

# YUCCA MOUNTAIN PROJECT

Studies

## DOE Interim Postclosure Performance Measure: Implementation Aspects

Presented to:  
Nuclear Waste Technical Review Board  
Panel on the Environment, Regulations, and QA

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# Panel Request

- **To have an explanation of the content of the DOE's interim performance measure (Preceding presentation, by Steve Brocoum, DOE)**
- **To have an explanation of several implementation considerations, namely**
  - **Dose limit for undisturbed performance**
  - **Performance measure for disturbed performance**
  - **Definition of biosphere**
  - **Definition of location of critical group**
  - **Protection of groundwater**
  - **Evaluation of potential human intrusion**

# Outline

- **Undisturbed performance**
- **Disturbed performance and human intrusion**
- **Interim performance measure includes disturbed and undisturbed performance**
- **Definition of biosphere and critical group**
- **Protection of groundwater**
- **Summary**

# Undisturbed Performance

- **The interim performance measure is a target to guide the technical program**
- **System design activities need a high level performance goal in order to specify design goals**
- **System and component design performance goals address the undisturbed case, including:**
  - **climate change effects**
  - **thermal effects**
  - **design basis seismic events**
- **Higher-probability scenarios (features, events and processes) are considered in the undisturbed case**

# **Disturbed Performance and Human Intrusion**

- **Lower-probability events are part of the disturbed performance case(s):**
  - **Volcanism (direct and indirect effects)**
  - **Major seismic events (shaking, rock-fall, hydrologic effects)**
  - **Criticality (in-package, near field, far field)**
- **Human intrusion is to be addressed as per National Academy of Sciences recommendations: it will be treated separately as a sensitivity study to evaluate potential effects on system performance**

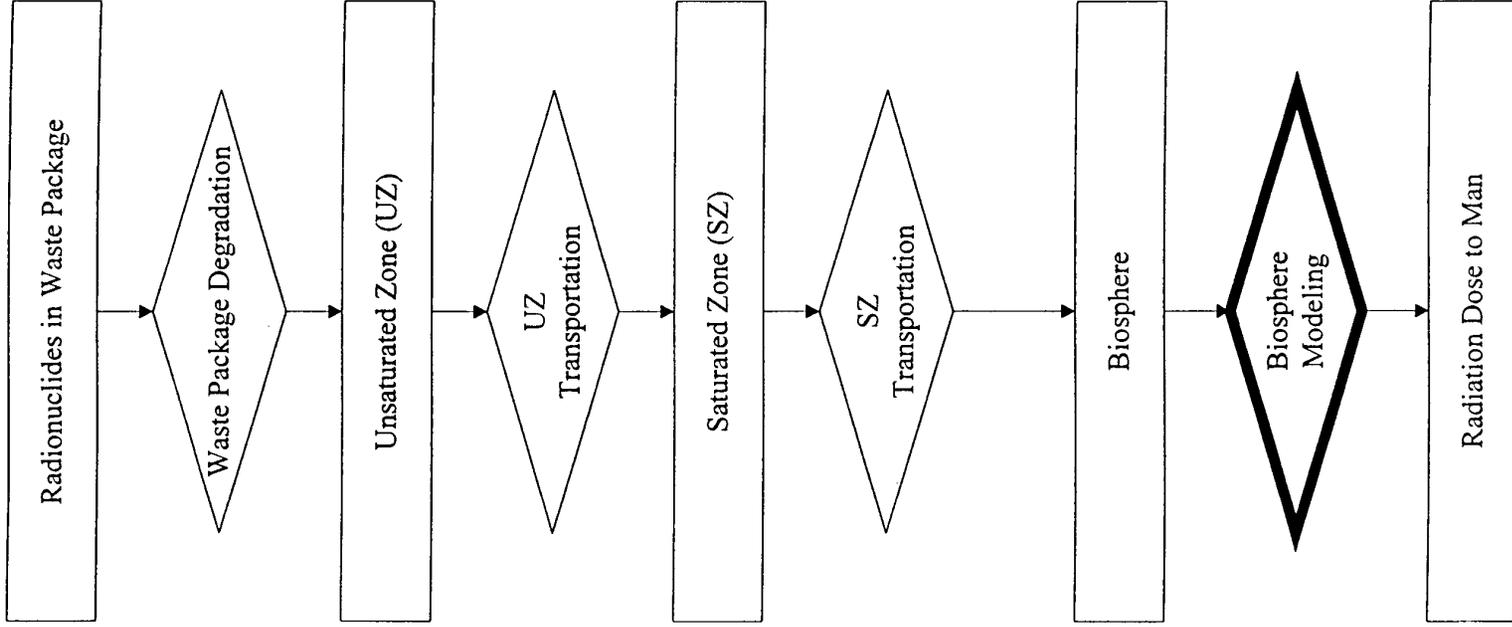
# **Interim Performance Measure Includes Disturbed and Undisturbed Performance**

- **The interim performance measure specifies an “expected annual dose” value**
- **“Expected” in this context refers to the 50th percentile value on a probabilistic dose distribution function curve (a mean value result will also be run for comparison)**
- **That dose curve will include both the undisturbed case with its uncertainties, and the cases representing perturbations from low-probability events with their uncertainties**

# Definition of Biosphere and Critical Group

- **The biosphere definition and a discription of the critical group were addressed in this morning's presentation by Bob Kimble entitled "Yucca Mountain Biosphere Modeling"**
- **The modeling described in that presentation is the basis for the modeling to be incorporated into the TSPA-VA**

