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PART II

AEC Investigation of Cobalt-60 Exposure at the Variable Dose Rate Irradiation Facility, UT-AEC

(Conclusions and Recommendations of Investigating Committee)

February 4, 1971



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[REDACTED]

PART II

**AEC Investigation of Cobalt-60 Exposure
at the
Variable Dose Rate Irradiation Facility, UT-AEC**

(Conclusions and Recommendations of Investigating Committee)

February 4, 1971

[REDACTED]

1116558

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INTRODUCTION AND SUMMARY

On February 4, 1971, at about 11:30 A.M., a research technician employed by the University of Tennessee, and performing work at the University of Tennessee - AEC Agricultural Research Laboratory was exposed to 8,000 curies of Cobalt-60 gamma radiation from Source No. 5 at the Variable Dose Rate Irradiation Facility (VDRIF). The VDRIF is a Government-owned facility operated by the University of Tennessee under Prime Contract No. AT-(40-1)-Gen-242 between the University and the United States of America as represented by the U. S. Atomic Energy Commission. The accidental exposure occurred while the technician was irradiating lettuce seed samples. Thermoluminescence Dosimetry by a commercially supplied TLD Badge worn on his belt indicates a total body exposure of 260 Rem. Essentially all of the exposure dose was received in about thirty seconds while the employee was positioning sample vials in a holder mounted 17 cm from the source rod. The employee's medical symptoms, primarily nausea and vomiting on the first day and leukocyte count depression, are typical of this level of exposure. Hand exposure is estimated to be no greater than 1,200 Rem. The hands had evidenced no visible symptoms of exposure as of 25 days post-exposure. Inadvertent entry by the employee into the source room with Source No. 5 exposed occurred because two automatic safety interlocks did not perform their intended functions. Had either performed properly, this incident probably would have not occurred. Procedural laxity also contributed to the exposure.

Following a preliminary investigation of the facts by UT-AEC and AEC-ORO representatives, the Manager of Oak Ridge Operations Office appointed a formal committee on February 8, 1971, to investigate the occurrence. A copy of the appointment letter is given in Appendix 1.

This section of the investigation report contains the biographical and medical data for the exposed employee and contains conclusions and recommendations of the committee. For detailed facility description, chronology of events, and dosimetry, the reader is referred to Part I of this report.

BIOGRAPHICAL DATA

Name: [REDACTED]

Date of Birth: [REDACTED]

Sex: Male

Place of Birth: [REDACTED]

Social Security Number: [REDACTED]

Position: Research Technician

Place of Employment: UT-AEC Agricultural Research Laboratory

MEDICAL ASPECTS

Employee A was admitted to the Oak Ridge Associated Universities Hospital approximately 2 hours after the exposure. He exhibited considerable nausea and vomiting prior to and during the first few hours after admission, as well as some epigastric pain. Although he stated that his eyes felt

1116560

"scratchy" nothing abnormal was seen on examination of the retina. No reddening of the skin was noted. A bone marrow aspirate taken approximately 29 hours post-exposure showed some maturation alteration of the red cell series.

The patient has remained free of symptoms through 25 days post-exposure, except for an early decreased tolerance to exercise, an episode of increased sensitivity to touch on the ulnar aspect of the right hand and a sensation of numbness to the tips of his right thumb and index finger. There was an early rise in the leukocyte count to 15,800 per mm^3 during the first 12 hours followed by a decrease to 7,600. The leukocyte count at 25 days post-exposure was 3,600 per mm^3 . This count is not expected to reach its lowest point until 30 days post-exposure.

BIOLOGICAL DOSIMETRY

Leukocyte cultures were performed on blood samples taken approximately 2-1/2 hours after the incident and at several intervals later. Analyses of chromosome aberrations were conducted jointly by representatives of ORNL, ORAU, and UT-AEC. Assuming a 2.5% dose reduction per cm of tissue and a depth to midline of 10 cm, phantom dosimetry corrected for blood volumes indicated a mean midline dose of 165 Rems. Mean chromosome aberration yield in cultures through 11 days post-exposure was 0.235 rings and dicentrics per cell. Fitted to the best available dose-response curves for human leukocytes, this data yielded an average midline dose estimate of 158 Rems. Variations between results obtained by the three laboratories were considered to be within the normal range.

CONCLUSIONS

- A. Based on the findings of fact, the committee concludes that the condition of the facility on February 4, 1971, was such that only the proper functioning of the door limit switch would have automatically prevented entry into the source room with sources exposed. Therefore, in view of its proper functioning during tests before and after the incident, it appears most credible to the committee that the door limit switch had been inadvertently left tied in the closed position following operations on February 2 or 3, 1971.
- B. It is concluded that the following directly contributed to the exposure of the employee:
 1. Defective electric door lock.
 2. Ambiguity of the source position indicator.
 3. Inadequate orientation and training of Employee A in the safety precautions to be followed at VDRIF.
 4. Inadequate communications between operator and Employee A.
 5. Unsafe operating practices such as:
 - a. continuing operation with known defective safety devices (i.e., the electric door lock),

- b. failure to use available "pocket chirper" type personnel monitoring equipment, and
 - c. failure to use TV to observe source position prior to entering source room as specified in the Operation Manual.
6. Failure to maintain the flashing light in the source room in operating condition.
- C. It is concluded that the following contributed to a general environment which allowed this incident to occur:
- 1. Administrative control over the operation of the VDRIF is lax.
 - 2. Operation Manual is incomplete and in some instances ambiguous. The manual had not been distributed to either of the approved operators.
 - 3. No written testing or maintenance procedures or requirements exist and no routine preventive maintenance or testing program was being done.
 - 4. There is no formal procedure for training and certifying operators.
 - 5. The Orientation and Training Program for VDRIF users is not clearly defined and appears to be marginal.
 - 6. Personnel monitoring coverage (i.e., TLD Badging) for persons who work at the VDRIF is incomplete.
- D. It is concluded that the VDRIF system design is undesirable in the following aspects:
- 1. There is no unambiguous indicator of source drive position.
 - 2. The proper functioning of access control devices (i.e., door limit switch and electric door lock) is too dependent on the normal functioning of components designed for precise source positioning. The activation of flashing lights and the horn is also too dependent.
 - 3. The positioning of warning lights is not optimum for their intended purpose.
 - 4. The volume control on the audible warning system is easily accessible for adjustment.
 - 5. The mechanical characteristics of the door lock and door limit switch are unreliable.

RECOMMENDATIONS

- A. It is recommended that a reevaluation be made of the protective features of the VDRIF, including administrative as well as automatic; however, it is recognized that a considerable amount of time might elapse before such a review could result in major system changes.
- B. It is recommended that the following be done as interim measures to assure that the system can be operated safely:
 - 1. The door lock system should be redesigned so that its operation does not depend so critically on the tight closure of the door.
 - 2. The door limit switch actuator should be modified so that the switch cannot slip past the actuator and falsely indicate that the door is open.
 - 3. The position indicator system should be replaced or supplemented by a simpler more direct measuring system that does not depend upon the encoder which controls positioning, preferably driven by the drive train downstream of the decoupling mechanism.
 - 4. Revise the control system so that opening the door at any time after the "go" button has been pressed will immediately cause the drive to insert the sources or prevent their withdrawal if they have not moved.
 - 5. Repair and relocate the light in the source room and install a lighted sign in the maze which indicates that the sources are not in their shields and entrance is prohibited. Re-assignment and relocation of two of the lower limit switches (one, 30 mm and one, overtravel limit) for this latter function would afford a signal that is independent of the normal control system and all other warnings (except for power supply, and that could be supplied by a properly maintained battery system).
 - 6. Adjust loudness level of the audible alarm in the source room with a fixed resistor network and remove the volume control.
 - 7. Repair trouble monitors and test circuits on the radiation meters. Re-install batteries if it is intended that these monitors operate in the absence of AC power.
 - 8. Mount sign on wall at eye level beside door to indicate meaning of flashing light above door to the maze from control room.
- C. It is recommended that a testing and maintenance program be established to detect and correct failures at the component level rather than at the system level. The use of redundant devices, such as drive limit switches, gives some immunity to system failure as a result of single component failure. However, unless these component failures are detected and corrected as they occur, the system can become degraded to the point that failure of the system will occur simultaneously with the failure of the

last element. In repairable systems where the utmost reliability is an objective, redundancy, independence of redundant devices, adequate testing, and repair are considered to be essential.

- D. It is recommended that formal procedures be established for initiating, documenting, reviewing, approving and implementing system design changes.
- E. It is recommended that formal procedure be established to assure that all persons working at the VDRIF wear a TLD Badge and that audible monitoring accompany each entry into the source room.
- F. It is recommended that formal procedures be established to assure that VDRIF users are acquainted with the safety aspects of facility operation.
- G. It is recommended that additional guidance be provided the VDRIF operator to assure preoperational checks of safety and operating systems.
- H. It is recommended that strict formal procedures be provided to define conditions under which safety devices may be bypassed. This should include alternative controls and a procedure for assuring bypass removal.
- I. It is recommended that the safety responsibility of the line organization be clearly defined and documented. The audit and advisory responsibility of the RSO does not eliminate the need for this line responsibility.
- J. It is recommended that formal procedures be established for certification of a VDRIF operator.



UNITED STATES
ATOMIC ENERGY COMMISSION

OAK RIDGE OPERATIONS
P.O. BOX E
OAK RIDGE, TENNESSEE 37830

AREA CODE 615
TELEPHONE 483-8611

February 8, 1971

Dr. John A. Ewing
Project Leader
UT-AEC Agricultural
Research Laboratory
1299 Bethel Valley Road
Oak Ridge, Tennessee

PROBABLE COBALT-60 EXPOSURE AT THE UT-AEC AGRICULTURAL RESEARCH
LABORATORY

Dear Dr. Ewing:

It appears from preliminary technical and medical considerations that the radiation exposure occurrence at the ARL on February 4, 1971, involving Mr. [REDACTED] falls within the criteria for a Class "A" radiation exposure as defined by AEC and OR-0502 and should, therefore, be formally investigated. In accordance with the provisions of AEC-0502, the following individuals are hereby designated to serve on the investigating committee:

W. T. Thornton, AEC, Chairman
S. J. Ditto, UCC-ND, ORNL
A. F. McFee, UT-AEC, ARL

The committee shall follow the guidance of AEC and OR-0502 in investigating and reporting on this occurrence. It is requested that full cooperation be extended to the committee by members of your staff.

Mr. Kenneth D. McCasland of our Chief Counsel's Office has been assigned to act as legal advisor to the committee.

Your cooperation in this matter will be appreciated.

Sincerely,

S. R. Sapir
S. R. Sapir
Manager
Oak Ridge Operations

OSH:WTT

cc: R. F. Hibbs, UCC-ND
R. C. Armstrong
C. W. Hill
H. M. Roth
J. A. Lenhard
W. T. Thornton

APPENDIX 2 - IDENTIFICATION OF OTHER UNIVERSITY OF TENNESSEE EMPLOYEES

Employee B - [REDACTED]
Principal Operator VDRIF

Employee C - [REDACTED]
Associate Professor

Employee D - [REDACTED]
Senior Technician

Employee E - [REDACTED]
Technician

APPENDIX 3 - TESTIMONY OF [REDACTED]

The following account, to the best of my recollections, is pertaining to the accident of Thursday, February 4, 1971:

The irradiation of the seeds had been scheduled for Thursday morning from 8:30 A.M. to 10 00 A.M. However, due to the fact that Mr. [REDACTED] had gone to have his medical examination I was planning to run it from 12:30 P.M. to 3:30 P.M. He came back about 11:00 A.M. and asked me if I wanted to run some of the treatment before lunch. We then agreed to run half of the experiment before lunch and the rest (9-14) after lunch. By the time we arrived at the source it was about 11:10 A.M.

As soon as we arrived, I proceeded to gather the first vials for the 1st run. These were treatment No. 2, (please see schedule sheet). As usual, I informed Mr. [REDACTED] of the time the run would take as well as the dose, in this case 62 sec and 2.5 kR. We both proceeded to go into the irradiation room where he fixed the other sources, so they would not go up, as I placed the styrofoam and the vials in front of the source which we have used in the past. We then returned to the control room and while Mr. [REDACTED] operated the machine, I got the next vials ready. When that 1st run finished, I gave him the time and dose for the next run. Then I went to the source and exchanged vials and returned to the room. The same procedure was observed for runs Nos. 2, 3, and 4. When run No. 4 was finished I gave him the time (310 sec) and the dose (12.5 kR). Then I proceeded to go to the source, got the 8 vials out and placed the next 4 vials in. When I returned to the control room I sat down--that was when I noticed the white piece of string on the mechanism over the door leading into the irradiation room. However, I did not think much about it since we had no problem with the door that day. After Mr. [REDACTED] finished operating the machine he turned around and we began to talk. At this point it was approximately 11:25 A.M. In the course of conversation, the subject came up about making another run before lunch or not. Since I was a bit hesitatnt, Mr. [REDACTED] suggested to go ahead and calculate how long it would take to run the rest of the treatments (9-14). He then suggested to run treatments 11, 13, and 10 for a total of approximately 20 minutes (1240 sec) and then let treatments 12, 14 run for 992 sec and in the meantime go to lunch and later come back and finish the runs. Even though I was not too much in favor of the idea of splitting the last batch of treatments; nevertheless, I said it was a good idea and agreed to do it that way. Now, as soon as I agreed to do it, he said "Well, let's put them on then," which I replied, "I am ready." As soon as I said that I looked over his right shoulder and glanced at the lights which indicates the elevation of the rod--they were all zeros. Therefore, I assumed that our discussion had taken longer than 5 minutes and that he had seen or heard the source shut down. The reason I looked at the meter lights was because in all previous runs that day they had indicated whether the source was up or down. So, I got up out of the chair, got the 8 vials to be run and told Mr. [REDACTED] the time and the dose (744 sec, 30 kR) and as I was walking toward the door, I was making sure I had picked the right vials (that's why I did not see the red light flashing above the door). Then I opened the door (no resistance whatsoever) and walked toward the source. As I was walking, I was thinking of splitting those last treatments would be such a good idea. I do not remember looking at the rod in as much as I expected it to be down. As I got near the source, I made a slight turn right so as to position myself in front of the vials. Now at this point, I do not remember if I placed the coffee cup (which I use whenever there are more than four vials) on a wooden horse between my back and the wall; or if I held the cup with my left hand and fished the four vials out of the styrofoam container. The end result was

that I exchanged the four vials from treatment 6 and loaded the 8 vials from treatments 11 and 13 in an alternating way (that is to say, I fished out one vial of treatment 13 and put it on the 3rd hole from right to left, then one of treatment 11 and placed it on the 4th hole, etc.) When I finished I just walked back toward the door. As I was approaching the door to enter into the control room, I saw Mr. [REDACTED] on the other side of the door. He then opened the door and came out into the hallway and very excitedly asked me if I did not see that the source was up! When I replied that I had not seen it, he then ran and looked (from the corner) to the source. We then came back into the control room. When I entered the room, I was in a state of shock, that is why it did not occur to me to glance at the 3 meters on the wall to see if they registered any activity which would have indicated to me whether the source was up or down. Besides that, I thought that if [REDACTED] had detected that the source was up, he would have shut it down immediately.

Now, from here on out, I am only certain of several things while the others are hazy. I very hazily remember him going in front of the machine for just a few seconds and then go to the door and try to open it several times. Then we engaged in a discussion concerning whether the source was up or down at the time I went there. He asked me several times if the door opened when I tried it, which I answered yes. Then he told me that the source must have been down. He also asked me if I could tell the difference of it being up or down. I said I never have seen it in the up position. Then, I believe, before he activated the source for run No. 6, he went to the door, opened it and fastened so that it would stay open. Then he reached to the upper left hand corner of the door frame and with that white piece of string which I mentioned before, he fixed the mechanism somehow so that he could activate the source. We then went out into the hallway around the bend and looked at the source in the up position. Then again he asked me "Surely, you would have noticed the source that way, didn't you?" I replied that I had not even looked at the rod when I went down. We proceeded to go back to the room. I am not sure if he closed the door then, or waited until the run was over--also, I do not recall him untying the string. Up to this point, I was not sure if I had been exposed or not--so when I would try to reach some conclusion, he would indicate that the source must have been down. Now, when run No. 6 was over, I again gave him the time and dose for run No. 7. Then we both went down to the source and while I was exchanging the vials, he obtained a rate meter and proceeded to position it where I had stood. We returned back to the room and he activated the source and looked at some meters on top of the machine. He then acted rather nervous and sat down. At this point, I asked him if he had, on run No. 5 erased the numbers which indicates the elevation of the rod. At this point he did not answer me, but got up and went outside (through the front door). This behavior, plus his nervousness, gave me strong indication that I had been exposed. That run finished, we put another one to run while we took a break for lunch. During most of the 7th run and during our way back to the lab, we did not say much. When he parked the car and we got out, he said, "See you after lunch." This was approximately 12:10 P.M. This is what happened, to the best of my recollection.

[REDACTED]
February 9, 1971

SIGNATURES OF THE INVESTIGATING COMMITTEE

W. T. Thornton
W. T. Thornton, Chairman

S. J. Ditto
S. J. Ditto

A. F. McFee
A. F. McFee

THE UNIVERSITY OF TENNESSEE LEAVE RECORD FORM

1985

Year

ID Number (SSN)

Mo

First

40 Hrs.

Percent Full Time

Plant & Soil Science

College/Division

Date of Termination

Job Classification

Responsible Acct. Name

Employment Date

Other Authorized Leave with Pay

SICK (Hours)

Previous Balance

acc.

used

bal.

Monthly TOTAL

(Hrs. Used)

Annual Leave Accrual Rate

Change Date

Constructed Annual Leave Date

12-28-66

Employment Date

Date of Termination:

Constructed Annual Leave Date:

Annual Leave Accrual Rate Change Date:

Month	Days																															Monthly TOTAL (Hrs. Used)	ANNUAL (Hours) Previous Balance 216.5			SICK (Hours) Previous Balance 898.0			OTHER AUTHORIZED LEAVE WITH PAY		LE/ W P Us																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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Monthly TOTAL	Annual (Hours) Previous Balance	SICK (Hours) Previous Balance	OTHER AUTHORIZED LEAVE WITH PAY	LEAVE WITH PAY
acc.	used	acc.	used	used
236.5	0	236.5	906.0	
214.5	19	225.5	914.0	
198.5	29	228.5	922.0	
272.5	45	237.5	930.0	
246.5	45	241.5	934.0	
221.5	45	255.5	816.0	
314.5	45	255.5	648.0	
322.5	45	283.5	480.0	
342.5	45	297.5	328.0	
356.5	45	311.5	153.0	
372.5	53	317.5	8.0	
374.5	181	203.5	8.0	
Excess Annual Leave				+
New Balances				

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University of Tennessee
By

- Reason for Absence:
- Annual Leave
 - Admin. Closing
 - Funeral Leave
 - Holiday
 - Jury/Court Duty
 - Military Leave
 - Personal Leave Day
 - Sick Leave
 - Workers' Comp. (with Pay)
 - Leave Without Pay
 - Other

Employee Signature

Supervisor Signature

Date of Change in Annual Leave Accrual Rate _____ Date of Termination _____

~~Not authorized~~
time off with pay
OCT 27 1985
Office of Personnel Service,
University of Tennessee.

PER - 12 (Rev 12-76)

LEAVE RECORD FORM

Coll. and Div.

Dept. Plant & Soil

Title

Year 1981

Working Hours 8

Employment Date 12/28/66 Normal Work Week

(or Constructed Date - See Personnel Policy & Procedures Statement No. 1)

Date of Termination

Date of Change in Annual Leave Accrual Rate

	Monthly TOTAL (Hours)																															Previous Balance			SICK (Hours)			OTHER AUTHORIZED LEAVE WITH PAY		
																																ANNUAL (Hours)								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	acc.	used	bal.	acc.	used	bal.	used	reason	
J																																	188	2	186	671	40	601		
F																																	202	16	196	649	48	601		
M																																	216	24	192	657	48	609		
A																																	230	40	190	665	50	615		
M																																	244	40	204	673	50	623		
J																																	258	64	194	691	54	637		
J																																	272	84	188	689	54	635		
A																																	286	92	194	697	54	643		
S																																	300	102	198	705	54	651		
O																																	314	122	200	713	54	659		
N																																	328	132	200	721	54	667		
D																																	342	152	190	729	54	675		
TOTALS																																174	633							

Reason for Absence:

A—Annual

F—Funeral

H—Holiday

L—Leave without pay

S—Sick

Other authorized time off with pay

(military, court, accident, etc.)

Office of Personnel Services

University of Tennessee

By

Employee

Signature

1116573

LEAVE RECORD FORM

Coll. and Div.

Title Research Asst.

Dept. Plant & Soil

Year 1980

40

Normal Work Week

Working Hours 8

Year 1980

Employment Date 12/28/66 (or Constructed Date - See Personnel Policy & Procedures Statement No. 1)

Date of Change in Annual Leave Accrual Rate

Date of Termination

Reason for Absence:	Date																															Monthly TOTAL (Hours)	Previous Balance			SICK (Hours)			OTHER AUTHORIZED LEAVE WITH PAY	
																																	ANNUAL (Hours)							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		acc.	used	bal.	acc.	used	bal.	used	reason
J																																	132	54	178	115	26	579		
F																																	21	12	13	32	28	5		
M																																	21	12	13	32	28	5		
A																																	21	12	13	32	28	5		
M																																	21	12	13	32	28	5		
J																																	21	12	13	32	28	5		
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A																																	21	12	13	32	28	5		
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O																																	21	12	13	32	28	5		
N																																	21	12	13	32	28	5		
D																																	21	12	13	32	28	5		
TOTALS																																1124	170	174	46	633				

MAILED TO BOARD TO 12/28/85

Reason for Absence: A—Annual F—Funeral H—Holiday L—Leave without pay S—Sick O—Other authorized time off with pay (military, court, accident, etc.)

Signatures:

1116574

Employee

Supervisor

Coll. and Div. _____

Year	1979
8.0	

____ Date of Termination _____
(or Constructed Date - See Personnel Policy & Procedures Statement No. 1)
____ Date of Change in Annual Leave Accrual Rate _____
____ Date of Change in Annual Leave Accrual Rate _____
____ OTHER _____

Date of Termination

TOTALS

Signatures:

Supervisor

PEA-12 (Rev 12-76)

Coll. and Div.

Plant & Soil

1978

Working Hours 8 Year

40

Const date 12-28-66
-1-69 Normal Work Week

—1-69

Employment Date _____ Normal Date _____
 Date Constructed Date - See Personnel Policy & Procedures Statement No. 1)

Date of Change in Annual Leave Accrual Rate.

Date of Termination:

[illegible]

Signatures:

Employee

С. И. МЕНДИС

REV. 12 (REV 12-78)

LEAVE RECORD FORM

Name: [redacted] Title: [redacted] Coll. and Div.: Plant & Soil
9-1-69 Employment Date: 12-28-66 Normal Work Week: 40 Working Hours: 8 Year: 1977
(or Constructed Date) Date of Change in Annual Leave Accrual Rate: Date of Termination: 3525 SICK (Hours) 360.5 362.5
OTHER AUTHORIZED LEAVE WITH PAY

Reason for Absence	Previous Balance																																	ANNUAL (Hours)	SICK (Hours)			OTHER AUTHORIZED LEAVE WITH PAY	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	acc.	used	bal.	acc.	used	bal.	used	reason
J																																104	12	92	360.5	0	362.5		
F																																118	14	102	268.5	2	316.5		
M																																132	16	116	376.5	10	366.5		
A																																146	18	130	384.5	10	394.5		
M																																160	20	140	404.5	10	414.5		
J																																174	22	154	424.5	10	434.5		
J																																188	24	168	444.5	10	454.5		
A																																202	26	182	464.5	10	474.5		
S																																216	28	196	484.5	10	494.5		
O																																230	30	210	504.5	10	514.5		
N																																244	32	224	524.5	10	534.5		
D																																258	34	238	544.5	10	554.5		
TOTALS																																156	102			11.5	437		

MAILED TO BOARD
OCT 25 1966

RECEIVED
OCT 24 1966
Office of Personnel & Training

Signatures:

Employee

June 16, 1975

M E M O R A N D U M

TO: All Concerned

FROM: Edgar B. Darden, Jr.
Radiation Safety Officer *EBD*

SUBJECT: Work Restrictions on [REDACTED]

1. This employee received a single whole body exposure to penetrating radiation in an accident at the VDRIF February 4, 1971. The commercial (Eberline) TLD badge he was wearing showed a reading of -260 rem. At the time he had not yet been assigned a permanent badge so that this reading has not been included in the Eberline cumulative personnel radiation record on this employee. Since then, this employee has not been assigned occupational duties that placed him at risk to further exposure. I have not, however, been able to find any documentary evidence of any official restriction in regard to his work assignments. The purpose of this memorandum is to place on record the restrictions which are deemed prudent in this case.

2. Following discussions with the Laboratory Director and the employee's immediate superiors, and in consultation with members of the ERDA-ORO Research and Technical Support Division and Safety and Environmental Control Division, it is agreed that this employee's work assignments with respect to radiation will be governed by the following conditions:

- a) Permanent restriction from any work involving sources of exposure to penetrating radiation.
- b) Work assignments involving the use of sources of nonpenetrating radiation are permissible only if it can be demonstrated that any exposure including internal exposure from credible accidents involving the material will be negligible. Such work assignments must be reviewed and approved by the Laboratory Director and the Radiation Safety Officer prior to initiation of the work.

3. The Eberline Company has agreed to correct this employee's cumulative personnel radiation record to include this accidental exposure.

4. A copy of this memorandum will be placed in the employee's personnel file and other copies will be distributed as indicated below.

EBD:gd

cc: H. E. Walburg
M. J. Constantin
B. V. Conger
J. A. Lenhard, ERDA-ORO
J. V. Carabia
E. B. Darden

1116578

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**AEC Investigation of Cobalt-60 Exposure
at the
Variable Dose Rate Irradiation Facility, UT-AEC**

(Report of Investigating Committee)

February 4, 1971

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1116579

**AEC Investigation of Cobalt-60 Exposure
at the
Variable Dose Rate Irradiation Facility, UT-AEC**

(Report of Investigating Committee)

February 4, 1971

1116580

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INTRODUCTION AND SUMMARY

On February 4, 1971, at about 11:30 A.M., a research technician employed by the University of Tennessee, and performing work at the University of Tennessee - AEC Agricultural Research Laboratory was exposed to 8,000 curies of Cobalt-60 gamma radiation from Source No. 5 at the Variable Dose Rate Irradiation Facility (VDRIF). The VDRIF is a Government-owned facility operated by the University of Tennessee under Prime Contract No. AT-(40-1)-Gen-242 between the University and the United States of America as represented by the U. S. Atomic Energy Commission. The accidental exposure occurred while the technician was irradiating lettuce seed samples. Thermoluminescence Dosimetry by a commercially supplied TLD Badge worn on his belt indicates a total body exposure of 260 Rem. Essentially all of the exposure dose was received in about thirty seconds while the employee was positioning sample vials in a holder mounted 17 cm from the source rod. The employee's medical symptoms, primarily nausea and vomiting on the first day and leukocyte count depression, are typical of this level of exposure. Hand exposure is estimated to be no greater than 1,200 Rem. The hands had evidenced no visible symptoms of exposure as of 25 days post-exposure. Inadvertent entry by the employee into the source room with Source No. 5 exposed occurred because two automatic safety interlocks did not perform their intended functions. Had either performed properly, this incident probably would not have occurred. Procedural laxity also contributed to the exposure.

Following a preliminary investigation of the facts by UT-AEC and AEC-ORO representatives, the Manager of Oak Ridge Operations Office appointed a formal committee on February 8, 1971, to investigate the occurrence. The members of the committee are as follows:

W. T. Thornton, AEC-ORO, Chairman
S. J. Ditto, UCC-ND, ORNL
A. F. McFee, UT-AEC, ARI

This document presents the formal report of the committee.

DESCRIPTION OF THE FACILITY

General Description

The Variable Dose Rate Irradiation Facility (VDRIF) is housed in a building (see Figure 1) approximately 90 ft by 40 ft, with 12" concrete walls on three sides. Earth shielding is used on these sides and the roof, with the exposed front of the building being shielded by at least 4 ft of concrete. The control room is connected to the irradiation room by a maze which is shielded from the sources by a 4 ft thick wall. Access to the maze is through a personnel door (see Figure 2) from the control room and an electrically operated roll-up door adjacent to the control room. A second door to the control room serves as the main building entrance.

Inside the irradiation room are the 6 Cobalt-60 sources, normally stored in their shielded containers which are located on 20 ft centers in a rectangular 2 x 3 array (see Figures 1 and 3). Each source contains approximately 8,000 curies distributed as shown in Figure 4. Any or all of the sources may be attached manually to the drive train prior to an irradiation. After the appropriate sources are attached and the irradiation targets are placed in position, the facility operator goes from the irradiation room to the control room, from which he can raise and lower

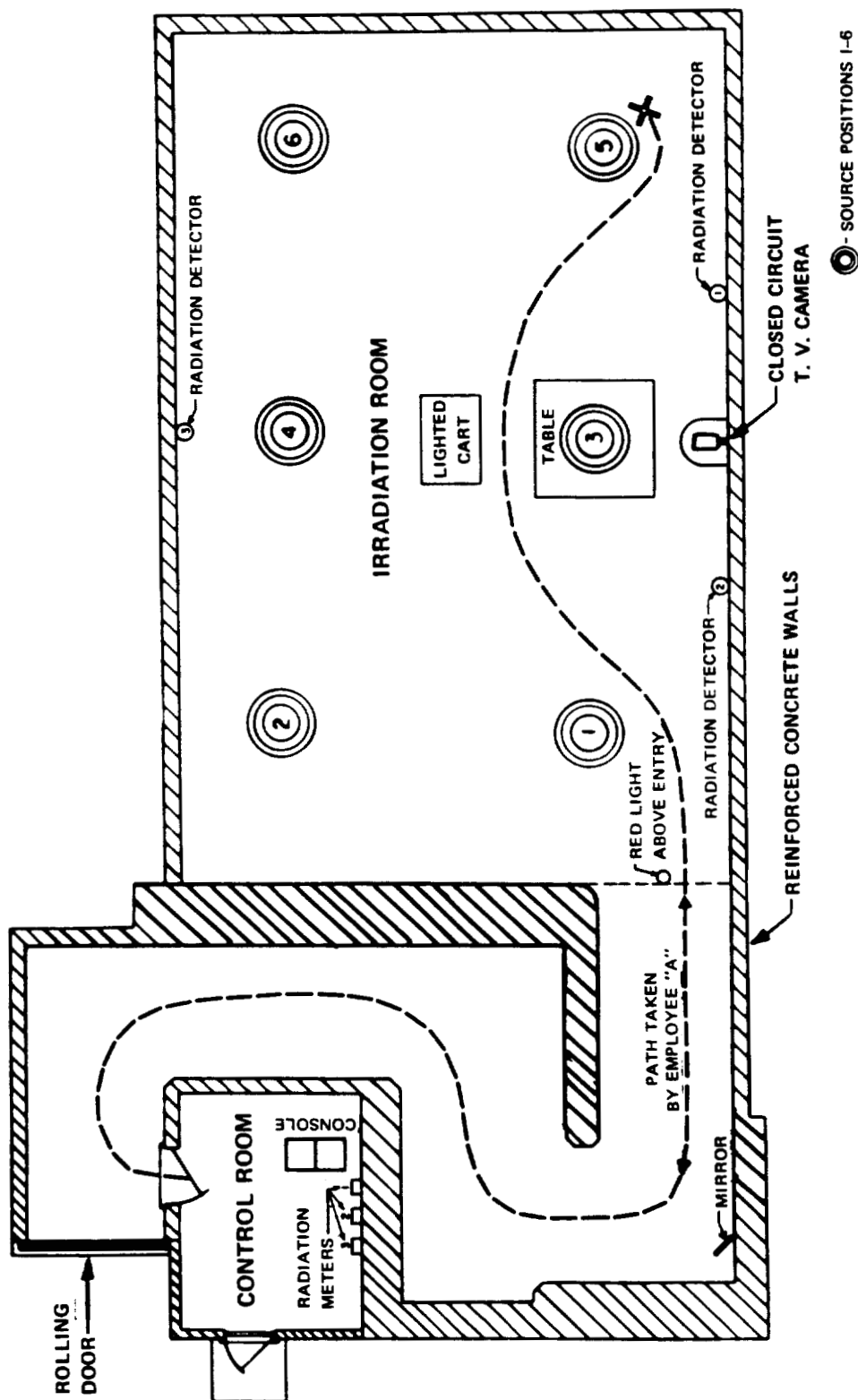


FIG. 1 - VARIABLE DOSE RATE FACILITY — FLOOR PLAN

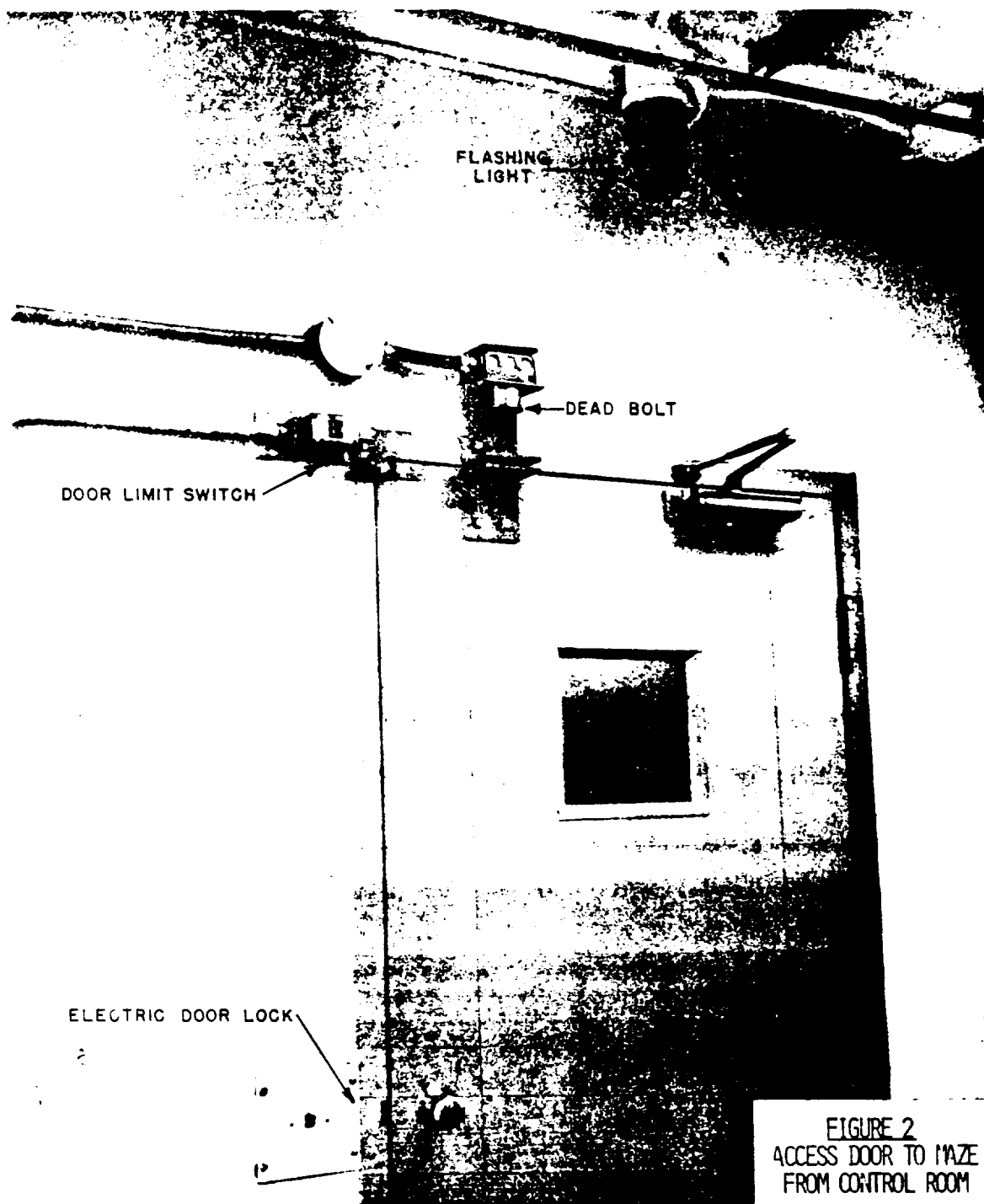




FIGURE 3
IRRADIATION ROOM AS
VIEWED FROM MAZE

WARNING
WHEN THE ALARM SOUNDS
YOU HAVE 15 SECONDS
TO CLEAR THIS AREA

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the attached sources remotely, with control of elevation and exposure time being achieved by a "program controller," as described later. When fully withdrawn (850 mm) the bottom of the active portion (Figure 4) of a source is approximately 90 cm above the floor. Since the top of the shield is approximately 76 cm above the floor, the bottom of the active portion of the source is then about 14 cm above the top of the shield.

