

Dr. Jacob D Paz
Drjacobn@yahoo.com
702-379-3300

Presentation to the State of Nevada Nuclear Waste Commission Meeting 6/7/2018 Las Vegas, NV

Gentleman and Ladies,

- I. Currently, there is a bill pending in Congress to restart YMP There are both scientific and legal outstanding obstacle which hasn't been addressed by The State of Nevada and could have an impact on the License Application pending. These issues are:
 1. First, the U.S. Supreme Court ruling in the case *Kleppe v. Sierra club 1976*. Stated the following "The US Supreme Court suggested that when a number of proposals for coal-related actions **that will have cumulative or synergistic environmental impact upon the region are pending concurrently before an agency, their environmental consequences must be considered together.**" **This ruling has been ignored!**
 2. Second, the Amendment to the clean Water Act of 1996 stated that the EPA Administrator shall "develop new approaches to the **study of complex mixtures, such as mixtures found in drinking water, especially to determine the prospects for synergistic or antagonistic inter actions that may affect the shape of the dose-response relationship of the individual chemicals and microbes, and to examine noncancer endpoints and infectious diseases, and susceptible individuals and subpopulations**" (emphasis added). Why the NRC or the DOE **didn't ask the Court for clarification in this matter**. This raised another legal question which agency EPA or DOE or NRC should have been studies risk assessment of complex mixtures for Yucca Mountain Project? It is very clear that the Nuclear Regulatory Commission did not comply with either both

or each *Kleppe v. the Serra Club of 1976* Supreme Court ruling and the Amendment to the Clean Water Act of 1996.

3. Third, why the EPA not **execute research on subpopulations specifically Indian Tribe**. The amendment to the clean water Act of 1997 clearly stated that the Administrator “shall conduct a continuing program of studies to identify groups within the general population that **may be at greater risk** than the general population of adverse health effects from exposure to contaminants in drinking water.” **In this case an Indian Tribe who lives in Death Valley they could be put at very high health risk of exposure to mixtures of chemicals and radionuclides if YMP repository approved?**
4. Forth, besides, why in the Supplemental of the Environmental Impact Statement of 2016 selected limit region addressing is limited to only **18 Km why?** First, due to large amount of **heavy metals and radionuclides** buried at YMP will have serious toxicity impact on both the Nevada and California groundwater. Probably the U. S. Supreme Court will have to clarified this issue what is a region is it limited to 18 Km or the all-region: A key word in the *Kleppe v. Sierra club 1976* case what is the meaning of “**on the region**”.
5. Fifth, there is no provision or a discussion in the FSEIS of 2016, if and when the following metals Ti, or Ni, or Cr, or Mo, and, Gd will leach into subsoil or groundwater.
6. There is a possibility that YMP site could become a **Superfund Site** and if it fails the Toxicity Characteristic Leaching Procedure which is designed to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes. How the YMP Site be cleaned?

7. In order to assess the public health risk associated with the behavior of radionuclides in the environment, knowledge of the partitioning of each radionuclide between different phases is required. This requirement is based on the basic physicochemical properties of the radionuclides, soil/mineral surfaces, and colloids/particulates. A distribution coefficient (K_d) describes the partitioning of radionuclides between the solid and aqueous phases of a system and ultimately provides an estimate of each radionuclide's transport interactions and movement via the groundwater pathway. Weren't addressed properly additional research is needed especially the effects of Ni_(carcinogen) and Gd_(potent toxic) from NiGd-Alloy.
8. Sulfur experimental data showed that it can breakdown chromium passive layer in C-22 Alloy (NRC 2007, Lindgren et al 2017). My contention to the NRC FSEIS of 2016 was ignored. NRC did not consider the effect of CaSO₄ on canister corrosion.

Critical Analysis of Yucca Mountain Project Erionite Occupational Health and Safety Erionite Standard Legal Issues

1. Erionite is a highly potent carcinogen present in the Yucca Mountain Project. Yucca is the proposed high nuclear waste repository north of Las Vegas. Erionite has been detected in the rock containing a concentration ranging from non-detectable to 45%. The Department of Energy issued in 1997 a standard for Erionite using the OSHA asbestos construction standard of 0.1 f/cc for 8-hour exposure. This action raised a legal issue: can the Department of Energy issue a standard without going through the proper process listed in the Occupational Health and Safety Administration Act of 1970? In 2011, the National Institute of Health and Safety issued guidelines for erionite handling procedures but no standard. It has a long incubation of about 30 to 60 years, until pathological symptoms of mesothelioma arise.
2. Erionite prognosis is very poor, and survival rate is deemed usually less than or about 12 months. Based upon erionite animal studies, erionite is 30 to 800 times more malignant than asbestos depending upon the asbestos speciation. Will the asbestos standard issued and used by the Department of Energy properly protect employees

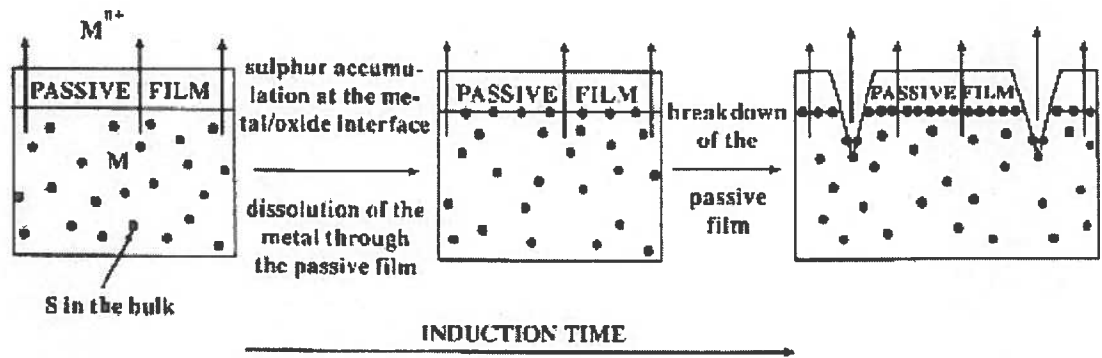
from developing mesothelioma? Why have erionite epidemiological and animal reports not been incorporated into the decision-making?

