

JUN 3 1982

MEMORANDUM FOR: Jim Shapaker, NRR:CSB
John Huang, NRR:CSB
Don Kirkpatrick, IE
Walt Rekito, IE:RI
Herb Whitener, IE:RII
Fred Maura, IE:RIII
Joe Tapia, IE:RIV
Harvey Canter, IE:RV

FROM: Gunter Arndt, MSEB, DET, RES

SUBJECT: AVAILABILITY OF TYPE A, B & C TEST REPORTS

ORNL is starting to gather the essential data for the containment leak test contract. What they need most right now are the licensee test reports. Please furnish me with lists of:

1. What Type A, B & C test reports you have at hand that can be made available to ORNL on short notice, noting:
 - a. Type _____ test
 - b. Plant name and type (Mk I, II, III, PWR, ice condenser)
 - c. Whether a summary report, or whether backup field data is included
 - d. How thick a package (for copying and mailing information).
2. Other Type A, B, or C reports that you are aware of, and know location of, even if not at hand, that can be made available to ORNL.
3. Which plants' (by type, name, or both) test reports (complete or summary only) you would like to have ORNL review for:
 - a. Type A tests
 - b. Type B tests
 - c. Type C tests.

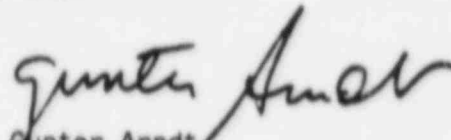
FOIA-85-143

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8206210067 YA

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I need this information in order that ORNL can get from, or through, the NRC the reports and field data essential to the performance of this contract. This is not, at this time, a request for the actual reports, just for a list of which ORNL should review, their availability, and how to get those not on hand. Please refer to the Work Description of Task A of the enclosed Work Statement for the context of this request. I would appreciate the above information by Friday, June 11, 1982, or sooner if possible.



Gunter Arndt
Mechanical/Structural Engineering Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

I need this information in order that ORNL can get from, or through, the NRC the reports and field data essential to the performance of this contract. This is not, at this time, a request for the actual reports, just for a list of which ORNL should review, their availability, and how to get those not on hand. Please refer to the Work Description of Task A of the enclosed Work Statement for the context of this request. I would appreciate the above information by Friday, June 11, 1982, or sooner if possible.

Gunter Arndt
Mechanical/Structural Engineering Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

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NRC CONTACTS FOR ORNL ON CONTAINMENT LEAK TESTING

NRR:CSB	Jim Shapaker	492-9416
	John Huang	492-9424
IE Hdqtrs	Don Kirkpatrick	492-7746
	(Gene Gallagher, formerly involved)	492-4792
	(Roger Woodruff, on MSIV test study)	492-4794
RI	Walt Rekito	(FTS) 488-1292
II	Herb Whitener	(FTS) 242-4193
III	Fred Maura	(FTS) 384-2696
IV	Joe Tapia	(FTS) 728-8158
V	Harvey Canter	(209) 748-2791 (Rancho Seco)

STATEMENT OF WORKBACKGROUND

Appendix J to 10 CFR 50 was issued in 1973. Changes in testing procedures, questions on interpretation, and numerous plant-specific exemption requests have generated a need to update and streamline this rule. In addition, in 1981 a national standard was issued providing detailed recommendations on the test procedures and analyses. Some of the positions in the proposed revision should be reviewed in depth against the field and licensing experiences of the past decade. Observations and recommendations resulting from such a review would either validate the positions in the proposed revision, or would provide a basis for modifying such positions.

OBJECTIVE

Evaluate the practicality of the containment leak testing program, and compatibility of regulatory requirements and industry testing standards.

SCOPE

- A. Review existing containment leak rate testing regulatory requirements, and the programs conducted in compliance with these requirements, using field and licensing experience.
- B. Review the proposed Appendix J revision. Provide recommendations and bases for specific proposed Appendix J revisions, and comment on the remainder of the proposed revision as appropriate.
- C. Review ANSI/ANS 56.8-1981, "Containment System Leakage Testing Requirements", for compatibility with the proposed Appendix J revision.
- D. Provide a value-impact analysis for the entire proposed Appendix J revision, as prepared for public comment issue, addressing the value and impact on the licensees, the licensing process, and the public. Revise the value-impact analysis as necessary following the public comment period, reflecting any changes made for the final rule.

WORK DESCRIPTIONTASK A

Review the existing Appendix J test requirements, including:

1. Relevant licensing exemption requests and exemptions granted.
2. Relevant Licensee Event Reports (LERs).
3. (See also #9) A minimum of 3 Type A test reports, complete with field data.
4. (" " ") " " " " " B " " " " " "
5. (" " ") " " " " " C " " " " " "
6. (" " ") A minimum of 7 additional summary reports each for Type A, B, & C tests.
7. (" " ") If not previously done, witness at least one test each of Type A, B, and C tests.
8. Interview, directly if necessary, or via correspondence to the maximum practical extent, at least 5 licensees, 2 non-utility organizations that perform these tests under contract to utilities, and 3 architect-engineer firms that design containments and plant systems that are subjected to Type A, B, & C tests.

9. Interview directly representatives from the following NRC groups: NRR - Containment Systems Branch; IE - Division of Reactor Programs; RES - Mechanical/Structural Engineering Branch. At this time, selection of plants from which data is to be reviewed and tests witnessed will be discussed. Selections are subject to approval by NRC Technical Monitor.

Items 1 - 7 will provide data for evaluation, while items 8 & 9 will provide information on field and licensing experiences with the existing Appendix J.

Time allocated: Approximately 6 months.

TASK B

- * With the background on the existing Appendix J gained from Task A, review the proposed revision to Appendix J.
- * Provide comment on the proposed revision in general.
- * In particular, provide recommendations, and supporting bases, for the following specific aspects of the proposed revision:

1. Containment Integrated Leak Rate Test (CILRT) pressure
2. CILRT frequency
3. CILRT duration
4. CILRT reporting requirements
5. Local leak testing
6. Verification testing
7. Test temperature for a) purge valves, b) MSIV's, or c) other containment isolation valves
8. Waiting period following valve closure before leak testing.

Further details are as follow:

1. Containment Integrated Leak Rate Test (CILRT) Pressure

Containment tests have been conducted at the design basis accident pressure or at a reduced pressure. At issue is whether reduced pressure testing provides adequate assurance of containment integrity. Difficulties have been encountered in defining the correlation of results at peak pressure with results at reduced pressure. There is a need to resolve the pros and cons of testing at peak pressure or reduced pressure.

1.1 Review and analyze plant leak-rate data from Task A to identify the problems associated with low-pressure testing.

1.2 To the extent that the information is readily retrievable from the available literature, review the foreign experience and data, and provide conclusions regarding their experience and philosophy of low-pressure testing. This is to be considered as supplementary to the domestic testing experience.

1.3 Assess validity and methods for extrapolation of low-pressure test results to accident pressure.

1.4 Discuss the advantages and disadvantages of the high- and low-pressure tests and provide recommendations to NRC regarding changes to Appendix J.

2. CILRT Frequency

The frequency of performing containment integrated leak rate tests is based on the 10-year service period. Any delay in the licensing of a plant following the performance of the preoperational CILRT would extend the time interval for the first periodic CILRT. The time interval between successive CILRTs is subject to interpretation. Perhaps a CILRT should not have to be performed in conjunction with the 10-year inservice inspection outage. Under consideration is a frequency for performing CILRTs without reference to the 10-year service period.

