



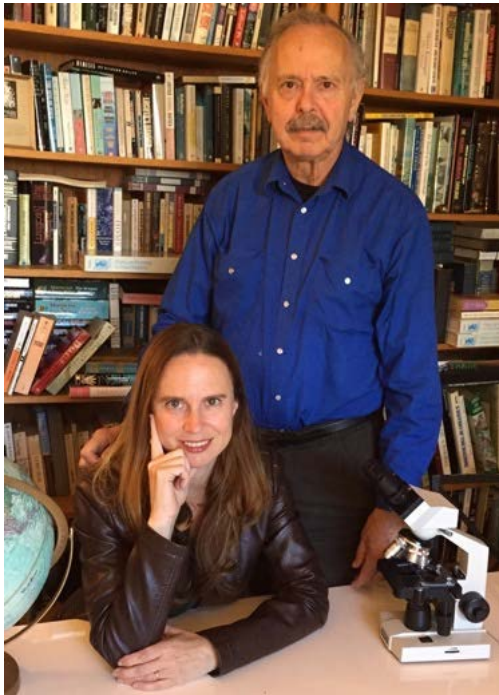
# Safe and Permanent Isolation of High Level Waste and Spent Nuclear Fuel

Rod Baltzer, Chief Operating Officer

# Expertise Spans Strategic Fields

**Founded by a unique duo that unites strategic vision with technical savvy.**

A Father-Daughter team that co-founded Berkeley Earth and has been working together for the past decade.



## Full-Time Team Includes:

- ✓ MacArthur “Genius” and Bloomberg “Innovative Thinker”
- ✓ Former CEO of Waste Control Specialists
- ✓ Gov’t Affairs expert who has briefed Pres. Obama and Pres. Trump
- ✓ Outreach coordinator for the Blue Ribbon Commission

## Advisors Include:

- ✓ 2 Nobel Laureates
- ✓ Former Secretary of Energy (under Obama)
- ✓ Advisor to Director for Yucca Mountain
- ✓ Member of Blue Ribbon Commission
- ✓ Member of Nuclear Waste Technical Review Board
- ✓ Political Influencers

# DEEP ISOLATION IP:

Secured thousands of feet deep underground in sedimentary rock, a natural protective barrier.

(not to scale)

