Presentation
TO
WEST VALLEY CITIZENS TASK FORCE
JANUARY 25, 2012

On behalf of the Carlsbad, NM Department of Development

by John Heaton

PRESENTATION OVERVIEW

- OVERVIEW OF WIPP
- REVIEW OF INTERIM STORAGE
- REVIEW OF THERMAL SALT TESTING
- STRATEGIES
  - DECOUPLING DHLW & GHLW FROM SNF
  - REDEFINE HLW PREPARATION

WASTE ISOLATION PILOT PROJECT

WIPP is America's only deep geologic repository for the permanent disposal of defense-generated transuranic (TRU) radioactive waste left from research and production of nuclear weapons.

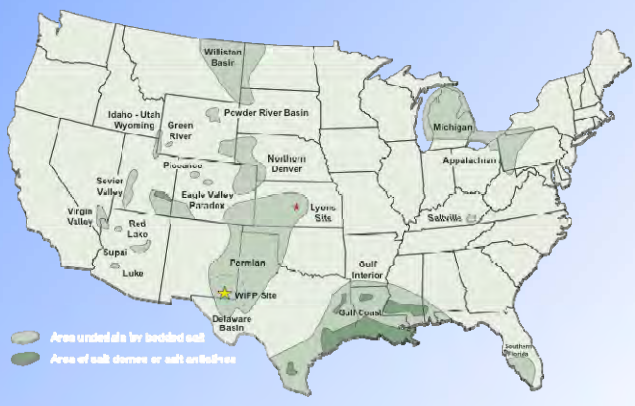
Available Withdrawn Land

Cold War Legacy

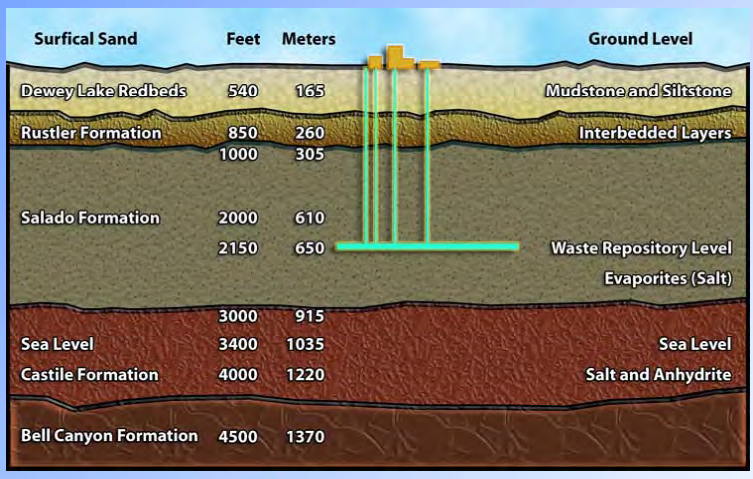
- WIPP IS THE SOLUTION to the question of how to deal with the Cold War legacy of nuclear waste
- More than 21 nuclear weapons research and production sites cleaned-up
- WIPP - best solution for the TRU and HLW waste from those locations.

Salt Is The Reason For WIPP's Location

- Stable geology
- Lack of water
- Easy to mine
- Fractures close
- Plastic quality of salt allows it to close in on the waste



Geologic Profile



History

- 1957–The National Academy of Sciences recommends deep geologic disposal for radioactive waste
- 1968 – A demonstration, "Project Salt Vault," is tested at a mine near Lyons, Kansas
- 1971 – State Senator Joe Gant Jr. contacts U.S. Congressman Harold Runnells and suggests that the Atomic Energy Commission take a look at Carlsbad's salt beds
- 1979 – Congress authorizes WIPP as a research and development facility
- 1981 – The Department of Energy proceeds with construction of WIPP
- 1989 – The DOE completes repository construction


Today's Editorial

AEC: Getting All The Facts

History

- 1992 – President Bush signs the WIPP Land Withdrawal Act. The act is amended in 1996.
- 1998 – The EPA certifies that WIPP meets all applicable regulations
- 1999 – The first shipment of TRU waste arrives at WIPP on March 26. The New Mexico Environment Department issues a hazardous waste facility permit in October
- 2005 – The final TRU waste shipment from Rocky Flats is received at WIPP
- 2007 – The first shipment of RH-TRU waste arrives at WIPP on January 23

TRU Waste

- Clothing, tools, rags, debris, residues and other items contaminated with man-made radioactive elements that are heavier than uranium

Contact-Handled (CH)

- Primarily emits alpha radiation (less penetrating)
- Can be handled without any shielding beyond the container itself
- About 96 percent of waste to be disposed at WIPP

Alpha radiation can be stopped with a piece of paper or a layer of human skin.

