Presentation
TO
WASTE MANAGEMENT 2012
FEBRUARY 29, 2012

On behalf of the City of Carlsbad, NM

By John Heaton

PRESENTATION OVERVIEW

- GREAT BRC REPORT!!!
  - WIPP POSTER CHILD FOR 4 OF 8 RECS
- BRC PUNTS
  - DECOUPLING DHLW & GHLW FROM SNF
  - REDEFINE HLW PREPARATION
  - REPOSITORY COST
  - MEDIUM CHOICE

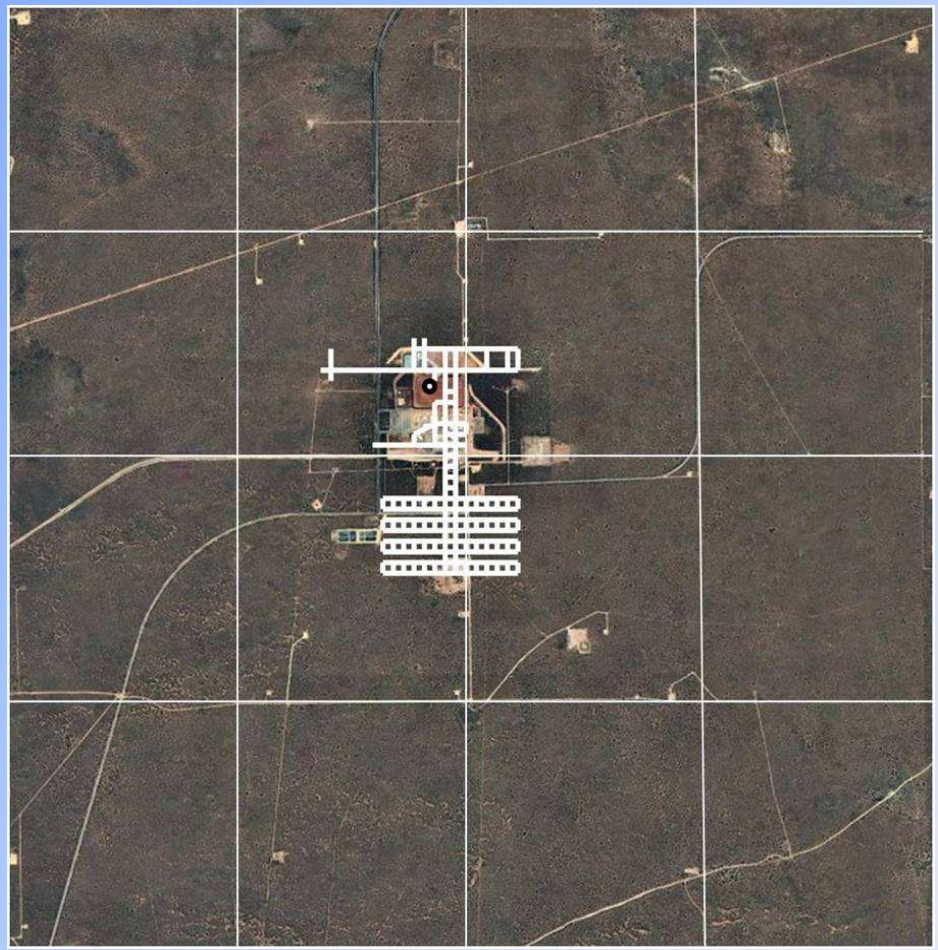
WIPP POSTER CHILD

- **CONSENT BASED APPROACH**
  - BEGAN IN MID ’70’S—OPENED 1999
  - CONSULT & COOPERATE AGREEMENT
  - LEGISLATIVE COMMITTEE FORMED
  - INDEPENDENT OVERSIGHT GROUP FORMED
  - DOE COMMITMENT TO SCIENCE
  - CLASS B CONTAINER DEVELOPMENT
  - ROBUST, CONSENT TRANSPORTATION
  - STRONG COMMUNITY INVOLVEMENT
  - THIRD PARTY REGULATOR
  - STATE AN ADDITIONAL REGULATOR

