





AREVA HTR CONCEPT FOR NEAR-TERM DEPLOYMENT

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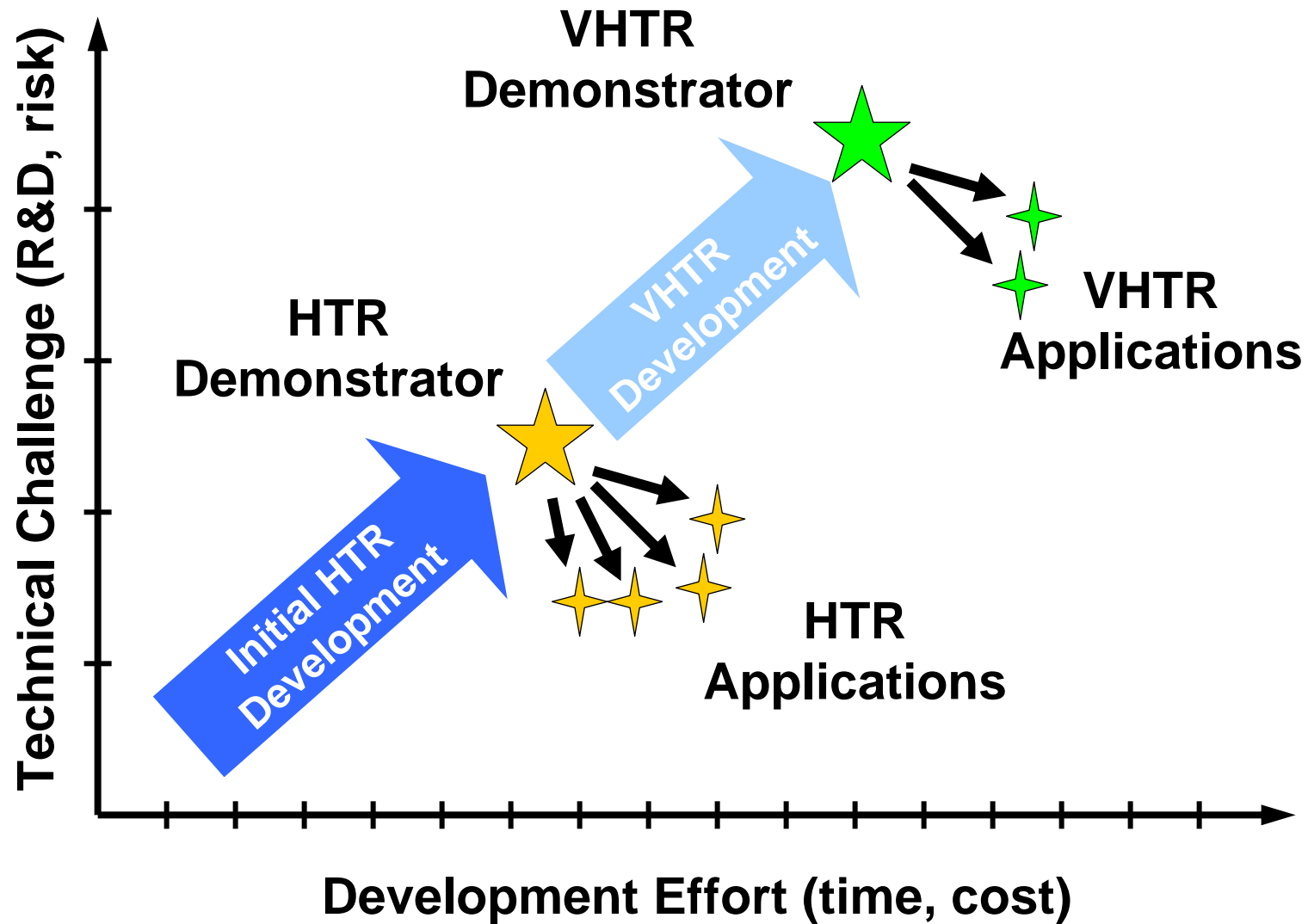


