SMR Procurement for Site Construction

FNPA Lunch & Learn Series

23 October 2024

Personal Safety Assessment – 2 Minute Rule

- Take 2 minutes to look around yourself and assess any safety hazards
- Not just for planned work, but also for unplanned actions (what could go wrong?)
- Are any conditions different than the last time you were here?
- Slow down to speed up
- Take deliberate action to avoid creating an unsafe situation or undesirable outcome that results in rework

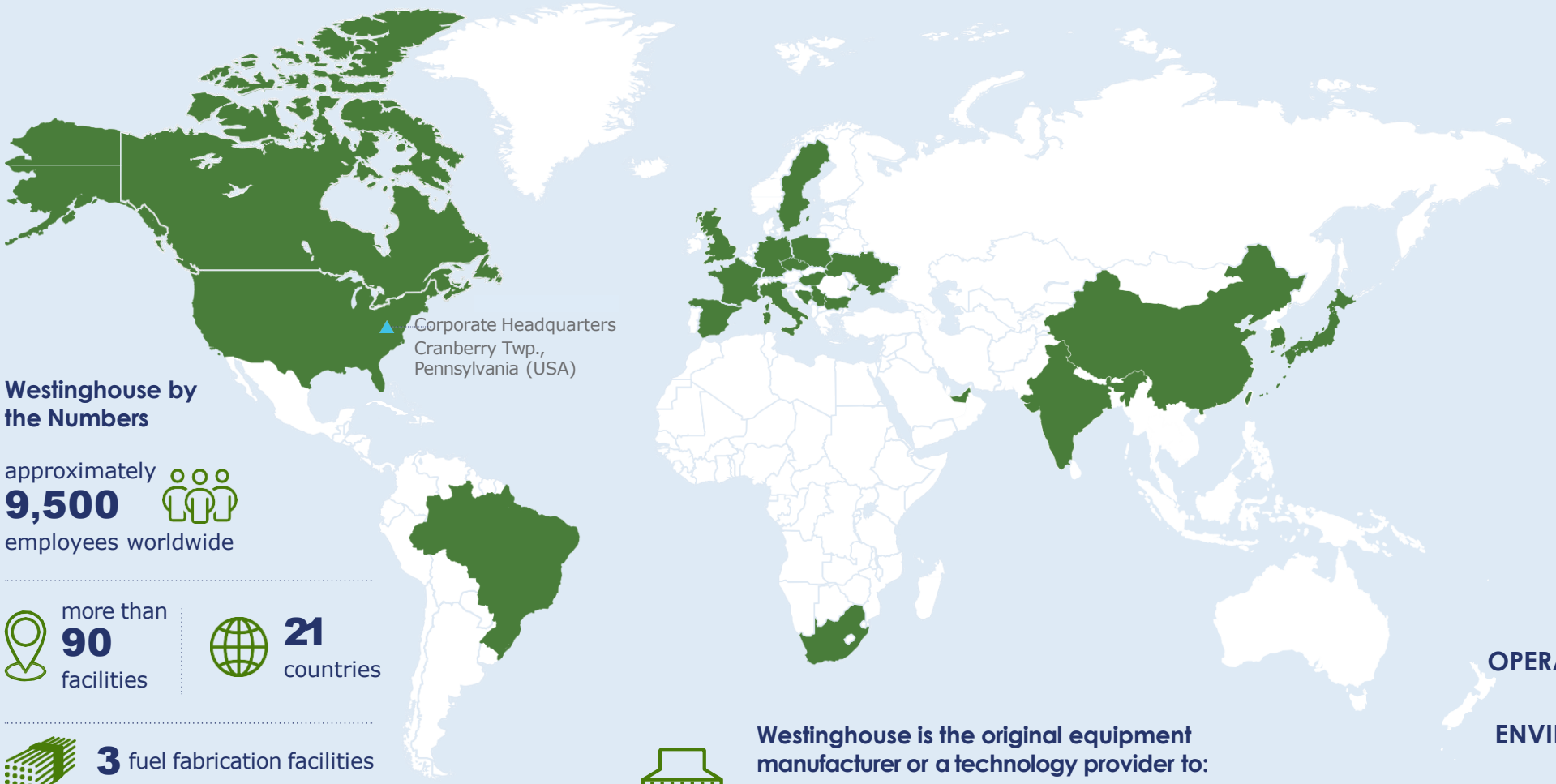
Westinghouse

Westinghouse

Global Presence

Legend

- Corporate Headquarters
- Countries with Westinghouse Presence



Westinghouse by the Numbers

approximately **9,500** employees worldwide

more than **90** facilities

21 countries

3 fuel fabrication facilities

Westinghouse is the original equipment manufacturer or a technology provider to:

~50% of the global nuclear reactor fleet, delivering capacity of ~190,000 carbon-free MWe

Comprised of 5 Business Units

ENERGY SYSTEMS

NUCLEAR FUEL

OPERATING PLANT SERVICES

ENVIRONMENTAL SERVICES

eVINCI

Westinghouse

Energy Systems

AP1000®
(~1,200 MW_e)

AP300™
(300 MW_e)

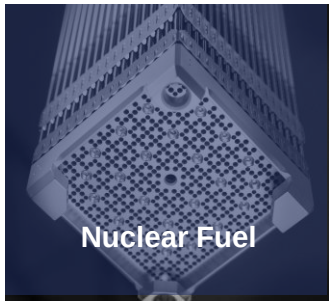
Pumped Thermal Energy Storage

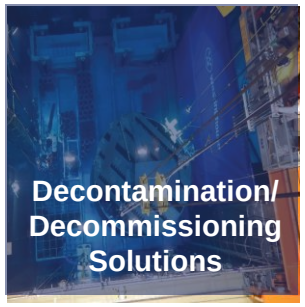
Nuclear Fuel

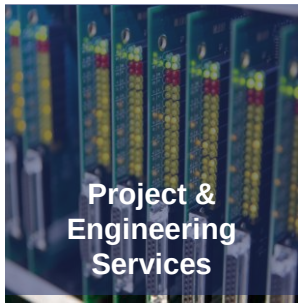
Operating Plant Services

Environmental Services

eVinci







AP1000 PWR Technology

Most Advanced, Proven Generation III+ Pressurized Water Reactor with Fully Passive Safety Systems

Innovative

Fully-passive safety systems protect the plant for over 72 hours, even in the event of a station blackout.

Proven

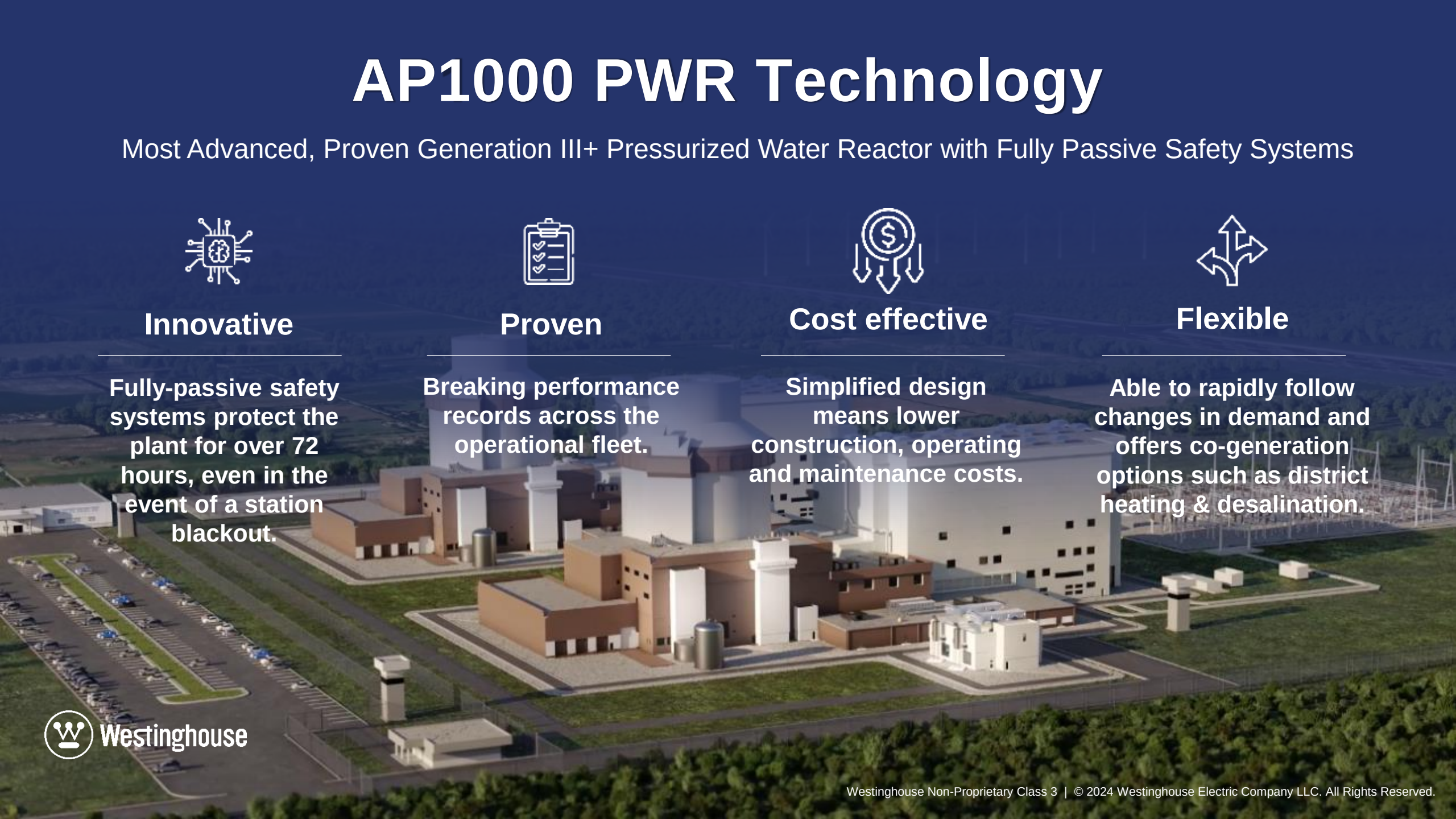
Breaking performance records across the operational fleet.