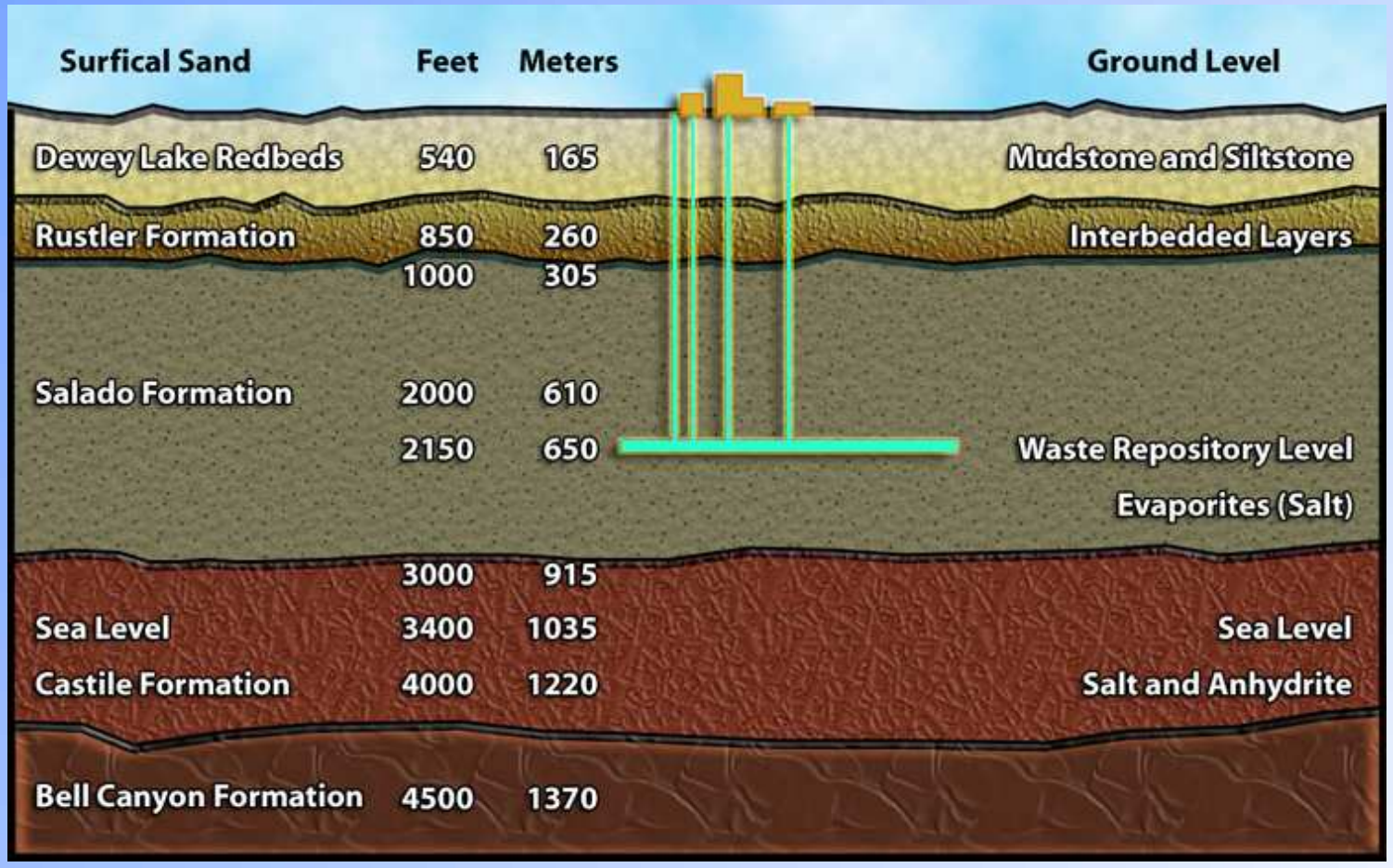
WIPP POSTER CHILD

- **PROMPT REPOSITORY DEVELOPMENT**
  - WIPP HAS 15 SQ. MILES UNUSED
  - IF SCIENCE RIGHT – STATE SUPPORTS
  - THERMAL STUDIES NEED FINISHING
  - DEFENSE HLW SHOULD LEAD WAY
  - WIPP MOST PROMISING OPPORTUNITY