Several features of the control system are intended to supplement administrative control to prevent accidental irradiation of operating personnel. They are intended to function as follows and are described in more detail in a subsequent section.

1. At the beginning of an irradiation run an audible warning is sounded in the irradiation room for about one minute, with the source movement delayed for the first 15 seconds to allow time for anyone to leave the room, if he should hear the warning.
2. An electrical lock secures the door from the control room to the maze (Figure 2) from the time the irradiation program is initiated until the sources are completely returned to their shields.
3. A "dead bolt" arrangement will lock the same door if it is closed and a power outage occurs. This lock must be reset manually when power is restored.
4. Limit switches monitor the closed positions of the two doors to the maze. Should either door be opened, the experiment is terminated and the sources are automatically returned to their shields.

There are a number of indicators to facilitate administrative control of access to the maze. They are as follows (see Figures 5 and 6):

1. Lights on the console indicate when a door is open, when there is high radiation in the irradiation room, and when an experiment is running. Certain control systems failures are also indicated.
2. Three meters in the control room indicate the radiation level in the irradiation room.
3. Three flashing lights (in the control room, outside the building, and in the irradiation room) are activated when an experiment is running or there is a high radiation level in the irradiation room.
4. A position indicator on the console indicates the position of the drive mechanism; hence, the sources, in millimeters withdrawn.

VDRIF Control System

The inputs and outputs of the program controller are shown in block form on Figure 7. The block labeled "Program Controller" comprises logic elements and input-output devices which act upon signals entering the block and produce output signals or actions. These outputs are influenced by the current status of the inputs as well as the sequential behavior of the inputs and the logic elements. The breakdown of equipment in block form is more nearly functional than geographic.

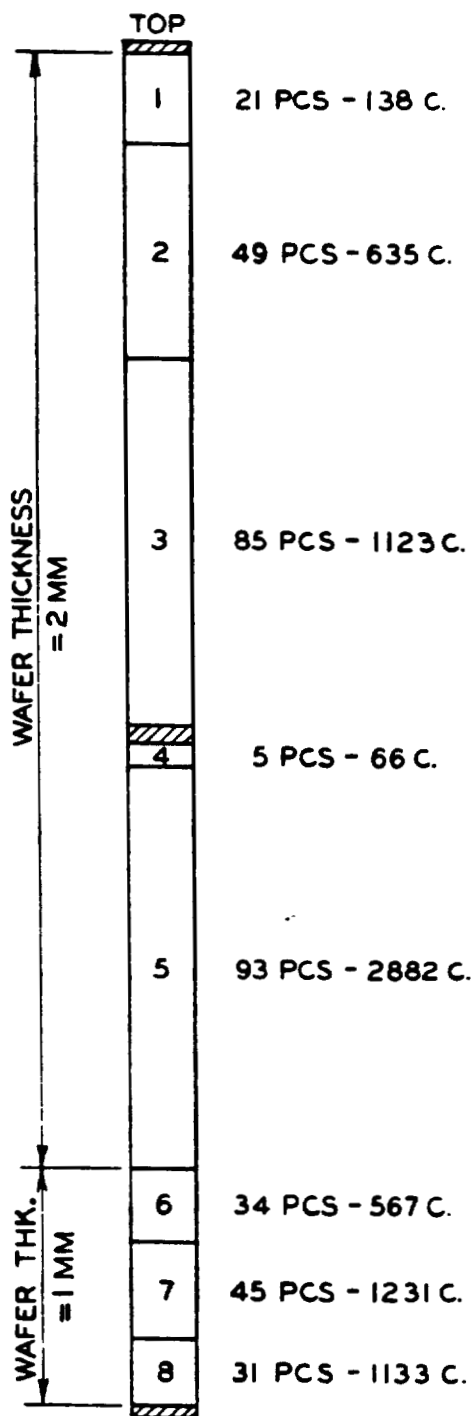


FIG. 4
SOURCE LOADING PLAN

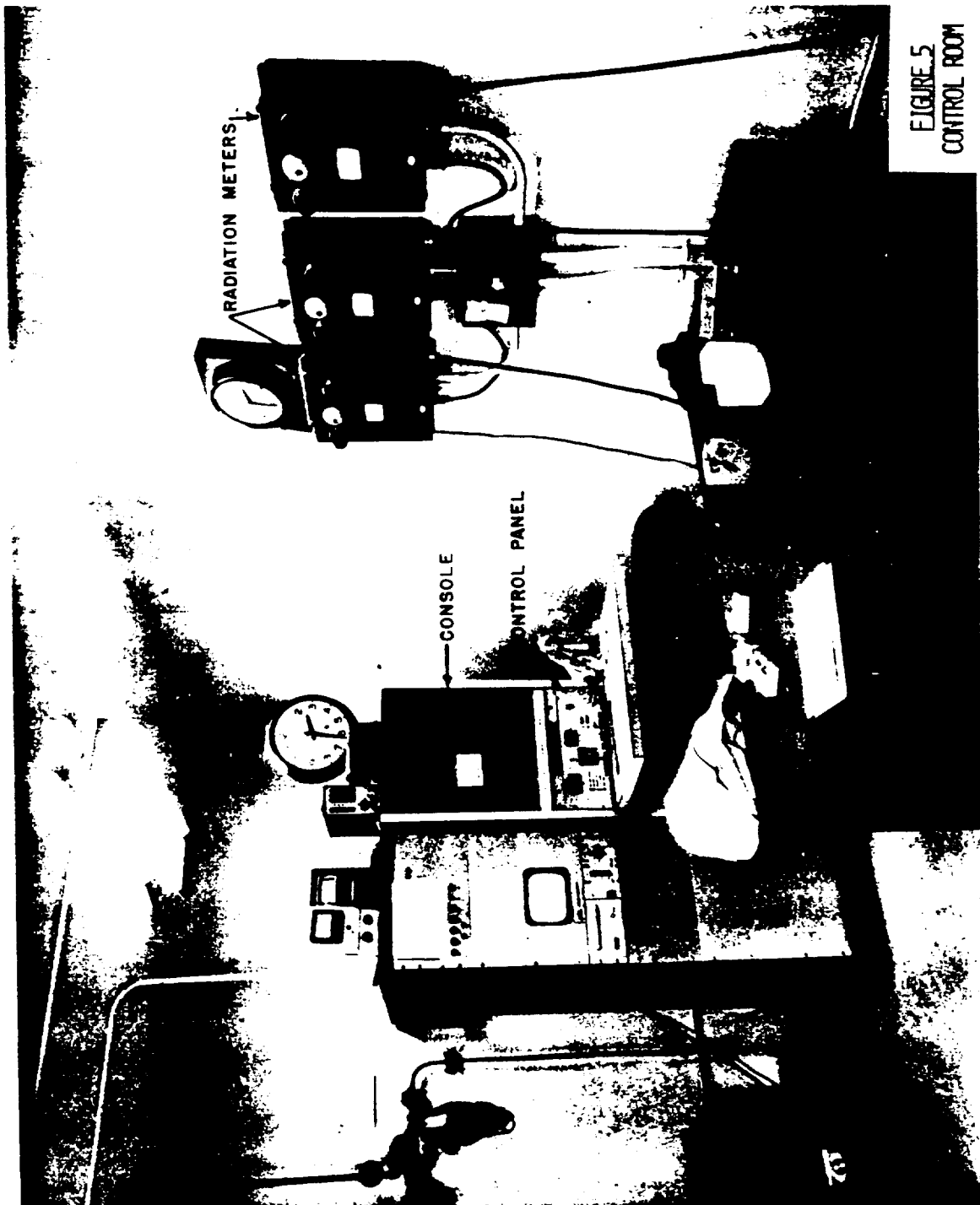


FIGURE 5
CONTROL ROOM

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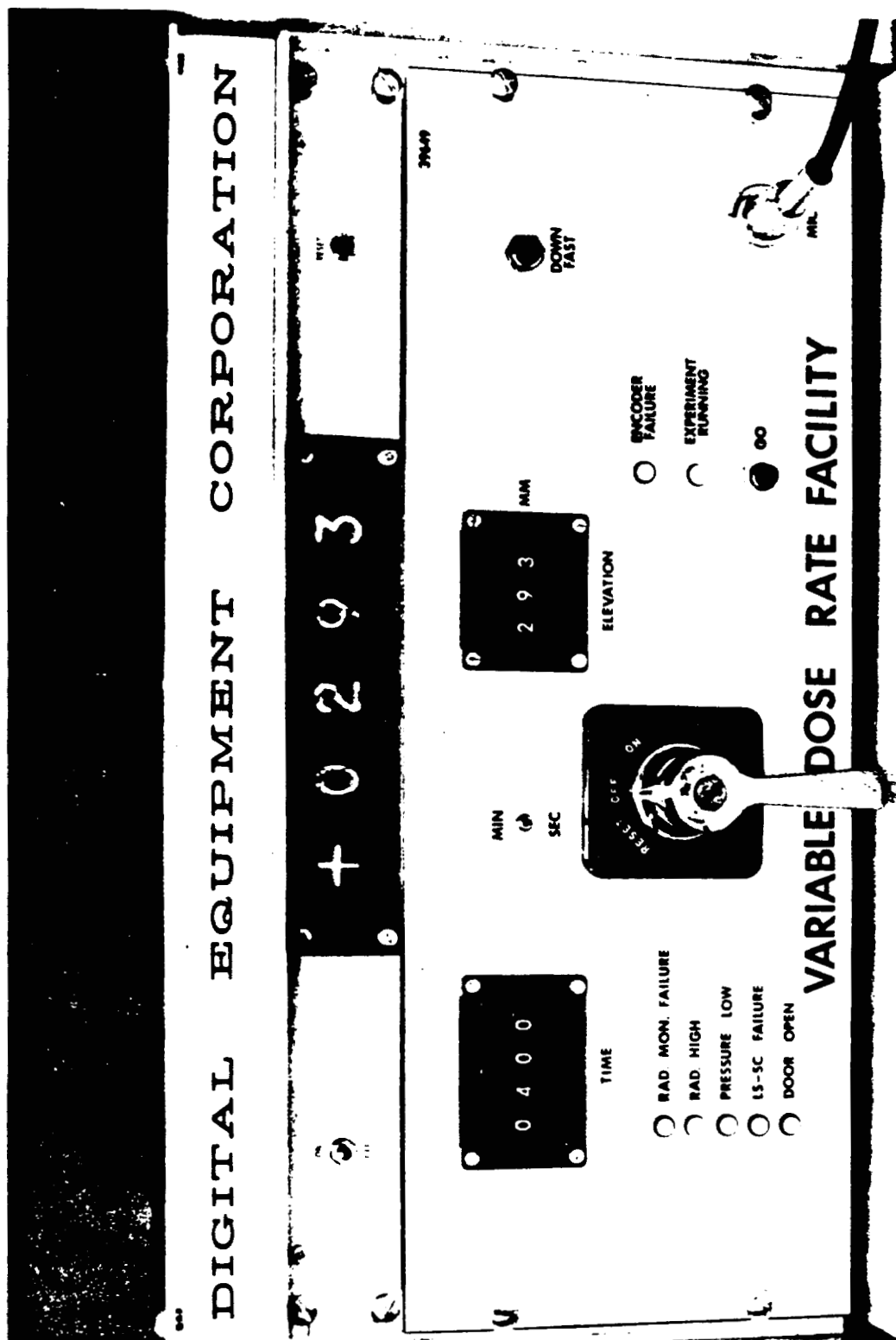


FIG. 6 CONTROL PANEL

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The following discussion is intended to describe the functions of the various inputs and those conditions required to achieve specific output responses. Except where noted, the system is assumed to be operating properly.

Each of the radiation monitors has two output contacts as well as a meter output in the control room. One of the contacts opens on high radiation level, the other for low alarm to provide indication of some types of monitor failure. If any low alarm contact opens, a light on the console is turned on indicating radiation monitor failure and the corresponding high alarm signal is blocked, so that it cannot illuminate the "radiation high" light on the console. If any radiation monitor failure is detected in this way, or if high radiation levels are detected, the operator cannot initiate a programmed irradiation; however, the occurrence of a failure after initiation does not abort the run. The high radiation contacts are arranged to activate the high radiation light on the console and to energize the flashing alarm lights in the control room, the irradiation room, and on the outside of the building. These same lights are turned on when the signal is given to withdraw the source, by a logical "OR" circuit.

The start count limit switches are located on drives 3 and 4 and serve as fiducial zero references. Each is a single pole, double throw switch which changes aspect as the drive goes through the reference height. The logic system continuously monitors these switches to detect inconsistencies between the two outputs of each switch and between the two switches. Any detected failure energizes a limit switch failure light on the console. This failure would also prevent initiation of a programmed irradiation but would not abort one in progress. Both SC limit switches must indicate that the sources are in their down limits before the operator can initiate the irradiation. As soon as either indicates that the drive has moved out of the limit a "count" condition is established. This count condition remains throughout the irradiation and is primarily an indication that the sources are up and the automatic run is terminated only after both limit switches are restored to their initial state. A condition for the source drives to be driven down by the automatic program or the operator's use of the down fast button is that the "count" state be activated (implying one of the two SC limit switches is in the "drive withdrawn" state). A number of other functions relative to timing and sequencing also are performed.

The down disable limit switches are installed on rods 2, 3, and 6 and are primarily used to prevent the drives from being driven into the overtravel limit at high speed in the event of certain control failures. They are adjusted 30 mm above the normal zero position and the logic arrangement is such that if the drive is operating in the "fast" mode and either of the three is actuated then a signal is generated to disable the down circuit and prevent further motor operation in the direction to lower the sources.

The door limit switches are standard industrial limit switches mounted on the wall of the maze adjacent to the truck door and on the control room wall adjacent to the door to the maze. Metal operators are bolted to the doors and the switch contacts are held closed when the doors are closed. When either door is opened, the appropriate switch contact is opened by spring forces. This action is sensed by the logic system and an "OR" gate is used to energize the "door open" light on the console. The same "OR" gate transmits a "door open" signal to another "OR" gate which is used to generate an "end exposure" signal. The other two inputs to this latter "OR" gate are a "down fast" pushbutton operation by the operator and an "end time" signal from the program timer. If either door is open, initiation of a run is inhibited.

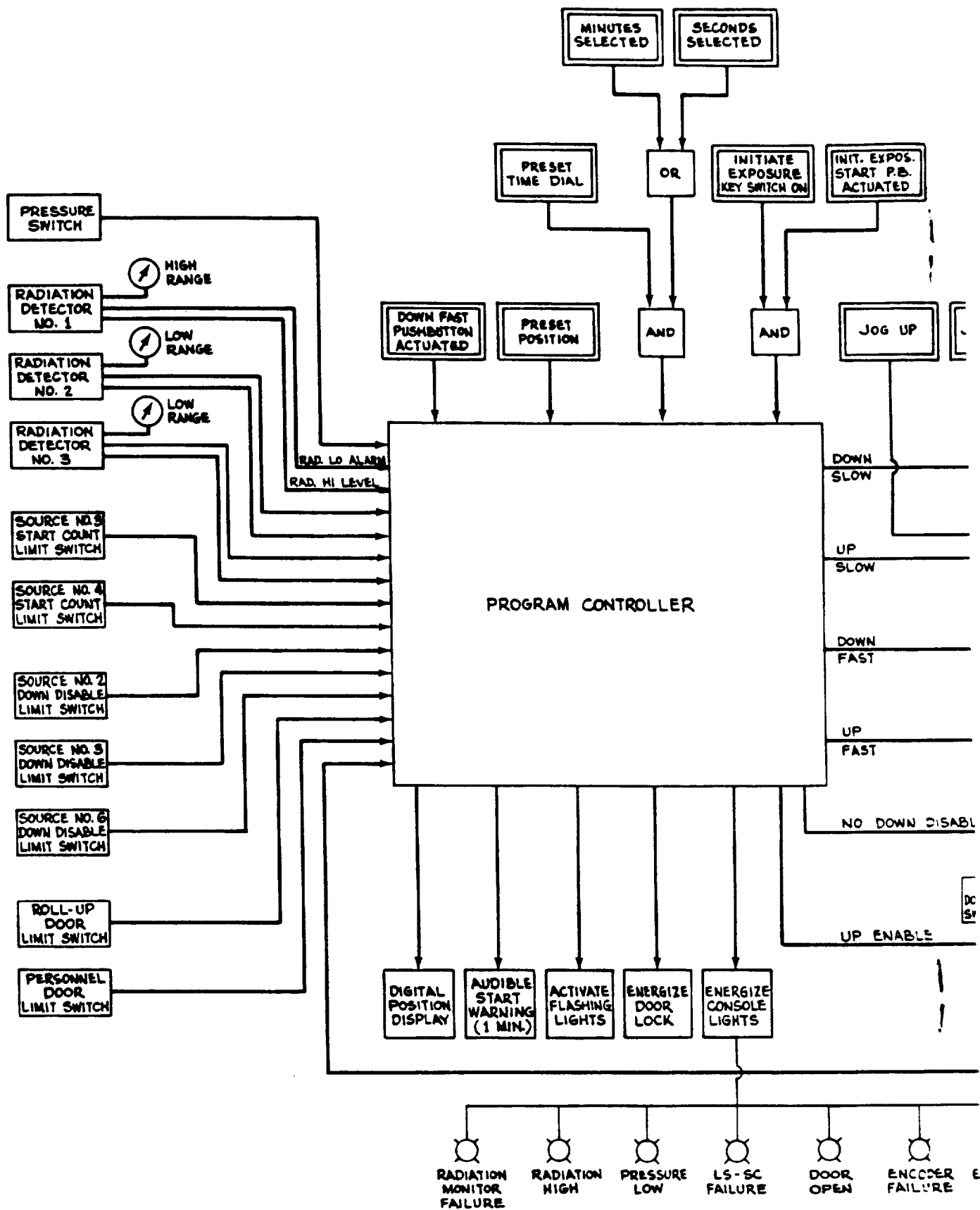
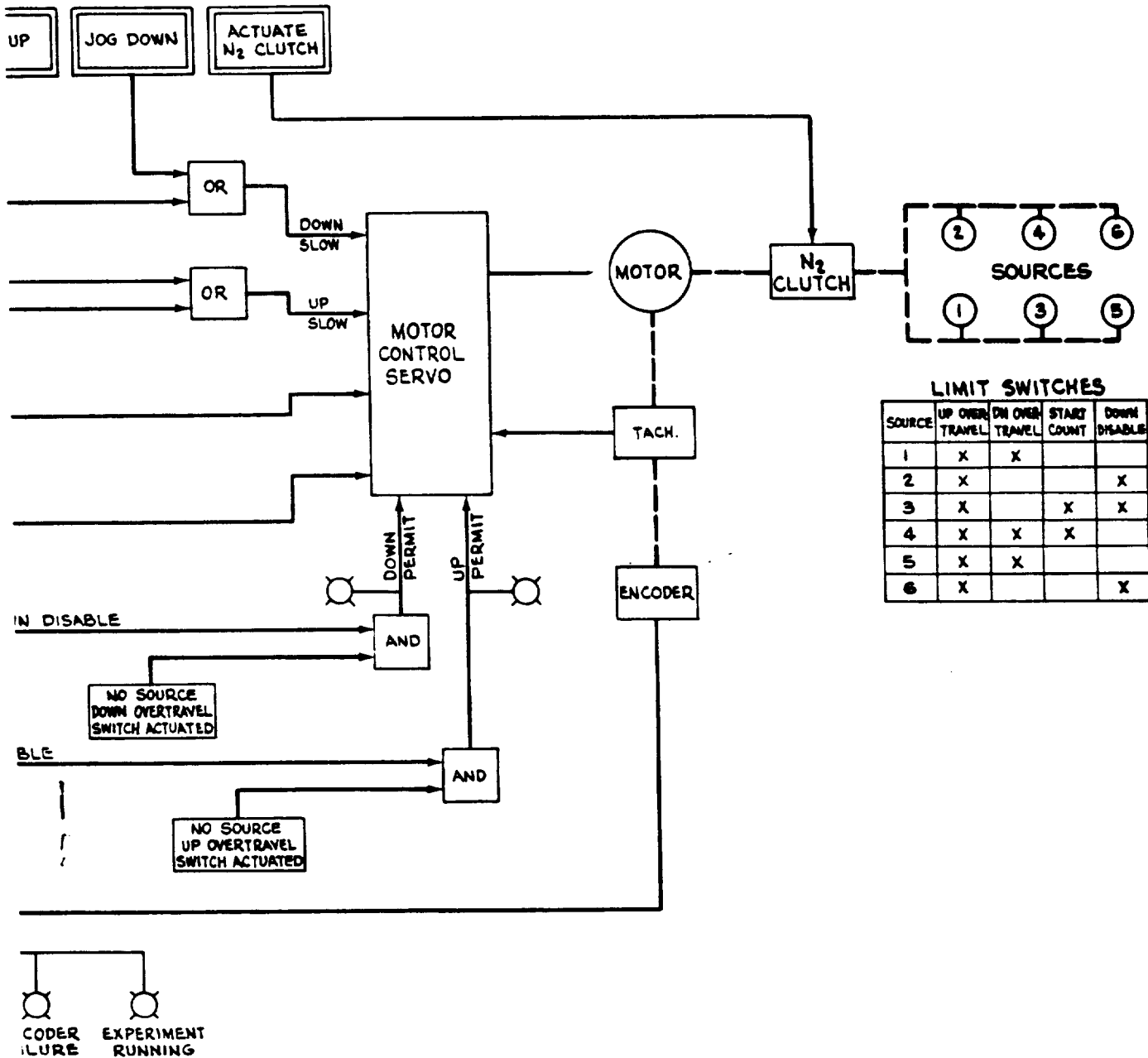


FIGURE 7
FUNCTIONAL SYSTEM DESCRIPTION OF VORIF

SS.
B.
D.



A pressure switch monitors nitrogen pressure in the system used to supply the force required to decouple the drives from the motor. This decoupling is used to allow the drives to be lowered by a winch from the roof of the building if the motor is inoperable. Its output energizes a light on the console if pressure is low, and will also inhibit starting a run if pressure is low.

The position encoder is a pulse generator which sends pulses to the down counter for controlling the positioning of the sources. These same pulses are counted and displayed on a digital scaler to indicate position to the operator. Note that at the beginning of each run the down counter is preset to the desired position and counts toward zero. Also at the end of exposure the down counter is again preset to the desired position and pulses are counted. The display system is designed so that direction and magnitude are sensed. Thus, after the scaler is reset to zero subsequent readings are relative to the position at the time of zeroing. There is no continuous unambiguous measure or indication of position of the drives.

The operator has several controls at his disposal as seen in Figure 6. First he can dial a preset position demand and a preset exposure time on digital switches. These read directly in millimeters and minutes or seconds depending on the position of a time base selector. He then can initiate an irradiation, subject to the constraints described above, by turning a key switch on and pushing a "go" pushbutton on the console.

The normal sequence of events, as directed by the logic system is as follows:

1. An audible warning is sounded for about 1 minute in the irradiation room.
2. Fifteen seconds after "go" (about 45 seconds prior to end of audible warning) the motor is energized in the "up fast" mode and will continue until the down counter indicates that the source is within 80 mm of its preset position.
3. At that time the drive speed will be reduced to slow, and this will continue until the preset position is reached and the motor stopped.
4. At the end of preset time the motor will be energized in the "down fast" mode until the drive is within 80 mm of the down position, then slowed, and finally stopped by the operation of the start count limit switches as described above.
5. During the time from actuation of the "go" button until the radiation level is below the alarm point three flashing lights are energized as described above.
6. From step 1 through step 4 the door between the control room and the irradiation room is locked. This is accomplished by energizing an "up-enable" relay, which occurs at the same time the "go" button is pressed, the timers are started, and the console "experiment running" light is turned on. This is fifteen seconds before the motor is energized.

The operator can also jog the drives up or down in slow speed by manually operating either of two pushbuttons. The only constraints are limit switches and the "up enable" and "down disable" outputs of the logic system. He can also operate a manual valve to release the drives from the motor by means of a clutch which is spring engaged and air released.

The motor is controlled by signals from the logic system subject to a few additional constraints. The motor receives signals to rotate in a particular direction and at high or low speed. Overtravel limit switches (6 in the up direction, 3 in the down direction) are series connected with the "up enable" contacts to operate a relay to allow rotation in the up direction, and with the "down disable" contacts to operate a "down permit" relay. A tachometer system senses speed of the motor and regulates it to match the demand, fast or slow.

Status of the Control System at Time of Incident

The committee has established that the following conditions were known by the operator and others to exist prior to operation of the facility on February 4, 1971:

1. The automatic door lock was malfunctioning, in that if the door were closed only by the operation of the mechanical door closer the lock would not engage.
2. The position indicator was erratic and frequently gave incorrect information.
3. The position indicator would often incorrectly reset to zero upon the occurrence of electrical noise transients from any one of several sources.

Status of Control System After Incident

Checks of the control system and interlocks by the Committee and the System Designer, after the inadvertent exposure, disclosed the following abnormalities:

1. It was necessary to forcibly close the door between the control room and the source room in order for the electric door lock to engage.
2. The position indicator (Anadex Counter) was erratic in operation and frequently gave erroneous information.
3. If the door between the control room and source room were slammed very hard, the actuating bar for the door interlock switch would sometimes pass the switch lever and allow the switch to return to the "door open" state and would inhibit source withdrawal.
4. Although the radiation monitors were all responding to radiation in the source room, two monitors were found to have no batteries and, therefore, would have failed to operate upon loss of all AC power.
5. Two of the radiation monitors failed to respond to a pushbutton test, indicating a fault in the test circuit.

6. A circuit intended to detect certain failures within the radiation monitor circuits failed to respond when the cable from one of the detectors to its monitor was removed.
7. The warning light in the source room was found to be inoperative.
8. An unused clip lead was discovered in the console behind the front panel. It was said to have been used to "bypass" the 15 second delay of source withdrawal.
9. Although not a malfunction, it was found that opening the door between the control room and source room after the sources began withdrawing does not prevent the sources from being further withdrawn, but allows the sources to be withdrawn to the pre-selected position before re-insertion. This cycle requires approximately 18 seconds for full source withdrawal and re-insertion.
10. On at least one occasion the TV system was found to be inoperable.

DISCUSSION OF THE INCIDENT

Chronology of Events

1. Pertinent Events Preceding February 4, 1971

On February 2 and 3, soybean plant irradiations were being made at the VDRIF. During operations early on February 2, Employee C inadvertently opened the door from the control room to the maze while an irradiation was in progress and the irradiation was immediately terminated by an automatic lowering of the sources, all six of which were being used at the time. This incident demonstrates that at this time the magnetic door lock was not engaged and that the door limit switch was functioning properly. Subsequent to this occurrence, testimony of Employees B, D, and E indicates that loading operations were performed in the maze with the control room door tied open and the door limit switch tied in the closed position while the sources were raised for irradiation of plants. Complete agreement was not reached among Employees B, D, and E on whether this interlock bypassing occurred on February 2 or February 3. It seems most likely, however, from analysis of the log book and the above testimony, that the loading operation involving interlock bypassing occurred between 11:30 A.M. and Noon on February 3. Employee B testified that he tied the switch for the loading operation in the maze and untied it shortly after the operation was completed. The door limit switch is shown in Figure 8 bypassed in the same manner as on February 2 or 3. Employee A indicated he observed string on the switch while in the control room on February 4 preceding the time of his inadvertent exposure; however, the existence of this condition is denied in the testimony of Employee B.

2. Events on February 4, 1971

Shortly after 11:00 A.M. on February 4, 1971, Employee A, a research technician, and Employee B, the principal VDRIF operator, arrived at the VDRIF to carry out the irradiation of lettuce seeds according to the schedule outlined in Table I. Employee B

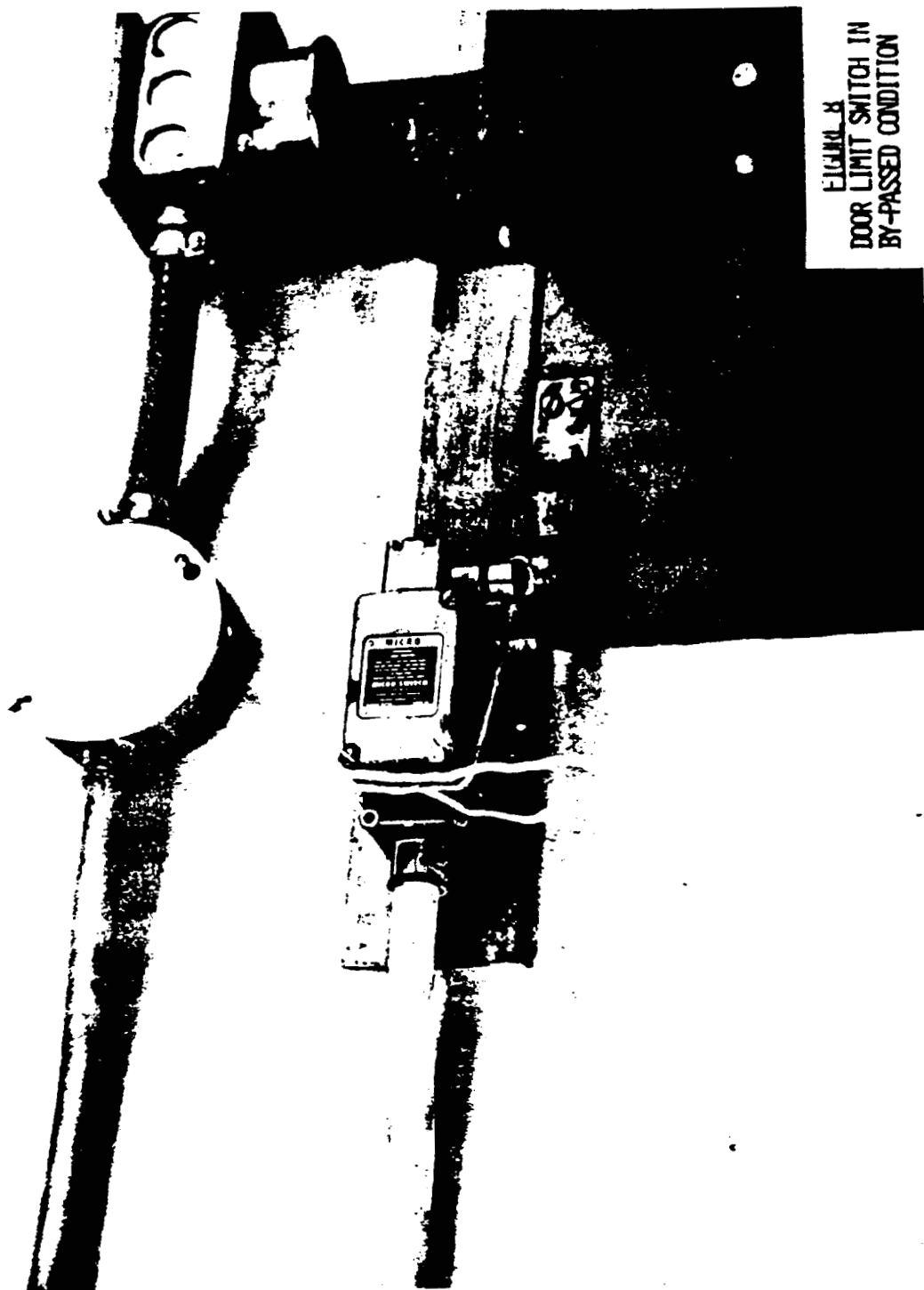


FIGURE 1
DOOR LIMIT SWITCH IN
BY-PASSED CONDITION

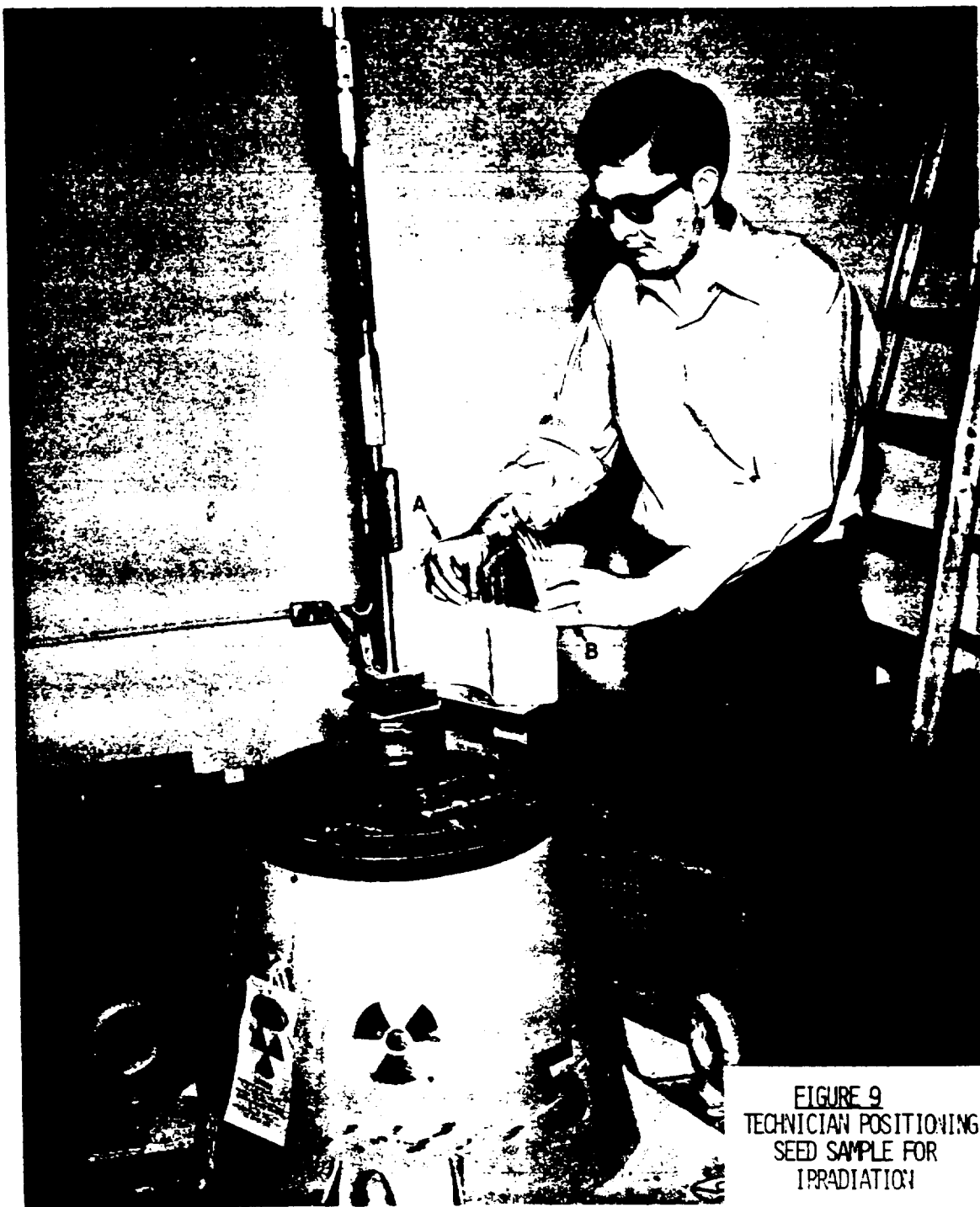


FIGURE 9
TECHNICIAN POSITIONING
SEED SAMPLE FOR
IRRADIATION

disengaged all sources except No. 5 from the drive mechanism which raises the sources since only Source No. 5 was to be used. Employee A meanwhile loaded the four vials for Treatment No. 2. The position of the samples for the experiment is shown in Figure 9.

TABLE I - LETTUCE SEED IRRADIATION SCHEDULE

Category 1: Seeds under O₂ atmosphere

Treatment No.	2	3	4	5	6	7
Dose (kR)	2.5	5.0	7.5	10.0	12.5	15.0
Time (Sec)	52	124	186	248	310	372

Category 2: Seeds under N₂ atmosphere

Treatment No.	9	10	11	12	13	14
Dose (kR)	10	20	30	40	50	60
Time (Sec)	248	496	744	992	1240	1488

Table II is a chronological presentation of events that followed as reconstructed from the Operations Log Book and testimony of the individuals involved.

At 11:36 A.M., subsequent to the exposure of Employee A, a twelve-minute irradiation was conducted. Prior to initiation of this run, Employee B indicated that he tied the door limit switch closed to permit entry into source room with source raised. During this time, Employees A and B attempted to confirm in their own minds whether or not the exposure had actually occurred. This they did by entering the maze to view the raised source briefly. Employee A indicated that he did not observe whether sources were up or down at time he inadvertently entered room. At 11:48 A.M., the irradiated seed samples were removed and a new set placed in position. During this time, while the source was down, a Victoreen Rate Meter was placed in the approximate position where Employee A would have been exposed. At 11:49 A.M., an eight-minute irradiation period was begun. Information on subsequent events is somewhat confused, but it appears that this exposure period timed out at 11:57 A.M.; samples were again changed and a final irradiation started at 11:58 A.M. Shortly thereafter Employees A and B left the VDRIF for lunch. Employee B went immediately to inform the Laboratory Director of the occurrence and after discussions with the Radiation Safety Officer and further discussions with Employee A, it was decided to send Employee A to the ORAU Medical Division for examination. Employee A was admitted to hospital at about 1:30 P.M.