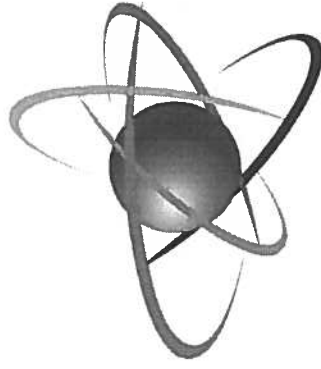
3. Why has the Occupational Health and Safety Administration decided not to develop an erionite exposure standard? The conclusion of test results of erionite personal monitoring is inconsistent with published health risks for erionite. For approximately sixteen months, no health and safety precautions were taken. The Department of Energy issued four stop-work orders. The new subcontractor in 1996 appeared to take some steps to improve erionite health and safety, However, several potential health and Safety compliance with OSHA Act are unclear and needed to be further evaluation. The Department of Labor must develop an erionite exposure standard before submitting Yucca Mountain License Application to the Nuclear Regulatory Commission Licensing Board.

Issues

Mechanism of the breakdown of the passive film induced by enrichment of sulfur at the metal-passive film interface (Marcus, 1995)

(Reprinted from "Sulfur-Assisted Corrosion Mechanisms and the Role of Alloyed elements" by P. Marcus in *Corrosion Mechanisms in Theory and Practice* edited by P. Marcus and J. Oudar, Marcel Dekker, Copyright (1995), with permission from Marcel Dekker)





U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

Understanding Long-Term Corrosion of Alloy 22 Container in the Potential Yucca Mountain Repository for High-Level Nuclear Waste Disposal

T. Ahn,¹ H. Jung,² X. He² and O. Pensado²

¹U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, U.S.A.

²Center for Nuclear Waste Regulatory Analyses, San Antonio, TX 78238-5166,
U.S.A.

**Third International Workshop on Long-term Prediction of
Corrosion Damage in Nuclear Waste Systems**

May 14 – 18, 2007

**The Pennsylvania State University (with OECD),
State College, PA 16802, U.S.A.**

Disclaimer

The U.S. Nuclear Regulatory Commission (NRC) staff views expressed herein are preliminary and do not constitute a final judgment or determination of the matters addressed or of the acceptability of a license application for a geological repository at Yucca Mountain. The paper describes work performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA) for the NRC under contract number NRC-02-02-012. The activities reported here were performed on behalf of the NRC office of Nuclear Material Safety and Safeguards, Division of High Level Waste Repository Safety.

Outline

- **Purpose**
- **Persistence of Passive Film**
 - **Anodic Sulfur Segregation**
 - **Conformance of Chromium Oxide**
 - **Other Potential Concerns**
- **Susceptibility and Propagation of Crevice Corrosion**
 - **Quantity and Chemistry of Groundwater**
 - **Induction Time**
 - **Limited Susceptibility and Restricted Area of Propagation**
- **Summary**
- **References**

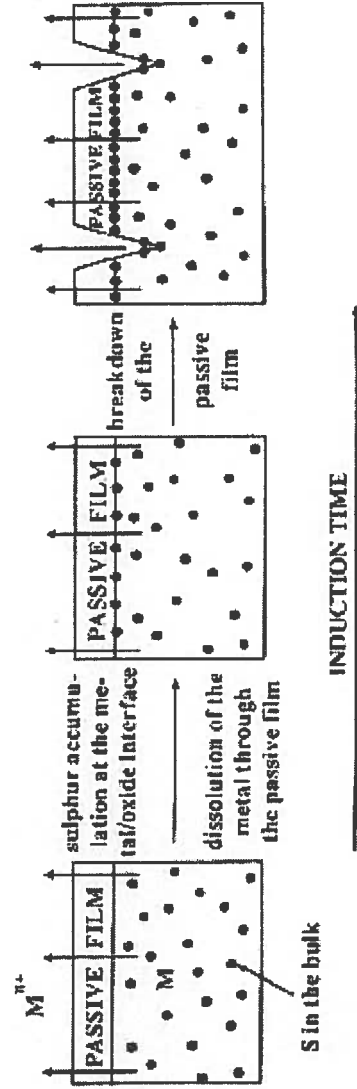
Purpose

- **Prepare for reviewing any U.S. Department of Energy's license application for a potential Yucca Mountain repository**
- **The outer container of a waste package at a potential Yucca Mountain repository may be constructed of Alloy 22, a corrosion resistant Ni-22Cr-13Mo-3W-4Fe alloy**
- **Present factors potentially relevant to Alloy 22 corrosion in a potential Yucca Mountain repository environments**
- **Obtain feedback from the expert peer group**

Anodic Sulfur Segregation – Issues

Mechanism of the breakdown of the passive film induced by enrichment of sulfur at the metal-passive film interface (Marcus, 1995)

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Anodic Sulfur Segregation – Observations and Postulates

- **Change of general corrosion rates within the data uncertainty range (Jones et al., 2005)**
- **Approximately 900 years to form a mono-layer of the sulfur at interface (Marcus, 2001)**
- **Enhancement of general corrosion rate (Marcus, 1995)**
- **Formation of soluble sulfur molybdenum compound (Marcus and Moscatelli, 1989)**
- **Protective film formation with chromium (Marcus and Grimal, 1990)**