Available Withdrawn Land

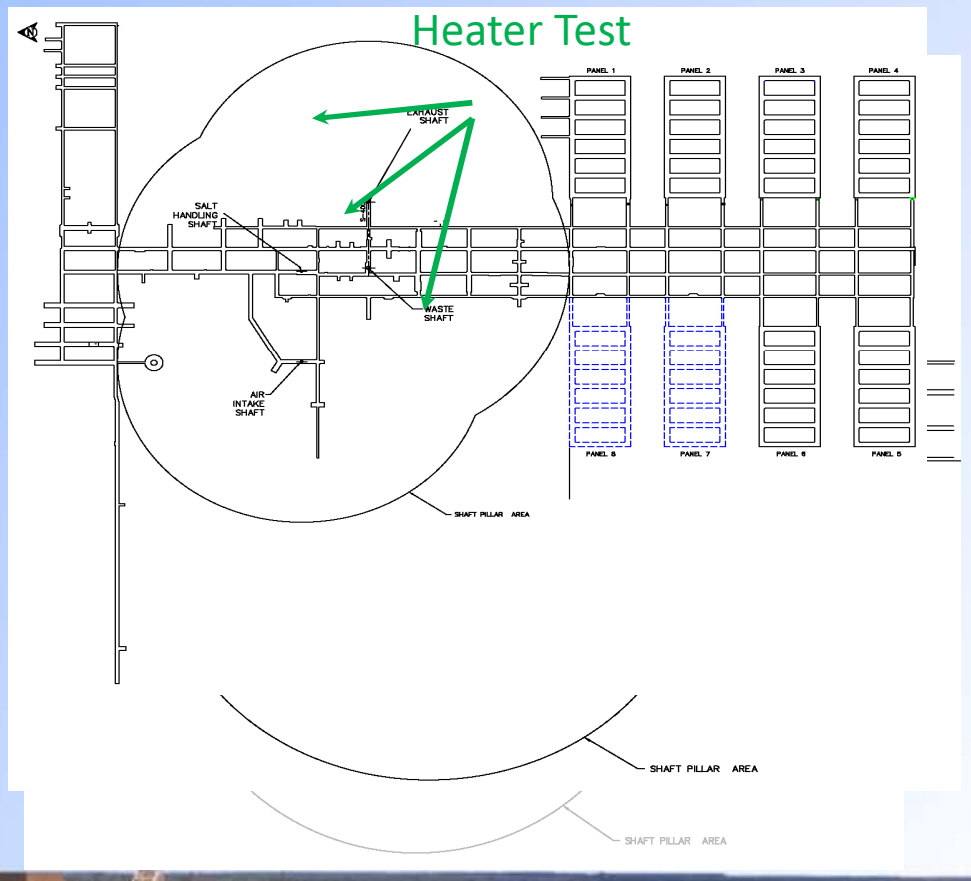


Geologic Profile



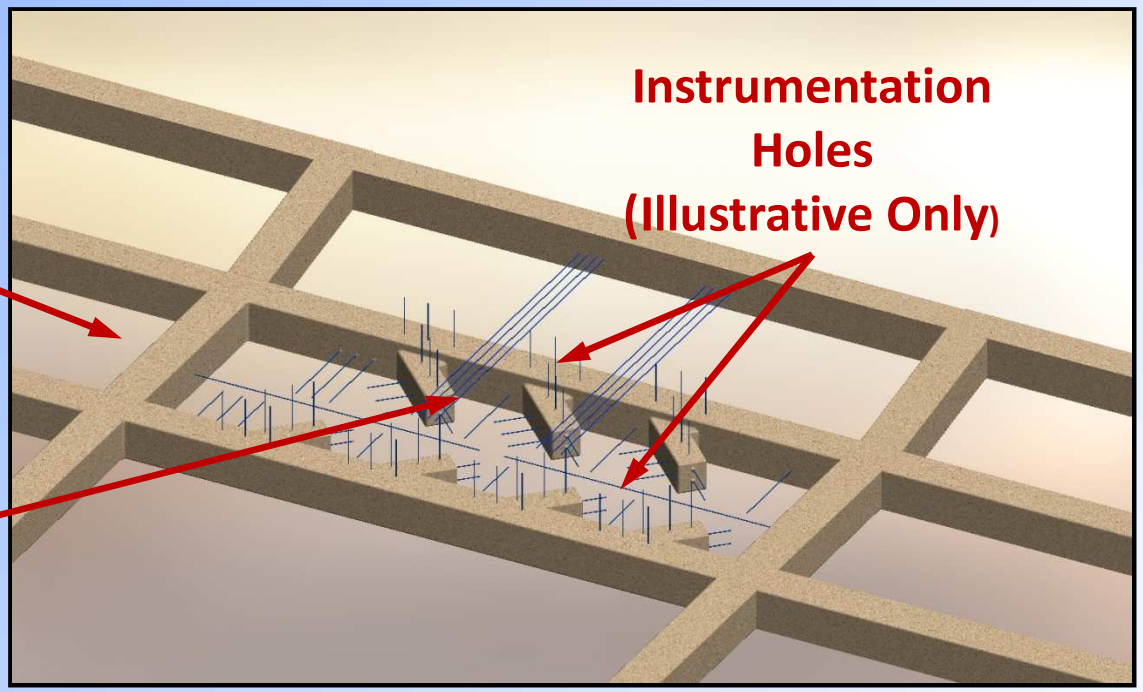
Why Conduct the Field Test at WIPP?

- COST SAVINGS BY TENS OF MILLIONS OF DOLLARS
- TIME SAVINGS BY DECADES DUE TO INFRASTRUCTURE
- TESTS CAN BEGIN NOW
- ADVANTAGES OF USING WIPP
  - Trained workforce
  - Mining infrastructure
  - Mining schedule accommodates this work
  - Construction equipment
  - MSHA Qualification
  - QA Program
  - Data more readily transferable to other potential salt sites



What Will the Field Test Look Like?

- Test modeled for **proof-of-principle design** and **operational strategy** for a **salt** repository
- Design consists of array of alcoves with access and ventilation drifts
- Boreholes will be drilled to contain monitoring instrumentation

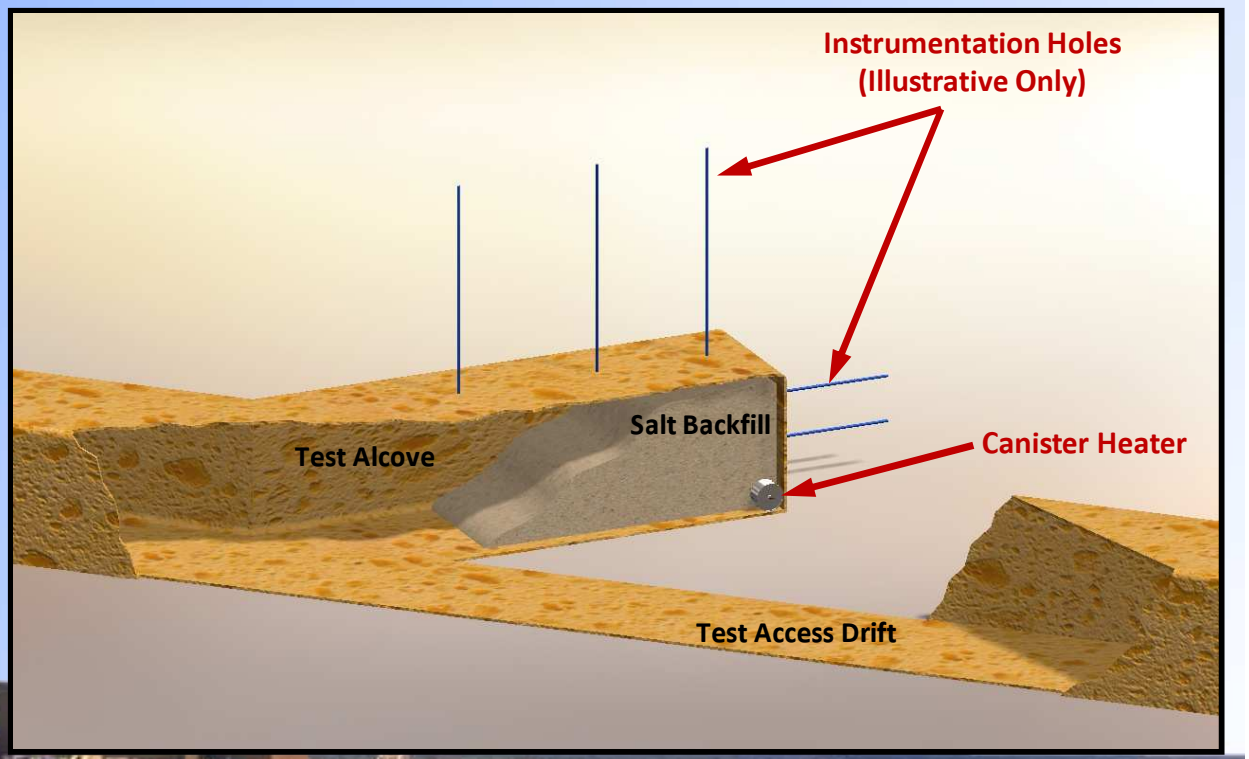


What Will the Field Test Look Like?