TABLE II. TIME SEQUENCE OF EVENTS PRECEDING AND INCLUDING
PERSONNEL EXPOSURE

<u>Time</u>	<u>Interval</u>	<u>Source #5 Position</u>	<u>Operations</u>
11:11 to	11:12	Up	Irradiation of Treatment No. 2 (4 vials).
11:12 to	11:16:15	Down	Employee A enters source room, unloads Treatment No. 2, loads Treatment No. 4 (4 vials).
11:16:15	11:19:21	Up	Irradiation of Treatment No. 4.
11:19:21	11:21	Down	Employee A enters source room, unloads Treatment No. 4, loads Treatment Nos. 5 and 7 (8 vials).
11:21	11:25:04	Up	Irradiation of Treatment Nos. 5 and 7.
11:25:04	11:26:30	Down	Employee A enters source room, unloads Treatment No. 5 (4 vials), loads Treatment No. 3 (4 vials).
11:26:30	11:28:24	Up	Irradiation of Treatment Nos. 3 and 7.
11:28:24	11:30:15	Down	Employee A enters source room, unloads Treatment Nos. 3 and 7, loads Treatment No. 6 (4 vials).
11:30:15	11:33:30*	Up	Irradiation of Treatment No. 6; Employees A and B in control room discuss schedule for balance of experiments.
11:33:30*	11:35*	Up	Employee A enters source room as Employee B turns to make telephone call; Employee A unloads Treatment No. 6 and loads Treatment Nos. 11 and 13 (8 vials).
11:35*	11:35:25	Up	Employee B, unable to complete telephone connection, turns to observe from console that the source is in Up position and realizes that Employee A is in source room. He rushes to door and meets Employee A coming out of the maze. Employee B rushes immediately thru the maze to visually determine position of source. He confirms Source No. 5 is Up and returns to control room. Since he does not recall manually (via down fast button) lowering the source, it is assumed that it lowered according to the programmed exposure time.

*Times estimated by committee from testimony and reconstruction of events.
All other times are taken directly from Log Book.

Dosimetry

1. TLD Badge

At the time of exposure to the Cobalt-60 radiation, Employee A was wearing a TLD Badge dosimeter at waist level approximately 10 cm left of center on his belt. The LiF thermoluminescence dosimeter was provided and processed by a commercial supplier located in Santa Fe, New Mexico. The TLD Badge is assumed to provide the best measurement of exposure in this case since reconstruction of the position and time of exposure is not precise enough to accommodate the great variation in dose rate which occurs in close proximity to the source.

Two LiF dosimeters were contained in Employee A's badge. The open-window dosimeter, shielded by 10 mg/cm², read 253 Rem, and the other, shielded by a 285 mg/cm², read 260 Rem. It is, therefore, concluded that the exposure to the badge worn by Employee A was probably no more than 260 Rem.

2. Incident Reconstruction

a. Total Body Exposure

An attempt was made to provide confirming back up to the badge dosimetry by reconstructing the position of Employee A and the duration of his exposure. Figure 10 is a representation of Employee A's position while unloading and reloading the samples at the time of his exposure. It is noted that the circular wire fence around the source shield is not anchored to the floor; however, based on Employee A's recollection of the operation, it is felt that he would have been no closer to the source than would be required to comfortably reach the sample holder. This position places the badge at 50 cm from the center line of the source rod. In this position, the head is 40 cm from the source rod. Using Lithium Fluoride thermoluminescence and low-Z silver metaphosphate glass dosimeters, the dose rate at the badge was determined to be 570 R/min. It is estimated based on the timed reenactment of the operation that Employee A could have been in approximately this position for 25 to 35 sec. This would place the total body dose estimate at 240 to 340 Rem for this closest proximity to the source. A quality factor of "1" was used in all conversions of roentgens to rems.

If it is assumed that the wire fence was positioned concentrically around the source (as the anchor bolt holes in the floor suggest it had been at some previous time), the distance from source to badge could have been as great as 69 cm and the dose rate would be 390 R/min. Based on the above exposure times, the probable minimum total body dose estimate would be in the range of 160 to 240 Rem.

Dosimetry measurements made on a phantom indicated that the surface dose to the head and the trunk of the body was within approximately 10% of the dose at the waist as would be measured by the badge. Therefore, no further refinement of dose to critical organs such as lens of the eye or gonads is attempted.



It is assumed that the exposure received while approaching and leaving position X (See Figure 1) was negligible.

It is evident that the above reenactment of the incident results in dose estimates which bracket the badge dose and tend to confirm its credibility.

b. Hand Exposure

Referring to Figures 9 and 10, the dose rate at Position A is 3400 R/min and at Position C is 900 R/min. Analyses of a video taped reenactment indicate that the right hand would probably have been in Position A for a maximum of 15 seconds and a minimum of 10 seconds. For the balance of the total exposure time, the right hand would have been in Position C. The dose to the right hand is, therefore, estimated to be in the range of 800 to 1200 Rem.

Employee A was not completely certain of the position of the left hand during the operation. Usually, it would be used to steady the sample holder while the exposed vials were unloaded. In this case, to remove the 4 vials would require a 5 second exposure at the dose rate for Position B, i.e., 2000 R/min. For the balance of the operation, 20 to 30 seconds, the left hand would probably have been in Position C. Under these conditions, the left hand exposure would be estimated at 500 to 650 Rem.

If, however, the left hand remained in Position B for the entire unloading-loading operation, the dose would be estimated at from 800 to 1200 Rem. Therefore, the uncertainties involved permit only an estimate that the dose to the right hand is between 800 and 1200 Rem and the dose to the left hand is somewhere between 500 and 1200 Rem.

FINDING OF FACT

1. Employee A entered source room with Source No. 5 raised and received a total body exposure measured by his TLD Badge to be 260 Rem.
2. The electric door lock did not prevent Employee A from opening the door with the source exposed.
3. The door limit switch did not cause the source to be lowered when Employee A opened the door.
4. On February 2, 1971, two days prior to the incident, the door limit switch performed its function properly.
5. On February 2, 1971, the electric door lock failed to perform its function.
6. Incomplete closing of the door resulting in failure of the electric door lock to perform its function had been observed by the operator on previous occasions. Repair had been attempted but operations were continued even though the malfunction persisted. In repeated

tests subsequent to the incident the door closer always failed to close the door far enough to permit engagement of the electric door lock.

7. Repeated checks subsequent to the incident have resulted in proper functioning of the door limit switch.
8. The door limit switch was occasionally bypassed to facilitate operations and the most recent established occasion was on either February 2 or 3, 1971.
9. The source height indicator had a history of erroneous operation and could not be relied on to accurately indicate source position. Employee A stated that the position indicator read zero just prior to the time he entered the source room.
10. Prior to leaving the control room, Employee A failed to observe the flashing red light above the door, the radiation meters in the control room, and upon entering the source room failed to observe the raised source.
11. Repeated checks of the radiation meters, flashing red light in the control room, and control panel lights disclosed no failure of these indicators.
12. Formal procedures for orientation and training personnel participating in the operation of the VDRIF are nonexistent.
13. The operator was in the control room at the time Employee A entered the source room.
14. Employee A was not wearing a "pocket chirper" when he entered the source room, although these instruments were available in the control room.
15. Subsequent to the incident, the flashing red light in the source room was found to be inoperable.
16. Employee B was not wearing a TLD Badge or other personnel monitoring device at the time of the incident.

SIGNATURES OF THE INVESTIGATING COMMITTEE

W. T. Thornton
W. T. Thornton, Chairman

S. J. Ditto
S. J. Ditto

A. F. McFee
A. F. McFee



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

Letter Supplement to
Contract No. DE-AC05-76OR00242
UNIVERSITY OF TENNESSEE
Modification No. ~~A025~~ **4025**

September 27, 1979 **4025**

University of Tennessee
ATTN: Dr. E. H. Fly
Vice President
Knoxville, Tennessee 37916

Gentlemen:

SUBJECT: Obligation of Funds - Contract No. DE-AC05-76OR00242

Pursuant to the provisions of Article V, Section 1., of Contract No. DE-AC05-76OR00242, you are advised that the amount of funds obligated by the Government under said contract has been increased from \$27,623,786.00 to \$27,863,251.00.

Please acknowledge receipt of this Letter Supplement in the space provided below and return one copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY: SECRETARY OF ENERGY

BY: *Peter D. Dayton*
(Contracting Officer)

AD-423:AHF

TITLE: Peter D. Dayton
Deputy Director
Procurement & Contracts Division

RECEIVED:

UNIVERSITY OF TENNESSEE

BY: *E. H. Fly*

TITLE: VICE PRESIDENT

DATE: OCT 12 1979

1116605



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

Letter Supplement to
Contract No. DE-AC05-76OR00242
UNIVERSITY OF TENNESSEE
November 6, 1979

University of Tennessee
ATTN: Dr. E. H. Fly
Vice President
Knoxville, Tennessee 37916

Gentlemen:

OVERHEAD ALLOWANCE - OCTOBER 1, 1979, THROUGH
SEPTEMBER 30, 1980

Reference is made to subparagraph 3.0. of Article III of Contract
No. DE-AC05-76OR00242. In accordance with such subparagraph,
it is proposed that the allowance for overhead for the period
October 1, 1979, through September 30, 1980, shall be \$50,000.

If the foregoing is acceptable, please sign in the space provided
below and return one executed copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY: SECRETARY OF ENERGY

BY: Peter D. Dayton

TITLE: CONTRACTING OFFICER

CC-10:DGD

RECEIVED:

UNIVERSITY OF TENNESSEE

BY: [Signature]

TITLE: VICE PRESIDENT

DATE: DEC - 5 1979

1116606

DEC 31 1979



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

Letter Supplement to
Contract No. DE-AC05-76OR00242
UNIVERSITY OF TENNESSEE
Modification No. A025

University of Tennessee
ATTN: Dr. E. H. Fly
Vice President
Knoxville, Tennessee 37916

Gentlemen:

SUBJECT: OBLIGATION OF FUNDS - Contract No. DE-AC05-76OR00242

Pursuant to the provisions of Article V, Section 1, of the subject contract, you are advised that the amount of funds obligated by the Government under said contract has been increased from \$27,863,251.00 to \$29,363,251.00.

Please acknowledge receipt of this Letter Supplement in the space provided below and return one copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY: SECRETARY OF ENERGY

BY: Peter D. Dayton

TITLE: _____

RECEIVED:

UNIVERSITY OF TENNESSEE

BY: E. H. Fly

TITLE: Vice President for Business & Finance

DATE: January 8, 1980

1116607



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

80 JUL 3 16:14
Letter Supplement to
Contract No. DE-AC05-76OR00242
UNIVERSITY OF TENNESSEE
Modification No. ~~20~~ M028

MAY 23 1980

University of Tennessee
ATTN: Dr. E. H. Fly
Vice President
Knoxville, Tennessee 37916

Gentlemen:

CONTRACT NO. DE-AC05-76OR00242

The purpose of this modification is to provide the correct modification numbers for the following letter supplements which were inadvertently numbered improperly.

Letter Supplement dated November 6, 1979, Subject: "Overhead Allowance - October 1, 1979 through September 30, 1980," should be numbered Modification No. M026.

Letter Supplement dated December 21, 1979, Subject: "Obligation of Funds - Contract No. DE-AC05-76OR00242," should be renumbered from Modification No. A025 to A027.

If the foregoing is acceptable, please sign in the space provided below and return one executed copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY: SECRETARY OF ENERGY

BY: Pete Dayton

TITLE: CONTRACTING OFFICER

AD-421:MNW

RECEIVED:

UNIVERSITY OF TENNESSEE

BY: _____

TITLE: VICE PRESIDENT

DATE: _____

1116908

WHA



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

Letter Supplement to
CONTRACT NO. DE-AC05-76OR00242
UNIVERSITY OF TENNESSEE
Modification No. A029

SEP 3 0 1980

University of Tennessee
ATTN: Dr. E. H. Fly
Vice President
Knoxville, Tennessee 37916

Gentlemen:

OBLIGATION OF FUNDS - CONTRACT NO. DE-AC05-76OR00242

Pursuant to the provisions of Article V, Section 1. of the subject contract, you are advised that the amount of funds obligated by the Government under said contract has been increased by the amount of \$91,978.00 from \$29,363,251.00 to \$29,455,229.00.

Please acknowledge receipt of this Letter Supplement in the space provided below and return one copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY: SECRETARY OF ENERGY

BY: Peter D. Dayton

TITLE: CONTRACTING OFFICER

CC-10:MKH

RECEIVED:

UNIVERSITY OF TENNESSEE

BY: [Signature]

TITLE: _____

DATE: _____

1116609



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

Letter Supplement to
Contract No. DE-AC05-76OR00242
UNIVERSITY OF TENNESSEE
Modification No. A030

University of Tennessee
ATTN: Dr. E. H. Fly
Vice President
Knoxville, Tennessee 37916

DEC 23 1980

Gentlemen:

OBLIGATION OF FUNDS - CONTRACT NO. DE-AC05-76OR00242

Pursuant to the provisions of Article V, Section 1., of the subject contract, you are advised that the amount of funds obligated by the Government under said contract has been increased by the amount of \$174,600.00 from \$29,455,229.00 to \$29,629,829.00.

Please acknowledge receipt of this Letter Supplement in the space provided below and return one copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY:

Peter D. Dayton
Peter D. Dayton

TITLE:

Contracting Officer
Contracting Officer

DATE: DEC 23 1980

CC-10:MBH

ACCEPTED:

UNIVERSITY OF TENNESSEE

BY:

CH

TITLE: Vice President for Business and Finance

DATE: December 31, 1980

1116610



MAR 3 1981

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

Letter Supplement to
Contract No. DE-AC05-76OR00242
UNIVERSITY OF TENNESSEE
Modification No. A031

University of Tennessee
ATTN: Dr. E. H. Fly
Vice President
Knoxville, Tennessee 37916

FEB 27 1981

Gentlemen:

OBLIGATION OF FUNDS - CONTRACT NO. DE-AC05-76OR00242

Pursuant to the provisions of Article V, Section 1., of the subject contract, you are advised that the amount of funds obligated by the Government under said contract has been increased by the amount of \$1,066,712.00 from \$29,629,829.00 to \$30,696,541.00.

Please acknowledge receipt of this Letter Supplement in the space provided below and return one copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY:

TITLE:

CONTRACTING OFFICER

DATE:

FEB 27 1981

CC-10:PMK

ACCEPTED:

UNIVERSITY OF TENNESSEE

BY:

TITLE:

VICE PRESIDENT

DATE:

MAR 3 1981

1116611

SEP 28 1981



Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

September 25, 1981

Letter Supplement to
Contract No. DE-AC05-76OR00242
UNIVERSITY OF TENNESSEE
Modification No. A032

University of Tennessee
ATTN: Dr. E. H. Fly
Vice President
Knoxville, TN 37916

Gentlemen:

DEOBLIGATION OF FUNDS - CONTRACT NO. DE-AC05-76OR00242

Pursuant to the provisions of Article V, Section 1., of the subject contract, you are advised that the amount of funds obligated by the Government under said contract has been decreased by the amount of \$268,430.00 from \$30,696,541.00 to \$30,428,111.00.

Please acknowledge receipt of this Letter Supplement in the space provided below and return one copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY: Sylvia H. Halde
TITLE: Contracting Officer

DATE: September 25, 1981

AD-421:SGG

ACCEPTED:

UNIVERSITY OF TENNESSEE

BY: [Signature]

TITLE: [Signature]

DATE:

1116612

MAY 21 1982

STANDARD FORM 30 JULY 1960 GENERAL SERVICES ADMINISTRATION FED. PROC. REG. (41 CFR) 1-16.101		AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		PAGE 1 OF 1
1. AMENDMENT/MODIFICATION NO. M033		2. EFFECTIVE DATE Same as		3. REQUISITION/PURCHASE REQUEST NO.
5. ISSUED BY U. S. Dept. of Energy Oak Ridge Operations Office Post Office Box E Oak Ridge, Tennessee 37830		4. PROJECT NO. (If applicable)		
CODE Block 19		6. ADMINISTERED BY (If other than block 5) Contract Management Branch Procurement & Contracts Division		
7. CONTRACTOR NAME AND ADDRESS The University of Tennessee ATTN: Dr. E. H. Fly Vice President Knoxville, Tennessee 37996 (Street, city, county, state, and ZIP Code)		8. AMENDMENT OF SOLICITATION NO. DATED (See block 9) MODIFICATION OF CONTRACT/ORDER NO. DE-AC05-760R00242 (Formerly EY-76-C-05-0242) DATED 5/11/48 (See block 11)		
9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS <input type="checkbox"/> The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended, <input type="checkbox"/> is not extended. Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods: (a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
10. ACCOUNTING AND APPROPRIATION DATA (If required) NA NO FUNDS OBLIGATED				
11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS (a) <input type="checkbox"/> This Change Order is issued pursuant to _____ The Changes set forth in block 12 are made to the above numbered contract/order. (b) <input type="checkbox"/> The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12. (c) <input checked="" type="checkbox"/> This Supplemental Agreement is entered into pursuant to authority of P.L. Law 95-91 and other applicable law It modifies the above numbered contract as set forth in block 12.				
12. DESCRIPTION OF AMENDMENT/MODIFICATION The purpose of this modification is to establish the allowance for overhead pursuant to subparagraph 3.o. of Article III. of Contract No. DE-AC05-760R00242. With the acceptance of this modification it is agreed that the allowance for overhead for the period October 1, 1980 through September 30, 1981 is \$50,000. All other provisions of the contract remain unchanged.				
Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.				
13. <input type="checkbox"/> CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT <input checked="" type="checkbox"/> CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 1 COPIES TO ISSUING OFFICE				
14. NAME OF CONTRACTOR/OFFEROR BY Emerson H. Fly (Signature of person authorized to sign)		17. UNITED STATES OF AMERICA BY J. D. Burlison (Signature of Contracting Officer)		
15. NAME AND TITLE OF SIGNER (Type or print) Emerson H. Fly Vice President		16. DATE SIGNED 5/27/82		18. NAME OF CONTRACTING OFFICER (Type or print) J. D. Burlison Contracting Officer
				19. DATE SIGNED MAY 15 1982

STANDARD FORM 30, JULY 1966 GENERAL SERVICES ADMINISTRATION FED. PROC. REG. (41 CFR) 1-16.101		AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		PAGE 1	OF 1
1. AMENDMENT/MODIFICATION NO. A034		2. EFFECTIVE DATE Same as		3. REQUISITION/PURCHASE REQUEST NO. 05-820R00242.002	
4. PROJECT NO. (If applicable)		5. ISSUED BY U. S. Department of Energy Oak Ridge Operations P. O. Box E Oak Ridge, Tennessee 37830		6. ADMINISTERED BY (If other than block 5) Contract Management Branch Procurement and Contracts Division	
7. CONTRACTOR NAME AND ADDRESS The University of Tennessee ATTN: Dr. E. H. Fly Vice President Knoxville, Tennessee 37996		8. AMENDMENT OF SOLICITATION NO. DATED _____ (See block 9) MODIFICATION OF CONTRACT/ORDER NO. DE-AC05-760R00242 (Formerly EY-76-C-05-0242) DATED 5/11/48 (See block 11)			
<p>9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS</p> <p><input type="checkbox"/> The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended, <input type="checkbox"/> is not extended.</p> <p>Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:</p> <p>(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.</p>					
<p>10. ACCOUNTING AND APPROPRIATION DATA (If required)</p> <p style="text-align: center;">N/A</p> <p style="text-align: right;">DEOBLIGATE: \$279,718.00</p>					
<p>11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS</p> <p>(a) <input type="checkbox"/> This Change Order is issued pursuant to _____ The Changes set forth in block 12 are made to the above numbered contract/order.</p> <p>(b) <input type="checkbox"/> The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.</p> <p>(c) <input checked="" type="checkbox"/> This Supplemental Agreement is entered into pursuant to authority of <u>Section I - Article V of Contract</u> It modifies the above numbered contract as set forth in block 12.</p>					
<p>12. DESCRIPTION OF AMENDMENT/MODIFICATION</p> <p>The purpose of this modification is to deobligate a portion of the uncosted funding pending final closeout of the contract.</p> <p>With the acceptance of this modification, the contract is modified as follows:</p> <p>Pursuant to the provisions of Article V, Section I., of the subject contract, the amount of funds obligated by the Government under said contract is decreased from \$30,428,111. to \$30,148,393.00, a decrease of \$279,718.00.</p> <p>All other provisions of the contract remain unchanged.</p>					
ORIGINAL					
<p>Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.</p>					
<p>13. <input type="checkbox"/> CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT <input checked="" type="checkbox"/> CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN <u>1</u> COPIES TO ISSUING OFFICE</p>					
14. NAME OF CONTRACTOR/OFFEROR BY <u>Joseph E. Johnson</u> (Signature of person authorized to sign)		17. UNITED STATES OF AMERICA BY <u>J. D. Burleson</u> (Signature of Contracting Officer)			
15. NAME AND TITLE OF SIGNER (Type or print) JOSEPH E. JOHNSON VICE PRESIDENT		16. DATE SIGNED 5/11/48		18. NAME OF CONTRACTING OFFICER (Type or print) J. D. Burleson	
				19. DATE SIGNED 5/11/48	

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

DE-AC05-760R00242

1 1

2. AMENDMENT/MODIFICATION NO. A035		3. EFFECTIVE DATE Same as Block 1	4. REQUISITION/PU 6c. 05-840R00242.501	5. PROJECT NO. (If applicable)
6. ISSUED BY U. S. Dept. of Energy Oak Ridge Operations Office P. O. Box E Oak Ridge, Tennessee, 37831		7. ADMINISTERED BY (If other than Item 6) Contract Management Branch Procurement and Contracts Division		
5. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) The University of Tennessee ATTN: Dr. E. H. Fly Vice President Knoxville, Tennessee 37996		9A. AMENDMENT OF SOLICITATION NO. 9B. DATED (SEE ITEM 11) 10A. MODIFICATION OF CONTRACT/ORDER NO. DE-AC05-760R00242 10B. DATED (SEE ITEM 13) 5/11/48		
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS <input type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended, <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.		12. ACCOUNTING AND APPROPRIATION DATA (If required) NOT APPLICABLE DEOBLIGATE: \$35,424.30		
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14. (V) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A. B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b). C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: D. OTHER (Specify type of modification and authority) X Section 1 - Article V of Contract				
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input checked="" type="checkbox"/> is required to sign this document and return <u>1</u> copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible) The purpose of this modification is to deobligate the uncosted funding relative to final closeout of the contract. With the acceptance of this modification, the contract is modified as follows: Pursuant to the provisions of Article V, Section 1:, of the subject contract, the amount of funds obligated by the Government under said contract is decreased from \$30,148,393.00 to \$30,112,968.70, a decrease of \$35,424.30. The figure \$30,112,968.70 represents the actual cost to the Government under the contract. All other provisions of the contract remain unchanged. Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect				
15A. NAME AND TITLE OF SIGNER (Type or print) J. D. Burleson		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) J. D. Burleson		
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)		15C. DATE SIGNED 9/10/84		16C. DATE SIGNED 8-29-84

Contract No. DE-AC05-76OR00242
THE UNIVERSITY OF TENNESSEE
Modification No. M024

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 1st day of November, 1979, and effective as of October 1, 1979, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), represented herein by the UNITED STATES DEPARTMENT OF ENERGY (hereinafter referred to as "DOE"), and the UNIVERSITY OF TENNESSEE (hereinafter referred to as the "University");

WITNESSETH THAT:

WHEREAS, the Government and the University entered into this contract, dated May 11, 1948, for the performance of certain studies and related work in regard to the effects of radiation on domestic animals and crops; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 through 23; and

WHEREAS, the University and the DOE desire to amend the contract further to provide for the continuance of this research and/or the performance of additional research; and

WHEREAS, this Supplemental Agreement is authorized by the Department of Energy Organization Act (P. L. 95-91), and other applicable law;

NOW, THEREFORE, the parties do mutually agree that the contract, as amended, is hereby further amended in the following particulars, but in no others:

1. Wherever the terms "Atomic Energy Commission" or "AEC" or "Energy Research and Development Administration" or "ERDA" appear in the original contract and any modifications thereto, such terms shall be deemed to refer to the Department of Energy or DOE and wherever the

"ARTICLE I - STATEMENT OF WORK

1. Scope. The Government expressly engages the University to manage, operate, and maintain the facilities described below and to perform the work and services described in this contract, including the utilization of information, material, funds and other property of DOE, the collection of revenues, and the acquisition, sale or other disposal of property for DOE, subject to the limitations as hereinafter set forth. The University undertakes and promises to manage, operate, and maintain said facilities and to perform said work and services, upon the terms and conditions herein provided and in accordance with such directions and instructions not inconsistent with this contract which DOE may deem necessary or give to the University from time to time. In the absence of applicable directions and instructions from DOE the University will use its best judgment, skill and care in all matters pertaining to the performance of this contract. The University will not be required to operate the facilities below in any manner which it deems unsafe to the facilities or personnel.

2. Facilities. The facilities to be managed, operated, and maintained by the University hereunder consist of the Government-owned lands, buildings, and toxicological research facilities located in Anderson County, being along the north side of the Clinch River and generally east or southeast of the plant areas known as X-10 and Y-12. The lands currently included total approximately 2,500 acres.

3. Programs. The University shall manage, operate, and maintain the facilities described in Section 2. above, in accordance with programs approved in writing from time to time by DOE. The functions to be performed include but are not necessarily limited to the following:

a. Performance of studies in the general area of comparative vertebrate toxicology with various laboratory and domestic animals. This research will include the investigation of the effects of toxicants and other environmental stresses on various biological processes such as reproduction, growth, and development; and evaluation of the metabolism and toxicity of radionuclides and other toxic agents that could be associated with energy producing operations. Also, performance of research studies to evaluate the effects of radiation, chemicals and other energy pollutants on survival, growth, and productivity in various plant species.

b. Cooperation with educational and other institutions or organizations.

4. Construction. Upon request of DOE and acceptance thereof by the University, the University shall procure by subcontract the construction of new facilities or the alteration or repair of Government-owned facilities. Any subcontract entered into under this section shall be subject to the written approval of DOE and shall contain the provisions relative to labor and wages required by law to be included in contracts for the construction, alteration and/or repair, including painting and decorating, of a public building or public work.

5. Administration of Contracts Made by the University. The administration of all subcontracts, purchase orders, and other contractual agreements made by the University, including responsibility for payment from the Government funds advanced and agreed to be advanced hereunder to the University, shall, during the period of this contract, remain in the University unless and until transferred to the Government or other designee of DOE at the direction or with the approval of DOE.

6. Related Services.

a. In addition to the services specifically described in other provisions of this Article I, the University shall perform such other services, incidental or related to the services described in this Article I or to the programs of DOE as DOE and the University shall agree in writing from time to time will be performed under this contract either for DOE or its contractors. The costs incurred by the University in performing such services shall be allowable in accordance with the provisions of Article III.

b. The University, to the extent it is in a position to do so, will render such services, including transfers of property to Federal agencies and to other cost-type contractors of DOE as requested in accordance with such procedures and requirements as DOE may establish from time to time. The University will receive transfers of funds therefor from such Federal agencies and other cost-type contractors to the extent that such transfer is required by and in accordance with policies adopted from time to time by DOE. The funds received in exchange for such services shall be handled as a part of the advances of Government funds as provided in Article VI. In the performance of such services, the University is authorized to use facilities, materials, and equipment in its custody under this contract. The costs incurred by the University in the performance of any such services shall be allowable in accordance with the provisions of Article III. With the approval of DOE, the University may render the same

services, including transfers of property to lump-sum or unit-price DOE contractors under the terms and conditions herein stated, and the payments received therefor shall be for the account of the Government and will be received, held and utilized as a part of the advances of Government funds pursuant to Article VI.

7. General.

a. The University shall perform the maintenance work necessary for the efficient operation of the facilities to the extent such work is included in work programs agreed in writing between the University and DOE. Projects which, under applicable procedures adopted by DOE, from time to time, require the issuance of a directive therefor by DOE shall not be undertaken until such directive has been issued.

b. In carrying out the work under this contract, the University shall, subject to the general control of DOE, do all things necessary in the best judgment of the University in the management, operation, and maintenance of the facilities; provided that, whenever approval or other action by DOE is required with respect to any expenditure or commitment by the University under the terms of this contract, the Government shall not be responsible unless and until such approval or action is obtained or taken.

c. In carrying out the work under this contract, the University shall be responsible for the employment of all professional, technical, skilled and unskilled personnel engaged and to be engaged by the University in the work hereunder, and for the training of personnel. Persons employed by the University shall be and remain employees of the University and shall not be deemed employees of DOE or the Government; provided that, nothing herein shall require the establishment of any employer-employee relationship between the University and consultants and others whose services are utilized by the University for the work hereunder.

d. The University shall exert its best efforts to acquire for the Government such materials, supplies, equipment, and facilities required in connection with work under this contract as are not furnished by the Government.

8. University Use of Facilities. In recognition of the University's extensive biological and agricultural research programs, the DOE is willing for the University to utilize for its own sponsored research, the special research facilities, personnel and other resources available for the work under this contract, provided: (1) a determination is made by the Laboratory Director, and DOE is so advised, that the University-sponsored research is considered to be of interest and benefit to DOE research programs being carried out under the contract, (2) a description of the planned research, method of performance, and estimated cost is provided to DOE, and (3) DOE approves performance of the planned research. The University will reimburse DOE or credit the contract account for all direct and indirect costs incurred under the contract in the performance of research for the University. In consideration of the expected benefits to DOE research programs from performance of University-sponsored research, including the availability of all research results and data, the DOE will waive those elements of its costs for depreciation on Government property and the "added factor" provided for in DOE pricing policy."

3. In ARTICLE II, subparagraph 1. Term, the words "September 30, 1979" are deleted and the words "September 30, 1981" are substituted therefor.

4. In ARTICLE III - ALLOWABLE COSTS, the following changes are made:

a. In subparagraph 3.a. the words "exclusive of Government Property" are added after the words "Bonds and Insurance".

b. In subparagraph 3.g. delete the last words in the paragraph "in accordance with the article of this contract entitled 'Patents'" and the words "in accordance with the Patent article of this contract" are substituted therefor.

c. A new subparagraph 3.p. is added which shall read:

"p. Indemnification of Pension Benefit Guaranty Corporation pursuant to the employee Retirement Income Act of 1974, in accordance with §9-15.205-6."

d. In Paragraph 4. a new subparagraph x. is added which shall read:

"x. Late premium payment charges related to employee deferred compensation plan insurance, in accordance with §9-15.205-16."

5. ARTICLE V - OBLIGATION OF FUNDS is deleted in its entirety and the following Article V substituted therefor:

"ARTICLE V - OBLIGATION OF FUNDS

1. Obligation of Funds. The amount presently obligated by the Government with respect to this contract is Twenty-seven Million, Six Hundred Twenty-three Thousand, Seven Hundred Eighty-six Dollars (\$27,623,786.00). Such amount may be increased unilaterally by DOE by written notice to the University and may be increased or decreased by written agreement of the parties (whether or not by formal modification of this contract). Estimated revenues and receipts from others for work and services to be performed under this contract are not included in the amount obligated with respect to this contract. Such revenues and receipts, to the extent actually received by the University, shall be available and used for the payment of allowable costs as provided in the article of this contract entitled 'Payments and Advances.' Nothing in this Paragraph 1. is to be construed as authorizing the University to exceed limitations stated in financial plans established by DOE and furnished to the University from time to time under this contract.

2. Limitation on Payment By the Government. Except as otherwise provided in this contract and except for costs which may be incurred by the University pursuant to the article of this contract entitled 'Termination' or costs of claims allowable under the contract accruing after completion or termination and not released by the University at the time of financial settlement of the contract in accordance with the article entitled 'Payments and Advances,' payment by the Government under this contract on account of allowable costs shall not in the aggregate exceed the amount obligated with respect to this contract. Unless expressly negated in this contract, payment on account of those costs excepted in the preceding sentence which are in excess of the amount obligated with respect to this contract shall be subject to the availability of (i) revenues and receipts deposited to the Government's account as provided in the article of this contract entitled 'Payments and Advances,' and (ii) other funds which DOE may legally use for such purpose: Provided, DOE will use its best efforts to obtain the appropriation of funds for this purpose if not otherwise available.

3. Notices - University Excused From Further Performance. The University shall notify DOE in writing whenever the unexpended balance of funds (including revenues and receipts) available under Paragraph 1., above, plus the University's best estimate of revenues and receipts to be received during the 45-day period hereinafter specified, is in the Contractor's best judgment sufficient to

continue contract operations at the programmed rate for only 45 days and to cover outstanding commitments and liabilities on account of costs allowable under the contract at the end of such period. Whenever the unexpended balance of funds (including revenues and receipts) available under Paragraph 1., above, is in the University's best judgment either sufficient only to liquidate outstanding commitments and liabilities on account of costs allowable under this contract or is equal to zero, the University shall immediately notify DOE and shall make no further commitments or expenditures (except to liquidate existing commitments and liabilities), and, unless the parties otherwise agree, the University shall be excused from further performance (except such performance as may become necessary in connection with termination by the Government) and the performance of all work hereunder will be deemed to have been terminated for the convenience of the Government in accordance with the provisions of the article of this contract entitled 'Termination.'

4. Financial Plans; Cost and Commitment Limitations. In addition to the limitations provided for elsewhere in this contract, DOE may, through Financial Plans or other directives issued to the University, establish controls on the costs to be incurred and commitments to be made in the performance of the contract work. Such plans and instructions may be amended or supplemented from time to time by DOE. The University hereby agrees to comply with the specific limitations (ceilings) on costs and commitments set forth in such plans and directives, to use its best efforts to comply with the other requirements of such plans and directives, and to promptly notify DOE in writing whenever it has reason to believe the authorized financial levels of costs and commitments will be exceeded or substantially underrun.

5. Government's Right to Terminate Not Affected. The giving of any notice under this article shall not be construed to waive or impair any right of the Government to terminate the contract under the provisions of the article of this contract entitled 'Termination.'

6. ARTICLE VII - ACCOUNTS, RECORDS AND INSPECTION is deleted in its entirety and the following Article VII substituted therefor:

"ARTICLE VII - ACCOUNTS, RECORDS, AND INSPECTION

1. Accounts. The University shall maintain a separate and distinct set of accounts, records, documents, and other evidence showing and supporting all allowable costs incurred or anticipated to be incurred, revenues or other applicable credits, fixed-fee accruals, and the receipt, use, and disposition of all Government property coming into the possession of the University under this

contract. The system of accounts employed by the University shall be satisfactory to DOE and in accordance with generally accepted accounting principles consistently applied.

2. Inspection and Audit of Accounts and Records. All books of account and records relating to this contract shall be subject to inspection and audit by DOE at all reasonable times, before and during the period of retention provided for in 4. below and the University shall afford DOE proper facilities for such inspection and audit.

3. Audit of Subcontractors' Records. The University also agrees, with respect to any subcontracts (including lump-sum or unit-price subcontracts or purchase orders) where, under the terms of the subcontract, costs incurred are a factor in determining the amount payable to the subcontractor of any tier, to conduct an audit of the costs of the subcontractor in a manner satisfactory to DOE or to have the audit conducted by the next higher tier subcontractor in a manner satisfactory to the University and DOE, except when DOE elects to waive such audit or approves other arrangements for the conduct of the audit.

4. Disposition of Records.

a. Except as agreed upon by the Government and the University, all financial and cost reports, books of account and supporting documents, and other data evidencing costs allowable and revenues and other applicable credits under this contract in the possession of the University at its Knoxville Office and relating to this contract shall be preserved by the University for a period of three (3) years after final payment under this contract or otherwise disposed of in such manner as may be agreed upon by the Government and the University.

b. Except as provided in the foregoing and except as agreed upon by the Government and the University, all sketches, drawings, designs, design data, plans, specifications, technical notes and data, medical records, books of account and supporting documents relating to this contract, and other data evidencing costs allowable and revenues received, earned or accrued under this contract and any notebooks, photographs, negatives, reports, findings, recommendations, data, and memoranda of every description and any copies of the foregoing relating to the foregoing or the work under this contract, and the information contained therein shall be the property of the Government, and, subject to the right of the University to retain a copy of any such material for its own use, shall be delivered to the Government or otherwise disposed of by the

University either as DOE may from time to time direct during the progress of the work or in any event as DOE shall direct upon completion or termination of this contract and final audit of all accounts hereunder. The Government shall have the right to use all or any part of said material and information which is the property of the Government for any purpose whatsoever including, but not limited to, the right to reproduce said material and disseminate it to the public. The University's right of retention and use shall be subject to the security, patent, and the following use of information provisions of this contract.

5. Reports. The University shall furnish such progress reports and schedules, financial and cost reports, and other reports concerning the work under this contract as the Contracting Officer may from time to time require.

