

WM2009 Conference Panel Report

Panel Session 40: International SNF Recycling - Status and Near Future Progress Assessment

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This panel session was focused on updating Waste Management '09 attendees on spent fuel recycling activities. The panel discussed different approaches to recycling (aka reprocessing), institutional issues (regulatory and non-proliferation), and the broader political issues associated with addressing the sustainability of nuclear power through spent fuel recycling. Average Attendance was 60 people. Our thanks to Josh Peterson, University of Texas, Austin, the panel's student session supporter, for his excellent note taking that enhanced this panel summary.

The drivers for recycling were discussed including:

- Improving US energy security through a reliable, diverse and sustainable domestic energy supply,
- Enhancing options for nuclear waste management and disposal, and
- Expanding the benefits of nuclear power internationally in a way that does not increase the risk of proliferation.

Counter arguments to recycling were also discussed, including:

- Proliferation concerns associated with reprocessing technology and accumulated plutonium,
- Economic viability, and
- Adequacy of present international safeguards regimes.

The panel format consisted of a series of introductory remarks by each of the panelists expressing their viewpoints on recycling followed by a question and answer session among the panel members and with the attendees.

Panelists included:

- Sal Golub, Director, US DOE – Office of Fast Reactor Development;
- Martin Wheeler, EnergySolutions
- Dorothy Davidson, *Vice President, Nuclear Energy, Renewable and Science Programs* Nuclear Energy, AREVA Federal Services
- Earl Saito, Advanced Recycling Center Development Manager, GE-Hitachi
- Rod McCullum, Nuclear Energy Institute (USA)
- John Mathieson, Nuclear Decommissioning Authority (UK)
- Zvonko Lovasic, International Atomic Energy Agency

Panel Member Opening Remarks and Presentations

A brief synopsis of the main points made by each panelist is provided below. Even though the panelists were generally supportive of recycling, their differing views were associated more with tactics and strategy for recycling.

Nuclear Fuel Cycle Options

Sal Golub, Director US DOE Office of Fast Reactor Development, noted that the DOE focus has shifted from accelerated deployment of recycling facilities [under the former Global Nuclear Energy Partnership - GNEP] to a long-term, science-based R&D program. Innovative, science-driven R&D will enable the safe, secure, economic and sustainable expansion of nuclear energy. Nuclear power is poised to grow in the U.S., but there are uncertainties as discussed in Mr. Golub's presentation, and by other speakers. Therefore, the U.S. fuel-cycle management strategy must contain options to provide the flexibility we know we will need as conditions in the world change. **Industry Outlook for Used Fuel Recycling**

Rod McCullum, Director, Nuclear Energy Institute [NEI], concluded that the prospects for additional US Nuclear electricity generation are good and that industry is pursuing an integrated approach to used fuel management. The development of recycling technologies is an essential element of this approach and is a key to long-term nuclear sustainability. The industry wants DOE to recommend choosing to close the fuel cycle. *DOE's draft GNEP Programmatic Environmental Impact Statement provides a platform for completing the NEPA evaluation of recycling. Industry recommends DOE complete a Record of Decision opting to recycle.*

Advanced Recycling

Dr. Earl Saito, Advanced Recycling Center Development Manager for GE-Hitachi discussed a summary of where the industry was in 1992 to where it is now in 2008-9. He noted that the policy view of most governments and their legislatures (e.g., politicians) is neutral in nuclear. We need, as industry and professionals to get nuclear viewed as positive. During the last part of his presentation, Dr. Saito discussed both the advantage and added flexibility of creating state or regional Energy Parks, a concept of taking advantage of former federal cleanup sites as assets. Such parks could deal with the assessment of:

- Mature technologies — currently available technologies are implemented on a commercial basis as part of public-private partnership.
- Promising technologies — Nurture public private research and development. Lowers commercial risk for companies and focuses government programs.
- Developed Technologies — when R&D completes technologies move to commercial portions of energy parks.

Activities on Spent Fuel Management — Keeping the Recycle Option Open

Dr. Zvonko Lovasic, IAEA Nuclear Fuel Cycle and Material Section, presented a global view of the spent fuel management situation. He noted that international collaboration on the development of advanced reprocessing methods is essential to facilitate the future deployment of these technologies. Dr. Lovasic concluded by noting that non proliferation concerns will continue to be high on the agenda and will warrant the effort in arranging for multilateral approaches in the nuclear fuel cycle. Under these circumstances long term storage of over 100 years or more is a likely approach for many countries.

Recycling in the US: Taking what we have learned and defining the next steps

Dorothy Davidson, Vice President of Government Programs for AREVA Federal Services, concluded in her talk that after 2-1/2 years of study under the now defunct Global Nuclear Energy Partnership that the results are supportive of closed fuel cycle but there is work to do before a decision to recycle is made." She proposed a new waste strategy to achieve a nuclear renaissance in the US:

- Allow the NRC to complete its job of reviewing the YM license application while DOE looks at alternatives
- Establish Fedcorp to manage integrated strategy for used fuel including one or more repository, transportation and eventual recycling
- Take the nuclear waste fund off budget and out of the annual appropriations process.

- Task the Government (DOE or Fedcorp) with evaluating options to close the fuel cycle.
- Finally, the need for transparency was reemphasized. We must keep the dialogue going to enhance public acceptance.

Status and Nuclear Future Progress Assessment

Martin Wheeler, Energy Solutions' Vice President for the Nuclear Fuel Recycling Project advocated following an incremental approach to deployment of fuel cycle facilities: aqueous LWR recycling first to minimize risk and costs by using advanced processes on proven equipment followed by fast reactor and non-aqueous recycling later. He made the point that the US needs to start now in order to close the fuel cycle in the future. He concluded by reemphasizing that closing the fuel cycle can solve the nuclear waste problem, significantly reduce the amount, heat load and toxicity of high level nuclear waste, minimize risk of proliferation by transmuting plutonium while never producing pure plutonium, and improve US energy security by reducing dependence on foreign energy supplies.

The UK's Nuclear Development Authority [NDA]

John Matheson, Nuclear Decommissioning Authority (NDA - UK), presented an overview of the NDA's activities in recycling. The NDA is a non-departmental public body established in April 2005 to clean up the civil public sector nuclear legacy for sites and facilities built from 1940s onwards. With an annual funding of ~£2.8 Bn (\$4.04 Bn) it is responsible for executing an integrated waste strategy for 19 former UKAEA and BNFL sites. Primary activities include reprocessing used nuclear fuel at Thorp (thermal oxide reprocessing plant). Mr. Matheson indicated that an Oxide Spent Fuel Management Review is underway with a report due out this year (2009). It will evaluate the alternatives of reprocessing, interim storage, and direct (repository) disposal of used nuclear fuel.

Panel Question and Answer Section

Session co-chair, Jim Buelt of PNNL, moderated the panel session during questions from the audience. A synopsis of the questions and the panel responses is available upon request from the session co-chair (james.buelt@pnl.gov). The synopsis is not meant to be a verbatim transcript of the discussion, but merely a paraphrased summary.