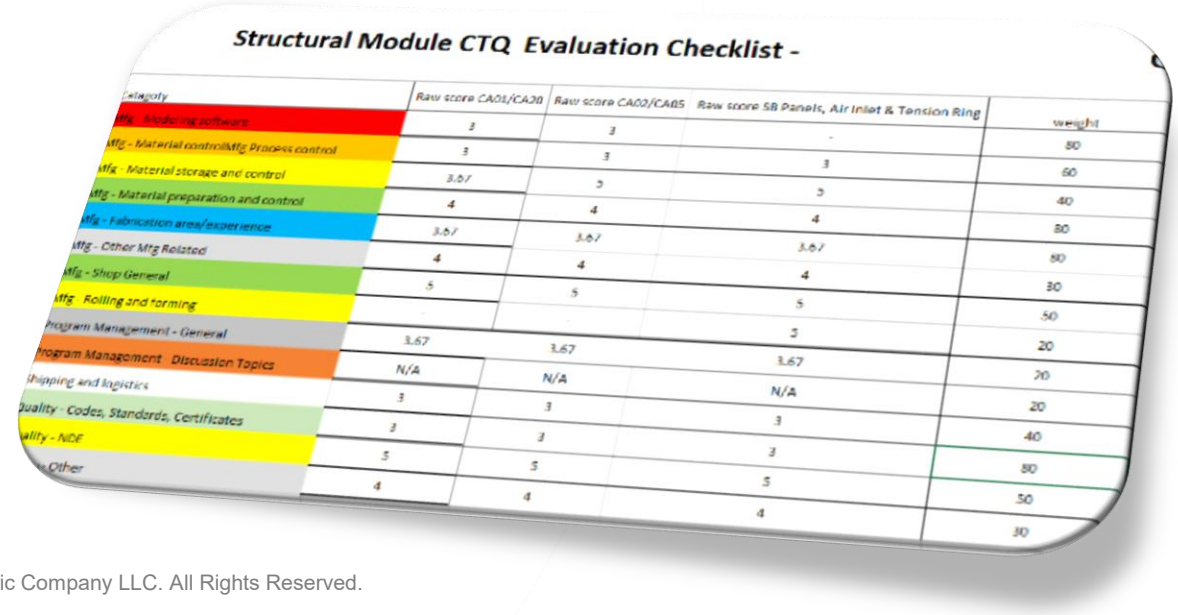


Focusing on Quality and Flawless Execution as Essential Components of the Program

Critical to Quality (CTQ) Attributes

Identified for each commodity/ component and focus on key aspects of procurement, project management, fabrication/ manufacturing, quality, commercial, and logistics considered to be critical to the successful execution of the scope.

Ideally developed and assessed during the preliminary supplier assessment process; however, they can also be evaluated as part of the Supplier down-selection or Supplier development process