2.1 Review the test experience and recommend acceptable test frequency with technical support.

2.2 Evaluate the impact on the test conclusions of the different methods of data analysis and test techniques.

3. CILRT Duration

Develop and provide a method of analysis and guidelines for determining acceptable duration of CILRT test.

4. CILRT Reporting Requirements

Provide recommendations on reporting requirements with respect to format and test results for integrated and local leak rate tests (V.B.).

5. Local Leak Testing

5.1 Examine the feasibility and practicality of conducting local leak rate (Types B & C) tests during plant operation.

5.2 Explore regulatory criteria and techniques to encourage continuous leak testing.

6. Verification Testing

Appendix J requires that a supplemental leak rate test be performed to verify the measurements of a containment leak rate. In one such test, the CILRT test is repeated after completion of the initial CILRT by introducing a known leak rate from the containment by direct leakage through an orifice to atmosphere. The new measurements of leakage from containment should not vary more than 25% from the initial test leakage rate for adequate verification. At issue is whether such a test is either directly or indirectly useful, and whether the criteria are adequate.

6.1 Reassess the acceptability of the supplemental CILRT verification test and test acceptance criteria.

7. Test Temperature

Most valves test more leak tight when hot than when cold. Evaluate the practicality of requiring a valve temperature test condition, and make appropriate suggestions.

8. Waiting Period

Soft-seated valves seal better after being pressed against the seat for a while. Evaluate the practicality of establishing a waiting period following valve closure before leak testing. Make appropriate recommendations.

Time allocated: Approximately 3 months past Task A.

TASK C

Review ANSI/ANS 56.8-1981. Considering it as a detailed adjunct to the regulation, containing test procedures and analytic methods as compared with test criteria in the regulation,

- (a) highlight conflicts between the two documents, and
- (b) note if any Appendix J contents belong instead in ANSI/ANS 56.8, or the reverse.

Time allocated: Approximately 2 months past Task A.

TASK D

1) Develop an initial value-impact statement for the proposed Appendix J revision, using guidance to be provided by the NRC. Following the public comment period, revise as necessary to reflect any changes made for the final rule.

Time allocated: Approximately 3 months past Task A for initial statement.
Approximately 2 separate, additional months for final statement.

MEETINGS AND TRAVEL

Task A will require, for up to two contractor employees per trip, at least:

- 1 two-day meeting with NRC staff under Task A.
- 2 two-day site visits to witness tests under Task A, if not done prior to this contract.
- 1 one-day visit to a data source in connection with Task D.
- 1 two-day meeting with NRC staff to discuss Draft Report.

REPORTING REQUIREMENTS

The contractor will submit the following reports:

1. Monthly progress report
2. Draft Report
3. Final Report

CONTRACT SCHEDULE

• 6 mo •

(Review existing rule)

3 mo

(Review Proposed rule)

2 mo

(Review ANSI/ANS 56.8)

3 mo 2 mo

(Prepare value-impact statement)

		PROJECT AND BUDGET PROPOSAL FOR NRC WORK		NEW REVISION NO. 0		
PROJECT TITLE: <div style="text-align: center; font-weight: bold; font-size: 1.2em;">CONTAINMENT LEAK RATE TESTING</div>				FIN NUMBER <div style="text-align: center; font-weight: bold; font-size: 1.2em;">B0429</div>		
NRC OFFICE <div style="text-align: center; font-weight: bold;">Nuclear Regulatory Research</div>				NRC B & R NUMBER <div style="text-align: center; font-weight: bold;">60 19 21</div>		
DOE CONTRACTOR <div style="text-align: center; font-weight: bold;">UNION CARBIDE CORPORATION</div>		PATENT STATUS <i>This proposal is being transmitted in advance of patent review for evaluation purposes only. No further dissemination or publication shall be made without prior approval of the Assistant General Counsel for Patents, DOE.</i>		CONTRACTOR/ORNL ACT <div style="text-align: center; font-weight: bold;">41 89 55 12 9</div>		
SITE <div style="text-align: center; font-weight: bold;">OAK RIDGE NATIONAL LABORATORY OAK RIDGE, TENNESSEE 37830</div>				DIV. (16) DOE B & R NUMBER <div style="text-align: center; font-weight: bold;">40 10 01 06</div>		
COGNIZANT PERSONNEL		ORGANIZATION	FTS PHONE NUMBER	PERIOD OF PERFORMANCE		
NRC PROJECT MANAGER E. G. Arndt		MSEB	443-5860	STARTING DATE 76-01-82		
OTHER NRC TECHNICAL STAFF				COMPLETION DATE 09-30-83		
DOE PROJECT MANAGER W. R. Bibb		DOE-ORO	626-0742			
CONTRACTOR/ORNL		CMO	624-0422			
PROG. DIR.: A. L. Lotts		M&C Division	624-5169			
PROG. MGR.: F. J. Homan		ET Division	624-0657			
PROJ. MGR.: D. J. Naus		ET Division	624-0650			
PRIN. INVESTIGATOR(S) J.R. Dougan G. C. Robinson		ET Division	624-0649			
STAFF YEARS OF EFFORT (Round to nearest tenth of a year)		FY 1982	FY 19 83	FY 1984	FY 19 85	FY 19 86
Direct Scientific/Technical		0.1	1.0	0	0	0
Other Direct		0	0	0	0	0
TOTAL DIRECT STAFF YEARS		0.1	1.0	0	0	0
COST PROPOSAL (OBLIGATIONS)		(\$ In Thousands)				
Direct Salaries (Cost Centers)		7	80	0	0	0
Material and Services (Excluding ADP)		0	15	0	0	0
ADP Support		0	3	0	0	0
Subcontracts and Consultants		0	0	0	0	0
Travel Expenses		0	0	0	0	0
		3	7	0	0	0
Indirect Labor Costs (Cost Centers)						
Other (Specify) GSO Change		137	(137)	0	0	0
General and Administrative (G&A/GPS)		3	32	0	0	0
TOTAL OPERATING COST (Obligations)		150	0	0	0	0
CAPITAL EQUIPMENT		0	0	0	0	0
FIN CHARGED:		0	0	0	0	0
TOTAL PROJECT COST (Obligations)		150	0	0	0	0
FY 1983	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH
	12	12	13	10	10	10
MONTHLY FORECAST EXPENSE	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
	10	10	10	13	14	13

05-01-82

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PROJECT TITLE:




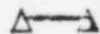

CONTAINMENT LEAK RATE TESTING

DOE PROPOSING ORGANIZATION:

UNION CARBIDE CORPORATION
OAK RIDGE NATIONAL LABORATORY
OAK RIDGE, TENNESSEE 37830

FORECAST MILESTONE CHART: Schedule to Start —  — Completed (Shown in Quarter Year)

PROVIDE ESTIMATED DOLLAR COST FOR EACH TASK FOR EACH FISCAL YEAR

TASK		FY 1982				FY 1983				FY 1984				FY 1985				FY 1986			
		1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
A. Review existing containment leak rate testing requirements.	SCHEDULE																				
	COST	13				37															
B. Review proposed Appendix J revisions.	SCHEDULE																				
	COST					20															
C. Review ANSI/ANS 56.8-1981 for compatibility with Appendix J	SCHEDULE																				
	COST					20															
D. Provide value-impact analysis for Appendix J proposed revision.	SCHEDULE																				
	COST					30															
E. Provide final report.	SCHEDULE																				
	COST					30															
TOTAL ESTIMATED PROJECT COST		13				137				0				0				0			

PROJECT DESCRIPTION: (Provide narrative descriptions on NRC Form 189 page 3 of 3 for the following topics in the order listed. Check applicable block. If an item is not applicable, so state.)