## Biosphere Modeling in TSPA



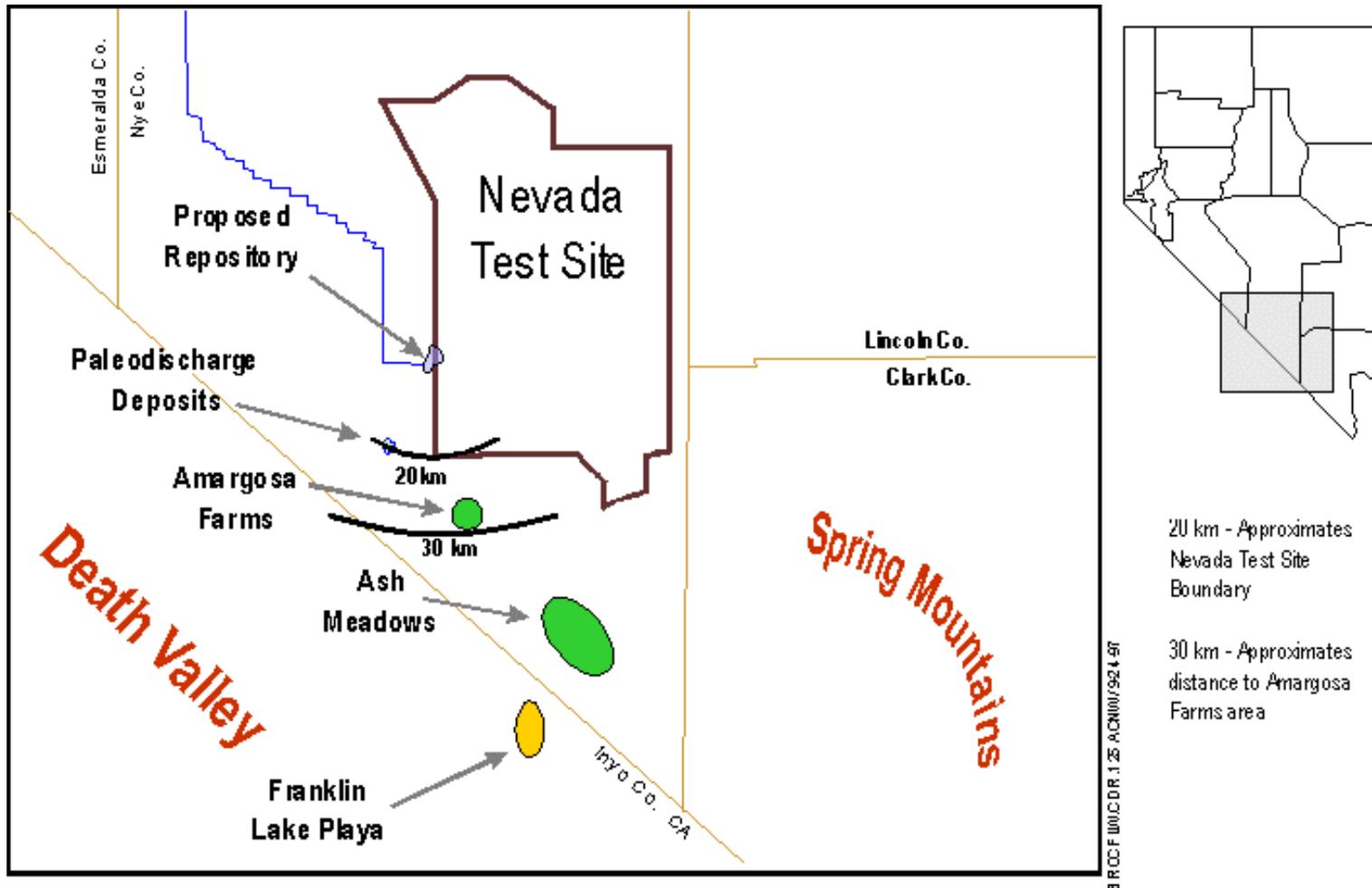
# Evaluating Dose for Average Individual at 20 km

- **Statement on potential dose receptor in the interim performance measure**
  - The expected annual dose is to be calculated to “an average individual in a critical group living 20 km from the repository”
- **Average individual defined in biosphere modeling represents critical group centered at ~30 k**
  - Biosphere modeling prepares for addressing a critical group based on current locations & practices
  - Regulatory requirement, or implementation requirement, for defining potential dose recipient(s) not presently known

# Location of Average Individual

- **The reference individual for the critical group being defined in the biosphere modeling is not likely to live at 20 km, more likely at ~ 30 km**
- **Evaluating this ~30 km hypothetical person at 20 km is somewhat conservative since there is less home- or business-agricultural activity at 20 km**
- **This is the approach for the TSPA-VA; the approach for the License Application TSPA will be based on applicable regulations**

# General Map of Yucca Mountain Vicinity



# Protection of Groundwater

- **This topic was addressed in the preceding presentation by Steve Brocoum entitled “DOE Interim Performance Measure”**
  - **A groundwater protection standard specifies a limit on radionuclide concentrations to protect the drinking water pathway**
  - **An all-pathway dose limit, like the one suggested in the DOE interim performance measure, should be protective of public health and includes the groundwater drinking water pathway**
  - **Therefore, a groundwater protection standard affords no added public health protection, is redundant, and unnecessary**

# Summary

- **The DOE interim postclosure performance measure provides a reasonable target**
  - **To guide the technical program and protect public health**
- **Modeling of the biosphere is addressing the current population and practices of the area**
- **The average member of the critical group being defined is representative of a person at ~30 km**
- **Evaluating this person at 20 km is conservative**
- **The regulatory requirement that will govern biosphere modeling for licensing is not known**