- Electrical heaters simulate waste packages
- Heaters will produce temperatures in excess of 160°C in salt (temperatures well above other existing salt data and beyond temperatures achieved by the Drift Scale Heater Test at Yucca Mountain)

- Instrumented to measure:
  - Water movement
  - Temperature
  - Deformation
  - Alcove closure
  - Crushed salt pressure
  - Ventilation conditions

- Two-three years heating
- Two years cooling
- Post-test forensics will confirm measured data

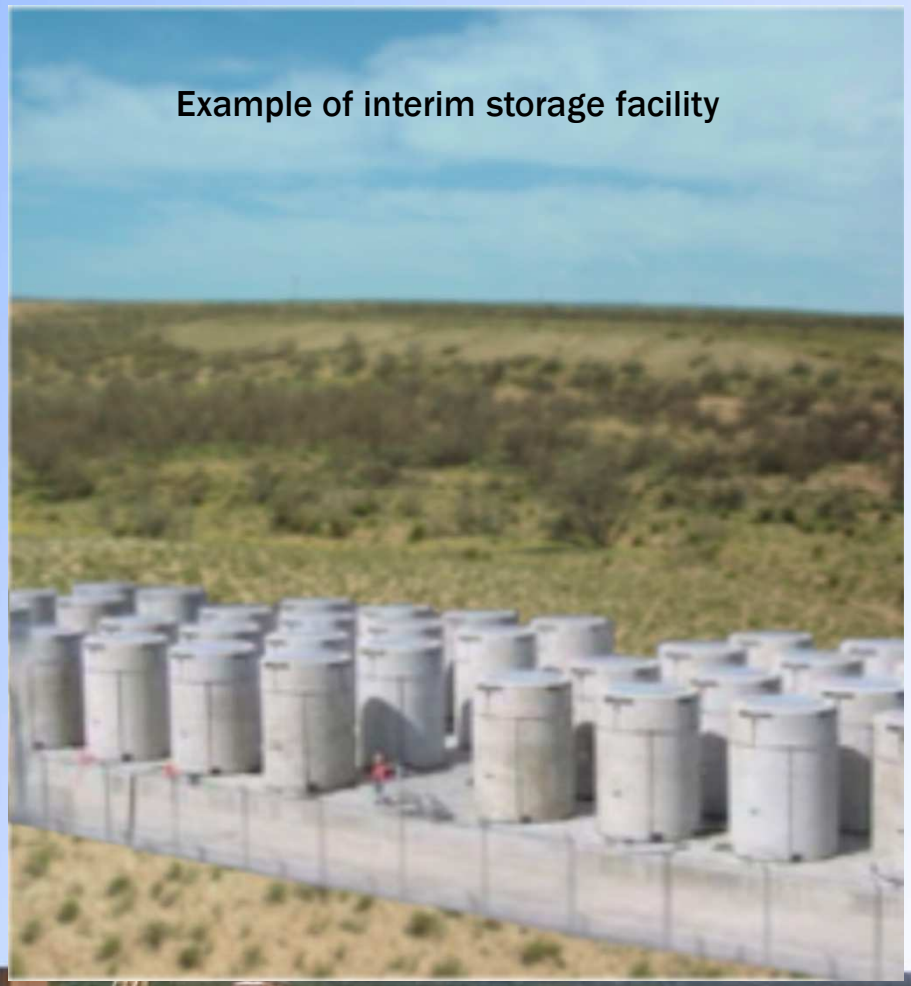


WIPP POSTER CHILD

- **PROMPT ISF DEVELOPMENT**
  - EDDY-LEA ALLIANCE FORMED
  - OWNS 1,000 ACRES FOR ISF
  - IN PROCESS OF DEVELOPING

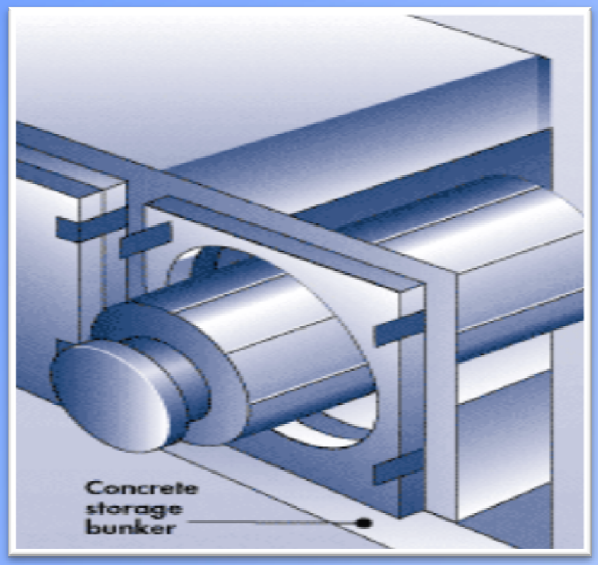
EDDY LEA ENERGY ALLIANCE (ELEA)

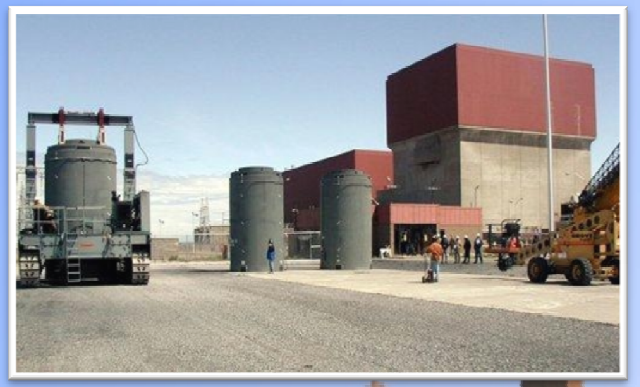
- **ELEA is an LLC that includes the cities of Hobbs and Carlsbad, New Mexico, and Eddy and Lea counties**
- **ELEA purchased 1,000 acres of land approximately halfway between Carlsbad and Hobbs, N.M. for potential use**
- **Land studied extensively during Global Nuclear Energy Partnership process**
- **Includes land ideal for interim storage**



Example of interim storage facility

WHY CENTRAL INTERIM STORAGE OF USED FUEL?