☒ 1. OBJECTIVE OR PROPOSED WORK☐ 9. DESCRIBE SPECIAL FACILITIES REQUIRED☐ 2. SUMMARY OF PRIOR EFFORTS☒ 10. CONFLICT OF INTEREST INFORMATION☒ 3. WORK TO BE PERFORMED AND EXPECTED RESULTS☒ 11. OBLIGATION ESTIMATES☒ 4. DESCRIPTION OF ANY FOLLOW-ON EFFORTS☒ 12. OTHER (SPECIFY):☒ 5. RELATIONSHIP TO OTHER PROJECTS☒ 6. REPORTING SCHEDULE☐ 7. SUBCONTRACTOR INFORMATION☐ 8. LIST NEW CAPITAL EQUIPMENT REQUIRED

APPROVAL AUTHORITY-SIGNATURE

DATE

PROJECT TITLE:

CONTAINMENT LEAK RATE TESTING

ITEM NO.

1. OBJECTIVE OF PROPOSED WORK:

Summary

The program objective is to evaluate the practicability of the containment leak testing program, and the compatibility of regulatory requirements and industry testing standards. Existing containment leak rate testing regulatory requirements will be reviewed as well as programs which have been conducted in compliance with these requirements. Field and licensing experience will be utilized. ANSI/ANS 56.8-1981 and the proposed revision to Appendix J of 10 CFR 50 will be reviewed. A value-impact analysis will be provided for the entire proposed Appendix J revision.

Additional Information

In 1981 a national standard was issued providing detailed recommendations on the test procedures and analyses. Some of the positions in the proposed revisions should be reviewed in depth against field and licensing experiences of the past decade. Observations and recommendations resulting from such a review would either validate the positions in the proposed revision, or would provide a basis for modifying such positions.

2. SUMMARY OF PRIOR EFFORTS:

Not applicable.

3. WORK TO BE PERFORMED AND EXPECTED RESULTS:

Summary

Existing containment leak rate testing regulatory requirements will be reviewed, as well as the programs conducted in compliance with these requirements, using field and licensing experience. The proposed revision to Appendix J will be reviewed and recommendations provided. ANSI/ANS 56.8-1981, "Containment System Leakage Testing Requirements," will be reviewed for compatibility with the proposed Appendix J revision. A value-impact analysis will be provided for the entire proposed Appendix J revision, as prepared for public comment issue, addressing the value and impact on the licensees, the licensing process, and the public. After the public comment period, the value-impact analysis will be revised, as required.

FY-1983

Work will be completed on all tasks. Task A includes a review of the following: (1) relevant licensing exemption reports and exemptions granted; (2) relevant license event reports; (3) types A, B and C test reports complete with field data; (4) witnessing of at least one of each of the three type tests; (5) interviews with licensees, non-utility organizations that perform leak rate tests, and architectural-engineering firms that design containments and plant systems; and (6) discussions with appropriate NRC groups. Task B includes a review of the proposed revision to Appendix J, a general commentary on the proposed revision, and recommendations on specific aspects of the proposed revision.

PROJECT TITLE:

CONTAINMENT LEAK RATE TESTING

ITEM NO.

[containment integrated leak rate test (CILRT) pressure, CILRT frequency, CILRT duration, CILRT reporting requirements, local leak testing, verification testing, test temperature for valves, and waiting period following valve closure before leak testing]. Task C includes a review of ANSI/ANS 56.8-1981 with respect to potential conflicts with the proposed revision to Appendix J, and a determination if any of the Appendix J contents belong instead in ANSI/ANS 56.8-1981. Task D includes development and revision, after public comment, of a value-impact statement for the proposed Appendix J revision. Task E includes development of a final report summarizing results of the study.

FY-1984

Work under this study will be completed in FY-1983.

4. DESCRIPTION OF ANY FOLLOW-ON EFFORTS:

A potential follow-on effort of this study would be a probabilistic risk assessment. The assessment would include an evaluation of the consequences of a change in the present leakage rate limitations.

5. RELATIONSHIPS TO OTHER PROJECTS:

The work described herein has a relationship to work and personnel of project No. A9044 Greased Tendon Evaluations. There is an interchange of information and personnel as needed between the two programs.

6. REPORTING SCHEDULE:

Publications in FY-1982.

Not applicable.

Expected future reports

"Evaluation of Containment Leak Rate Testing Criteria" (Draft to be submitted to NRC September, 1983).

7. SUBCONTRACTOR INFORMATION:

Not applicable.

8. LIST NEW CAPITAL EQUIPMENT REQUIRED:

Not applicable.

9. DESCRIBE SPECIAL FACILITIES REQUIRED:

Not applicable.

PROJECT TITLE:

CONTAINMENT LEAK RATE TESTING

ITEM NO.

10. CONFLICT OF INTEREST INFORMATION:

There are no known relationships between this organization or its employees with industries related to the NRC and suppliers thereof that might give rise to an apparent or actual conflict of interest regarding the work described in this proposal.

11. OBLIGATION EXPENSES:

Operating Expenses	Obligation Estimates			
	FY-1982	FY-1983	FY-1984	FY-1985
(1) Cost Estimates	13	137	0	0
(2) Goods and Services on Order-GSO Estimate	137	0	0	0
Less: Uncosted Balance 9/30	0	137	0	0
GSO Change	137	(137)	0	0
(3) TOTAL OBLIGATIONS-CHANGE	150	0	0	0

12. OTHER (Specify):

12(a). QUALITY ASSURANCE AND CONTROL:

Not applicable.

12(b). COST AND MILESTONE CHARTS

A. PROJECT COST SCHEDULE

Costs	Prior Years	1982	1983	1984	1985	1986	Total Estimated Cost
Task A	0	13	37	0	0	0	50
Task B	0	0	20	0	0	0	20
Task C	0	0	20	0	0	0	20
Task D	0	0	30	0	0	0	30
Task E	0	0	30	0	0	0	30

B. 189 SUBTASK/MILESTONE CHARTS

NO. 12(b)	SUBTASK/MILESTONE SCHEDULE																	
	SUBTASK/MILESTONE		FY 82		FY 83				FY 84				FY	FY	FY	BEYOND FY		
			1	2	3	4	1	2	3	4	1	2					3	4
1. Task A: <u>Review Existing Containment Leak Rate Testing Requirements.</u>																		
a. Complete review of relevant reports.																		
b. Complete witnessing of typical tests.																		
c. Complete interviews with interested parties.																		
2. Task B: <u>Review Proposed Appendix J Revisions.</u>																		
a. Complete review of proposed revision to Appendix J.																		
b. Complete commentary on proposed revision to Appendix J.																		
c. Complete recommendations on specific aspects of the proposed revision to Appendix J																		
3. Task C: <u>Review ANSI/ANS 56.8-1981 for compatibility with Appendix J</u>																		
a. Complete review with respect to potential conflicts with Appendix J.																		
b. Complete determination of items in Appendix J which should be included.																		

SUBTASK/MILESTONE SCHEDULE													
NO. 12(b)	SUBTASK/MILESTONE	FY 82			FY 83			FY 84				FY	BEYOND FY
		1	2	3	4	1	2	3	4	1	2		
4. Task D:	Provide Value-Impact Analysis for Appendix J Proposed Revision												
	a. Complete development of an initial value-impact statement.												
	b. Complete revision of value-impact statement.												
5. Task E:	Provide Final Report												
	a. Complete development of draft final report.												

