

*Summerman for the file.*



BROOKHAVEN NATIONAL LABORATORY  
ASSOCIATED UNIVERSITIES, INC.

Upton, New York 11973

(516) 345-

18

Department of Applied Science

April 13, 1977



Mr. John S. Berggren, Chief  
Systems Analysis Branch  
U.S. NRC  
Washington, D. C. 20555

Dear Jack,

Attached is the third phase proposal from SAI. Note that page 2 of the cover letter estimates the entire Phase III effort. The next nine pages refer to a partial (3 month) effort aimed at holding the SAI team together and starting Phase III while NRC is making its final determination of the appropriate approach to the completion of Phase III. The last 20 pages or so of the attachment detail the full Phase III work scope.

I recommend funding the 3-month effort as rapidly as possible. I believe it to be responsive to NRC RES needs yet does not commit NRC to the fully funded Phase III effort, a commitment which NRC is probably not yet ready to make.

An increase in the Consequences obligation to BNL of \$110,000 would allow us to subcontract the SAI 3-month proposed effort.

Very truly yours,

John H. Cusack

JHC/dd  
Enclosure

cc: F. Arsenault ✓



Dr. John Cusack  
Technical Support Organization  
Brookhaven National Laboratory  
Upton, New York 11973

Dear Dr. Cusack:

In retrospect, it seems that my presentation of 1 April on results to date under project 374708-S(Task 2) "Consequence Estimation" was quite successful. As my measure, I must consider the constructive nature of the comments of Dr. Wall, among others, and the straightforward questions of Dr. Sherr pertaining to the direction of the study and the necessity of considering certain events. I profitted greatly by this exposure and hope to translate this into improved reports in current and late phases of the effort.

During the post mortem of my visit in general and my presentation in particular, Dr. Arsenault raised three questions concerning the study and its future:

1. Has the work been done previously, all or in part?
2. Is there sufficient support within NRC to justify project continuation, and
3. Will national policies obviate the necessity of considering particular events?

In summary, I believe that the answers to these questions are that:

1. Previous work has been and will continue to be accounted for, though modified to enhance its relevance to the study.
2. Reception of the presentation indicated genuine interest in project continuation, even in consideration of nuclear explosive events.
3. Current existence of SNM within the U.S. and its continued production worldwide necessitates consideration of most events. Spent fuel storage and transport should receive a second look for possible events. Finally, reprocessing will in all likelihood, receive almost constant reconsideration and should therefore be considered in spite of the current political climate.

In keeping with my answers to Dr. Arsenault's questions as given above, I would like to recommend for your sponsorship the third phase of the consequence estimation study which calls for the implementation of the methodology assessed in phase 2 in the state-of-the-art analysis of the consequences of events identified in phase 1. Therefore, this

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Other SAI Offices: Albuquerque, Ann Arbor, Arlington, Atlanta, Boston, Chicago, Huntsville, La Jolla, Los Angeles, McLean, Palo Alto, Santa Barbara, Sunnyvale, and Tucson.

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letter forwards as an enclosure a detailed list of tasks to be undertaken in Phase 3 and an estimate of the effort required for their completion. Estimated technical man months (TMM) are given for each sub-task and are summarized below for each area of phenomenology.

Phenomenology Area	TMM
1. Nuclear Explosives	12
2. Environmental Release	15
3. Atmospheric Transport	19 1/2
4. Pathways to man and human dosimetry	14 1/2
5. Health Effects and Property Damage	12
6. Project Coordination and Reporting	8
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TOTAL	81

In addition, the project will incur other direct costs, including an estimated 30 hours of computer time and of course some travel. The following is an estimate of total phase 3 costs included here for budget purposes.

Direct Labor	174,940
6.75 man years @ \$25,917/hr (based on Level 3.21 personnel)	
Overhead @ 82%	143,451
Fringe Benefits @ 33%	57,730
Other Direct Costs	
Computer 30 hrs @ \$400/hr (est.)	12,000
Travel	5,000
Report Production	500
Communication (including remote terminal)	2,000
Total Direct Costs & Overhead	383,633
General and Administrative Expense @ 11.3%	43,351
Total estimated cost	426,984
Fixed Fee @ 10%	42,698
Total Estimated Cost plus Fixed Fee	469,682

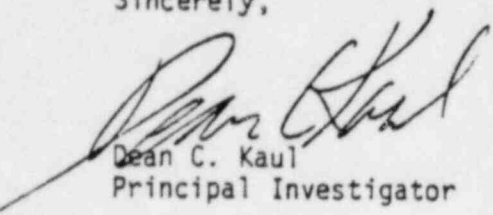
This figure exceeds the number I had given you earlier for the project and as such is subject to revision. Thus, the breakdown of effort within subtasks as given in the enclosure is quite specific and should be amenable to discussion on particular points of interest which I will be happy to pursue with you at your convenience.