6. Inspections. DOE shall have the right to inspect the work and activities of the University under this contract at such time and in such manner as it shall deem appropriate.

7. Subcontracts. The University further agrees to require the inclusion of provisions similar to those in Paragraphs 1. through this Paragraph 8. of this article in all subcontracts (including lump-sum or unit-price subcontracts or purchase orders) of any tier entered into hereunder where, under the terms of the subcontract, costs incurred are a factor in determining the amount payable to the subcontractor.

8. Internal Audit. The University agrees to conduct an internal audit and examination satisfactory to DOE of the records, operations, expenses, and the transactions with respect to costs claimed to be allowable under this contract annually and at such other times as may be mutually agreed upon. The results of such audit, including the working papers, shall be submitted or made available to the Contracting Officer."

7. ARTICLE IX - GOVERNMENT PROPERTY is deleted in its entirety and the following Article IX substituted therefor:

"ARTICLE IX - PROPERTY

1. Furnishing of Government Property. The Government reserves the right to furnish any property or services required for the performance of the work under this contract.

2. Title to Property. Title to all property furnished by the Government shall remain in the Government except as otherwise provided in this article. Except as otherwise provided by the Contracting Officer, title to all materials, equipment, supplies, and tangible personal property of every kind and description purchased by the Contractor, for the cost of which the University is entitled to be reimbursed as a direct item of cost under this contract, shall pass directly from the vendor to the Government. The Government reserves the right to inspect, and to accept or reject, any item of such property. The University shall make such disposition of rejected items as the Contracting Officer shall direct. Title to other property, the cost of which is reimbursable to the University under this contract, shall pass to and vest in the Government upon (i) issuance for use of such property in the performance of this contract, or (ii) commencement of processing or use of such property in the performance of this contract, or (iii) reimbursement of the cost thereof by the Government, whichever first occurs. Property furnished by the Government and property purchased or furnished by the University, title to which vests in the Government, under this paragraph are hereinafter referred to as Government Property. Title to Government Property shall not be affected by the incorporation of the property into or the attachment of it to any property not owned by the Government, nor shall such Government Property or any part thereof be or become a fixture or lose its identity as personalty by reason of affixation to any realty.

3. Identification. To the extent directed by the Contracting Officer, the University shall identify Government Property coming into the University's possession or custody by marking or segregating in such a way, satisfactory to the Contracting Officer, as shall indicate its ownership by the Government.

4. Disposition. The University shall make such disposition of Government Property which has come into the possession or custody of the University under this contract as the Contracting Officer shall direct. When authorized in writing by the Contracting Officer during the progress of the work or upon completion or termination of this contract, the University may, upon such terms and conditions as the Contracting Officer may approve, sell or exchange such property, or acquire such property at a price agreed upon by the Contracting Officer and the University as the fair value thereof. The proceeds of any disposition shall be received for the account of the Government, and shall be received, held, and utilized as part of the advances of Government funds pursuant to the article hereof entitled 'Payments' or otherwise credited to the account of the Government as DOE may direct. Upon completion of the work or

the termination of this contract, the University shall render an accounting, as prescribed by the Contracting Officer, of all Government Property which had come into the possession or custody of the University under this contract.

5. Protection of Government Property - Classified Materials. The University shall take all reasonable precautions, as directed by the Contracting Officer, or in the absence of such directions in accordance with sound industrial practice, to safeguard and protect Government Property in the University's possession or custody. Special measures shall be taken by the University in the protection of and accounting for any classified or special materials involved in the performance of this contract, in accordance with the regulations and requirements of DOE.

6. Risk of Loss of Government Property. The University shall not be liable for loss or destruction of or damage to Government Property in the University's possession unless such loss, destruction or damage results from willful misconduct or lack of good faith on the part of the corporate officers of the University, or unless such loss, destruction or damage results from a failure on the part of the corporate officers of the University to take all reasonable steps to comply with any appropriate written directives of the Contracting Officer to safeguard such property under Paragraph 5. hereof.

7. Steps to Be Taken in Event of Loss. Upon the happening of any loss or destruction of or damage to Government Property in the possession or custody of the University, the University shall immediately inform the Contracting Officer of the occasion and extent thereof, shall take all reasonable steps to protect the property remaining, and shall repair or replace the lost, destroyed, or damaged property, if and as directed by the Contracting Officer, but shall take no action prejudicial to the right of the Government to recover therefor and shall furnish to the Government, on request, all reasonable assistance in obtaining recovery.

8. Government Property for Government Use Only. Government Property shall be used only for the performance of this contract."

8. ARTICLE XI - DISPUTES is deleted in its entirety and the following Article XI is substituted therefor:

"ARTICLE XI - DISPUTES

1. This contract is subject to the Contract Disputes Act of 1978 (41 U.S.C. 601, et seq.). If a dispute arises relating

to the contract, the University may submit a claim to the Contracting Officer who shall issue a written decision on the dispute in the manner specified in DAR 1-314 (FPR 1-1.318).

2. 'Claim' means:

- a. a written request submitted to the Contracting Officer;
- b. for payment of money, adjustment of contract terms, or other relief;
- c. which is in dispute or remains unresolved after a reasonable time for its review and disposition by the Government; and
- d. for which a Contracting Officer's decision is demanded.

3. In the case of disputed requests or amendments to such requests for payment exceeding \$50,000, or with any amendment causing the total request in dispute to exceed \$50,000, the University shall certify, at the time of submission as a claim, as follows:

I certify that the claim is made in good faith, that the supporting data are accurate and complete to the best of my knowledge and belief; and that the amount requested accurately reflects the contract adjustment for which the University believes the Government is liable.

(University's Name) _____
(Title) _____

4. The Government shall pay the University interest:

- a. on the amount found due on claims submitted under this article;
- b. at the rates fixed by the Secretary of the Treasury, under the Renegotiation Act, Public Law 92-41;
- c. from the date the Contracting Officer receives the claim, until the Government makes payment.

5. The decision of the Contracting Officer shall be final and conclusive and not subject to review by any forum, tribunal, or Government agency unless an appeal or action is timely commenced within the times specified by the Contract Disputes Act of 1978.

6. The University shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal or action related to the contract, and comply with any decision of the Contracting Officer."

9. ARTICLE XII - PATENTS is deleted in its entirety and the following Article XII substituted therefor:

"ARTICLE XII - PATENT RIGHTS

1. Definitions.

a. 'Subject Invention' means any invention or discovery of the University conceived or first actually reduced to practice in the course of or under this contract, and includes any art, method, process, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plants, whether patented or unpatented under the Patent Laws of the United States of America or any foreign country.

b. 'Contract' means any contract, grant, agreement, understanding or other arrangement, which includes research, development, or demonstration work, and includes any assignment or substitution of parties.

c. 'States and domestic municipal governments' means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and any political subdivision and agencies thereof.

d. 'Government agency' includes an executive department, independent commission, board, office, agency, administration, authority, Government corporation, or other Government establishment of the Executive Branch of the Government of the United States of America.

e. 'To the point of practical application' means to manufacture in the case of a composition or product, to practice in the case of a process, or to operate in the case of a

machine and under such conditions as to establish that the invention is being worked and that its benefits are reasonably accessible to the public.

f. 'Patent Counsel' means the Department of Energy Patent Counsel assisting the procuring activity.

2. Allocation of Principal Rights.

a. Assignment to the Government. The University agrees to assign to the Government the entire right, title, and interest throughout the world in and to each Subject Invention, except to the extent that rights are retained by the University under subparagraph 2.b. and Paragraph 3. of this article.

b. Greater Rights Determinations. The University or the employee-inventor with authorization of the University may request greater rights than the nonexclusive license and the foreign patent rights provided in Paragraph 3. of this article on identified inventions in accordance with 41 CFR 9-9.109-6. Such requests must be submitted to Patent Counsel (with notification by Patent Counsel to the Contracting Officer) at the time of the first disclosure pursuant to subparagraph 5.b. of this article, or not later than 9 months after conception or first actual reduction to practice whichever occurs first, or such longer periods as may be authorized by Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the University.

3. Minimum Rights to the Contractor.

a. Contractor License. The Contractor may reserve, upon request, a revocable, nonexclusive, paid-up license in each patent application filed in any country on a Subject Invention and any resulting patent in which the Government acquires title. The license shall extend to the Contractor's domestic subsidiaries and affiliates, if any, within the corporate structure of which the Contractor is a part and shall include the right to grant sublicenses of the same scope, to the extent the Contractor was legally obligated to do so at the time the contract was awarded. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the Contractor's business to which the invention pertains.

b. Revocation Limitations. The University's nonexclusive license retained pursuant to subparagraph 3.a. of this article and sublicenses granted thereunder may be revoked or modified by DOE, either in whole or in part, only to the extent necessary to achieve expeditious practical application of the Subject Invention under DOE's published licensing regulations (10 CFR 781), and only to the extent an exclusive license is actually granted. This license shall not be revoked in that field of use and/or the geographical areas in which the University, or its sublicensee, has brought the invention to the point of practical application and continues to make the benefits of the invention reasonably accessible to the public, or is expected to do so within a reasonable time.

c. Revocation Procedures. Before modification or revocation of the license or sublicense, pursuant to subparagraph 3.b. of this article, DOE shall furnish the University a written notice of its intention to modify or revoke the license and any sublicense thereunder, and the University shall be allowed 30 days, or such longer period as may be authorized by the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the University, after such notice to show cause why the license or any sublicense should not be modified or revoked. The University shall have the right to appeal, in accordance with 10 CFR 781, any decision concerning the modification or revocation of its license or any sublicense.

d. Foreign Patent Rights. Upon written request to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer), and subject to DOE security regulations and requirements, there shall be reserved to the University, or the employee-inventor with authorization of the University, the patent rights to a Subject Invention in any foreign country where the Government has elected not to secure such rights provided:

(i) The recipient of such rights, when specifically requested by DOE and three years after issuance of a foreign patent disclosing said Subject Invention, shall furnish DOE a report setting forth:

(A) The commercial use that is being made, or is intended to be made, of said invention, and

(B) The steps taken to bring the invention to the point of practical application or to make the invention available for licensing.

(ii) The Government shall retain at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government (including any Government agency) and States and domestic municipal governments, unless the head of the agency or his designee determines that it would not be in the public interest to acquire the license for the State and domestic municipal governments.

(iii) Subject to the rights granted in subparagraphs 3.a., b. and c. of this article, the head of the agency or his designee shall have the right to terminate the foreign patent rights granted in this subparagraph 3.d. in whole or in part unless the recipient of such rights demonstrates to the satisfaction of the head of the agency or his designee that effective steps necessary to accomplish substantial utilization of the invention have been taken or within a reasonable time will be taken.

(iv) Subject to the rights granted in subparagraphs 3.a., b., and c. of this article, the head of the agency or his designee shall have the right commencing four years after foreign patent rights are accorded under this subparagraph 3.d. to require the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances and in appropriate circumstances to terminate said foreign patent rights in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing:

(A) If the head of the agency or his designee determines, upon review of such material as he deems relevant, and after the recipient of such rights or other interested person, has had the opportunity to provide such relevant and material information as the head of the agency or his designee may require, that such foreign patent rights have tended substantially to lessen competition or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates; or

(B) Unless the recipient of such rights demonstrates to the satisfaction of the head of the agency or his designee at such hearing that the recipient has taken effective steps, or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.

4. Filing of Patent Applications.

a. With respect to each Subject Invention in which the Contractor or the inventor requests foreign patent rights in accordance with subparagraph 3.d. of this article, a request may also be made for the right to file and prosecute the U. S. application on behalf of the U. S. Government. If such request is granted, the University or inventor shall file a domestic patent application on the invention within 6 months after the request for foreign patent rights is granted, or such longer period of time as may be approved by Patent Counsel for good cause shown in writing by the requestor. With respect to the invention, the requestor shall promptly notify the Patent Counsel (with notification by Patent Counsel to the Contracting Officer of any decision not to file an application.)

b. For each Subject Invention on which a domestic patent application is filed by the University or inventor, the University or inventor shall:

(i) Within 2 months after the filing or within 2 months after submission of the invention disclosure if the patent application previously has been filed, deliver to the Patent Counsel a copy of the application as filed including the filing date and serial number;

(ii) Within 6 months after filing the application or within 6 months after submitting the invention disclosure if the application has been filed previously, deliver to the Patent Counsel a duly executed and approved assignment to the Government, on a form specified by the Government;

(iii) Provide the Patent Counsel with the original patent grant promptly after a patent is issued on the application; and

(iv) Not less than 30 days before the expiration of the response period for any action required by the Patent and Trademark Office, notify the Patent Counsel of any decision not to continue prosecution of the application.

c. With respect to each Subject Invention in which the University or inventor has requested foreign patent rights, the University or inventor shall file a patent application on the invention in each foreign country in which such request is granted and within one of the following periods:

(i) Eight months from the date of filing a corresponding United States application, or if such an application is not filed, six months from the date the request was granted;

(ii) Six months from the date a license is granted by the Commissioner of Patents and Trademarks to file the foreign patent application where such filing has been prohibited by security reasons; or

(iii) Such longer periods as may be approved by the Patent Counsel for good cause shown in writing by the University or inventor.

d. Subject to the license specified in subparagraphs 3.a., b. and c. of this article, the University or inventor agrees to convey to the Government, upon request, the entire right, title, and interest in any foreign country in which the University or inventor fails to have a patent application filed in accordance with subparagraph 4.c. of this article, or decides not to continue prosecution or to pay any maintenance fees covering the invention. To avoid forfeiture of the patent application or patent the University or inventor shall, not less than 60 days before the expiration period for any action required by any Patent Office, notify the Patent Counsel of such failure or decision, and deliver to the Patent Counsel the executed instruments necessary for the conveyance specified in this paragraph.

5. Invention Identification, Disclosures, and Reports.

a. The University shall establish and maintain active and effective procedures to ensure that Subject Inventions are promptly identified and timely disclosed. These procedures shall include the maintenance of laboratory notebooks or equivalent records and any other records that are reasonably necessary to document the conception and/or the first actual reduction to practice of Subject Inventions, and records which show that the procedures for identifying and disclosing the inventions are followed. Upon request, the University shall furnish the Contracting Officer a description of these procedures so that he may evaluate and determine their effectiveness.

b. The University shall furnish the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) on a DOE-approved form:

(i) A written report containing full and complete technical information concerning each Subject Invention within 6 months after conception or first actual reduction to practice whichever occurs first in the course of or under this contract, but in any event prior to any on sale, public use or public disclosure of such invention known to the University. The report shall identify the contract and inventor and shall be sufficiently complete in technical detail and appropriately illustrated by sketch or diagram to convey to one skilled in the art to which the invention pertains a clear understanding of the nature, purpose, operation, and to the extent known, the physical, chemical, biological, or electrical characteristics of the invention. The report should also include any request for foreign patent rights under subparagraph 3.d. of this article and any request to file a domestic patent application made within the period set forth in subparagraph 2.b. of this article. When an invention is reported under this subparagraph 5.b.(i), it shall be presumed to have been conceived or first actually reduced to practice in the course of or under the contract unless the University contends it was not so made in accordance with subparagraph 7.b.(ii) of this article.

(ii) Upon request, but not more than annually, interim reports on a DOE-approved form listing Subject Inventions and subcontracts awarded containing a Patent Rights article for that period and certifying that:

(A) The University's procedures for identifying and disclosing Subject Inventions as required by this Paragraph 5. have been followed throughout the reporting period;

(B) All Subject Inventions have been disclosed or that there are no such inventions;

(C) All subcontracts containing a Patent Rights article have been reported or that no such subcontracts have been awarded; and

(iii) A final report on a DOE-approved form within three months after completion of the contract work listing all Subject Inventions and all subcontracts awarded containing a Patent Rights article and certifying that:

(A) All Subject Inventions have been disclosed or that there were no such inventions; and

(B) All subcontracts containing a Patent Rights article have been reported or that no such subcontracts have been awarded.

c. The University shall obtain patent agreements to effectuate the provisions of this article from all persons in its employ who perform any part of the work under the contract except nontechnical personnel, such as clerical employees and manual laborers.

d. The University agrees that the Government may duplicate and disclose Subject Invention disclosures and all other reports and papers furnished or required to be furnished pursuant to this article. If the University is to file a foreign patent application on a Subject Invention, the Government agrees, upon written request, to use its best efforts to withhold publication of such invention disclosures until the expiration of the time period specified in subparagraph 4.a. of this article, but in no event shall the Government or its employees be liable for any publication thereof.

6. Publication. It is recognized that during the course of the work under this contract, the University or its employees may from time to time desire to release or publish information regarding scientific or technical developments conceived or first actually reduced to practice in the course of or under this contract. In order that public disclosure of such information will not adversely affect the patent interests of DOE or the University, patent approval for release or publication shall be secured from Patent Counsel prior to any such release or publication.

7. Forfeiture of Rights in Unreported Subject Inventions.

a. The University shall forfeit to the Government, at the request of the head of the agency or his designee, all rights in any Subject Invention which the University fails to report to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) within six months after the time the University:

(i) Files or causes to be filed a United States or foreign patent application thereon; or

(ii) Submits the final report required by subparagraph 5.b.(iii) of this article, whichever is later.

b. However, the University shall not forfeit rights in a Subject Invention if, within the time specified in a.(i) or a.(ii) of this Paragraph 7., the University:

(i) Prepared a written decision based upon a review of the record that the invention was neither conceived nor first actually reduced to practice in the course of or under the contract and delivers the same to Patent Counsel (with notification by Patent Counsel to the Contracting Officer); or

(ii) Contending that the invention is not a Subject Invention the University nevertheless discloses the invention and all facts pertinent to this contention to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer); or

(iii) Establishes that the failure to disclose did not result from the University's fault or negligence.

c. Pending written assignment of the patent application and patents on a Subject Invention determined by the head of the agency or his designee to be forfeited (such determination to be a final decision under the Disputes article of this contract), the University shall be deemed to hold the invention and the patent applications and patents pertaining thereto in trust for the Government. The forfeiture provision of this Paragraph (g) shall be in addition to and shall not supersede other rights and remedies which the Government may have with respect to Subject Inventions.

8. Examination of Records Relating to Inventions.

a. The Contracting Officer or his authorized representative, until the expiration of 3 years after final payment under this contract shall have the right to examine any books (including laboratory notebooks), records, documents, and other supporting data of the University which the Contracting Officer or his authorized representative reasonably deem pertinent to the discovery or identification of Subject Inventions or to determine compliance with the requirements of this article.

b. The Contracting Officer or his authorized representative shall have the right to review all books (including laboratory notebooks), records and documents of the University relating to the conception or first actual reduction to practice of inventions in the same field of technology as the work under this contract to determine whether any such inventions are Subject Inventions, if the University refuses or fails to:

(i) Establish the procedures of subparagraph 5.a. of this article; or

(ii) Maintain and follow such procedures; or

(iii) Correct or eliminate any material deficiency in the procedures within thirty days after the Contracting Officer notifies the University of such a deficiency.

9. Withholding of Payment (Not Applicable to Subcontracts).

a. Any time before final payment of the amount of this contract, the Contracting Officer may, if he deems such action warranted, withhold payment until a reserve not exceeding \$50,000 or 5 percent of the amount of this contract, whichever is less, shall have been set aside if in his opinion, the University fails to:

(i) Establish, maintain and follow effective procedures for identifying and disclosing Subject Inventions pursuant to subparagraph 5.a. of this article; or

(ii) Disclose any Subject Invention pursuant to subparagraph 5.b.(i) of this article; or

(iii) Deliver the interim reports pursuant to subparagraph 5.b.(ii) of this article; or

(iv) Provide the information regarding subcontracts pursuant to subparagraph 10.e. of this article; or

(v) Convey to the Government in a DOE-approved form the title and/or rights of the Government in each Subject Invention as required by this article.

b. The reserve or balance shall be withheld until the Contracting Officer has determined that the University has rectified whatever deficiencies exist and has delivered all reports, disclosures, and other information required by this article.

c. Final payment under this contract shall not be made by the Contracting Officer before the University delivers to Patent Counsel all disclosures of Subject Inventions and other information required by subparagraph 5.b.(i) of this article, the final report required by subparagraph 5.b.(iii) of this article, and Patent Counsel has issued a patent clearance certification to the Contracting Officer.

d. The Contracting Officer may, in his discretion, decrease or increase the sums withheld up to the maximum authorized above. If the University is a nonprofit organization, the maximum amount that may be withheld under this paragraph shall not exceed \$50,000 or 1 percent of the amount of this contract, whichever is less. No amount shall be withheld under this paragraph while the amount specified by this paragraph is being withheld under other provisions of the contract. The withholding of any amount or subsequent payment thereof shall not be construed as a waiver of any rights accruing to the Government under this contract.

10. Subcontracts.

a. For the purpose of this paragraph the term 'University' means the party awarding a subcontract and the term 'subcontractor' means the party being awarded a subcontract, regardless of tier.

b. Unless otherwise authorized or directed by the Contracting Officer, the University shall include the Patent Rights article of 41 CFR 9-9.107-5(a) or 41 CFR 9-9.107-6 as appropriate, modified to identify the parties in any subcontract hereunder having as a purpose the conduct of research, development, or demonstration work. In the event of refusal by a Subcontractor to accept this article, or if in the opinion of the University this article is inconsistent with DOE's patent policies, the University:

(i) Shall promptly submit written notice to the Contracting Officer setting forth reasons for the subcontractor refusal and other pertinent information which may expedite disposition of the matter; and

(ii) Shall not proceed with the subcontract without the written authorization of the Contracting Officer.

c. Except as may be otherwise provided in this article the University shall not, in any subcontract by using a subcontract as consideration therefor, acquire any rights in its subcontractor's Subject Invention for the University's own use (as distinguished from such rights as may be required solely to fulfill the University's contract obligations to the Government in the performance of this contract).

d. All invention disclosures, reports, instruments, and other information required to be furnished by the subcontractor to DOE, under the provisions of a Patent Rights article in any subcontract hereunder may, in the discretion of the Contracting Officer, be furnished to the University for transmission to DOE.

e. The University shall promptly notify the Contracting Officer in writing upon the award of any subcontract containing a Patent Rights article by identifying the subcontractor, the work to be performed under the subcontract, and the dates of award, and estimated completion. Upon the request of the Contracting Officer the University shall furnish a copy of the subcontract.

f. The University shall identify all Subject Inventions of the subcontractor of which it acquires knowledge in the performance of this contract and shall notify the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) promptly upon the identification of the inventions.

g. It is understood that the Government is a third-party beneficiary of any subcontract article granting rights to the Government in Subject Inventions, and the University hereby assigns to the Government all rights that the University would have to enforce the subcontractor's obligations for the benefit of the Government with respect to Subject Inventions. The University shall not be obligated to enforce the agreements of any subcontractor hereunder relating to the obligations of the subcontractor to the Government in regard to Subject Inventions.

11. Background Patents.

a. 'Background Patent' means a domestic patent covering an invention or discovery which is not a Subject Invention and which is owned or controlled by the University at any time through the completion of this contract:

(i) Which the University, but not the Government, has the right to license to others without obligation to pay royalties thereon, and

(ii) Infringement of which cannot reasonably be avoided upon the practice of any specific process, method, machine, manufacture or composition of matter (including relatively minor modifications thereof) which is a subject of the research, development, or demonstration work performed under this contract.

b. The University agrees to and does hereby grant to the Government a royalty-free, nonexclusive license under any Background Patent for purposes of practicing a subject of this contract by or for the Government in research, development, and demonstration work only.

c. The University also agrees that upon written application by DOE, it will grant to responsible parties for purposes of practicing a subject of this contract, nonexclusive licenses under any Background Patent on terms that are reasonable under the circumstances. If, however, the University believes that exclusive or partially exclusive rights are necessary to achieve expeditious commercial development or utilization, then a request may be made to DOE for DOE approval of such licensing by the University.

d. Notwithstanding the foregoing subparagraph 11.c., the University shall not be obligated to license any Background Patent if the University demonstrates to the satisfaction of the head of the agency or his designee that:

(i) A competitive alternative to the subject matter covered by said Background Patent is commercially available or introducible from one or more other sources; or

(ii) The University or its licensees are supplying the subject matter covered by said Background Patent in sufficient quantity and at reasonable prices to satisfy market needs, or have taken effective steps or within a reasonable time are expected to take effective steps to so supply the subject matter.

12. Atomic Energy.

a. No claim for pecuniary award or compensation under the provisions of the Atomic Energy Act of 1954, as amended,

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shall be asserted by the University or its employees with respect to any invention or discovery made or conceived in the course of or under this contract.

b. Except as otherwise authorized in writing by the Contracting Officer, the University shall obtain patent agreements to effectuate the provisions of subparagraph 12.a. of this article from all persons who perform any part of the work under this contract, except nontechnical personnel, such as clerical employees and manual laborers.

13. Limitation of Rights. Nothing contained in this Patent Rights article shall be deemed to give the Government any rights with respect to any invention other than a Subject Invention except as set forth in the Patent Rights article of this contract with respect to Background Patents and the Facilities License.

14. Facilities License. In addition to the rights of the parties with respect to inventions or discoveries conceived or first actually reduced to practice in the course of or under this contract the Contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive paid-up license in and to any inventions or discoveries regardless of when conceived or actually reduced to practice or acquired by the University, which are owned or controlled by the University at any time through completion of this contract and which are incorporated or embodied in the construction of the facility or which are utilized in the operation of the facility or which cover articles, materials, or products manufactured at the facility (1) to practice or to have practiced by or for the Government at the facility, and (2) to transfer such license with the transfer of such facility. The acceptance or exercise, by the Government of the aforesaid rights and license shall not prevent the Government at any time from contesting the enforceability, validity or scope of, or title to, any rights or patents herein licensed."

10. ARTICLE XX - SECURITY AND CLASSIFICATION is retitled ARTICLE XX - SECURITY. Paragraph 8. Classification is deleted in its entirety.

11. ARTICLE XXIV - BONDS AND INSURANCE is deleted in its entirety and the following Article XXIV substituted therefor:

"ARTICLE XXIV - REQUIRED BONDS AND INSURANCE--EXCLUSIVE OF GOVERNMENT PROPERTY

The University shall procure and maintain such bonds and insurance as are required by law or by the written direction of the Contracting Officer. The terms of any such bond or insurance

policy shall be submitted to the Contracting Officer for approval, upon request. In view of the provisions of the article entitled 'Property,' the University shall not procure or maintain for its own protection any insurance covering loss or destruction of or damage to Government-owned property."

12. ARTICLE XXV - COPYRIGHT is deleted in its entirety and the following Article XXV substituted therefor:

"ARTICLE XXV - RIGHTS IN TECHNICAL DATA - FACILITY

1. Definitions.

a. 'Technical Data' means recorded information, regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental, or demonstration, or engineering work or be usable or used to define a design or process or to procure, produce, support, maintain, or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design type documents, or computer software (including computer programs, computer software documentation). Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification and related information. Technical data as used herein does not include financial reports, cost analyses and other information incidental to contract administration.

b. 'Proprietary Data' means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

(i) Are not generally known or available from other sources without obligation concerning their confidentiality;

(ii) Have not been made available by the owner to others without obligation concerning their confidentiality; and

(iii) Are not already available to the Government without obligation concerning their confidentiality.

c. 'Unlimited Rights' means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.

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1. Allocation of Rights.

a. The Government shall have:

(i) Ownership in all technical data first produced in the performance of the contract,

(ii) The right to inspect technical data first produced or specifically used in the performance of the contract at all reasonable times (for which inspection the proper facilities shall be afforded DOE by the University and its subcontractors),

(iii) The right to have all technical data first produced or specifically used in the performance of the contract delivered to the Government or otherwise disposed of by the University, either as the Contracting Officer may from time to time direct during the progress of the work or in any event as the Contracting Officer shall direct upon completion or termination of this contract, provided, that nothing contained in this paragraph shall require the University to actually deliver any technical data the delivery of which is excused by this Rights in Technical Data article,

(iv) Unlimited rights in technical data specifically used in the performance of this contract except technical data pertaining to items of standard commercial design; the University agrees to leave a copy of such technical data at the facility or plant to which such data relate, and to make available for access or to deliver to the Government such data upon request by the Contracting Officer;

(v) The right to remove, cancel, correct or ignore any marking not authorized by the terms of this contract on any technical data furnished hereunder if, in response to a written inquiry by DOE concerning the propriety of the markings, the University fails to respond thereto within 60 days or fails to substantiate the propriety of the markings. In either case DOE will notify the University of the action taken.

b. The University shall have:

(i) The right to withhold its proprietary data, in accordance with the provisions of this article; and

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(ii) The right to use for its private purposes, subject to patent, security or other provisions of this contract, technical data it first produces in the performance of this contract, provided the data requirements of this contract have been met as of the date of the private use of such data. The University agrees that to the extent it receives or is given access to proprietary data or other technical, business or financial data in the form of recorded information from DOE or a DOE contractor or subcontractor, the University shall treat such data in accordance with any restrictive legend contained thereon, unless use is specifically authorized by prior written approval of the Contracting Officer.

c. Nothing contained in this article shall imply a license to the Government under any patent or be construed as affecting the scope of any licenses or other rights otherwise granted to the Government under any patent.

3. Copyrighted Material.

a. The University shall not, without prior written authorization of the Contracting Officer, establish a claim to statutory copyright in any technical data first produced in the performance of this contract. To the extent such authorization is granted, the Government reserves for itself and others acting on its behalf a royalty-free, nonexclusive, irrevocable, world-wide license for Governmental purposes to publish, distribute, translate, duplicate, exhibit and perform any such data copyrighted by the University.

b. The University agrees not to include in the technical data delivered under the contract any material copyrighted by the University and not to knowingly include any material copyrighted by others without first granting or obtaining at no cost a license therein for the benefit of the Government of the same scope as set forth in subparagraph 3.a. above. If the University believes that such copyrighted material for which the license cannot be obtained must be included in the technical data to be delivered, rather than merely incorporated therein by reference, the University shall obtain the written authorization of the Contracting Officer to include such material in the technical data prior to its delivery.

4. Subcontracting.

a. Unless otherwise directed by the Contracting Officer, the University agrees to use in subcontracts having as a purpose the conduct of research, development or demonstration

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or in subcontracts for supplies, the contract article provisions of 41 CFR 9-9.202-3(c) and 41 CFR 9-9.202-3(e)(2) in accordance with the policy and procedures of 41 CFR 9-9.202-1, 2 and 3.

b. It is the responsibility of the University to obtain from its subcontractors technical data and rights therein, on behalf of the Government, necessary to fulfill the University's obligations to the Government with respect to such data. In the event of refusal by a subcontractor to accept a article affording the Government such rights, (in technical data as set forth above), the University shall:

(i) Promptly submit written notice to the Contracting Officer setting forth reasons for the subcontract refusal and other pertinent information which may expedite disposition of the matter; and

(ii) Not proceed with the subcontract without the written authorization of the Contracting Officer."

13. ARTICLE XXVII - UTILIZATION OF SMALL BUSINESS CONCERNS is deleted in its entirety and the following Article XXVII substituted therefor:

"ARTICLE XXVII - UTILIZATION OF SMALL BUSINESS CONCERNS AND SMALL BUSINESS CONCERNS OWNED AND CONTROLLED BY SOCIALLY AND ECONOMICALLY DISADVANTAGED INDIVIDUALS

1. It is the policy of the United States that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practicable opportunity to participate in the performance of contracts let by any Federal agency.

2. The University hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with the efficient performance of this contract. The University further agrees to cooperate in any studies or surveys that may be conducted by the Small Business Administration or the contracting agency which may be necessary to determine the extent of the University's compliance with this article.

3. a. The term 'small business concern' shall mean a small business as defined pursuant to Section 3 of the Small Business Act and in relevant regulations promulgated pursuant thereto.

b. The term 'small business concern owned and controlled by socially and economically disadvantaged individuals' shall mean a small business concern--

(i) which is at least 51 per centum owned by one or more socially and economically disadvantaged individuals; or in the case of any publicly owned business, at least 51 per centum of the stock of which is owned by one or more socially and economically disadvantaged individuals; and

(ii) whose management and daily business operations are controlled by one or more of such individuals.

The University shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, and other minorities, or any other individual found to be disadvantaged by the Small Business Administration pursuant to Section 8(a) of the Small Business Act.

4. Universities acting in good faith may rely on written representations by their subcontractors regarding their status as either a small business concern or a small business concern owned and controlled by socially and economically disadvantaged individuals."

14. ARTICLE XXVIII - SAFETY, HEALTH AND FIRE PROTECTION is deleted in its entirety and the following Article XXVIII substituted therefor:

"ARTICLE XXVIII - SAFETY AND HEALTH

The University shall take all reasonable precautions in the performance of the work under this contract to protect the safety and health of employees and of members of the public and shall comply with all applicable safety and health regulations and requirements (including reporting requirements) of DOE. In the event that the University fails to comply with said regulations or requirements of DOE, the Contracting Officer may, without prejudice to any other legal or contractual rights of DOE, issue an order stopping all or any part of the work; thereafter, a start order for resumption of work may be issued at the discretion of the Contracting Officer. The University shall make no claim for compensation or damages by reason of or in connection with such work stoppage."

15. ARTICLE XXXI - COST ACCOUNTING STANDARDS is deleted in its entirety and the following ARTICLE XXXI substituted therefor:

"ARTICLE XXXI - COST ACCOUNTING STANDARDS

1. Unless the Cost Accounting Standards Board, has prescribed rules or regulations exempting the University or this contract from standards, rules, and regulations promulgated pursuant to 50 U.S.C. App. 2168 (P. L. 91-379, August 15, 1970), the University, in connection with this contract, shall:

a. By submission of a Disclosure Statement, disclose in writing its cost accounting practices as required by regulations of the Cost Accounting Standards Board. The required disclosures must be made prior to contract award unless the Contracting Officer provides a written notice to the Contractor authorizing postaward submission in accordance with regulations of the Cost Accounting Standards Board. The practices disclosed for this contract shall be the same as the practices currently disclosed and applied on all other contracts and subcontracts being performed by the University and which contain this Cost Accounting Standards article. If the University has notified the Contracting Officer that the Disclosure Statement contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement will not be released outside of the Government.

b. Follow consistently the cost accounting practices disclosed pursuant to (1), above, in accumulating and reporting contract performance cost data concerning this contract. If any change in disclosed practices is made for purposes of any contract or subcontract subject to Cost Accounting Standards Board requirements, the change must be applied prospectively to this contract, and the Disclosure Statement must be amended accordingly. If the contract price or cost allowance of this contract is affected by such changes, adjustment shall be made in accordance with subparagraph (a)(4) or (a)(5), below, as appropriate.

c. Comply with all Cost Accounting Standards in effect on the date of award of this contract or if the University has submitted cost or pricing data, on the date of final agreement on price as shown on the University's signed certificate of current cost or pricing data. The University shall also comply with any Cost Accounting Standard which hereafter becomes applicable to a contract or subcontract of the University. Such compliance shall be required prospectively from the date of applicability to such contract or subcontract.

d. (A) Agree to an equitable adjustment (as provided in the Changes article of this contract, if any) if the contract cost is affected by a change which, pursuant to (3) above, the University is required to make to its established cost accounting practices whether such practices are covered by a Disclosure Statement or not.

(B) Negotiate with the Contracting Officer to determine the terms and conditions under which a change may be made to either a disclosed cost accounting practice or an established cost accounting practice, other than a change made under other provisions of this subparagraph (a)(4), Provided, That no agreement may be made under this provision that will increase costs paid by the United States.

(C) When the parties agree to a change to either a disclosed cost accounting practice or an established cost accounting practice, other than a change under (4)(A) above, negotiate an equitable adjustment as provided in the Changes article of this contract.

e. Agree to an adjustment of the contract price or cost allowance, as appropriate, if it or a subcontractor fails to comply with an applicable Cost Accounting Standard or to follow any practice disclosed pursuant to subparagraphs (a)(1) and (a)(2), above, and such failure results in any increased costs paid by the United States. Such adjustment shall provide for recovery of the increased costs to the United States together with interest thereon computed at the rate determined by the Secretary of the Treasury pursuant to P. L. 92-41, 85 Stat. 97, or 7 percent per annum, whichever is less, from the time the payment by the United States was made to the time the adjustment is effected.

2. If the parties fail to agree whether the University or a subcontractor has complied with an applicable Cost Accounting Standard, rule, or regulation of the Cost Accounting Standards Board and as to any cost adjustment demanded by the United States, such failure to agree shall be a dispute concerning a question of fact within the meaning of the Disputes article of this contract.

3. The University shall permit any authorized representatives of the Secretary, of the Cost Accounting Standards Board, or of the Comptroller General of the United States to examine and make copies of any documents, papers, or records relating to compliance with the requirements of this article.