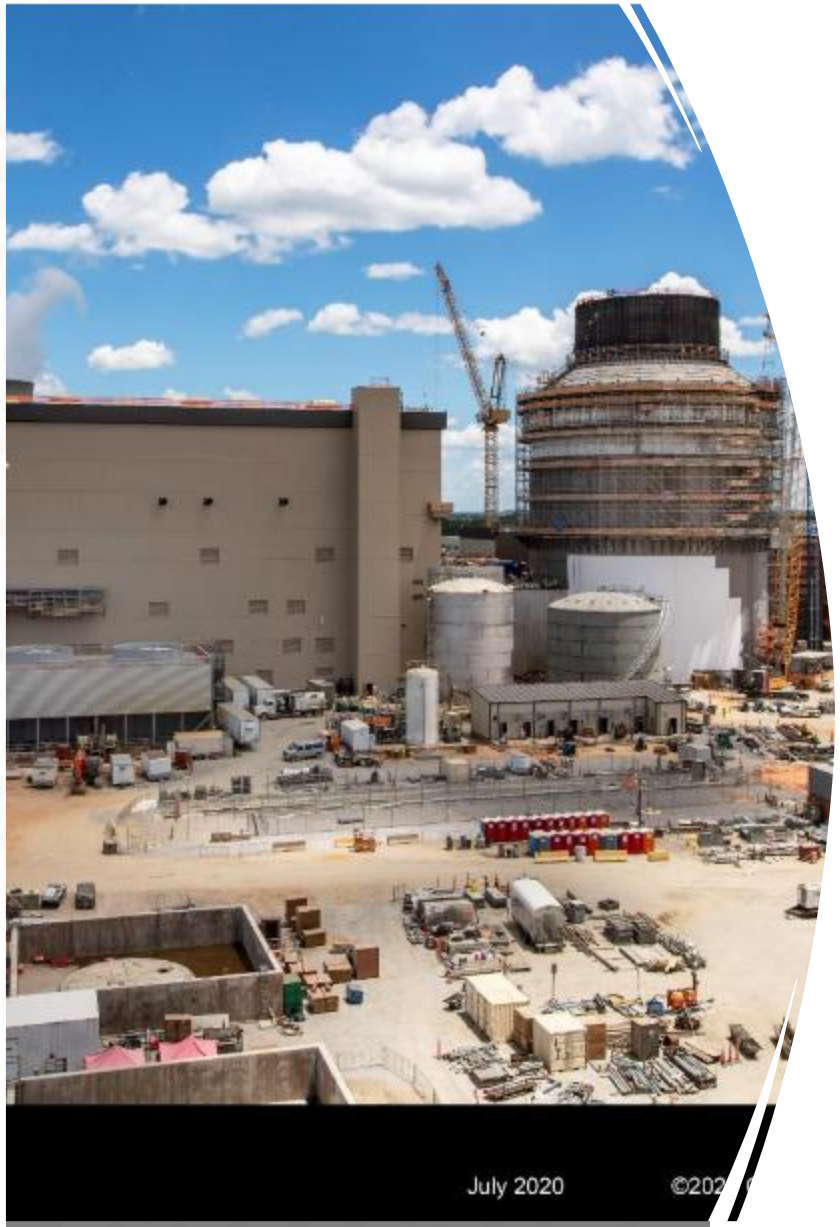


Photo courtesy of Georgia Power.

Development Process Overview

Phase 1: Preliminary Qualification

1. Performed a Supplier Capability & Capacity Assessment
2. WEC and Supplier perform an initial Standup Assessment

Phase 2: Joint Technical and Quality Assessments

1. Develop integrated team to strengthen quality program for fabrication
2. WEC has performed independent in-process Gap analysis
3. Gap analysis informs the Supplier Development Plan

Phase 3: GAP Closure & Supplier Development Plan

1. Integrated team completes Gap closure actions & program specifics
2. Final WEC independent audit to confirm supplier meets all requirements

Phase 4: Procurement Execution

1. Actively manage the overall procurement execution and oversight to ensure predictive delivery

Systematic & rigorous preparation to drive flawless execution

Local Engagement

Regional and local suppliers are key to the success of these projects

- Improves **Efficiency and Effectiveness** by pooling resources, talent and effort collaborating in a way that creates more effective planning
- Improves **Quality of Life** by connecting individuals to more transportation, economy, housing, workforce and social activity
- **Advocates for the region** with collective voice to for policies and funding at the state and federal level that will support the region's shared priorities.

Teamwork & Accountability with Regional Supply Chain

Systematic & rigorous preparation to drive flawless execution

- **Safety is part of our values**
- Working in safety environment to get you back home safe.
- **Mutual integrity and accountability**, "*we say what we do and do what we said*"
- AP1000® lessons learned implementation from Chinese AP1000® + Vogtle 3&4 projects
- Early Focus on Long Lead Items
- Use of proven Design
- **Quality First principle**