Cost effective

Simplified design means lower construction, operating and maintenance costs.

Flexible

Able to rapidly follow changes in demand and offers co-generation options such as district heating & desalination.



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AP1000 PWR Technology: Record-Setting Operations

- *China has 4 AP1000 reactors in operation (Sanmen & Haiyang); 8 units under construction and 4 under contract*
- *U.S. has 2 operating AP1000 reactors in Georgia*

- ***Superior operating performance – availability and capacity factors >92%***
- ***Dramatically reduced start-up test programs from 10 months to 5 months or less***
- ***Industry performance records set for first cycle refueling outages (28 days) second cycle (19 days)***
- ***Plants used for baseload and load-follow modes with ramp rates of 1 MW/second***
- ***Sanmen units received a perfect score by the World Association of Nuclear Operators (WANO)***

Westinghouse

AP300 SMR

Only SMR based on deployed, operating & advanced reactor technology

Proven Technology

24 AP1000 reactor-years of safe operations

Based on the fully licensed & operating AP1000 technology.

Advanced Safety

More than **30** years licensing advanced passive technologies with global regulators

We pioneered passive safety systems. AP300 utilizes identical passive safety systems used in the AP1000 reactor to maintain safe shutdown condition.

Readily Deployable

Approximately **0.4** acres needed for safety related buildings

Ultra-compact, simplified design reduces construction timeframes. Maximizes use of established supply chain.

Today's Energy Landscape

The world is recognizing the need for nuclear & is seeking proven solutions

CUSTOMER CHALLENGES

- Emission-free Energy
- Energy Security
- Energy Price Stability
- Grid Stability

THE SOLUTION

CUSTOMERS CONTINUE TO SELECT WESTINGHOUSE

- China has 4 AP1000 reactors in operation & 8 units under construction
- Poland contracts for 3 AP1000 reactors
- Bulgaria selects 2 AP1000 reactors
- U.S. has 2 AP1000 in commercial operation
- Ukraine contracts for 9 AP1000 reactors
- India selects 6 AP1000 reactors
- UK selects 4 AP300 reactors – Community Nuclear Power

Advanced Reactor Technology Procurement & Delivery Model

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

Westinghouse

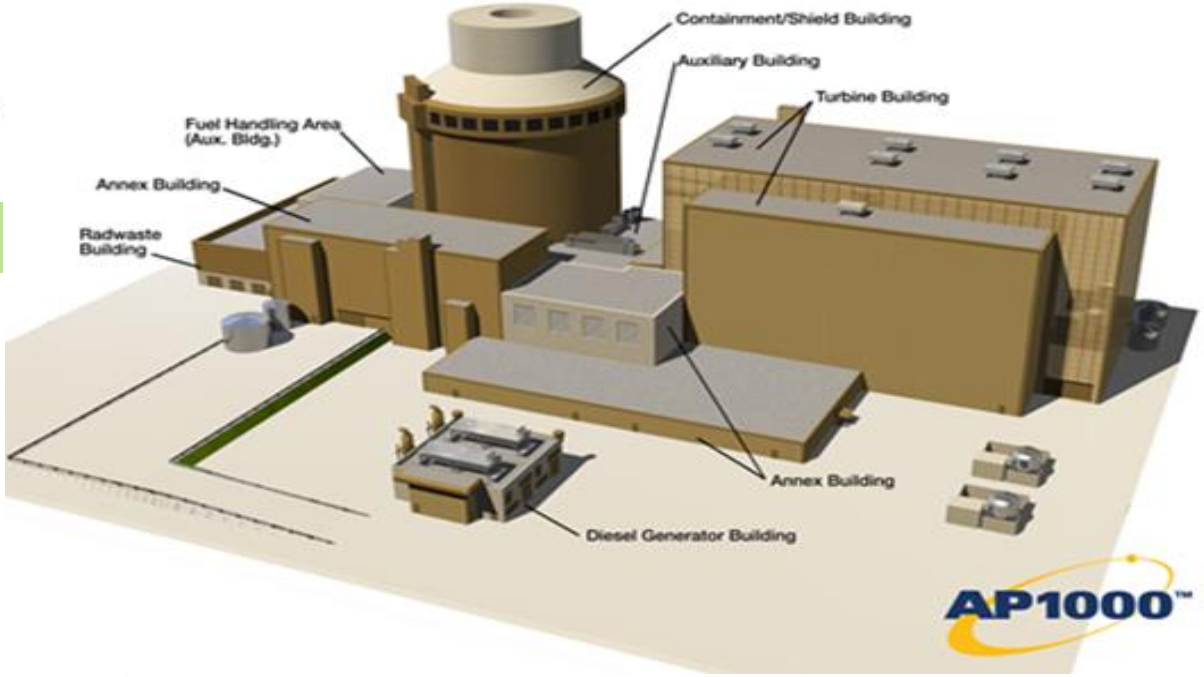
Procurement Scope Split

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.)
- Solid Radwaste Treatment Facility (SRTF)
- Turbine Island Procurement

