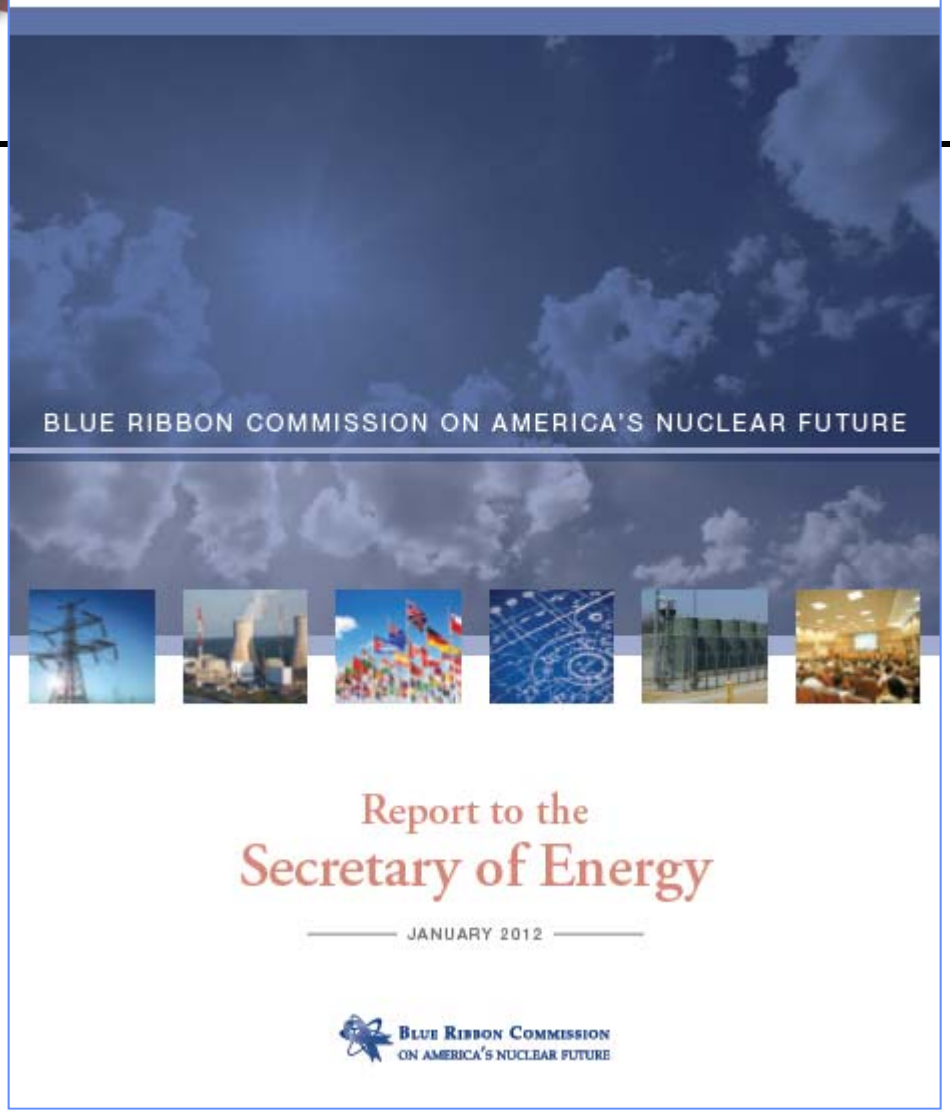
Deep Borehole Disposal of Spent Fuel

Patrick V. Brady, Sandia National Laboratories
Albuquerque, New Mexico

NEI/Used Fuel Management Conference, May 7, 2013
St. Petersburg, Florida

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.



"DOE should develop an RD&D plan and roadmap for taking the borehole disposal concept to the point of a licensed demonstration...

... EPA and NRC ... should be coordinated with the aim of developing draft regulations for mined repositories and deep borehole facilities..."

