

YUCCA
MOUNTAIN
PROJECT

Studies

East-West Tunnel Crossing the Repository Block: Recommended Studies and their Objectives

Presented to:
Nuclear Waste Technical Review Board

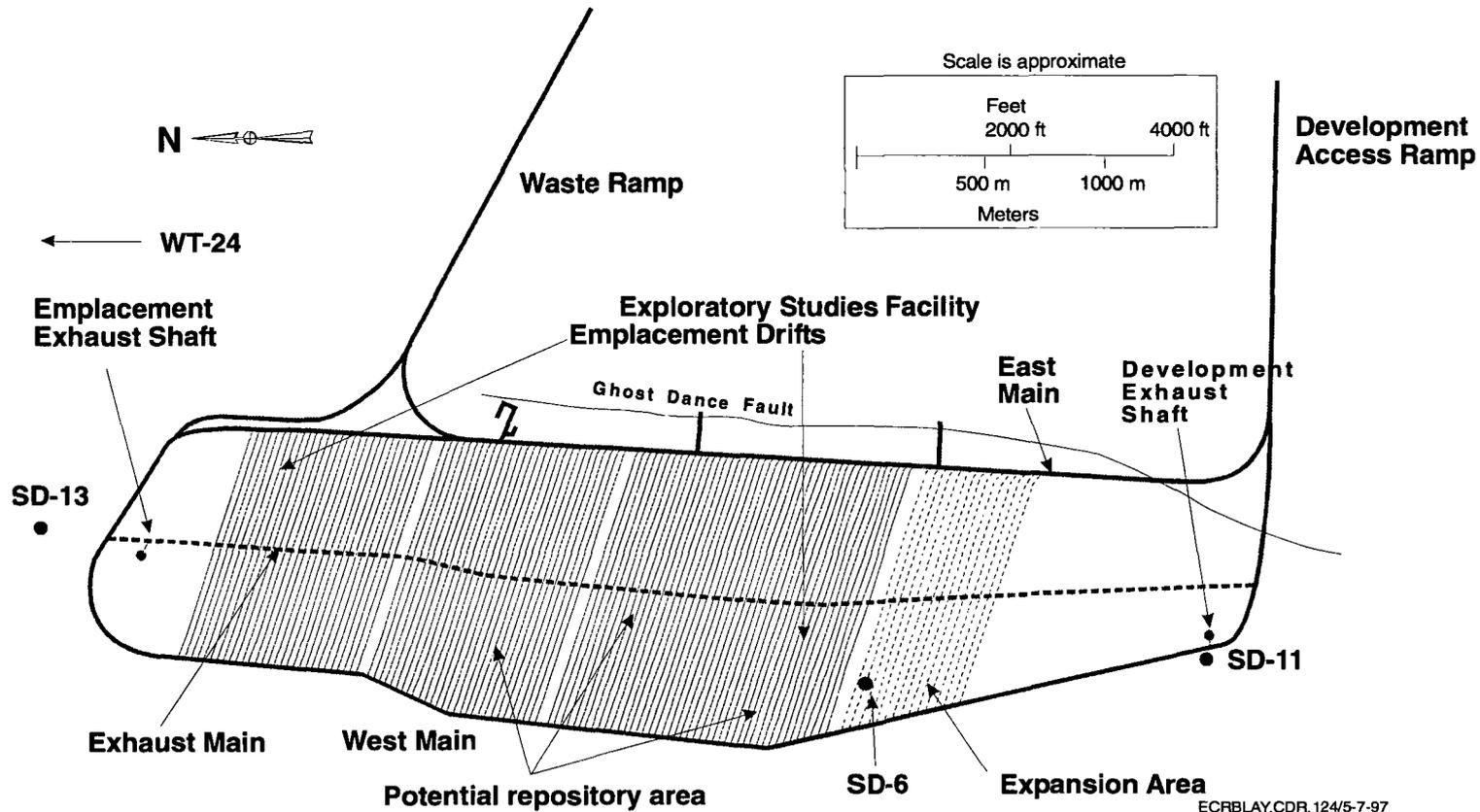
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Las Vegas, Nevada

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

Preliminary East-West Drift Layout - - Recommended



Borehole locations are approximations for illustration only

Testing to Support Design/Construction

- **Monitoring construction water usage and ventilation impacts**
- **Evaluation of dust suppression strategies**
- **Mapping fracture distribution, frequency, and physical attributes**
- **Investigation of footwall deformation of the Solitario Canyon Fault**
- **Characterization of hazardous mineral distributions**
- **Location of basal vitrophyre of the Topopah Spring formation**
- **Predict geologic features of engineering and construction significance, and anticipated ground conditions**

Testing to Support Hydrologic Model

- **Saturation profiles and hydrologic properties from surface boreholes**
- **Niche and alcove studies to characterize percolation flux, seepage into drifts, and fracture-matrix interactions**
- **Saturation and water potential measurement from the crossdrift to characterize the spatial variability of percolation flux**
- **Characterization of environmental isotope distributions and fracture fillings to evaluate flow pathways**

Testing to Support Hydrologic Model

(Continued)

- **Boreholes in the crossdrift to evaluate tracer migration rates**
- **Characterize the hydrologic properties of the Solitario Canyon fault**
- **Testing of any perched water encountered in surface boreholes**
- **Predict ambient moisture, gas, heat, and geochemical conditions along the recommended crossdrift using the calibrated 3-D site scale UZ flow model**