Motivation for Near-Term HTR Deployment



- ▶ Existing LWR technology is not well suited to non-electric energy markets
- ▶ Process heat and transportation fuel sectors completely dependent on fossil fuels
 - ◆ Environmental concerns
 - ◆ Security of supply
 - ◆ Price volatility
- ▶ Near-term deployment allows these needs to be addressed more rapidly
- ▶ Process heat users have relatively short planning horizons
 - ◆ Near-term concepts more readily accepted

Near-Term HTR Supports Early Market Penetration and Future Enhancements



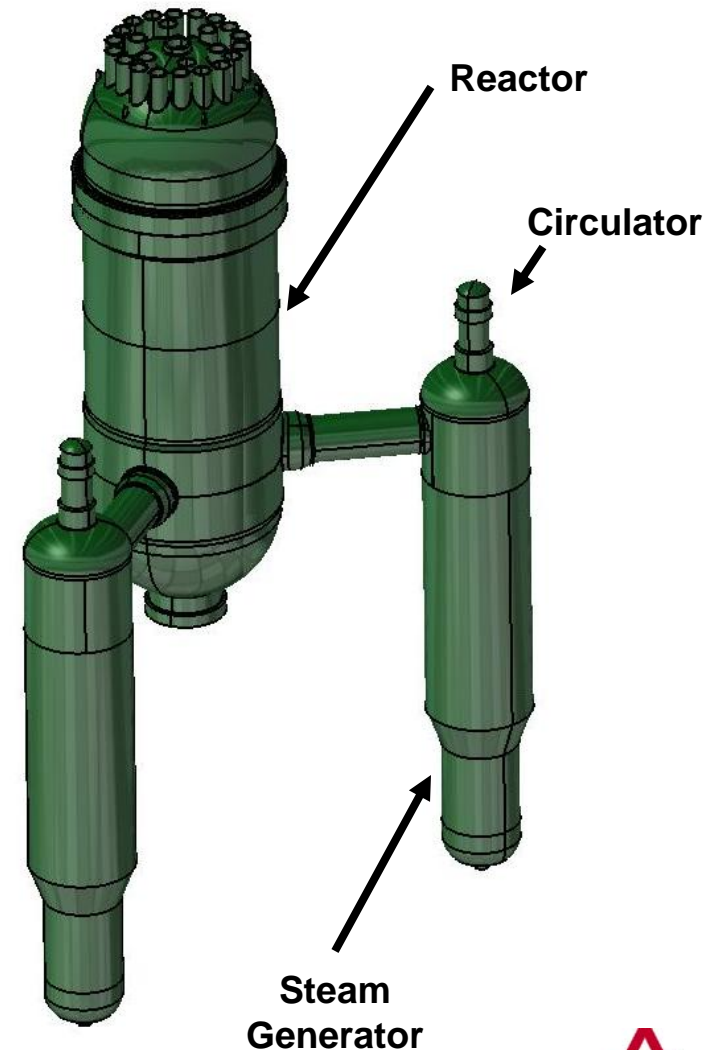
Risk Partitioned Between Near-Term and Long-Term Phases



Required Development	Steam Cycle	Future VHTR
Fuel Qualification	X	
HTR Siting	X	
HTR Licensing	X	
Process Interface Issues	X	
Safety Case Validation	X	
Very High Temperature Materials (metals, ceramics)		X
High temperature fuel		X
IHX development		X
Very high temperature process interface		X

Key Features of AREVA Near-Term HTR

- ▶ Prismatic block annular core
- ▶ Conventional steam cycle
- ▶ Modular reactors
- ▶ Inherent safety characteristics
 - ◆ Passive decay heat removal
 - ◆ Large thermal inertia
 - ◆ Negative reactivity feedback
- ▶ Minimal reliance on active safety systems
- ▶ Sized to minimize steam production cost
- ▶ Fully embedded reactor building
 - ◆ Partially embedded alternative possible