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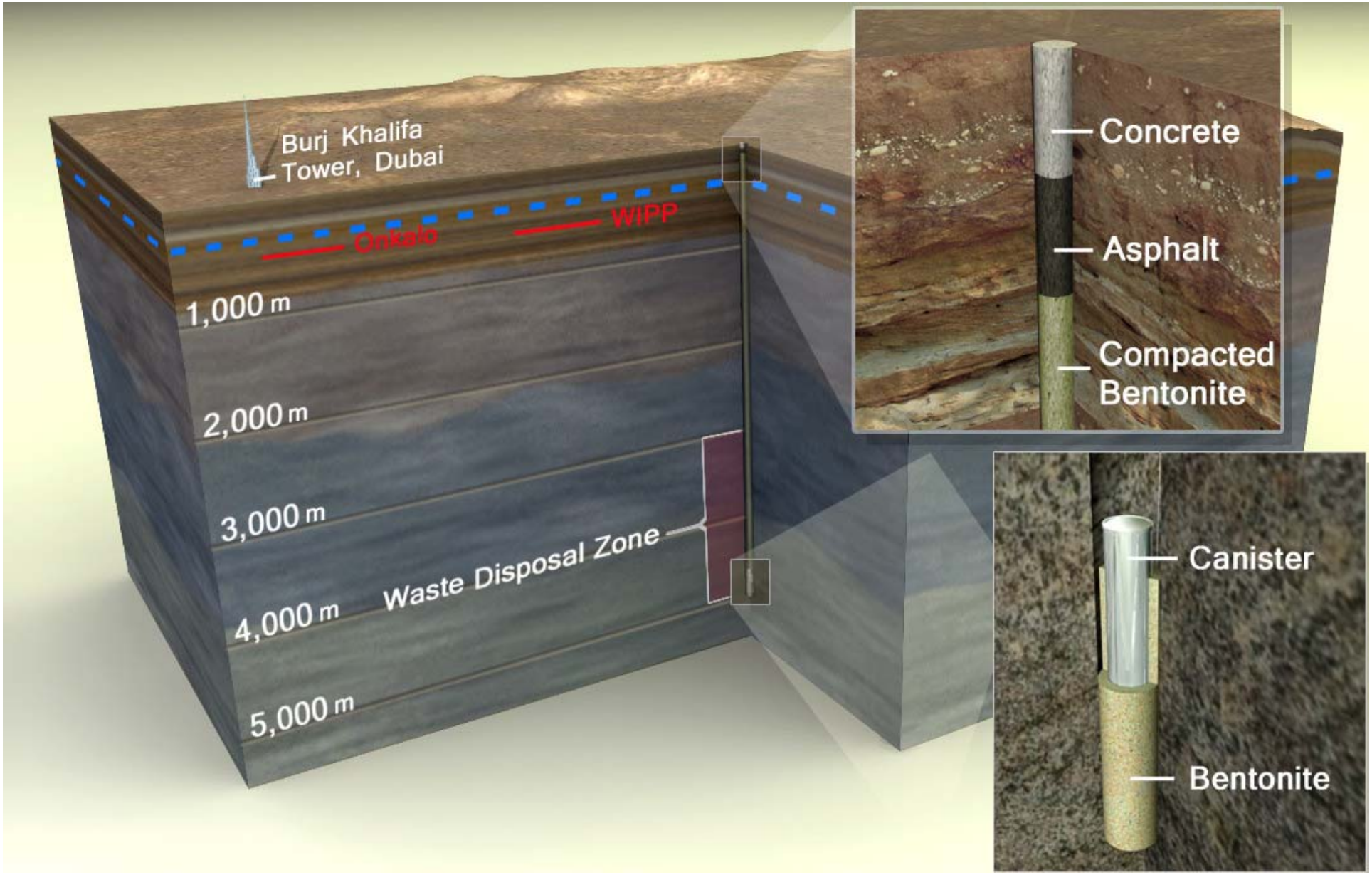