- Controlled, safe, proven technology
- Reduces risks to high-density populations
- Averts over-packing of used fuel pools due to limited storage space
- Allows decommissioned facilities to move waste off site
- Provides path forward for defense HLW and SNF
- Halts fines and settlement payments related to waste disposition
- Allows more time for evaluation of best long-term solution

WHY THE ELEA SITE?

- Remote location
- Geologic stability
- Dry area
- Infrastructure present, including rail
- Preexisting robust scientific and nuclear operations workforce
- Excellent location for future repository nearby
- Highly supportive community

WIPP POSTER CHILD

- **PREPARE LARGE SCALE TRANSPORT SYSTEM**
  - DEVELOPED CONSENT BASED SYSTEM
  - WORK CLOSELY WITH STATES & TRIBES
  - TRAINED THOUSANDS FIRST RESPONDERS
  - MORE THAN 10,000 LOADED MILES
  - SATELITE TRACKED
  - SAFETY RECORD ENVY OF TRUCK INDUSTRY
  - SYSTEM IN PLACE FOR DEFENSE HLW

WIPP Transportation System

"…The [WIPP transportation] system is safer than that employed for any other hazardous material in the U.S…."

National Academy of Sciences, WIPP Panel

BRC PUNTS

- WHY DIDN'T THEY ADDRESS
  - DECOUPLING OF DHLW & SNF?
  - HLW PREPARATION?
  - CHOOSING THE RIGHT MEDIUM?
  - THE COSTS OF THE MEDIUMS CHOICES?

TO COMMINGLE OR NOT COMMINGLE

THAT IS THE QUESTION?

DEFENSE AND GOVERNMENT OWNED HIGH LEVEL WASTE

COUPLE

DECOUPLE

COMMERCIAL USED NUCLEAR FUEL

WHAT IS THE STATUS

DHLW/GOHLW		SNF
Old, Cold & Worthless	V	Valuable for Reuse
Ready for Disposal Now	S	30 Years From Disposal
Financing by DOE		Financing From NWF
Significant Storage Costs		Significant Storage Costs
Transportation System by Truck Ready Now		Transportation System Must be Developed
Thermal Studies Complete		Thermal Studies 10 Yrs From Completion
Stops Fines From States		Waiting for Reprocessing Decision
Step for Confidence		

SHOULD COMMINGLING OR SEQUENCING BE THE STRATEGY?

- SNF SHOULD NOT BE LEFT BEHIND
- IT SHOULD BE AT A CENTRAL ISF TO REDUCE RISK & UTILITY LIABILITY UNTIL REPROCESSING OR DISPOSAL DECISION
- DHLW/GOHLW IS READY FOR DISPOSAL & SCIENCE COMPLETE
- DHLW/GOHLW SHOULD PROCEDE NOW
- DHLW/GOHLW DISPOSAL PROVIDES ROADMAP & PROOF OF PRINCIPLE FOR SNF THAT WILL FOLLOW
- ***ONE WASTE STREAM SHOULD NOT STOP OTHER***

WE SHOULD REDEFINE HLW PREPARATION FOR DISPOSAL

- WHY ARE WE USING A VITRIFICATION PARADIGM?
- MUCH DHLW IS IN OTHER FORMS
  - CALCINED OR MINERALIZED
- IS A $20 BILLION VIT PLANT NECESSARY OR EVEN TECHNICALLY POSSIBLE?
  - SHOULD WE BE STEAM REFORMING
  - OTHER MINERALIZED FORMS
- WHY AREN'T REPOSITORY LIFE CYCLE COSTS CONSIDERED?
- SALT REPOSITORY (WIPP) CAN TAKE ANY DRY, SHIELDED WASTE

WHY NO RECOMMENDATION TO ELIMINATE RETRIEVABILITY?

- **RETRIEVABLE VS RECOVERABLE**
  - WHY SPEND BILLIONS BURYING ONLY TO RETRIEVE FOR REPROCESSING?
  - REPROCESSING DECISION 30 YR AWAY
  - LEAVE IT IN SURFACE STORAGE
  - ARGUMENT FOR REPOSITORY FAILURE?
    - MAKE A BETTER MEDIUM CHOICE
    - WHY 300 YEARS
    - RELY ON PERFORMANCE ASSESSMENT
    - CHANGE REQUIREMENT IN NWPA

WHY AREN'T MEDIUM & LIFE CYCLE COSTS CONSIDERED

WIPP (salt)

BELOW WATER TABLE
WATER CANNOT FLOW THRU SALT
LOW SEIZMIC AREA
NO ENGINEERED BARRIERS REQUIRED

TRANSPORTATION SYSTEM IN PLACE
NO VITRIFYING REQUIRED
STATE SUPPORTIVE
LIFE CYCLE COST $39 BILLION

YUCCA (tuff)

ABOVE WATER TABLE
TUFF VERY POROUS

HIGH SEIZMIC AREA
REQUIRES ENGINEERED BARRIERS -- $20 BILLION
TITANIUM -1/3 OF WORLD
TRANSPORTATION SYSTEM MUST BE DEVELOPED
MUST VITRIFY
STATE **NOT** SUPPORTIVE
LIFE CYCLE COST $192 BILLION

WHY DIDN'T BRC ANALYZE THE BEST MEDIUM CHOICE?