Remote-Handled (RH)

- Emits more penetrating radiation than CH-TRU
- Transported and handled in certified casks that provide additional shielding
- About four percent of waste to be disposed at WIPP

Up to 1,000 R/hr

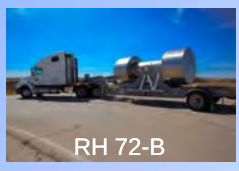
WIPP Transportation System

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

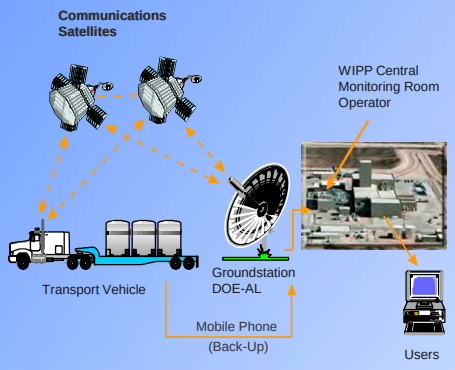
National Academy of Sciences, WIPP Panel

Safest Shipping Containers on the Road

- Nuclear Regulatory Commission certified Type B Shipping Containers
  - TRUPACT-II
  - HalfPACT
  - RH-72B
  - TRUPACT-III
- Proven leak tight after rigorous testing
  - 30-foot drop
  - Puncture bar test
  - TRUPACT-II tested for 30 minutes in 1,475-degree jet fuel fire



Shipments Tracked by Satellite



- Fully automated nation-wide tracking to within 500 feet
- Five-minute updates
- States and tribes have access to password-protected Web site
- Drivers in constant communication with WIPP's Central Monitoring Room

Emergency Responders Trained Along Pre-approved Routes

- Since 1988, more than 30,000 first responders have been trained
  - Exercises
  - State, tribe and hospital personnel training
  - Outreach

Key Regulatory Success

- Environmental Protection Agency
  - Recertification every five years until closure
  - Documents compliance with long-term disposal regulations
  - WIPP recertified for the second time since opening on November 18, 2010
- Hazardous Waste Facility Permit
  - Required for disposal of TRU waste mixed with hazardous materials
  - Original 10-year permit issued by New Mexico Environment Department in October 1999
  - Permit renewed on November 30, 2010

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

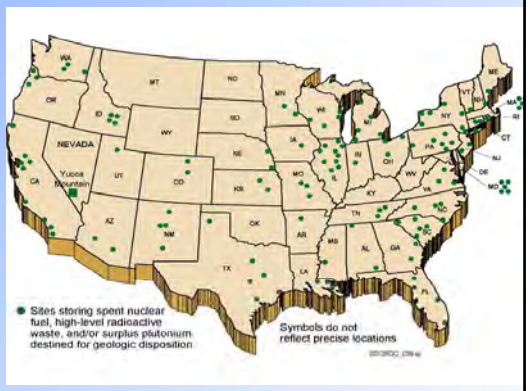
A SOLUTION TO USED FUEL STORAGE

WHAT WILL WE DO WITH NUCLEAR WASTE/SNF?

- Fukushima, tornados, fires, floods, earthquakes have changed the world
- New nuclear plants are being constructed
- AP-1000 Prototype approved by NRC
- Nuclear power provides carbon free energy
- We must have a plausible, integrated, durable policy to manage used fuel responsibly.

USED NUCLEAR FUEL STORAGE

- Used fuel inventory June 2010
  - Approximately 63,700 MTU
  - Add 2,000 – 2,400 MTU annually
- Dry storage thru 2009
  - 14,600 MTU
  - Over 1200 casks loaded
  - 49 Operating ISFSIs
- Dry inventory by 2020
  - Estimating 26,200 MTU
  - 2,600 casks loaded
  - At 75 dry storage facilities
  - Fuel from 118 units