Given the generally favorable reception accorded earlier phases of the work and the desire heretofore expressed by you to keep the project team intact, it is suggested that pending full approval of the Phase 3 effort, it receive partial funding against the accomplishment of specific

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tasks involving long lead-time items such as code and data acquisition and implementation. Such funding would also allow SAI to respond more adequately to suggestions and criticisms involving the current report drafts. The balance of this letter is a proposal for funding of Phase 3 for a 3 month period. Task numbers refer to those described in the enclosure.

Sincerely,



Dean C. Kaul  
Principal Investigator

DCK/rmp

PHASE 3  
3 Month Work Scope

		<u>Level of Effort</u>
I.	Nuclear Explosives	
	Task 1a Phenomenology Code Acquisition and Modification	1 1/2 TMM
	Task 2a Personnel Casualty Criteria data Acquisition	1
	Task 2b Property Damage Criteria data Acquisition computer time 2 hr*	1/2
II.	Environmental Release	
	Task A Particle size data Analysis	1
	Task C Aerosol flow analysis computer time 1 hr **	2
III.	Atmospheric Transport	
	Work Unit 1, Task 1 Low-Yield fallout code Development	1
	Work Unit 2, Task 1 Selection of the Mass Consistent Wind Field Generator	1
	Work Unit 2, Task 4 Evaluate Atmospheric Dispersion and Transport Models computer time 1 hr**	1
IV.	Pathways to Man and Human Dosimetry	
	Task A. Dosimetric Model Acquisition and Review	1/2
	Task C. Terrestrial Pathway Mode Acquisition and Modification	1 1/2
	Task D. Aquatic Pathway Model Development computer time 1 hr**	1
V.	Health Effects and Property Damage	
	Task 1 Code Acquisition and Modularization	1
	Task 3 Lung Model Improvements	1
	Task 4 Impact of Health Effects and their Representation computer time 1 hr**	1

PHASE 3  
3 Month Work Scope (Cont'd)

	<u>Level of Effort</u>
VI. Project Coordination and Reporting	2
TOTAL	<hr/> 17

\*SAI DEC

\*\*CDC 7600 or equivalent

Management

It is proposed that management and Technical staffing continue as per the first two phases of the effort, with Mr. Dean C. Kaul, SAI, Chicago, as Principal Investigator.

Schedule and Reports

It is proposed that the project schedule be modified to allow work continuation through 1 July 1977 and that monthly progress reports be continued through that date.

Price and Contractual Information

The funding of the initial portion of phase 3 is proposed on a cost-plus-fixed-fee basis as follows:

Proposal No. 1-121-71-780-03

Direct Labor

<u>Classification</u>	<u>Rate/hr</u>	<u>Estimated hours</u>	<u>Estimated Cost</u>
Scientist 42	16.48	130	2142
Scientist 41	14.30	390	5577
Scientist 32	12.47	737	9190
Scientist 31	10.39	1300	13507
Scientist 23	8.95	390	3491
Tech. Typist	5.85	40	234

Total Direct Labor	34141
Overhead @ 82% of Direct Labor	27996
Fringe Benefits @ 33% of Direct Labor	11267
Total Labor Overhead	39263

Other Direct Costs

Computer	5300
Travel and Per Diem	3241

Total Other Direct Charges	8541
Total Direct Cost and Overhead	81945
General & Administrative Expenses @ 11.3%	9260
Total Estimated Cost	91205
Fixed Fee @ 10%	9121
Total Estimated Cost Plus Fixed Fee	100,326



TRAVEL

Trips

R/T Chi/DC	1 man/2 days
R/T Chi/La Jolla	1 man/2 days
R/T SD/DC	1 man/3 days
R/T SF/DC	1 man/3 days

Airfare

<u>No. of Trips</u>	x	<u>Cost per Trip</u>	
2		142	
1		306	
2		384	= \$1,742
1		384	