PROGRAM AND BUDGET PROPOSAL
ELEMENTS OF COST SCHEDULE
WPAS-FIELD TASK PROPOSAL/AGREEMENTS
AND WORK FOR OTHERS ESTIMATES
(Dollars in Thousands)

For Operating Expenses
Budget Outlay
(B/O)

WORKSHEET

41 10 01 06

RESOURCE PROGRAM ACTIVITY NO.

CHECK: ☐ New Budget Proposal ☐ Revised Budget Proposal

DIVISION

ET (16)

PREPARED BY

D. J. Naus

PRINCIPAL INVESTIGATOR

J. R. Dougan

DATE PREPARED

5/18/82

CONTROL NO. (FTP/A #) TITLE
B0489

Containment Leak Rate Testing

SUMMARY BY MAJOR ELEMENTS		FISCAL YEAR ESTIMATES					
		FY 1982		FY 1983		FY 1984	
		\$	PY	\$	PY	\$	PY
1	COST CENTERS	7	0.1	80	1.0	0	0
2	INTRA DIVISION COST CENTERS	0	0	0	0	0	0
3	INTER DIVISION COST CENTERS	0	0	0	0	0	0
4	TOTAL - COST CENTERS	7	0.1	80	1.0	0	0
5	TRAVEL	3		7			
6	MAJOR MATERIALS - NON EXEMPT						
7	MAJOR MATERIALS - EXEMPT						
8	COMPUTER & PROGRAMMING SERVICES			3			
9	HOT CELLS - SERVICES						
10	REACTOR SERVICES						
11	UTILITY - PURCHASED POWER - EXEMPT ONLY						
12	SPECIAL COST DISTRIBUTIONS - EXEMPT						
13	SUPPLIES, SHOPS & MAINTENANCE MATERIAL						
14	ORNL SUPPORT SERVICES:						
	P&E DIVISION						
	I&C DIVISION						
	INSPECTION ENGINEERING						
	OTHER DIRECT						
15	OTHER UC-ND PLANT SUPPORT						
16	GENERAL ENGINEERING SERVICES						
17	CAPITAL EQUIPMENT (\$3000 or less)						
18	OTHER COSTS TIS, HP, WASTE DISP, UTIL. & DIV. DISTR			15			
19	TOTAL - MATERIALS AND SERVICES	3	0	25	0	0	0
20	R&D SUBCONTRACTS & CONSULTANTS - NON EXEMPT						
21	R&D SUBCONTRACTS - EXEMPT						
22	TOTAL - R&D SUBCONTRACTS & CONSULTANTS	0		0		0	
23	SUBTOTAL	10	0.1	105	1.0	0	0
24	INDIRECT COSTS - G & A AND OPS	3		32		0	
25	GRAND TOTAL	13	0.1	137	1.0	0	0

ORNL TECHNICAL / FINANCIAL INFORMATION SYSTEM (FY 1984)

BFR NO. PTP NO. PPOB TITLE (SHORT) DATE
 40 10 01 06 B0489 1 Containment Leak Rate Testing 5/20/82
 TITLE: Containment Leak Rate Testing
 AD: D. B. Trauger FUNDING AGENCY: NRC/MSEB
 TCODE: DI SECTION: Solid Mechanics
 PC(s): Naus, D. J.
 PI(s): 100% Dougan, J. R.
 10% Robinson, G. C.

ABSTRACT: (If additional space is needed please use the back of this form)

The program objective is to evaluate the practicability of the containment leak testing program, and the compatibility of regulatory requirements and industry testing standards. Existing containment leak rate testing regulatory requirements will be reviewed as well as programs which have been conducted in compliance with these requirements. ANSI/ANS 56.8-1981 and the proposed revision to Appendix J will be reviewed. A value-impact analysis will be provided for the entire proposed Appendix J. revision.

KEYWORDS: (CIRCLE on attached keyword list)

TYPE OF ACTIVITY: (Indicate % - must add to 100%)

10 1. Basic Research --- 3. Exploratory Dev --- 5. Engineering Dev
 90 2. Applied Research --- 4. Advanced Dev

TECHNOLOGY: (Indicate % - must add to 100%)

1. Coal --- 7. LMFBR --- 13. Geothermal
 2. Oil and Gas 100 8. LWR --- 14. Conservation
 3. Oil Shale --- 9. Gas Cooled React --- 15. Apply to all Tech
 4. Radiation Damage --- 10. Other Fission --- 16. Long Range/
 5. Nuclear Waste --- 11. Fusion Tech Related
 6. Fuel Cycle --- 12. Solar

INITIATIVES: (Indicate % - need not add to 100%)

1. Water --- 6. Biotechnology Dev --- 11. Acid Rain
 2. Combustion --- 7. Biomass --- 12. Risk Assessment
 3. Materials --- 8. Eastern Shales --- 13. Toxicology
 4. Life Sci/Syn Fuel --- 9. Environ Geosci --- 14. Biogeochemical Cyc
 5. Environ Control --- 10. Hazardous Waste

RESERVES BO

DIVISION: 16 Engineering Technology

DESCRIPTION	FY 1982		FY 1983		FY 1984	
	REV EST	PTE	REV EST	FTE	SUBMIT	FTE
Financial Plan	13	Pres Budget	137			
Total BO & PTE	13	0.1	137	1.0		
Subcontract						
Major Materials						
CSD Service			3			
Engr Service						
P&E and OD PY						
I&C and OD PY						
Capital Equip.						
BA and SST		0.1		1.0		

KEYWORDS

1	ACCELERATOR	45	COGENERATION
2	ACID RAIN	46	COLLISIONS
3	ACTINIDES	47	COMBUSTION
4	ACTIVE SOLAR	48	COMMUNITY ENERGY SYSTEMS
5	AEROSOLS	49	COMPATIBILITY
6	AFBC MATERIALS	50	COMPOSITES
270	AGING	51	COMPUTER CODES
7	AIR CONDITIONING	52	COMPUTER GRAPHICS
8	AIR QUALITY	53	CONCENTRATION FACTORS
9	ALCOHOLS	54	COOLING TOWERS
10	ALLOYS	55	CORROSION
11	ALTERNATE CYCLES	56	CROP RESIDUES
12	ALTERNATIVE ENERGY SOURCE	57	CROSS SECTIONS
13	AMORPHOUS ROCK	58	CRYOGENICS
14	ANNEALING	59	CRYSTALS
15	ARCHITECTURE	60	DATA BASES
271	ASSESSMENT	61	DECOMMISSIONING
18	AUGER	62	DECONTAMINATION
19	BARYONS	63	DEFECTS
20	BASE TECHNOLOGY	64	DEFENSE
21	BATTERIES	65	DEFORMATION
22	BIOCHEMISTRY	66	DEMAND
23	BIOMASS ENERGY	67	DEPOSITION
24	BIOPHOTOLYSIS	68	DESIGN
25	BIOTECHNOLOGY	69	DEVELOPMENT
272	BLOOD	70	DIELECTRICS
26	BUILDINGS	71	DIESEL
27	CARBIDES	72	DIFFRACTION
28	CARBON DIOXIDE	73	DIFFUSION
29	CARCINOGENESIS	74	DISPERSION
273	CARDIOVASCULAR DISEASE	75	DISTRICT HEATING
30	CATALYSIS	76	DNA
31	CELLULOSE	77	DNA REPAIR
32	CERAMICS	78	DOSIMETRY
33	CHANNELING	79	ECOSYSTEMS
34	CHATTANOOGA SHALE	80	EIS
35	CHEMICAL DEVELOPMENT	81	ELECTRICITY
36	CHEMISTRY	82	ELECTROCHEMISTRY
37	CHROMATOGRAPHY	83	ELECTRONS
38	CHROMOSOME DAMAGE	84	ELMO BUMPY TORUS
39	COAL CONVERSION	85	EMISSIONS
40	COAL FLUIDIZED BED	86	ENGINEERING EXPERIMENTS
41	COAL GASIFICATION	87	ENTRAINMENT
42	COAL LIQUEFACTION	88	ENVIRON CONTROL TECH
43	COAL PREPARATION	89	ENVIRONMENTAL EFFECTS
44	COAL WASTES	90	ENZYMES

