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INTERIM REPORT

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ORNL/HASRD-98 _____

Contract Program or Project Title:

Safeguards Analysis for Byproduct
Materials and Small Quantities of
SNM

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Author(s), Affiliation and Address:

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

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

Mr. George H. Gardes
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.

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*Oak Ridge National Laboratory
Oak Ridge, Tennessee
operated by
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INTERIM REPORT

NRC Research and Technical
Assistance Report

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MONTHLY PROGRESS REPORT
FOR SEPTEMBER 1980

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. editing at ORNL of formal documentation (ORNL/NUREG-69) on this topic is complete. Classification and printing 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. Draft copies of the FY-80 interim project report, following the format requested by G. H. Gardes (NRC project manager), have been sent to NRC for review.

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 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. ORNL is awaiting response to preliminary suggestions on this topic.

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 on the docket file work, 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. Use of a "health hazard commitment factor," based on dose conversion factors (ORNL/NUREG/TM-190, V. 1 and V. 2) and organ weighting factors (ICRP-26) and consequently of a "relative health hazards index" is being considered.

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

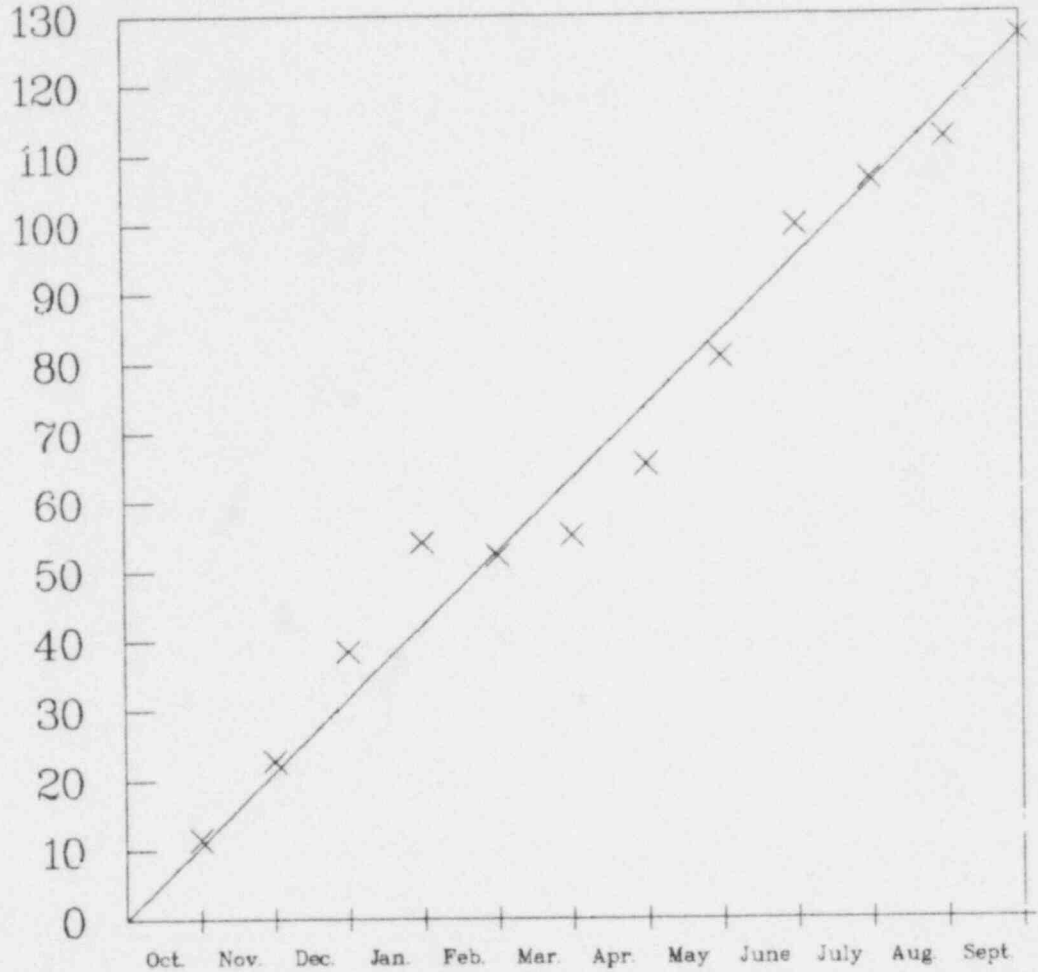
BUDGET AND TECHNICAL MANPOWER EXPENDITURES (FY 1980)

<u>Reporting Period</u>	<u>Project Costs, \$</u>	<u>Technical Support, Man-months</u>
September 1980	15,328	2.0
Total to Date	126,626	15.2
Estimated Cost to Completion	0	0

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	15

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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