

YUCCA
MOUNTAIN
PROJECT

Studies

Repository Design and Operations

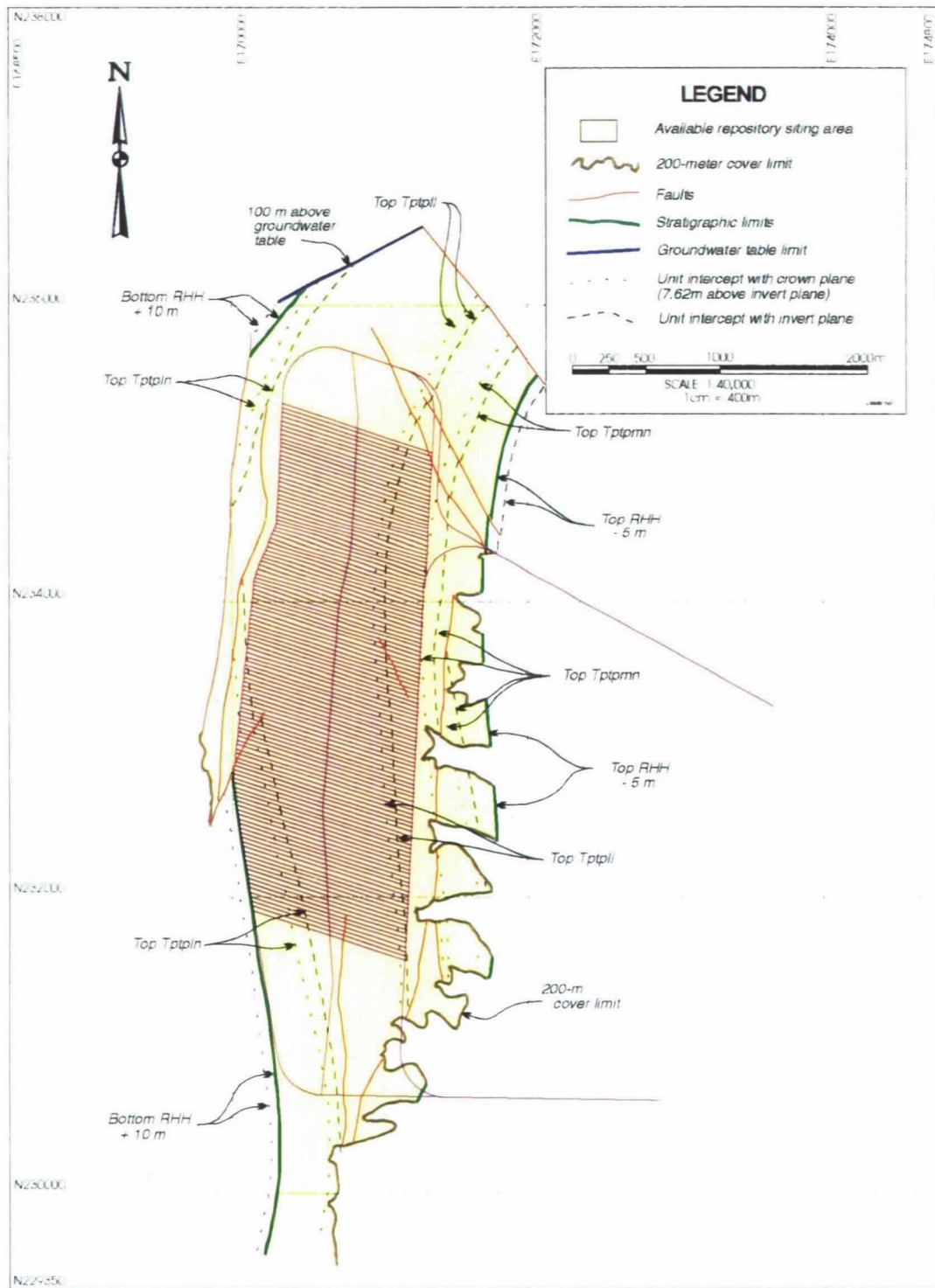
Presented to:
Nuclear Waste Technical Review Board