Auto Rental

No. of Days	x	Avg. Cost	
15		18	= \$ 270

Airport Parking

No. of Trips	x	Avg. Cost of Parking and Mileage	
6		12	= \$ 72

Communications

20 LDC @ \$5		
25 hrs. Terminal-Computer Communications @ \$21.60/hr		\$ 640
	TOTAL TRAVEL	\$2,274

PER DIEM

No. of Days	x	Avg. Cost of Room and Meals Per Day
2		31
13		35

TOTAL PER DIEM = \$ 517

Computer

2 hrs. SAI DEC Computer @ \$250 per hour	500
4 hrs. ERDA CDC 7600 or Equivalent @ 1200 per hour *	4800
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TOTAL	5300

\*Estimated rate available to NRC related contracts on ERDA machines

Reference "A"

DIRECT LABOR

Direct Labor rates proposed are based on the Contractor's Labor Skill Level Reported February 1977 and are average actual salaries being paid by SCIENCE APPLICATIONS, INC., to representative personnel within each of the labor categories required to perform the proposed task. A copy of the document is on file with DCAA and within the contracts office located in La Jolla, California. All wages were escalated by a 2.75% factor to account for salary increases over the period of the contract performance. Average skill levels are computed at the conclusion of each quarter during the Company's fiscal year which begins 1 February.

Reference "B"

LABOR OVERHEAD

Science Applications, Inc. completed its Fiscal Year 1973 with a fringe benefit rate of 25.83%. Completion of Fiscal Year 1974 resulted in an increase in the rate to 29.3%. The Fiscal Years 1975 and 1976 rate was 30% and the Fiscal Year 1977 rate was 32%. The proposed rate for Fiscal year 1978 is 33%. Payroll burden reference contains a detailed breakdown of these historical and projected fringe benefit rates.

Science Applications, INC. completed Fiscal Year 1973 with an overhead rate of 76.14%; Fiscal Year 1974 with an overhead rate of 79.3%; Fiscal Year 1975 with an overhead rate of 78% and Fiscal Year 1976 at 80%. Fiscal Year 1977 labor overhead remained at 80%. The proposed rate for Fiscal year 1978 is 82%.

The fringe benefit and overhead rates set forth are based upon detailed data provided to the DCAA Auditor-in-Charge, Mr. Doyle Hughes. This data is available in the Corporate Contracts Department, La Jolla, California.

Reference "D"

GENERAL AND ADMINISTRATIVE EXPENSE

Science Applications, Inc. General and Administrative Expense rate of 7.6% for current Fiscal Year 1978 is based on our estimate of cost to support the following departments: Accounting, Personnel, Budgeting, Contracts/Legal, Purchasing, and Office of the President. The IR&D and B&P rate, separately computed in accordance with the requirements of ASPR Section 15, is 3.7%. Combined, these cost estimates represent 11.3% of all direct costs and overhead. This rate is not applied to materials, purchased parts or subcontracts.

## PROJECT BRIEF

TITLE: CONSEQUENCE ESTIMATION

FIN NO.: A3044  
CONTRACTOR: BNL  
TYPE: ERDA  
STATE: NEW YORK

PROJECT MANAGER: W. H. Immerman

OBLIG: FY77: 536K  
FY78: OK

PRINCIPAL INVESTIGATOR: Jack Cusack

ISSUE:

The public risk due to nuclear maleficence is a function of the likelihood of an adversary attempting a malevolent act, the likelihood of an attempt succeeding and the possible consequences of a successful attempt. What is the spectrum of potential consequences?

OBJECTIVE:

Produce systematically supported estimates of the consequences (death, injury, property damage) of a spectrum of reference events caused by malevolent acts using nuclear material or facilities.

SCOPE:

This work is being accomplished in three phases. Phase I defined the reference events, which were chosen to be representative of the range of events which were conceivable given a credible level of threat. A rough calculation of consequences was then performed on these events. Phase II examined the methodologies currently available for portions of the consequence calculation, including nuclear explosive effects, environmental release, atmospheric transport, pathways to man and human dosimetry, and health effects and property damage. Models and methods to be used in the final phase were recommended, and places where new work would be needed were indicated. Phase III will use these methods to carefully estimate consequences of the reference events. The output of this phase will be a listing of the events and their consequences, and extensive documentation of the assumptions and methods used to arrive at these consequences. This will allow verification of these results, as well as allow further use of the methods for calculation of consequences of events not included in this analysis.