Constructor

- 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



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

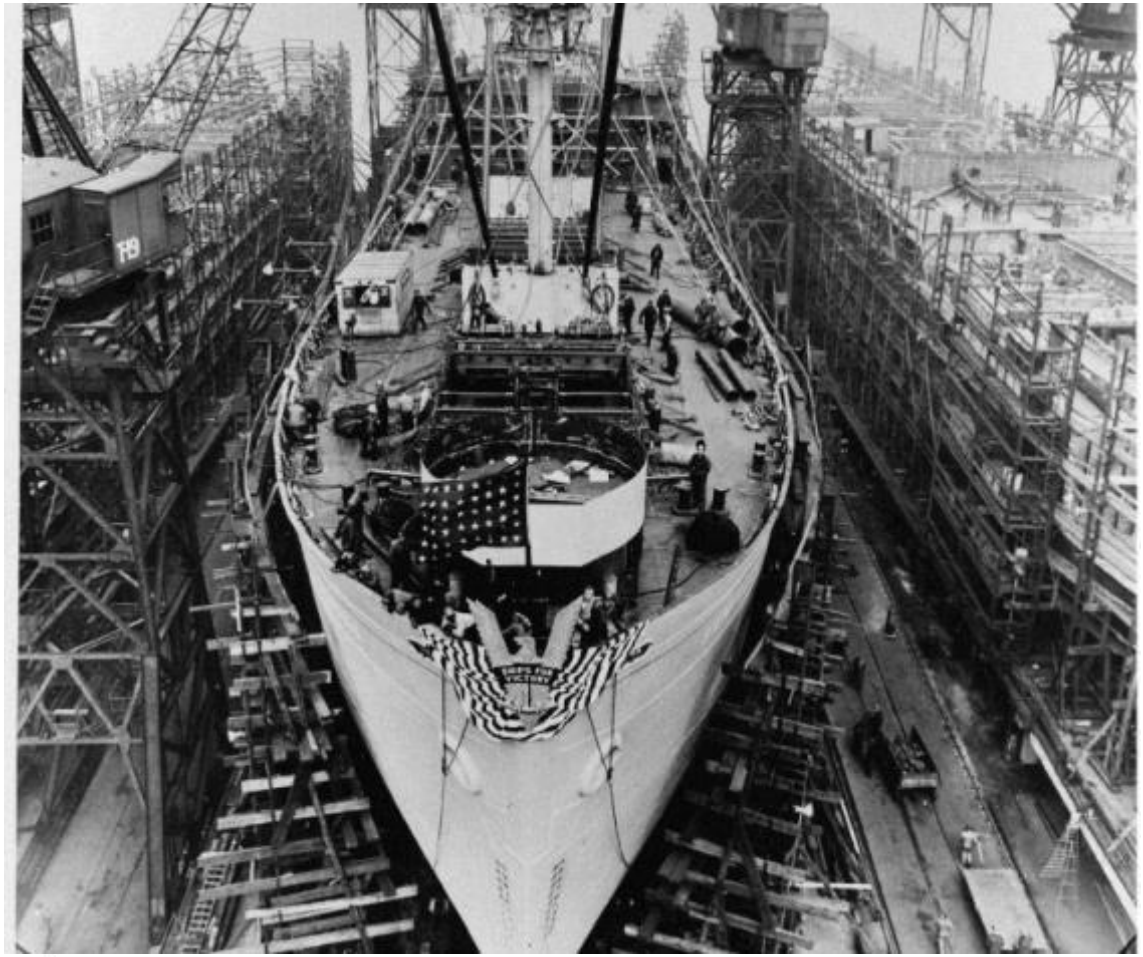
Site Construction

Construction and module assembly

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

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



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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

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

Squib Valve

Steam Generator

RCP

Reactor Vessel

Canadian 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

Large Structural Modules

Containment Vessel

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)

Non-Safety Valve

Transformers

Delivery Model

From WBS to Commodity Codes

- Plant is composed of > 700 commodities, each commodities is constituted by an individual element or a group of element
- WBS's align like commodities and skillsets to streamline the delivery model

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	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.

WBS	Description	Scope
6	Cranes & FHME	Procurement and transport to NPP site of various cranes and fuel handling equipment associated with the augmented Nuclear Island
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. associated with the augmented Nuclear Island
8	Valves	Procurement and transport to NPP site of >5,000 valves of various type and procurement class (ASME, SR, non-SR) associated with the augmented Nuclear Island.
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. associated with the augmented Nuclear Island
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

Procurement Program Delivery Office	Account Management	Commercial	Supplier Performance Engineering	Operations
Program Delivery Office Overall accountability for procurement execution for AP1000® 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

Procurement Execution – Functional Excellence

Westinghouse Sourcing Process for AP1000® / AP300™ Plants

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

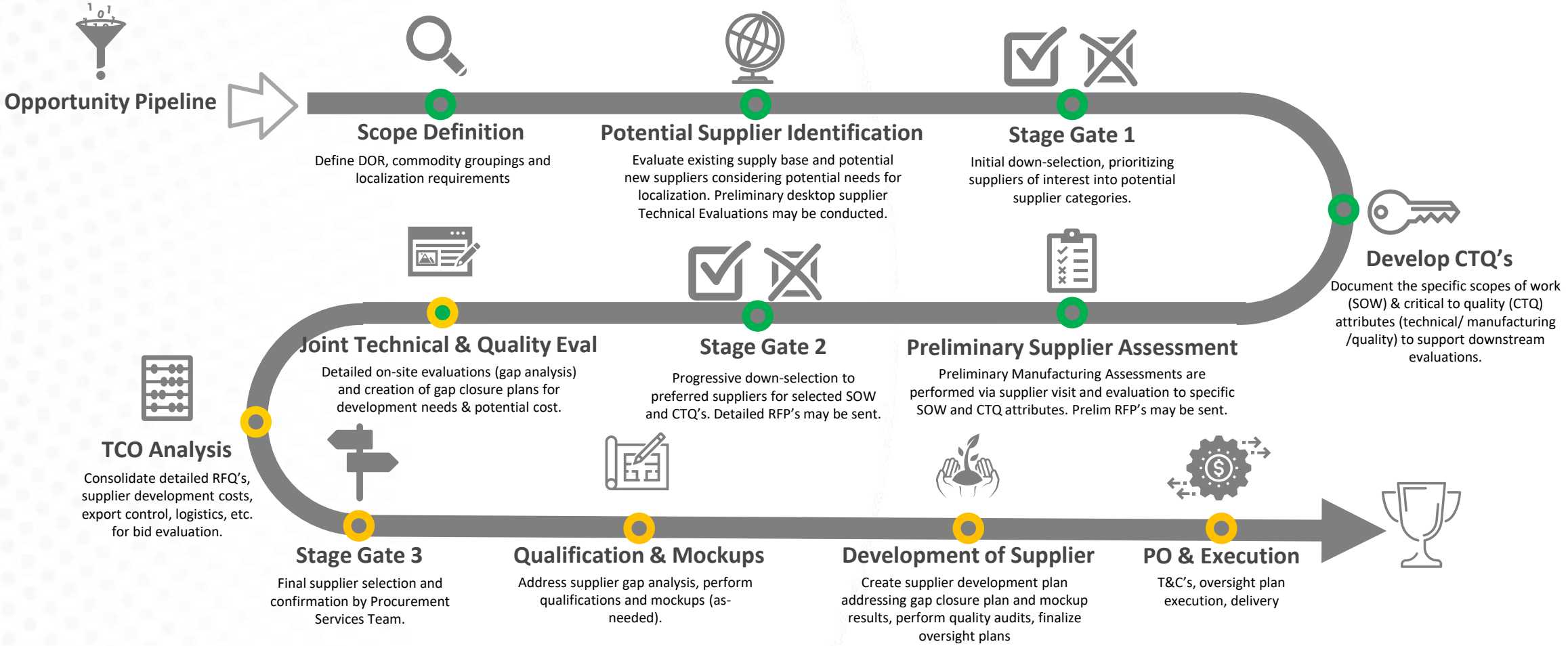
5 - Quality Audits
Supplier audits and onboarding to ASL/QSL

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

Supplier Evaluation Process Map

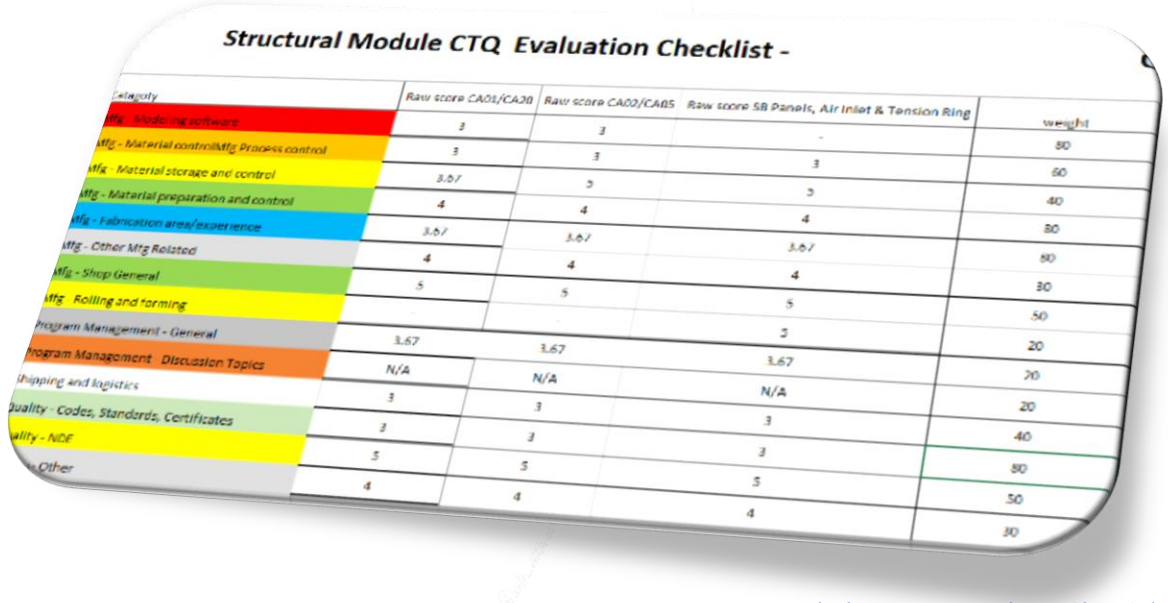


Focusing on Quality and Flawless Execution as Essential Components of the Program