Presented by:
Richard D. Snell
Operations Manager, Engineering and Integration
Management and Operating Contractor
Las Vegas, Nevada



U.S. Department of Energy
Office of Civilian Radioactive
Waste Management

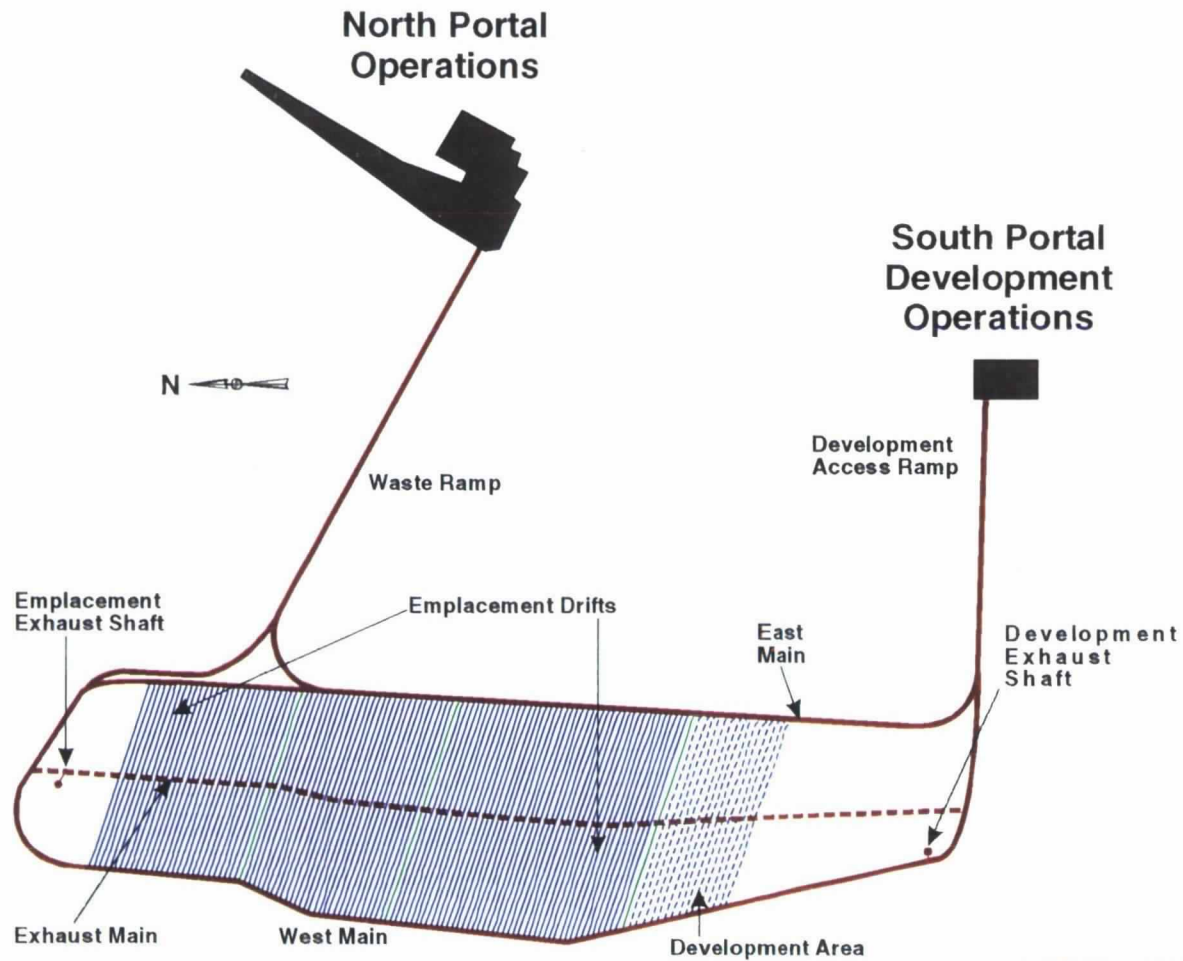
June 25-26, 1997



NEWLMC CDR VAC TRW.6 23/97

Available repository siting area

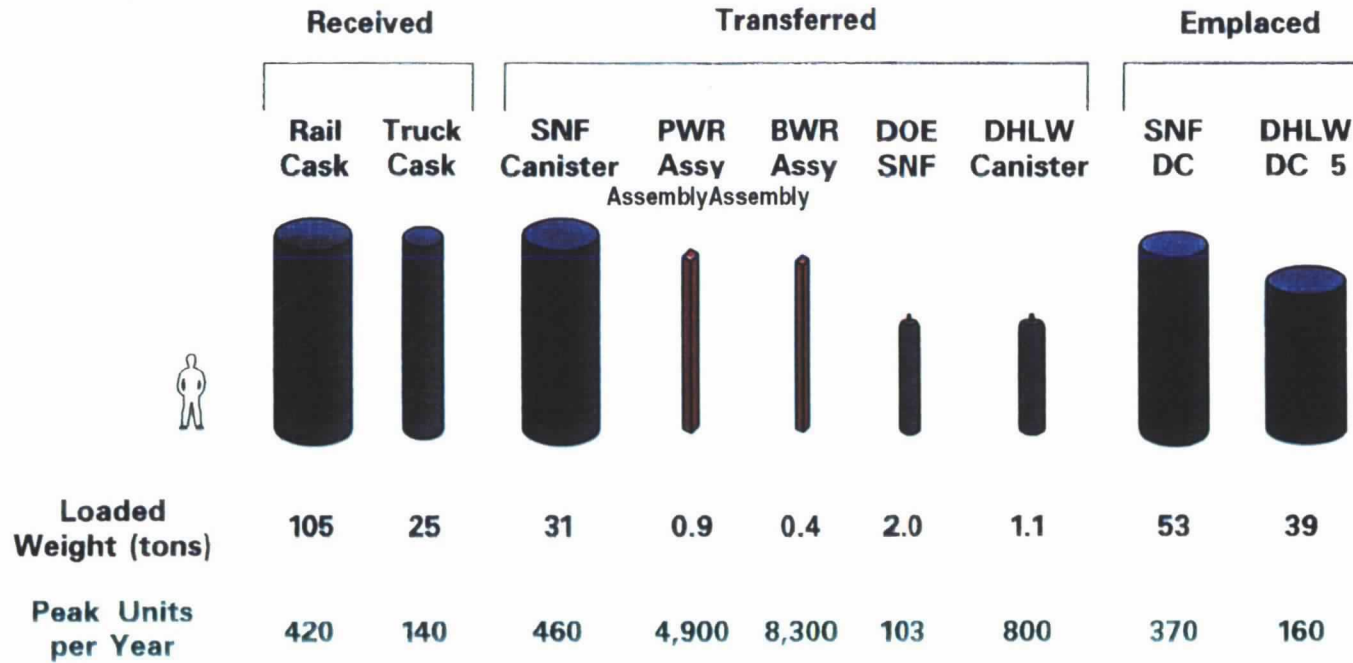
