

MAR 31 1993

MEMORANDUM FOR: Margaret Federline, Chief
Hydrology and Systems Performance Branch
Division of High-Level Waste Management, NMSS

FROM: M. Rose Byrne, Civil Engineer (Intern)
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THRU: David Brooks, Section Leader
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SUBJECT: TRIP REPORT: WASTE MANAGEMENT '93 CONFERENCE,
TUCSON, ARIZONA, MARCH 1-4, 1993

The Waste Management '93 Conference, held March 1-4, 1993, covered both LLW and HLW issues. The conference promises that the proceedings, which are not available now, will be available in June 1993. Enclosure 1 contains the titles and authors of all papers presented at the session that I attended.

The following topics seemed to be of recurring interest:

- The Voluntary Siting Process
- Evolving Standards for HLW
- Performance Assessment for LLW
- Defense Cleanup (or Lack of Cleanup), Particularly at Hanford
- Partitioning and Transmutation of HLW
- Nevada's Opposition to the Yucca Mountain Repository

Brief synopses of selected papers follow.

Siting in the 21st Century: The Volunteer Process by David LeRoy, Nuclear Waste Negotiator (3/1, 8:30am plenary).

Mr. LeRoy reported that he is still searching for a volunteer MRS site despite DOE's announcement that they will site an MRS on federal land. He warned that "nuclear fear means nuclear near." He went on to explain that because of public fear of nuclear everything, nuclear waste will wind up a little bit near everyone. He pointed to the presence of lots of little de facto MRS's: 75 to date, with more needed soon. He regards this development as undesirable for reasons which he did not state. He stressed the importance of "leading, listening, and leaving (when asked to do so)" in the voluntary siting process. He went on to explain that it is important to show leadership in approaching prospective sites, to listen to residents' concerns, and to leave when and if one is asked to do so. Leaving is important to preserve the integrity of the voluntary process and preserve the goodwill of remaining sites. When asked how long the voluntary process will take, he says "the voluntary process will

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last until one site says yes, until all the sites say no, or until Congress loses patience with the process." He added that in the current atmosphere of litigation, the voluntary process is the only process which can site controversial facilities (such as all nuclear waste storage and disposal facilities, no matter how safe, particularly those connected to the federal government). He called for "heros" to go forth and make contacts and promote an MRS.

IAEA Sub-Group on Principles & Criteria for Radioactive Waste Disposal -- A Status Report on Activities to Date by K. Bragg, AECB (CANADA) (3/1, 2:00pm VII).

This international group is trying to reach a consensus on appropriate postclosure safety standards for intended-to-be-permanent disposal of different types of radioactive waste. They are considering issues of dose/risk, intrusion, retrievability, the appropriate way to measure safety for different timescales, and the timescale appropriate for requiring safety demonstrations. They advocate breaking the safety demonstration into three pieces: up to 100 years, from 100 years to 10,000 years, and from 10,000 years to 1,000,000 years. Their recommendations about the appropriateness of different ways to measure safety vary for each of the three pieces. They regard collective dose as of limited usefulness in all circumstances. They point out that up to 6 orders of magnitude of uncertainty will be present, and parameter uncertainty is not the whole story.

The Proposed USEPA Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes (40 CFR Part 191) by Raymond Clark, Floyd L. Galpin, and James M. Gruhlke, USEPA (3/1, 2:00pm VII).

EPA has published the regulations which it is proposing to apply to WIPP. These regulations are also being used to argue about other DOE cleanup operations. EPA will require the same total system performance assessment as before. They will also have an individual protection requirement of 15 mrem/year via all pathways for 10,000 years of undisturbed repository performance. The change from 25 mrem/yr to 15 mrem/yr is based on new data. The change from 1,000 to 10,000 years is based on a desire for consistency in different parts of the standard. They will also have a groundwater protection standard of 4 mrem/yr CED with additional concentration limits on α contamination. Part 191 will include a statement that compliance with part 191 meets the intent of Underground Injection Control and the Safe Drinking Water Act. EPA may modify part 191 to be consistent with whatever they come up with for Yucca Mountain after the NAS study.

DOE Technical Assistance and Recent Developments Regarding 40 CFR 191 by E.P. Regnier, USDOE (3/1, 2:00pm VII).

In their recent technical assistance to EPA, DOE suggested that human intrusion be placed in bucket #2 via rulemaking and subjected to the three-bucket limits for bucket #2 (10x limits). They also made suggestions about the definition of a TRU waste disposal unit. A lengthy discussion followed the presentation. EPA thinks there is a reasonable likelihood of human

intrusion and therefore rejected DOE's suggested treatment of human intrusion. DOE's suggestions about defining a TRU disposal unit seemed to be better received. A side discussion then occurred concerning the impact of the Energy Policy Act. DOE considers that, under the Energy Policy Act, NAS is obligated by statute to conclude that a standard based on individual doses is appropriate. They are confident that such a standard would eliminate the C14 dilemma. They also consider that human intrusion has been removed from regulatory concern by the Energy Policy Act. EPA commented about maybe considering multimode release limits, which EPA feels would address C14. EPA still likes collective dose. EPA did not openly dispute DOE's estimate of 10 μ rem average individual dose from C14 resulting in 4000 health effects over 10,000 years when converted to collective dose. They also did not openly dispute DOE's assertion that the risk from C14 needs to be compared to other risks.

Carbon-14 Releases from an Unsaturated Repository: A Senseless but Expensive Dilemma by Chris G. Pflum, SAIC (3/1, 2:00pm VII).

