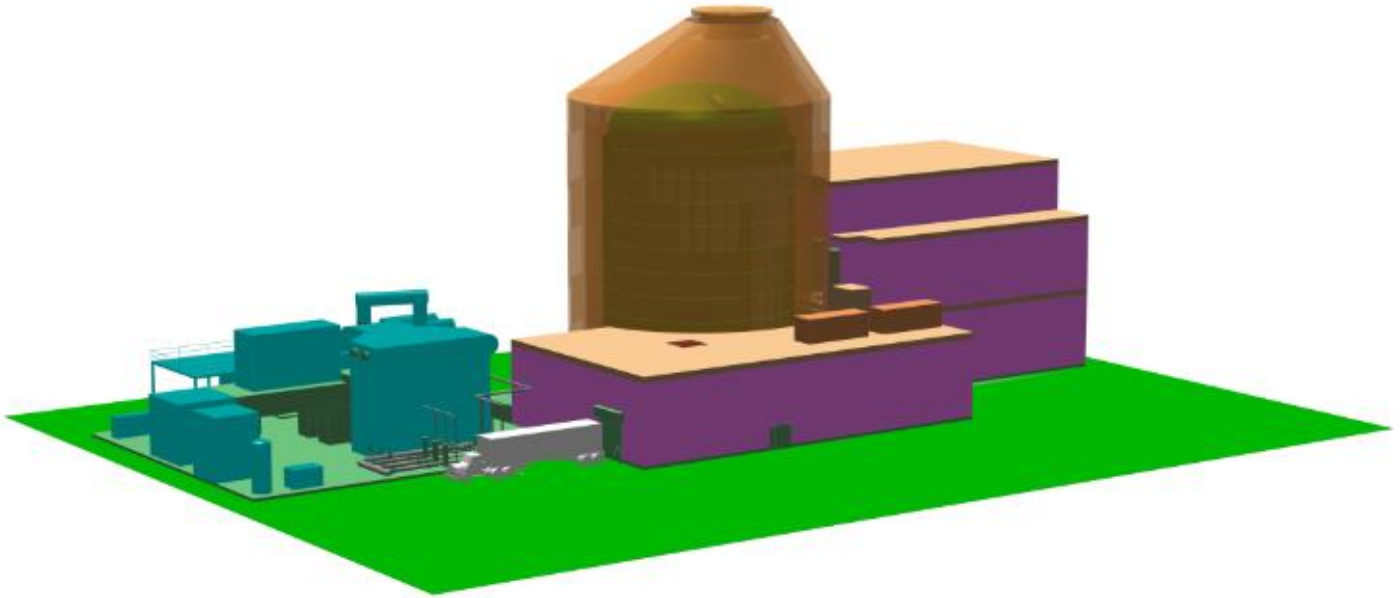
SMR-160

- SMR-160 is a unique power plant - offering an important and *immediate near and long-term solution and opportunity* for regional and nation state electric power needs



Innovative Features of SMR-160

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- A Passive Containment Cooling System integrates decay heat removal from the spent fuel pool and reactor core under off-normal conditions, including station blackout
- A unique Integrated Containment System provides **certain unlimited cooling for postulated transients and beyond design basis accidents**, with robust protection against natural disasters (flood, wind, storm) and man-made attacks (aircraft and missiles)
- A large inventory of water around and over the reactor core, with a gravity driven water replenishment system, **makes the scenario of an uncovered reactor core non-credible**
- Easy access to critical reactor system components for in-service inspection and testing in compliance with the ASME Code – unlike some other iPWR SMRs; and readily reconciled to other similar international Codes (as regards design, fabrication and testing requirements)
- No penetrations in the lower region of the Reactor Vessel; hence no pathway for inadvertent or accidental drainage of reactor water
- Absence of boric acid in the plant helps increase the plant's service life (longevity) and economics
- **Reduced security concerns and costs and enhanced safety**, with a tiny volume of irradiated fuel in the plant (all inside containment) and on-site *underground* storage of used fuel in welded multi-purpose canisters – **included in base plant design and cost**

A better plant design…

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- **Licensable**
  - No regulatory exemptions (meets *all* U.S. General Design Criteria (10CFR50.AppA)), no new materials, no unqualified operating components or concepts
- **Fabricable**
  - From Conceptual through Detailed Design, Holtec employs an iterative controlled process for development of the product design, concluding with detailed fabrication instructions in the form of specifications, procedures, and drawings
- **Shippable**
  - Largest components and systems designed for practical manufacture and large transports
- **Inspectable**
  - Easy assembly and disassembly of vessels and equipment; no new inspection techniques or criteria needed to license, construct or operate
- **Maintainable**
  - Ease of access to all equipment inside containment - Rx/SG equipment, valves, CRDMs, penetrations
- **Securable**
  - Smallest inventory of nuclear fuel elements in any LLWR or SMR plant – all inside containment or UMAX, dramatically reducing offsite dose and security threats, concerns, costs
- **Affordable**
  - Less than half the capital cost per MWe of LLWRs
  - Easy assembly and disassembly of vessels and equipment, containment and BOP for ease of decommissioning