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



Structural Module CTQ Evaluation Checklist -

Category	Raw score CA01/CA20	Raw score CA02/CA05	Raw score SB Panels, Air Inlet & Tension Ring	weight
Mfg - Modeling software	3	3	-	80
Mfg - Material control/Mfg Process control	3	3	3	60
Mfg - Material storage and control	3.67	5	5	40
Mfg - Material preparation and control	4	4	4	80
Mfg - Fabrication area/experience	3.67	3.67	3.67	80
Mfg - Other Mfg Related	4	4	4	30
Mfg - Shop General	5	5	5	50
Mfg - Rolling and forming	-	-	5	20
Program Management - General	3.67	3.67	3.67	70
Program Management - Discussion Topics	N/A	N/A	N/A	20
Shipping and logistics	3	3	3	40
Quality - Codes, Standards, Certificates	3	3	3	80
Quality - NDE	5	5	5	50
Other	4	4	4	30

Preliminary Qualification

- Conduct preliminary assessments of supplier's capability and capacity validating initially that the suppliers can support the product needs.
- Validate alignment of transparency and teamwork core principles
- Communication of Westinghouse procurement process and expectations

Joint Technical and Quality Evaluation

- **Joint Technical and Quality Evaluation** of the supplier to validate the supplier's ability to effectively complete a scope

- **Standardized, on-site evaluation** intend to identify and critical gaps that may exist, related to
  - Capability and Capacity (technical and personnel)
  - Work processes, procedures, and qualification
  - Quality program

- **Development and Oversight plans** that are reviewed with the supplier and will establish actions to address any gaps identified

Transparency & Teamwork

Gap Closure & Supplier Development Plan

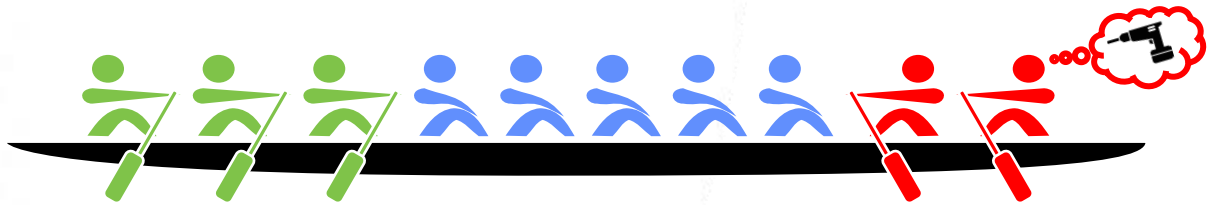
- **Delivery Stream** organization engages suppliers to drive closure of actions defined in a Development plan and ensure supplier readiness to execute.
- Provide on-site, relevant nuclear industry experience and guidance (Quality, Regulatory, and Technical) to suppliers to address both technical limitations and programmatic needs

Technical Advising (Supplier Performance)

- Special Processes and Procedures (welding, etc.)
- Tooling and Fixturing
- Best Practices and Operational Experience
- Part and Process Qualification

Programmatic Consulting

- Quality Program Improvements / Enhancements
- Regulatory Compliance and Reporting
- Personnel Training and Development
- Document Management systems

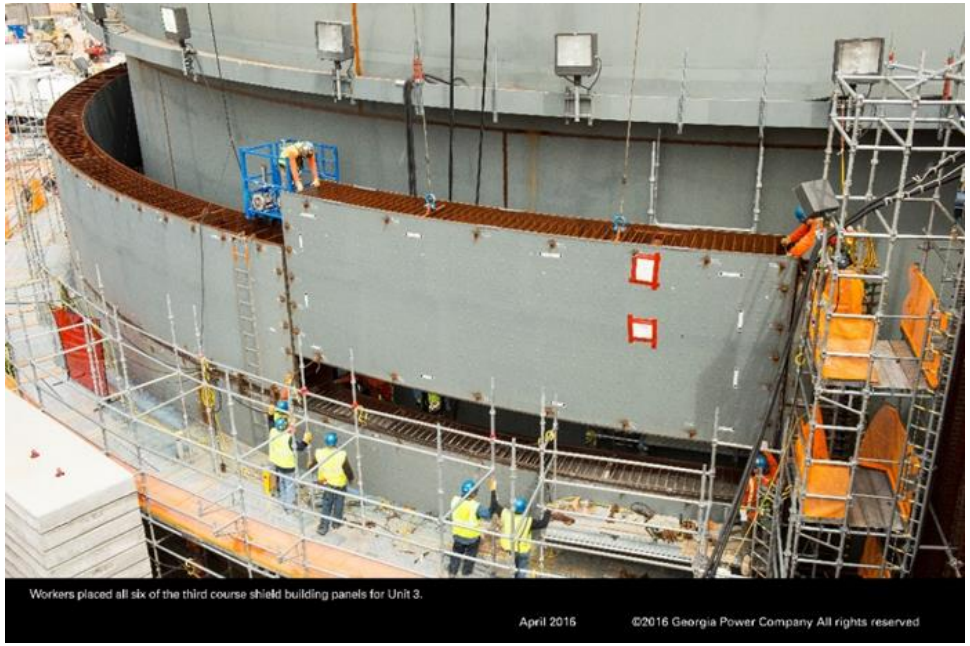


- Support and advise the supplier through the closure of key gaps necessary to pass independent Supplier Quality audit for Nuclear Safety-Related scopes

Production Mockups

For Structural Modules, Shield Building and Containment Vessel the selected preferred suppliers will perform a qualification covering:

1. Material Procurement to support mockup
2. Document generation and approvals
3. Development of Quality Plans, Procedures, Inspection programs
4. Fabrication of 1 or more major sub-assemblies that best represent the challenges of the main commodity with WEC and Customer oversight
5. Testing and Inspection process to confirm requirements have been met
6. Produce a production level quality assurance data package



Prepare for Success

Procurement Execution

- Westinghouse Delivery Steam organization manages supplier execution from Purchase Order issuance to close-out.
- Implement the Oversight Plan established during the Supplier Assessment and Development phases
- Proactively identify and resolve issues to ensure delivery certainty and flawless execution
- Oversight is conducted through multiple means (Best Athlete approach)

Preliminary Qualification → Supplier Development & Qualification → Gap Closure & Supplier Development Plan → **Procurement Execution**

Teamwork & Accountability with Regional Supply Chain

Systematic & rigorous preparation to drive flawless execution

- **Safety is a value**
- 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**

Lessons Learned

Lessons Learned from FOAK Procurement

- Design completion prior to manufacturing
- Schedule time for document submittals and approvals
- Production mock-ups to demonstrate capability and identify deficiencies
- Supply base diversity

Lessons Learned from AP1000® Projects

Sanmen Unit 1 CV Bottom Head Set – October 2009

Haiyang Unit 1 CB20 Set – March 2014

Vogtle Unit 3 CA01 Module Set – August 2015

Sanmen Unit 2 CA20 Onsite Transport – June 2010

Haiyang Unit 2 CV Top Head Set – August 2015

Vogtle Containment Ring Fabrication – July 2015

Timing of Design Completion

- **Value of a Complete Design**
  - Several of the key AP1000 plant advantages (compacted footprint, reduction in component and construction materials, reduction in work hours to build, modular construction) are EXTREMELY sensitive to the timing of design completion, as the ‘substantial’ completion of the design needs to be achieved well in advance of first nuclear concrete, especially for the large structural modules
  - Late start/completion of design, especially when coupled with inaccurate % complete assessments due to the stage, can have significant impact
  - Early completion of reference design, allows engineering to focus on procurement, fabrication and construction support
- **Approach for future AP1000 projects**
  - Leverage the **value of a complete design**, limit changes to manufacturing & construction improvements with high return
  - Improve module delivery by implementing shop and site lessons learned (attachments and connections)
  - Limit changes to the design to activities with significant construction cost return