KEYWORDS continued

274	EPIDEMIOLOGY	135	INTERNATIONAL COOPERATION
91	EQUIPMENT DEVELOPMENT	136	ION
92	FAULT TREES	137	ION EXCHANGE
93	FIBER OPTICS	138	ION IMPLANTATION
94	FILTRATION	139	IONIZATION
95	FINITE ELEMENT METHODS	140	IONIZING RADIATION
96	FISH	141	IRRADIATION
97	FISSION PRODUCTS	142	ISOTOPES
98	FLOW	143	KINETICS
99	FLUIDIZATION	144	LAND USE
100	FLUIDS	145	LANTHANIDES
101	FLUORESCENCE	146	LASERS
102	FORESTS	147	LATTICE DYNAMICS
103	FRACTURE	148	LEACHING
104	FUEL CELLS	149	LOW LEVEL WASTE
105	GENERATORS	150	MASS SPECTROMETRY
106	GENETICS	151	MATERIALS ENGINEERING
107	GERM CELLS	152	MATERIALS SCIENCE
108	GRAPHITE	153	MECHANICAL PROPERTIES
109	GREENHOUSES	154	MEMBRANES
110	H COAL	155	METALS
111	HADRONS	156	METHANE
112	HEALTH EFFECTS	157	METHANOL
113	HEAT EXCHANGERS	158	METHODS DEVELOPMENT
114	HEAT PUMP	159	MICROORGANISMS
115	HEAT RECOVERY	160	MICROSCOPY
116	HEAT TRANSFER	161	MIGRATION
117	HEAVY IONS	162	MODEL ANALYSIS
118	HELIUM	163	MODELING
119	HFIR	164	MODULAR STRUCTURES
120	HHIFF	165	MOLTEN SALTS
121	HIGH ENERGY	166	MONITORING
122	HIGH VOLTAGE	167	MOVING BOUNDARIES
123	HYDROCARBONS	168	MUTAGENESIS
124	HYDROELECTRIC	169	NATIONAL ENERGY PLANNING
125	HYDROGEN	170	NEUTRINOS
126	HYDROLOGY	171	NEUTRONICS
127	HYDROTREATING	172	NEUTRONS
128	IGNEOUS ROCK	173	NITROGEN DIOXIDES
129	IMMUNOLOGY	174	NONDESTRUCTIVE TESTING
130	IMPINGEMENT	175	NUMERICAL ANALYSIS
131	INDUSTRIAL CONSERVATION	176	OPERATIONS
275	INDUSTRIAL HYGIENE	177	OTEC
132	INNOVATIVE STRUCTURES	178	OXIDATION
133	INSTRUMENTATION	179	OXYGEN
134	INSULATION	180	OZONE

KEYWORDS continued

181	PARTICULATES	225	SILICATES
182	PASSIVE SOLAR	226	SKIN
183	PERMEATION	227	SOLID MECHANICS
184	PHARMACOLOGY	228	SOLID WASTES
185	PHASES	229	SOLIDIFICATION
186	PHOSPHATES	230	SOLUBILITY
187	PHOTOCHEMISTRY	231	SOLVENT EXTRACTION
188	PHOTOELECTRON	232	SORPTION
189	PHOTONS	233	SPECTROPHOTOMETRY
190	PHOTOVOLTAICS	234	SPECTROSCOPY
191	PHYSICS	235	STANDARDS
192	PLASMA	236	STEAM
193	PLUTONIUM	237	STEELS
194	POLICY ANALYSIS	238	STORAGE
195	POLYCYCLIC HYDROCARBONS	239	STRUCTURE
196	POLYMERS	240	SULFUR
197	POSITRON	241	SUPERCONDUCTORS
198	POWER PLANTS	242	SURFACE
199	PROBABILITY	243	SURFACTANTS
200	PROCESS DEVELOPMENT	244	SYNCHROTRON
201	PROCESSES	245	SYSTEM DEVELOPMENT
202	PROTEINS	246	TEMPERATURE
203	PYROLYSIS	247	TERATOGENESIS
204	RADIOACTIVE	248	THERMODYNAMICS
206	RADIOPHARMACEUTICALS	249	THORIUM
205	RCRA	250	THREE MILE ISLAND
206	REACTOR FUEL DEVELOPMENT	251	TOSCA
207	REACTOR SAFETY	252	TOXICOLOGY
208	RECOVERY	253	TRANSFORMATION
209	REFRACTORY	254	TRANSPORT
210	REGIONAL ANALYSIS	255	TRANSPORTATION
211	REGULATIONS	256	TRANSURANICS
212	REPROCESSING	257	TRANSURANIUM
217	REPRODUCTION	258	TRITIUM
213	RISK ASSESSMENTS	259	ULTRAVIOLET RADIATION
214	RNA	260	UPANIUM
215	SAFEGUARDS	261	WASTE ENERGY UTILIZATION
216	SAFETY	262	WASTE ISOLATION
217	SALT REPOSITORY	263	WASTE MANAGEMENT
218	SCATTERING	264	WASTEWATER TREATMENT
218	SCREENING	265	WATER AVAILABILITY
220	SEDIMENTS	266	WATER CHEMISTRY
221	SEPARATION PROCESSES	267	WATER QUALITY
222	SERVICES	268	WELDING
223	SHALE	269	X-RAY
224	SHIELDING		



PROJECT AND BUDGET PROPOSAL FOR NRC BRK

06-01-82

☒ NEW
☐ REVISION NO. 0

PROJECT TITLE: CONTAINMENT LEAK RATE TESTING			FIN NUMBER B0489			
NRC OFFICE Nuclear Regulatory Research			NRC B & R NUMBER 60-82-248			
DOE CONTRACTOR UNION CARBIDE CORPORATION		PATENT STATUS <i>This proposal is being transmitted in advance of patent review for evaluation purposes only. No further dissemination or publication shall be made without prior approval of the Assistant General Counsel for Patents, DOE.</i>		CONTRACTOR/ORNL ACT. 41 89 55 139		
SITE OAK RIDGE NATIONAL LABORATORY OAK RIDGE, TENNESSEE 37830				DOE B & R NUMBER 40 10 01 06		
COGNIZANT PERSONNEL		ORGANIZATION	FTS PHONE NUMBER	PERIOD OF PERFORMANCE		
NRC PROJECT MANAGER E. G. Arndt		MSEB	443-5860	STARTING DATE 06-01-82		
OTHER NRC TECHNICAL STAFF				COMPLETION DATE 09-30-83		
DOE PROJECT MANAGER W. R. Bibb		DOE-ORO	626-0742			
CONTRACTOR/ORNL						
PROG. DIR.: A. L. Lotts		CMO	624-0422			
PROG. MGR.: F. J. Homan		M&C Division	624-5169			
PROJ. MGR.: D. J. Naus		ET Division	624-0657			
PRIN. INVESTIGATOR(S) J.R. Dougan G. C. Robinson		ET Division	624-0650			
		ET Division	624-0649			
STAFF YEARS OF EFFORT (Round to nearest tenth of a year)						
		FY 1982	FY 1983	FY 1984	FY 1985	FY 1986
Direct Scientific/Technical		0.1	1.0	0	0	0
Other Direct		0	0	0	0	0
TOTAL DIRECT STAFF YEARS		0.1	1.0	0	0	0
COST PROPOSAL (OBLIGATIONS)						
(\$ In Thousands)						
Direct Salaries (Cost Centers)		7	80	0	0	0
Material and Services (Excluding ADP)		0	15	0	0	0
ADP Support		0	3	0	0	0
Subcontracts and Consultants		0	0	0	0	0
Travel Expenses		0	0	0	0	0
		3	7	0	0	0
Indirect Labor Costs (Cost Centers)						
Other (Specify) GSO Change		0	0	0	0	0
General and Administrative (G&A/GPS)		3	32	0	0	0
TOTAL OPERATING COST (Obligations)		13	137	0	0	0
CAPITAL EQUIPMENT						
FIN CHARGED:		0	0	0	0	0
TOTAL PROJECT COST (Obligations)		13	137	0	0	0
FY 1983		OCTOBER 12	NOVEMBER 12	DECEMBER 13	JANUARY 10	FEBRUARY 10
MONTHLY FORECAST EXPENSE		APRIL 10	MAY 10	JUNE 10	JULY 13	AUGUST 14
						SEPTEMBER 13