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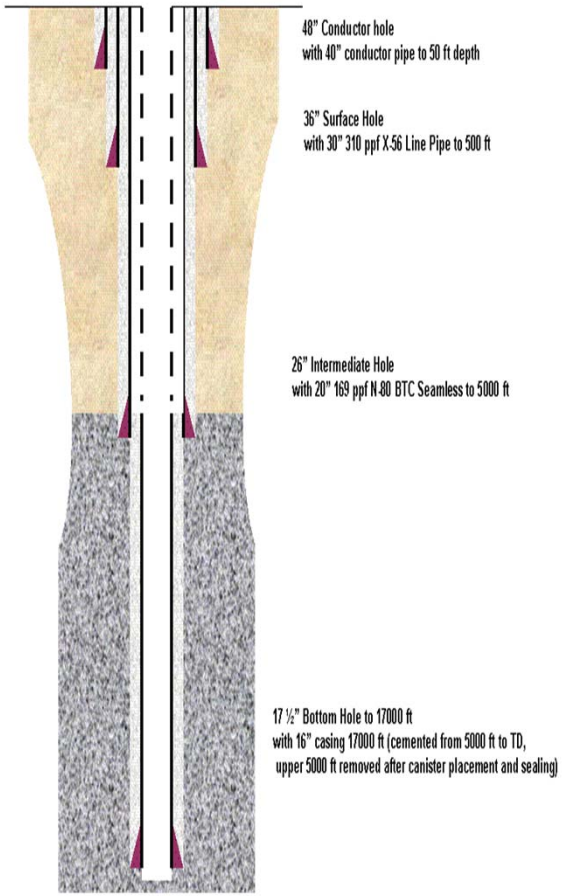
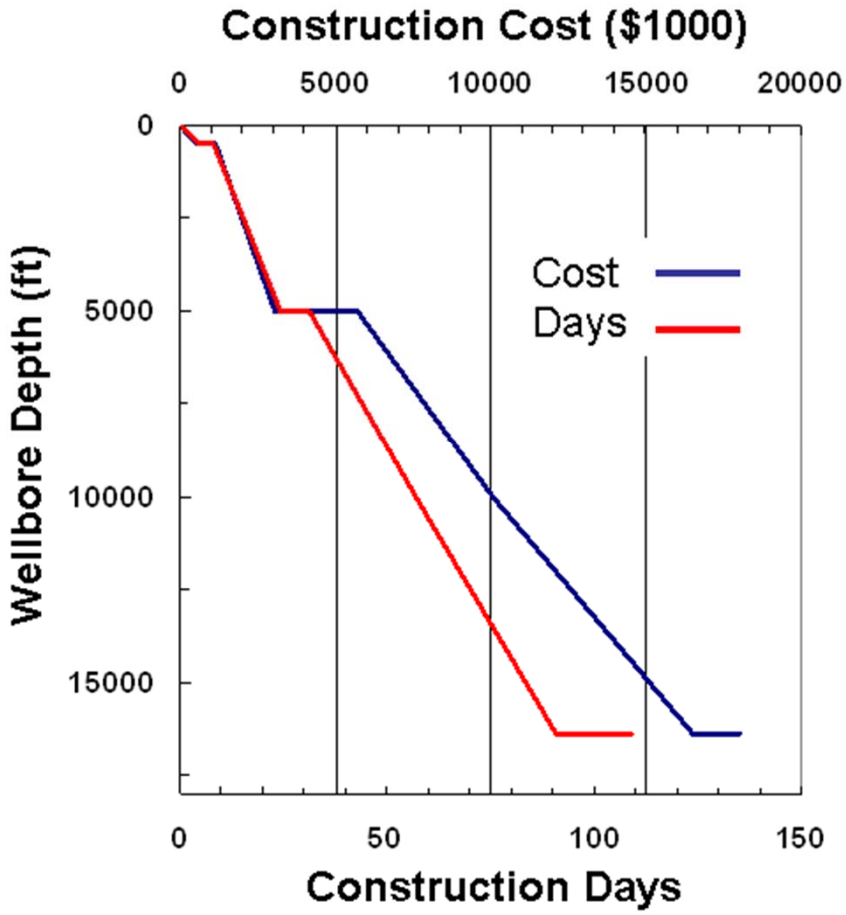
Borehole Deployment