Ease of Construction Changes - Approach

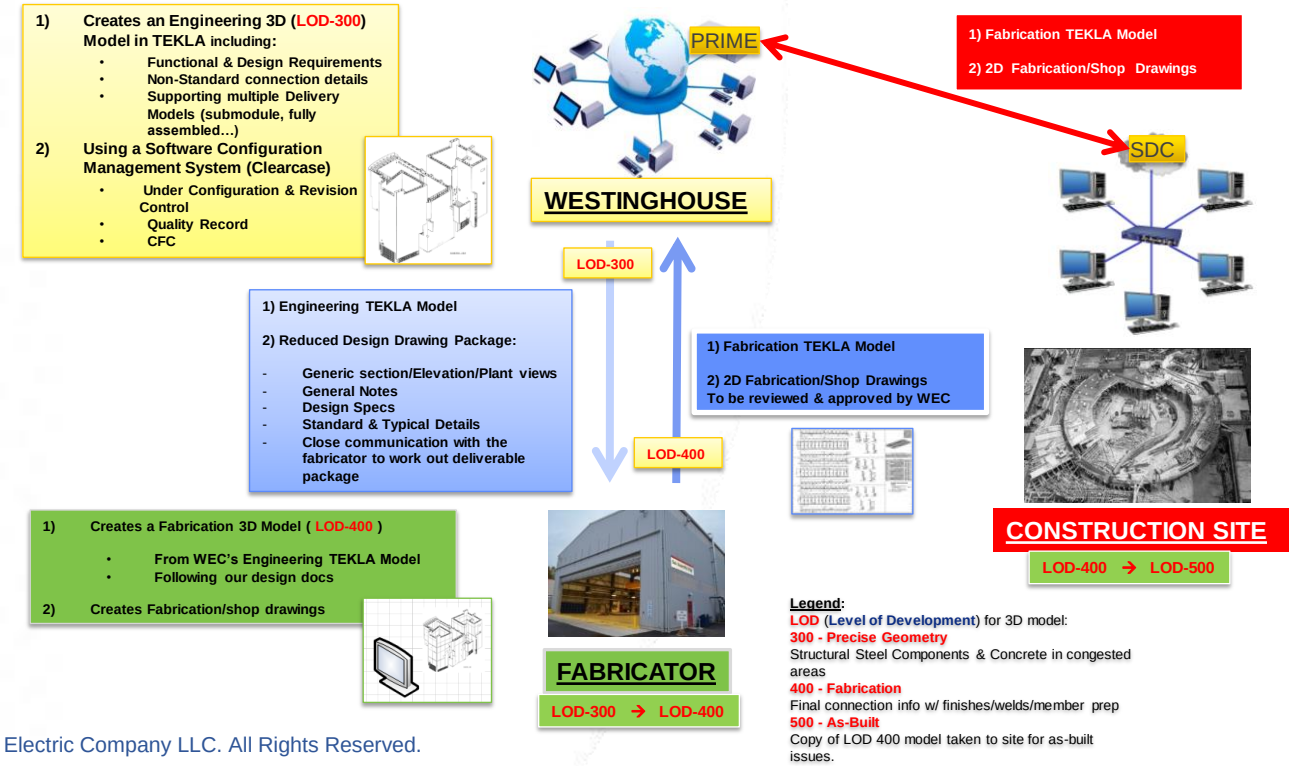
- **Structural Modules Optimization**
  - Extensive review of lessons learned during construction to optimize module fabrication and delivery
  - Fabrication: digitalization of design, TEKLA design optimized with key US and Japanese fabricators
  - Construction: Elimination of Attachment Plates, Simplification of design in key areas
- **Ease of Construction Targeted Changes**
  - Joint construction/engineering review to identify key areas of design improvement to simplify construction
  - Over 100 different initiatives jointly agreed to, with focus mostly in the structural area (e.g. rebar simplification), electrical (raceways simplifications, cabling,…) and field routed commodities (3D model detailing for field routed commodities)
- **Digitalization and Simplification of Design**
  - Design optimization for digital work-packages integration
  - Elimination/simplification of IFC documentation
  - Approach for design cleanup (e.g. EDCRs as well as form of EDCRs and Issued For Construction – IFC – documentation)

Ease of Fabrication Changes

Design Digital Delivery Model

Optimize design delivery process for critical path structural modules

- Significant cost/time invested in Wave 1 projects on paperwork reconciliation
- Digital delivery of design optimized between fabricator and design entity to facilitate (1) fabrication drawings preparation and (2) ease of fabricator means and methods implementation

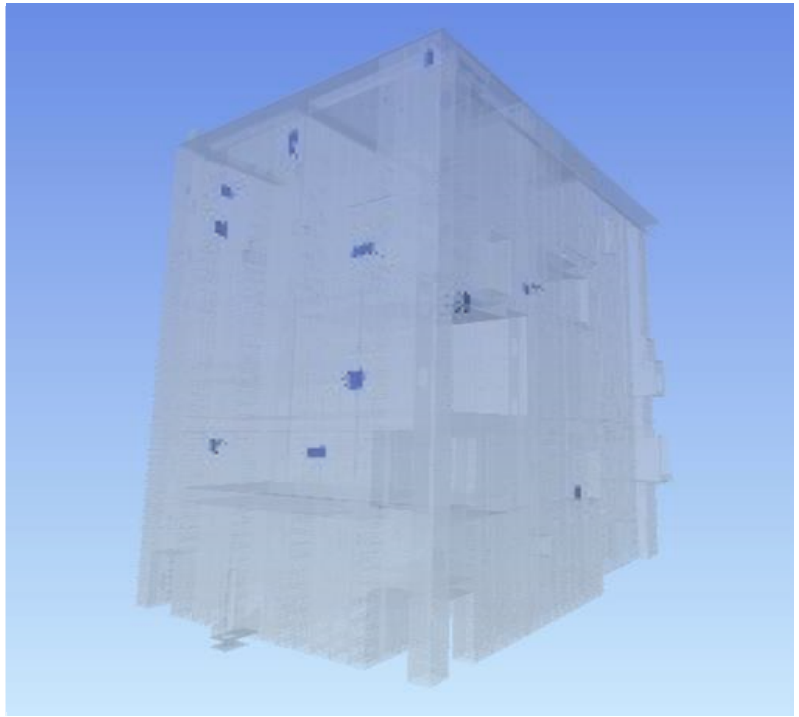


Ease of Fabrication Changes

Large Structural Modules Optimization (CA20)

*IFC = issued for construction	Before optimization	After optimization
Overlay plates	330	4
IFC* Drawings	752	75
Machined block (basemat)	150	0
Internal hook rebar		-50%

Largest Auxiliary Building structural module: spent fuel pool & transfer canal and waste processing areas.
Size (LxWxH) 20.5 x 14.2 x 21m
Lift Weight 905 MT



Design Digitalization

State of the art Integrated Building Information Modeling (BIM) and Plant Lifecyle Management (PLM) system for new plants – WNEXUS Suite

- Accurate 3D Model to design, with extensive embedded data managed via the **Westinghouse WNEXUS suite**
  - ✓ Westinghouse data management architecture (WECAF) enables integration and transition between different commercial tools and with the constructor
- Continuous development of state-of-the-art digital data/model applications: WIRED (electrical), WISDM (fluid systems), WASP (structures).
- Transition from drawings/documents to Nuclear Quality Digital deliverables: reduction of IFC documents for Augmented Nuclear Island from 63,000 to under 40,000
- Digital Change Approach simplifies dramatically management of impacts during construction and issue resolution (digital EDCR reduction of volume of change by over 90%)
- Flexible framework enables integration of new technologies (e.g., new D&I 3D scanning solutions tested and commercialized at Vogtle) and is a key enabler for a digital work package approach