Temporary  
emplacement rig, 160-feet high

Aquifer casing

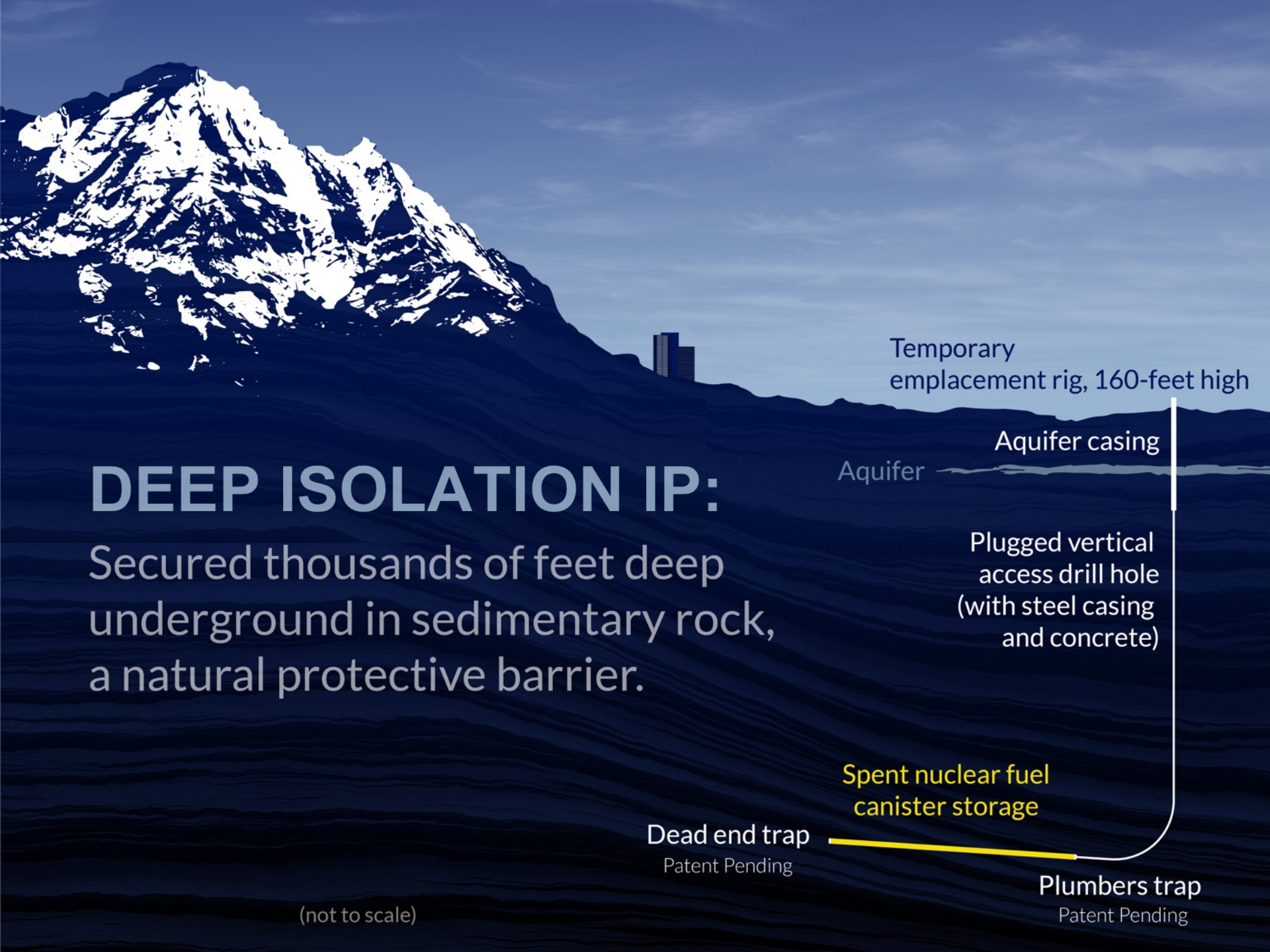
Aquifer

Plugged vertical  
access drill hole  
(with steel casing  
and concrete)

Spent nuclear fuel  
canister storage

Dead end trap  
Patent Pending

Plumbers trap  
Patent Pending



# A Unique Technology

- Shale has held volatile gas (methane) for millions of years, making a prima facie case for isolation
- Minimize transportation by siting near existing nuclear reactors or regionally
- First patent issued for disposing in or under shale layer; six more pending, others in the works.
- Spent fuel is compact; one drill hole can store 200 to 400 metric tons
- 3-4 drill holes per nuclear reactor lifetime



# Solution Features

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- Safe and backed by sound science
  - Superior retentive properties of sedimentary rock
  - Completely below aquifer
- Vastly more economical
  - Mature technology, 3-4 drill holes per unit
  - Saves utilities, ratepayers, and taxpayers tens of billions USD
- Potential to solve problem faster
  - Gets waste out of biosphere
  - Ends utilities ongoing obligation to manage and DOE's liability to pay them.

# Comparison of Concepts

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## Vertical Borehole

- Three mile deep shaft that was completely vertical
- No shafts or testing done before end of program

## Yucca Mountain/Mined Repository

- 1,000 foot depth with 5-miles of tunnels that were 18 feet wide
- Testing was started before funding was eliminated

## Deep Isolation/Horizontal Drillhole

- Thousands of feet deep into a horizontal drillhole that is up to two miles long and 18 inches wide
- Equipment test to place and retrieve small disposal canisters was completed using standard oil & gas equipment

# Technology Features

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- Deep Geologic Repository
  - Superior retentive properties of sedimentary rock
  - Thousands of feet below the surface
  - Smaller diameter holes (e.g. 8” to 30”) reduce the disturbed zone of geological environment
  - Horizontal aspect allows thousands of feet of undisturbed rock between waste and surface
- Engineered Barriers
  - Reducing environment at depth significantly reduces corrosion
  - Corrosion resistant alloys provide an engineered barrier that will survive for tens of thousands of years

# Engagement Features

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- Early Community & Utility Engagement
  - An early and authentic approach to engaging with communities to determine if they are interested in the Deep Isolation solution
  - A core value we employ, even for equipment tests where no radioactive waste was used
  - Encouragement of a two-way dialogue to determine the right approach for each individual community
  - Discuss potential revenue-sharing benefits
- Environmental Groups
  - We are engaging with a range of environmental groups to find common areas of interest and cooperation



# Technology Demonstration – Jan 16th



## Deep Isolation Technology Demo:

- Used a commercial oil & gas testing facility
- Mock disposal canister sized for Cesium / Strontium capsules
- Total length of 2700 feet – 2200 feet vertical and 500 horizontal
- Emplaced and recovered the mock canister



# **Path Forward: Three-pronged Approach to Commercial SNF Disposal**

- **Legislative & Regulatory**
  - Congressional Allowance to Pursue a Second Repository
  - NRC License
- **Community & Utility Engagement**
  - Identifying Receptive Communities
  - Revenue Sharing Model
- **Scientific & Technological Development**

# Takeaways

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- Deep Isolation is a Supplement to Yucca
  - Not everything will fit in a borehole
  - Not every site or community will be favorable
- We want to work with industry
  - We want a solution that works for everyone
  - We can get started on high-level waste
- It is time to consider alternative options to address an issue that is growing in scope and scale.



**DEEP  
ISOLATION**

**Thank You!**

[www.deepisolation.com](http://www.deepisolation.com)