Thank You

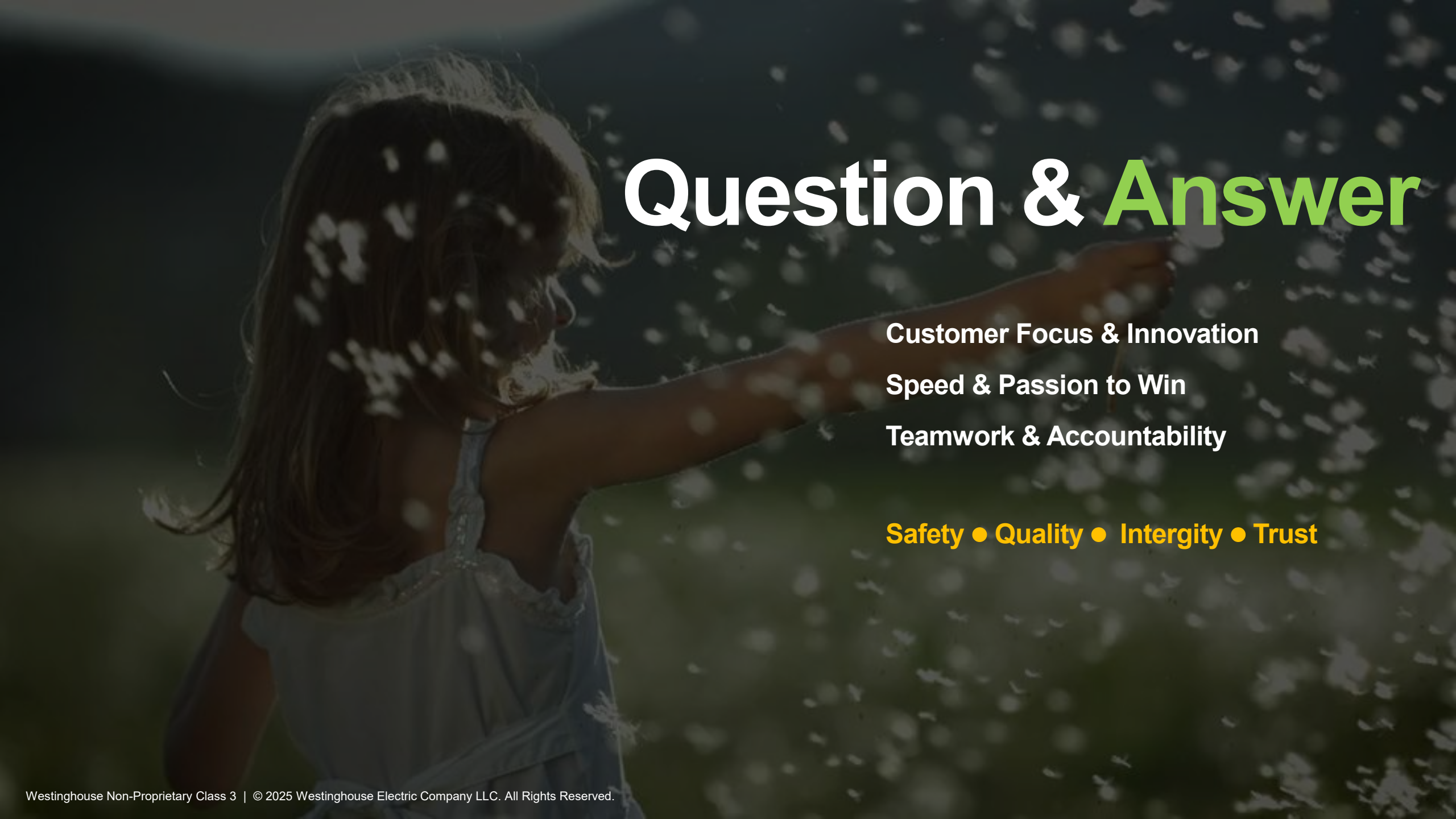
https://www.westinghousenuclear.com/poland/

You are invited to complete Supplier AP1000® Plant Initial Interest Form, which will only take 2 minutes to complete.

To access the site either visit the site link:
https://forms.office.com/Pages/ResponsePage.aspx?id=esFuUS-5i0OFlOEbb2vseQmU7l4qlcxMpdY1Af99-7pUN0JLWTYyMk02TVBJRVg2RzM0NjRYQkhERS4u

or scan the QR code below with any device with an internet connection

Westinghouse



Question & Answer

Customer Focus & Innovation

Speed & Passion to Win

Teamwork & Accountability

Safety ● Quality ● Intergity ● Trust