PROJECT AND BUDGET PROPOSAL FOR NRC WORK

B0489

DATE

06-01-82






PROJECT TITLE:

CONTAINMENT LEAK RATE TESTING

DOE PROPOSING ORGANIZATION:

UNION CARBIDE CORPORATION
OAK RIDGE NATIONAL LABORATORY
OAK RIDGE, TENNESSEE 37830FORECAST MILESTONE CHART: Schedule to Start—  —Completed (Shown in Quarter Year)

PROVIDE ESTIMATED DOLLAR COST FOR EACH TASK FOR EACH FISCAL YEAR

TASK		FY 1982				FY 19 83				FY 1984				FY 19 85				FY 19 86			
		1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
A. Review existing containment leak rate testing requirements.	SCHEDULE																				
	COST		13				37														
B. Review proposed Appendix J revisions.	SCHEDULE																				
	COST						20														
C. Review ANSI/ANS 56.8-1981 for compatibility with Appendix J	SCHEDULE																				
	COST						20														
D. Provide value-impact analysis for Appendix J proposed revision.	SCHEDULE																				
	COST						30														
E. Provide final report.	SCHEDULE																				
	COST						30														
TOTAL ESTIMATED PROJECT COST			13				137				0				0					0	

PROJECT DESCRIPTION: (Provide narrative descriptions on NRC Form 189 page 3 of 3 for the following topics in the order listed. Check applicable block. If an item is not applicable, so state.)

☒ 1. OBJECTIVE OR PROPOSED WORK☐ 9. DESCRIBE SPECIAL FACILITIES REQUIRED☐ 2. SUMMARY OF PRIOR EFFORTS☒ 10. CONFLICT OF INTEREST INFORMATION☒ 3. WORK TO BE PERFORMED AND EXPECTED RESULTS☒ 11. OBLIGATION ESTIMATES☒ 4. DESCRIPTION OF ANY FOLLOW-ON EFFORTS☒ 12. OTHER (SPECIFY):☒ 5. RELATIONSHIP TO OTHER PROJECTS☒ 6. REPORTING SCHEDULE☐ 7. SUBCONTRACTOR INFORMATION☐ 8. LIST NEW CAPITAL EQUIPMENT REQUIRED

APPROVAL AUTHORITY-SIGNATURE

DATE

PROJECT TITLE:

CONTAINMENT LEAK RATE TESTING

ITEM NO.

1. OBJECTIVE OF PROPOSED WORK:

Summary

The program objective is to evaluate the practicability of the containment leak testing program, and the compatibility of regulatory requirements and industry testing standards. Existing containment leak rate testing regulatory requirements will be reviewed as well as programs which have been conducted in compliance with these requirements. Field and licensing experience will be utilized. ANSI/ANS 56.8-1981 and the proposed revision to Appendix J of 10 CFR 50 will be reviewed. A value-impact analysis will be provided for the entire proposed Appendix J revision.

Additional Information

In 1981 a national standard was issued providing detailed recommendations on the test procedures and analyses. Some of the positions in the proposed revisions should be reviewed in depth against field and licensing experiences of the past decade. Observations and recommendations resulting from such a review would either validate the positions in the proposed revision, or would provide a basis for modifying such positions.

2. SUMMARY OF PRIOR EFFORTS:

Not applicable.

3. WORK TO BE PERFORMED AND EXPECTED RESULTS:

Summary

Existing containment leak rate testing regulatory requirements will be reviewed, as well as the programs conducted in compliance with these requirements, using field and licensing experience. The proposed revision to Appendix J will be reviewed and recommendations provided. ANSI/ANS 56.8-1981, "Containment System Leakage Testing Requirements," will be reviewed for compatibility with the proposed Appendix J revision. A value-impact analysis will be provided for the entire proposed Appendix J revision, as prepared for public comment issue, addressing the value and impact on the licensees, the licensing process, and the public. After the public comment period, the value-impact analysis will be revised, as required.

FY-1983

Work will be completed on all tasks. Task A includes a review of the following: (1) relevant licensing exemption reports and exemptions granted; (2) relevant license event reports; (3) types A, B and C test reports complete with field data; (4) witnessing of at least one of each of the three type tests; (5) interviews with licensees, non-utility organizations that perform leak rate tests, and architectural-engineering firms that design containments and plant systems; and (6) discussions with appropriate NRC groups. Task B includes a review of the proposed revision to Appendix J, a general commentary on the proposed revision, and recommendations on specific aspects of the proposed revision

PROJECT AND BUDGET PROPOSAL FOR NRC WORK

B0489

PROJECT TITLE:

CONTAINMENT LEAK RATE TESTING

ITEM NO.

[containment integrated leak rate test (CILRT) pressure, CILRT frequency, CILRT duration, CILRT reporting requirements, local leak testing, verification testing, test temperature for valves, and waiting period following valve closure before leak testing]. Task C includes a review of ANSI/ANS 56.8-1981 with respect to potential conflicts with the proposed revision to Appendix J, and a determination if any of the Appendix J contents belong instead in ANSI/ANS 56.8-1981. Task D includes development and revision, after public comment, of a value-impact statement for the proposed Appendix J revision. Task E includes development of a final report summarizing results of the study.

FY-1984

Work under this study will be completed in FY-1983.

4. DESCRIPTION OF ANY FOLLOW-ON EFFORTS:

A potential follow-on effort of this study would be a probabilistic risk assessment. The assessment would include an evaluation of the consequences of a change in the present leakage rate limitations.

5. RELATIONSHIPS TO OTHER PROJECTS:

The work described herein has a relationship to work and personnel of project No. A9044 Greased Tendon Evaluations. There is an interchange of information and personnel as needed between the two programs.

6. REPORTING SCHEDULE:

Publications in FY-1982.

Not applicable.

Expected future reports

"Evaluation of Containment Leak Rate Testing Criteria" (Draft to be submitted to NRC September, 1983).

7. SUBCONTRACTOR INFORMATION:

Not applicable.

8. LIST NEW CAPITAL EQUIPMENT REQUIRED:

Not applicable.

9. DESCRIBE SPECIAL FACILITIES REQUIRED:

Not applicable.

PROJECT AND BUDGET PROPOSAL FOR NRC WORK

B0489

PROJECT TITLE:

CONTAINMENT LEAK RATE TESTING

ITEM NO.