4. The University shall include in all negotiated subcontracts which it enters into the substance of this article, except Paragraph (b), and shall require such inclusion in all other subcontracts of any tier, including the obligation to comply with all Cost Accounting Standards in effect on the date of award of the subcontract or if the subcontractor has submitted cost or pricing data, on the date of final agreement on price as shown on the subcontractor's signed Certificate of Current Cost or Pricing Data. This requirement shall apply only to negotiated subcontracts in excess of \$100,000 where the price negotiated is not based on:

a. Established catalog or market prices of commercial items sold in substantial quantities to the general public; or

b. Prices set by law or regulation, and except that the requirement shall not apply to negotiated subcontracts otherwise exempt from the requirement to accept the Cost Accounting Standards article by reason of § 331.30(b) of Title 4, Code of Federal Regulations (4 CFR 331.30(b)).

However, if this is a contract with an agency which permits subcontractors to appeal final decisions of the Contracting Officer directly to the Secretary or his duly authorized representative, then the University shall include the substance of Paragraph (b) as well.

NOTE: (1) Subcontractors shall be required to submit their Disclosure Statements to the University. However, if a subcontractor has previously submitted its Disclosure Statement to a Government Contracting Officer it may satisfy that requirement by certifying to the University the date of such Statement and the address of the Contracting Officer.

NOTE: (2) In any case where a subcontractor determines that the Disclosure Statement information is privileged and confidential and declines to provide it to its University or higher tier subcontractor, the University may authorize direct submission of that subcontractor's Disclosure Statement to the same Government offices to which the University was required to make submission of its Disclosure Statement. Such authorization shall in no way relieve the University of liability as provided in subparagraph (a)(5) of this article. In view of the foregoing and since the contract may be subject to adjustment under this article by reason of any failure to comply with rules, regulations, and standards of the Cost Accounting Standards Board in connection with covered subcontracts, it is expected that the University may wish to include an article in each such subcontract requiring the subcontractor to appropriately indemnify the University. However, the

inclusion of such an article and the terms thereof are matters for negotiation and agreement between the University and the subcontractor, provided that they do not conflict with the duties of the University under its contract with the Government.

It is also expected that any subcontractor subject to such indemnification will generally require substantially similar indemnification to be submitted by its subcontractors.

NOTE: (3) If the subcontractor is a business unit which, pursuant to 4 CFR Part 332 is entitled to elect modified contract coverage and to follow Standards 401 and 402 only, the article entitled 'Disclosure and Consistency of Cost Accounting Practices' set forth in ASPR 7-104.83(a)(2) (see also FPR 1-3.1204-1(a)(2)) shall be inserted in lieu of this article.

5. The terms defined in Section 331.20 of Part 331 of Title 4, Code of Federal Regulations (4 CFR 331.20) shall have the same meanings herein. As there defined 'negotiated subcontract' means 'any subcontract except a firm fixed-price subcontract made by a University or subcontractor after receiving offers from at least two firms not associated with each other or such University or subcontractor, providing (1) the solicitation to all competing firms is identical, (2) price is the only consideration in selecting the subcontractor from among the competing firms solicited, and (3) the lowest offer received in compliance with the solicitation from among those solicited is accepted.'

16. ARTICLE XXXVII - LISTING OF EMPLOYMENT OPENINGS is deleted in its entirety and the following ARTICLE XXXVII substituted therefor:

"ARTICLE XXXVII - DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA

1. The University will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era in regard to any position for which the employee or applicant for employment is qualified. The University agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans status in all employment practices such as the following: Employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

2. The University agrees that all suitable employment openings of the University which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment of the University other than the one wherein the contract is being performed but excluding those of independently operated corporate affiliates, shall be listed at an appropriate local office of the State employment service system wherein the opening occurs. The University further agrees to provide such reports to such local office regarding employment openings and hires as may be required.

State and local government agencies holding Federal contracts of \$10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service, but are not required to provide those reports set forth in Paragraphs 4. and 5.

3. Listing of employment openings with the employment service system pursuant to this article shall be made at least concurrently with the use of any other recruitment source or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and nonveterans. The listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the University from any requirements in Executive orders or regulations regarding nondiscrimination in employment.

4. The reports required by Paragraph 2. of this article shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the Contractor has more than one hiring location in a State, with the central office of the State employment service. Such reports shall indicate for each hiring location (1) the number of individuals hired during the reporting period, (2) the number of nondisabled veterans of the Vietnam era hired, (3) the number of disabled veterans of the Vietnam era hired, and (4) the total number of disabled veterans hired. The reports should include covered veterans hired for on-the-job training under 38 U.S.C. 1787. The University shall submit a report within 30 days after the end of each reporting period wherein any performance is made on this contract identifying data for each hiring location. The University shall maintain at each hiring location copies of the reports submitted until the expiration of one (1) year after final payment under the contract, during which time these reports and related documentation shall be made available, upon request, for

examination by any authorized representatives of the Contracting Officer or of the Secretary of Labor. Documentation would include personnel records respecting job openings, recruitment, and placement.

5. Whenever the University becomes contractually bound by the listing provisions of this article, it shall advise the employment service system in each State where it has establishments of the name and location of each such hiring location in the State. As long as the University is contractually bound to these provisions and has so advised the State system, there is no need to advise the State system of subsequent contracts. The University may advise the State system when it is no longer bound by this contract article.

6. This article does not apply to the listing of employment openings which occur and are filled outside the 50 States, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands.

7. The provisions of Paragraphs 2., 3., 4., and 5. of this article do not apply to openings which the University proposes to fill from within its own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of its own organization or employer-union arrangement for that opening.

8. As used in this article:

a. 'All suitable employment openings' includes, but is not limited to, openings which occur in the following job categories: Production and nonproduction; plant and office; laborers and mechanics; supervisory and nonsupervisory; technical; and executive, administrative, and professional openings which are compensated on a salary basis of less than \$25,000 per year. This term includes full-time employment, temporary employment of more than three days' duration, and part-time employment. It does not include openings which the University proposes to fill from within its own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement nor openings in an educational institution which are restricted to students of that institution. Under the most compelling circumstances an employment opening may not be suitable for listing, including such situations where the needs of the Government cannot reasonably be otherwise supplied, where listing would be contrary to national security, or where the requirement of listing would otherwise not be for the best interest of the Government.

b. 'Appropriate office of the State employment service system' means the local office of the Federal State national system of public employment offices with assigned responsibility for serving the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico and the Virgin Islands.

c. 'Openings which the University proposes to fill from within its own organization' means employment openings for which no consideration will be given to persons outside the University's own organization (including any affiliates, subsidiaries, and the parent companies) and includes any openings which the University proposes to fill from regularly established 'recall' lists.

d. 'Openings which the University proposes to fill pursuant to a customary and traditional employer-union hiring arrangement' means employment openings for which the University proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the University and representatives of its employees.

9. The University agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

10. In the event of the University's noncompliance with the requirements of this article, actions for noncompliance may be taken in accordance with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

11. The University agrees to post in conspicuous places available to employees and applicants for employment notices in a form to be prescribed by the Director, provided by or through the Contracting Officer. Such notice shall state the University's obligation under the law to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era for employment, and the rights of applicants and employees.

12. The University will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding that the University is bound by terms of the Vietnam Era Veteran's Readjustment Assistance Act and is committed to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era.

13. The University will include the provisions of this article in every subcontract or purchase order of \$10,000 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to the Act, so that such provisions will be binding upon each subcontractor or vendor. The University will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance."

17. ARTICLE XXXVIII - PRICE STABILIZATION CERTIFICATION will be deleted in its entirety and the following Article XXXVIII substituted therefor:

"ARTICLE XXXVIII - CLASSIFICATION

In the performance of the work under this contract, the University shall assign classifications to all documents, material, and equipment originated or generated by the University in accordance with classification guidance furnished to the University by DOE. Every subcontract and purchase order issued hereunder involving the origination or generation of classified documents, material, or equipment, shall include a provision to the effect that in the performance of such subcontract or purchase order the subcontractor or supplier shall assign classifications to all such documents, material, and equipment in accordance with classification guidance furnished to such subcontractor or supplier by the University."

18. The following articles and clauses are added to the contract and are made a part thereof.

a. ARTICLE XL - EMPLOYMENT OF THE HANDICAPPED

1. The University will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The University agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

2. The University agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Rehabilitation Act of 1973, as amended.

3. In the event of the University's noncompliance with the requirements of this article, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

4. The University agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor, provided by or through the Contracting Officer. Such notices shall state the University's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

5. The University will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the University is bound by the terms of Section 503 of the Act, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

6. The University will include the provisions of this article in every subcontract or purchase order of \$2,500 or more unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The University will take such action with respect to any subcontract or purchase order as the Director, Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

b. ARTICLE XLI - CLEAN AIR AND WATER

The University agrees to insert the following article in all nonexempt subcontracts:

(Applicable only if the subcontract exceeds \$100,000, or the Corporation has determined that the orders under an indefinite quantity subcontract in any one year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is not listed by EPA, or the subcontract is not otherwise exempt.)

1. Subcontractor agrees as follows:

a. To comply with all the requirements of Section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by Public Law 91-604) and Section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251, as amended by Public Law 92-500), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in Section 114 and Section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this contract.

b. That no portion of the work required by this subcontract will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date when this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing.

c. To use its best efforts to comply with clean air standards and clean water standards at the facility in which the contract is being performed.

d. To insert the substance of the provisions of this article in any nonexempt subcontract, including this subparagraph 1.d.

2. The terms used in this article have the following meanings:

a. The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Public Law 91-604).

b. The term "Water Act" means the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Public Law 92-500).

c. The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738; an applicable implementation plan as described in Section 110(d) of the Clean Air Act (42 U.S.C. 1857c-5(d)); an approved implementation procedure or plan under Section 111(c) or Section 111(d), respectively, of the Air Act (42 U.S.C. 1857c-6(c) or (d)); or an approved implementation procedure under Section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).

d. The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by Section 402 of the Water Act (33 U.S.C. 1342), or by a local government to ensure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 U.S.C. 1317).

e. The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency or an air or water pollution control agency in accordance with the requirement of the Air Act or Water Act and regulations issued pursuant thereto.

f. The term "facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor or subcontractor, to be utilized in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

c. ARTICLE XLII - AUTHORIZATION AND CONSENT

The Government hereby gives its authorization and consent for all use and manufacture of any invention described in and covered by a patent of the United States in the performance of this contract or any part hereof or any amendment hereto or any subcontract hereunder (including all lower-tier subcontracts).

d. ARTICLE XLIII - NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT

The provisions of this article shall be applicable only if the amount of this contract exceeds \$10,000.

1. The University shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the University has knowledge.

2. In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed hereunder, the University shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the University pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the University has agreed to indemnify the Government.

3. This article shall be included in all subcontracts.

e. ARTICLE XLIV - REPORTING OF ROYALTIES

If this contract is in an amount which exceeds \$10,000 and if any royalty payments are directly involved in the contract or are reflected in the contract price to the Government, the University agrees to report in writing to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) during the performance of this contract and prior to its completion or final settlement the amount of any royalties or other payments paid or to be paid by it directly to others in connection with the performance of this contract together with the names and addresses of licensors to whom such payments are made and either the patent numbers involved or such other information as will permit identification of the patents or other basis on which the royalties are to be paid. The approval of DOE of any individual payments or royalties shall not stop the Government at any time from contesting the enforceability, validity or scope of, or title to, any patent under which a royalty or payments are made.

f. ARTICLE XLV - LABOR SURPLUS AREA SUBCONTRACTING PROGRAM

1. The University agrees to establish and conduct a program which will encourage labor surplus area concerns to compete for subcontracts within their capabilities. In this connection, the University shall--

a. Designate a liaison officer who will (i) maintain liaison with duly authorized representatives of the Government on labor surplus area matters, (ii) supervise compliance with the Utilization of Labor Surplus Area Concerns article, and (iii) administer the University's "Labor Surplus Area Subcontracting Program";

b. Provide adequate and timely consideration of the potentialities of labor surplus area concerns in all "make-or-buy" decisions;

c. Assure that labor surplus area concerns will have an equitable opportunity to compete for subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of labor surplus area concerns;

d. Maintain records showing procedures which have been adopted to comply with the policies set forth in this article and report subcontract awards (see 41 CFR 1-16.804-5 regarding use of Optional Form 61). Records maintained pursuant to this article will be kept available for review by the Government until the expiration of 1 year after the award of this contract, or for such longer period as may be required by any other article of this contract or by applicable law or regulations; and

e. Include the Utilization of Labor Surplus Area Concerns article in subcontracts which offer substantial labor surplus area subcontracting opportunities.

2. a. The term "labor surplus area" means a geographical area identified by the Department of Labor as an area of concentrated unemployment or underemployment or an area of labor surplus.

b. The term "concern located in a labor surplus area" means a labor surplus area concern.

c. The term "labor surplus area concern" means a concern that, together with its first-tier subcontractors, will perform substantially in labor surplus areas.

d. The term "perform substantially in labor surplus areas" means that the costs incurred on account of manufacturing, production or appropriate services in labor surplus areas exceed 50 percent of the contract price.

3. The University further agrees to insert, in any subcontract hereunder which may exceed \$500,000 and which contains the Utilization of Labor Surplus Area Concerns article, provisions which shall conform substantially to the language of this article, including this Paragraph 3., and to notify the Contracting Officer of the names of such subcontractors.

g. ARTICLE XLVI - ORGANIZATIONAL CONFLICTS OF INTEREST

1. General.

a. It is DOE policy to avoid situations which place a Contractor in a position where its judgment may be biased because of any past, present, or currently planned interest, financial or otherwise, the University may have which relates to the work to be performed under its contract or where the University's performance of such work may provide it with an unfair competitive advantage. Accordingly, the University agrees that it will exercise its best efforts (1) to conduct its activities to avoid bias in performance of work under this contract and (2) to avoid any unfair competitive advantage by virtue of its performance of work under this contract. The University, however, is entitled to the normal flow of benefits from performance of this contract.

b. In the event DOE or the University is of the opinion that the activities of the University create or reasonably give the appearance of creating a conflict of interest with University's performance of work under the contract, (1) the University will notify DOE and supply information requested by DOE based on such potential conflict of interest, subject to proprietary rights of others, and (2) if DOE finds that any such activity creates a conflict of interest under applicable law or under the criteria in the DOE regulations, DOE will promptly inform the University. DOE and the University will enter into good faith discussions concerning appropriate measures to be taken to eliminate, avoid or mitigate such conflict. Such measures may include appropriate restrictions on University's future participation in Department contracts or deletion of the activities creating the potential conflict from work under this contract.

2. Access to and Use of Information.

a. If the University, in the performance of technical consulting and management support services or evaluation services, obtains access to information, such as Department plans, policies, reports, studies, financial plans, internal data protected by the Privacy Act of 1974 (P. L. 93-579), or data which has not been released or otherwise made available to the public, the University agrees that without prior written approval of the Contracting Officer it shall use its best efforts not to (a) use such information so

obtained for any purpose, other than the performance of this contract, unless the information has been released or otherwise made available to the public; (b) compete for work for the Department based on such information so obtained for a period of six (6) months after either the completion of this contract, or until such information is released or otherwise made available to the public by the Department. Nothing in this Paragraph (2) shall be construed to limit University from (a) competing for work for the Department, or (b) submitting unsolicited proposals to the Government.

b. In addition, the University agrees that to the extent it receives or is given access to appropriately marked or identified (a) proprietary data, (b) data protected by the Privacy Act of 1974 (P. L. 93-579), or (c) other confidential or privileged technical, business, or financial information and University accepts such data or information under this contract, it shall use its best efforts to treat such information in accordance with any written restrictions imposed on such information.

c. The University shall have, subject to patent and security provisions of this contract, the rights to use technical data it first produces under this contract for its private purpose provided that, as of the date of such use, all reporting requirements of this contract have been met or University has reported such information or data in writing to DOE.

3. Personnel Access to Contract Operations. University will use its best efforts to control access of University personnel not engaged in the performance of this contract to facilities in which performance of this contract is in progress on the same basis as the access of U.S. citizens employed by the U.S. organizations is controlled.

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IN WITNESS WHEREOF, the parties have executed this Supplemental Agreement as of the day and year first above written.

UNITED STATES OF AMERICA

BY: SECRETARY OF ENERGY

BY:

Peter D. Dayton

TITLE:

Contracting Officer

THE UNIVERSITY OF TENNESSEE

BY:

W. W. Armistead

TITLE:

VICE PRESIDENT FOR
AGRICULTURE

[Signature]
VICE PRESIDENT

Contract No. AT-(40-1)-GEN-242
UNIVERSITY OF TENNESSEE
Modification No. 20

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 8th day of November, 1972, between the UNITED STATES OF AMERICA (hereinafter called the "Government"), acting through the U. S. ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and the UNIVERSITY OF TENNESSEE (hereinafter called the "University");

WITNESSETH THAT:

WHEREAS, the Government and the University entered into Contract No. AT-(40-1)-GEN-242, dated May 11, 1948, for the performance of certain studies and related work in regard to the effects of radiation on domestic animals and crops; and

WHEREAS, the contract has been amended previously by Modifications 1 through 19; and

WHEREAS, the parties are desirous of further amending said contract for the purpose of increasing the obligation of funds and adding two new contract articles dealing with cost accounting standards; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1954, as amended;

NOW, THEREFORE, the parties hereto do hereby agree that Contract No. AT-(40-1)-GEN-242 as previously amended is further amended as follows:

1. In Section 1 of Article V - Obligation of Funds, the sum \$16,173,369.00 is deleted and the sum \$16,240,369.00 is inserted in lieu thereof.

2. There are inserted, following the present contract terms, two new articles as follows:

"ARTICLE XXXV - COST ACCOUNTING STANDARDS

"1. Unless the Cost Accounting Standards Board has prescribed rules or regulations exempting the University or this contract from standards, rules, and regulations promulgated pursuant to 50 U.S.C. App. 2168 (P.L. 91-379, August 15, 1970), the University, in connection with this contract shall:

"a. By submission of a Disclosure Statement, disclose in writing its cost accounting practices as required by regulations of the Cost Accounting Standards Board. The required disclosures must be made prior to contract award unless the Commission provides a written notice to the University authorizing postaward submission in accordance with regulations of the Cost Accounting Standards Board. The practices disclosed for this contract shall be the same as the practices currently disclosed and applied on all other contracts and subcontracts being performed by the University and which contain this Cost Accounting Standards article. If the University has made the Disclosure Statement to indicate that it contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement will be protected and will not be released outside of the Government.

"b. Follow consistently the cost accounting practices disclosed pursuant to a., above, in accumulating and reporting contract performance cost data concerning this contract. If any change in disclosed practices is made for the purposes of any contract or subcontract subject to Cost Accounting Standards Board requirements, the change must be applied prospectively to this contract, and the Disclosure Statement must be amended accordingly. If the contract price or cost allowance of this contract is affected by such changes, adjustment shall be made in accordance with subsection 1 d. or 1 e., below, as appropriate.

"c. Comply with all Cost Accounting Standards in effect on the date of award of this contract or if the University has submitted cost or pricing data on the date of final agreement on price as shown on the University's signed certificate of current cost or pricing data. The University shall also comply with any Cost Accounting Standard which hereafter becomes applicable to a contract or subcontract of the University. Such compliance shall be required prospectively from the date of applicability to such contract or subcontract.

"d. (1) Agree to an equitable adjustment as provided in the Changes article of this contract if the contract cost is affected by a Disclosure Statement change which the University is required to make pursuant to c., above. If the University has not been required to file a Disclosure Statement but is required pursuant to 1 c., above, to change an established practice, then an equitable adjustment shall similarly be agreed to.

"(2) Negotiate with the Commission to determine the terms and conditions under which any Disclosure Statement change other than changes under d.(1), above, may be made. A change to a Disclosure Statement may be proposed by either the Government or the University, provided, however, that no agreement may be made under this provision that will increase costs paid by the United States under this contract.

"e. Agree to an adjustment of the contract price or cost allowance, as appropriate, if it or a subcontractor fails to comply with an applicable Cost Accounting Standard or to follow any practice disclosed pursuant to subsections 1.a. and 1.b., above, and such failure results in any increased costs paid by the United States. Such adjustment shall provide for recovery of the increased costs to the United States together with interest thereon computed at the rate determined by the Secretary of the Treasury pursuant to P.L. 92-41, 85 Stat. 97, or 7 percent per annum, whichever is less, from the time the payment by the United States was made to the time the adjustment is effected.

"2. If the parties fail to agree whether the University or subcontractor has complied with an applicable Cost Accounting Standard, rule, or regulation of the Cost Accounting Standards Board and as to any cost adjustment demanded by the United States, such failure to agree shall be a dispute concerning a question of fact within the meaning of the Disputes article of this contract.

"3. The University shall permit any authorized representatives of the head of the agency, the Cost Accounting Standards Board, or the Comptroller General of the United States to examine and make copies of any documents, papers, or records relating to compliance with the requirements of this article.

"4. The University shall include in all negotiated subcontracts which it enters into the substance of this article and shall require such inclusion, except Section 2, in all lower-tier subcontracts, except that this requirement shall apply only to negotiated subcontracts in excess of \$100,000 where the price negotiated is not based on:

"a. Established catalog or market prices of commercial items sold in substantial quantities to the general public; or

"b. Prices set by law or regulation.

"NOTE:

"1. Subcontractors shall be required to submit their Disclosure Statements to the University. However, if a subcontractor has previously submitted its Disclosure Statement to a Government Contracting Officer it may satisfy that requirement by certifying to the University the date of such Statement and the address of the Contracting Officer.

"2. In any case where a subcontractor determines that the Disclosure Statement information is privileged and confidential and declines to provide it to its Contractor or higher-tier subcontractor, the University may authorize direct submission of that subcontractor's Disclosure Statement to the same Government offices to which the University was required to make submission of its Disclosure Statement. Such authorization shall in no way relieve the University of liability as provided in subsection 1. e. of this article. In view of the foregoing and since the contract may be subject to adjustment under this article by reason of any failure to comply with rules, regulations, and Standards of the Cost Accounting Standards Board in connection with covered subcontracts, it is expected that the University may wish to include a clause in each such subcontract requiring the subcontractor to appropriately indemnify the University. However, the inclusion of such a clause and the terms thereof are matters for negotiation and agreement between the University and the subcontractor, provided that they do not conflict with the duties of the University under its contract with the Government. It is also expected that any subcontractor subject to such indemnification will generally require substantially similar indemnification to be submitted by its subcontractors.

"5 The terms defined in Sec. 331.2 of Part 331 of Title 4, Code of Federal Regulations (4 CFR 331.2) shall have the same meanings herein. As there defined, 'negotiated subcontract' means 'any subcontract except a firm fixed-price subcontract made by a Contractor or subcontractor, providing (a) the solicitation to all competing firms is identical, (b) price is the only consideration in selecting the subcontractor from among the competing firms

"ARTICLE XXXVI - UNIVERSITY COMPLIANCE - COST ACCOUNTING
STANDARDS"

"Reference is made to Article XXXV - Cost Accounting Standards. Notwithstanding the provisions of that article, the University shall not be liable to the Government for any increased costs or interest thereon, resulting from any failure of the University, with respect to activities carried on at the site of the work, or of a subcontractor to comply with applicable cost accounting standards or to follow any practices disclosed pursuant to the requirements of such article: Provided, That the University shall include in each covered subcontract a clause making the subcontractor liable for any increased costs or interest thereon resulting from any failure of the subcontractor to comply with prescribed standards or disclosed practices."

IN WITNESS WHEREOF, the parties have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: U. S. ATOMIC ENERGY COMMISSION

BY: David E. Miller
David E. Miller, Deputy Director
(Contracting Officer)

UNIVERSITY OF TENNESSEE

BY: M. S. Read
TITLE: VICE PRESIDENT

ATTEST:
John A. Bunch
SECRETARY
(Title)

[Seal]

1116667

CONTRACT No. AT-(40-1)-GEN-242
UNIVERSITY OF TENNESSEE
MODIFICATION No. 21

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, ENTERED INTO THIS 25th DAY OF October, 1973, EFFECTIVE AS OF THE 1ST DAY OF SEPTEMBER, 1972, BY AND BETWEEN THE UNITED STATES OF AMERICA (HEREINAFTER CALLED THE "GOVERNMENT"), AS REPRESENTED BY THE UNITED STATES ATOMIC ENERGY COMMISSION (HEREINAFTER CALLED THE "COMMISSION"), AND THE UNIVERSITY OF TENNESSEE (HEREINAFTER CALLED THE "UNIVERSITY");

WITNESSETH THAT:

WHEREAS, THE PARTIES HERETO HAVE HERETOFORE ENTERED INTO CONTRACT No. AT-(40-1)-GEN-242 AND MODIFICATIONS THERETO NUMBERED 1 THROUGH 20 PROVIDING FOR THE CONTRACTOR'S PERFORMANCE OF CERTAIN STUDIES AND RELATED WORK IN REGARD TO THE EFFECTS OF RADIATION IN DOMESTIC ANIMALS AND CROPS; AND

WHEREAS, THE PARTIES DESIRE TO FURTHER AMEND THE CONTRACT AS HEREINAFTER PROVIDED; AND

WHEREAS, THIS SUPPLEMENTAL AGREEMENT IS AUTHORIZED BY AND EXECUTED UNDER THE ATOMIC ENERGY ACT OF 1954, AS AMENDED;

NOW, THEREFORE, THE PARTIES DO MUTUALLY AGREE THAT THE CONTRACT, AS AMENDED, IS HEREBY FURTHER AMENDED IN THE FOLLOWING PARTICULARS, BUT IN NO OTHERS:

THE LAST PROVISIO APPEARING AT THE END OF SUBITEM H.(7) OF SECTION 3 OF ARTICLE III - ALLOWABLE COSTS (SEE PAGE 9 OF MODIFICATION No. 19) WHICH READS: "AND PROVIDED FURTHER THAT NO PART OF THE SALARY OR WAGES OF ANY SCIENTIFIC OR TECHNICAL EMPLOYEES WHO ARE EXPECTED TO GIVE LESS THAN 50% OF THEIR TIME TO THE WORK UNDER THIS CONTRACT SHALL BE ALLOWABLE COSTS." IS DELETED IN ITS ENTIRETY AND THE FOLLOWING SUBSTITUTED THEREFOR:

"AND PROVIDED FURTHER THAT, UNLESS OTHERWISE SPECIFICALLY APPROVED IN WRITING BY THE COMMISSION PRIOR TO THE COMMENCEMENT OF SUCH SERVICES, NO PART OF THE SALARY OR WAGES OF ANY SCIENTIFIC OR TECHNICAL EMPLOYEES WHO ARE EXPECTED TO GIVE LESS THAN 50% OF THEIR TIME TO WORK UNDER THIS CONTRACT SHALL BE ALLOWABLE COST."

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IN WITNESS WHEREOF, THE PARTIES HAVE EXECUTED THIS SUPPLEMENTAL AGREEMENT.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY
COMMISSION

BY: David E. Miller
David E. Miller, Deputy Director
Contract Division, ORC
(CONTRACTING OFFICER)

UNIVERSITY OF TENNESSEE

BY: W. H. Rouse

TITLE: VICE PRESIDENT

ATTEST:

John W. Rouse
SECRETARY
(TITLE)

(SEAL)

1116669

UNIVERSITY OF TENNESSEE
Contract No. AT-(40-1)-GEN-242
Modification No. 22

1116670

UNITED STATES
ATOMIC ENERGY COMMISSION
UNIVERSITY OF TENNESSEE
Contract No. AT-(40-1)-GEN-242

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Contract No. AT-(40-1)-GEN-242
UNIVERSITY OF TENNESSEE
Modification No. 22

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 3rd day of June, 1974, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and the UNIVERSITY OF TENNESSEE (hereinafter called the "University");

WITNESSETH THAT:

WHEREAS, the Government and the University entered into Contract No. AT-(40-1)-GEN-242, dated May 11, 1948, for the performance of certain studies and related work in regard to the effects of radiation on domestic animals and crops; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 - 21; and

WHEREAS, the parties hereto desire to further modify said contract to extend the term thereof, to make certain other changes as are included hereinafter, and to integrate all of the terms of the contract in one supplemental agreement; and

WHEREAS, this Supplemental Agreement is authorized by and executed under Section 302(c)(15) of the Federal Property and Administrative Services Act of 1949, as amended, and the Atomic Energy Act of 1954, as amended;

NOW, THEREFORE, the parties hereto do mutually agree that from and after the date of this modification said Contract No. AT-(40-1)-GEN-242 is amended to read in its entirety as follows:

ARTICLE I - STATEMENT OF WORK

1. Scope. The Government expressly engages the University to manage, operate, and maintain the facilities described below and to perform the work and services described in this contract, including the utilization of information, material, funds, and other property of the Commission, the collection of revenues, and the acquisition, sale or other disposal of property for the Commission, subject to the limitations as hereinafter set forth. The University undertakes and promises to manage, operate, and maintain said facilities, and to perform said work and services, upon the terms and conditions herein provided and in accordance with such directions and instructions not

inconsistent with this contract which the Commission may deem necessary or give to the University from time to time. In the absence of applicable directions and instructions from the Commission, the University will use its best judgment, skill, and care in all matters pertaining to the performance of this contract. The University will not be required to operate the facilities below in any manner which it deems unsafe to the facilities or personnel.

2. Facilities. The facilities to be managed, operated, and maintained by the University hereunder consist of the Government-owned lands, buildings, and radiobiological research facilities located in Anderson and Roane Counties, being along the west side of the Clinch River and generally east or southeast of the plant areas known as X-10 and Y-12. The lands currently included total approximately 5,000 acres.

3. Programs. The University shall manage, operate, and maintain the facilities described in Section 2., above, in accordance with programs approved in writing from time to time by the Commission. The functions to be performed include but are not necessarily limited to the following:

a. Performance of studies in the general area of comparative vertebrate radiobiology with various laboratory and domestic animals. This research will include the investigation of the effects of radiation and other environmental stresses on various biological processes such as reproduction, growth, and development; and evaluation of the toxicity of radionuclides and other agents that could be associated with energy producing operations. Also, performance of research studies to evaluate the effects of radiation, chemicals, and other physical agents on survival, growth, and productivity in various plant species.

b. Cooperation with educational and other institutions or organizations.

4. Construction. Upon request of the Commission and acceptance thereof by the University, the University shall procure by subcontract the construction of new facilities or the alteration or repair of Government-owned facilities. Any subcontract entered into under this section shall be subject to the written approval of the Commission and shall contain the provisions relative to labor and wages required by law to be included in contracts for the construction, alteration and/or repair, including painting and decorating, of a public building or public work.

5. Administration of Contracts Made by the University. The administration of all subcontracts, purchase orders, and other contractual agreements made by the University, including responsibility for payment from the Government funds advanced and agreed to be advanced hereunder to the University, shall, during the period of this contract, remain in the University unless and until transferred to the Government or other designee of the Commission, at the direction or with the approval of the Commission.

6. Related Services.

a. In addition to the services specifically described in other provisions of this Article I, the University shall perform such other services, incidental or related to the services described in this Article I or to the programs of the Commission as the Commission and the University shall agree in writing from time to time will be performed under this contract either for the Commission or its contractors. The costs incurred by the University in performing such services shall be allowable in accordance with the provisions of Article III.

b. The University, to the extent it is in a position to do so, will render such services, including transfers of property to Federal agencies and to other cost-type contractors of the Commission as requested in accordance with such procedures and requirements as the Commission may establish from time to time. The University will receive transfers of funds therefor from such Federal agencies and other cost-type contractors to the extent that such transfer is required by and in accordance with policies adopted from time to time by the Commission. The funds received in exchange for such services shall be handled as a part of the advances of Government funds as provided in Article VI. In the performance of such services, the University is authorized to use facilities, materials, and equipment in its custody under this contract. The costs incurred by the University in the performance of any such services shall be allowable costs in accordance with the provisions of Article III. With the approval of the Commission, the University may render the same services, including transfers of property, to lump-sum or unit-price Commission contractors under the terms and conditions herein stated, and the payments received therefor shall be for the account of the Government and will be received, held, and utilized as a part of the advances of Government funds pursuant to Article VI.

7. General.

a. The University shall perform the maintenance work necessary for the efficient operation of the facilities to the extent such work is included in work programs agreed in writing between the University and the Commission. Projects which under applicable procedures adopted by the Commission from time to time require the issuance of a directive therefor by the Commission shall not be undertaken until such directive has been issued.

b. In carrying out the work under this contract, the University shall, subject to the general control of the Commission, do all things necessary in the best judgment of the University in the management, operation, and maintenance of the facilities; provided that, whenever approval or other action by the Commission is required with respect to any expenditure or commitment by the University under the terms of this contract, the Government shall not be responsible unless and until such approval or action is obtained or taken.

c. In carrying out the work under this contract, the University shall be responsible for the employment of all professional, technical, skilled, and unskilled personnel engaged and to be engaged by the University in the work hereunder, and for the training of personnel. Persons employed by the University shall be and remain employees of the University and shall not be deemed employees of the Commission or Government; provided, that nothing herein shall require the establishment of any employer-employee relationship between the University and consultants and others whose services are utilized by the University for the work hereunder.

d. The University shall exert its best efforts to acquire for the Government such materials, supplies, equipment, and facilities required in connection with work under this contract as are not furnished by the Government.

8. University Use of Facilities. In recognition of the University's extensive biological and agricultural research programs, the Commission is willing for the University to utilize for its own sponsored research, the special research facilities, personnel and other resources available for the work under this contract, provided: (1) a determination is made by the Laboratory Director, and the Commission is so advised, that the University-sponsored research is considered to be of interest and benefit to the AEC research program being carried out under the contract, (2) a description of the planned research, method of performance, and estimated cost is provided to the Commission, and (3) the Commission approves performance of the planned research. The Contractor may consider such

approval as having been given as to planned research reported to the Commission in writing and involving costs estimated to be less than \$50,000 and requiring less than one year to perform, unless within 15 days after such report to the Commission an objection is interposed on behalf of the Commission. The University will reimburse the Commission or credit the contract account for all direct and indirect costs incurred under the contract in the performance of research for the University. In consideration of the expected benefits to the AEC research program from performance of University-sponsored research, including the availability of all research results and data, the Commission will waive those elements of its costs for depreciation on Government property and the "added factor" provided for in the AEC pricing policy.

ARTICLE II - TERM AND TERMINATION

1. Term. This contract shall continue until September 30, 1979, unless sooner terminated by either party in accordance with other provisions of this Article II.

2. Termination by Government.

a. This contract may be terminated by the Government for its convenience whenever the Commission, in its discretion, considers such termination to be in the best interest of the Government, and, accordingly, mails or delivers a Notice of Termination to the University (at Oak Ridge or at the University's home office) which states that effective on a date specified therein (which date shall be at least 60 calendar days after the date of such mailing or delivery) this contract shall be terminated.

b. The Government shall also have the right to terminate (from time to time) contract work, in part, for its convenience, whenever the Commission, in its discretion, considers such termination to be in the best interest of the Government, and, accordingly, mails or delivers a Notice of Partial Termination to the University (at Oak Ridge or at the University's home office) which states that effective on a date specified therein (which date shall be at least 60 calendar days after the date of such mailing or delivery) such of the contract work as is specified therein shall be terminated. It is understood that in no event shall such a termination be deemed to be a termination of this contract.

3. Termination by University. This contract may be terminated by the University for its convenience upon at least six months' prior written notice to the Commission.

4. Closeout. Immediately upon the receipt by either party of any notice provided for in Sections 2. and 3., above, both parties shall in good faith do all things necessary, in the light of such notice, to assure the efficient and proper closeout (including, but not restricted to, protection of Government property) of the terminated work. The University will be allowed its costs, pursuant to the provisions of Article III, for its close-out costs and expenses (including, but not restricted to, those attendant on taking such steps as the Commission may require in connection with outstanding commitments and claims).

ARTICLE III - ALLOWABLE COSTS

1. Compensation for University's Services. Payment for the allowable cost as herein defined shall constitute full and complete compensation for the performance of the work under this contract.

2. Allowable Cost. The allowable cost of performing the work under this contract shall be the costs and expenses that are actually incurred by the University in the performance of the contract work, in accordance with its terms, that are necessary or incident thereto, and are determined to be allowable pursuant to this Section 2. The determination of the allowability of cost hereunder shall be based on: (a) reasonableness, including the exercise of prudent business judgment, (b) consistent application of generally accepted accounting principles and practices that result in equitable charges to the contract work, and (c) recognition of all exclusions and limitations set forth in this article or elsewhere in this contract as to types or amounts of items of cost. Allowable costs shall not include cost of any item described as unallowable in Section 4. of this article, except as indicated therein. Failure to mention an item of cost specifically in Section 3. or Section 4. shall not imply either that it is allowable or that it is unallowable.