Well Design Concept
(not to scale)



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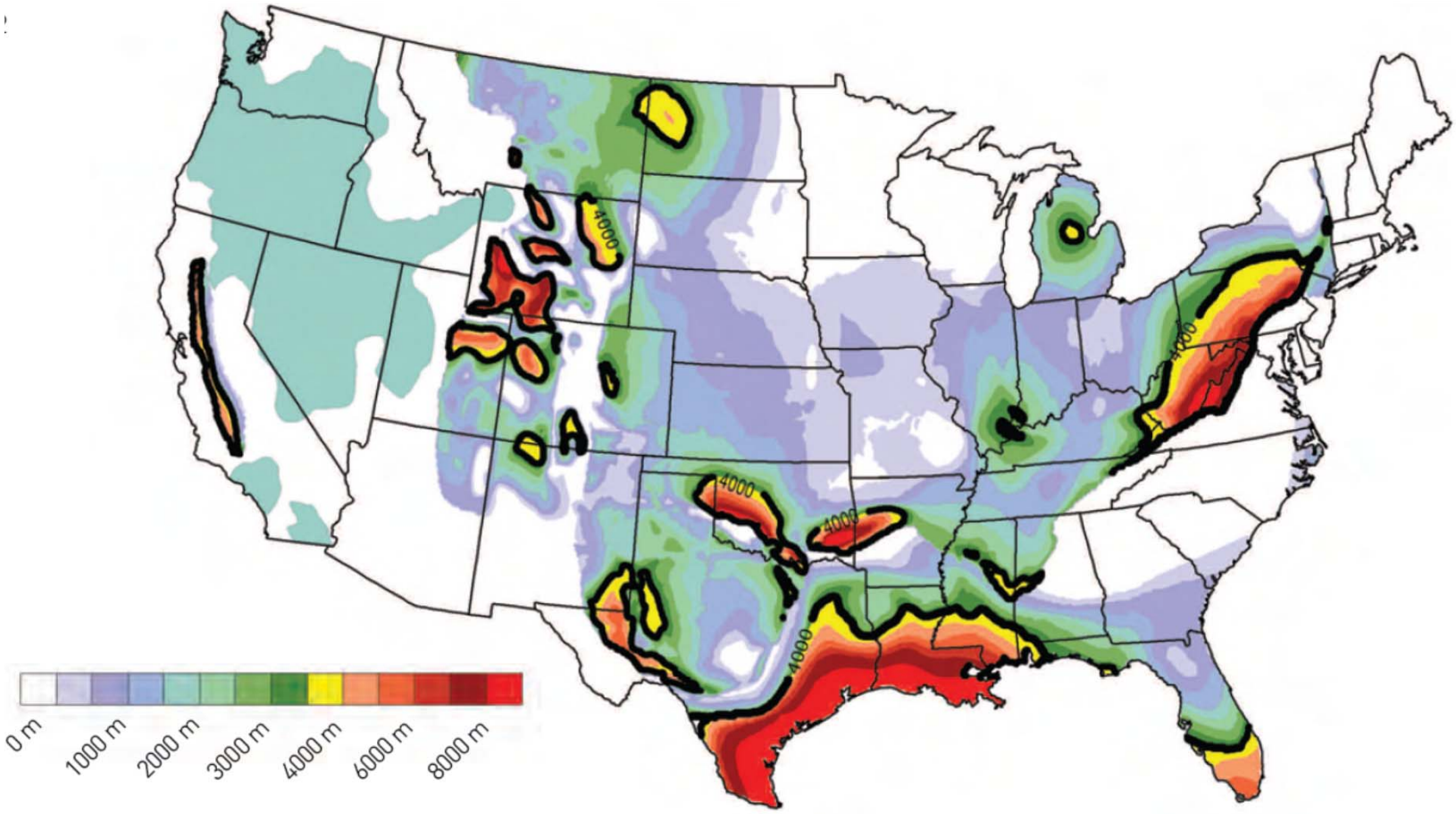