10. CONFLICT OF INTEREST INFORMATION:

There are no known relationships between this organization or its employees with industries related to the NRC and suppliers thereof that might give rise to an apparent or actual conflict of interest regarding the work described in this proposal.

11. OBLIGATION EXPENSES:

Operating Expenses	Obligation Estimates			
	FY-1982	FY-1983	FY-1984	FY-1985
(1) Cost Estimates	13	137	0	0
(2) Goods and Services on Order-GSO Estimate	0	0	0	0
Less: Uncosted Balance 9/30	0	0	0	0
GSO Change	0	0	0	0
(3) TOTAL OBLIGATIONS-CHANGE	13	137	0	0

12. OTHER (Specify):

12(a). QUALITY ASSURANCE AND CONTROL:

Not applicable.

12(b). COST AND MILESTONE CHARTS

A. PROJECT COST SCHEDULE

Costs	Prior Years	1982	1983	1984	1985	1986	Total Estimated Cost
Task A	0	13	37	0	0	0	50
Task B	0	0	20	0	0	0	20
Task C	0	0	20	0	0	0	20
Task D	0	0	30	0	0	0	30
Task E	0	0	30	0	0	0	30

B. 189 SUBTASK/MILESTONE CHARTS

NO. 12(b)		SUBTASK/MILESTONE SCHEDULE																
SUBTASK/MILESTONE		FY 82				FY 83				FY 84				FY	FY	FY	FY	BEYOND FY
		1	2	3	4	1	2	3	4	1	2	3	4					
1.	Task A: <u>Review Existing Containment Leak Rate Testing Requirements.</u>				▽													
	a. Complete review of relevant reports.				▽													
	b. Complete witnessing of typical tests.				▽													
	c. Complete interviews with interested parties.				▽													
2.	Task B: <u>Review Proposed Appendix J Revisions.</u>																	
	a. Complete review of proposed revision to Appendix J.								▽									
	b. Complete commentary on proposed revision to Appendix J.								▽									
	c. Complete recommendations on specific aspects of the proposed revision to Appendix J								▽									
3.	Task C: <u>Review ANSI/ANS 56.8-1981 for compatibility with Appendix J</u>																	
	a. Complete review with respect to potential conflicts with Appendix J.								▽									
	b. Complete determination of items in Appendix J which should be included.								▽									

SUBTASK/MILESTONE SCHEDULE													
NO. 12(b)	SUBTASK/MILESTONE	FY 82			FY 83			FY 84				FY	BEYOND FY
		1	2	3	1	2	3	1	2	3	4		
4. Task D: Provide Value-Impact Analysis for Appendix J Proposed Revision	a. Complete development of an initial value-impact statement.												
5. Task E: Provide Final Report	a. Complete development of draft final report.												

PROGRAM AND BUDGET PROPOSAL
ELEMENTS OF COST SCHEDULE
FOR WPAS-FIELD TASK PROPOSAL/AGREEMENTS
AND WORK FOR OTHERS ESTIMATES
(Dollars in Thousands)

For Operating Expenses
Budget Outlay
(B/O)

WORKSHEET

41 10 01 06

RESOURCE PROGRAM ACTIVITY NO.

CHECK: ☐ New Budget Proposal ☐ Revised Budget Proposal

DIVISION

ET (16)

PREPARED BY

D. J. Naus

PRINCIPAL INVESTIGATOR

J. R. Dougan

DATE PREPARED

5/18/82

CONTROL NO. (FTP/A #)

B0489

TITLE

Containment Leak Rate Testing

SUMMARY BY MAJOR ELEMENTS		FISCAL YEAR ESTIMATES					
		FY 1982		FY 1983		FY 1984	
		\$	PY	\$	PY	\$	PY
1	COST CENTERS	7	0.1	80	1.0	0	0
2	INTRA-DIVISION COST CENTERS	0	0	0	0	0	0
3	INTER-DIVISION COST CENTERS	0	0	0	0	0	0
4	TOTAL - COST CENTERS	7	0.1	80	1.0	0	0
5	TRAVEL	3		7			
6	MAJOR MATERIALS - NON-EXEMPT						
7	MAJOR MATERIALS - EXEMPT						
8	COMPUTER & PROGRAMMING SERVICES			3			
9	HOT CELLS - SERVICES						
10	REACTOR - SERVICES						
11	UTILITY - PURCHASED POWER - EXEMPT ONLY						
12	SPECIAL COST DISTRIBUTIONS - EXEMPT						
13	SUPPLIES, SHOPS & MAINTENANCE MATERIAL						
14	ORNL SUPPORT SERVICES:						
15	P&E DIVISION						
16	I&C DIVISION						
17	INSPECTION ENGINEERING						
18	OTHER DIRECT						
19	OTHER UC-ND PLANT SUPPORT						
20	GENERAL ENGINEERING SERVICES						
21	CAPITAL EQUIPMENT (\$3000 or less) ^{Items}						
22	OTHER COSTS TIS, HP, WASTE DISP, UTIL & DIV. DISTR			15			
23	TOTAL - MATERIALS AND SERVICES	3	0	25	0	0	0
24	R&D SUBCONTRACTS & CONSULTANTS - NON EXEMPT						
25	R&D SUBCONTRACTS - EXEMPT						
26	TOTAL - R&D SUBCONTRACTS & CONSULTANTS	0		0		0	
27	SUBTOTAL	10	0.1	105	1.0	0	0
28	INDIRECT COSTS - G & A AND GPS	3		32		0	
29	GRAND TOTAL	13	0.1	137	1.0	0	0

BFR NO. 40 10 01 06 PTP N B0489 PROB 1 TITLE (AORT) Containment Leak Rate Testing DATE 5/20/82
 TITLE: Containment Leak Rate Testing
 AD: D. B. Trauger FUNDING AGENCY: NRC/MSEB
 TCODE: DI SECTION: Solid Mechanics
 PC(s): Naus, D. J.
 PI(s): 100% Dougan, J. R.
 10% Robinson, G. C.
 ABSTRACT: (If additional space is needed please use the back of this form)

The program objective is to evaluate the practicability of the containment leak testing program, and the compatibility of regulatory requirements and industry testing standards. Existing containment leak rate testing regulatory requirements will be reviewed as well as programs which have been conducted in compliance with these requirements. ANSI/ANS 56.8-1981 and the proposed revision to Appendix J will be reviewed. A value-impact analysis will be provided for the entire proposed Appendix J. revision.