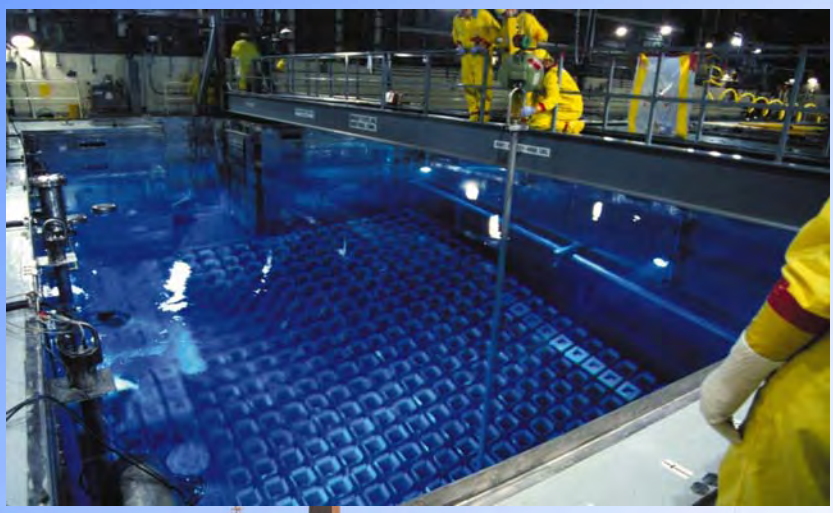
USED FUEL CURRENT EVENTS

- Yucca Mountain project being terminated
- New NRC rules for fuel pools & dry cask storage
- Center piece of Blue Ribbon Commission on America's Nuclear Future recommendations will be *centralized interim storage*
- Waste Confidence Rule revised
- Fed-Corp legislation introduced last year
- Interim Storage bill introduced this year

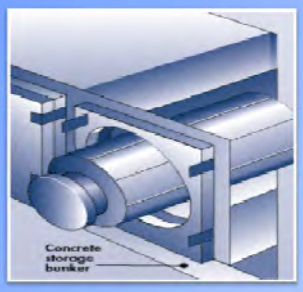
USED NUCLEAR FUEL

- 40 years of nuclear electricity generation has produced only a small amount SNF
  - –entire inventory would only cover a single football field about 7 yards deep

USED FUEL STORED IN POOL



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
- Halts fines and settlement payments related to waste disposition
- Allows more time for evaluation of best long-term solution

HORIZONTAL STORAGE SYSTEM

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

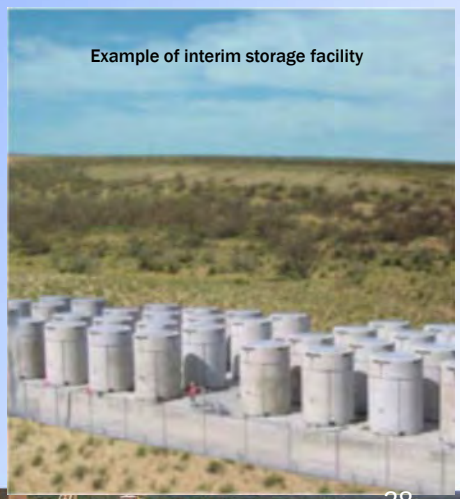
VERTICAL STORAGE CASKS

Yankee Rowe

Connecticut Yankee

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 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**

THE FACTS

- Nation wants and needs more nuclear energy
- Nuclear industry is pursuing integrated approach to used fuel management
- Used fuel inventories in storage will continue to grow
- Dry cask storage can safely accommodate this growth, especially at central interim storage sites
- An implementable and sustainable federal used nuclear fuel management plan must be developed
  - –Plan must address all elements of integrated approach: centralized interim storage, recycling and disposal
- A Central Interim Storage Facility is doable

NEXT STEPS

- Find a company or group of companies that can do the job
  - –Manage the facility
  - –Manage collecting and shipping of used fuel
  - –Manage container research
  - –Manage container manufacturing
- Interview potential companies (9 RFI Responses)
- Funding opportunities
  - –Federal corporation
  - –Waste fund
  - –Transfer of settlement fund, $15 – 50 billion

GENERIC SALT DISPOSAL INVESTIGATIONS

(with a field scale heater test at WIPP)

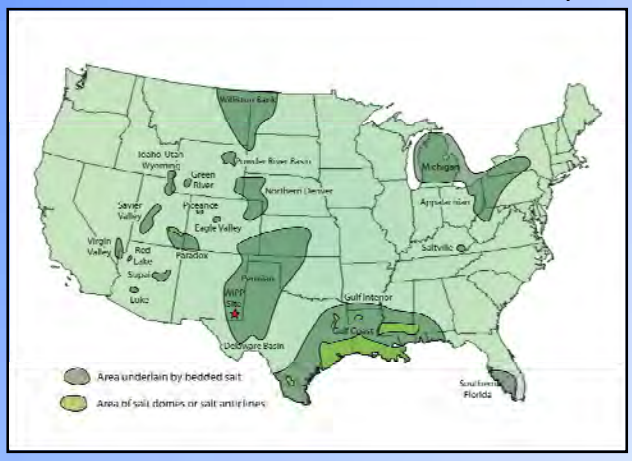
What is the SDI Proposal?