Source: AAPG

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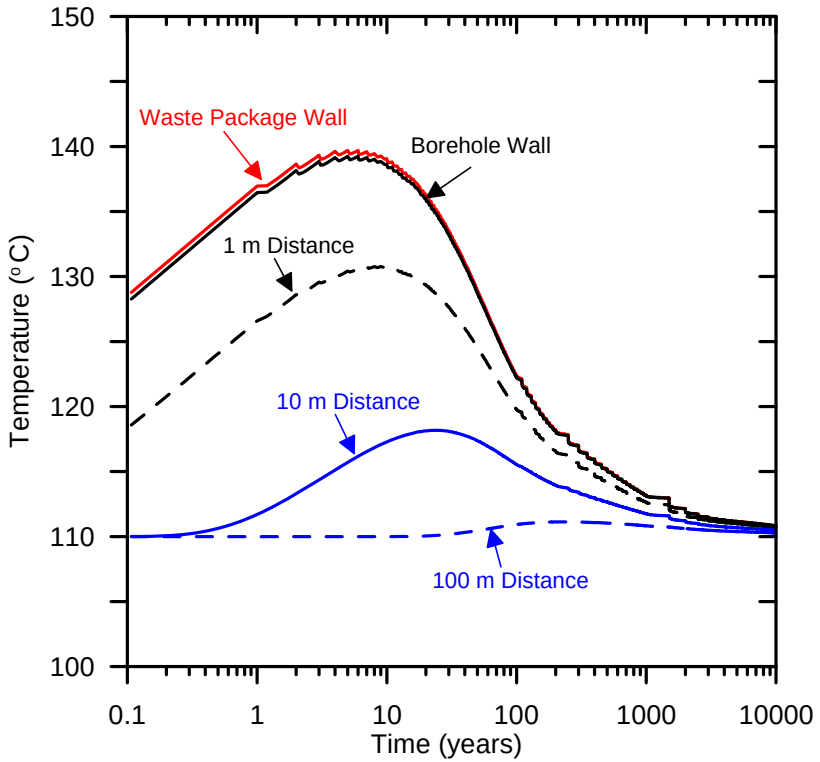
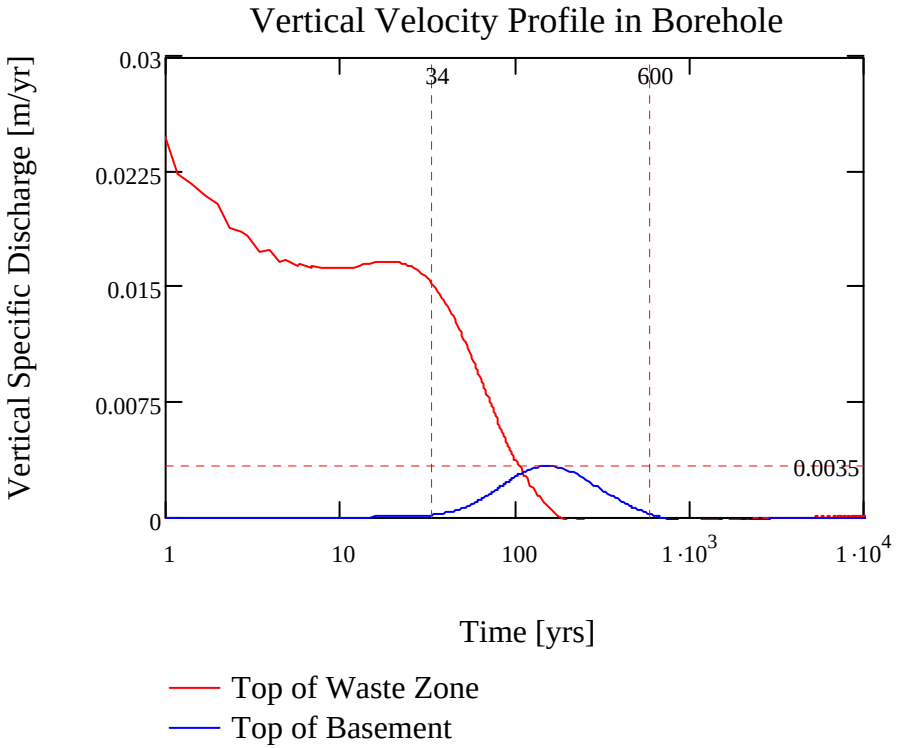
Temperature and Upward Fluid Flow