3. Examples of Items of Allowable Cost. Subject to the other provisions of this article, the following examples of items of cost of work done under this contract shall be allowable to the extent indicated:

a. Bonds and insurance including self-insurance, as provided in the article entitled "Bonds and Insurance."

b. Communication costs including telephone services, local and long distance calls, telegrams, cablegrams, radiograms, postage and similar items.

c. Consulting services (including legal and accounting), and related expense, as approved by the Contracting Officer, except as made unallowable by subsection 4.s.

d. Litigation expenses, including reasonable counsel fees, incurred in accordance with the article of this contract entitled "Litigation and Claims."

e. Losses and expenses (including settlements made with the consent of the Contracting Officer) sustained by the University in the performance of this contract and certified in writing by the Contracting Officer to be just and reasonable, except the losses and expenses made unallowable under other provisions of this contract.

f. Materials, supplies and equipment, including freight, transportation, material handling, inspection, storage, salvage, and other usual expenses incidental to the procurement, use and disposition thereof, subject to approvals required under other provisions of this contract.

g. Patents, purchased design, and royalty payments to the extent expressly provided for under other provisions in this contract or as approved by the Contracting Officer; and preparation of invention disclosures, reports and related documents and searching the art to the extent necessary to make such invention disclosures in accordance with the article of this contract entitled "Patents."

h. Personnel costs and related expenses incurred in accordance with Appendix A, or amendments thereto, such as:

(1) Salaries and wages; bonus and incentive compensation; overtime, shift differential, holiday and other premium pay for time worked; nonwork time including vacations, holidays, sick, funeral, military, jury, witness and voting leave; salaries and wages to employees in their capacity as union stewards and committeemen for time spent in handling grievances or serving on labor-management (University) committees; Provided, however, That the Contracting Officer's approval is required in each instance of total compensation to an individual employee at an annual rate of \$25,000 or more, when it is proposed that a total of fifty percent or more of such compensation be reimbursed under AEC cost-type contracts. Total compensation, as used here, includes only the employee's base salary and bonus and incentive compensation payments.

(2) Legally required contributions to old age and survivors' insurance, unemployment compensation plans and workmen's compensation plans (whether or not covered by insurance); voluntary or agreed-upon plans providing benefits for retirement, separation, life insurance, hospitalization, medical-surgical and unemployment (whether or not such plans are covered by insurance).

(3) Travel (except foreign travel, which requires specific approval by the Contracting Officer on a case-by-case basis); incidental subsistence and other allowances of University employees, in connection with performance of work under this contract (including new employees reporting for work and transfer of employees, the transfer of their household goods and effects and the travel and subsistence of their dependents).

(4) Employee relations, welfare, morale, etc., programs, including incentive or suggestion awards, employee counseling services, health or first-aid clinics and house or employee publications.

(5) Personnel training (except special education and training courses and research assignments calling for attendance at educational institutions which require specific approval by the Contracting Officer on a case-by-case basis) including apprenticeship training programs designed to improve efficiency and productivity of contract operations, to develop needed skills and to develop scientific and technical personnel in specialized fields required in the contract work.

(6) Recruitment of personnel (including help-wanted advertisement) including services of employment agencies at rates not in excess of standard commercial rates, employment office, travel of prospective employees at the request of the University for employment interviews; and

(7) Net cost of operating plant-site cafeterias, dining rooms and canteens attributable to the performance of this contract

Appendix A may be modified from time to time, in writing, without execution of an amendment to this contract for the purposes of effecting any changes in or additions to Appendix A as may be agreed upon by the parties.

i. Repairs, maintenance, inspection, replacement and disposal of Government-owned property and the restoration or cleanup of site and facilities to the extent directed or approved by the Contracting Officer.

j. Subcontracts and purchase orders subject to approvals required by other provisions of this contract.

k. Subscriptions to trade, business, technical, and professional periodicals, as approved by the Contracting Officer.

l. Taxes, fees, and charges levied by public agencies which the University is required by law to pay, except those which are expressly made unallowable under other provisions of this contract.

m. Utility services, including electricity, gas, water, steam, and sewerage.

n. Establishment and maintenance of bank accounts in connection with the work hereunder, including, but not limited to, service charges, the cost of disbursing cash, necessary guards, cashiers, and paymasters. If payments to employees are made by check, facilities and arrangements for cashing checks may be provided without expense to the employees, subject to the approval of the Contracting Officer.

o. The allocable portion of the allowable indirect cost incurred by the University in the performance of this contract as hereinafter provided.

The University shall be paid an allowance for overhead of a fixed amount to be agreed to in writing on or before June 30 of each year following submission of a proposal by the University by June 1, applicable to the ensuing fiscal year. Such overhead shall be in lieu of all charges or costs resulting from activity in support of or connected with this contract and carried on at the University's campus, business office, or other locations of the University not especially established for this contract.

In the event the parties fail to agree upon the amount of the allowance for the ensuing fiscal year before the beginning of that year, a cost allowance shall be paid during a new fiscal year provisionally, at the rate previously effective but to be adjusted to the new rate effective as of the beginning of such year when agreement is reached. Failure of the parties to agree upon an amount shall be resolved pursuant to the article of this contract entitled "Disputes."

It is agreed that the amount to be paid the University hereunder for the period July 1, 1974, through June 30, 1975, shall be \$50,000.00.

It is presently contemplated that in lieu of direct payment to the University of the above and such subsequently agreed-upon amounts, the liability of the Commission hereunder will be liquidated by offsetting the payments due the University under this item o. against the payments due the Commission under the provisions of Paragraph 8. of Article I. In the event such payment due the Commission is inadequate to liquidate the amount of the above overhead allowance in a reasonable period of time, the remaining portion of such allowance may be settled in cash, at the option of either party.

4. Examples of Items of Unallowable Costs. The following specific items of costs assumed by the University (subsections a., b., and c.) and the further examples of items of costs are unallowable under this contract to the extent indicated:

a. Advertising, except (i) help-wanted advertising, and (ii) other advertising (such as costs or participation in exhibits) approved by the Contracting Officer as clearly in furtherance of work performed under this contract.

b. Bad debts (including expenses of collection) and provisions for bad debts arising out of other business of the University.

c. Bidding expenses and costs of proposals.

d. Bonuses and similar compensation under any other name, which (i) are not pursuant to an agreement between the University and an employee prior to the rendering of the services or an established plan consistently followed by the University, (ii) are in excess of those costs which are allowable by the Internal Revenue Code and regulations thereunder, or (iii) provide total compensation to an employee in excess of reasonable compensation for the services rendered.

e. Central and branch office expenses of the University, except as specifically set forth in this contract.

f. Commissions, bonuses and fees (under whatever name) in connection with obtaining or negotiating for a Government contract or a modification thereto, except when paid to bona fide employees or bona fide established selling organizations maintained by the University for the purpose of obtaining Government business.

g. Contingency reserves, provision for.

h. Contributions and donations.

i. Entertainment costs, except the costs of such recreational activities for on-site employees as may be approved by the Contracting Officer or provided for elsewhere in this contract.

j. Fines and penalties including assessed interest, resulting from violations of, or failure of the University to comply with Federal, state, or local laws or regulations, except when incurred in accordance with the written approval of the Contracting Officer or as a result of compliance with the provisions of this contract.

k. Government-furnished property, except to the extent that cash payment therefor is required pursuant to procedures of the Commission applicable to transfers of such property to the University from others.

l. Insurance (including any provision of a self-insurance reserve) on any person where the University under the insurance policy is the beneficiary, directly or indirectly, and insurance against loss of or damage to Government property as defined in the article of this contract entitled "Government Property."

m. Interest, however represented, except interest incurred in compliance with article entitled "State and Local Taxes."

n. Legal, accounting, and consulting services and related costs incurred in connection with the preparation of prospectuses, preparation and issuance of stock rights, organization or reorganization, prosecution or defense of antitrust suits, prosecution of claims against the United States, contesting actions or proposed actions of the United States, and prosecution or defense of patent-infringement litigation.

o. Losses (including litigation expenses, counsel fees, and settlements) on, or arising from the sale, exchange, or abandonment of capital assets, including investments; losses on other contracts, including the University's contributed portion under cost-sharing contracts; losses in connection with price reductions to and discount purchases by employees and others from any source; and losses where such losses or expenses

(1) are compensated for by insurance or otherwise or which would have been compensated by insurance required by law or by written direction of the Contracting Officer but which the University failed to procure or maintain through its own fault or negligence;

(2) result from willful misconduct or lack of good faith on the part of any of the University's corporate officers; and

(3) represent liabilities to third persons for which the University has expressly accepted responsibility under other terms of this contract.

p. Membership in trade, business, and professional organizations, except as approved by the Contracting Officer.

q. Storage of records pertaining to this contract after completion of operations under this contract irrespective of contractual or statutory requirement of the preservation of records.

r. Travel expenses of the University's responsible supervising representative, and officers, proprietors, executives, administrative heads and other employees of the University's central office or branch office organizations concerned with the general management, supervision and conduct of the University's business as a whole, except to the extent that particular travel is in connection with the contract and approved by the Contracting Officer.

s. Salary or other compensation (and expenses related thereto) of any individual employed under this contract as a consultant or in another comparable employment capacity who is an employee of another organization and concurrently performing work on a full-time annual basis for that organization under a cost-type contract with the Commission, except to the extent that cash payment therefor is required pursuant to the provisions of this contract or procedure of the Commission applicable to the borrowing of such an individual from another cost-type contractor.

t. First-class air travel in excess of the cost of less than first-class air accommodations, except when less than first-class accommodations are not reasonably available to meet necessary mission requirements, such as where less than first-class accommodations would:

- (1) Require circuitous routing.
- (2) Require travel during unreasonable hours.
- (3) Greatly increase the duration of the flight.
- (4) Result in additional costs which would offset the transportation savings.
- (5) Offer accommodations which are not reasonably adequate for the medical needs of the traveler.

u. Depreciation in excess of that calculated by application of methods approved for use by the Internal Revenue Service under the Internal Revenue Code of 1954, as amended, including the straight-line, declining balance (using a rate not exceeding twice the rate which would have been used had the depreciation been computed under the straight-line method), or sum-of-the-years digits method, on the basis of expected useful life, to the cost of acquisition of the related fixed assets less estimated salvage or residual value at the end of the expected useful life.

v. Maintenance, depreciation and other costs incidental to the University's idle or excess facilities (including machinery and equipment) other than reasonable standby facilities.

w. Research and development costs, unless specifically provided for elsewhere in this contract.

ARTICLE IV - UNIVERSITY INDEMNITY

1. In view of the fact that the University will perform the work under this contract without fee, it is agreed that, subject to Section 2. of this article:

a. The University shall not be liable to the Government for any delays or failures in connection with the contract work.

b. The Government shall indemnify the University against and the University shall have the right to look to the Government for recognition as allowable costs all losses-expenses (including, but not limited to litigation), and/or damages (including, but not limited to liability to third parties because of death, bodily injury, and property damage) of any kind whatsoever arising out of or in connection with the contract work.

2. a. The provisions of Section 1., above, shall not apply with respect to such costs and expenses as are assumed by the University or are made unallowable under other provisions of this contract.

b. The provisions of Section 1., above, shall apply only to the extent that such damage, loss, destruction and/or expense is not due to any act, or failure to act, on the part of a then corporate officer of the University which is tantamount to willful misconduct or gross negligence.

c. The provisions of Section 1., above, are subject to the provisions of Article V of this contract.

ARTICLE V - OBLIGATION OF FUNDS

1. Obligation of Funds. The amount presently obligated by the Government with respect to this contract is \$ 17,931,995.00. Such amount may be increased unilaterally by the Commission by written notice to the University and may be increased or decreased by written agreement of the parties (whether or not by formal modification of this contract). Estimated revenues and receipts from others for work and services to be performed under this contract are not included in the amount obligated with respect to this contract. Such revenues and receipts, to the extent actually received by the University, shall be available and used for the payment of allowable costs as provided in the article of this contract entitled "Payments." Nothing in this Section 1. is to be construed as authorizing the University to exceed limitations stated in financial plans established by the Commission and furnished to the University from time to time under this contract.

2. Limitation on Payment by the Government. Except as otherwise provided in this contract and except for costs which may be incurred by the University pursuant to the article of this contract entitled "Term and Termination," or costs of claims allowable under the contract accruing after completion or termination and not released by the University at the time of financial settlement of the contract in accordance with the article entitled "Payments," payment by the Government under this contract on account of allowable costs shall not in the aggregate exceed the amount obligated with respect to this contract. Unless expressly negated in this contract, payment on account of those costs excepted in the preceding sentence which are in excess of the amount obligated with respect to this contract shall be subject to the availability of (a) revenues and receipts deposited to the Government's account as provided in the article of this contract entitled "Payments," and (b) other funds which the Commission may legally use for such purpose: Provided, The Commission will use its best efforts to obtain the appropriation of funds for this purpose if not otherwise available.

3. Notices - University Excused from Further Performance. The University shall notify the Commission in writing whenever the unexpended balance of funds (including revenues and receipts) available under Section 1., above, plus the University's best estimate of revenues and receipts to be received during the 45-day period hereinafter specified, is in the University's best judgment sufficient to continue contract

operations at the programmed rate for only 45 days and to cover the University's outstanding commitments and liabilities on account of costs allowable under the contract at the end of such period. Whenever the unexpended balance of funds (including revenues and receipts) available under Section 1., above, is in the University's best judgment either sufficient only to liquidate outstanding commitments and liabilities on account of costs allowable under this contract or is equal to zero, the University shall immediately notify the Commission and shall make no further commitments or expenditures (except to liquidate existing commitments and liabilities), and, unless the parties otherwise agree, the University shall be excused from further performance (except such performance as may become necessary in connection with termination by the Government) and the performance of all work hereunder will be deemed to have been terminated for the convenience of the Government in accordance with the provisions of the article of this contract entitled "Term and Termination."

4. Financial Plans; Cost and Commitment Limitations. In addition to the limitations provided for elsewhere in this contract, the Commission may, through Financial Plans or other directives, issued to the University, establish controls on the costs to be incurred and commitments to be made in the performance of the contract work. Such plans and instructions may be amended or supplemented from time to time by the Commission. The University hereby agrees to comply with the specific limitations (ceilings) on costs and commitments set forth in such plans and directives, to use its best efforts to comply with the other requirements of such plans and directives, and to promptly notify the Commission in writing whenever it has reason to believe the authorized financial levels of costs and commitments will be exceeded or substantially underrun.

5. Government's Right to Terminate Not Affected. The giving of any notice under this article shall not be construed to waive or impair any right of the Government to terminate the contract under the provisions of the article of this contract entitled "Term and Termination."

ARTICLE VI - PAYMENTS

1. Reimbursements and Revenues. The Government shall provide funds to the University from time to time under a letter of credit when, in the opinion of the Commission, the University's need therefor develops. The University may obtain reimbursement for allowable costs by withdrawing funds from the letter of credit, after taking into consideration revenues received by the University in the performance of the contract work.

2. Payments on Account of Allowable Costs. Payments for allowable costs shall be made by the University from the bank account or accounts wherein are deposited the reimbursements from the Government and revenues received in the performance of the contract work.

3. Optional Method of Payment. At the option of the Government, reimbursement may be made by check payable to the University, in lieu of withdrawal pursuant to a letter of credit in favor of the University.

4. Review and Approval of Costs Incurred. The University shall prepare and submit annually as of June 30 a voucher, for the total of net expenditures accrued (i.e., net costs incurred) for the period covered by the voucher, and the Commission, after audit and appropriate adjustment, will approve such voucher. This approval by the Commission will constitute an acknowledgement by the Commission that the net costs incurred are allowable under the contract and that they have been recorded in the accounts maintained by the University in accordance with the Commission accounting policies, but will not relieve the University of responsibility for the Commission's assets in its care, for appropriate subsequent adjustments, or for errors later becoming known to the Commission.

5. Financial Settlement. The Government shall promptly pay to the University the unpaid balance of allowable costs upon termination of the work, expiration of the term of the contract, or completion of the work and its acceptance by the Government after (a) compliance by the University with the Commission's patent clearance requirements, and (b) the furnishing by the University of:

(1) An assignment of the University's rights to any refunds, rebates, allowances, accounts receivable, or other credits applicable to allowable costs under the contract;

(2) A closing financial statement;

(3) The accounting for Government-owned property required by the article entitled "Government Property;" and

(4) A release discharging the Government, its officers, agency, and employees from all liabilities, obligations, and claims arising out of or under this contract, subject only to the following exceptions:

(i) Specified claims in stated amounts or in estimated amounts where the amounts are not susceptible of exact statement by the University;

(ii) Claims, together with reasonable expenses incidental thereto, based upon liabilities of the University to third parties arising out of the performance of this contract; provided that such claims are not known to the University on the date of the execution of the release; and provided further that the University gives notice of such claims in writing to the Contracting Officer not more than six (6) years after the date of the release or the date of any notice to the University that the Government is prepared to make final payment, whichever is earlier; and

(iii) Claims for reimbursement of costs (other than expenses of the University by reason of any indemnification of the Government against patent liability), including reasonable expenses incidental thereto, incurred by the University under the provisions of this contract relating to patents.

In arriving at the amount due the University under this article, there shall be deducted (a) any claim which the Government may have against the University in connection with this contract, and (b) deductions due under the terms of this contract, and not otherwise recovered by or credited to the Government. The unliquidated balance of any revenues may be applied to the amount due, and any balance shall be returned to the Government forthwith.

6. Claims. Claims for credit against funds advanced or for payment shall be accompanied by such supporting documents and justification as the Contracting Officer shall prescribe.

7. Discounts. The University shall take and afford the Government the advantage of all known and available cash and trade discounts, rebates, allowances, credits, salvage, and commissions unless the Contracting Office finds that such action is not in the best interest of the Government.

8. Revenues. Any revenues accruing to the University in connection with the work under this contract shall be received for the account of the Government and shall be received, held and utilized as a part of the reimbursements from the Government pursuant to Section 1., above.

9. Direct Payment of Charges - Deductions. The Government reserves the right, upon ten days' written notice from the Contracting Officer, to

the University to pay directly to the persons concerned all amounts due which otherwise would be allowable under this contract. Any payment so made shall discharge the Government of all liability to the University therefor.

ARTICLE VII - ACCOUNTS, RECORDS AND INSPECTION

1. Accounts. The University shall maintain accounts, records, documents and other evidence showing and supporting all allowable costs incurred, revenues or other applicable credits, fixed-fee accruals, and the receipt, use, and disposition of all Government property coming into the possession of the University under this contract. The system of accounts employed by the University shall be satisfactory to the Commission and in accordance with generally accepted accounting principles consistently applied.

2. Inspection and Audit of Accounts and Records. All books of account and records relating to this contract shall be subject to inspection and audit by the Commission at all reasonable times, before and during the period of retention provided for in 4., below, and the University shall afford the Commission proper facilities for such inspection and audit.

3. Audit of Subcontractors' Records. The University also agrees, with respect to any subcontracts (including lump-sum or unit-price subcontracts or purchase orders) where, under the terms of the subcontract, costs incurred are a factor in determining the amount payable to the subcontractor of any tier, to conduct an audit of the costs of the subcontractor in a manner satisfactory to the Commission or to have the audit conducted by the next higher tier subcontractor in a manner satisfactory to the University and the Commission, except when the Commission elects to waive such audit or approves other arrangements for the conduct of the audit.

4. Disposition of Records.

a. Except as agreed upon by the Government and the University, all financial and cost reports, books of account and supporting documents, and other data evidencing costs allowable and revenues and other applicable credits under this contract in the possession of the University at its Knoxville Office and relating to this contract shall be preserved by the University for a period of three (3) years after final payment under this contract or otherwise disposed of in such manner as may be agreed upon by the Government and the University.

b. (1) Except as provided in the foregoing and except as agreed upon by the Government and the University, all sketches, drawings, designs, design data, plans, specifications, technical notes and data, medical records, books of account and supporting documents relating to this contract, and other data evidencing costs allowable and revenues received, earned or accrued under this contract and any notebooks, photographs, negatives, reports, findings, recommendations, data, and memoranda of every description and any copies of the foregoing relating to the foregoing or the work under this contract, and the information contained therein shall be the property of the Government, and, subject to the right of the University to retain a copy of any such material for its own use, shall be delivered to the Government or otherwise disposed of by the University either as the Commission may from time to time direct during the progress of the work or in any event as the Commission shall direct upon completion or termination of this contract and final audit of all accounts hereunder. The Government shall have the right to use all or any part of said material and information which is the property of the Government for any purpose whatsoever including but not limited to the right to reproduce said material and disseminate it to the public. The University's right of retention and use shall be subject to the security, patent, and the following use of information provisions of this contract.

(2) Except as specifically authorized by this contract, or as otherwise approved by the Contracting Officer, information and other data developed or acquired by or furnished the University in the performance of this contract shall be used only in connection with the work under this contract.

5. Reports. The University shall furnish such progress reports and schedules, financial and costs reports, and other reports concerning the work under this contract as the Contracting Officer may from time to time require.

6. Inspections. The Commission shall have the right to inspect the work and activities of the University under this contract at such time and in such manner as it shall deem appropriate.

7. Subcontracts. The University further agrees to require the inclusion of provisions similar to those in Section 1. through this

Section 7. of this article in all subcontracts (including lump-sum or unit-price subcontracts or purchase orders) of any tier entered into hereunder where, under the terms of the subcontract, costs incurred are a factor in determining the amount payable to the subcontractor.

ARTICLE VIII - EXAMINATION OF RECORDS BY COMPTROLLER GENERAL

1. This article is applicable if the amount of this contract exceeds \$2,500 and was entered into by means of negotiation, including small business restricted advertising, but is not applicable if this contract was entered into by means of formal advertising.

2. The University agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three (3) years after final payment under this contract, unless the Commission authorizes their prior disposition, have access to and the right to examine any directly pertinent books, documents, papers, and records of the University involving transactions related to this contract.

3. The University further agrees to include in all its subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three (3) years after final payment under the subcontract, unless the Commission authorizes their prior disposition, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used in this article excludes (a) purchase orders not exceeding \$2,500 and (b) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

4. The periods of access and examination described in Sections 2. and 3., above, for records which relate to (a) appeals under the "Disputes" article of this contract, (b) litigation or the settlement of claims arising out of the performance of this contract, or (c) costs and expenses of this contract as to which exception has been taken by the Comptroller General or any of his duly authorized representatives, shall continue until such appeals, litigation, claims, or exceptions have been disposed of.

5. Nothing in this contract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this contract.

ARTICLE IX - GOVERNMENT PROPERTY

1. Title to Property. Title to all property furnished by the Government shall remain in the Government except as otherwise provided in this article. Except as otherwise provided by the Contracting Officer, title to all materials, equipment, supplies, and tangible personal property of every kind and description purchased by the University, the cost of which is allowable as a direct item of cost under this contract, shall pass directly from the vendor to the Government. Title to other property, the cost of which is allowable under this contract, shall pass to and vest in the Government upon (i) issuance for use of such property in the performance of this contract, or (ii) commencement of processing or use of such property in the performance of this contract, or (iii) payment of the cost thereof by the Government, whichever first occurs. Property furnished by the Government and property purchased or furnished by the University, title to which vests in the Government, under this section are hereinafter referred to as Government property. Title to Government property shall not be affected by the incorporation of the property into or the attachment of it to any property not owned by the Government, nor shall such Government property or any part thereof, be or become a fixture or lose its identity as personalty by reason of affixation to any realty.

2. Identification. To the extent directed by the Contracting Officer, the University shall identify Government property coming into the University's possession or custody by marking or segregating in such a way, satisfactory to the Contracting Officer, as shall indicate its ownership by the Government.

3. Disposition. The University shall make such disposition of Government property which has come into the possession or custody of the University under this contract as the Contracting Officer shall direct. When authorized in writing by the Contracting Officer during the progress of the work or upon completion or termination of this contract, the University may, upon such terms and conditions as the Contracting Officer may approve, sell or exchange such property, or acquire such property at a price agreed upon by the Contracting Officer and the University as the fair value thereof. The proceeds of any disposition shall be received for the account of the Government, and shall be received, held, and utilized as a part of the advances of Government funds pursuant to the article hereof entitled "Payments" or otherwise credited to the account of the Government as the Commission may direct. Upon completion of the work or the termination of this contract, the University shall render an accounting, as prescribed by the Contracting Officer, of all Government property which had come into the possession or custody of the University under this contract.

4. Protection of Government Property - Classified Materials. The University shall take all reasonable precautions, as directed by the Contracting Officer, or in the absence of such directions in accordance with sound industrial practice, to safeguard and protect Government property in the University's possession or custody. Special measures shall be taken by the University in the protection of and accounting for any classified or special materials involved in the performance of this contract, in accordance with the regulations and requirements of the Commission.

5. Risk of Loss of Government Property. The University shall not be liable for the loss or destruction of or damage to any property in the University's possession unless the same is due to the willful misconduct or bad faith on the part of any of the corporate officers of the University in the performance of the work under this contract, or unless such loss, destruction or damage is due to a failure on the part of the corporate officers of the University in the performance of the work under this contract to take reasonable steps to comply with any appropriate written directives of the Commission to safeguard such property.

6. Steps to Be Taken in Event of Loss. Upon the happening of any loss or destruction of or damage to Government property in the possession or custody of the University, the University shall immediately inform the Contracting Officer of the occasion and extent thereof, shall take all reasonable steps to protect the property remaining, and shall repair or replace the lost, destroyed, or damaged property, if and as directed by the Contracting Officer, but shall take no action prejudicial to the right of the Government to recover therefor and shall furnish to the Government, on request, all reasonable assistance in obtaining recover

7. Government Property for Government Use Only. Except as otherwise provided in this contract, Government property shall be used only for the performance of this contract.

ARTICLE X - UNIVERSITY PROCUREMENT

1. The Commission reserves the right at any time to require that the University submit for approval any or all procurements under this contract. The University shall not procure any item whose purchase is expressly prohibited by the written direction of the Commission and shall use such special and directed procurement sources as may be expressly required by the Commission. The University shall provide information concerning procurement methods, practices, and procedures used or proposed to be used, and shall use methods, practices, and procedures which are acceptable to the Commission. Procurement arrangements under this

contract shall not relieve the University of any obligation under this contract (including, among other things, the obligation properly to supervise, administer, and coordinate the work of subcontractors) and shall be in such form and contain such provisions as are required by this contract or as the Commission may prescribe.

2. In addition to, and without derogation of any rights under Section 1. of this Article X and any other provision in this contract, the University shall require subcontractors to furnish cost or pricing data, and shall include in such subcontracts the clause set forth in AECPR 9-3.814-50, except as otherwise directed or approved by the Commission.

ARTICLE XI - DISPUTES

1. Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the University. The decision of the Contracting Officer shall be final and conclusive unless within 30 days from the date of receipt of such copy, the University mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the Commission. The decision of the Commission or its duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this article, the University shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the University shall proceed diligently with the performance of this contract and in accordance with the Contracting Officer's decision.

2. This "Disputes" article does not preclude consideration of law questions in connection with decisions provided for in Section 1., above; Provided, That nothing in this contract shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

ARTICLE XII - PATENTS

1. Whenever any invention or discovery is made or conceived by the University or its employees in the course of or under this contract, the University shall promptly furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine

whether or not and where a patent application shall be filed and to determine the disposition of the title to and rights in and to any invention or discovery and any patent application or patent that may result. The judgment of the Commission on these matters shall be accepted as final; and the University, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission

2. No claim for pecuniary award or compensation under the provisions of the Atomic Energy Act of 1954, as amended, shall be asserted by the University or its employees with respect to any invention or discovery made or conceived in the course of or under this contract.

3. Except as otherwise authorized in writing by the Commission, the University will obtain patent agreements to effectuate the purposes of Sections 1. and 2. of this article from all persons who perform any part of the work under this contract, except such clerical and manual labor personnel as will not have access to technical data.

4. Except as otherwise authorized in writing by the Commission, the University will insert in all subcontracts provisions making this article applicable to the subcontractor and its employees.

5. It is recognized that during the course of the work under this contract, the University or its employees may from time to time desire to publish, within the limits of security requirements, information regarding scientific or technical developments made or conceived in the course of or under this contract. In order that public disclosure of such information will not adversely affect the patent interests of the Commission or the University, patent approval for release and publication shall be secured from the Commission prior to any such release or publication.

6. With respect to any U. S. Patent Application filed by the University on any contract invention or discovery made or conceived in the course of this contract, the University will incorporate in the first paragraph of the U. S. Patent Application the following statement:

"The invention described herein was made in the course of, or under, a contract with the U. S. Atomic Energy Commission."

ARTICLE XIII - ASSIGNMENT

Neither this contract nor any interest therein nor claim thereunder shall be assigned or transferred by the University except as expressly authorized in writing by the Contracting Officer.

ARTICLE XIV - OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE XV - COVENANT AGAINST CONTINGENT FEES

1. Warranty - Termination or Deduction for Breach. The University warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the University for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

2. Subcontracts and Purchase Orders. Unless otherwise authorized by the Contracting Officer in writing the University shall cause provisions similar to the foregoing to be inserted in all subcontracts and purchase orders entered into under this contract.

ARTICLE XVI - EQUAL OPPORTUNITY

During the performance of this contract, the University agrees as follows:

1. The University will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The University will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The University agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this Equal Opportunity article.

2. The University will, in all solicitations or advertisements for employees placed by or on behalf of the University, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

3. The University will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Contracting Officer, advising the labor union or workers' representative of the University's commitments under this Equal Opportunity article, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4. The University will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

5. The University will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Commission and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

6. In the event of the University's noncompliance with the Equal Opportunity article of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and the University may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

7. The University will include the provisions of Sections 1. through 7. in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The University will take such action with respect to any subcontract or purchase order as the Commission may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the University becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the University may request the United States to enter into such litigation to protect the interests of the United States.

ARTICLE XVII - CONVICT LABOR

In connection with the performance of work under this contract, the University agrees not to employ any person undergoing sentence of imprisonment at hard labor.

ARTICLE XVIII - PERMITS

Except as otherwise directed by the Contracting Officer, the University shall procure all necessary permits or licenses and abide by all applicable laws, regulations, and ordinances of the United States and of the state, territory, and political subdivision in which the work under this contract is performed.

ARTICLE XIX - BUY AMERICAN ACT

1. In acquiring end products, the Buy American Act (41 U. S. Code 10a-d) provides that the Government give preference to domestic source end products. For the purpose of this article:

a. "Components" means those articles, materials, and supplies, which are directly incorporated in the end products;

b. "End products" means those articles, materials, and supplies, which are to be acquired under this contract for public use; and

c. A "domestic source end product" means (i) an unmanufactured end product which has been mined or produced in the United States and (ii) an end product manufactured in the United States if the cost of the components thereof which are mined, produced, or manufactured in the United States exceeds 50 percent of the costs of all its components. For the purposes of this 1.c.(ii) components of foreign origin of the same type or kind as the products referred to in 2.b or c. of this article shall be treated as components mined, produced or manufactured in the United States.

2. The University agrees that there will be used under this contract (by the University, subcontractors, materialmen, and suppliers) only domestic source end products, except end products:

a. Which are for use outside the United States;

b. Which the Government determines are not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality;

c. As to which the Commission determines the domestic preference to be inconsistent with the public interest; or

d. As to which the Commission determines the cost to the Government to be unreasonable.

(The foregoing requirements are administered in accordance with Executive Order No. 10582, dated December 17, 1954.)

ARTICLE XX - SECURITY AND CLASSIFICATION

1. University's Duty to Safeguard Restricted Data, Formerly Restricted Data, and Other Classified Information. The University shall, in accordance with the Atomic Energy Commission's security regulations and requirements, be responsible for safeguarding Restricted Data, Formerly Restricted Data, and other classified information and protecting against sabotage, espionage, loss and theft, the classified documents and material in the University's possession in connection with the performance of work under this contract. Except as otherwise expressly provided in this contract, the University shall, upon completion or termination of this contract, transmit to the Commission any classified matter in the possession of the University or any person under the University's control in connection with performance of this contract. If retention by the University of any classified matter is required after the completion or termination of the contract and such retention is approved by the Contracting Officer the University will complete a certificate of possession to be furnished to the Atomic Energy Commission, specifying the classified matter to be retained. The certification shall identify the items and types or categories of matter retained, the conditions governing the retention of the matter and the period of retention, if known. If the retention is approved by the Contracting Officer, the security provisions of the contract will continue to be applicable to the matter retained.

2. Regulations. The University agrees to conform to all security regulations and requirements of the Commission.

3. Definition of Restricted Data. The term "Restricted Data," as used in this article, means all data concerning (a) design, manufacture, or utilization of atomic weapons; (b) the production of special nuclear material; or (c) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to Section 142 of the Atomic Energy Act of 1954.

4. Definition of Formerly Restricted Data. The term "Formerly Restricted Data," as used in this article, means all data removed from the Restricted Data category under Section 142 d. of the Atomic Energy Act of 1954, as amended.

5. Security Clearance of Personnel. The University shall not permit any individual to have access to Restricted Data, Formerly Restricted Data, or other classified information, except in accordance with the Atomic Energy Act of 1954, as amended, and the Commission's regulations or requirements applicable to the particular type or category of classified information to which access is required.

6. Criminal Liability. It is understood that disclosure of Restricted Data, Formerly Restricted Data, or other classified information relating to the work or services ordered hereunder to any person not entitled to receive it, or failure to safeguard any Restricted Data, Formerly Restricted Data, or any other classified matter that may come to the University or any person under the University's control in connection with work under this contract, may subject the University, its agents, employees, or subcontractors to criminal liability under the laws of the United States. (See the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011, et seq.; 18 U.S.C. 793 and 794; and Executive Order 11652, as amended.)

7. Subcontracts and Purchase Orders. Except as otherwise authorized in writing by the Contracting Officer, the University shall insert provisions similar to the foregoing in all subcontracts and purchase orders under this contract.

8. Classification. In the performance of the work under this contract, the University shall assign classifications to all documents, material and equipment originated or generated by the University in accordance with classification guidance furnished to the University by the Commission. Every subcontract and purchase order issued hereunder involving the origination or generation of classified documents, material or equipment shall include a provision to the effect that in the performance of such subcontract or purchase order the subcontractor or supplier shall assign classifications to all such documents, material and equipment in accordance with classification guidance furnished to such subcontractor or supplier by the University.

ARTICLE XXI - CONTRACT WORK HOURS AND SAFETY STANDARDS ACT -
OVERTIME COMPENSATION

This contract, to the extent that it is of a character specified in the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333), is subject to the following provisions and to all other applicable provisions and exceptions of such Act and the regulations of the Secretary of Labor thereunder.

1. Overtime Requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, apprentices, trainees, watchmen, and guards shall require or permit any laborer, mechanic, apprentice, trainee, watchman, or guard in any workweek in which he is employed on such work to work in excess of 8 hours in any calendar day or in excess of 40 hours in such workweek on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer, mechanic, apprentice, trainee, watchman, or guard receives compensation at a rate not less than one and one-half times his basic rate of pay for all such hours worked in excess of 8 hours in any calendar day or in excess of 40 hours in such workweek, whichever is the greater number of overtime hours.

2. Violation; Liability for Unpaid Wages; Liquidated Damages. In the event of any violation of the provisions of Section 1., the University and any subcontractor responsible therefor shall be liable to any affected employee for his unpaid wages. In addition, such University and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, apprentice, trainee, watchman, or guard employed in violation of the provisions of Section 1 in the sum of \$10 for each calendar day on which such employee was required or permitted to be employed on such work in excess of 8 hours or in excess of his standard workweek of 40 hours without payment of the overtime wages required by Section 1.

3. Withholding for Unpaid Wages and Liquidated Damages. The Contracting Officer may withhold from the University, from any moneys payable on account of work performed by the University or subcontractor such sums as may administratively be determined to be necessary to satisfy any liabilities of such University or subcontractor for unpaid wages and liquidated damages as provided in the provisions of Section 2

4. Subcontracts. The University shall insert Sections 1. through 4. of this article in all subcontracts, and shall require their inclusion in all subcontracts of any tier.

5. Records. The University shall maintain payroll records containing the information specified in 29 CFR 516.2(a). Such records shall be preserved for three (3) years from the completion of the contract.

ARTICLE XXII - LITIGATION AND CLAIMS

1. Initiation of Litigation. The University may, with the prior written authorization of the Contracting Officer, and shall, upon the request of the Government, initiate litigation against third parties, including proceedings before administrative agencies, in connection with this contract. The University shall proceed with such litigation in good faith and as directed from time to time by the Contracting Officer.

2. Defense and Settlement of Claims. The University shall give the Contracting Officer immediate notice in writing (a) of any action, including any proceeding before an administrative agency, filed against the University arising out of the performance of this contract, and (b) of any claim against the University the cost and expense of which is allowable under the article entitled "Allowable Costs." Except as otherwise directed by the Contracting Officer, in writing, the University shall furnish immediately to the Contracting Officer copies of all pertinent papers received by the University with respect to such action or claim. To the extent not in conflict with any applicable policy of insurance, the University may with the Contracting Officer's approval settle any such action or claim, shall effect at the Contracting Officer's request an assignment and subrogation in favor of the Government of all the University's rights and claims (except those against the Government) arising out of any such action or claim against the University, and, if required by the Contracting Officer, shall authorize representatives of the Government to settle or defend any such action or claim and to represent the University in, or to take charge of, any action. If the settlement or defense of an action or claim against the University is undertaken by the Government, the University shall furnish all reasonable assistance in effecting a settlement or asserting a defense. Where an action against the University is not covered by a policy of insurance, the University shall, with the approval of the Contracting Officer, proceed with the defense of the action in good faith, and in such event the defense of the action shall be at the expense of the Government; provided, however, that the Government shall not be liable for such expense to the extent that it would have been compensated for by insurance which was required by law or by the written direction of the Contracting Officer, but which the University failed to secure through its own fault or negligence.