- 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.

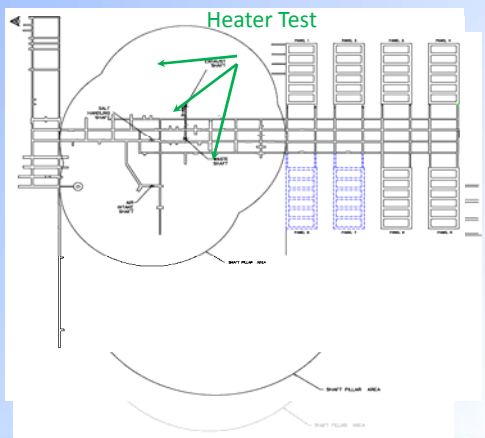
No engineered barriers are needed – disposal in salt is permanent.

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

Why Conduct the Field Test at WIPP?

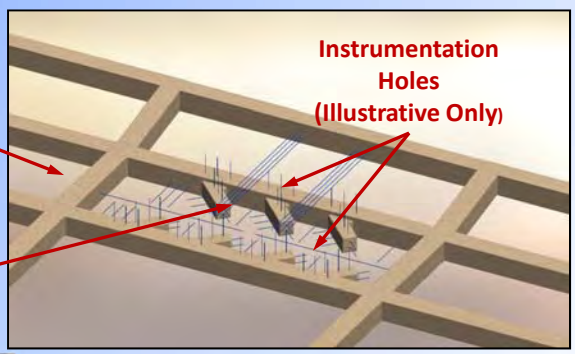
- COST SAVINGS BY TENS OF MILLIONS OF DOLLARS
- TIME SAVINGS BY DECADES DUE TO INFRASTRUCTURE
- TESTS CAN BEGIN NOW
- ADVANTAGES OF USING WIPP
  - Trained workforce
  - Mining infrastructure
  - Mining schedule accommodates this work
  - Construction equipment
  - MSHA Qualification
  - QA Program
 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

SDI Access Drifts
Heater Test



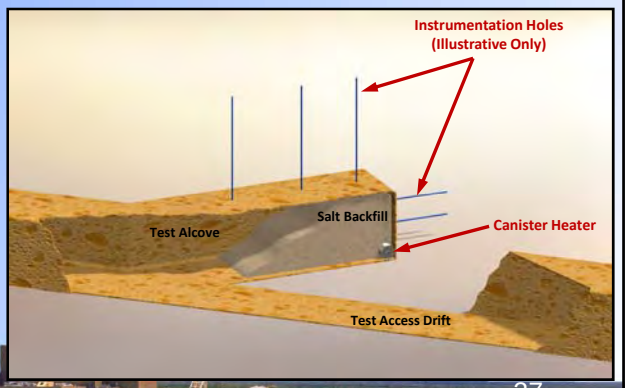
What Will the Field Test Look Like?

- Test design is modeled for proof-of-principle layout and operational strategy for a repository in salt
- 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



SDI Goals and Objectives

- Explore the efficacy of salt for spent fuel and high-level waste
  - Acquire FY 2012 funding (total SDI program = $43M over 10 yrs)
  - Use existing mining & engineering workforce at WIPP to mine experimental area beginning in FY 2012
- Confirm bedded salt as appropriate HLW repository medium
- Utilize WIPP's highly skilled workforce, scientists & infrastructure to insure most accurate possible results
- Serve the nation to provide the most economically and timely information regarding the best repository science related to salt

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 Read 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
- IS A $20 BILLION VIT PLANT NECESSARY OR EVEN TECHNICALLY POSSIBLE?
- WHY AREN'T REPOSITORY LIFE CYCLE COSTS CONSIDERED?
- WHY WOULD WE BURY SNF & THEN RETRIEVE IT, IF IT IS TO BE REPROCESSED?
- WHY ARE WE CHASING A REPOSITORY MEDIUM OTHER THAN SALT?

Questions???