Reducing Hydrologic Uncertainties

- **Characterizing percolation of water at the repository horizon in different host rock units**
- **Characterizing effects, at depth, of varying surface infiltration rates**
- **Characterizing seepage into drifts through *in situ* testing in niches**
- **Characterizing movement of water below drift inverts**

Reducing Hydrologic Uncertainties

(Continued)

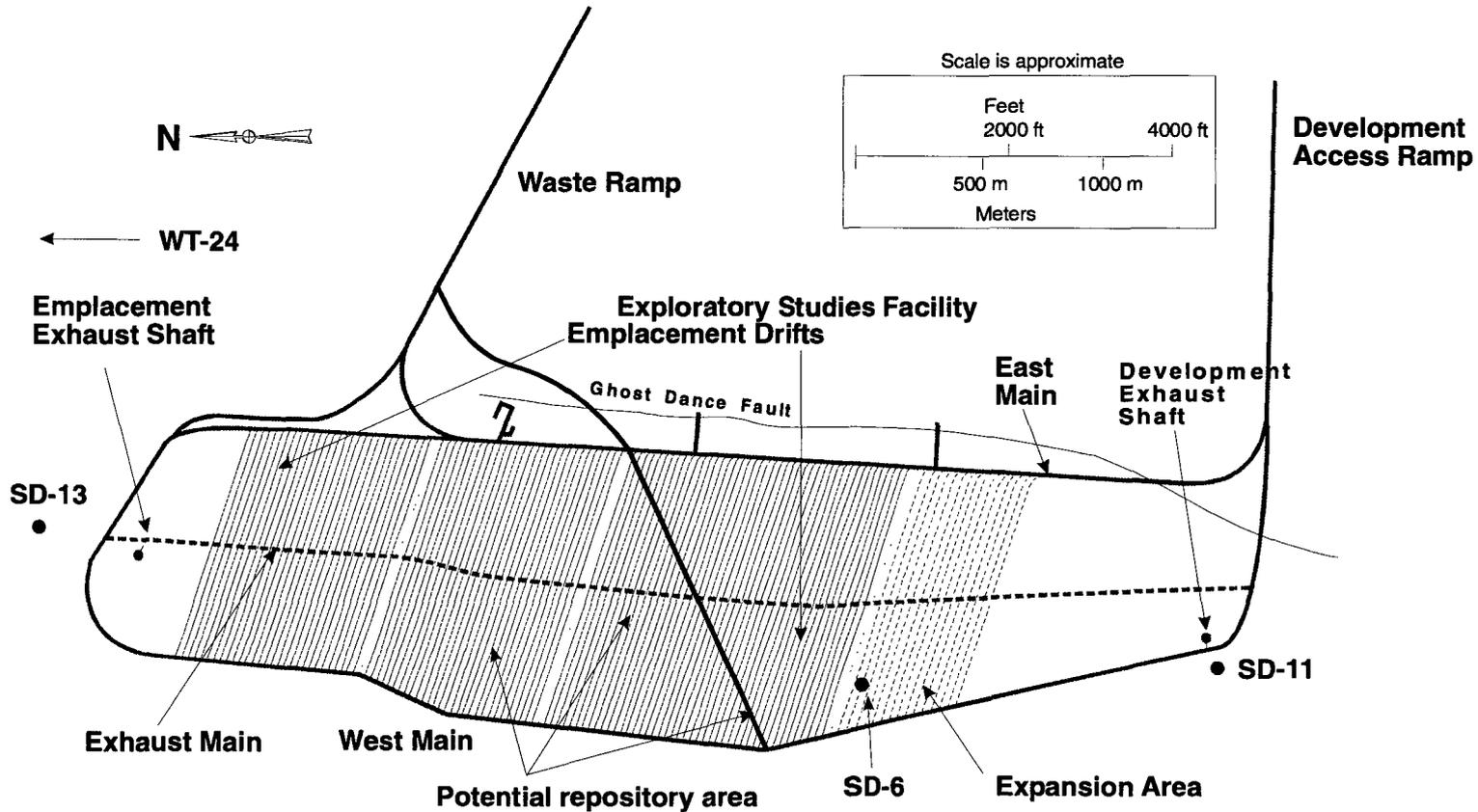
- **Help discriminate between different models for fracture/matrix interaction and seepage into drifts**
 - **Dye infiltration in niches**
 - **Progressively increasing water injection above excavated niche to evaluate seepage threshold**
 - **East-West Drift construction water monitoring from launch bay to crossing of the ESF main**

Reducing Hydrologic Uncertainties

(Continued)

- **Address variability in percolation flux; verify or reduce range**
 - **Total chloride: Chloride, mass balance and Chloride-36 in ESF main (sidewall borings), niche samples, E-W drift, and new boreholes**
 - **Other chemical elements: Strontium isotopes, environmental isotopes (Cl-36, Tritium, C-14, C-13, Technetium, Iodine, ESF main, niches, E-W drift, and new boreholes**
 - **Temperature: Geothermal gradient measuring in boreholes**
 - **Fracture coatings: Calcite/opal for Uranium disequilibrium samples collected in ESF niches, E-W drift and new boreholes**

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