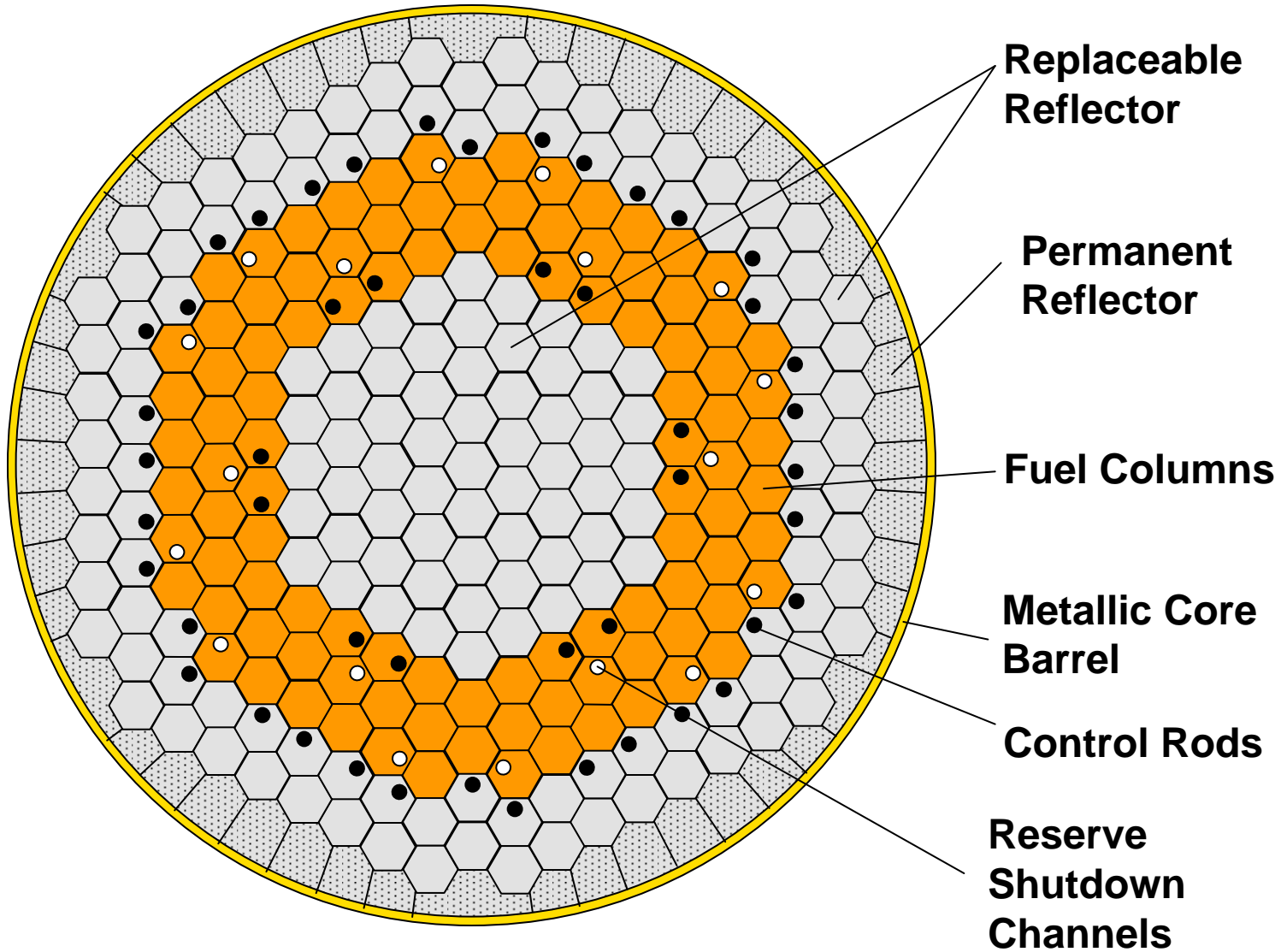


Nominal Operating Parameters



Fuel type	TRISO particle
Core geometry	102 column annular 10 block high
Reactor power	625 MWt
Reactor outlet temperature	750°C
Reactor inlet temperature	325°C
Primary coolant pressure	6 MPa
Vessel Material	SA 508/533
Number of loops	2
Steam generator power	315 MWt (each)
Main circulator power	4 MWe (each)
Main steam temperature	566°C
Main steam pressure	16.7 MPa