- SALT IS THE SUPERIOR MEDIUM
  - DOES NOT REQUIRE VITRIFIED WASTE
  - EASY TO MINE
  - FLOWS AT HIGH PRESURES
  - SEIZMIC CRACKS HEAL THEMSELVES
  - ENCAPSULATES THE WASTE FOREVER
  - WATER CANNOT FLOW THRU SALT
  - BEST HEAT DISPERSION CAPABILITY
  - MANY THERMAL STUDIES ALREADY CONDUCTED
  - WHY DIDN'T RECOMMEND STUDIES AT OPEN SITES?
  - **WHY ARE WE PURSUING ANYTHING BUT SALT?**

NATIONAL NUCLEAR SUMMIT CARLSBAD, NM APRIL 2TH THRU 6TH

- WIPP TOURS
- BRC MEMBER KEYNOTES
- PROMINENT RESEARCH PRESENTERS
- INTERIM STORAGE STRATEGIES
- REGULATORS: STATE, NRC, EPA
- ALL Y' ALL COME

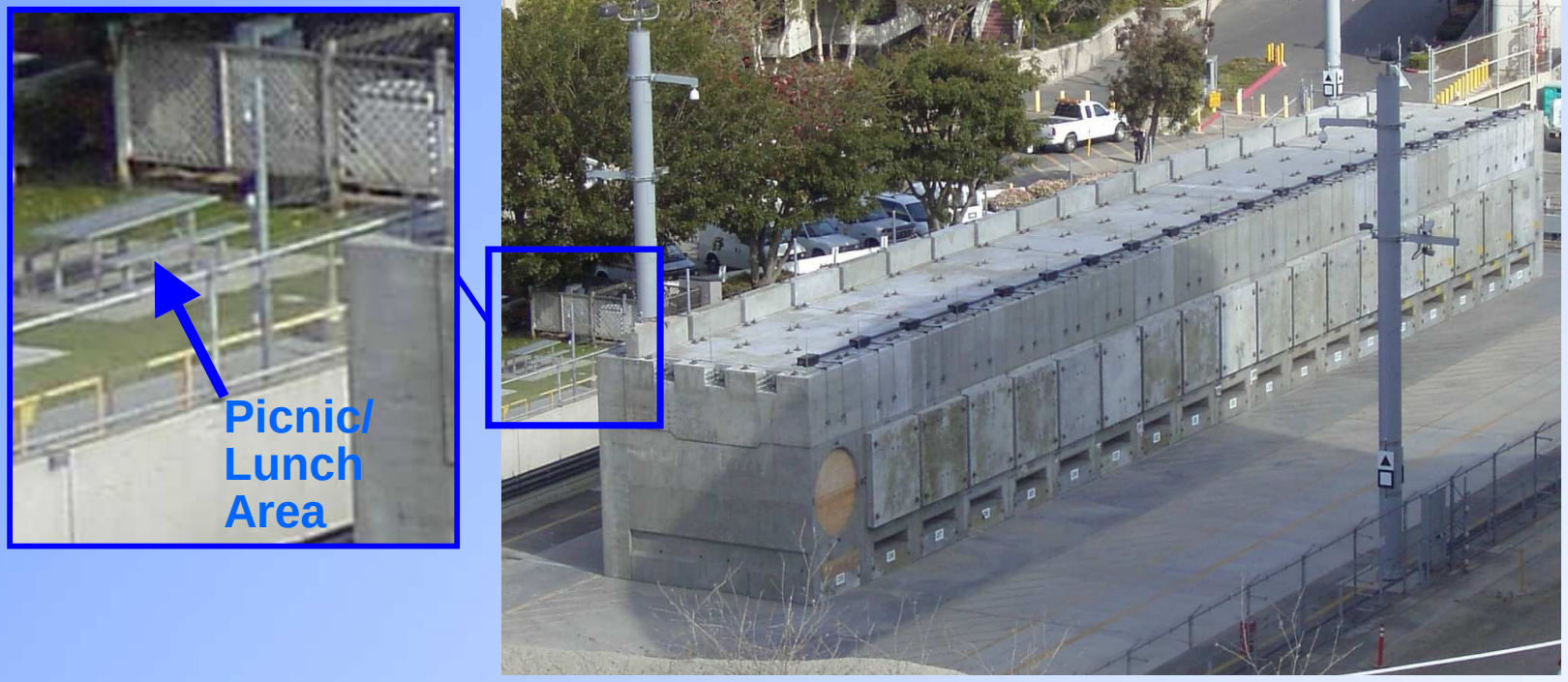
Questions???

WIPP's Record of Success

12 Years of Safe Operation

- Three sites cleaned up in 2011
- Total number of TRU waste sites cleaned up to date: 21
- More than 10,000 shipments safely received
- Over 12 million loaded miles traveled