KEYWORDS: (CIRCLE on attached keyword list)

TYPE OF ACTIVITY: (Indicate % - must add to 100%)

10 1. Basic Research --- 3. Exploratory Dev --- 5. Engineering Dev
 90 2. Applied Research --- 4. Advanced Dev

TECHNOLOGY: (Indicate % - must add to 100%)

--- 1. Coal --- 7. LMFBR --- 13. Geothermal
 --- 2. Oil and Gas 100 8. LWR --- 14. Conservation
 --- 3. Oil Shale --- 9. Gas Cooled React --- 15. Apply to all Tech
 --- 4. Radiation Damage --- 10. Other Fission --- 16. Long Range/
 --- 5. Nuclear Waste --- 11. Fusion Tech Related
 --- 6. Fuel Cycle --- 12. Solar

INITIATIVES: (Indicate % - need not add to 100%)

--- 1. Water --- 6. Biotechnology Dev --- 11. Acid Rain
 --- 2. Combustion --- 7. Biomass --- 12. Risk Assessment
 --- 3. Materials --- 8. Eastern Shales --- 13. Toxicology
 --- 4. Life Sci/Syn Fuel --- 9. Environ Geosci --- 14. Biogeochemical Cyc
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RESERVES BO

DIVISION: 16 Engineering Technology

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Capital Equip.						
BA and S&T		0.1		1.0		

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ntinued

- 135 INTERNATIONAL COOPERATION
- 136 ION
- 137 ION EXCHANGE
- 138 ION IMPLANTATION
- 139 IONIZATION
- 140 IONIZING RADIATION
- 141 IRRADIATION
- 142 ISOTOPES
- 143 KINETICS
- 144 LAND USE
- 145 LANTHANIDES
- 146 LASERS
- 147 LATTICE DYNAMICS
- 148 LEACHING
- 149 LOW LEVEL WASTE
- 150 MASS SPECTROMETRY
- 151 MATERIALS ENGINEERING
- 152 MATERIALS SCIENCE
- 153 MECHANICAL PROPERTIES
- 154 MEMBRANES
- 155 METALS
- 156 METHANE
- 157 METHANOL
- 158 METHODS DEVELOPMENT
- 159 MICROORGANISMS
- 160 MICROSCOPY
- 161 MIGRATION
- 162 MODEL ANALYSIS
- 163 MODELING
- 164 MODULAR STRUCTURES
- 165 MOLTEN SALTS
- 166 MONITORING
- 167 MOVING BOUNDARIES
- 168 MUTAGENESIS
- 169 NATIONAL ENERGY PLANNING
- 170 NEUTRINOS
- 171 NEUTRONICS
- 172 NEUTRONS
- 173 NITROGEN DIOXIDES
- 174 NONDESTRUCTIVE TESTING
- 175 NUMERICAL ANALYSIS
- 176 OPERATIONS
- 177 OTEC
- 178 OXIDATION
- 179 OXYGEN
- 180 OZONE

KEYWORDS continued

274	EPIDEMIOLOGY	135	INTERNATIONAL COOPERATION
91	EQUIPMENT DEVELOPMENT	136	ION
92	FAULT TREES	137	ION EXCHANGE
93	FIBER OPTICS	138	ION IMPLANTATION
94	FILTRATION	139	IONIZATION
95	FINITE ELEMENT METHODS	140	IONIZING RADIATION
96	FISH	141	IRRADIATION
97	FISSION PRODUCTS	142	ISOTOPES
98	FLOW	143	KINETICS
99	FLUIDIZATION	144	LAND USE
100	FLUIDS	145	LANTHANIDES
101	FLUORESCENCE	146	LASERS
102	FORESTS	147	LATTICE DYNAMICS
103	FRACTURE	148	LEACHING
104	FUEL CELLS	149	LOW LEVEL WASTE
105	GENERATORS	150	MASS SPECTROMETRY
106	GENETICS	151	MATERIALS ENGINEERING
107	GERM CELLS	152	MATERIALS SCIENCE
108	GRAPHITE	153	MECHANICAL PROPERTIES
109	GREENHOUSES	154	MEMBRANES
110	H COAL	155	METALS
111	HADRONS	156	METHANE
112	HEALTH EFFECTS	157	METHANOL
113	HEAT EXCHANGERS	158	METHODS DEVELOPMENT
114	HEAT PUMP	159	MICROORGANISMS
115	HEAT RECOVERY	160	MICROSCOPY
116	HEAT TRANSFER	161	MIGRATION
117	HEAVY IONS	162	MODEL ANALYSIS
118	HELIUM	163	MODELING
119	HFIR	164	MODULAR STRUCTURES
120	HIRF	165	MOLTEN SALTS
121	HIGH ENERGY	166	MONITORING
122	HIGH VOLTAGE	167	MOVING BOUNDARIES
123	HYDROCARBONS	168	MUTAGENESIS
124	HYDROELECTRIC	169	NATIONAL ENERGY PLANNING
125	HYDROGEN	170	NEUTRINOS
126	HYDROLOGY	171	NEUTRONICS
127	HYDROTREATING	172	NEUTRONS
128	IGNEOUS ROCK	173	NITROGEN DIOXIDES
129	IMMUNOLOGY	174	NONDESTRUCTIVE TESTING
130	IMPINGEMENT	175	NUMERICAL ANALYSIS
131	INDUSTRIAL CONSERVATION	176	OPERATIONS
275	INDUSTRIAL HYGIENE	177	OTEC
132	INNOVATIVE STRUCTURES	178	OXIDATION
133	INSTRUMENTATION	179	OXYGEN
134	INSULATION	180	OZONE

KEYWORDS continued

181 PARTICULATES	225 SILICATES
182 PASSIVE SOLAR	226 SKIN
193 PERMEATION	227 SOLID MECHANICS
184 PHARMACOLOGY	228 SOLID WASTES
195 PHASES	229 SOLIDIFICATION
186 PHOSPHATES	230 SOLUBILITY
187 PHOTOCHEMISTRY	231 SOLVENT EXTRACTION
198 PHOTOELECTRON	232 SORPTION
189 PHOTONS	233 SPECTROPHOTOMETRY
190 PHOTOVOLTAICS	234 SPECTROSCOPY
191 PHYSICS	235 STANDARDS
192 PLASMA	236 STEAM
193 PLUTONIUM	237 STEELS
194 POLICY ANALYSIS	238 STORAGE
195 POLYCYCLIC HYDROCARBONS	239 STRUCTURE
196 POLYMERS	240 SULFUR
197 POSITRON	241 SUPERCONDUCTORS
198 POWER PLANTS	242 SURFACE
199 PROBABILITY	243 SURFACTANTS
200 PROCESS DEVELOPMENT	244 SYNCHROTRON
201 PROCESSES	245 SYSTEM DEVELOPMENT
202 PROTEINS	246 TEMPERATURE
203 PYROLYSIS	247 TERATOGENESIS
204 RADIOACTIVE	248 THERMODYNAMICS
276 RADIOPHARMACEUTICALS	249 THORIUM
205 RCRA	250 THREE MILE ISLAND
206 REACTOR FUEL DEVELOPMENT	251 TOSCA
207 REACTOR SAFETY	252 TOXICOLOGY
208 RECOVERY	253 TRANSFORMATION
209 REFRACTORY	254 TRANSPORT
210 REGIONAL ANALYSIS	255 TRANSPORTATION
211 REGULATIONS	256 TRANSURANICS
212 REPROCESSING	257 TRANSURANIUM
277 REPRODUCTION	258 TRITIUM
213 RISK ASSESSMENTS	259 ULTRAVIOLET RADIATION
214 RNA	260 UPANIUM
215 SAFEGUARDS	261 WASTE ENERGY UTILIZATION
216 SAFETY	262 WASTE ISOLATION
217 SALT REPOSITORY	263 WASTE MANAGEMENT
218 SCATTERING	264 WASTEWATER TREATMENT
278 SCREENING	265 WATER AVAILABILITY
220 SEDIMENTS	266 WATER CHEMISTRY
221 SEPARATION PROCESSES	267 WATER QUALITY
222 SERVICES	268 WELDING
223 SHALE	269 X-RAY
224 SHIELDING	

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WORK STATEMENT ADDENDUM

Appendix J Requirements/ Site Source Terms

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 correspond 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 off-site risk, in terms of dose, to the public from each of these potential containment source terms, and
- C. 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 safety margin to see whether it provides reasonable assurance that actual leakage does not exceed design value.

Other References

- NUREG - 0771, Regulatory Impact of Nuclear Reactor Accident Source Term Assumptions, June 1981. Under extensive revision, estimated 9/82 publishing.
- 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.