



United States Department of the Interior

WM DOCKET CONTROL
CENTER
BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

84 NOV 28 13:28

November 26, 1984

Mr. John Greeves
Chief, Engineering Branch
MS 623-SS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

WM-RES
WM Record File
B6934
DOM

WM Project 10, 11, 16
Docket No. _____
PDR ✓
LPDR ✓ (B, N, S)

Distribution:
Greeves _____
BARRETT _____
(Return to WM, 623-SS) _____

cc. Tinkinsky

Dear Mr. Greeves:

The Bureau of Mines is coordinating an Interagency Agreement with the Department of Energy involving high-level-radioactive waste disposal in salt repositories during the fiscal years 1985-1989. Under this Agreement the Bureau will provide technical support that will be generic in scope and not site specific. A copy of the draft statement of work is enclosed for NRC's information.

Sincerely,

Harry R. Nicholls
Harry R. Nicholls
Assistant Director
Mining Research

Enclosure

8501110231 841126
PDR WMRES EUSDDIMI
B-6934 PDR

1697

INTERAGENCY AGREEMENT

STATEMENT OF WORK

This Statement of Work provides for involvement by the U.S. Bureau of Mines (USBM) in the Department of Energy's (DOE) program for high-level waste disposal in salt during the period Fiscal Years 1985-1989, inclusive. The USBM will provide technical support that will be generic in scope and not site specific in three broad areas:

- 1) Project Management and Coordination - USBM will provide a project manager to work with and be responsible to the DOE Salt Repository Project Office (SRPO) in Columbus. The USBM will provide technical expertise in support of state-of-the-art drilling/mining techniques, mining equipment, ground control studies, and identification and mitigation of gassy mine conditions. Within funding limitations, the USBM will conduct special studies and technical reviews as requested by the DOE Project Manager. The USBM will develop and maintain a Quality Assurance (QA) program consistent with guidance given by SRPO. All tasks will be based on technical expertise available to the project from the USBM. All deliverables and reports under this agreement will be channeled through the DOE Project Manager (SRPO), for appropriate handling.
- 2) Technical Review and Guidance - The USBM will make the appropriate expertise available on an interim basis to afford review, consultation and evaluation within the field of earth science and mining technology to the Department of Energy's investigations in salt. This task will provide a scientifically objective review and consultation that will contribute to program credibility. In broad terms, the objectives of this task are to provide the Civilian Radioactive Waste Management (CRWM) Program, both Headquarters and SRPO, with quality, in-depth reviews by the best scientists that the Bureau of Mines has available in appropriate disciplines. In addition to reviewing technical documents and plans, USBM personnel will respond to requests from DOE to participate in meetings pertaining to their area of expertise.
- 3) Technical Studies - The USBM will conduct research and carry out field work on various topics related to nuclear waste isolation, including geologic field studies and laboratory studies of the composition and properties of rock and salt with regard to mining technology and minability. Specific tasks that will be performed include studies of methane occurrences, measurements of fluids in salt, drilling technology, and in situ stress measurements.

Each year specific tasks will be detailed within these three broad areas of responsibility. Each task will address specific program needs and will be developed consistent with this Interagency Agreement.

Fiscal Year 1985 Tasks

For fiscal year 1985 four tasks have been identified for work under the Interagency Agreement. The four broad tasks are:

- I. Project Management and Coordination
- II. Technical Review and Guidance
- III. Technical Studies
- IV. Quality Assurance

Tasks I and IV are straightforward administrative tasks.

Tasks II and III are broken down for closer examination.

TASK II: Technical Review and Guidance

Subtask 1. Review of Programs, Plans and Documents and Coordinate these With Other USBM Research Centers as Required

Plans and documents expected to become available for technical review in FY85 are test plans for field studies and in situ testing, topical reports by ONWI contractors, and exploratory shaft facility design reports.

Review of specific materials will be requested by the DOE Project Manager, who will also provide guidance for each review. Reviews should be scheduled with sufficient lead time to allow the USBM staff an appropriate period for each review. This will be a level-of-effort task as determined by specific review requirements. All reviews will be performed in direct consultation with and/or by other USBM Research Centers over a wide range of technical topics as requested by the DOE.

TASK III: Technical Studies

Subtask 1. Gas Occurrences in Salt

The occurrence of methane and its effect on mine conditions and mining techniques has certain implications in the salt repository program. The relationship of gas-bearing horizons to bedded and domal salt deposits needs to be evaluated from a historical viewpoint and in active mining operations.

The USBM will evaluate the existing literature and collect data on gas occurrences and mining experience in salt and provide a summary report covering the following topical areas:

- 1) A historical survey of gas occurrences in salt environments related to the three evaporite basins currently under study by SRPO. This regional evaluation will be used to indicate the potential for gas occurrences within the horizons selected for nuclear waste repositories.
- 2) An evaluation of the origin of gas (and other fluids) in salt and geologic mechanisms controlling gas concentrations. This study should present the most widely accepted theories.
- 3) A review of techniques currently available for identifying gas accumulations in salt mines, and for mitigating gassy conditions during mining.

Subtask 2. Salt Reservoir Characterization

The objective of this subtask will be to determine the variability in fluid flows with direction relative to geologic factors such as banding and various discontinuities and to investigate formation pressures. Studies will include an evaluation of available field data, and laboratory tests on core collected by DOE, USBM and their contractors. These studies will evaluate the gas content of the salt, develop procedures and tests for quantifying the gas hazard problem prior to mining so a strategy can be formulated to avoid emission hazards.

Subtask 3. Drilling Technology

In-mine drilling technology will be important for exploring the geology of a salt body in advance of mining. Precise control and accurate surveying of horizontal drill holes will be very useful for in situ testing and eventual development of a mined repository.

The USBM will conduct comparative evaluations of a variety of directional control drilling techniques (core, rotary, inhole motor, etc.). Also, several survey tools will be examined to determine the most effective means of surveying mine-face exploration holes. Regional sites in active commercial mines (in both bedded and domal salt environments) will be selected for testing of the various techniques.

Subtask 4. Measurement of Stress - Relief Creep in Existing Salt Mines

The Bureau of Mines possesses the capability to conduct in-mine studies to further the understanding of rock salt behavior. The Bureau has conducted extensive ground control studies in coal to define and quantify the support loadings and strata activities associated with mining for particular mine designs. The USBM has recently developed a prototype biaxial pressure sensor and has conducted a preliminary test utilizing this sensor at the Belle Isle Salt Mine. Using available instrumentation, the USBM will initiate an investigation to determine the following:

- 1) Stress - relief creep of existing salt mine openings
 - a) Convergence and closure rate
 - b) Differential movement within cavity walls and pillars
- 2) Diametral movement of boreholes in salt
- 3) Salt dome movement at the surface and underground

This field data may be used to substantiate the data obtained from various mathematical models. A field study for these tasks will be carried out at an existing salt mine in which the USBM can gain access.