

NRC Research and/or Technical Assistance Report

POR

INTERIM REPORT

ACCESSION ON. _____
ORNL/HASRD-148 _____

Contract Program or Project Title:

Safeguards Analysis for Byproduct
Materials and Small Quantities of
SNM

Subject of this Document:

Technical Progress

Type of Document:

Monthly Progress Report
January 1982

Author(s), Affiliation and Address:

R. O. Chester and M. L. Randolph
Health and Safety Research Division*

Date of Document:

February 15, 1982

NRC Individual and NRC Office or Division
to Whom Inquiries Should be Addressed:

Dr. Carl J. Withee
Office of Nuclear Material
Safety and Safeguards

This document was prepared primarily for preliminary or internal use. It has not received full review and approval. Since there may be substantive changes, this document should not be considered final.

Prepared for
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555
Under Interagency Agreement DOE #40-549-75
NRC FIN No. B6108

*Oak Ridge National Laboratory
Oak Ridge, Tennessee
operated by
Union Carbide Corporation
for the
U. S. Department of Energy



INTERIM REPORT

OAK RIDGE NATIONAL LABORATORY

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OAK RIDGE, TENNESSEE 37830

February 15, 1982

Dr. Carl J. Withee
Office of Nuclear Material Safety
and Safeguards
Mail Stop SS-881
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Withee:

Enclosed is the monthly progress report January 1 through January 31, 1982, on the NMSS project entitled, "Safeguards Analysis for Byproduct Materials and Small Quantities of SNM" (189 No. B6108).

Sincerely,

A handwritten signature in dark ink, appearing to read "P. S. Rohwer". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

P. S. Rohwer, Head
Technology Assessments Section
Health and Safety Research Division

PSR/ROC/ns

Enclosure

cc: File-NoRC

MONTHLY PROGRESS REPORT
FOR JANUARY 1982

SAFEGUARDS ANALYSIS FOR BYPRODUCT MATERIALS
AND SMALL QUANTITIES OF SNM

Health and Safety Research Division
Oak Ridge National Laboratory

PRINCIPAL SCIENTIST: R. O. Chester

OBJECTIVE:

The principal objective of this analysis is to examine the question of whether the risk and consequences of theft or sabotage of facilities or vehicles containing small quantities of special nuclear materials (SNM), and byproduct materials are such that licensees should be required to adopt further measures to safeguard them. Phase 1 of this study was an initial screening of these materials. From this screening, candidates for further consideration were identified. In the course of Phase 2, a detailed examination will be made of the conditions of possession, use, and shipment of materials identified in Phase 1. The characterization of the conditions of possession, use, or shipment will identify any current conditions of the referenced materials that contribute significantly to either the protection from or vulnerability to potential attempts at theft, diversion, or sabotage.

TECHNICAL PROGRESS:

Subtask 1.a(1) Description of various possible delivery methods. This subtask has been completed.

Subtask 1.a(2) Description of adversary capabilities and resources. Description is included in draft of final report.

Subtask 1.a(3) Analysis and description of the material conditions and processing operations necessary. This subtask has been completed. Camera-ready masters for the final document (ORNL/NUREG-69) were sent to NRC in April 1981.

Subtask 1.a(4) Analysis and description of the impact of meteorology. This subtask has been completed.

Subtask 1.b. Perform a literature review of the acceptable/unacceptable threshold level of consequences. This subtask has been completed with report (ORNL/HASRD-137) mailed to NRC Project Manager, C. J. Withee, in September 1981.

Subtask 1.c. Project status reports, monthly, interim, and final. This series of reports is up-to-date. A first draft of the final project report was delivered to NRC review on December 15. Peer and administrative reviews at ORNL have been completed. Review from NRC is scheduled for March 1982.

Subtask 2.a. Update the material screening list of Phase 1 using the results of Task 1. This subtask is complete with issuing of formal documentation (ORNL/NUREG-69) imminent [see Subtask 1.a(3)].

Subtask 2.b. Develop a plan to obtain the necessary information for characterizing the conditions of possession and shipment of potentially hazardous radionuclides. This subtask has been completed, and is described in a Topical Progress Report, *Summary of Docket File Survey*, ORNL/HASRD-89, August 1980, covering Subtasks 2.b. and 2.c.

Subtask 2.c. Upon NRC approval or modification of the plan developed in Subtask 2.b., gather the needed data from the docket files. This subtask is complete and has been reported in detail in Topical Progress Report, *Summary of Docket File Survey*, ORNL/HASRD-89. (Also see Subtask 2.f.)

Subtask 2.d. Prepare a list of industry contacts for formal survey and specify information to be collected. This subtask has been completed and served as the basis for Subtask 2.e.

Subtask 2.e. Upon NRC approval of contacts, obtain the information indicated in Subtask 2.d. Work on this task is complete with the report "Summary of Visits to Seven Selected NRC Licensee Sites" (ORNL/HASRD-136) having been sent to the NRC project manager in November 1981.

Subtask 2.f. Analyze results of information-gathering effort and produce an updated list of hazardous radionuclides. A report (NUREG/CR-2203) has been written and reviewed and is now in final processing at ORNL. As mentioned in Subtask 2.e., a summary report on the results of the licensee site visits has been prepared. The final project report gives analysis of various phases of this project.

Subtask 2.g. Perform the final analysis of the (25 or less) most hazardous radionuclides. See special note "Milestone Revision" which follows Subtask 3.b.

Subtask 2.h. For those radionuclides or scenarios that are not well enough characterized or understood, provide a description of the research to produce the needed basic information. See special note "Milestone Revision" which follows Subtask 3.b.

Subtask 3.a. Based on the results of Tasks 1 and 2, identify the feasible malevolent options for each radionuclide of interest. Conclusions on this topic are in the final report.

Subtask 3.b. Based on the results of Tasks 1 and 2, identify and characterize the commercially available radionuclides which should be reconsidered for their safeguards provisions. Conclusions on this topic are in the final report.

MILESTONE REVISION

Submission of NRC Form 173 by R. S. Brown, Jr. (NRC) to R. J. Hart (Oak Ridge Operations Office) on April 15 provides for deletion of Subtasks 2.g. and 2.h. from the current statement of work. In accordance with this order: (1) we do not proceed further on these two subtasks or report them in this or subsequent monthly reports; and (2) a revised 189 proposal with a new milestone chart has been prepared and forwarded to NRC. This gives more realistic projections allowing for the inevitable slippage in Milestone 2.d. and subsequent work and for deletion of Milestones 2.g. and 2.h.

BUDGET AND TECHNICAL MANPOWER EXPENDITURES (FY 1982)

<u>Reporting Period</u>	<u>Project Costs, \$</u>	<u>Technical Support, Man-months</u>
January 1982	0	0.0
Total to Date	76,779	6.2
Estimated Cost to Completion	721	

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