Annular Core Arrangement



Cooling Systems Optimized for Reliability, Safety



▶ Main heat transport system

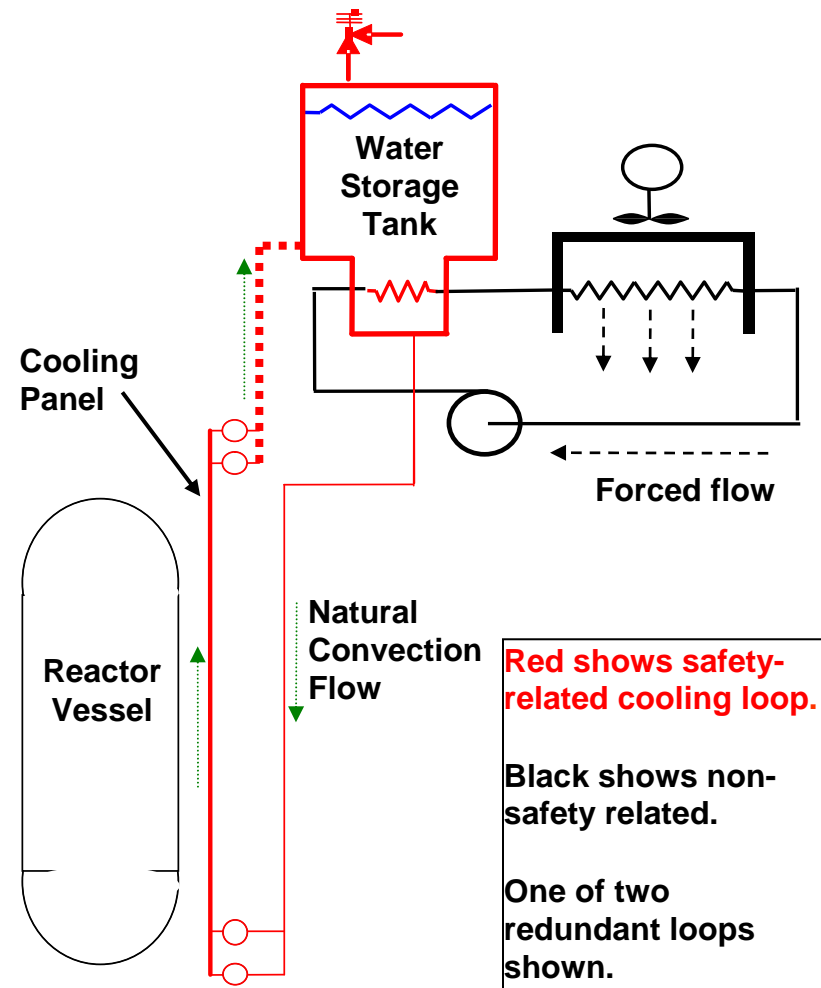
- ◆ Established helical coil steam generator technology
- ◆ Electric motor circulator with magnetic bearings