Repository Operations Areas



REPOSTRW CDR 129 TRW/6-3-97

Receipt

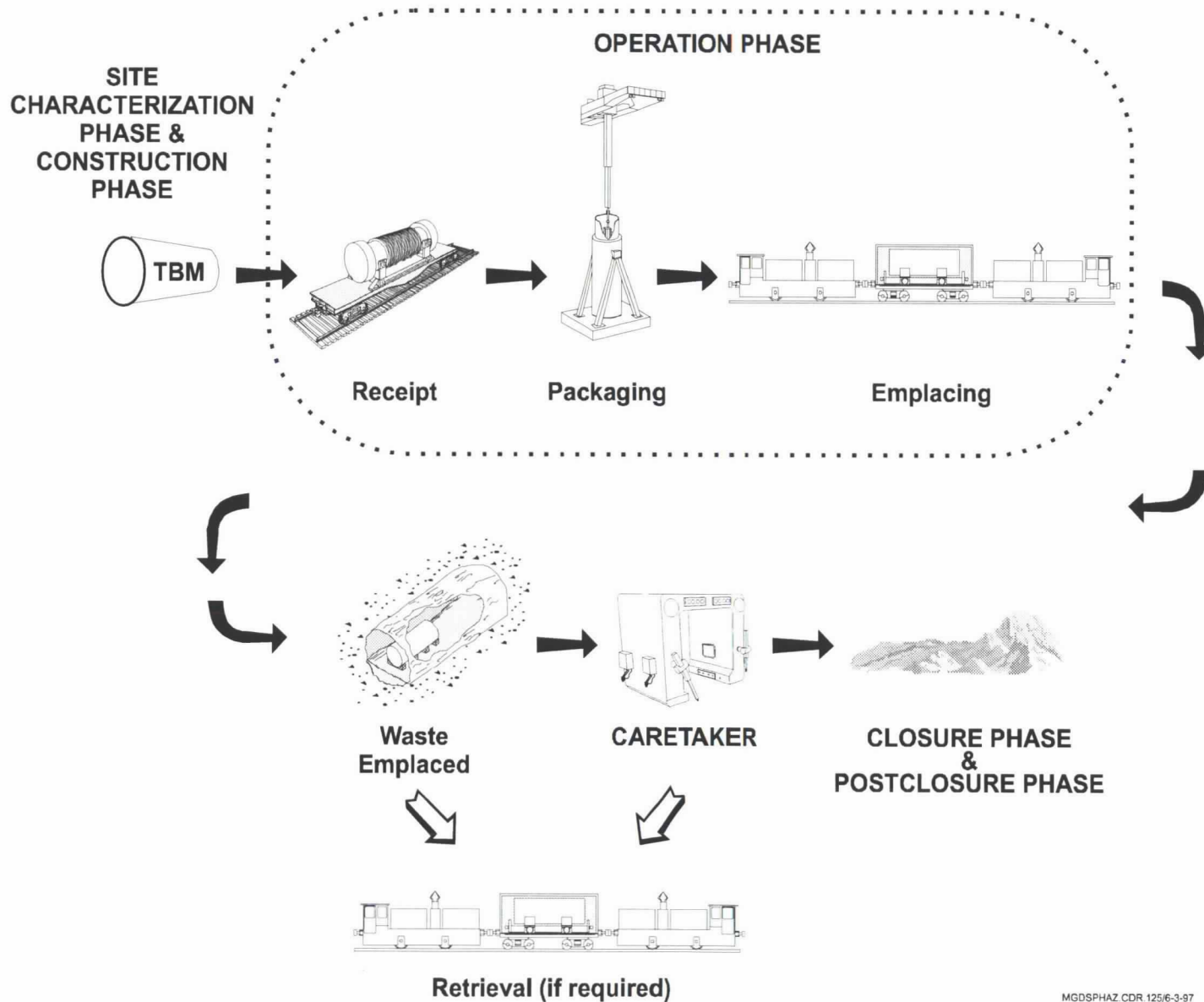
Representative Waste Form Data



BWR Boiling Water Reactor
