



UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
2300 Clarendon Boulevard, Suite 1300
Arlington, VA 22201-3367

**Workshop on Localized Corrosion of Alloy 22
in Yucca Mountain Environments
September 25-26, 2006**

Las Vegas Marriott Suites
325 Convention Center Drive
Las Vegas, Nevada 89109
(Tel) 702-650-2000

Workshop purpose: to present and discuss data, analyses, studies, and models of localized corrosion of alloy 22 in aqueous environments that could exist in a repository at Yucca Mountain

Monday, September 25

1:00 p.m. Call to order/welcome
Background/scope of workshop
Introduction of workshop participants
(Participants are listed beginning on page 3.)
John Garrick, Chairman, Nuclear Waste Technical Review Board (NWTRB)
Ron Latanision, Member, NWTRB and chair of the NWTRB's Panel on the Engineered System

Session on Environments on Waste Package Surfaces

1:20 p.m. Evolution of environments in a repository in Yucca Mountain
Charles Bryan, Sandia National Laboratories

1:40 p.m. Questions/discussion

2:05 p.m. Chemistry of water contacting engineered barriers
Roberto Pabalan, Center for Nuclear Waste Regulatory Analyses (CNWRA), Southwest Research Institute (SwRI)

2:25 p.m. Questions/discussion

2:50 p.m. Break (15 minutes)

3:05 p.m. Effect of cyclic, sporadic, or episodic processes on evolution of environments in a repository in Yucca Mountain

John Walton, University of Texas at El Paso

3:25 p.m. Questions/discussion

3:45 p.m. EPRI-sponsored studies on the evolution of environments at Yucca Mountain
Randy Arthur, Monitor Scientific, LLC

4:05 p.m. Questions/discussion

4:25 p.m. Update of State of Nevada research on waste package environments in Yucca Mountain

[Maury Morgenstein](#), Geosciences Management Institute, Inc. (GMII)

4:40 p.m. Questions/discussion

5:05 p.m. Recess until 8:00 a.m. tomorrow

Tuesday, September 26

8:00 a.m. Reconvene

David Duquette, Member NWTRB

Session on Localized Corrosion of Alloy 22 (I)

8:05 a.m. Newer alloy-22 data and their relevance to high-temperature localized corrosion

[Raúl Rebak](#), Lawrence Livermore National Laboratory

8:25 a.m. Questions/discussion

8:55 a.m. Environments of corrosion: Update

[Don Shettel](#), GMII

9:15 a.m. Questions/discussion

9:40 a.m. Corrosion of alloy 22 in salt environments at elevated temperatures

[Lietai Yang](#), CNWRA, SwRI

9:55 a.m. Questions/discussion

10:10 a.m. Break (15 minutes)

10:25 a.m. Localized corrosion initiation and propagation tests

[Xihua He](#), CNWRA, SwRI

10:50 a.m. Questions/discussion

11:15 a.m. Localized corrosion data and analyses from the Materials Performance Thrust of the OCRWM Science and Technology Program

[Joe Payer](#), Case Western Reserve University

[Rob Kelly](#), University of Virginia

11:40 a.m. Questions/discussion

Sulfur enrichment on alloy 22 (Summary)

[Russ Jones](#), GT-Engineering

12:10 p.m. Lunch (1 hour 5 minutes)

1:15 p.m. Reconvene
Ron Latanision, NTRWB

Session on Localized Corrosion of Alloy 22 (II)

1:20 p.m. Corrosion models to support total system performance assessments
[Osvaldo Pensado](#), CNWRA, SwRI

1:40 p.m. Questions/discussion

2:00 p.m. Developments in modeling localized corrosion of alloy 22
[Fraser King](#), Integrity Consulting Ltd.

2:30 p.m. Questions/discussion

2:55 p.m. Break (10 minutes)

3:05 p.m. Development and implementation of the localized corrosion model
[Neil Brown](#), Bechtel SAIC Company, LLC

3:25 p.m. Questions/discussion

3:50 p.m. Summary of NRC work and waste package corrosion risk insights
[Tae Ahn and Yi-Ming Pan](#)*

Nuclear Regulatory Commission (NRC)

*CNWRA, SwRI

4:20 p.m. Questions/discussion

4:45 p.m. Public comments
Public

5:00 p.m. Closing remarks and adjournment
Ron Latanision, NWTRB

List of workshop participants

Tae Ahn	Senior Materials Engineer, Technical Review Directorate, Division of High-Level Waste Repository Safety, Office of Nuclear Material Safety and Safeguards, NRC
Randy Arthur	Geochemist, Monitor Scientific, LLC (Electric Power Research Institute [EPRI] Contractor)
Neil Brown	Manager, Engineered Systems, Bechtel SAIC Company, LLC (DOE Contractor)
Charles Bryan	Geochemist, Sandia National Laboratories (DOE Contractor)
Thure Cerling	Professor of Geology and Geophysics and Professor of Biology, University of Utah

David Duquette	Department Head and Professor, Dept of Materials Science and Engineering, Rensselaer Polytechnic Institute (Member, NWTRB)
John Garrick	Chairman, NWTRB, (Risk science consultant)
Xihua He	Research Scientist, CNWRA, SwRI (NRC Contractor)
Russ Jones	Senior Materials Scientist, GT Engineering
Ron Latanision	Principal and Practice Director, Materials/Metallurgy and Mechanical Engineering, Exponent, Inc. and Professor emeritus of Materials Science and Engineering and Nuclear Engineering, Massachusetts Institute of Technology (Member, NWTRB)
Rob Kelly	Professor, Dept of Materials Science and Engineering, and Co-Director, Center for Electrochemical Science and Engineering, University of Virginia (DOE Contractor)
Fraser King	Principal Investigator, Integrity Consulting Ltd. (EPRI Contractor)
Maury Morgenstein	Geologist and President, Geosciences Management Institute, Inc. (GMII; State of Nevada Contractor)
Roberto Pabalan	Institute Scientist, CNWRA, SwRI (NRC Contractor)
Yi-Ming Pan	Principal Engineer, CNWRA, SwRI (NRC Contractor)
Joe Payer	Professor, Dept of Materials Science and Engineering, and Director, DOE Corrosion and Materials Performance Cooperative, Case Western Reserve University (DOE Contractor)
Oswaldo Pensado	Senior Research Scientist, CNWRA, SwRI (NRC Contractor)
Raúl Rebak	Senior Corrosion Scientist, Lawrence Livermore National Laboratory
Paige Russell	General Engineer, Office of Civilian Radioactive Waste Management, DOE
Don Shettel	Geochemist and Chairman, GMII (State of Nevada Contractor)
John Walton	Professor, Civil Engineering and Program Director, Environmental Science and Engineering, UTEP (Nye County Contractor)
Lietai Yang	Senior Research Engineer, CNWRA, SwRI (NRC Contractor)

Potential Questions for Panel Discussion

1. Are data, understanding, and models sufficient to bound potential environments on waste packages in a repository in Yucca Mountain with reasonable confidence from a corrosion standpoint? (If so, what do they show; if not, what needs to be done?)
2. Are data, understanding, and models sufficient to assess with confidence whether localized corrosion of the (Alloy-22) outer surfaces of waste packages in a repository in Yucca Mountain is likely to occur? (If sufficient, how likely is corrosion; if not sufficient, what needs to be done?)
3. If localized corrosion of the outer surfaces of waste packages occurs, will it be deep and/or widespread? Explain basis for response.
4. What are the consequences of localized corrosion?