HORIZONTAL STORAGE SYSTEM



Southern California Edison – SONGS Units 1, 2, and 3

VERTICAL STORAGE CASKS

Yankee Rowe

Connecticut Yankee

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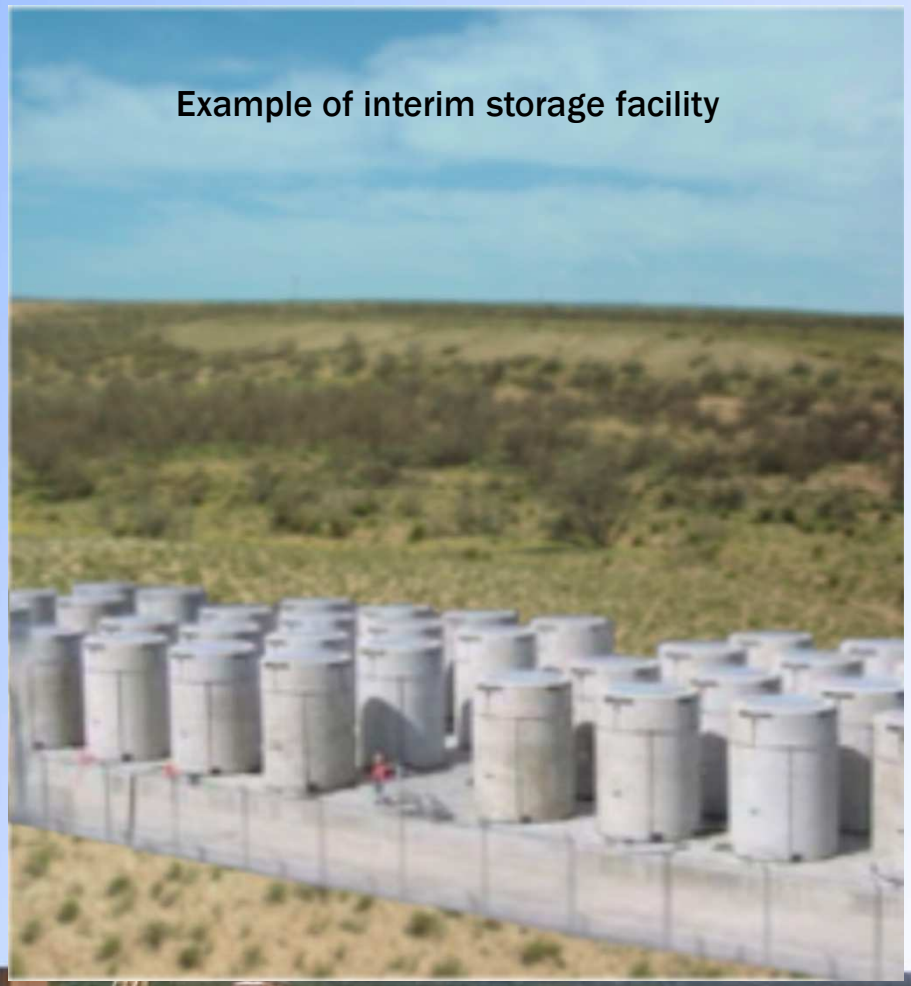
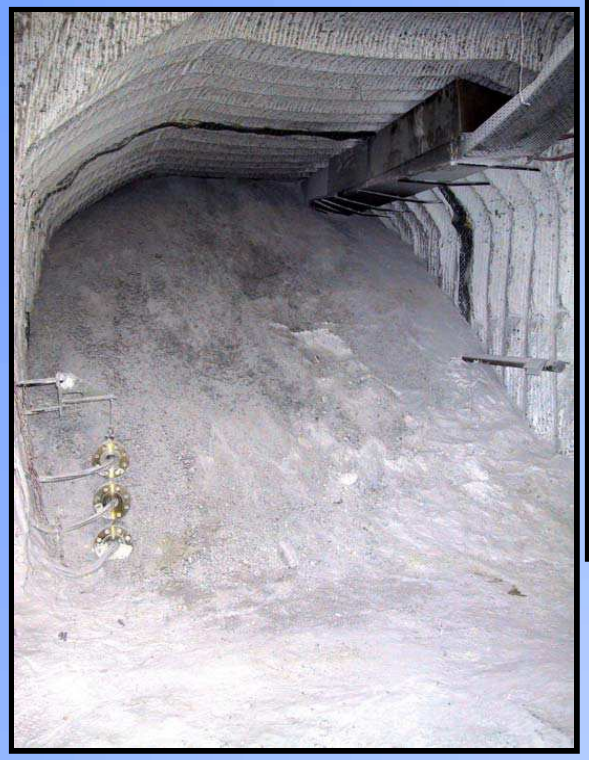
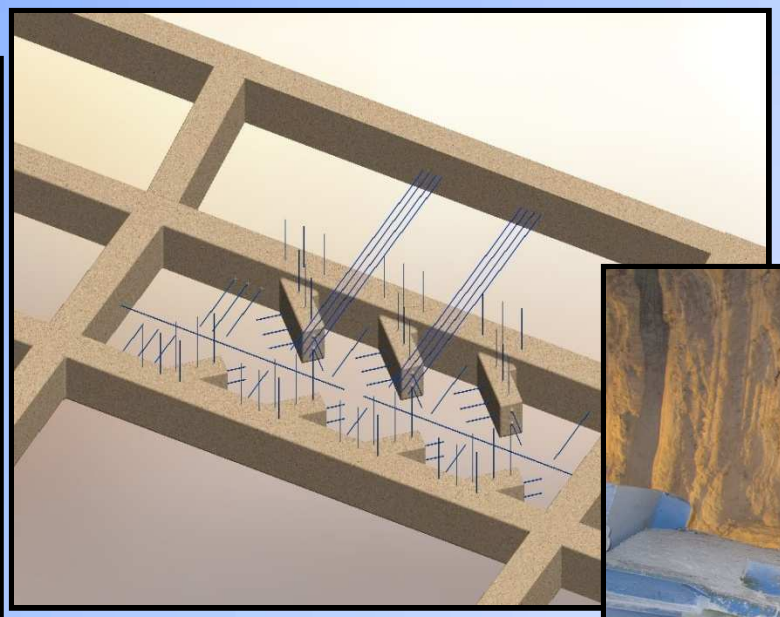
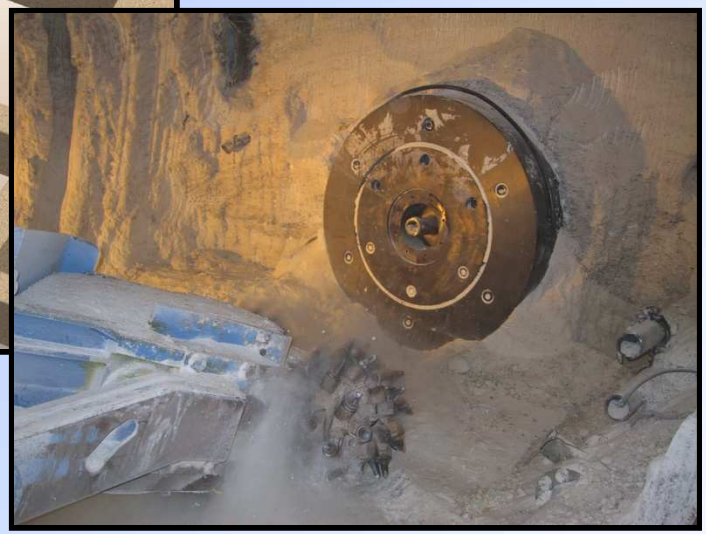