 DC Disposal Container
 DC 5 5 Pack DOE Center

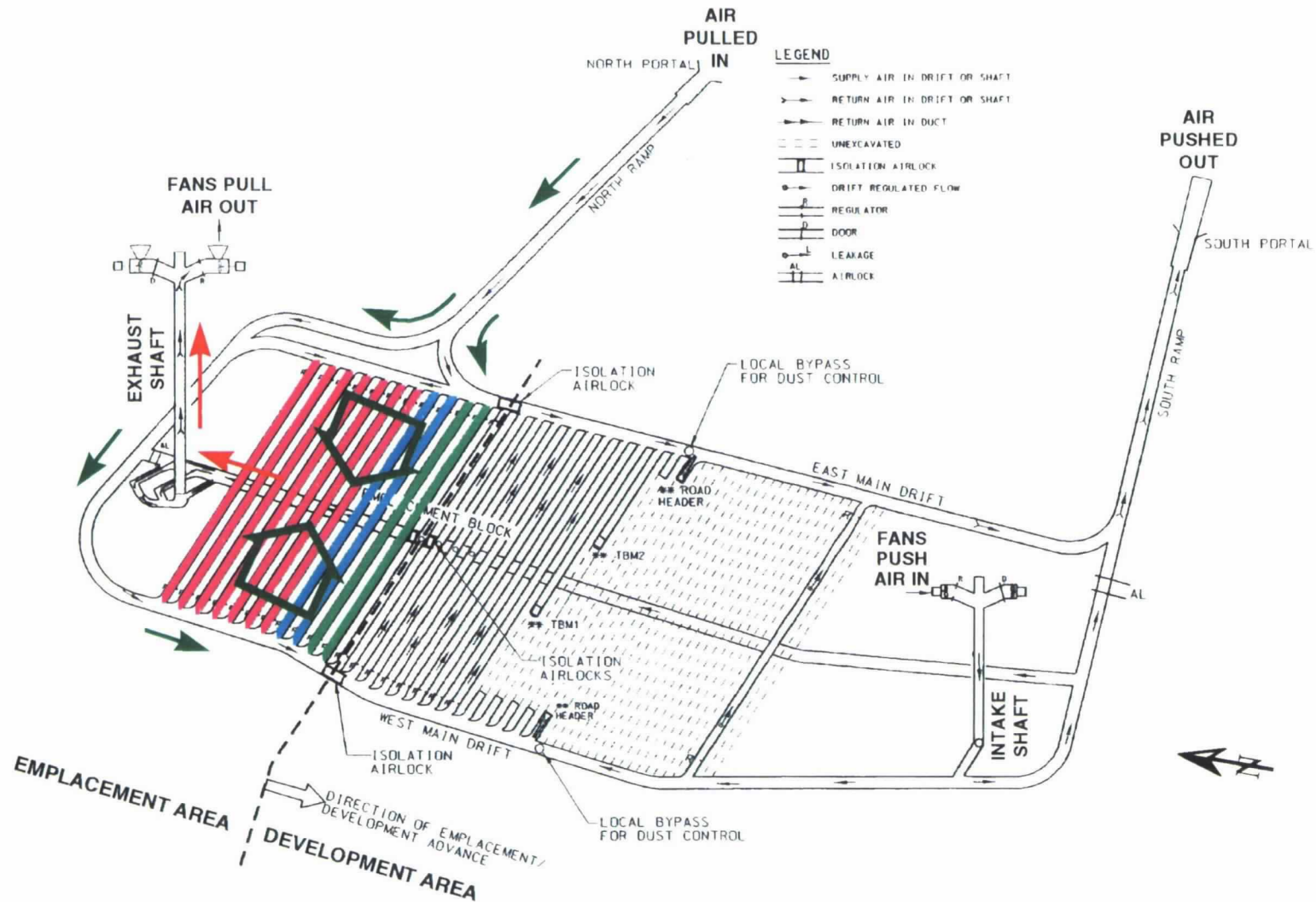
DHLW Defense High-Level Waste
 PWR Pressurized Water Reactor
 SNF Spent Nuclear Fuel