Reactor Coolant System

Integrated Reactor Pressure Vessel (RPV) and Steam Generator (SG)

Simple, practical Integral natural circulation PWR (iPWR)

- No reactor coolant pumps

Offset Design

- Direct access to the Core for refueling and inspection without disassembly of the Reactor Coolant System

Vessel to vessel connection

- Eliminates hot/cold leg piping – no large break LOCA

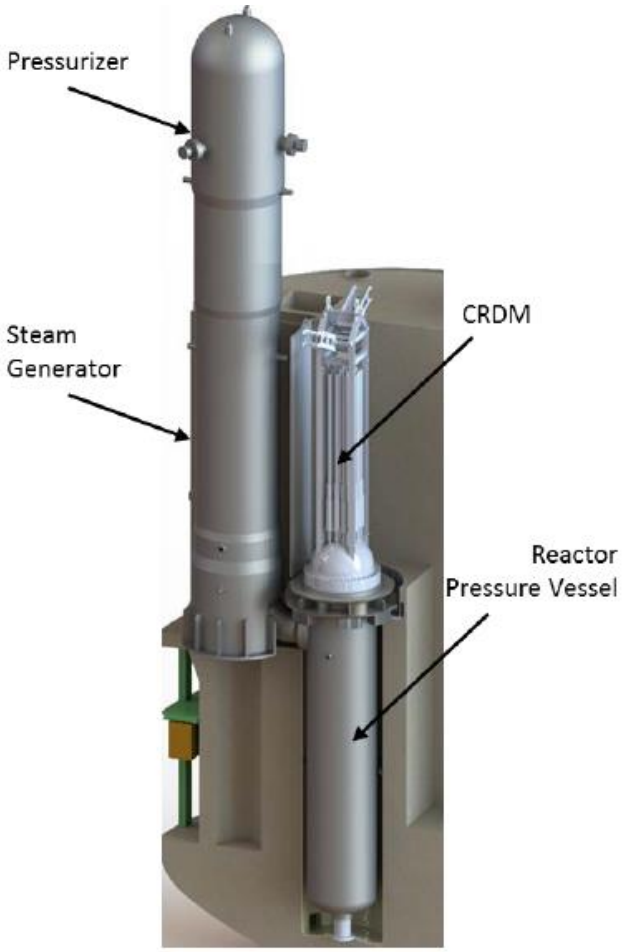
Simplified RPV penetrations and connections

- Safe and simple to operate and maintain
- A large inventory of water always over the reactor core with a gravity driven coolant system makes an uncovered reactor core accident non-credible

Dependable, optimal external Control Rod Drive Mechanisms

- Absence of boric acid in the plant helps increase the plant's service life and dramatically improves economics

Easy access for SG inspection and maintenance, with an Integral Pressurizer



Essential SMR-160 Plant Data

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- Nominal electric power output: 160 MW(e)
- Reactor thermal power: 525 MW(t)
- Reactor coolant inlet temperature: 384.5°F
- Reactor coolant outlet temperature: 600.0°F
- Reactor coolant flow rate: 7.1 Mlb/hr
- Steam generation rate: 1.55 Mlb/hr
- Cycle steam pressure and superheat: 335 psia, 167.4°F
- Refueling cycle length: 18-24 mths

General Design Characteristics

- Net electrical power is 160 MWe (525 MWth)
- Core is designed for an 18 to 24 month refueling cycle using currently licensed LWR fuel technology
- No soluble poisons (boron) are used for reactivity control during normal operations
- The plant is designed to accept a 100 percent load reduction without a reactor trip or operation of the primary or secondary safety relief valves
- 80 year plant design life without replacement of the reactor pressure vessel
- Spent fuel stored inside containment
- U-MAXX interim dry fuel storage facility

General Design Characteristics

- The design, layout, operation and fuel management solution of the plant has taken security design considerations into account to minimize security force requirements
- Proven plant controls – uses NRC-approved MELTAC I&C system
- 72 hour Station Blackout (electrical) coping period with unlimited passive cooling duration
- Safety divisions rely on 1E battery power vs. Class 1E generators - only lower voltage (<250 V) safety actuations required
- Non-safety, onsite standby AC generators are available to provide power to safe shutdown systems in response to a loss of generator and offsite power
- Redundant and anticipatory trips are provided for different classes of accidents

Major Design Features

- Natural Circulation – eliminates reactor coolant pumps and associated RCP costs, maintenance, transients, trips
- Robust Integrated Containment System with unlimited passive fuel cooling – reactor and spent fuel pool
- Small volume of irradiated nuclear fuel within facility, with integrated interim underground spent fuel storage
- Large Pressurizer – Eliminates PORVs
- No alarms for design basis transients
- No large bore RCS piping – SG connects directly to RPV
- Top mounted in-core detectors and control rod drives
- Ring forged reactor vessel

Major Design Features

- Overall design simplicity and reduced number of components
- Modular construction - simpler and shorter construction time
- Passive safety systems: – No reliance on AC power for safety injection and heat removal
- Automatic response to accidents
- Non-safety AC backup systems
- Autocatalytic hydrogen recombiners
- Control room habitability system
- Proven microprocessor-based protection and control