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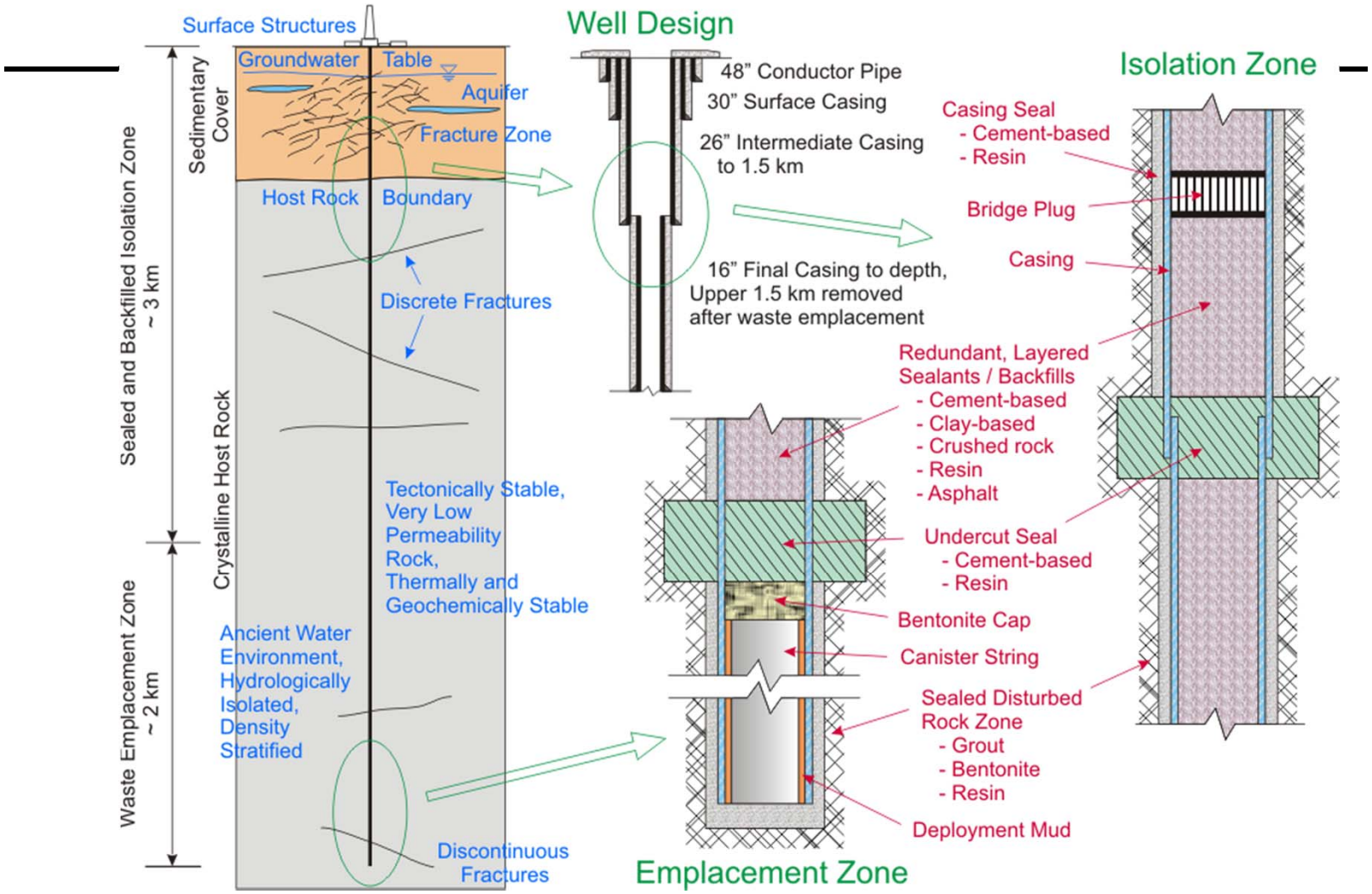
Composite Borehole Sealing