Base Repository Operations

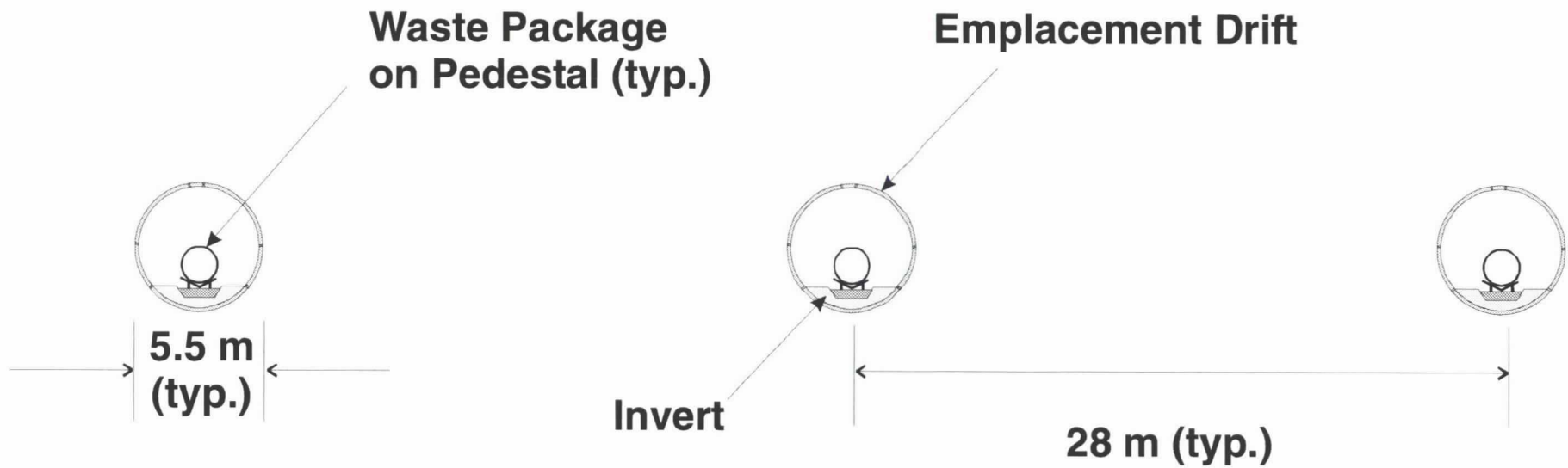


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Typical Ventilation Balance

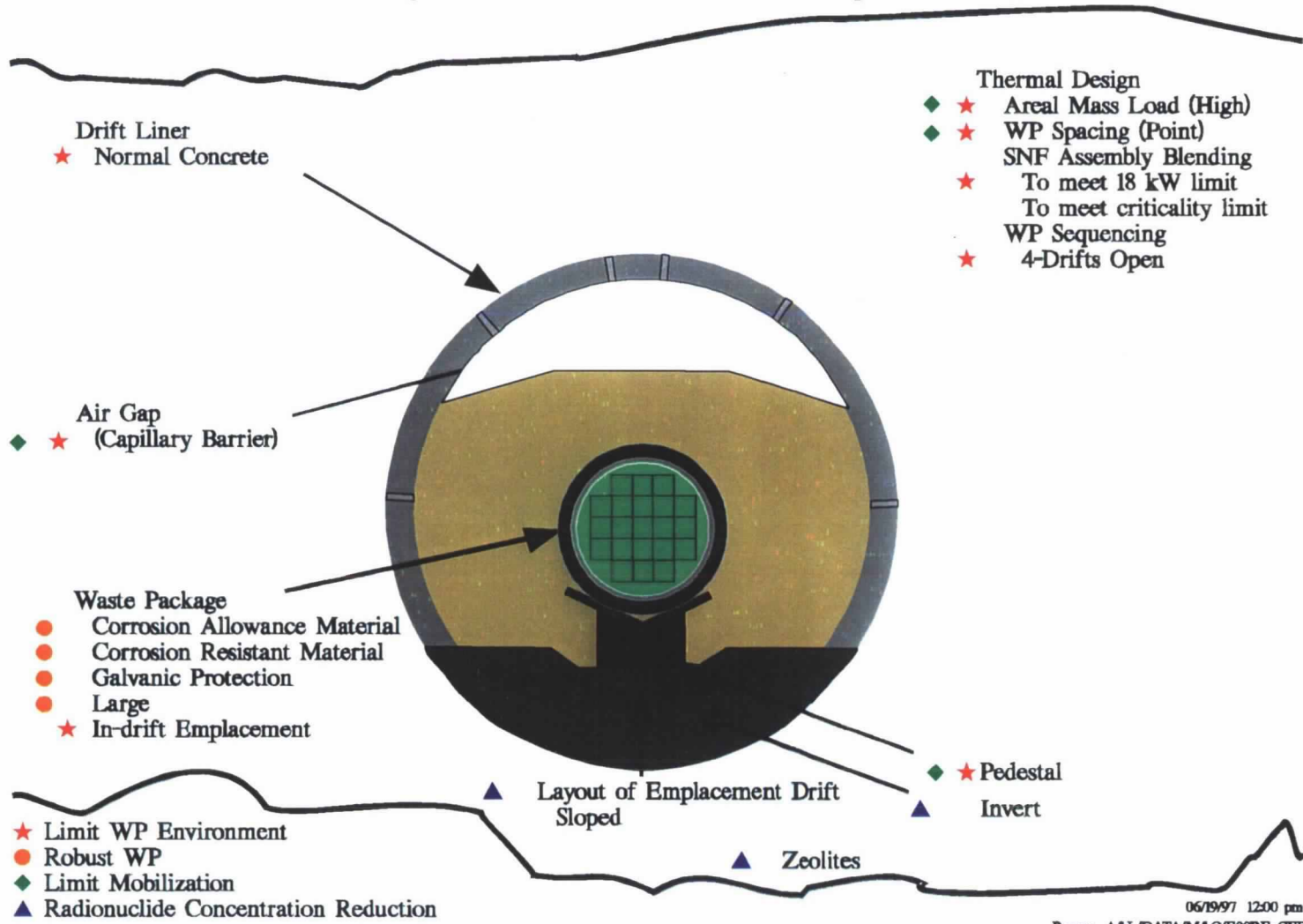


Partial Repository Section



REPSECT.CDR.121.RDD/6-17-97

Design Options for Waste Isolation (Reference Case)



Engineered Barrier System (EBS)

- **What must the EBS do?**
 - **Work in concert with the natural barriers so the repository meets performance requirements**
 - **Be configured to provide “Defense-in-Depth”**
 - **Be explainable and defensible by analysis and test for NRC licensing**

Engineered Barrier System (EBS)

(Continued)

