NOV 18 1982

Mr. R. J. Hart, Manager
Oak Ridge Operations Office
U. S. Department of Energy
P. O. Box E
Oak Ridge, Tennessee 37830

Dear Mr. Hart:

FY 1983 NUCLEAR REGULATORY RESEARCH ORDER NO. 60-83-065 FOR OAK RIDGE NATIONAL LABORATORY

Please authorize Oak Ridge National Laboratory to execute the program described in the enclosed NRC Order.

If this meets with your approval, it is requested that acceptance be indicated on the enclosed form and the original be returned to the NRC Office of Resource Management and a copy to this office.

Sincerely,

Original signed by G. A. Arlotto

Guy A. Arlotto, Director
Division of Engineering Technology
Office of Nuclear Regulatory Research

Enclosures:
1. NRC Order
2. Program Briefs

cc w/enclosures:
R. W. Barber, DOE/NSC
G. Flanagan, ORNL

Distribution
Subj
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Chron
Riggs:rdg
A. Puglise, ORM
J. Mate, ORM
RES:D
Wylbur
FIN File
G. Arndt, DET
A. Eiss, DET

FOIA-85-143
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RECORD NOTE: 1102 sent 11/1/82

OFFICE	RES:RMB	RES:RMB	RES:DET	RES:DET	RES:DET	RES:DET	RES:ARCS
SURNAME	Riggs/mt	Forehand/	Anderson for	Eiss	Shao	Arlotto	Gillespie
DATE	11/1/82	11/ /82	11/21 /82	11/3/82	11/4/82	11/ /82	11/ /82

NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY

(5)

NOV 18 1982

DIV. OF ET CHANGE CONTROL FORM # _____ DATE: 11/1/82

(06) CONTRACTOR ORNL ORIGINATOR Riggs

(01) NEW FIN _____ OLD FIN B0489 (14) LEAD NAME Arndt G

(03) TITLE Containment Leak Test Sensitivity Studies

CHANGES AND COMMENTS:

B&R NO.	FIN NO.	FY	FROM K$	TO K$	▲ K$
~~6020101~~	B0489	83	0	50	+50
_____	B7558	1	50	0	-50
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

E. Gunter Arndt — 11/2/82
Project Officer — Date

for WFA — 11-2-82
Branch Chief — Date

11/3/82
A. Eiss, Technical Assistant

APPROVED
Guy A. Arlotto, Director
Div. of Eng. Technology
11/4/82

(07) CONT ABBREV _____ (02) B&R _____ (08) CONT NO _____

(04) RRG-NO _____ ☐ EQ _____ (22) TERM DAT _____

(09) CONTMETH _____ (15) BASE-CY _____ (29) OPER-BY _____

(10) STATE _____ (26) OPER-CY _____ (30) COM-BY _____

(11) ORG-CODE _____ (27) COM-CY _____ (47) EST-MTH _____

(12) CONT-TYP _____ (28) COMTH-CY _____ (32) UNCST-PY _____

(13) CITY _____ (23) OPER-PY _____ (39) REQUEST1 _____

(20) PERF-DAT _____ (21) CONT-END _____ (42) ENDORSE _____

(46) CON-LEAD _____ (43) SUBCONT _____ (18) TMI-BASE _____

(19) CY TMI SUPPL _____ (57) TMI TAP# _____ (17) CY SUPPL _____

OTHER COMMENTS: BY = NEXT YEAR CY = CURRENT YEAR PY = PREVIOUS YEAR

SUSPENSE COPY TO MARIANNE RIGGS, m/s 1130-SS

COPY TO _____

NRC FORM 173 (2-78) U.S. NUCLEAR REGULATORY COMMISSION

ORDER NUMBER: 60-83-065

DATE: NOV 18 1982

STANDARD ORDER FOR DOE WORK

ISSUED TO (DOE Office)	ISSUED BY (NRC Office)
Oak Ridge Operations Office	Division of Engineering Technology

PERFORMING ORGANIZATION AND LOCATION: Oak Ridge National Laboratory

FIN TITLE: Containment Leak Test Sensitivity Study

ACCOUNTING CITATION

APPROPRIATION SYMBOL: 31X0200.603

B&R NUMBER: 60190101

FIN NUMBER: B0489-3

WORK PERIOD - THIS ORDER

FIXED ☐ ESTIMATED ☒

FROM: 10/1/82 TO: 2/1/83

OBLIGATION AVAILABILITY PROVIDED BY:

