

IMPLEMENTING ARRANGEMENT #2
UNDER
THE MEMORANDUM OF UNDERSTANDING
BETWEEN
THE UNITED STATES DEPARTMENT OF ENERGY
AND
THE RUSSIAN ACADEMY OF SCIENCES
ON
COOPERATION IN SCIENCE AND TECHNOLOGY

Title: RISK ASSESSMENT AND ADVANCED MODELING REGARDING GEOLOGIC DISPOSAL

Authority:

This Implementing Arrangement which is subject to the provisions of the Memorandum of Understanding between the U.S. Department of Energy and the Russian Academy of Sciences on Cooperation in Science and Technology, signed on March 24th, 1999 (MOU), has as its goal the practical implementation of the MOU. It takes into account the results and recommendations of the U.S. Department of Energy / Russian Academy of Sciences Workshop "Science behind Safe Geological Disposal of Radioactive Waste" held October 19-21, 1999, in Moscow.

Objectives/Scope:

1. Construction of conceptual models for transport processes in inhomogeneous media.
2. Development of numerical models addressing transport processes in inhomogeneous media on the basis of novel theoretical ideas.
3. Development of novel methodologies for spatial data analysis of environmental contamination at radioactive waste sites on the basis of geostatistics, stochastic simulation, and artificial neural networks.
4. Development of inverse flow and transport models with assessment of uncertainties.
5. Building a basis for developing recommendations to deal with the perception of the risk associated with deep disposal.
6. Use of state-of-the-art probabilistic risk assessment methodologies for risk assessment of waste disposal.

7. Environmental / economic impact analysis methodologies.
8. Other areas as mutually agreed, such as the development of other methodologies / approaches / models and gaining new scientific evidence for the purposes of risk assessment and advanced modeling regarding geologic disposal.

Expected Results:

1. Tools for systemic assessment of sites for safe nuclear waste disposal.
2. Better understanding of risks associated with radioactive waste storage both at surface facilities and in geologic environments.
3. Identification of key scientific problems to be solved involving radioactive waste disposal in geological environments.
4. Better theoretical description of heat and mass transfer processes.
5. Refinement of the theoretical basis for geochemical monitoring of ground water.
6. Modified computational algorithms and computer codes for describing stochastic behavior of seepage in inhomogeneous rock.
7. Robust models for risk assessment associated with water seepage behavior in thick blocks of fractured rocks.
8. Advanced methodology of spatial modeling of radioactive contamination in the environment.
9. Improved characterization of contamination and potential exposure doses at US. and Russian sites.
10. Validated techniques for modeling the spatial/temporal evolution of radioactive contaminants.
11. Improved methodologies and techniques for modeling the uncertainties associated with different remediation alternatives.

Funding Arrangements:

Funding arrangements shall be delineated in attached Appendices. All funding commitments contained herein shall be subject to the availability of appropriated funds.

Participating Organizations:

U.S. DOE national laboratories, scientific institutions of the Russian Academy of Sciences, and other research institutions of both countries as mutually agreed.

and mineralogical composition of samples. This data will be the basis for developing a mathematical model for the prediction of the behaviors of actinides should they be released to the environment in various regions of both states.

7. Development of conceptual models to represent processes important to radionuclide behavior in natural systems as a link to work in IA#2.
8. New information on the biochemical activity of natural underground microflora, and its part in biodestruction of technogenic and inorganic substances; recommendations on the use of biotechnology for cleaning underground waters in close proximity to storage sites.
9. Exchange programs in the area of methodological and technological knowledge between US and Russian scientists.

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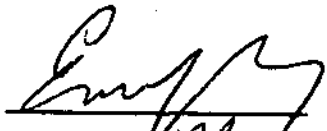
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Appendices

Please see attached Appendices under this Implementing Arrangement for detailed project descriptions, including funding arrangements.

**FOR THE U.S. DEPARTMENT
OF ENERGY:**


Date: 15 May 2000

**FOR THE RUSSIAN ACADEMY
OF SCIENCES:**


Date: 15/05/00