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SUPPLY STRATEGY FOR SMR DEPLOYMENT – PRESENTATION FOR THE 2nd INTERNATIONAL TECHNICAL MEETING ON SMALL REACTORS SUBMISSIONS

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ABSTRACT

1. Introduction

This document provides a description of Babcock & Wilcox's deployment strategy for the mPower™ Small Modular Reactor from the perspective of Supply Chain and Manufacturing.

A desirable future state of readiness is described as one which leverages and revitalizes an existing supply chain and manufacturing infrastructure, as well as leveraging an existing workforce of engineering, construction, and project management employees.

B&W's mPower™ SMR value proposition offers many desired design and operating advantages to the SMR market.

2. Background

B&W's mPower™ SMR is an integral pressurized water reactor (iPWR) delivering 180MWe of carbon-free baseload power. A special purpose company, Generator mPower (GmP) was established between Babcock & Wilcox mPower, Inc. (a wholly-owned subsidiary of The Babcock and Wilcox Company) and Bechtel Power. B&W and Bechtel will utilize a mature and existing manufacturing and supply base as follows:

- Plant design eliminates large bore piping and large forging needs
- 2,000 suppliers across 43 states and 7 provinces (currently supporting our nuclear fabrication facilities)
- B&W operates a network of 14 major manufacturing facilities, including five ASME N-Stamp-certified shops (includes Cambridge, ON and Melville, SK)
- Bechtel holds an ASME N-Stamp certification for engineering, procurement and construction of nuclear facilities

B&W's manufacturing scope includes the NSSS Module (SG, Reactor & Pressurizer), Steel Containment Vessel, and miscellaneous Nuclear Island systems and Balance of Plant components.

The following describes the current primary design basis for the mPower™ SMR.

Integral 530 MWt NSSS Module

- Core, CRDMs, SG, Pressurizer and Coolant Pumps
- No penetrations below top of core
- 50-degree superheat in Secondary Loop
- Rail shippable

Passively Safe Design Philosophy

- Core remains covered during all DBAs
- No active ECCS or safety-related AC power
- Multiple defense-in-depth layers deliver ~10^{-8} CDF

4-Year Fuel Cycle With "Standard" PWR Fuel

- 69 fuel assemblies with <5% ^{235}U enrichment
- Burnable poisons, no chemical boron shim in coolant
- Full reactivity control using 69 control rod assemblies

3. Supply Chain

B&W's strategic supply goal is to grow additional North American (NA) supply base capabilities, and engage the supply base early in design phase by obtaining commercial commitments with an extensive network of suppliers. We have various material supply agreements currently in negotiation and we are finalizing vendor development activities required prior to issuing a purchase order to suppliers.

A second strategic goal is to achieve 100% NA content for mPower SMRs.

4. Manufacturing

B&W's manufacturing goal is to revitalize and leverage existing manufacturing capabilities for the supply of an mPower™ SMR. B&W has remained active in NA since the late 1970s producing all large NSSS components for Naval and commercial nuclear power applications. The following applies:

- Fabricating and assembling nuclear fuel-bearing components for the Naval nuclear propulsion systems
- Delivered more than 1,100 major NSSS components and pressure vessels, including more than 300 nuclear steam generators for commercial nuclear plants
- Nearly 2.6 million square feet of manufacturing space with ASME N-stamped accredited for the products
- Only NA fabricator of Research Reactors for DOE

A second manufacturing goal is to maximize manufacturing in a shop environment over the plant construction site. This will be achievable by minimizing field stick build to drive schedule, cost, and quality certainty. This allows a greater share of the work considered critical to deployment to be performed by a stable and experienced shop workforce.

A third manufacturing goal is to apply experience with modular manufacturing in the design.

In order to accomplish the above manufacturing goals, B&W is executing an integrated manufacturing strategy to involve manufacturing expertise early in the design stage. This includes manufacturing facilities and resources in 5 locations in the U.S. and Canada coordinated under one team focused on mPower™ SMR project. Integrated Manufacturing Teams (IMTs), comprised of representatives from Design, Manufacturing, Quality, Engineering and Project Management have been established at each site for their respective manufacturing scope. Supply Management is considered an integral part of Manufacturing Team, and the team liaises with Plant Design, Construction and various other resource groups within the corporation.

IMTs are focused on defining machine and facility needs, as well as establishing a list of development and qualification tasks required to ensure readiness from a manufacturing process perspective. Attention will also be given to pursue manufacturing technology advancements, and as well as defining steps required to establish and training a fabrication workforce to support the expected future work load. Effort will be made to define any and all gaps requiring attention prior to execution of the first SMR project.

Attention is being given to "Design for Manufacturability" and "Supply Chain for Manufacturability". This ensures involvement by Manufacturing personnel and key suppliers for their input early in the plant design phase, thereby reducing the risk of problems during the supply and manufacturing.

B&W also recognizes the importance of pursuing the following activities to improve performance of the SMR project execution:

- Stakeholder integration to obtain input from perspective customers
- Evaluate historical lessons learned to experience feedback
- Develop a thorough Risk Management process
- Utilize existing company support programs such as QAP, SCWE, CFSI, etc

5. Job Creation

Job creation opportunities to the year 2030 have been forecasted, but the information has not been published in the public domain.