Mr. Pflum's argument is as follows. The unsaturated repository could result in an individual dose from C14 of 0.05(?) mrem/yr if the quick release fraction were released. We are each subjected to 1.3 mrem/yr from the C14 in our bodies. Because the EPA standard is based on collective dose across the globe, the unsaturated repository could release more C14 than the standard allows. No C14 transport calculations were presented. A high-integrity canister to prevent C14 from being released from the waste package will cost \$3.2 billion. 26,000 curies/year of C14 are produced globally annually. The repository could produce 1 curie/year, which is much less than that produced by a coal fired power plant, a nuclear power plant, or a reprocessing plant.

LLW Performance Assessment Technical Issues and Branch Technical Position by Andrew Campbell, USNRC (3/2, 8:30am XII).

The NRC is developing staff capability, defining LLWPA, and demonstrating one acceptable method for demonstrating compliance with part 61 in the Branch Technical Position currently under revision. Difficult issues include how much data is needed, how to handle the iterative nature of the process, the use of distributions for parameters, the role of the engineered barriers, and the treatment of uncertainties. They have developed a model by combining submodels. Their standard is based on individual dose to the maximally exposed individual. Their treatment of parameter uncertainty includes variation of parameters involved in the dosimetry.

Updated Recommendations for Low-Level Waste Performance Assessments by Matthew Kozak and Natalie Olague, SNL (under contract to NRC) (3/2, 8:30am XII).

SNL recommends an iterative, participatory process with formal treatment of sensitivity and uncertainty and a conservative bias. They recommend treating parameter uncertainty by using distributions. They recommend handling alternate conceptual models by using several which can explain the available data. The one which is most conservative is then used for comparison with the standard. In the iterative process, conservatism is only removed if it is clearly indicated by new data. A regulatory decision will have to be made

about how much of the distribution of estimated individual dose to the maximally exposed individual must be within the regulatory limits. They are addressing problems with the transferability of validation, developing a single computational platform, improving the source model, improving the groundwater model, and improving the dosimetry.

A Small Town that Considered & Rejected Volunteering for an MRS Study -- Lessons Learned by S. H. Kale, Dynamac (3/3, 1:30pm XXX).

The speaker is a nuclear engineer who approached the small city of Conneaut, Ohio about volunteering for an MRS study. In his paper, he provided details of his experiences with the MRS process. He approached the mayor and superintendent of schools, who quickly became enthusiastic about the idea. He did some preliminary research to make sure the site seemed to be technically feasible. He made sure the mayor knew that anti-nuclear activists would oppose the concept. The mayor said he could handle it. The mayor insisted on convening a steering committee he appointed before telling the public about the idea. They met one evening and heard about it. The mayor told them not to talk to anyone, but to think about it and tell him at the end of 1 week what each of them thought of the idea. The next day, anti-nuclear activists were picketing outside the mayor's office. By noon, the mayor announced that the concept of hosting an MRS had been rejected. There was a committee which formed without the mayor's blessing to consider the idea further, but they folded. The speaker concludes first, that there is very strong widespread sentiment against nuclear power, and second, that there are a lot of people who do not trust the federal government.

Issues Stalling Hanford Waste Management and Cleanup Activities by F.R. Cook, ERWM (presented by Russell Jim of the Yakima Indian Nation -- typed text of speech - Enclosure 2) (3/3, 1:30pm XXX).

The Yakima Nation is unhappy about DOE's plans not to clean up all of Hanford for unrestricted use now that DOE is through with Hanford. These plans are acknowledged in a publication written and distributed by DOE at another session. DOE promised the Yakima cleanup for unrestricted use when the Yakima ceded the land to DOE. We have no jurisdiction over most of this dispute. It should be noted, however, that the Yakima say that DOE's design for a hot repository at Yucca Mountain is incompatible with the casks which DOE has selected to store the Hanford tank waste. They also say that DOE plans to store some of the tank waste at Hanford in near-surface disposal facilities. They say that the defense waste cleanup and OCRWM parts of DOE are not communicating. They also say that the culture change which DOE advertises has not happened at Hanford.

Partitioning and Transmutation: Near-Term Solution or Long-Term Option? by Thomas Issacs, USDOE (3/4, 8:30am XXXIX).

Mr. Issacs argument is as follows. Partitioning and transmutation is sometimes viewed as an alternative to siting a HLW repository. Reprocessing was seen until 1989 solely as a way to extend the uranium supply. Waste management was not a concern. Perhaps in the long term, an IFR with advanced reprocessing and burning of minor actinides will be an attractive alternative

to light-water reactors. Partitioning and transmutation is not a near-term solution, however. He is skeptical of the suggestion that a repository with a reduced inventory will be any more acceptable to the public. The economics of partitioning and transmutation are very unfavorable at present. A long-term commitment to nuclear power would be necessary even if the process became cheaper. There is a large amount of defense HLW which cannot go into the partitioning and transmutation input stream. The main partitioning and transmutation waste stream is a HLW waste stream which is chemically altered to be much more available than the input. The partitioning process would need to become 5 to 7 orders of magnitude more efficient than is possible at present for the partitioning and transmutation output stream to be stabilizable to produce no more groundwater contamination than the spent fuel from which it was produced. The partitioning process also produces secondary low level and mixed waste streams. The USA is having difficulty siting LLW facilities, too. Some of the other speakers at this session seemed enthusiastic about partitioning and transmutation as a near-term option, particularly the Japanese. None of them, however, addressed the issue of managing any of the wastes from the process. I had to leave early to catch my plane, so I would have missed any discussion which occurred at the end.

Nevada Wants Fair Shake by John Macko (article appeared in WM93 publication--no oral presentation - Enclosure 3).