AP1000 Digital Twin Overview – Data Model Integration

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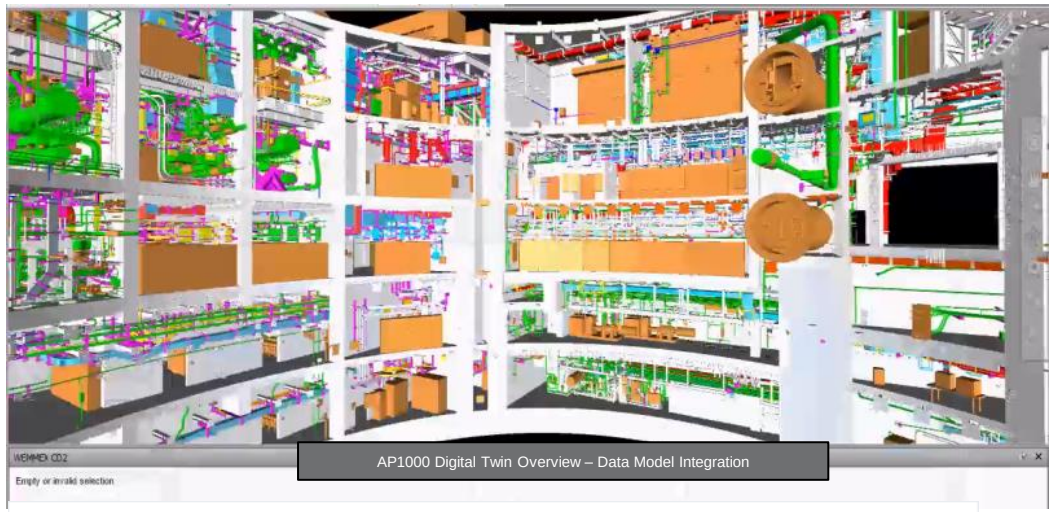
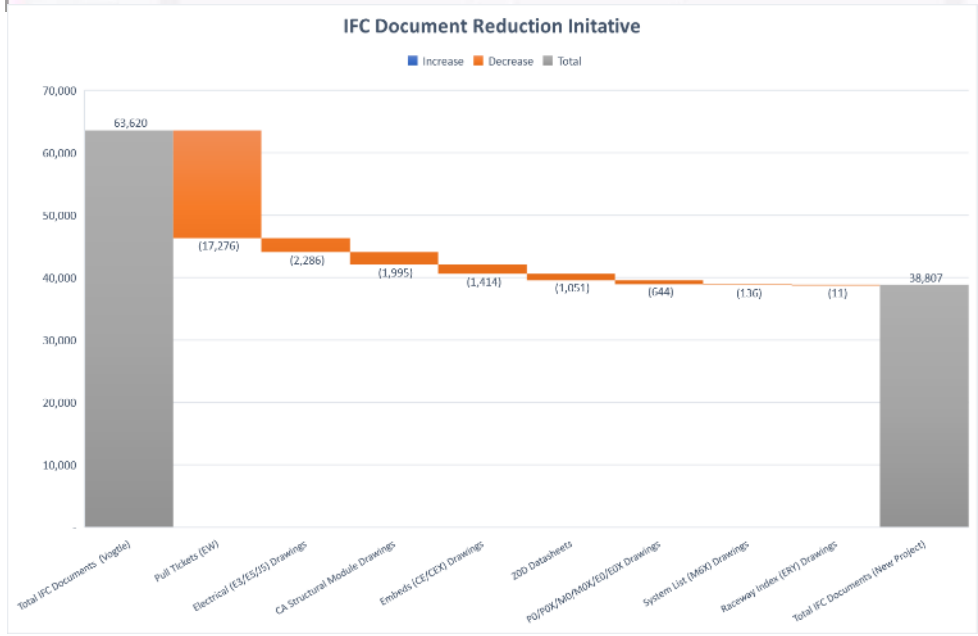


AP1000 Digital Twin Overview – Data Model Integration



Construction Planning

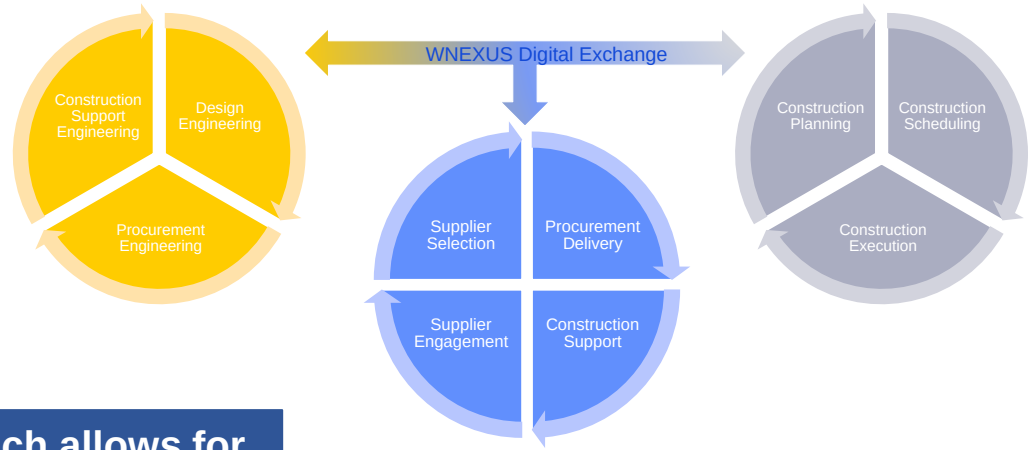
Challenges in Construction Planning and Construction/Design integration

Lack of adequate planning and integration of Work Packages with Design significantly impacts construction progress and especially construction closeout at end of project

- Engineering Delivery Model for New Plant Projects – **Integrated Digital Work Packages**
- **State of the art integrated BIM/PLM framework** (WNEXUS) to integrate AP1000 design for WEC scope. Unprecedented level of control over Index of Engineering Deliverables
- Digital Work package interface allow full integration of construction to design. Enable development and tracking of schedule in a **full 4D environment**. Adaptable to different constructor(s) and their toolset, but within a single framework (WCON module within WNEXUS)
- **Procurement integration** to both Design and digital work packages with WPRO module
- **Digital Work Package Index**, with direct mapping to every Engineering construction deliverables (IFCs, 3D Model, Specs), enabled by WNEXUS Digital Exchange, provides the fundamental building block of project execution management

4D Schedule and Work Package Management

WNEXUS in Project Delivery



WNEXUS Integrated BIM/PLM approach allows for unprecedented control of planning and schedule

WBS Details

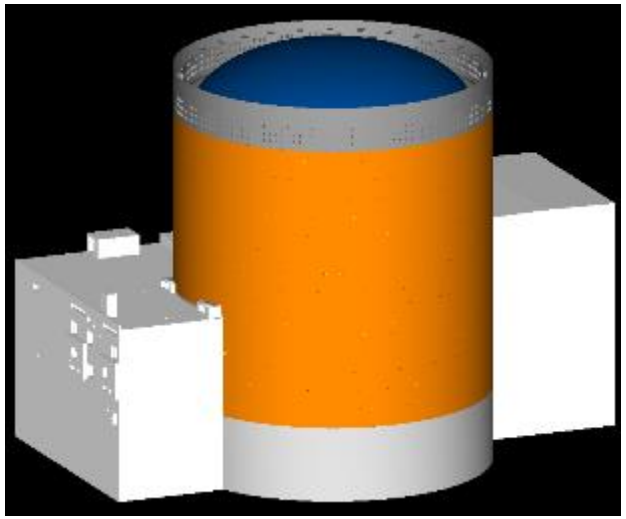
WBS 1 - Containment Vessel & Shield Building

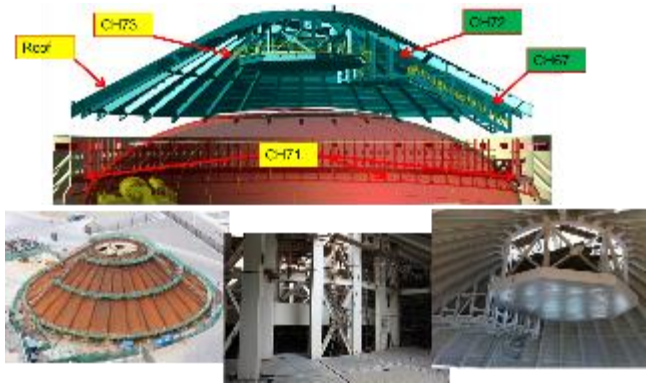
Containment Vessel (MV50)