ARTICLE XXIII - STATE AND LOCAL TAXES

1. The University agrees to notify the Commission of any State or local tax, fee, or charge levied or purported to be levied on or collected from the University with respect to the contract work, any transaction thereunder, or property in the custody or control of the University and constituting an allowable item of cost if due and payable, but which the University has reason to believe, or the Commission has advised the University, is or may be inapplicable or invalid; and the University further agrees to refrain from paying any such tax, fee, or charge unless authorized in writing by the Commission. Any State or local tax, fee, or charge paid with the approval of the Commission or on the basis of advice from the Commission that such tax, fee, or charge is applicable and valid, and which would otherwise be an allowable item of cost, shall not be disallowed as an item of cost by reason of any subsequent ruling or determination that such tax, fee, or charge was in fact inapplicable or invalid.

2. The University agrees to take such action as may be required or approved by the Commission to cause any State or local tax, fee, or charge which would be an allowable cost to be paid under protest; and to take such action as may be required or approved by the Commission to seek recovery of any payments made, including assignment to the Government or its designee of all rights to an abatement or refund thereof, and granting permission for the Government to join with the University in any proceedings for the recovery thereof or to sue for recovery in the name of the University. If the Commission directs the University to institute litigation to enjoin the collection of or to recover payment of any such tax, fee, or charge referred to above, or if a claim or suit is filed against the University for a tax, fee, or charge it has refrained from paying in accordance with this article, the procedures and requirements of the article entitled "Litigation and Claims" shall apply and the costs and expenses incurred by the University shall be allowable items of cost, as provided in this contract, together with the amount of any judgment rendered against the University.

3. The Government shall save the University harmless from penalties and interest incurred through compliance with this article. All recoveries or credits in respect of the foregoing taxes, fees, and charges (including interest) shall inure to and be for the sole benefit of the Government.

ARTICLE XXIV - BONDS AND INSURANCE

The University shall procure and maintain such bonds and insurance as are required by law or by the written direction of the Contracting Officer. The terms of any such bond or insurance policy shall be submitted to the Contracting Officer for approval, upon request. In view of the provisions of the article entitled "Government Property," the University shall not procure or maintain for its own protection any insurance (including self-insurance or reserves) covering loss or destruction of or damage to Government-owned property.

ARTICLE XXV - COPYRIGHT

1. The University agrees to and does hereby grant to the Government, and to its officers, agents, servants and employees acting within the scope of their official duties (a) a royalty-free, nonexclusive and irrevocable license to reproduce, translate, publish, use, and dispose of, and to authorize others so to do, all copyrightable material first produced or composed under this contract by the University, its employees or any individual or concern specifically employed or assigned to originate and prepare such material; and (b) a license as aforesaid under any and all copyrighted or copyrightable work not first produced or composed by the University in the performance of this contract but which is incorporated in the material furnished under the contract, provided that such license shall be only to the extent the University now has, or prior to completion or final settlement of this contract may acquire, the right to grant such license without becoming liable to pay compensation to others solely because of such grant.

2. The University agrees that it will exert all reasonable effort not to include any copyrighted material in any written or copyrightable material furnished or delivered under this contract, without a license as provided for in Section 1. (b) hereof, or without the consent of the copyright owner, unless specific written approval of the Contracting Officer to the inclusion of such copyrighted material is secured.

3. The University agrees to report to the Commission promptly and in reasonable written detail, any notice or claim of copyright infringement received by the University with respect to any material delivered under this contract.

ARTICLE XXVI - UTILIZATION OF LABOR SURPLUS AREA CONCERNS

1. It is the policy of the Government to award contracts to labor surplus area concerns that (a) have been certified by the Secretary of Labor (hereafter referred to as certified-eligible concerns with first

or second preferences) regarding the employment of a proportionate number of disadvantaged individuals and have agreed to perform substantially (i) in or near sections of concentrated unemployment or underemployment or in persistent or substantial labor surplus areas or (ii) in other areas of the United States, respectively, or (b) are noncertified concerns which have agreed to perform substantially in persistent or substantial labor surplus areas, where this can be done consistent with the efficient performance of the contract and at prices no higher than are obtainable elsewhere. The University agrees to use its best efforts to place its subcontracts in accordance with this policy.

2. In compliance with Section 1. of this article and with Section 2. of the article of this contract entitled "Utilization of Small Business Concerns" the University in placing its subcontracts shall observe the following order of preference: (a) certified-eligible concerns with a first preference which are also small business concerns; (b) other certified-eligible concerns with a first preference; (c) certified-eligible concerns with a second preference which are also small business concerns; (d) other certified-eligible concerns with a second preference; (e) persistent or substantial labor surplus area concerns which are also small business concerns; (f) other persistent or substantial labor surplus area concerns; and (g) small business concerns which are not labor surplus area concerns.

ARTICLE XXVII - UTILIZATION OF SMALL BUSINESS CONCERNS

1. It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with small business concerns.

2. The University agrees to accomplish the maximum amount of subcontracting to small business concerns that the University finds to be consistent with the efficient performance of this contract.

ARTICLE XXVIII - SAFETY, HEALTH AND FIRE PROTECTION

The University shall take all reasonable precautions in the performance of the work under this contract to protect the health and safety of employees and of members of the public and to minimize danger from all hazards to life and property, and shall comply with all health, safety, and fire protection regulations and requirements (including reporting requirements) of the Commission. In the event that the University fails to comply with said regulations or requirements of the Commission, the Contracting Officer may, without prejudice to any other legal or contractual rights of the Commission, issue an order stopping

all or any part of the work; thereafter a start order for resumption of work may be issued at the discretion of the Contracting Officer. The University shall make no claim for compensation or damages by reason of or in connection with such work stoppage.

ARTICLE XXIX - UNIVERSITY'S ORGANIZATION

1. Organization Chart. As promptly as possible after the execution of this contract, the University shall furnish to the Contracting Officer a chart showing the names, duties, and organization of key personnel to be employed in connection with the work, and shall furnish from time to time supplementary information reflecting changes therein.

2. Supervising Representative of University. The Laboratory Director, who shall be a competent full-time resident supervising representative of the University, satisfactory to the Contracting Officer, shall be in charge of the work under this contract at all times. The Laboratory Director will be a member of the Institute of Agriculture, University of Tennessee staff, and responsible to the Dean of the Agricultural Experiment Station. BKH

3. Control of Employees. The University shall be responsible for maintaining satisfactory standards of employee competency, conduct, and integrity and shall be responsible for taking such disciplinary action with respect to its employees as may be necessary. The University shall establish such standards and procedures as are necessary to implement effectively the provisions set forth in Atomic Energy Commission Procurement Regulation 9-12.54, and such standards and procedures shall be subject to the approval of the Contracting Officer.

4. Consultant or Other Comparable Employment Services of University Employees. The University shall require all employees who are employed full time (an individual who performs work under the cost-type contract on a full-time annual basis) or part time (50 percent or more of regular annual compensation received under terms of a contract with the Commission) on the contract work to disclose to the University all consultant or other comparable employment services which the employees propose to undertake for others. The University shall transmit to the Contracting Officer all information obtained from such disclosures. The University will require any employee who will be employed full time on this contract work to agree, as a condition of his participation in such work, that he will not perform consultant or other comparable employment services for another Commission cost-type contractor or in the atomic energy field for another organization except with the prior approval of the University. If the University believes, with respect to any employee who is employed full time on this contract work, that any proposed consultant or other comparable employment service for an organization in the atomic energy field other than a Commission cost-type contractor may

involve: (a) a rate of remuneration significantly in excess of the employee's regular rate of remuneration; (b) a significant question concerning possible conflict with the Commission's policies regarding conduct of employees of the Commission's contractors; (c) the University's responsibility to report fully and promptly to the Commission all significant research and development information; or (d) the patent provisions of the University's contract with the Commission, the University shall obtain the prior approval of the Contracting Officer for such consultant or other comparable employment service.

ARTICLE XXX - WALSH-HEALEY PUBLIC CONTRACTS ACT

If this contract is for the manufacture or furnishing of materials, supplies, articles, or equipment in an amount which exceeds or may exceed \$10,000.00 and is otherwise subject to the Walsh-Healey Public Contracts Act, as amended (41 U. S. Code 35-45), there are hereby incorporated by reference all representations and stipulations required by said Act and regulations issued thereunder by the Secretary of Labor, such representations and stipulations being subject to all applicable rulings and interpretations of the Secretary of Labor which are now or may hereafter be in effect. The University shall insert the foregoing in all subcontracts or purchase orders for the manufacture or furnishing of materials, supplies, articles or equipment in an amount which exceeds or may exceed \$10,000.00.

ARTICLE XXXI - COST ACCOUNTING STANDARDS

1. Unless the Cost Accounting Standards Board has prescribed rules or regulations exempting the University or this contract from standards, rules, and regulations promulgated pursuant to 50 U.S.C. App. 2168 (P.L. 91-379, August 15, 1970), the University, in connection with this contract, shall:

a. By submission of a Disclosure Statement, disclose in writing its cost accounting practices as required by regulations of the Cost Accounting Standards Board. The required disclosures must be made prior to contract award unless the Commission provides a written notice to the University authorizing postaward submission in accordance with regulations of the Cost Accounting Standards Board. The practices disclosed for this contract shall be the same as the practices currently disclosed and applied on all other contracts and subcontracts being performed by the University and which contain this Cost Accounting Standards article. If the University has marked the Disclosure Statement to indicate that it contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement will be protected and will not be released outside of the Government.

b. Follow consistently the cost accounting practices disclosed pursuant to a., above, in accumulating and reporting contract performance cost data concerning this contract. If any change in disclosed practices is made for the purposes of any contract or subcontract subject to Cost Accounting Standards Board requirements, the change must be applied prospectively to this contract, and the Disclosure Statement must be amended accordingly. If the contract price or cost allowance of this contract is affected by such changes, adjustment shall be made in accordance with subsection 1.d. or e., below, as appropriate.

c. Comply with all Cost Accounting Standards in effect on the date of award of this contract or, if the University has submitted cost or pricing data, on the date of final agreement on price as shown on the University's signed certificate of current cost or pricing data. The University shall also comply with any Cost Accounting Standard which hereafter becomes applicable to a contract or subcontract of the University. Such compliance shall be required prospectively from the date of applicability to such contract or subcontract.

d. (1) Agree to an equitable adjustment as provided in the Changes article of this contract if the contract cost is affected by a Disclosure Statement change which the University is required to make pursuant to c., above. If the University has not been required to file a Disclosure Statement but is required pursuant to 1.c., above, to change an established practice, then an equitable adjustment shall similarly be agreed to.

(2) Negotiate with the Commission to determine the terms and conditions under which any Disclosure Statement change other than changes under d.(1), above, may be made. A change to a Disclosure Statement may be proposed by either the Government or the University, provided, however, that no agreement may be made under this provision that will increase costs paid by the United States under this contract.

e. Agree to an adjustment of the contract price or cost allowance, as appropriate, if it or a subcontractor fails to comply with an applicable Cost Accounting Standard or to follow any practice disclosed pursuant to 1.a. and 1.b., above, and such failure results in any increased costs paid by the United States. Such adjustment shall provide for recovery of the increased costs to the United States together with interest thereon computed at the rate determined

by the Secretary of the Treasury pursuant to P.L. 92-41, 85 Stat. 97, or 7 percent per annum, whichever is less, from the time the payment by the United States was made to the time the adjustment is effected.

2. If the parties fail to agree whether the University or subcontractor has complied with an applicable Cost Accounting Standard, rule, or regulation of the Cost Accounting Standards Board and as to any cost adjustment demanded by the United States, such failure to agree shall be a dispute concerning a question of fact within the meaning of the Disputes article of this contract.

3. The University shall permit any authorized representative of the Commission, the Cost Accounting Standards Board, or the Comptroller General of the United States to examine and make copies of any documents, papers, or records relating to compliance with the requirements of this article.

4. The University shall include in all negotiated subcontracts which it enters into the substance of this article and shall require such inclusion, except Section 2., in all lower-tier subcontracts, except that this requirement shall apply only to negotiated subcontracts in excess of \$100,000 where the price negotiated is not based on:

(a) Established catalog or market prices of commercial items sold in substantial quantities to the general public; or

(b) Prices set by law or regulation.

5. The terms defined in Section 331.2 of Part 331 of Title 4, Code of Federal Regulations (4 CFR 331.2) shall have the same meanings herein. As there defined, "negotiated subcontract" means "any subcontract except a firm fixed-price subcontract made by a contractor or subcontractor, providing (i) the solicitation to all competing firms is identical, (ii) price is the only consideration in selecting the subcontractor from among the competing firms solicited, and (iii) the lowest offer received in compliance with the solicitation from among those solicited is accepted."

ARTICLE XXXII - UNIVERSITY COMPLIANCE - COST ACCOUNTING STANDARDS

Reference is made to Article XXXI - Cost Accounting Standards. Notwithstanding the provisions of that article, the University shall not be liable to the Government for any increased costs or interest thereon resulting from any failure of the University with respect to activities carried on at the site of the work, or of a subcontractor

to comply with applicable cost accounting standards or to follow any practices disclosed pursuant to the requirements of such article: Provided, That the University shall include in each covered subcontract a clause making the subcontractor liable for any increased costs or interest thereon resulting from any failure of the subcontractor to comply with prescribed standards or disclosed practices.

ARTICLE XXXIII - PRESERVATION OF INDIVIDUAL OCCUPATIONAL RADIATION EXPOSURE RECORDS

Individual occupational radiation exposure records generated in the performance of work under this contract shall be subject to inspection by the Commission and shall be preserved by the University until disposal is authorized by the Commission, or at the option of the University delivered to the Commission upon completion or termination of the contract. If the University exercises the foregoing option, title to such records shall vest in the Commission upon delivery.

ARTICLE XXXIV - PAYMENT OF INTEREST ON UNIVERSITY'S CLAIMS

1. If an appeal is filed by the University from a final decision of the Contracting Officer under the Disputes article of this contract, denying a claim arising under the contract, simple interest on the amount of the claim finally determined owed by the Government shall be payable to the University. Such interest shall be at the rate determined by the Secretary of the Treasury pursuant to Public Law 92-41, 26 Stat. 97, from the date the University furnishes to the Contracting Officer its written appeal under the Disputes article of this contract, to the date of (a) a final judgment by a court of competent jurisdiction, or (b) mailing to the University of a supplemental agreement for execution either confirming completed negotiations between the parties or carrying out a decision of a board on contract appeals.

2. Notwithstanding 1., above, (a) interest shall be applied only from the date payment was due, if such date is later than the filing of appeal, and (b) interest shall not be paid for any period of time that the Contracting Officer determines the University has unduly delayed in pursuing its remedies before a board of contract appeals or a court of competent jurisdiction.

ARTICLE XXXV - PRIORITIES, ALLOCATIONS, AND ALLOTMENTS

The University shall follow the provisions of DMS Regulation 1 and all other applicable regulations and orders of the Bureau of Domestic Commerce, Department of Commerce, in obtaining controlled materials and other products and materials needed to fill this contract.

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ARTICLE XXXVI - UTILIZATION OF MINORITY BUSINESS ENTERPRISES

1. It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of Government contracts.

2. The University agrees to use its best efforts to carry out this policy in the award of its subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, the term "minority business enterprise" means a business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American-Aleuts. The University may rely on written representations by the subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

ARTICLE XXXVII - LISTING OF EMPLOYMENT OPENINGS

(This article is applicable pursuant to 41 CFR 50-250 if this contract is for \$2,500 or more.)

1. The University agrees, in order to provide special emphasis to the employment of qualified disabled veterans and veterans of the Vietnam era, that all suitable employment openings of the University which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment other than the one wherein the contract is being performed but excluding those of independently operated corporate affiliates, shall be offered for listing at an appropriate local office of the State employment service system wherein the opening occurs and to provide such reports to such local office regarding employment openings and hires as may be required. Provided, That if this contract is for less than \$10,000 or if it is with a State or local government the reports set forth in Sections 3. and 4. are not required.

2. Listing of employment openings with the employment service system pursuant to this article shall be made at least concurrently with the use of any other recruitment service or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and nonveterans. This listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and

nothing herein is intended to relieve the University from any requirements in any statutes, Executive orders, or regulations regarding non-discrimination in employment.

3. The reports required by Section 1. of this article shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the University has more than one establishment in a State, with the central office of the State employment service. Such reports shall indicate for each establishment (i) the number of individuals who were hired during the reporting period, (ii) the number of those hired who were disabled veterans, and (iii) the number of those hired who were nondisabled veterans of the Vietnam era. The University shall submit a report within 30 days after the end of each reporting period wherein any performance is made under this contract. The University shall maintain copies of the reports submitted until the expiration of 1 year after final payment under the contract, during which time they shall be made available, upon request, for examination by any authorized representatives of the Contracting Officer or of the Secretary of Labor.

4. Whenever the University becomes contractually bound by the listing provisions of this article, it shall advise the employment service system in each State wherein it has establishments of the name and location of each such establishment in the State. As long as the University is contractually bound to these provisions and has so advised the State employment system, there is no need to advise the State system of subsequent contracts. The University may advise the State system when it is no longer bound by this contract article.

5. This article does not apply to the listing of employment openings which occur and are filled outside of the 50 States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, and the Virgin Islands.

6. This article does not apply to openings which the University proposes to fill from within its own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of its own organization or employer-union arrangement for that opening.

7. As used in this article:

a. "All suitable employment openings" includes, but is not limited to, openings which occur in the following job categories: Production and nonproduction; plant and office; laborers and

mechanics; supervisory and nonsupervisory; technical; and executive, administrative, and professional openings which are compensated on a salary basis of less than \$18,000 per year. The term includes full-time employment, temporary employment of more than 3 days' duration, and part-time employment. It does not include openings which the University proposes to fill from within its own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement.

b. "Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility for serving the area of the establishment where the employment opening is to be filled, including the District of Columbia, the Commonwealth of Puerto Rico, Guam, and the Virgin Islands.

c. "Openings which the University proposes to fill from within its own organization" means employment openings for which no consideration will be given to persons outside the University's own organization (including any affiliates, subsidiaries, and parent companies), and includes any openings which the University proposes to fill from regularly established "recall" or "rehire" lists.

d. "Openings which the University proposes * * * to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings for which no consideration will be given to persons outside of a special hiring arrangement, including openings which the University proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the University and representatives of its employees.

e. "Disabled veteran" means a person entitled to disability compensation under laws administered by the Veterans Administration for a disability rated at 30 percentum or more, or a person whose discharge or release from active duty was for a disability incurred or aggravated in line of duty.

f. "Veteran of the Vietnam era" means a person (A) who (i) served on active duty with the Armed Forces for a period of more than 180 days, any part of which occurred after August 5, 1964, and was discharged or released therefrom with other than a dishonorable discharge, or (ii) was discharged or released from active duty for service-connected disability if any part of such duty was performed after August 5, 1964, and (B) who was so discharged or released within the 48 months preceding his application for employment covered by this article.

8. If any disabled veteran or veteran of the Vietnam era believes that the University (or any first-tier subcontractor) has failed or refuses to comply with the provisions of this contract article relating to giving special emphasis in employment to veterans, such veteran may file a complaint with the veterans' employment representative at a local State employment service office who will attempt to informally resolve the complaint and then refer the complaint with a report on the attempt to resolve the matter to the State office of the Veterans' Employment Service of the Department of Labor. Such complaint shall then be promptly referred through the Regional Manpower Administrator to the Secretary of Labor who shall investigate such complaint and shall take such action thereon as the facts and circumstances warrant consistent with the terms of this contract and the laws and regulations applicable thereto.

9. The University agrees to place this article (excluding this Section 9.) in any subcontract directly under this contract.

ARTICLE XXXVIII - PRICE STABILIZATION CERTIFICATION

The University certifies that it is in compliance with the price stabilization requirements of Executive Order 11723, dated June 13, 1973, and amendments thereof, and the regulations of the Cost of Living Council as set forth in Title 6, Code of Federal Regulations, Part 140, or any additions or revisions to Title 6.

ARTICLE XXXIX - DEFINITIONS

As used throughout this contract, the following terms shall have the meanings set forth below:

1. The term "Contracting Officer" means the person executing this contract on behalf of the Government and includes his successors or duly authorized representative of any such person.

2. The term "Commission" means the United States Atomic Energy Commission or any duly authorized representative thereof, including the Contracting Officer except for the purpose of deciding an appeal under the article entitled "Disputes."

3. Except as otherwise provided in this contract, the term "subcontracts" means purchase orders under this contract.

APPENDIX III

PROPOSED MODIFICATION NO. 21 TO
CONTRACT NO. AT-(40-1)-GEN-242
WITH THE UNIVERSITY OF TENNESSEE
AND
EXPLANATION OF PROPOSED DEVIATIONS
FROM
CURRENT AEC POLICIES

The following items set forth: (a) the references to the current articles in the contract as contained in Modifications numbered 19 and 20; (b) the significant changes, if any, made in the current articles by proposed Modification No. 21; and (c) the significant manner, if any, in which the articles in the proposed Modification No. 21 differ from the current policies of the Commission. The omission of a reference to an article indicates that the existing article was included in the proposed modification, that no substantial change was made thereto, and that such article in the proposed modification does not substantially deviate from the current policies of the Commission.

1. Article I - Statement of Work. In Section 2., the phrase, "Government-owned farm lands, buildings, and agricultural research facilities" was changed to "Government-owned lands, buildings, and radiobiological research facilities." In Section 3., subsection a. was deleted, and the provisions of subsection a. in the proposed modification were substituted therefor; subsection b. was deleted; and subsection c. was renumbered subsection b. Section 8. was deleted and the provisions of Section 8. in the proposed modification were substituted therefor.
2. Article II - Term and Termination. The date "June 30, 1974" was changed to "June 30, 1979." Since the portion of the article dealing with termination predates AECPR 9-8.753, it continues to differ therefrom.
3. Article III - Allowable Costs. In Section 3., the last paragraph

revised to omit the words "bond discounts and expenses, and cost of financing and refinancing operations" since such provisions are inapplicable to the University (see III,4.m.); and (5) 9-7.5006-9(e)(17)(ii) was tailored to fit the University. (See III,4.o.(2). In this connection, see also Article XXXIX, 4. of Modification No. 21.)

4. Article IV - University Indemnity. No changes were made in this article. Although this is not a standard clause, we do not feel that, for the reasons stated in the previous submissions, the indemnity provided by this article is of such magnitude as to bring it within the purview of AECPR 9-4.5011.
5. Article V - Obligation of Funds. This article was revised to conform to AECPR 9-7.5006-15 with the exceptions that: all words and phrases relating to fee were omitted; and the references therein to the clause of the contract entitled "Payment and Advances" was changed to "Payments."
6. Article VI - Payment and Advances. This article was deleted in its entirety, and a new Article VI was redrafted using AECPR 9-7.5006-23 as a model. However, Sections 1, 2, 3, 5 (last sentence only), and 8 in the proposed modification differ from AECPR 9-7.5006-23(b), (c), (d), (e), and (i). These differences reflect the current payment arrangement of a change to a letter of credit method of payment without the use of a "special bank account."
7. Article VII - Accounts, Records, and Inspection. No changes were made in this article. It continues to differ from AECPR 9-7.5006-1(d), AECPR 9-7.5006-13, and AECPR 9-7.5006-59 in that all these requirements have been combined in the redrafted Section 4. in order to give recognition to the University's ownership of many of the fiscal records.
8. Article VIII - Examination of Records. The title and provisions of this article were revised to comply with the present provisions of FPR 1-7.103-3 and AECPR 9-7.5004-10.
9. Article IX - Government Property. In Section 5., the phrase "or the Laboratory Director or other full-time supervising representative of the University," as such appears in two places therein, was omitted (in this connection, see Article XXXIX, 4. of Modification No. 21); in Section 7., the phrase "Except as otherwise provided in this contract" was added at the beginning of the one sentence thereof; and Section 8. was omitted in its entirety. This article continues to differ from AECPR 9-7.5006-26 in that: (1) 9-7.5006-26(a) was omitted since the subject thereof was covered in Article I; (2) the third and fourth sentences of 9-7.5006-26(b) were omitted from Section 1., since the Government's reservation of its right to

inspect, accept, or reject property acquired by the cost-type contractor is not felt to be applicable to an operating contractor of the Commission; (3) two revisions were made in 9-7.5006-26(b) to make the provision compatible with the concept of "allowable costs" rather than "reimbursement"; and (4) the third sentence of 9-7.5006-26(d) was revised to make the provisions of Section 3. compatible with the concept of "advance payments" rather than "allowable costs."

10. Article X - University Procurement. This article differs from AECPR 9-7.5006-29 in that subsection (c) continues to be omitted since such provisions are inapplicable to the University.
11. Article XX - Security. The provisions of this article were revised to conform to the present provisions of AECPR 9-7.5004-11. The Title was changed to reflect the addition of the new Section 8., which was added pursuant to AECPR 9-7.5004-21.
12. Article XXI - Contract Work Hours Standards Act - Overtime Compensation. The title and provisions of this article were revised to conform to the present provisions of FPR 1-12.303.
13. Article XXII - Removal of Individuals From Oak Ridge Area. This article was omitted in its entirety.
14. Article XXIII - Litigation and Claims. The provisions of this article were revised to conform to the present provisions of AECPR 9-7.5006-50. See Article XXII of Modification No. 21.
15. Article XXVI - Copyright. No changes were made in this article. This article (see Article XXV of Modification No. 21) continues to differ from AECPR 9-9.5103(e) in that Section 2. thereof was drafted around the concept of the University's using reasonable effort to accomplish the objective sought therein. This deviation appears more reasonable to us in view of the numerous reports, etc., produced by the University.
16. Article XXVII - Utilization of Concerns in Labor Surplus Areas. The title and provisions of the article were revised to conform to the present provisions of FPR 1-1.805-3(a). (See Article XXVI of Modification No. 21.)
17. Article XXVIII - Labor Surplus Area Subcontracting Program. This article was omitted in its entirety because of the decrease in the volume of procurement under the contract.

18. Article XXX - Small Business Subcontracting Program. This article was likewise omitted in its entirety because of the decrease in the volume of procurement under the contract.
19. Article XXXI - Safety, Health and Fire Protection. No changes were made in this article. This article (see Article XXVIII of Modification No. 21) continues to differ from AECPR 9-7:5006-47 in that the words "an extension of time or for" are omitted from the last sentence since they are clearly inapplicable in a cost-type contract of this category.
20. Article XXXII - University's Organization. Section 2. of this article was deleted and the provisions of Section 2. of Article XXIX of Modification No. 21 were substituted therefor. As revised, it continues to differ from AECPR 9-7:5006-6(b).
21. Article XXXIII - Walsh-Healey Public Contracts Act. No significant changes were made in this article. This article (see article XXX of Modification No. 21) continues to differ from FPR 1-12.605 in that the last sentence was added to make the requirements of the Act applicable to suppliers and/or subcontractors to the University since the requirements of the Act are not applicable to the University, itself.
22. Article XXXIV - Definitions. This article was renumbered as Article XXXIX of Modification No. 21 and a new Section 4. was added which is self-explanatory.
23. Article XXXV - Cost Accounting Standards. This article, as presently appears in Modification No. 20, was renumbered as Article XXXI in Modification No. 21, and the note appearing under Section 4. thereof was omitted.
24. Article XXXVI - University Compliance - Cost Accounting Standards. This article, as presently appears in Modification No. 20, was renumbered as Article XXXII in Modification No. 21.
25. The following articles were added to the contract by Modification No. 21 for reasons cited below.
 - a. Article XXXIII - Preservation of Individual Occupational Radiation Exposure Records AECPR 9-5006-60.

- b. Article XXXIV - Payment of Interest on University's Claims FPR 1-1.322(b)
- c. Article XXXV - Priorities, Allocations, and Allotments AECPR 9-7.5006-52
- d. Article XXXVI - Utilization of Minority Business Enterprises FPR 1-1.1310-2(a)
- e. Article XXXVII - Listing of Employment Openings FPR 1-12.1102-2
- f. Article XXXVIII - Price Stabilization Certification FPR, Temp. Reg. 32



UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

OAK RIDGE OPERATIONS
P. O. BOX E
OAK RIDGE, TENNESSEE 37830

AREA CODE 615
TELEPHONE 483 8611

Letter Supplement to
Contract No. EY-76-C-05-0242
(Formerly Contract No. E(40-1)-Gen-242)
Modification No. A023
UNIVERSITY OF TENNESSEE
December 21, 1976

University of Tennessee
ATTN: Dr. Joseph E. Johnson
Vice President
Knoxville, Tennessee 37916

Gentlemen:

OBLIGATION OF FUNDS - CONTRACT NO. EY-76-C-05-0242

Pursuant to the provisions of Article V, Section 1, of Contract No. EY-76-C-05-0242, you are advised that the amount of funds obligated by the Government under said contracts has been increased from \$22,274,369.00 to \$22,683,369.00.

Please acknowledge receipt of this Letter Supplement in the space provided below and return one copy to this office.

Sincerely,

UNITED STATES OF AMERICA

BY: ADMINISTRATOR OF ENERGY RESEARCH
AND DEVELOPMENT ADMINISTRATION

BY:

James A. Hall
Contracting Officer

OFFICE OF THE DEAN
UNIVERSITY OF TENNESSEE
Dean

MC:JJF

RECEIVED:

UNIVERSITY OF TENNESSEE

BY:

TITLE:

DATE:

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Contract No. AT-(40-1)-GEN-242
UNIVERSITY OF TENNESSEE
Modification No. 19

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 19th day of May, 1969, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and the UNIVERSITY OF TENNESSEE (hereinafter called the "University");

WITNESSETH THAT:

WHEREAS, the Government and the University entered into Contract No. AT-(40-1)-GEN-242, dated May 11, 1948, for the performance of certain studies and related work in regard to the effects of radiation on domestic animals and crops; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 - 18; and

WHEREAS, the parties hereto desire to further modify said contract to extend the term thereof, to make certain other changes as are included hereinafter, and to integrate all of the terms of the contract in one supplemental agreement; and

WHEREAS, this Supplemental Agreement is authorized by and executed under Section 302(c)(15) of the Federal Property and Administrative Services Act 1949, as amended, and the Atomic Energy Act of 1954, as amended;

NOW, THEREFORE, the parties hereto do mutually agree that from and after the date of this modification said Contract No. AT-(40-1)-GEN-242 is amended to read in its entirety as follows:

ARTICLE I - STATEMENT OF WORK

1. The Government expressly engages the University to manage, operate, and maintain the facilities described below and to perform the work and services described in this contract, including the utilization of information, material, funds, and other property of the Commission, the collection of revenues, and the acquisition, sale or other disposal of property for the Commission, subject to the limitations as hereinafter set forth. The University undertakes and promises to manage, operate, and maintain said facilities, and to perform said work and services, upon the terms and conditions herein provided and in accordance with such directions and instructions not inconsistent with this contract which the

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Commission may deem necessary or give to the University from time to time. In the absence of applicable directions and instructions from the Commission, the University will use its best judgment, skill, and care in all matters pertaining to the performance of this contract. The University will not be required to operate the facilities below in any manner which it deems unsafe to the facilities or personnel.

2. The facilities to be managed, operated, and maintained by the University hereunder consist of the Government-owned farm lands, buildings, and agricultural research facilities located in Anderson and Roane Counties, being along the west side of the Clinch River and generally east or southeast of the plant areas known as X-10 and Y-12. The lands currently included total approximately 5000 acres.

3. The University shall manage, operate, and maintain the facilities described in Section 2. above in accordance with programs approved in writing from time to time by the Commission. The functions to be performed include but are not necessarily limited to the following:

a. The performance of studies and related work in regard to the effects and use of radionuclides and radiation, with principal emphasis on domestic and laboratory animals. Studies of radiation effects on plant species, plant breeding, and soils will continue.

b. Procurement and/or maintenance of suitable quantities of experimental and control animals.

c. Cooperation with educational and other institutions or organizations.

4. Upon request of the Commission and acceptance thereof by the University, the University shall procure by subcontract the construction of new facilities or the alteration or repair of Government-owned facilities. Any subcontract entered into under this section shall be subject to the written approval of the Commission and shall contain the provisions relative to labor and wages required by law to be included in contracts for the construction, alteration and/or repair, including painting and decorating, of a public building or public work.

5. Administration of Contracts made by the University. The administration of all subcontracts, purchase orders, and other contractual agreements made by the University, including responsibility for payment from the Government funds advanced and agreed to be advanced hereunder to the University, shall, during the period of this contract, remain in the University unless and until transferred to the Government

or other designee of the Commission, at the direction or with the approval of the Commission.

6. Related Services.

a. In addition to the services specifically described in other provisions of this Article I, the University shall perform such other services, incidental or related to the services described in this Article I or to the programs of the Commission as the Commission and the University shall agree in writing from time to time will be performed under this contract either for the Commission or its contractors. The costs incurred by the University in performing such services shall be allowable in accordance with the provisions of Article III.

b. The University, to the extent it is in a position to do so, will render such services, including transfers of property to Federal agencies and to other cost-type contractors of the Commission as requested in accordance with such procedures and requirements as the Commission may establish from time to time. The University will receive transfers of funds therefor from such Federal agencies and other cost-type contractors to the extent that such transfer is required by and in accordance with policies adopted from time to time by the Commission. The funds received in exchange for such services shall be handled as a part of the advances of Government funds as provided in Article VI. In the performance of such services, the University is authorized to use facilities, materials, and equipment in its custody under this contract. The costs incurred by the University in the performance of any such services shall be allowable costs in accordance with the provisions of Article III. With the approval of the Commission, the University may render the same services, including transfers of property, to lump-sum or unit-price Commission contractors under the terms and conditions herein stated, and the payments received therefor shall be for the account of the Government and will be received, held, and utilized as a part of the advances of Government funds pursuant to Article VI.

7. General.

a. The University shall perform the maintenance work necessary for the efficient operation of the facilities to the extent such work is included in work programs agreed in writing between the University and the Commission. Projects which under applicable procedures adopted by the Commission from time to time require

the issuance of a directive therefor by the Commission shall not be undertaken until such directive has been issued.

b. In carrying out the work under this contract, the University shall, subject to the general control of the Commission, do all things necessary in the best judgment of the University in the management, operation, and maintenance of the facilities; provided that, whenever approval or other action by the Commission is required with respect to any expenditure or commitment by the University under the terms of this contract, the Government shall not be responsible unless and until such approval or action is obtained or taken.

c. In carrying out the work under this contract, the University shall be responsible for the employment of all professional, technical, skilled, and unskilled personnel engaged and to be engaged by the University in the work hereunder, and for the training of personnel. Persons employed by the University shall be and remain employees of the University, and shall not be deemed employees of the Commission or Government; provided, that nothing herein shall require the establishment of any employer-employee relationship between the University and consultants and others whose services are utilized by the University for the work hereunder.

d. The University shall exert its best efforts to acquire for the Government such materials, supplies, equipment, and facilities required in connection with work under this contract as are not furnished by the Government.

8. a. The University may, at its expense, furnish to the Commission animals to carry out programs approved pursuant to Section 3. above. Such animals may be furnished in any number mutually agreed to in writing. Title to animals furnished pursuant to this paragraph shall pass to the Government upon delivery to the farm facilities maintained under this contract, subject, however, to the rights of the University provided in Article IX, Section 8. of this contract.

b. The identity of animals furnished under Paragraph a. above shall be preserved until such time as they may be sold, destroyed, or otherwise disposed of.

c. The University may utilize animals and Government facilities maintained for programs approved pursuant to Section 3 above, at the place of such maintenance, for its own programs including but not limited to progeny testing, production testing, and feeding and pasture tests, in accordance with plans therefor prepared by the University and concurred in by the Commission. It is understood that with the approval of the Commission, animals may be brought to the farm facilities maintained under this contract for brief periods of time (not exceeding eight months) for testing purposes, and that title to such animals shall not vest in the Government. In no event shall the activities approved pursuant to this paragraph be of a character or be carried on in such manner as to interfere with utilization of animals and Government facilities for programs of the Commission and such activities shall be conducted at no increased costs to the Government. No such activity shall constitute work under this contract.

ARTICLE II - TERM AND TERMINATION

1. This contract shall continue until June 30, 1974, unless sooner terminated by either party in accordance with other provisions of this Article II.

2. a. This contract may be terminated by the Government for its convenience whenever the Commission, in its discretion, considers such termination to be in the best interest of the Government, and, accordingly, mails or delivers a Notice of Termination to the University (at Oak Ridge or at the University's home office) which states that effective on a date specified therein (which date shall be at least 60 calendar days after the date of such mailing or delivery) this contract shall be terminated.

b. The Government shall also have the right to terminate (from time to time) contract work, in part, for its convenience, whenever the Commission, in its discretion, considers such termination to be in the best interest of the Government, and accordingly, mails or delivers a Notice of Partial Termination to the University (at Oak Ridge or at the University's home office) which states that effective on a date specified therein (which date shall be at least 60 calendar days after the date of such mailing or delivery) such of the contract work as is specified therein shall be terminated. It is understood that in no event shall such a termination be deemed to be a termination of this contract.