A. THIS ORDER	$	10,000
B. TOTAL OF ORDERS PLACED PRIOR TO THIS DATE WITH THE PERFORMING ORGANIZATION UNDER THE SAME "APPROPRIATION SYMBOL" AND THE FIRST FOUR DIGITS OF THE "B&R NUMBER" CITED ABOVE	$	2,390,000
C. TOTAL ORDERS TO DATE (TOTAL A & B)	$	2,400,000
D. AMOUNT INCLUDED IN "C" APPLICABLE TO THE "FIN NUMBER" CITED IN THIS ORDER.	$	10,000

FINANCIAL FLEXIBILITY:

☐ FUNDS WILL NOT BE REPROGRAMMED BETWEEN FINS. LINE D CONSTITUTES A LIMITATION ON OBLIGATIONS AUTHORIZED.

☒ FUNDS MAY BE REPROGRAMMED NOT TO EXCEED ± 10% OF FIN LEVEL UP TO $50K. LINE C CONSTITUTES A LIMITATION ON OBLIGATIONS AUTHORIZED.

STANDARD TERMS AND CONDITIONS PROVIDED DOE ARE CONSIDERED PART OF THIS ORDER UNLESS OTHERWISE NOTED.

ATTACHMENTS:
THE FOLLOWING ATTACHMENTS ARE HEREBY MADE A PART OF THIS ORDER:

☒ STATEMENT OF WORK
☐ ADDITIONAL TERMS AND CONDITIONS
☐ OTHER

SECURITY:

☒ WORK ON THIS ORDER IS NOT CLASSIFIED.
☐ WORK ON THIS ORDER INVOLVES CLASSIFIED INFORMATION. NRC FORM 187 IS ATTACHED.

REMARKS:

A final work package (189) reflecting approved FY 1983 resources and scope should be furnished within 90 days. Six copies should be sent to the Office of Nuclear Regulatory Research and one copy to the NRC Office of Resource Management.

FIN NO.	TITLE	FY 83 BUDGET	THIS OBLIG
B0489-3	Containment Leak Test Sensitivity Study	$ 50K	$ 10K

ISSUING AUTHORITY	ACCEPTING ORGANIZATION
SIGNATURE: Guy A. Arlotto, Director	SIGNATURE
TITLE: Division of Engineering Technology, Office of Nuclear Regulatory Research	TITLE
	DATE

NRC FORM 173 (2-78)

FY 1983 PROGRAM BRIEF
DIVISION: DET

TITLE: CONTAINMENT LEAK TEST SENSITIVITY STUDY

FIN NO.: B0489
CONTRACTOR: ORNL
SITE: OAK RIDGE
STATE: TN

NRC TECHNICAL MONITOR: E. G. ARNDT

PRINCIPAL INVESTIGATOR: G. FLANAGAN

BUDGET ACTIVITY: 60190101

FY 83 BUDGET: $50K

FY 1983 WORK PERIOD: 11/1/82 - 2/1/83

OBJECTIVE:

DETERMINE WHETHER CURRENTLY SPECIFIED CONTAINMENT ALLOWABLE LEAK RATES SHOULD BE REVISED, AND, IF SO, HOW MUCH AND ON WHAT BASIS.

EVALUATE THE DESIRABILITY AND PRACTICALITY OF ESTABLISHING, EXPLICITLY IN APPENDIX J, A SINGLE LEAKAGE LIMITING CRITERION FOR ALL CONTAINMENT TYPES.

SCOPE:

DRAFT NUREG-0773, "REACTOR ACCIDENT SOURCE TERMS: DESIGN AND SITING PERSPECTIVES," DATED MARCH 1982, PRESENTS CURRENT INFORMATION ON REACTOR ACCIDENTS THAT HAVE BEEN ANALYZED FOR VARIOUS REACTOR DESIGNS, AND DEVELOPS A SET OF RADIOACTIVE RELEASES (SOURCE TERMS) IN CATEGORIES 1 THROUGH 5 WHICH REPRESENT THE SPECTRUM OF ACCIDENTS.

USING RELEASE FRACTIONS TO THE CONTAINMENT WHICH CORRESPONDS TO THESE SOURCE TERMS IN CATEGORIES 1 THROUGH 5:

A. PERFORM A SENSITIVITY ANALYSIS (INCLUDE ALSO TEST COSTS VS CONFIDENCE LEVEL) IN WHICH THE CONTAINMENT DESIGN LEAK RATE IS ASSUMED TO BE 0.1%, 0.5%, 1.0%, 5.0%, 10%, 25%, 50%, and 100% (WT.%/DAY).

