

INTERIM REPORT

ACCESSION NO. \_\_\_\_\_  
ORNL/HASRD-94 \_\_\_\_\_

Contract Program or Project Title:

Safeguards Analysis for Byproduct  
Materials and Small Quantities of  
SNM

Subject of this Document:

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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.

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INTERIM REPORT

NRC Research and Technical  
Assistance Report

MONTHLY PROGRESS REPORT  
FOR ~~JULY~~ 1980  
~~AUGUST~~  
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 the 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. Work on this subtask is scheduled to start in November 1980.

Subtask 1.a(3) Analysis and description of the material conditions and processing operations necessary. This subtask has been completed. Review at ORNL of formal documentation (ORNL/NUREG-69) on this topic is complete. Classification and editorial processing are to follow.

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. Related to this subtask is a current analysis of lifetime excess of cancer mortality from low levels of gamma radiation.

Subtask 1.c. Project status reports, monthly, interim, and final. This series of reports is up-to-date.

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

NRC Research and Technical  
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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 partially 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 study has been discussed in detail in Topical Progress Report, *Summary of Docket File Survey*, ORNL/HASRD-89. On the basis of potential availability (i.e., license limit) alone, more radionuclides that should be considered closely for possible safeguarding are identified by the docket file study than have previously been considered using transportation data. (Also see subtask 2.f.)

Subtask 2.d. Prepare a list of industry contacts for formal survey and specify information to be collected. At the August 6 site visit of J. Yardumian and G. H. Gardes to Oak Ridge, it was suggested that ORNL send NRC proposals on this subtask. Hence, as a basis for discussions, the Project Officer, George H. Gardes, has been sent lists of (1) information desired; (2) procedures and format for getting information; and (3) criteria for selection of individual licenses.

Subtask 2.e. Upon NRC approval of contacts, obtain the information indicated in subtask 2.d. This subtask can proceed only on completion of subtask 2.d.

Subtask 2.f. Analyze results of information gathering effort and produce an updated list of hazardous radionuclides. The topical report, ORNL/HASRD-89, August 1980, identifies, on the basis of potential (licensed) availability, radionuclides not previously included in our hazard analyses. Preparation of a similar report based on PNL Report 2930 on DOE radioisotope customers is nearing completion. Relative hazards of radionuclides identified in these two ways are to be added to those previously identified from transportation records and ultimately all are to be ranked for relative hazards using scenarios given in ORNL/NUREG-69.

Subtask 2.g. Perform the final analysis of the (25 or less) most hazardous radionuclides. Planning for this subtask is just starting.

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. Thought is being given to this topic.

Subtasks 3.a. and 3.b. These subtasks are not scheduled to start until early 1981.

#### Site Visit

On August 6, J. Yardumian and G. H. Gardes were on a site visit in Oak Ridge to discuss the project progress. Detailed planning for subtask 2.d. and the annual project review were major items of discussion. A visit to an aerosol research laboratory operated by the Chemical Technology Division of ORNL (A. Wichner and G. W. Parker) was arranged to acquaint NRC staff with the aerosol research capabilities of ORNL and the Chemical Technology staff with aerosol problems involved in Safeguards work.

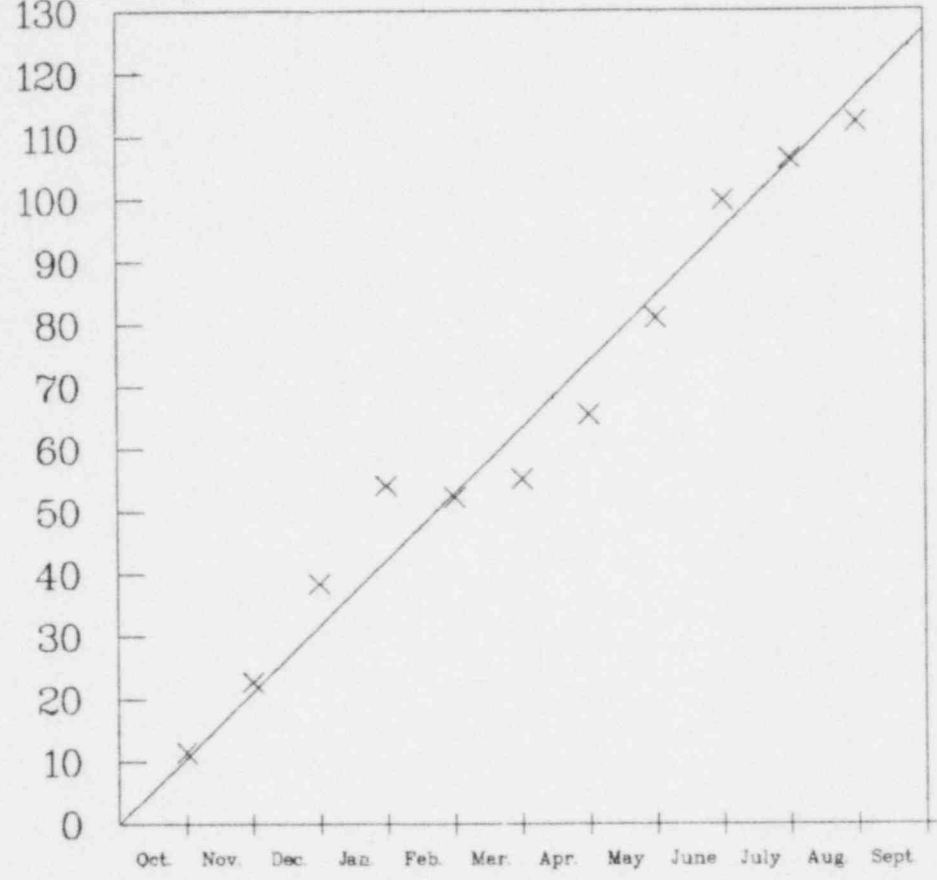
BUDGET AND TECHNICAL MANPOWER EXPENDITURES (FY 1980)

<u>Reporting Period</u>	<u>Project Costs, \$</u>	<u>Technical Support, Man-months</u>
August 1980	4,665	0.5
Total to Date	111,298	13.2
Estimated Cost to Completion	15,328	5.3

MONTHLY EXPENDITURES FY 1980 (\$1,000)

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Monthly Projected:	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
Monthly Actual:	11	11	16	15	-2*	3	11	14	19	8	5	

Total Expenditures\*\*  
(thousands of dollars)



1979

1980

Months FY 1980

\*Inadvertent overcharges were corrected with a credit in February.

\*\*Solid line represents projected costs; x marks represent actual costs.

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