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Borehole Consortium

MEMORANDUM OF UNDERSTANDING
between
Sandia Corporation,
URS Energy and Construction, Inc.,
AREVA, Inc.,
CH2M Hill, Inc.,
Fluor Corporation,
Olympic Research, Inc.
DOSECC Exploration Services, LLC
University of Sheffield, UK
and
Massachusetts Institute of Technology

SUBJECT: Enable collaboration between the aforementioned parties to promote the construction and operation of a deep borehole demonstration to evaluate the feasibility of long-term disposal of nuclear waste.

INTRODUCTION.
Sandia Corporation (Sandia) is a Delaware Corporation that operates Sandia National Laboratories (SNL) pursuant to Contract No. DE-AC04-94AL85000 with the United States Department of Energy (DOE).

Collectively, Sandia, URS, AREVA, CH2M, Fluor, Olympic Research, DOSECC, University of Sheffield and MIT are the Parties; individually, each is the Party.

(a) Background.
Sandia has a number of missions defined by the National Nuclear Security Administration (NNSA) including nuclear energy research. As part of this mission Sandia has a responsibility to investigate technologies and approaches with the potential to offer significant improvements to the nuclear energy industry.

Disposal of high-level nuclear waste in deep boreholes is a relatively new technology that has not been demonstrated at a large field scale. Moreover, very little expertise in this technology exists. SNL has developed expertise in the deep borehole technology over the past couple of years through a LDRD and DOE-Nuclear Energy (NE) funding. However, the required expertise to implement and operate a deep borehole demonstration is wide ranging and much broader than SNL can provide. Additional expertise is required in many areas of project implementation including project management, construction planning, nuclear material handling and transportation, operations, procurement, safety, quality assurance, and basic science and engineering research. All of the entities below recognize that deep borehole disposal has the

Consortium Structure

Executive Group

Responsibilities:

- lead information exchange with outside groups
- establish working groups
- priotitize activities and lead projects
- release non-participating consortium members from the consortium

Selection Process: Initially by invitation from Sandia. Maximum of 2 members from each organization in the consortium.

Consortium Chair

Responsibilities: Prioritizing activities and projects for deployment; establishing working groups; facilitating exchange of information

Selection Process: Nominees must be members of the executive group and are selected by majority vote of the executive group.

Term of Service: Two years, with possible renewal.

ing Groups

groups have a specific mandate such as pment of a regulatory analysis. These clude members of the executive group hers outside of the consortium.

Other Participants

This could include participants such as the Expert Advisory Board.

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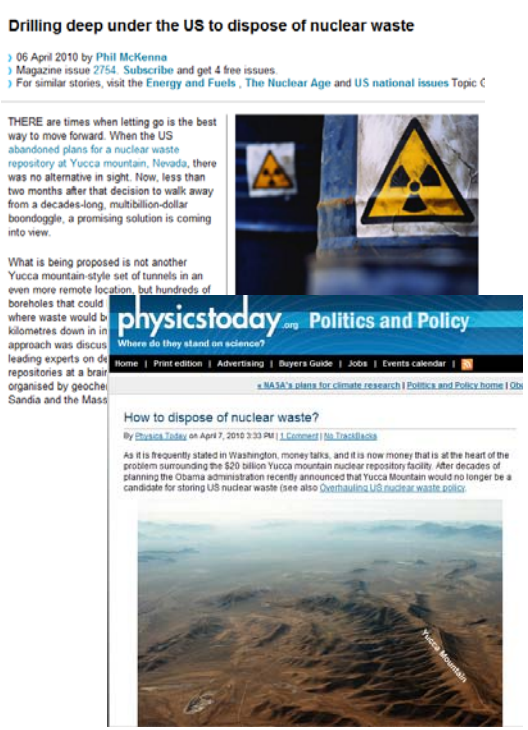

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