February Mixed Waste Subgroup Highlights

The Hanford STCG Mixed Waste (MW) Subgroup met on February 12, 1998 in the EESB Stampede Room. Mike Lilga (PNNL) gave a viewgraph presentation on electrically switched ion exchange (ESIX). Funding for this effort was provided by the Efficient Separations and Processing Crosscutting Program (EM-50) and the work was done with the University of Washington and Electrosynthesis Co., Inc. The ESIX concept does not involve the use of any acids or bases in solution and no external chemicals are needed to regenerate the system. There is minimal secondary waste generation, no ion exchange resins to dispose of, and lower capital costs compared to an RF resin system. Some of the other advantages of the ESIX system are that it is remotely operated, has less worker exposure, and is mobile and small. Some of the targeted waste streams for ESIX include INEEL ICPP dissolved calcium waste and process water from D&D, effluent treatment facilities, etc. The current ESIX research objective was to evaluate a number of electroactive films for separating Cs from solutions that have high Na concentrations. New films are being tested now including some for Sr and TRU elements. The ESIX can be operated in either a flow-through or flow-by mode with stacks of cells to achieve the desired concentration. Mike then presented the results of a study done on K-Basin waste decontamination with ESIX. The results showed that ESIX saved $1.5 million per year as compared to the current method or baseline. This would result in a payback period of about 4 months. A large-scale ESIX system will be in operation by the end of the FY.

Xiangdong Feng (PNNL) gave a viewgraph presentation on Self Assembled Monolayers on Mesoporous Supports (SAMMS). This new class of materials are being developed to remove RCRA metals and radionuclides from a variety of media. SAMMS have high capacity due to high surface area and are made to be specific/selective for a particular waste type. The focus of the research so far has been on the removal of Hg from SRS wastewater and oil waste. A field demo is planned in June 1998. Three industrial partners are involved so far. Cost estimates are completed and show considerable cost savings from the baseline method. Other potential DOE end-users identified include the following at Hanford: actinide removal from Tank Waste, Pb removal from D&D waste, Tc and Cr removal from groundwater, actinide removal from PFP water, and Tritium removal from K-Basin water. One of the more positive attributes of SAMMS is that there is no secondary waste. At the present time SAMMS research is on liquid systems, but the gas phase will be examined after that.

Jim Hanson talked about an information exchange meeting attended by a number of Hanford individuals dealing with technologies for the NDA of RH-TRU waste. This meeting was hosted by the MWFA in Idaho Falls on January 29 and 30 and Larbi Bounini and Tony Peurrung were on the agenda. Tony presented the TRU assay proposal that he reviewed at a previous MW Subgroup meeting. Present at the MWFA were researchers working on the same type of problems that Tony's research addresses. This meeting allowed communications to be set up among the researchers and with the problem owners at DOE sites across the country. Bill Bonner said two questions were raised by Tony's presentation. The first was whether you can really reflect neutrons as Tony presented. This was not seen as a showstopper by anyone at the meeting. The second question was whether the equipment Tony has developed could measure accurately down to 100 nanocurries/gram without other data. The answer was no, you would need other data to do so. The viewgraphs from the meeting are on the MWFA website for

viewing. A lot of work is being done on making a neutron generator and on capturing neutrons. Most of the technologies are years away from working. All of the technologies are for RH-TRU waste as CH-waste can be measured adequately now. With Tony's technology you would still need an isotopic analysis. WIPP will be the judge between the technologies for certification. If we were to use the new technology, we would need to have an independent ASME review of it. At this time Tony has some funds from DOE and some internal PNNL funding also to continue developing the technology. There is no funding from the MWFA this FY, but the hope is that they would provide some for next FY. A portable version of the device could be ready within two years, depending on funding availability. PNNL needs to see if it can be used for WIPP certification or just for screening. WIPP will certify the characterization techniques, procedures, etc. at each site before they can ship to the repository. Joe Waring and Jim Hanson will ask the MWFA about the ASME review and Tony will present an update on the technology at the next MW Subgroup meeting.

Moses Jaraysi presented an update on the Washington State Ecology Certification Program. Ecology has a pilot project with three tasks to test out the program at Hanford. The three tasks are for certifying the use of the plasma arc for thermal treatment, the use of various techniques for the cleanup of PFP gloveboxes, and the use of various technologies for the D&D of C-Reactor. Each of these is a different type of certification program. Moses is working on the plasma arc certification task and will use an independent agency to help. A panel is being formed to set up the testing protocol, monitor operations, and verify the data gathered. The intent is to make the permitting, operations, and deployment of the technology easier for similar uses. The vendor has to put up the money for the certification testing. Hopefully, this program will speed up and improve the permitting process.

A conference call put together by the MWFA was held on the use of direct chemical oxidation (DCO) for treating Hanford waste. It was decided that the 77 cubic meters of PCB contaminated CH-TRU waste at Hanford may be amenable to DCO. LLNL has developed this technology for destroying organics and the conference call included the LLNL researcher. They want an expression of interest from us and then they would run a test of DCO using a surrogate of our waste to see if it meets the standards. They would like to start the test at the end of April, and it would take two to three months. If it was successful, then they would bring the technology up here to use on the drums.

Larbi Bounini mentioned that some MWFA representatives will be at Hanford on February 19 and 20 and to contact him if you would like to meet with them. The MWFA mid-year review is scheduled for March 31 to April 2 at INEEL. A plan is now being put together for WIPP certification of our wastes. Funding has been obtained for this and when the plan is done WIPP representatives will come and check it out. Hanford is not scheduled to ship waste to WIPP until the year 2000. A report on macroencapsulation is now undergoing comment review and clearance. Copies will be distributed to all subgroup members when they are ready. One more macroencapsulation technology will be examined this year and the ATG method also. A recommendation will then be made as to how to proceed. Joe Waring attended a review of the Efficient Separations and Processing Cross-Cutting Focus Area's programs. Joe stated that there was not much for MW cleanup at Hanford that he could see being developed by them.