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

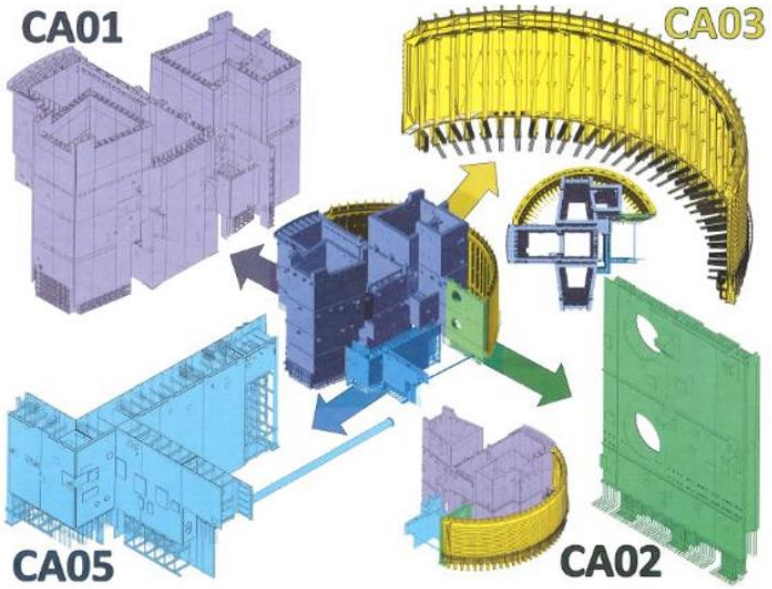
WBS 1 - Containment Vessel & Shield Building

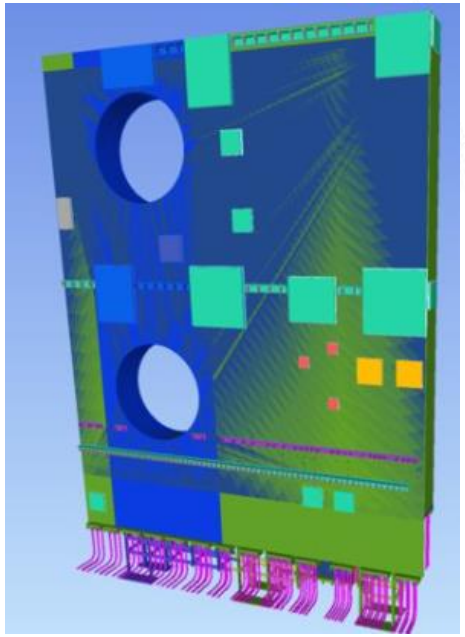
Shield Building (SC30, SC40 & SS10)





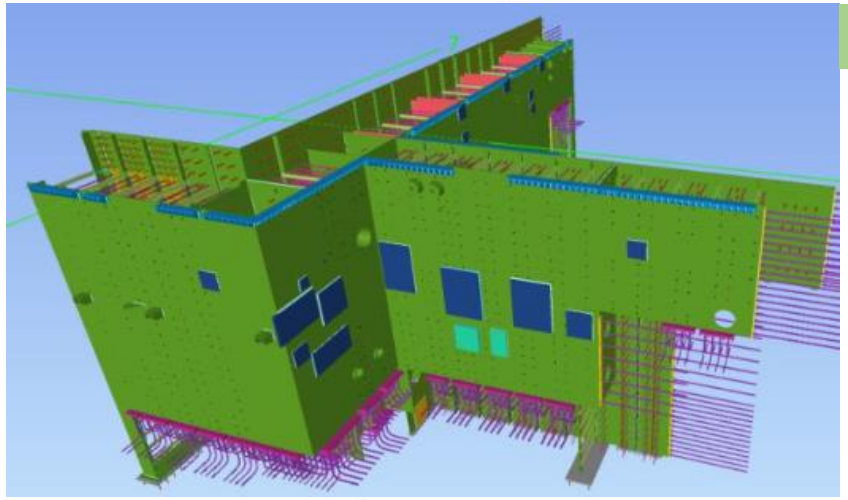
WBS 2 – Structural modules (CA01, CA02, CA03, CA05 & CA20)





CA03 - IRWST Wall Module

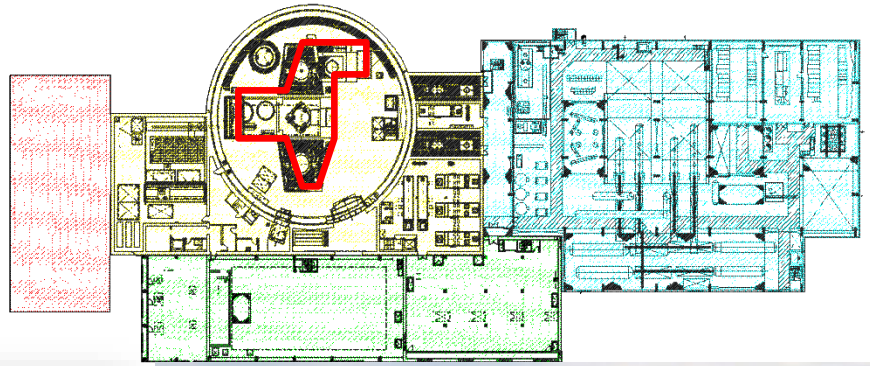
CA02 – PRHR Penetrations Wall Module

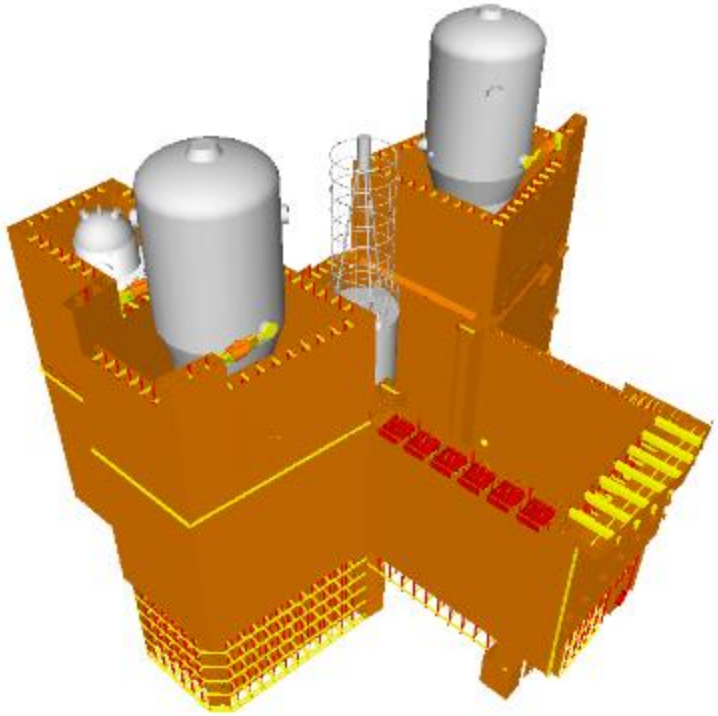


CA05 – CVS / Access Tunnel /PXS-B Wall Module

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

CA01 Steam Generator & Refueling Canal Module





Steam Generators, Pressurizer and Integrated Head Package shown inside CA01

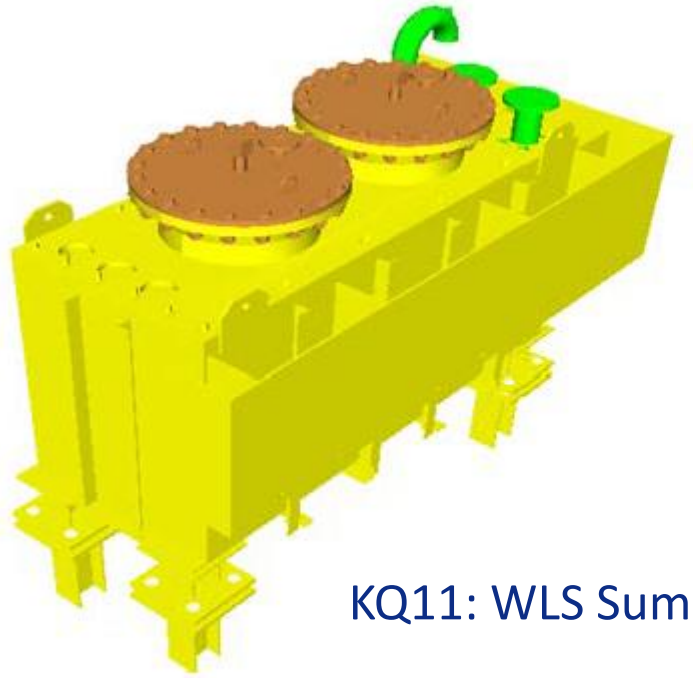
WBS 3 – Mechanical Module/Room Module

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.