B. DETERMINE THE OFFSITE RISK IN TERMS OF DOSE TO THE PUBLIC FROM EACH OF THESE POTENTIAL CONTAINMENT SOURCE TERMS,

C. COMPARE RISK REDUCTION OF A SIMPLE GROSS CONTAINMENT INTEGRITY CHECK WITH THESE APPENDIX J LEAK RATE TESTS, AND

D. EVALUATE THE DESIRABILITY AND PRACTICALITY OF ESTABLISHING, EXPLICITLY IN APPENDIX J, A SINGLE LEAKAGE LIMITING CRITERION FOR CONTAINMENT SYSTEMS THAT WOULD APPLY EQUALLY WELL TO:

   a) LARGE, DRY PWR CONTAINMENTS,
   b) TYPE I, II, AND III BWR CONTAINMENTS,
   c) ICE CONDENSER CONTAINMENTS, AND
   d) NEGATIVE PRESSURE CONTAINMENTS.

THIS ANALYSIS WILL PROVIDE A BASIS FOR JUDGING WHETHER THE PRESENT APPENDIX J CONTAINMENT INTEGRATED LEAK RATE TEST CRITERIA ARE REALISTIC IN TERMS OF THEIR EFFECT ON PUBLIC RISK AND OPERATIONAL COSTS, AND SHOULD INCLUDE THE FOLLOWING:

1) WHETHER THERE IS A CORRELATION BETWEEN LEAKAGE TEST VALUES/TEST INTERVALS AND ESTIMATED ACTUAL LEAKAGE DURING INTERVALS BETWEEN TESTS (BASED ON LERS, AS-FOUND TESTS, ETC.).

2) REVIEW THE CURRENT $0.25L_a$ SAFETY MARGIN TO SEE WHETHER IT PROVIDES REASONABLE ASSURANCE THAT ACTUAL LEAKAGE DOES NOT EXCEED DESIGN VALUE.

OTHER REFERENCES

NUREG - 0771, (FOR COMMENT) REGULATORY IMPACT OF NUCLEAR REACTOR ACCIDENT SOURCE TERM ASSUMPTIONS, JUNE 1981.

NUREG - 0772, TECHNICAL BASIS FOR ESTIMATING FISSION PRODUCT BEHAVIOR DURING LWR ACCIDENTS, JUNE 1981.

NUREG/CR - 2239 (DRAFT), TECHNICAL GUIDANCE FOR SITING CRITERIA DEVELOPMENT (2.3). DESCRIBES, IN PART, ACCIDENT SOURCE TERMS, RELEASE CHARACTERISTICS, AND UNCERTAINTIES IN SOURCE TERM MAGNITUDES.

For work conducted for the Office of Nuclear Regulatory Research (RES), contacts with NRC licensees require the advanced written approval of the RES project officer.

FIN Plan Input

12/2/82

OPNL

TITLE: CONTAINMENT LEAK TEST SENSITIVITY STUDY

FY 83 OPER	FY 84 OPER	FIN(S)	RES LEAD	PRINCIPAL INVESTIGATOR	MANAGER
0.05	—	B0489	G. Arndt	Tom Burns	George Flanagan

Addendum

I. OBJECTIVES 1) Determine changes to risk contribution by the containment system as the leak rate changes, i.e., how important is containment leakage?
2) Furnish a method for comparing test and operational data to estimate actual leakage probabilities at times between tests.

II. HOW ARE OBJECTIVES RELATED TO SAFETY? The objectives relate to 1) the adequacy of NRC regulations on leakage, and 2) the adequacy of the leaktight integrity of containments.

III. WHAT WORK HAS BEEN COMPLETED SO FAR? An ORNL / NRC coordination meeting has been held, clarifying objectives and limitations of this study, and identifying information and data sources for ORNL.

IV. WHAT ARE THE EXPECTED ACHIEVEMENTS OF THIS WORK? 1) Sensitivity analysis of offsite risk in terms of dose to public for various leak rates.
2) Risk reduction comparison of gross containment integrity check with App. J leak rate tests, and 3) Determination of practicality of single leakage limiting criterion for all containment types.

V. HOW WILL THE RESULTS BE APPLICABLE TO LICENSING PROCESS?

The results will influence revisions to 10CFR50 Appendix J, and the proposed RG endorsing ANSI/ANS 56.8-1981.

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