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MEMORANDUM FOR: Abraham L. Eiss, Acting Director
Special Issues Group
Program Management, Policy Development
and Analysis Staff, NMSS

FROM: B. J. Youngblood, Director
Division of High-Level Waste Management
Office of Nuclear Material Safety
and Safeguards

SUBJECT: RESPONSE FOR REQUEST FOR POTENTIAL PROJECTS FOR FORMER SOVIET
WEAPONS SCIENTISTS

In response to your request, we have enclosed three project descriptions
that might be suitable for assignment to the former Soviet scientists.

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B. J. Youngblood
Division of High-Level Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

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Potential Project for Soviet Scientists

High-Level Waste Performance Assessment

Soviet scientists are world renowned for the development and use of advanced mathematical methods. This capability was developed, in part, to compensate for the modest development and use of digital computers, which lagged behind Western practices. Current practices in the performance assessment of high-level waste repositories are pressing digital computer technology to its limit. It is possible that a combination of the advanced mathematical methods of the Soviet's combined with the digital computer technology and digital computational methods of the West could provide advances in the technology to analyze the performance of high-level waste repositories.

The objective would be to evaluate Soviet advanced mathematical analysis methods to determine whether such methods, alone or in concert with methods based on digital computer technology, could provide improved solutions to difficult problems involved in the performance assessment of a high-level waste repository. Such an effort would require: (1) a familiarization of Soviet scientists with the problems associated with the assessment of performance of a high-level waste repository, (2) an evaluation of how advanced Soviet mathematical techniques could assist in improving assessment methodologies, (3) if improvements appeared feasible, development of improved methodologies, taking advantage of the best of Soviet and Western methods, and (4) application of improved methods to both Soviet and Western problems of high-level waste management. The anticipated product would be an improved methodology and a demonstration of its application to one or more (probably at least two) high-level waste performance assessments. Probable time frames are two to four years, but accounting for language difficulties, three to six years may be more realistic.

Potential Projects for Soviet Scientists

Waste Package Performance :

Uncertainties associated with the performance of waste packages are one of the most important problems in high-level waste management for regulatory purposes. The objective of this task would be to utilize Soviet advanced materials technologies in the performance assessment of high-level waste packages. They have advanced technologies in many areas of materials engineering such as aqueous corrosion under radiation field; titanium technologies; technologies associated with the manufacturing of weapon parts; and radiational and thermal properties of waste forms. This effort would require: (1) a familiarization of Soviet scientists with the problems associated with the performance assessment of high-level waste packages, and (2) utilization of Soviet technologies to resolve the problems. The anticipated product would be improved methods of assessing the performance of high-level waste packages. Probable time frames of three to six years may be realistic.

Rare Metal Technology Application :

Technologies of rare metals are very advanced in Soviet Union. Those have been obtained during the course of the development of various nuclear weapons. The objective of this task would be to utilize those technologies in our industries not restricted to the nuclear technology. Examples of such rare metals are Germanium and Chromium for which the Soviets have advanced technologies. This effort would require: (1) a familiarization of Soviet scientists with the problems associated with special metals or alloys for the use in various industries, and (2) utilization of Soviet technologies to resolve the problems. The anticipated product would be improved technologies in the processing of rare metals and their alloys. Probable time frames of three to six years may be realistic.