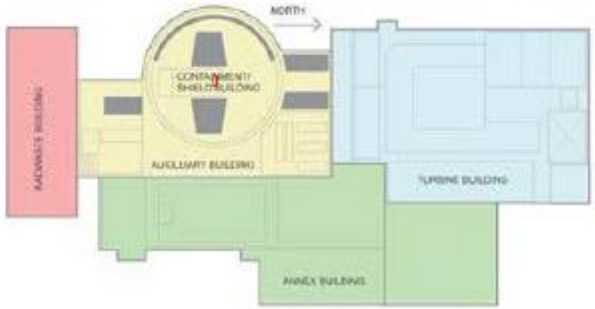
Room (Area):
11104 (1110)

Plant Elevation:
71'-6"

Classification:
D

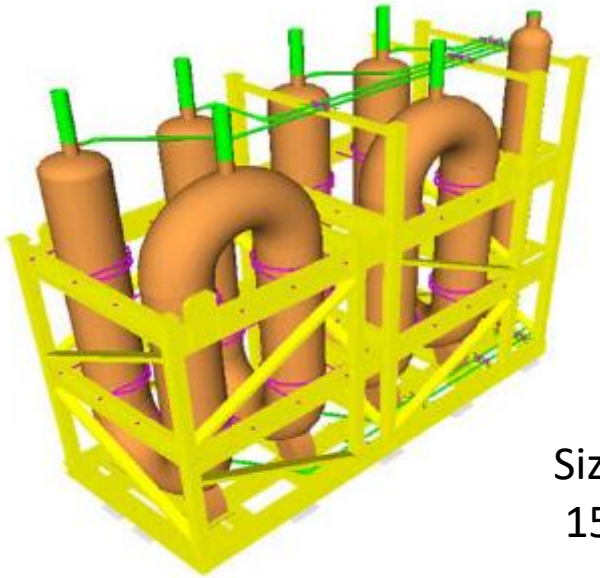
Non-Safety

Non-Seismic



WBS 3 – Mechanical Module/Room Module

- KB04 – WGS Delay and Guard Bed



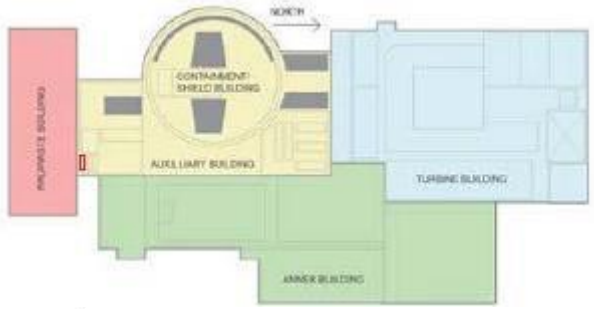
Size (L x W x Height):
15’-2” x 6’-2” x 14’-11”

[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

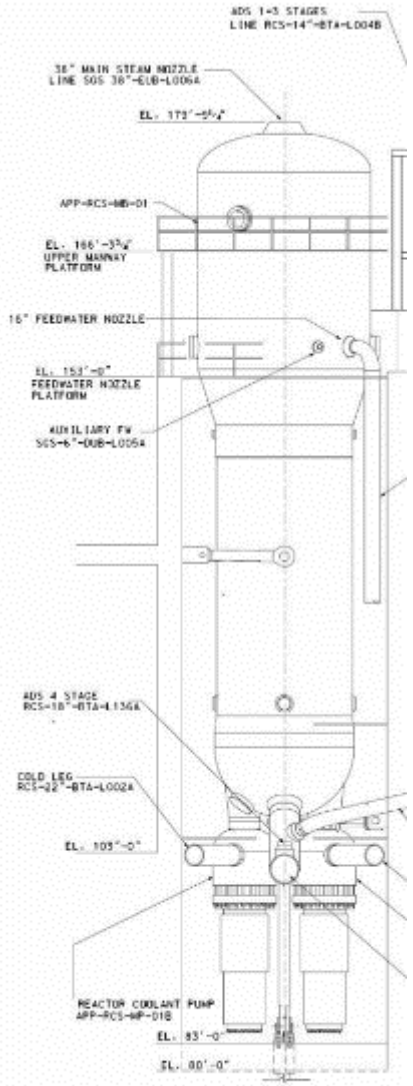
Non-Seismic

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 components.

- 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]

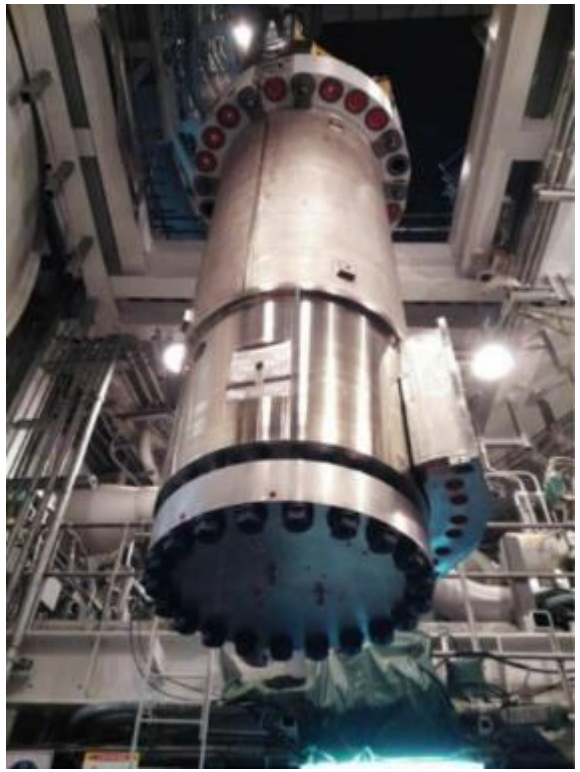
  Weight :
  202,050 lbs. **[~92,000 kg]**

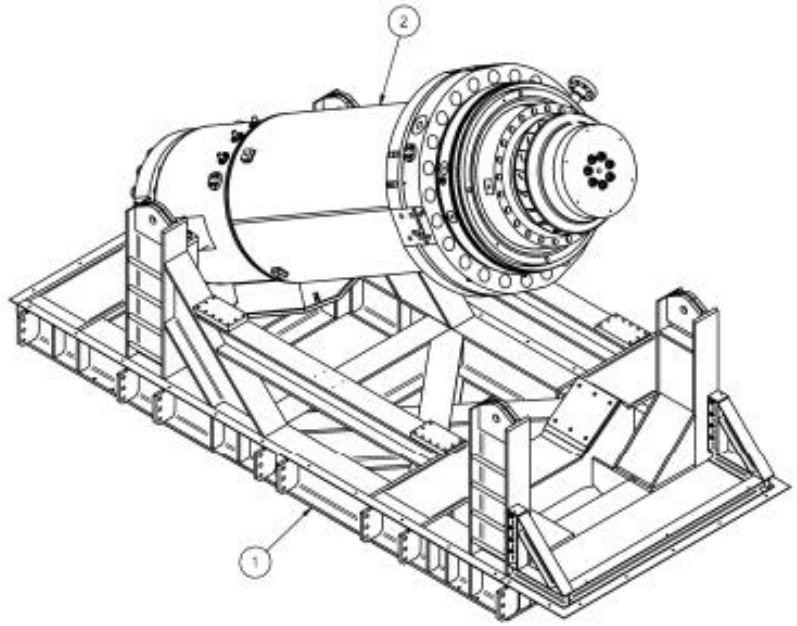
  Design and Spec

  ASME Section III

  Safety Class A

  Seismic Class 1





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

WBS 6 – Cranes & FMHE

Procurement and transport to NPP site of various cranes and fuel handling equipment associated with the augmented Nuclear Island.

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. associated with the augmented Nuclear Island

- 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 >5,000 valves of various type and procurement class (ASME, SR, non-SR) associated with the augmented Nuclear Island.

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. associated with the augmented Nuclear Island. This includes variations of seismic classifications.

ET01 – Main Generator 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. associated with the augmented Nuclear Island. 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.

WBS 11 – Turbine Generator

Procurement and transport to NPP site the Turbine Generator. A half (1/2) speed turbine design.

MG01 – Steam Turbine Generator

Turbine

Generator

10 CFR50 & 10CFR21 do not applicable

Non-Class 1E

Safety Class NNS – Class E