In the attached article, Mr. Macko reported that Gov. Bob Miller of Nevada has expressed his desire for Secretary of Energy Hazel O'Leary to listen to his concerns. Governor Miller has talked to President Clinton, who assured Miller of his interest and understanding. President Clinton has spoken to Secretary O'Leary about his desire to see Nevada treated fairly. (see attached article).

Except where noted above, vugraphs or other records of the presentations are unavailable. As noted before, the proceedings have been promised for June. All materials available are on file in my office (5-H-16\504-4668).

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Enclosures:
As stated

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MONDAY, MARCH 1, 1993

8:00 AM--Introductory Remarks
(Music Hall, TCC)*

1. Welcome to Tucson and the University of Arizona-Michael Cusanovich, Vice-President for Research, University of Arizona
2. Welcome and Presentation of Awards-Dave Rossin, President, ANS

Best Poster Paper-WM'92

Use of Rare Earth Tracers as Pu Surrogates in ISV Studies-August Cronenberg, ESA

Best Oral Paper-WM'92

Lessons Learned from Cleanup Projects-William Adams, USDOE

8:30 AM--Plenary

Co-chair: J. Vrijen, COVRA
Dave Rossin, ANS

1. Spent Fuel Management and Waste Minimization in France and the World-J.P. Giraud, J. Pijsselman, COGEMA (FRANCE)
2. Siting in the 21st Century: The MRS Moves Ahead-David H. LaFoy, Nuclear Waste Negotiator
3. Technology and the Media-The Solution or the Problem-Lou Waters, CNN

10:15 AM--III. State, Compact and Utility Status, Issues and Plans for LLW Storage and Disposal-Part I

Co-chair: John Randall, NYLLRW;
Vern Rogers, Rogers & Assoc.
SO(s): George Antonucci, Chem-Nuclear;
John Randall, NYLLRW

1. Integration of Low-Level Waste Storage and Disposal Requirements in the 1990s-R.T. Anderson, S. Pearson, Chem-Nuclear
2. New York State's Low-Level Radioactive Waste Storage Study-John P. Spath, Heidi Voelk, Hal Brodie, NYSERDA; Ralph Wild, D&M; Catherine Stanton, CSA
3. Low-Level Waste Storage: Underlying Sociopolitical Issues-Mary R. English, EERC
4. Radioactive Waste Reclassification-David V. LeMone, Univ. of TX; Lawrence R. Jacobi, Jr., TX LLRW OA

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2:00 PM--VII. HLW Disposal Standards and Compliance

Co-chair: Ron Izatt, USDOE-RL;
Joe Spencer, PNL
SO(s): Don Wood, WHC

1. IAEA Sub-Group on Principles & Criteria for Radioactive Waste Disposal-A Status Report on Activities to Date-K. Bragg, AECB (CANADA)
2. Nordic Criteria for Disposal of High Level Waste in the Perspective of International Development in the Area-J.O. Snihs, E. Ruokola, G. Johansson, S. Norrby, R. Mustonen, S. Wingefors, SRPI (SWEDEN)
3. The Proposed USEPA Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes (40 CFR Part 191)-Raymond Clark, Floyd L. Galpin, James M. Gruhke, USEPA
4. DOE Technical Assistance and Recent Developments Regarding 40CFR 191-E.P. Fegnier, USDOE
5. The Perspectives on the Ongoing Development of the HLW Disposal Standard-Maureen Conley, RE; Edward Helminski, Exchange Publications
6. An Economic Perspective on EPA's High-Level Waste Rule-C. Elliot Foutes, USEPA
7. Carbon-14 Releases from an Unsaturated Repository: A Senseless but Expensive Dilemma-Chris G. Pflum, SAIC

8:30 AM--XII. LLW Regulations and Performance Assessments

Co-chair: J.A. Coleman, USDOE-HQ;
Don Wood, WHC
SO(s): Don Wood, WHC

1. LLW Performance Assessment Technical Issues and Branch Technical Position-Andrew Campbell, USNRC
2. Updated Recommendations for Low-Level Waste Performance Assessment-Matthew Kozak, Natalie Crague, SNL
3. Waste Acceptance Criteria for Shallow Land Repositories-L. Nachmilner, NPI (CZECHOSLOVAKIA)
4. Potential Impact of DOE's Performance Objective for Protection of Inadvertent Intruders on Low-Level Waste Disposals at Oak Ridge National Laboratory-David Kocher, ORNL
5. On Establishing Concentration Limits for Low-Level Radioactive Waste Disposal Facilities-Roger R. Seitz, INEL; David C. Kocher, ORNL
6. Low-Level Radioactive Waste from Nuclear Power Generating Stations: Characterization, Classifications and Assessment of Activated Metal and Waste Streams-V.W. Thomas, D.E. Robertson, C.W. Thomas, PNL
7. Performance Assessment for LLRW Disposal in a Near Surface Repository-D.S. Rattan, AECL (CANADA)
8. Application of Lysimetry Data to Performance Assessment Evaluations of an LLW Disposal Facility-John W. McConnell, EG&G; R.D. Rogers, INEL; Terry M. Sullivan, BNL; J.D. Jastrow, ANL; D.S. Wickliff, ORNL; Richard R. Brey, Purdue

1:30 PM--XX. Progress at YUCCA Mountain-Compliance and Suitability

Co-chair: Lowell Snow, Roy F. Weston;
Bill Griffin, Fluor-Daniel
SO(s): Lowell Snow, Roy F. Weston;
Carl Gertz, USDOE-ID