▶ Shutdown cooling system

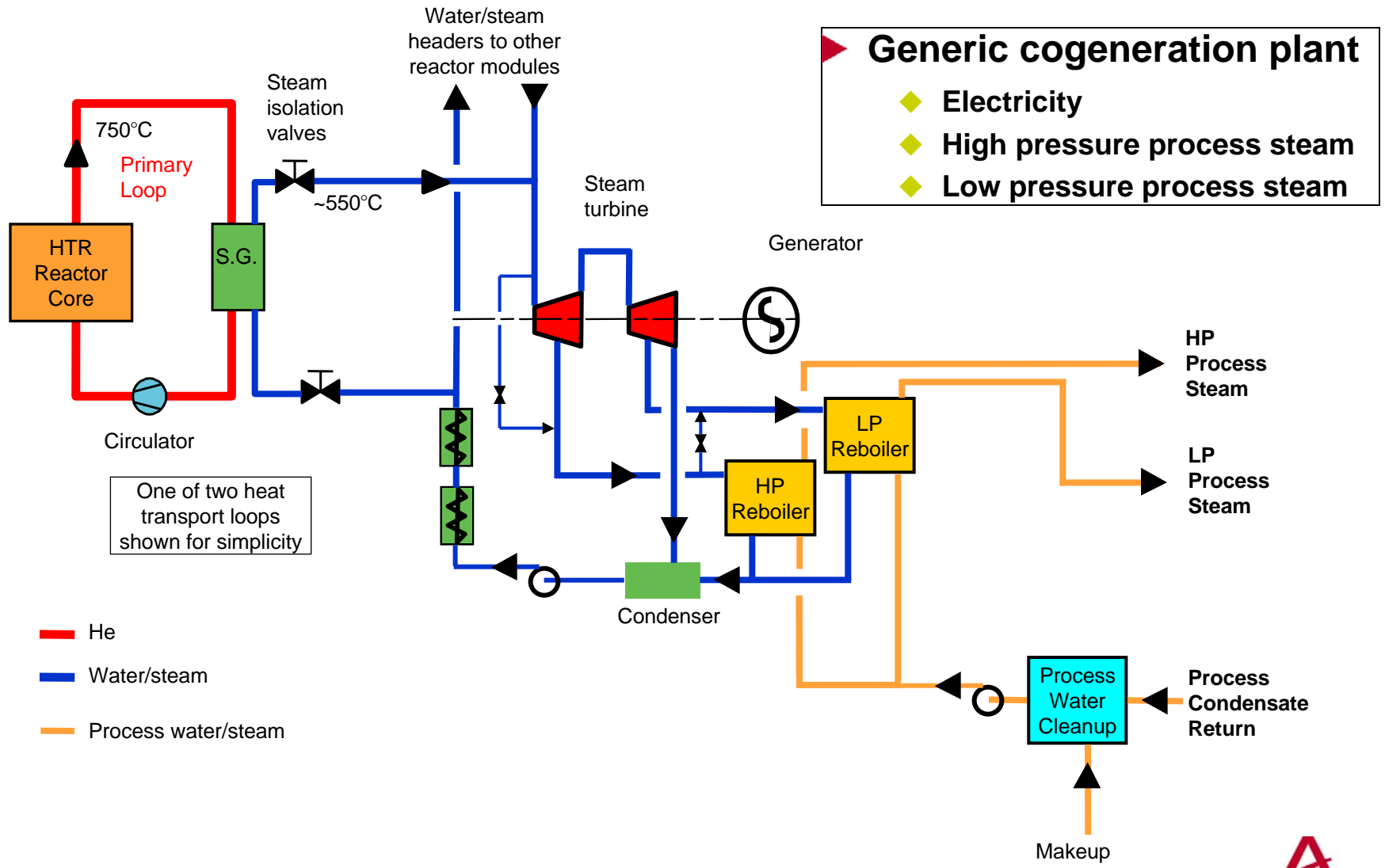
- ◆ Active system
- ◆ Maximizes plant availability
 - Maintenance
 - Rapid accident recovery

▶ Reactor cavity cooling system

- ◆ Safety related heat removal system
- ◆ Passive cooling of vessel and surrounding cavity (operates continuously – safety-related)
- ◆ Active cooling of water storage tank during normal operation (non-safety)



Single Reactor Module Design Supports Many Applications



AREVA HTR Concept Combines Past Experience and Recent Developments



- ▶ **Steam cycle builds directly on the experience from past operating HTRs**
- ▶ **Incorporates safety characteristics of recent modular HTR concepts**
- ▶ **Prismatic block reactor is based on AREVA's ANTARES concept**
- ▶ **Minimizes need for advanced materials development**
- ▶ **Components technology well understood**
- ▶ **Based on current fuel development programs**

Summary



- ▶ **Near-term HTR deployment needed to reduce process heat dependence on fossil fuels**
- ▶ **AREVA HTR concept**
 - ◆ **Annular prismatic block core**
 - ◆ **Conventional steam cycle**
 - ◆ **Two loops**
 - ◆ **625 MWt reactor module for economic steam supply**
 - ◆ **Passive safety characteristics**
- ▶ **Near-term focus on steam cycle concept improves risk management**
- ▶ **Minimizes technology development needs**
- ▶ **Flexibility supports variety of process heat, electricity and cogeneration applications**

