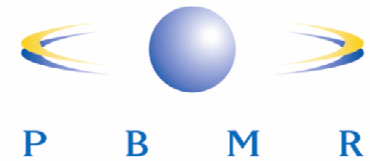


PBMR CONTAINMENT DESIGN PHILOSOPHY

Presented at NRC Workshop on Options for Non-LWR
Containment Functional Performance
January 14, 2004

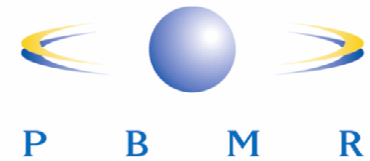
Edward G. Wallace
Sr. General Manager – US Programs
PBMR Pty LTD

PBMR Module Building Design Functions



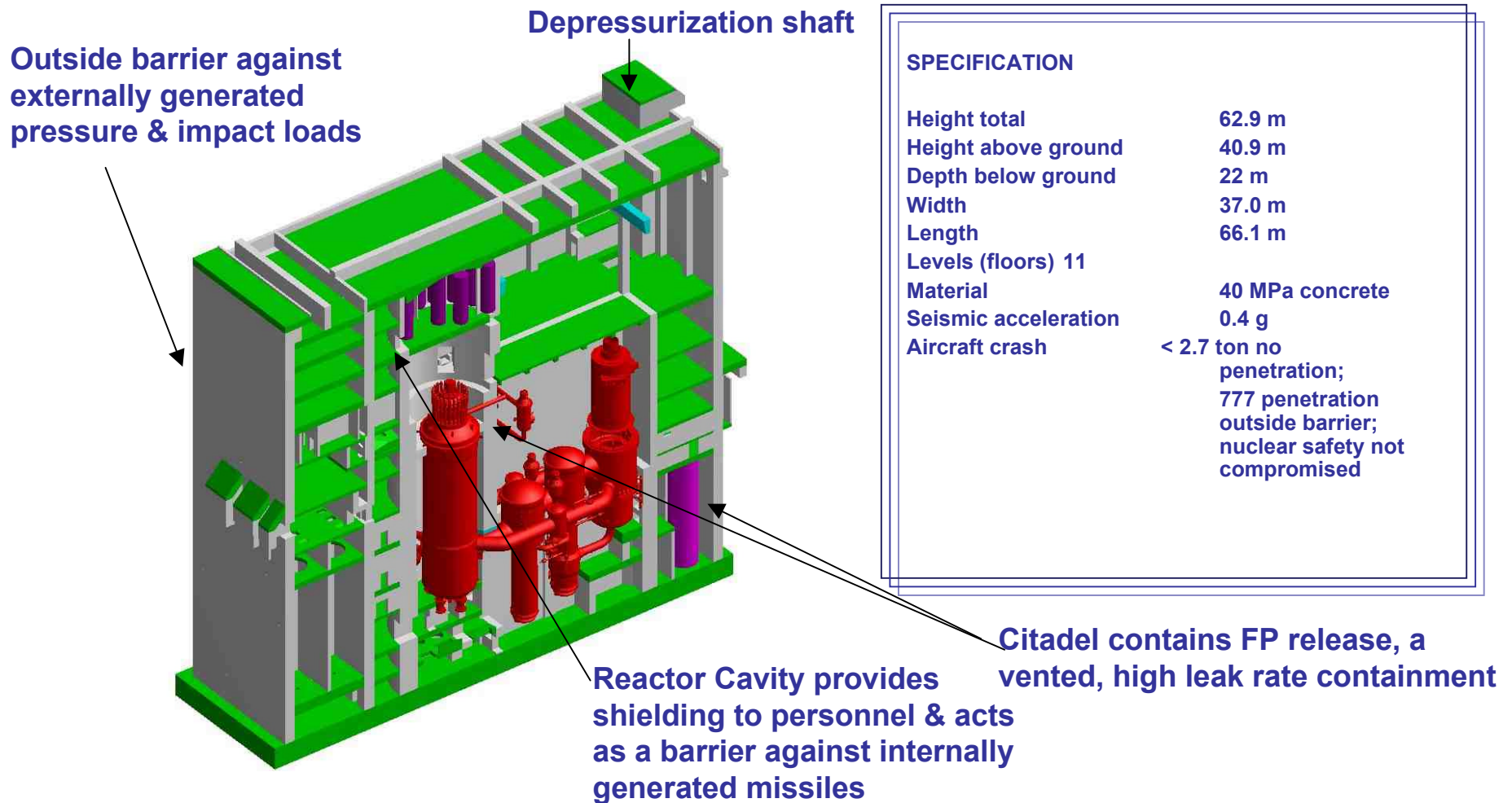
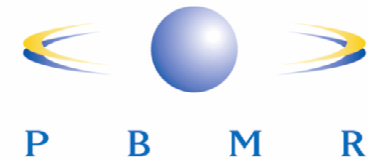
- Maintain Core Geometry
- Passive Reactor Heat Sink
- Fission Product Control
 - Normal Operations and Anticipated Occurrences
 - Accident Conditions
- Internal / External Event Hazard Protection
- Operator Radiological Protection
- Physical Security