1. 1992: When Things Began to Move at Yucca Mountain-Carl Gertz, USDOE; Sheldon Teitelbaum, SAIC
2. Early Evaluation of the Suitability of the Potential Repository Site at Yucca Mountain, Nevada-J. Russell Dyer, USDOE; Jean L. Younker, TRWESS
3. Annotated Outline Process for a Potential Mined Geologic Disposal System License Application-April VanCamp Gil, USDOE; Thomas M. Williamson, Duke Engr.
4. Issue Resolution Process: Yucca Mountain Site Characterization Project-Susan B. Jones, USDOE; Miguel A. Lugo, TRWESSI
5. Performance of a Potential Civilian Radioactive Waste Repository: Future Directions Derived from TSPA 1991 and Program Priorities-Jeremy M. Boak, USDOE; Holly A. Dockery, SNL; Abraham E. Van Luik, Intera
6. Application of Systems Engineering to the Licensing of a High-Level Nuclear Waste Repository-Joseph J. Holonich, Robert L. Johnson, USNRC; Patrick C. Mackin, CNWRA
7. The Development of Functional Requirements for the OCRWM Waste Acceptance System and Transportation System-M.A. Duffy, Battelle; T. A. Mozhi; R. Hahn, Weston; T. Truong, M. Senderling, USDOE

8:30 AM--XXIV. Environmental Restoration and Improvement

Co-chair: William D. Adams, USDOE-OR;
Steve McCracken, USDOE-WSSRAP
SO(s): Julie D'Ambrosia, EnviroTech

1. Environmental Restoration Waste Management Pollution Prevention Numerical Scoring System Model-B.E. Phifer, Jr., J.T. Grumski, S.M. George, MMES
2. Soil Washing as a Potential Remediation Technology for Contaminated DOE Sites-Jas S. Devgun, M.E. Natis, ANL
3. Remediation of Transuranic-Contaminated Coral Soil at Johnston Atoll Using the Segmented Gate System-Kathleen S. Moroney, N.R. Johnson, J.D. Moroney, TMA/Eberline
4. Full-Scale Field Demonstration and Testing of Physicochemical Processes for In Situ Treatment of Soil Contaminated by Volatile Organic Compounds in the Presence of Radioactive Substances-R.L. Siegrist, M.I. Morris, O.M. West, D.D. Gates, D.A. Pickering, R.A. Jenkins, T.J. Mitchell, D.W. Greene, C.A. Muhr, S. Herbes, T.M. Gilliam, H.L. Jennings, A.J. Lucero, J. Zutman, T. McKnight, D. Davenport, J.S. Watson, ORNL
5. Application of Electrokinetic Migration Technology for Removal of Chromium and Uranium from Unsaturated Soil at SRS-Jane P. Bibler, A.B. Osteen, WSRC; Thomas F. Meaker, Effingham City HS
6. Field Test of Six-Phase Soil Heating and Evaluation of Engineering Design Code-T.M. Bergsman, J.S. Roberts, D.L. Lessor, W.O. Heath, PNL
7. Investigation of Potential for Occurrence of Glass Displacement Events During In Situ Vitrification of Combustible Wastes-Janet S. Roberts, Christian W. Strachan, Je-Kael Luey, PNL
8. Investigation of the Saturation Profile and Resulting Contaminant Transport in the 100°C Isoband Outside of an ISV Melt-Janet S. Roberts, Bill L. Kuhn, Lesley J. Snowden-Swan, PNL

1:30 PM-XXX. Public Involvement and Institutional Roles in Waste Management Management

Co-chair: Critz George, RE/SPEC;

John Shideler, JK Assoc.

SO(s): Linda Ulland, Weston

1. **Public Involvement Activities at the Nation's Hanford Federal Facility, from the Regulating State's Perspective-Mary A. Getchell, WA**

2. **Compliance Strategies: A Regulator's Viewpoint-C.O. Ruud, L.E. Russell, D.D. Teel, G.T. Tebb, WA Dept. of Ecology**

3. **Public Acceptance and Nuclear Waste: Do New Technologies Matter?-Amy S. McCabe, PSU; E. William Colglazier, ERWM**

4. **Options for Citizen Participation and Technical Oversight of St. Louis-Area Radioactive Waste Sites-Linda A. Witt, Robert P. Morgan, WA U**

→ 5. **A Small Town that Considered & Rejected Volunteering for an MRS Study-Lessons Learned-S.H. Kale, Dynamac**

→ 6. **Issues Stalling Hanford Waste Management and Cleanup Activities-F.R. Cook, ERWM**

7. **Contrasts Between the Environmental Restoration Challenges Posed by Uranium Mining & Milling in the United States and the Former East German Republic of the Soviet Union-Roger Nelson, Jacobs; A.R. Chernoff, UMTRA; W. Goldhammer, BSP**

1:30 PM-XXXII. Mixed Waste Characterization, Treatment, Management and Compliance (Including Storage and Systems Analysis)

Co-chair: Leon Borduin, LANL;

Myron Kaczmarek, Ebasco

SO(s): Leon Borduin, LANL;

Gary Benda, Chem-Nuclear

1. **Estimation of Initial Costs of DOE Mixed Low-Level Waste Management Options-Sayan Chakraborti, M. Devarakonda, Mark Abashian, IT Corp.; Jo-Ann Bassi, USDOE**

→ 2. **Application of a Multicriteria Decision Technique for Evaluation of DOE Mixed Low-Level Waste Management Options-Fritz Seiler, Sayan Mark Abashian, Chakraborti, Sayan Chakraborti, Sinisa Djordjevic, Murthy Devarakonda, IT Corp.; Jo-Ann Bassi, USDOE**

3. **Evaluation of the Regulatory Compliance Impact on DOE Mixed Low-Level Waste Management Options-M. Abashian, Sayan Chakraborti, IT Corp.; Jo-Ann Bassi, USDOE**

