

**Joint U.S.-Russian Workshop on the
Cobalt Dicarbolide Universal Extraction (UNEX) Technology**

Idaho National Engineering and Environmental Laboratory (INEEL)
Idaho Falls, Idaho
April 15-26, 2001

Russian Participants:

Alexander Rimskiy-Korsakov, Khlopin Radium Institute (KRI)
Valery Romanovsky, KRI
Igor Smirnov, KRI
Vasily Babain, KRI
Boris Zaitsev, KRI
Leonid Shklyar, Research and Development Institute of Construction Technology (NIKIMT)

U.S. Participants:

Terry Todd, Idaho National Engineering and Environmental Laboratory (INEEL)
Scott Herbst, INEEL
Jack Law, INEEL
James Rindfleisch, INEEL
Nolan Olson, INEEL
Jack Watson, Oak Ridge National Laboratory
Liliya Petrachenkova, Science Applications International Corporation (SAIC)
Tanya Albert, Thomas E. Albert and Associates, Inc.
Sergei Silitchev, Thomas E. Albert and Associates, Inc.

Background:

The contract between the United States Department of Energy (DOE) and the V.G. Khlopin Radium Institute of the Russian Federation, "Applicability of the Russian Separation Technology to Processing of U.S. Radioactive Waste," is being implemented under the auspices of the Joint Coordinating Committee for Environmental Restoration and Waste Management (JCCEM). The purpose of the contract, the period of performance of which is January 1-December 31, 2001, is further research on the correct solvent concentrations for UNEX and perfecting analytical methods, and testing of the UNEX process on dissolved calcine waste.

The main objectives of the workshop were to conduct a countercurrent flowsheet test of the UNEX process with actual INEEL dissolved calcine. The workshop activities included discussion of the flowsheet, preparation of solvent and reagents, running the test, and analyses of solvent and process streams.

Workshop Activities:

During the first week of the workshop, batch contact tests were performed using actual dissolved calcine samples and the UNEX solvent. From these tests, extraction, scrub, and strip distribution coefficients for Cs, Sr, and the actinides were generated. These distribution coefficients were used to finalize the flowsheet for testing during the second week of the workshop. Additionally, testing was performed in which the sulfone from the solvent used in last years testing was recovered for reuse.

During the second week of the workshop, flowsheet testing of the UNEX process using actual dissolved H-3 calcine (280 minutes of operation) was conducted to: 1) demonstrate the UNEX process and determine removal efficiencies of Cs, Sr, and actinides from actual dissolved calcine solutions; 2) evaluate the behavior of the non radioactive metals in the actual dissolved calcine with the UNEX process, and; 3) verify that flooding and/or precipitate formation does not occur while processing the dissolved H-3 calcine. Additionally, modification of the 3.3-cm centrifugal contactor weir system was performed and tested to eliminate the small amount of flooding observed in the strip product during last years UNEX flowsheet testing.

During the final day of the workshop, discussions were held on the test results, lessons learned, and FY02-03 work plans.

Jack Law presented the results from the UNEX flowsheet testing performed during the second week of the workshop. Removal efficiencies of 99.73%, 99.99%, and 99.92% were obtained for Sr-90, Cs-137, and total alpha activity, respectively. These removal efficiencies met or exceeded the goals for this flowsheet test.

Dr. Smirnov presented preliminary data on the new carbonate stripping solution that was successfully tested in Khlopin Radium Institute.

Dr. Romanovsky made a presentation on successful PA Mayak's industrial separation facility UE-35, which by that time has processed about 750 m³ of High-Level Waste.

Dr. Zaitsev made a brief overview of current progress on extraction mechanisms of UNEX project at Khlopin Radium Institute.

Proposed FY02-03 Work Plan

The discussions were held on FY02-03 proposed Scope of Work. It was agreed that next two years work will emphasize selection of the carbonate strip agent for the UNEX process, development and testing of the methods for its recovery and recycling. Another emphasis will be on development and testing of the flow sheet for processing the INEEL aluminium calcines with the application of the UNEX process.

It was agreed that DOE and INEEL will review the proposed Scope of Work. Once it has been approved by the U.S. side, it will be sent to Khlopin Radium Institute for review.

The Record of Meeting was signed:

For the U.S. side

Terry Todd
INEEL

For the Russian side

Alexander Rimsky-Korsakov
V.G. Khlopin Radium Institute