Example of interim storage facility

GENERIC
SALT DISPOSAL INVESTIGATIONS
(with a field scale heater test at WIPP)







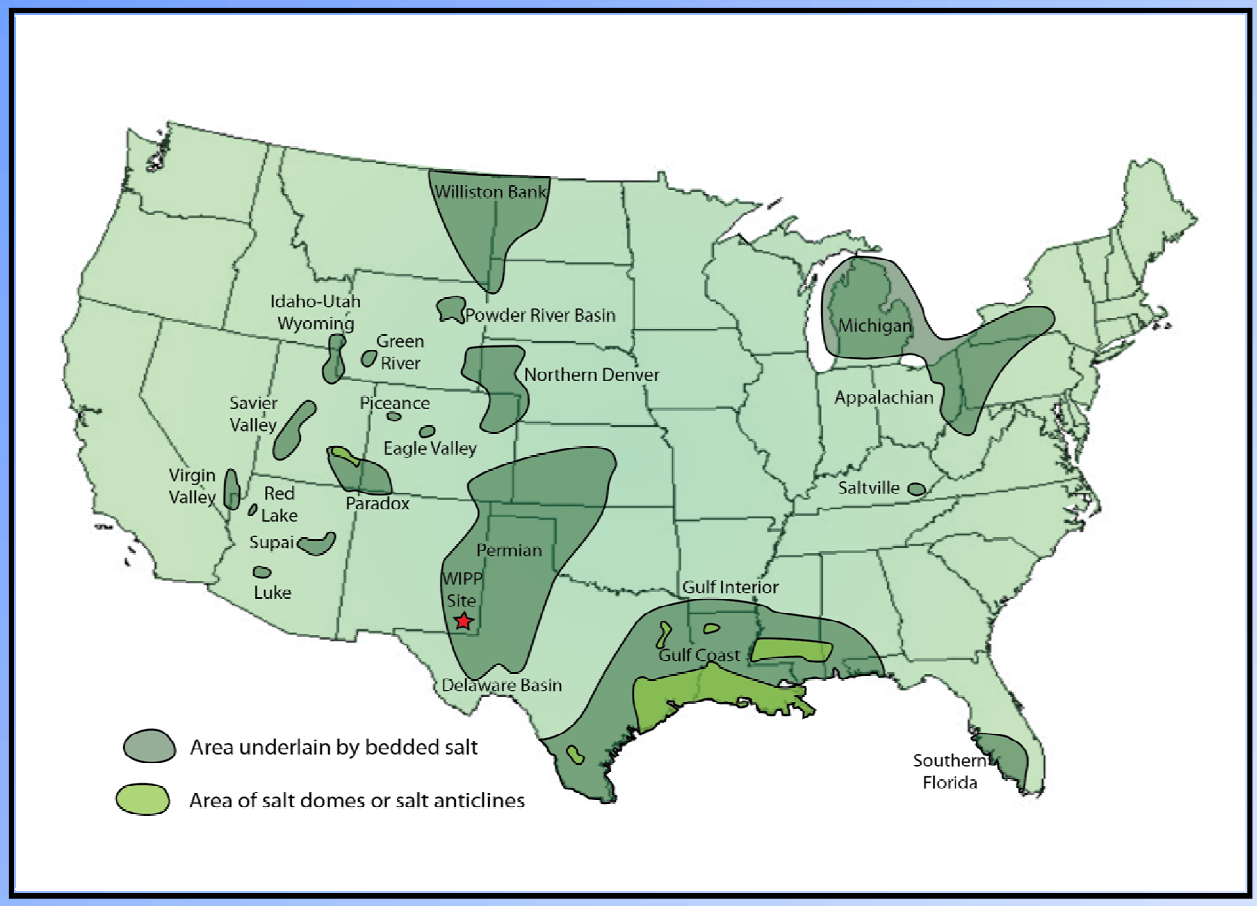
What is the SDI Proposal?

- Science-based tests for disposal of heat-generating nuclear waste in salt consisting of:
  - laboratory testing
  - modeling efforts
  - an underground field test at WIPP
- Directly tests disposal arrangement balancing heat loading with waste and repository temperature limits
- Majority of laboratory and modeling work will be conducted at the national laboratories in New Mexico
- Builds upon past experiences – thermal tests at WIPP, Kansas, Louisiana, and Germany

Salt is an Ideal Disposal Medium

Salt is widely distributed

Salt has existed underground for millions of years and has a stable geology.



"The great advantage is that no water can pass through salt. Fractures are self healing…."

National Academy of Sciences, 1957

Bedded salt is preferred over domed salt due to the inherently larger areas contained in the bedded geologic salt formations.

Bedded salt will accommodate longer periods of repository operations.

No engineered barriers are needed – disposal in salt is permanent.

Salt at great depth 'flows.' It will encapsulate waste and isolate it from the surface for eons.