→ 4. **Evaluation of Treatment Technologies for Immobilization and Volume Reduction of Mixed Wastes-Heather Holmes Burns, WSRC**

→ 5. **Insights Gained from Evaluations of Alternatives for the Treatment of INEL Low-Level Waste and Low-Level Mixed Waste-W.S. Rossener, M. Jorgenson-Waters, T.H. Smith, D.E. Sheldon, EG&G-ID**

6. **Drum Processing and Sludge Dewatering Projects K-25 Site, Oak Ridge, Tennessee-SA Johanson, J.C. Christian, CWMNRS**

7. **Use of Life-Cycle Cost Estimates in the Evaluation of Proposed Waste-Treatment Facilities-T.E. Smith, D.N. Stoddard, T.H. Smith, W.S. Rossener, INEL**

8. **Methodology for Defining and Categorizing Radioactive Mixed Low-Level Waste Streams for the U.S. Department of Energy-T.D. Kirkpatrick, R.L. Black, D.M. Ahmed, EG&G**

8:30 AM--XXXVI. Decontamination and Decommissioning Technology and Issues and their Impact on Waste Management

**Co-chair: Tom H. Smith, EG&G-ID;
Cedric Mogg, NIREX
SO(s): Sue Mitchell, PNL;
Cedric Mogg, NIREX**

- 1. **The Legacy of D&D: Real Progress or Continued Deferral?**-M. Judson Lilly, David P. Boram, Jeffrey W. Nelson, Weston
2. **Licensing Experience for Decommissioning Fort St. Vrain**-Vincent F. Ukar, Dennis M. Popp, WEC
3. **Decontamination Experience at Rolls-Royce and Associates**-I. Armon, D. Pearson, Rolls-Royce
4. **Remote Dismantlement by Novel Adaptations of Conventional Equipment**-W.C. Sturtevant, R.D. Meyer, P.H. Horton, G. Subbaraman, Rockwell
5. **CO₂ Pellet Blasting Technology Applied Toward the Decontamination of 100,000 Pounds of Radioactively Contaminated Lead Items**-D.M. Osborne, M.J. Hochbrueckner, NRT; C. Norton, Environmental Alternatives
6. **Reactor and Facility Decommissioning at the Army Materials Technology Laboratory-A Model for Controlling Decommissioning Work**-Karl A. Swenson, William Pananos, Richard Skryness, S&W
7. **Response, Recovery, and Investigation of a Cesium Release and Subsequent Remediation of a Radiation Sterilization Facility**-E. Newman, J.R. Hightower, B.D. Patton, J.W. Snider, ORNL
8. **Decontamination Efforts at the Radiation Sterilizers, Inc. Facility in Decatur, Georgia**-Allen W. Fath, J.C. Christian, D. Brown, CWM

THURSDAY, MARCH 4, 1993 AM

8:30 AM--XXXVIII. Partitioning and Transmutation of HLW

**Co-chair: Atsuyuki Suzuki, Univ. of Tokyo;
Wayne Ross, PNL
SO(s): Larry Ramspott, LLNL;
Atsuyuki Suzuki, Univ. of Tokyo**

1. **Role and Influence of Partition and Transmutation on the Management of Nuclear Waste Streams**-L.H. Baetsle, Belgium NRE (BELGIUM)
- 2. **R&D Status on Transmutation of Minor Actinoids and Fission Products in JAERI**-Hiroji Katsuta, U of Tokyo (JAPAN)
- 3. **Application of Modified TRUEX Flowsheet to Minor Actinide Separation from High-Level Liquid Waste**-M. Ozawa, S. Nemoto, K. Nomura, Y. Koma, T. Kawata, U of Tokyo (JAPAN)
- 4. **Partitioning and Transmutation: Near-Term Solution or Long-Term Option?**-Thomas Isaacs, USDOE
5. **Transmutation of HLW (Actinide Nuclides and Fission Product)**-Qiu Lijian, Wu Yican, IPP (CHINA)
6. **Transuranic Material Recovery in the Integral Fast Reactor Fuel Cycle Demonstration**-Robert W. Benedict, K.M. Goff, ANL
7. **Hypothetical Criticality Accidents in Dilute Plutonium-Water Solutions: A Potential Transuranic Storage Hazard**-David L. Hetrick, Drew E. Kornreich, U of AZ
8. **Radiation Dose Levels in the Handling of Minor Actinide Fuels**-G. Ncolou, L. Koch, CEC (GERMANY)

ISSUES STALLING HANFORD WASTE MANAGEMENT AND CLEANUP ACTIVITIES**Abstract--**

The Yakima Indian Nation has focused its attention on four key issues/actions requiring resolution for progress at Hanford to occur in the area of waste management and cleanup. Such progress is considered necessary by the Yakima Nation to assure continued funding by Congress. These actions are: 1. Establishment of a regulatory presence relative to long-term storage of high-level radioactive wastes, long-lived decontamination and decommissioning waste and commercial spent fuel at Hanford. 2. Resolution of outstanding safety concerns associated with explosion hazards in double and single-shell tanks. 3. Cost effective integration of Hanford high-level radioactive waste management system conceptual designs with the conceptual design of the Yucca Mountain repository project under the Office of Civilian Radioactive Waste Management. 4. Coordination of cleanup and disposal actions, justified by comprehensive performance assessments that project long-term environmental health over the entire site with time, considering any and all projected land uses. The paper will review these issues/actions and the Yakima Nation's concerns relative to the current direction of DOE, the State of Washington and other relevant parties.