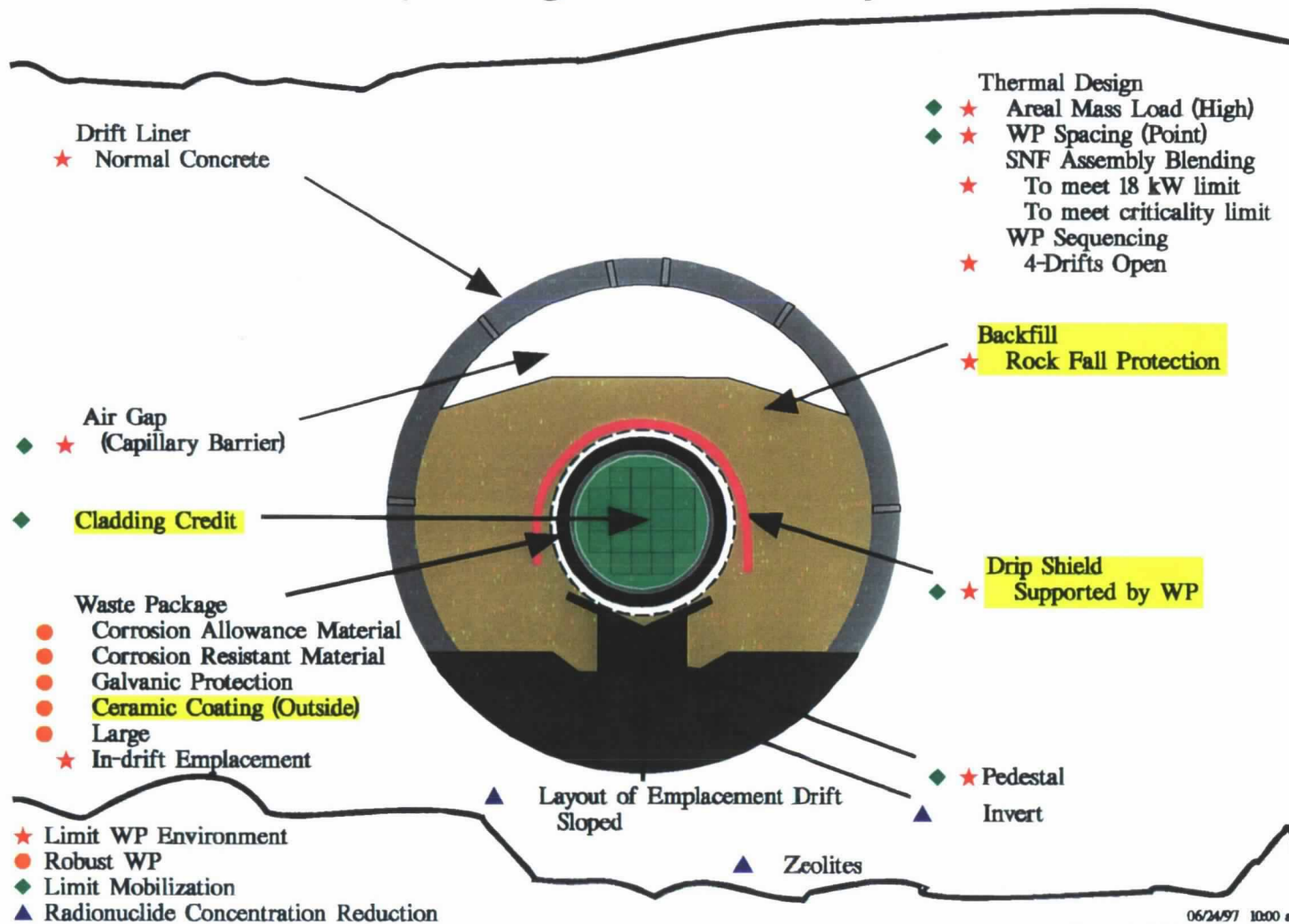
- **What is the strategy for developing the EBS?**
 - **Develop a set of operating and bounding conditions which are expected over the life of the Repository (e.g., water quantities and flow conditions in the mountain)**
 - **Identify, and characterize, a family of EBS design features that could be employed in the repository**
 - **Use Performance Assessment (PA) sensitivity studies to perform evaluations of the overall performance of the repository (using combinations of the EBS features) against the performance requirements**

Engineered Barrier System (EBS)

(Continued)

- **Evaluate percolation flux -- current considerations**
 - Percolation flux (1 -15 mm/yr; $6 \pm$ mm/yr average)
 - Climate changes (30 mm/yr)
 - Variability in percolation flux distribution; focused flows
 - Episodic behavior
- **Evaluate seepage into emplacement drifts**
- **Develop EBS features and evaluate performance/cost**
 - Includes interactions between site, PA, and design, and is an iterative process

Design Options for Waste Isolation (Design Features)



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EBS Performance Over Time

- **Other (non-CRWMS) test and empirical data**
- **Natural analogs**
- **Effective use of test programs**
- **Laboratory Materials Tests**
- **Drift Scale Test (In-Drift; Near Field)**
- **Performance Confirmation program data**
 - **Emplacement Drift Liner**
 - **Waste Package/EBS**
 - **In-Drift Environment**
 - **Near-Field Environment**
 - **Far-Field Environment**