Reference Regulatory Positions

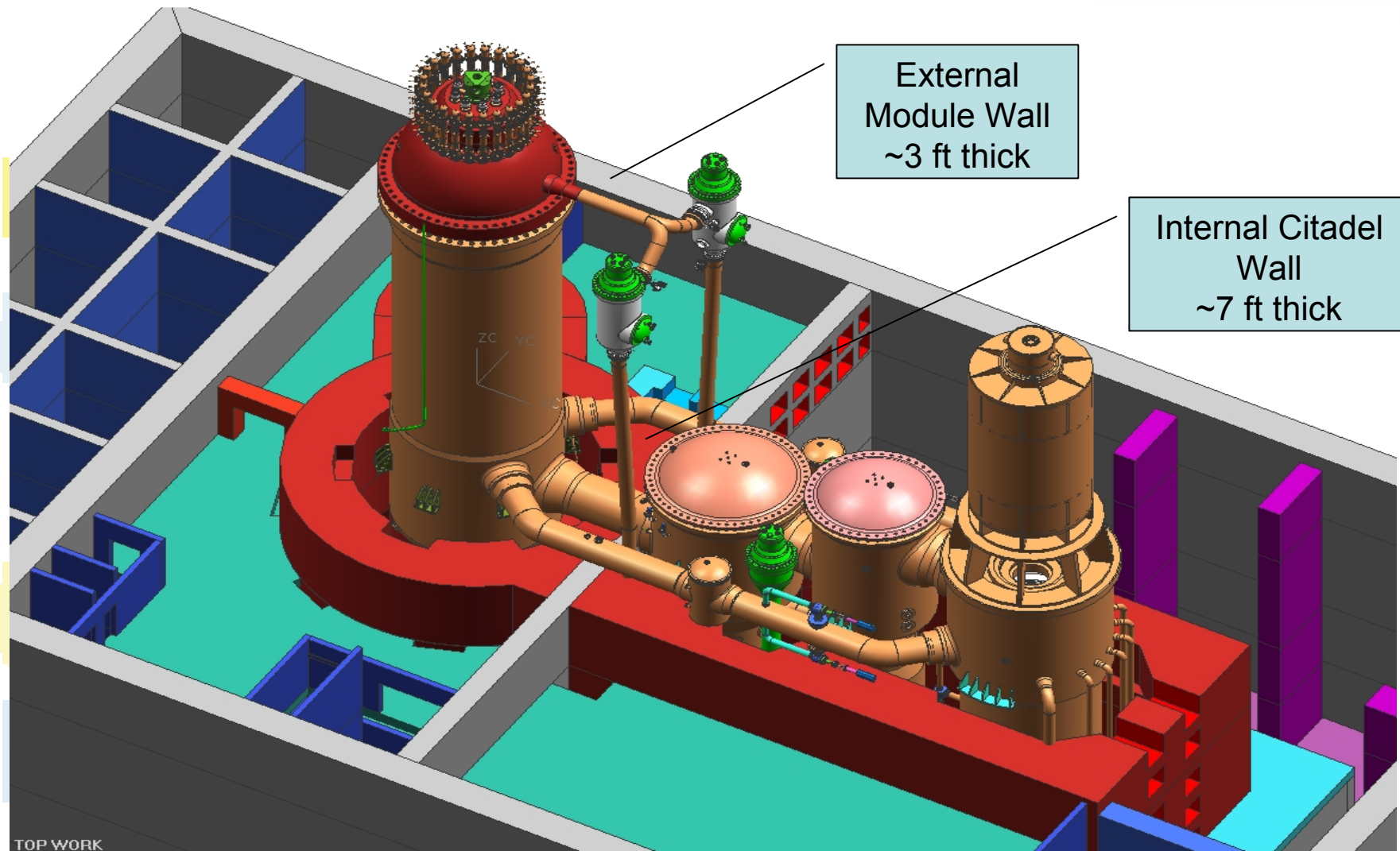


- South African NNR Public and Operator Safety Requirements
- US NRC Policy Statements for Advanced Reactors
 - Advanced Reactor Policy
 - SRM to SECY 93-092
 - SECY 95-299
 - Severe Accident Policy Statement

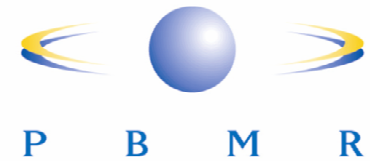
PBMR CONTAINMENT DESIGN OVERVIEW



Current PBMR Design



DLOFC Event Groups



- Small Breaks (<10mm)
 - Release of normal circulating activity contained within building and filtered via HVAC
- Medium Breaks (<65mm)
 - Release of normal circulating activity to environment during blowdown via vent path
 - Building resealed following pressure relief and recirculating ventilation restored
- Large Breaks (>65mm)
 - Release of normal circulating activity to environment
 - Resealing not immediate; peak temperatures <1600°C limit fission product source term

Regulatory Considerations



- Mechanistic Fission Product Source Terms appropriate for PBMR considering:
 - High level of fuel integrity
 - Slow, long response time characteristic of passive, integrated reactor systems
 - Limited fraction of core experiencing elevated accident temperatures
 - Opportunity for taking remedial manual actions well before peak temperatures reached (> 48 hours)
 - Absence of “cliff edge” fission product release effects
- Venting Containment removes transport mechanism for fission products and allows ventilation restoration, both actions enhancing public safety
- Preliminary conservative results well within regulatory limits
- Existing operating experience supports use of realistic margins
- Economic impact of more costly low leakage design not offset by increase in safety

Conclusions



- Functional requirements of Containment / Confinement vary by plant type / design
- PBMR design is quite robust
- Public better served by filtered/vented containment for PBMR design
- Mechanistic source terms appropriate for PBMR and enable enhanced safety through passive features
- PBMR design capable of meeting safety goals