Introduction--

I am Russell Jim, Manager of the Yakima Indian Nation's Environmental Restoration/Waste Management Program overseeing Hanford activities. I want to thank Roy Post for inviting us to make this presentation and to the Department of Energy for supporting our Program through a grant allowing participation in the activities at Hanford. Such action helps implement the DOE's policy of interacting with Indian Tribes on a government-to-governments basis and consulting on pre-decisional matters to ensure compliance with Treaty rights.

Background--

The Yakima Indian Nation has actively participated in the activities at the Department of Energy's Hanford Site for many years, however, substantive results of these activities only began to be apparent about 15 years ago.

The most significant result was formal recognition of affected Tribal status by the United States of YIN participation in the management of nuclear wastes as provided in the Nuclear Waste Policy Act.

Consistent with provisions in this Act, the Yakima Indian Nation reviewed the pre-decisional activities of the Department of Energy and its contractors at Hanford to characterize a proposed site for a high-level radioactive waste deep geologic repository. Because of efforts of the Yakima Nation and others, this site was shown to be unacceptable for the disposal of the radioactive wastes designated for such repositories.

The Yakima Nation's basis for its position did not include a bias either for or against nuclear power. Its actions were based on assuring the integrity of the environment at Hanford and in assuring the future for the children still unborn. We like to think of the Earth and our Northwest home as being loaned to us by the future children.

Requirements on the geological portion of the proposed Hanford

repository system--i.e., the ground water travel time--was shown to be likely unacceptable. In addition, the impracticality of constructing a repository in the proposed repository horizon as a result of ambient rock temperatures, adverse rock mechanics associated with the high in-situ rock stress and inferior rock quality, and ground water saturated in methane, was highlighted and revealed to the decision makers in Washington. As a result, the project at Hanford was canceled by amendments to the Nuclear Waste Policy Act, thereby focussing future hopes for a repository on the candidate Yucca Mountain Site in Nevada.

Thus, the Yakima Nation's motivation was not that of being anti-nuclear, but rather by a concern for the prospects of potential long-term environmental degradation of lands and waters for which it has reserved usage rights per the Treaty of 1855 with the United States.

Regulatory Presence Regarding Radioactive Wastes--

The same concerns regarding the long-term integrity of the Hanford environs, including the Columbia River, prompted the Yakima Nation to continue its oversight of waste management and environmental restoration activities at Hanford.

Because of these concerns, about two years ago we started to

indicate to the Department of Energy that their plans to dispose of high-level radioactive waste in a near surface series of grout vaults at Hanford was not necessarily the best way to proceed. We pointed out that the United States policy for disposal, as spelled out in the Nuclear Waste Policy Act, was to use a deep geologic repository. Although DOE plans called for disposing of about 75% of double-shell tank wastes in the deep repository, 25% was slated for Hanford disposal in grout vaults.

The DOE considered this waste stream to be "incidental waste" even though it would have contained 32.3 million curies for all single shell and double shell tanks in about 270 grout va, including the daughters of cesium and strontium.

The Yakima Nation felt that the DOE decision regarding grout disposal was inconsistent with the policy of the Nuclear Waste Policy Act and, in any case, would not be "demonstrated" to meet pertinent long-term performance objectives.

A solution for DOE is to dispose of all the tank wastes at Hanford in a licensed repository.

We consider that this option is attractive since it would eliminate a potential long-term environmental threat, it would likely reduce total Hanford Tank Waste Remediation system costs, even when considering repository costs, and it would expedite Hanford tank

remediation and tank farm cleanup. These conclusions stem from the fact that treatment systems for splitting tank wastes into two fractions would be unnecessary and primary operations would be limited to those associated with retrieving, stabilizing and packaging the wastes.

Current Activities Posing Environmental Threats--

As noted above the Yakima Nation is also concerned about current activities and their effects in the short term on the environment at Hanford. The potential catastrophic failure of high-level radioactive waste storage facilities, including the water cooled storage basins for N-Reactor fuel at the Hanford K-Reactor and the leaking and potentially explosive underground storage tanks, are prime examples of such issues.

Other operational policies that provide for the continued contamination of the soils, air and ground water are also problematic. The Department of Energy Order that allows contractors to continue to discharge gaseous I-129 and C-14 to the atmosphere after dilution with large quantities of facility ventilation exhausts and/or the atmosphere at the top of the stacks, and the discharge of tritium to the ground water (allowed by DOE Order 5400.5) or the Columbia River after dilution has occurred are examples of such policies. In addition the discharge

of nitrates, technetium and uranium to the soil column and ground water, such as is planned for operation of U-Plant at Hanford, also falls into the category of continued contamination.

We have proposed that such operations cease. We believe that until the culture changes at Hanford, real progress toward cleanup and public acceptance will not occur. Legal challenges will increase along with delays and cost increases. We would note that the issue associated with the U-Plant is currently being litigated.

Some of our recent attention has focused on the safety issues associated with the double-shell storage tank, 101-SY. This tank is considered by DOE to be its most serious safety hazard. It generates a burnable mixture (some people refer to the mixture as explosive) of nitrous oxide and hydrogen. Straight forward schemes for mitigating this tank (for example, by diluting the sludge layer with caustic) have been identified by the Hanford contractors for many years.

However, the DOE has been unable to decide to utilize some of the 5 million gallons of excess double-shell tank capacity at Hanford to help accomplish this mitigation. Instead the DOE continues to hold spare double-shell tanks empty awaiting the treatment of other wastes currently in tank storage or for emergency uses. These non-actions are in way of assuring compliance with Tri-Party milestones (for which DOE has requested relaxation) for the treatment and

disposal of high-level radioactive wastes slated for the grout vaults previously noted.

In our consideration the regulators are affecting safety at Hanford by their refusal to relax the grout schedule and to thereby free up spare tankage.

In addition to the utilization of spare double-shell tank space, the Yakima Nation has also suggested utilizing readily available railroad tank cars for the interim storage of the alpha emitting wastes in 102-SY, freeing-up this tank for treatment of the nearby 101-SY wastes.

Nevertheless, in lieu of expediting the chemical treatment of the 101-SY wastes, the DOE has decided to embark upon a program with no promise of eliminating the generation of the burnable gaseous mixture. This current scheme is to "test" a 150 horsepower, electrically driven, 450 volt submersible motor pump to agitate a small volume (a 5- to 10-foot radius from the pump) of the tank sludges, expected to cause the continuous evolution of the burnable mixture. It is hoped that this agitation may affect the whole tank and eliminate the episodic large releases of the burnable mixture. It is recognized that treatment of the 101-SY wastes to eliminate the gas generation problem will not be accomplished by the pump mixing plan.

We have clearly stated our concern about the lack of caution in the plan to introduce the high-voltage electrical gear into the highly energetic and dangerous environment of the 101-SY tank. This concern is heightened by the fact that there is no planned simulation testing for expected episodic tank conditions utilizing sludge like materials that simulate the 101-SY tank wastes.

DOE has argued that the pump operation in 101-SY is considered a test for which there is no requirement to consider other low risk alternative actions (the pump operation is part of an R&D program). Thus, DOE has not considered safer alternatives for ultimate mitigation with less potential environmental impact. This is expressed in their environmental assessment of the "test" program. Based on a safety analysis report, DOE claims that the pump operation is safe enough.

Again we want to note our conclusion that until the current practices of soil, water and air contamination are stopped, and meaningful safe mitigation of safety hazards is accomplished with meaningful and responsive environmental assessments, public acceptance will not be achieved and real progress will not be made in environmental restoration at Hanford.

Integrating Hanford Waste Management with Deep Geologic Repository/Monitored Retrievable Storage Facility Planning--

In discussion of the grout program I mentioned repository costs in considering the overall Tank Waste Remediation System at Hanford. Indeed repository costs as reflected by the system designed to accept Hanford wastes should be considered in the selection of Hanford's remediation. In this regard the Yakima Nation has been urging this coordination between the civilian and defense waste management entities at DOE.

Although concepts at Hanford have evolved to include consideration of large shielded packages (up to 11 cubic meters net capacity) for the waste, compatible with monitored retrievable storage facility concepts, the repository design being considered for Yucca Mountain does not include enough room in the drifts for the large number of stabilized waste casks that could be produced at Hanford. It would appear that this lack of space in the repository is influenced by the limited space available between fault zones at the Yucca Mountain Site and the related design initiative by DOE to pursue a "hot" repository concept. (The "hot" repository concept is necessary to provide room for 70,000 metric tons of spent fuel within the fault boundaries at Yucca Mountain.)

If the repository design concept were to embrace a more traditional "cold" design, additional space would be available in drift waste emplacement schemes to accommodate the Hanford shielded packages, estimated to number about 13,000, if all the Hanford tank wastes were stabilized without pretreatment.

The "hot" repository concept hinges on several key issues regarding the current NRC design requirements for the geologic portion of the waste isolation system. In particular, the relation of the repository disturbed zone to the accessible environment and the ground water travel time (required to be 1000 years) between the edge of the disturbed zone and the accessible environment are key design parameters at issue. It will be difficult to prove that the disturbed zone would not extend to the surface, considering the thermo-mechanical expansion the geologic system would suffer in the "hot" scenario.

Since the Hanford Tank Waste Remediation System costs are comparable to the entire projected repository cost, it warrants close coordination between the conceptual design efforts of the two DOE entities involved in the respective conceptual designs to assure a cost effective and environmentally sound outcome.

Coordination of Disposal and Cleanup Actions--

There is much talk about cleaning up Hanford. However many of the proposed actions merely shift wastes from one location to another creating new disposal facilities on undisturbed lands. Thus, long-term environmental problems are only being moved around. This has been our concern with the proposed grouting of high-level

radioactive waste discussed earlier. In addition, there are several different disposal areas either planned or operating at Hanford. These include the Navy reactor plant, in-hull disposal, the U.S. Ecology low level radioactive waste site, various cribs and ditches, and defense low-level radioactive waste burial grounds. In addition, a mixed low level/hazardous waste site is being discussed.

All these disposal sites are inconsistent with future site use goals at Hanford, since they establish long-term environmental hazards and contamination that are incompatible with unrestricted general usage of the site. The sites require long-term performance assessments to demonstrate their compatibility with general usage by people in the distant future, including usage by the Yakima Indian Nation.

Such general usage of the site has been identified by a citizens group that recently assessed and identified the potential future uses for Hanford. It was recognized by this group that land usage should establish the design basis for clean-up as well as disposal actions.

Most requirements for performance assessments concerning radioactive waste disposal sites include the necessary consideration of general usage by people following some period after disposal facility closure. For example, the NRC's

requirements in 10 CFR 61, Subpart C, specifies such consideration of possible usages and specifies that institutional controls shall not be assumed to exist beyond 100 years past closure. Further, engineered barriers are in general not considered able to function after 500 years past closure.

To be sure, deep geologic isolation is considered necessary to achieve long-term isolation of long-lived wastes by the NRC and is United States policy as specified in the Nuclear Waste Policy Act.

It is the Yakima Nation's position that these criteria should not only apply to the U.S. Ecology disposal site that is subject to 10 CFR 61 requirements, but also to all other radioactive and hazardous waste sites at Hanford. Since the Yakima Nation has reserved usage rights on the site, including rights that involve common agricultural practices of pasturing stock, DOE or any other entity should not create permanent disposal facilities or avoid clean-up actions that would be inconsistent with the exercise of this right.

In this regard we have raised questions about the disposal of any materials that do not degrade or decay within the 100 year time frame following closure of a disposal site. In particular the current design practice for hazardous waste disposal facilities that provide containment for the period of time the facility is operated and for 30 years beyond, as verified by monitoring

programs, is inadequate in assuring the long-term integrity of the environment.

The long-term issue is not addressed by the current RCRA requirements. Likewise designers of disposal facilities for materials resulting from CERCLA clean-up do not adequately take into account long-term environmental effects of the disposal facility.

Finally, the cumulative effects of several disposal facilities in a given locale are not considered in evaluating the long-term integrity of the environment. In this regard the regulators at Hanford seem to take a position that, since they are not responsible for other disposal facilities, they do not have to consider the effects of nearby disposal facilities on conditions of the ground water and soils in the respective performance assessments to which their cognizance extends.

We are concerned that EPA officials at Hanford may be taking the position that the general use criteria recommended by the citizens group should not apply to the Hanford areas where disposal facilities are planned. This suggests a conclusion by EPA that parts of the Hanford Site should be dedicated for permanent restrictions on use.

We conclude that until a firm commitment is made to clean-up and restore the entire Hanford Site, contamination of the soils, water

and air will continue.

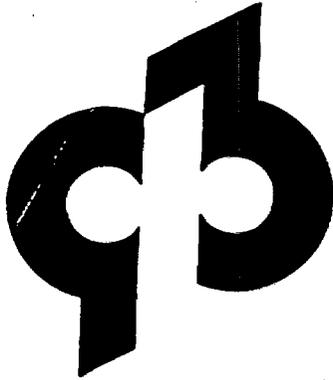
It is evident that the long-sought culture change talked about by DOE has still not become a reality at Hanford. The regulators participating in the Hanford Tri-Party Agreement continue to follow the old DOE culture. They use the argument that actions to avoid further contamination are not economically practical. This was the same argument that was used on Hanford in the 1960's to justify not resolving single-shell tank leaks and waste instability problems by calcination. We now have a multi-billion dollar clean-up task on our hands as a result.

Until long-term perspectives come to control decisions at Hanford (particularly long-term perspectives with respect to environmental integrity), public acceptance and meaningful clean-up will still not occur.

The long-term view of the Earth, and its inhabitants, is interwoven into the Yakima Indian Nation and its culture. It is true that we borrow this land, air, and water from our children, and that this cycle of life is unending. The responsibility to restore the Hanford land has been placed upon us; it must be restored as nearly as possible to its original condition, for all time.

Thank you ladies and gentlemen for your attention.

WM



The
**Environmental
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The Official Publication of the 19th annual WM Symposium

received its operating licence and is now under commission.

-- In Mexico, SGN is finishing a feasibility study for Comision Federal de Electricidad (CFE) assessing characteristics for LLW disposal.

-- For Atomic Energy of Canada, SGN has assessed the treatment of high-level liquid waste from the production of Mo 99 isotope. The study analyzes budget issues of technical options.

-- For IAEA, SGN will deliver, in May, a 40 ton compactor to be used by the AEA of Egypt. This small press will help Egyptians reduce waste volume from medical and research activities.

-- In Belgium, SGN won a bid from the Belgian waste management national agency for the design and construction of a pretreatment station for LLW to be installed at Mol. The facility will sort, precompact and decontaminate the waste.

-- At Chernobyl, SGN, in conjunction with Bouygues, will study how a new structure could cover the sarcophagus protecting the Reactor no.4. SGN will analyze safety and eventual dismantling of the reactor. Ukrainian authorities have received financial support from the French.

-- In the Czech Republic, the Waste Treatment Facility for Temelin will use the SGN process of bituminization. Tomelin is a new site where two 1000 MWe nuclear plants are under construction, expected to go online in 1995.

-- In Slovakia, SGN technologies have been chosen by Mochovec for the Waste Treatment Complex. The new site will put four 440 MWe nuclear plants in service by 1996. The Complex will be equipped with SGN's High Integrity Containers. The containers are manufactured by SGN's subsidiary Sogefibre, and under a technology transfer agreement, will be made locally.

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NEVADA WANTS FAIR SHAKE

by John Macko

All the Governor of Nevada wants is a fair shake and President Bill Clinton says that's what he's going to get.

Keeping the Yucca Mountain repository from opening remains the bottom line for Gov. Bob Miller. He said he hopes Hazel O'Leary, the new Secretary of Energy, will take an objective position on Yucca Mountain.

"We haven't been able to have an open conversation on this to date," he said. "It will be a pleasant change to be able to discuss it with someone who will listen to our concerns. Everyone to date has had one goal. Making it happen."

President Bush never was interested in Nevada's opposition to the repository, but Clinton, in a personal call to Miller, indicated his interest and understanding by speaking to O'Leary about it, Miller said.

O'Leary, however, while an executive with a Minnesota utility, told the Senate Energy Committee on March 31, 1992, she was frustrated by the slowness of the project, and she, "favored legislation to impose pressure on Nevada to issue the permits necessary to begin site characterization."

Miller said the stand taken by O'Leary worried him until President Clinton assured him she had been informed of Clinton's concerns about Yucca Mountain and his desire to see Nevada treated fairly.

"All we are asking for is some basic fairness and some honest evaluation," said Miller. "There is a huge monetary investment in this project."