3. This contract may be terminated by the University for its convenience upon at least six months' prior written notice to the Commission.

4. Immediately upon the receipt by either party of any notice provided for in Sections 2. and 3. above, both parties shall in good faith do all things necessary, in the light of such notice, to assure the efficient and proper close-out (including, but not restricted to, protection of Government property) of the terminated work. The University will be allowed its costs, pursuant to the provisions of Article III, for its close-out costs and expenses (including, but not restricted to, those attendant on taking such steps as the Commission may require in connection with outstanding commitments and claims).

ARTICLE III - ALLOWABLE COSTS

1. Compensation for University's Services. Payment for the allowable cost as herein defined shall constitute full and complete compensation for the performance of the work under this contract.

2. Allowable Cost. The allowable cost of performing the work under this contract shall be the costs and expenses that are actually incurred by the University in the performance of the contract work accordance with its terms, that are necessary or incident thereto, and are determined to be allowable pursuant to this Section 2. The determination of the allowability of cost hereunder shall be based on:
(a) reasonableness, including the exercise of prudent business judgment,
(b) consistent application of generally accepted accounting principles and practices that result in equitable charges to the contract work, and
(c) recognition of all exclusions and limitations set forth in this article or elsewhere in this contract as to types or amounts of items of cost. Allowable costs shall not include cost of any item described as unallowable in Section 4. of this article, except as indicated therein. Failure to mention an item of cost specifically in Section 3. or Section 4. shall not imply either that it is allowable or that it is unallowable.

3. Examples of Items of Allowable Cost. Subject to the other provisions of this article, the following examples of items of cost of work done under this contract shall be allowable to the extent indicated:

a. Bonds and insurance including self-insurance, as provided in the article entitled "Required Bonds and Insurance."

b. Communication costs including telephone services, local and long distance calls, telegrams, cablegrams, radiograms, postage and similar items.

c. Consulting services (including legal and accounting), and related expense, as approved by the Contracting Officer, except as made unallowable by Paragraph 4. v.

d. Litigation expenses, including reasonable counsel fees, incurred in accordance with the article of this contract entitled "Litigation and Claims."

e. Losses and expenses (including settlements made with the consent of the Contracting Officer) sustained by the University in the performance of this contract and certified in writing by the Contracting Officer to be just and reasonable, except the losses and expenses made unallowable under other provisions of this contract.

f. Materials, supplies and equipment, including freight, transportation, material handling, inspection, storage, salvage, and other usual expenses incidental to the procurement, use and disposition thereof, subject to approvals required under other provisions of this contract.

g. Patents, purchased design, and royalty payments to the extent expressly provided for under other provisions in this contract or as approved by the Contracting Officer; and preparation of invention disclosures, reports and related documents and searching the art to the extent necessary to make such invention disclosures in accordance with the article of this contract entitled "Patents."

h. Personnel costs and related expenses incurred in accordance with Appendix A, or amendments thereto such as:

(1) Salaries and wages; bonus and incentive compensation; overtime, shift differential, holiday and other premium pay for time worked; nonwork time including vacations, holidays, sick, funeral, military, jury, witness and voting leave; salaries and wages to employees in their capacity as union stewards and committeemen for time spent in handling grievances, negotiating agreements with the University, or serving on labor-management (University) committees; Provided, however, That the Contracting Officer's approval is required in each instance of total compensation to an individual employee at an annual rate of \$25,000 or more, when it is proposed that a total of fifty percent or more of such compensation be reimbursed under AEC

cost-type contracts. Total compensation, as used here, includes only the employee's base salary and bonus and incentive compensation payments.

(2) Legally required contributions to old age and survivors' insurance, unemployment compensation plans and workmen's compensation plans (whether or not covered by insurance); voluntary or agreed upon plans providing benefits for retirement, separation, life insurance, hospitalization, medical-surgical and unemployment (whether or not such plans are covered by insurance).

(3) Travel (except foreign travel, which requires specific approval by the Contracting Officer on a case-by-case basis); incidental subsistence and other allowances of University employees, in connection with performance of work under this contract (including new employees reporting for work and transfer of employees, the transfer of their household goods and effects and the travel and subsistence of their dependents).

(4) Employee relations, welfare, morale, etc., programs, including incentive or suggestion awards, employee counseling services, health or first-aid clinics and house or employee publications.

(5) Personnel training (except special education and training courses and research assignments calling for attendance at educational institutions which require specific approval by the Contracting Officer on a case-by-case basis) including apprenticeship training programs designed to improve efficiency and productivity of contract operations, to develop needed skills and to develop scientific and technical personnel in specialized fields required in the contract work.

(6) Recruitment of personnel (including help-wanted advertisement) including services of employment agencies at rates not in excess of standard commercial rates, employment office, travel of prospective employees at the request of the University for employment interviews; and

(7) Net cost of operating plant-site cafeterias, dining rooms and canteens attributable to the performance of this contract.

Appendix A may be modified from time to time, in writing, without execution of an amendment to this contract for the purposes of effecting any changes in or additions to Appendix A as may be agreed upon by the parties.

Provided, however, the Commission and the University may, when so mutually agreed in writing, share the salaries of scientific and technical employees (other than Department Heads and personnel in higher classifications of the University) who are expected to give 50% or more, but less than 100% of their time to work under this contract, and the sharing of these salaries shall be in accordance with the provisions of Appendix A; provided further that the salary of the Laboratory Director may be shared by the Commission and the University to the extent mutually agreed upon in writing from time to time by the Commission and the University; and provided further that no part of the salary or wages of any scientific or technical employees who are expected to give less than 50% of their time to work under this contract shall be allowable costs.

i. Repairs, maintenance, inspection, replacement and disposal of Government-owned property and the restoration or cleanup of site and facilities to the extent directed or approved by the Contracting Officer.

j. Subcontracts and purchase orders subject to approvals required by other provisions of this contract.

k. Subscriptions to trade, business, technical, and professional periodicals, as approved by the Contracting Officer.

l. Taxes, fees, and charges levied by public agencies which the University is required by law to pay, except those which are expressly made unallowable under other provisions of this contract.

m. Utility services, including electricity, gas, water, steam, and sewerage.

n. Establishment and maintenance of bank accounts in connection with the work hereunder, including, but not limited to, service charges, the cost of disbursing cash, necessary guards, cashiers, and paymasters. If payments to employees are made by check, facilities and arrangements for cashing checks may be provided without expense to the employees, subject to the approval of the Contracting Officer.

4. Examples of Items of Unallowable Costs. The following specific items of costs assumed by the University (Paragraphs a., b., and c.) and the further examples of items of costs are unallowable under this contract to the extent indicated:

a. The salaries of Department Heads and personnel in higher classifications of the University and of scientific and technical personnel to the extent that such salaries are not specifically allowable under the provisions of 3. h. above.

b. Costs and expenses of the University for keeping or handling books, records of account, and data in its home office.

c. Costs and expenses of the University, incurred in its home offices, in connection with the administration of this contract.

d. Advertising, except (i) help-wanted advertising, and (ii) other advertising (such as costs of participation in exhibits) approved by the Contracting Officer as clearly in furtherance of work performed under this contract.

e. Bad debts (including expenses of collection) and provisions for bad debts arising out of other business of the University.

f. Bidding expenses and costs of proposals.

g. Bonuses and similar compensation under any other name, which (i) are not pursuant to an agreement between the University and employee prior to the rendering of the services or an established plan consistently followed by the University, (ii) are in excess of those costs which are allowable by the Internal Revenue Code and regulations thereunder, or (iii) provide total compensation to an employee in excess of reasonable compensation for the services rendered.

h. Central and branch office expenses of the University, except as specifically set forth in this contract.

i. Commissions, bonuses and fees (under whatever name) in connection with obtaining or negotiating for a Government contract or a modification thereto.

j. Contingency reserves, provision for.

k. Contributions and donations.

1. Entertainment costs, except the costs of such recreational activities for on-site employees as may be approved by the Contracting Officer or provided for elsewhere in this contract.

m. Fines and penalties including assessed interest, resulting from violations of, or failure of the University to comply with Federal, state, or local laws or regulations, except when incurred in accordance with the written approval of the Contracting Officer or as a result of compliance with the provisions of this contract.

n. Government-furnished property, except to the extent that cash payment therefor is required pursuant to procedures of the Commission applicable to transfers of such property to the University from others.

o. Insurance (including any provision of a self-insurance reserve) on any person where the University under the insurance policy is the beneficiary, directly or indirectly, and insurance against loss of or damage to Government property as defined in the article of this contract entitled "Government Property."

p. Interest, however represented, except interest incurred in compliance with article entitled "State and Local Taxes."

q. Legal, accounting, and consulting services and related costs incurred in connection with the preparation of prospectuses, preparation and issuance of stock rights, organization or reorganization, prosecution or defense of antitrust suits, prosecution of claims against the United States, contesting actions or proposed actions of the United States, and prosecution or defense of patent-infringement litigation.

r. Losses (including litigation expenses, counsel fees, and settlements) on, or arising from the sale, exchange, or abandonment of capital assets, including investments; losses on other contracts, including the University's contributed portion under cost-sharing contracts; losses in connection with price reductions to and discount purchases by employees and others from any source; and losses where such losses or expenses

(1) are compensated for by insurance or otherwise or which would have been compensated by insurance required by law or by written direction of the Contracting Officer but which the University failed to procure or maintain through its own fault or negligence;

(2) result from willful misconduct or lack of good faith on the part of any of the University's corporate officers; and

(3) represent liabilities to third persons for which the University has expressly accepted responsibility under other terms of this contract.

s. Membership in trade, business, and professional organizations except as approved by the Contracting Officer.

t. Storage of records pertaining to this contract after completion of operations under this contract irrespective of contractual or statutory requirement of the preservation of records.

u. Travel expenses of the University's responsible supervising representative, and officers, proprietors, executives, administrative heads and other employees of the University's central office or branch office organizations concerned with the general management, supervision and conduct of the University's business as a whole, except to the extent that particular travel is in connection with the contract and approved by the Contracting Officer.

v. Salary or other compensation (and expenses related thereto) of any individual employed under this contract as a consultant or in another comparable employment capacity who is an employee of another organization and concurrently performing work on a full-time annual basis for that organization under a cost-type contract with the Commission, except to the extent that cash payment therefor is required pursuant to the provisions of this contract or procedure of the Commission applicable to the borrowing of such an individual from another cost-type contractor.

w. First-class air travel in excess of the cost of less than first-class air accommodations. except when less than first-class accommodations are not reasonably available to meet necessary mission requirements, such as where less than first-class accommodations would

(1) Require circuitous routing.

(2) Require travel during unreasonable hours.

(3) Greatly increase the duration of the flight.

(4) Result in additional costs which would offset the transportation savings.

(5) Offer accommodations which are not reasonably adequate for the medical needs of the traveler.

ARTICLE IV - UNIVERSITY INDEMNITY

1. In view of the fact that the University will perform the work under this contract without fee, it is agreed that, subject to Section 2. of this article:

a. The University shall not be liable to the Government for any delays or failures in connection with the contract work.

b. The Government shall indemnify the University against and the University shall have the right to look to the Government for recognition as allowable costs all losses-expenses (including, but not limited to litigation), and/or damages (including, but not limited to liability to third parties because of death, bodily injury, and property damage) of any kind whatsoever arising out of or in connection with contract work.

2. a. The provisions of Section 1. above shall not apply with respect to such costs and expenses as are assumed by the University or are made unallowable under other provisions of this contract.

b. The provisions of Section 1. above shall apply only to the extent that such damage, loss, destruction and/or expense is not due to any act, or failure to act, on the part of a then corporate officer of the University which is tantamount to willful misconduct or gross negligence.

c. The provisions of Section 1. above are subject to the provisions of Article V of this contract.

ARTICLE V - OBLIGATION OF FUNDS

1. The amount presently obligated by the Government with respect to this contract is \$12,500,148.00. The Commission may increase the obligation unilaterally by written notice to the University.

2. Payment to the University on account of allowable costs shall not in the aggregate at any time exceed the amount of funds currently obligated hereunder.

3. a. The University shall notify the Commission in writing when (i) the amount of funds obligated under Section 1. above, plus (ii) receipts and revenues (other than advances) deposited to the Government's account as provided in Article VI, and the University's estimate of amounts to be received, less (iii) the aggregate of expenditures to date, and the University's estimate of the amount required to liquidate outstanding liabilities and claims at the end of the period hereinafter specified, are in the University's best judgment sufficient only to continue operations at the programmed rate for forty-five (45) days.

b. At such time after the giving of such notice as the University's aggregate expenditures and the University's then current estimate of the amount required to liquidate outstanding liabilities are, in its best judgment, equal to the total of the amounts computed as provided in a. (i) and a. (ii) above, the University shall make no further commitments or expenditures (except to meet existing commitments) and shall be excused from further performance of the work unless and until the Contracting Officer thereafter shall increase the funds obligated with respect to this contract.

4. In addition to the limitations provided for elsewhere in this contract, the Commission may, through Financial Plans or other directives issued to the University, establish controls on the costs to be incurred and commitments to be made in the performance of the contract work. Such plans and instructions may be amended or supplemented from time to time by the Commission. The University hereby agrees to comply with the specific limitations (ceilings) on costs and commitments set forth in such plans and directives, to use its best efforts to comply with the other requirements of such plans and directives, and to promptly notify the Commission in writing whenever it has reason to believe the authorized financial levels of costs and commitments will be exceeded or substantially underrun.

5. The giving of any notice under this article shall not be construed to waive or impair any right of the Government to terminate the contract under the provisions of the article entitled "Term and Termination."

ARTICLE VI - PAYMENT AND ADVANCES

1. a. Payment for allowable costs shall be made by the University from the bank account or accounts wherein are deposited the advances from the Government, and revenues received in the performance of the contract work which account or accounts are described in Paragraph 2. c. below.

b. The University shall prepare and submit monthly or at such other intervals mutually agreed upon a voucher for the total of net expenditures (gross expenditures stated separately from receipts) for the period covered by the voucher and accompanied by such

supporting data as the Commission may require. The Commission shall promptly pay such voucher subject to subsequent audit of the University's accounting records. In addition, the University shall prepare and submit annually a voucher, for the total of net expenditures accrued (i.e., net costs incurred) for the period covered by the voucher, and the Commission, after audit and appropriate adjustment, will approve such voucher. This approval will be based on periodic audits made by the Commission during the year and the University will be advised of the results of these audits. The approval by the Commission will constitute an acknowledgement by the Commission that the net costs incurred were allowable under the contract and that they had been recorded in the University's accounts in accordance with Commission accounting policies, but will not relieve the University of responsibility for the Commission's assets in its care, or for errors later becoming known to the Commission; nor will such approval affect the audit responsibilities of the General Accounting Office.

2. a. It is the intent of the parties that the University shall not be required to utilize its own funds in making payments for allowable costs under this contract. Accordingly, the Government shall advance to the University from time to time (when in the opinion of the Commission the University's need therefor develops) such interest-free sums (hereinafter referred to as "advances") as the Commission, after consultation with the University and taking into consideration revenues received by the University, deems adequate to enable the University to continue to make payments for allowable costs under this contract in furtherance of its performance.

b. As a condition precedent to the making of any such advances, the University shall furnish the Government with such security as the Commission may prescribe as adequate; provided, however, that if no other security is prescribed by the Commission, the terms of this contract shall be deemed to be security prescribed as adequate; and provided, further, that if at any time the Commission considers the then security inadequate, the University shall furnish such additional security, in the form of a surety bond or surety bonds, as shall be satisfactory to the Commission. Any security in addition to the terms of this contract shall be furnished by the University at the University's nonreimbursable expense.

c. Until liquidated as provided herein, any advances or any revenues received by the University in connection with the work under this contract shall be deposited in such bank account or accounts as the University's Board of Trustees approves; said monies may, subject to the approval of the University's Board of Trustees, be commingled with other monies of the University in which the Government has no interest by reason of this contract. It is expressly understood, however, that the University's records and books shall, at all times, and to the satisfaction of the Commission, adequately cover such advances and revenues received in connection with the work under this contract. It is further understood that said monies shall be used by the University exclusively for the purpose of making payment of allowable costs under this contract. If the Contracting Officer shall at any time determine that the balance of advances and revenues on hand exceeds the University's current needs, the University shall make such disposition of the excess as the Contracting Officer may direct.

d. Upon expiration of this contract or its termination by either party, and upon the furnishing by the University of a release, in such form and with such exceptions as may be approved by the Contracting Officer, of all claims against the Government under or arising out of this contract, accompanied by the accounting for Government-owned property in the University's care, the Government shall promptly pay to the University the unpaid balance of allowable costs. In arriving at the amount due the University under this paragraph there shall be deducted (1) all unliquidated advances and revenues received by the University in connection with the performance of the work under this contract, (2) any other unliquidated payments on account theretofore made to the University, (3) any claim which the Government may have against the University in connection with this contract, and (4) deductions due under the terms of this contract, and not otherwise recovered by or credited to the Government. If the unliquidated balance of advances and other revenues exceeds the amount otherwise due the University, the excess shall be remitted by the University to the Government forthwith.

e. Any revenues accruing to the University in connection with the work under this contract shall be received for the account of the Government and shall be received, held and utilized as a part of the advances from the Government pursuant to Paragraph a. above.

f. The Government reserves the right, upon ten days' written notice from the Contracting Officer to the University, to pay directly to the persons concerned any charges for services, materials, or freight which otherwise would be allowable under this contract. Any payment so made shall discharge the Government of all liability to the University therefor.

g. The University shall, at all reasonable times, afford the Commission proper facilities for the inspection and audit of the University's pertinent accounts, and the Commission shall have the right (to the extent of the University's rights), during business hours, to inspect and make copies of any entries in the books and records, of the pertinent bank or banks, pertaining to advances to and revenues received by the University under this contract.

h. No advance payments shall be made by the University in connection with any subcontracts or other commitments made by the University hereunder without the prior written approval of the Commission.

ARTICLE VII - ACCOUNTS, RECORDS AND INSPECTION

1. Accounts. The University shall maintain accounts, records, documents and other evidence showing and supporting all allowable costs incurred, revenues or other applicable credits, fixed-fee accruals, and the receipt, use, and disposition of all Government property coming into the possession of the University under this contract. The system of accounts employed by the University shall be satisfactory to the Commission and in accordance with generally accepted accounting principles consistently applied.

2. Inspection and Audit of Accounts and Records. All books of account and records relating to this contract shall be subject to inspection and audit by the Commission at all reasonable times, before and during the period of retention provided for in 4. below, and the University shall afford the Commission proper facilities for such inspection and audit.

3. Audit of Subcontractors' Records. The University also agrees, with respect to any subcontracts (including lump-sum or unit-price subcontracts or purchase orders) where, under the terms of the subcontract, costs incurred are a factor in determining the amount payable to the subcontractor of any tier, to conduct an audit of the costs of the subcontractor in a manner satisfactory to the Commission or to have the audit conducted by the next higher tier subcontractor in a manner satisfactory to the University and the Commission, except when the Commission elects to waive such audit or approves other arrangements for the conduct of the audit.

4. Disposition of Records. a. Except as agreed upon by the Government and the University, all financial and cost reports, books of account and supporting documents, and other data evidencing costs allowable and revenues and other applicable credits under this contract in the possession of the University at its Knoxville Office and relating to this contract shall be preserved by the University for a period of three (3) years after final payment under this contract or otherwise disposed of in such manner as may be agreed upon by the Government and the University.

b. (1) Except as provided in the foregoing and except as agreed upon by the Government and the University, all sketches, drawings, designs, design data, plans, specifications, technical notes and data, medical records, books of account and supporting documents relating to this contract, and other data evidencing costs allowable and revenues received, earned or accrued under this contract, and any notebooks, photographs, negatives, reports, findings, recommendations, data, and memoranda of every description and any copies of the foregoing relating to the foregoing or the work under this contract, and the information contained therein shall be the property of the Government, and, subject to the right of the University to retain a copy of any such material for its own use, shall be delivered to the Government or otherwise disposed of by the University either as the Commission may from time to time direct during the progress of the work or in any event as the Commission shall direct upon completion or termination of this contract and final audit of all accounts hereunder. The Government shall have the right to use all or any part of said material and information which is the property of the Government for any purpose whatsoever including but not limited to the right to reproduce said material and disseminate it to the public. The University's right of retention and use shall be subject to the security, patent, and the following use of information provisions of this contract.

(2) Except as specifically authorized by this contract, or as otherwise approved by the Contracting Officer, information and other data developed or acquired by or furnished the University in the performance of this contract shall be used only in connection with the work under this contract.

5. Reports. The University shall furnish such progress reports and schedules, financial and costs reports, and other reports concerning the work under this contract as the Contracting Officer may from time to time require.

6. Inspections. The Commission shall have the right to inspect the work and activities of the University under this contract at such time and in such manner as it shall deem appropriate.

7. Subcontracts. The University further agrees to require the inclusion of provisions similar to those in Section 1. through this Section 7. of this clause in all subcontracts (including lump-sum or unit-price subcontracts or purchase orders) of any tier entered into hereunder where, under the terms of the subcontract, costs incurred are a factor in determining the amount payable to the subcontractor.

ARTICLE VIII - EXAMINATION OF RECORDS

1. The University agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract, have access to and the right to examine any directly pertinent books, documents, papers and records of the University involving transactions related to this contract unless the Commission authorizes their prior disposition.

2. The University further agrees to include in all its subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under the subcontract, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract unless the Commission authorizes their prior disposition. The term "subcontract" as used in this clause excludes (i) purchase orders not exceeding \$2,500.00 and (ii) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

3. Nothing in this contract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this contract.

ARTICLE IX - GOVERNMENT PROPERTY

1. Title to Property. Title to all property furnished by the Government shall remain in the Government except as otherwise provided in this article. Except as otherwise provided by the Contracting Officer, title to all materials, equipment, supplies, and tangible personal property of every kind and description purchased by the University, the cost of which is allowable as a direct item of cost under this contract, shall pass directly from the vendor to the Government. Title to other property, the cost of which is allowable under this contract, shall pass to and vest in the Government upon (i) issuance for use of such property in the performance of this contract, or (ii) commencement of processing or use of such property in the performance of this contract, or (iii) payment of the cost thereof by the Government, whichever first occurs. Property furnished by the Government and property purchased or furnished by the University, title to which vests in the Government, under this section are hereinafter referred to as Government property. Title to Government property shall not be affected by the incorporation of the property into or the attachment of it to any property not owned by the Government, nor shall such Government property or any part thereof, be or become a fixture or lose its identity as personalty by reason of affixation to any realty.

2. Identification. To the extent directed by the Contracting Officer, the University shall identify Government property coming into the University's possession or custody by marking or segregating in such a way, satisfactory to the Contracting Officer, as shall indicate its ownership by the Government.

3. Disposition. The University shall make such disposition of Government property which has come into the possession or custody of the University under this contract as the Contracting Officer shall direct. When authorized in writing by the Contracting Officer during the progress of the work or upon completion or termination of this contract, the University may, upon such terms and conditions as the Contracting Officer may approve, sell or exchange such property, or acquire such property at a price agreed upon by the Contracting Officer and the University as the fair value thereof. The proceeds of any disposition shall be received for the account of the Government, and shall be received, held, and utilized as a part of the advances of Government funds pursuant to the article hereof entitled "Payment and Advances" or otherwise credited to the account of the Government as the Commission may direct. Upon completion of the work or the termination of this contract, the University shall render an accounting, as prescribed by the Contracting Officer, of all Government property which had come into the possession or custody of the University under this contract.

4. Protection of Government Property - Classified Materials.

The University shall take all reasonable precautions, as directed by the Contracting Officer, or in the absence of such directions in accordance with sound industrial practice, to safeguard and protect Government property in the University's possession or custody. Special measures shall be taken by the University in the protection of and accounting for any classified or special materials involved in the performance of this contract, in accordance with the regulations and requirements of the Commission.

5. Risk of Loss of Government Property. The University shall not be liable for the loss or destruction of or damage to any property in the University's possession unless the same is due to the willful misconduct or bad faith on the part of any of the corporate officers of the University or the Laboratory Director or other full-time supervising representative of the University in the performance of the work under this contract, or unless such loss, destruction or damage is due to a failure on the part of the corporate officers or the Laboratory Director or other full-time supervising representative of the University in the performance of the work under this contract to take reasonable steps to comply with any appropriate written directives of the Commission to safeguard such property.

6. Steps to be Taken in Event of Loss. Upon the happening of any loss or destruction of or damage to Government property in the possession or custody of the University, the University shall immediately inform the Contracting Officer of the occasion and extent thereof, shall take all reasonable steps to protect the property remaining, and shall repair or replace the lost, destroyed, or damaged property, if and as directed by the Contracting Officer, but shall take no action prejudicial to the right of the Government to recover therefor and shall furnish to the Government, on request, all reasonable assistance in obtaining recovery.

7. Government Property for Government Use Only. Government property shall be used only for the performance of this contract.

8. The parties have expressly agreed, with respect of the animals of genus Bos maintained for work under this contract, that upon expiration or termination of this contract or at such earlier time as the parties may mutually agree upon, disposition of such animals then existing on the farm shall be in accordance with the following provisions:

a. For purposes of this Section 8., the cattle herd shall consist of the following categories of cattle (except for prize animals which would otherwise fall within any category listed):

- (1) Breeding cows - females at least 18 months of age.
- (2) Yearlings - animals of both sexes less than 18 months but more than one year of age.
- (3) Calves - animals of both sexes no more than one year of age.

b. The University shall receive from the herd by categories identified above, animals in proportion to the number contributed by the University in each category and in the herd as of June 30, 1955. The University shall have the right of selection of animals from the herd for its share in any category. The University may elect to take animals of any category in lieu of animals which it will be due hereunder in any other category, in accordance with ratios of values between the categories to be mutually agreed upon by the parties.

c. The University shall receive back all bulls, including prize bulls as defined below, it has contributed from without the herd at any time. The University shall receive bulls born from within the herd after June 30, 1955, except prize bulls, in proportion to the number of breeding cows contributed by the University and in the herd as of June 30, 1955, and the University shall have the right of selection. All other bulls, except as provided below for prize bulls, shall remain the property of the Government.

d. It is understood that reference above to animals "contributed" by the University means animals furnished by the University without cost to the Commission pursuant to Section 8, Paragraph a., of Article I of this contract. In determining the percentages to be applied in b. and c. above and e. below, the category of each animal contributed by the University shall be determined as of the date of its contribution. The Commission's contribution, by categories, shall be that existing as of June 30, 1955. All animals born from the herd prior to June 30, 1955, shall be deemed to have been contributed by the Commission except that all such animals born from cows contributed by the University shall be deemed to have been contributed by the University.

e. The University shall have the option of acquiring title to any prize animal or animals in the herd and any prize bull or bulls born after June 30, 1955, by paying to the Commission that percentage of the value of such animal or animals as is proportionate to the Commission's contribution of the breeding cows in the herd as of June 30, 1955. Upon the University's failure to exercise the option within 60 days following expiration or termination of the contract or such earlier time as the parties agree upon disposition of the animals, such prize animal or animals will be sold and the University shall receive from the proceeds of such sale a share proportionate to its contribution of the breeding cows in the herd as of June 30, 1955. A "prize animal" or "prize bull" is one having value at least five times the average value of similar (as to sex and age) animals maintained for programs approved pursuant to Section 3. of Article I of this contract.

f. It is contemplated that the parties may desire to establish in b., c., d., and e. above a date other than June 30, 1955. In the event a different date is agreed upon in writing, with or without formal modification of this contract, such different date shall be deemed substituted for the date "June 30, 1955", in b., c., d., and e. above.

ARTICLE X - UNIVERSITY PROCUREMENT

1. The Commission reserves the right at any time to require that the University submit for approval any or all procurements under this contract. The University shall not procure any item whose purchase is expressly prohibited by the written direction of the Commission and shall use such special and directed procurement sources as may be expressly required by the Commission. The University shall provide information concerning procurement methods, practices, and procedures used or proposed to be used, and shall use methods, practices, and procedures which are acceptable to the Commission. Procurement arrangements under this contract shall not relieve the University of any obligation under this contract (including, among other things, the obligation properly to supervise, administer, and coordinate the work of subcontractors) and shall be in such form and contain such provisions as are required by this contract or as the Commission may prescribe.

2. In addition to, and without derogation of any rights under Section 1. of this Article X and any other provision in this contract, the University shall require subcontractors to furnish cost or pricing data, and shall include in such subcontracts the clause set forth in AECPR 9-3.814-50, except as otherwise directed or approved by the Commission.

ARTICLE XI - DISPUTES

1. Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the University. The decision of the Contracting Officer shall be final and conclusive unless within 30 days from the date of receipt of such copy, the University mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the Commission. The decision of the Commission or its duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this article, the University shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the University shall proceed diligently with the performance of this contract and in accordance with the Contracting Officer's decision.

2. This "Disputes" article does not preclude consideration of law questions in connection with decisions provided for in Section 1. above; Provided, That nothing in this contract shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

ARTICLE XII - PATENTS

1. Whenever any invention or discovery is made or conceived by the University or its employees in the course of or under this contract, the University shall promptly furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed and to determine the disposition of the title to and rights in and to any invention or discovery and any patent application or patent that may result. The judgment of the Commission on these matters shall be accepted as final; and the University, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

2. No claim for pecuniary award or compensation under the provisions of the Atomic Energy Act of 1954, as amended, shall be asserted by the University or its employees with respect to any invention or discovery made or conceived in the course of or under this contract.

3. Except as otherwise authorized in writing by the Commission, the University will obtain patent agreements to effectuate the purposes of Sections 1. and 2. of this article from all persons who perform any part of the work under this contract, except such clerical and manual labor personnel as will not have access to technical data.

4. Except as otherwise authorized in writing by the Commission, the University will insert in all subcontracts provisions making this article applicable to the subcontractor and its employees.

5. It is recognized that during the course of the work under this contract, the University or its employees may from time to time desire to publish, within the limits of security requirements, information regarding scientific or technical developments made or conceived in the course of or under this contract. In order that public disclosure of such information will not adversely affect the patent interests of the Commission or the University, patent approval for release and publication shall be secured from the Commission prior to any such release or publication.

6. With respect to any U. S. Patent Application filed by the University on any contract invention or discovery made or conceived in the course of this contract, the University will incorporate in the first paragraph of the U. S. Patent Application the following statement:

"The invention described herein was made in the course of, or under, a contract with the U. S. Atomic Energy Commission."

ARTICLE XIII - ASSIGNMENT

Neither this contract nor any interest therein nor claim thereunder shall be assigned or transferred by the University except as expressly authorized in writing by the Contracting Officer.

ARTICLE XIV - OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE XV - COVENANT AGAINST CONTINGENT FEES

1. Warranty - Termination or Deduction for Breach. The University warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the University for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

2. Subcontracts and Purchase Orders. Unless otherwise authorized by the Contracting Officer in writing the University shall cause provisions similar to the foregoing to be inserted in all subcontracts and purchase orders entered into under this contract.

ARTICLE XVI - EQUAL OPPORTUNITY

During the performance of this contract, the University agrees as follows:

1. The University will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The University will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The University agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this Equal Opportunity clause.

2. The University will, in all solicitations or advertisements for employees placed by or on behalf of the University, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

3. The University will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the University's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4. The University will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

5. The University will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Commission and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

6. In the event of the University's noncompliance with the Equal Opportunity clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and the University may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

7. The University will include the provisions of Sections 1 through 7 in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The University will take such action with respect to any subcontract or purchase order as the Commission may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the University becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the University may request the United States to enter into such litigation to protect the interests of the United States.

ARTICLE XVII - CONVICT LABOR

In connection with the performance of work under this contract, the University agrees not to employ any person undergoing sentence of imprisonment at hard labor.

ARTICLE XVIII - PERMITS

Except as otherwise directed by the Contracting Officer, the University shall procure all necessary permits or licenses and abide by all applicable laws, regulations, and ordinances of the United States and of the State, territory, and political subdivision in which the work under this contract is performed.

ARTICLE XIX - BUY AMERICAN ACT

1. In acquiring end products, the Buy American Act (41 U. S. Code 10a-d) provides that the Government give preference to domestic source end products. For the purpose of this article:

a. "Components" means those articles, materials, and supplies, which are directly incorporated in the end products;

b. "End products" means those articles, materials, and supplies, which are to be acquired under this contract for public use; and

c. A "domestic source end product" means (A) an unmanufactured end product which has been mined or produced in the United States and (B) an end product manufactured in the United States if the cost of the components thereof which are mined, produced, or manufactured in the United States exceeds 50 percent of the costs of all its components. For the purposes of this 1. c. (B) components of foreign origin of the same type or kind as the products referred to in 2. b. or c. of this article shall be treated as components mined, produced or manufactured in the United States.

2. The University agrees that there will be used under this contract (by the University, subcontractors, materialmen and suppliers) only domestic source end products, except end products:

a. Which are for use outside the United States;

b. Which the Government determines are not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality;

c. As to which the Commission determines the domestic preference to be inconsistent with the public interest; or

d. As to which the Commission determines the cost to the Government to be unreasonable.

(The foregoing requirements are administered in accordance with Executive Order No. 10582, dated December 17, 1954.)

ARTICLE XX - SECURITY

1. University's Duty to Safeguard Restricted Data and Other Classified Information. In the performance of the work under this contract, the University shall, in accordance with the Commission's security regulations and requirements, be responsible for safeguarding restricted data and other classified matter and protecting against sabotage, espionage, loss and theft, the classified documents, materials, equipment, processes, etc., as well as such other material of high intrinsic or strategic value as may be in the University's possession in connection with performance of work under this contract. Except as otherwise expressly provided in the specifications, the University shall, upon completion or termination of this contract, transmit to the Commission any classified matter in the possession of the University or any person under the University's control in connection with performance of this contract.

2. Regulations. The University agrees to conform to all security regulations and requirements of the Commission.

3. Definition of Restricted Data. The term "Restricted Data", as used in this article, means all data concerning (a) design, manufacture, or utilization of atomic weapons; (b) the production of special nuclear material; or (c) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to Section 142 of the Atomic Energy Act of 1954.

4. Security Clearance of Personnel. The University shall not permit any individual to have access to Restricted Data, or other classified information, except in accordance with the Atomic Energy Act of 1954, as amended, and the Commission's regulations or requirements.

5. Criminal Liability. It is understood that disclosure of information relating to the work or services ordered hereunder to any person not entitled to receive it, or failure to safeguard any Restricted Data or any Top Secret, Secret, or Confidential matter that may come to the University or any person under the University's control in connection with work under this contract, may subject the University, its agents, employees, and subcontractors to criminal liability under the laws of the United States. (See the Atomic Energy Act of 1954, 68 Stat. 919), (see also Executive Order 10104 of February 1, 1950, 15 F. R. 597).

6. Subcontracts and Purchase Orders. Except as otherwise authorized in writing by the Contracting Officer, the University shall insert provisions similar to the foregoing in all subcontracts and purchase orders under this contract.

ARTICLE XXI - CONTRACT WORK HOURS STANDARDS ACT -
OVERTIME COMPENSATION

This contract, to the extent that it is of a character specified in the Contract Work Hours Standards Act (40 U.S.C. 327-330), is subject to the following provisions and to all other applicable provisions and exceptions of such Act and the regulations of the Secretary of Labor thereunder.

1. Overtime Requirements. Neither the University nor any subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any workweek in which he is employed on such work to work in excess of eight hours in any calendar day or in excess of forty hours in such workweek on work subject to the provisions of the Contract Work Hours Standards Act unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all such hours worked in excess of eight hours in any calendar day or in excess of forty hours in such workweek, whichever is the greater number of overtime hours.

2. Violation; Liability for Unpaid Wages; Liquidated Damages. In the event of any violation of the provisions of Section 1., the University and any subcontractor responsible therefor shall be liable to any affected employee for his unpaid wages. In addition, the University and such subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions of Section 1. in the sum of \$10 for each calendar day on which such

employee was required or permitted to be employed on such work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by Section 1.

3. Withholding for Unpaid Wages and Liquidated Damages. The Contracting Officer may withhold from the University, from any moneys payable on account of work performed by the University or subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of the University or such subcontractor for unpaid wages and liquidated damages as provided in the provisions of Section 2.

4. Subcontracts. The University shall insert Sections 1. through 4. of this article in all subcontracts, and shall require their inclusion in all subcontracts of any tier.

5. Records. The University shall maintain payroll records containing the information specified in 29 CFR 516.2(a). Unless otherwise authorized by the Commission, such records shall be preserved for three years from the completion of the contract.

ARTICLE XXII - REMOVAL OF INDIVIDUALS FROM OAK RIDGE AREA

It is understood that the Commission shall at all times have the right to require the University to remove from the Oak Ridge Area such of the individuals furnished by the University hereunder as the Commission considers objectionable, or whose presence in the Oak Ridge Area the Commission considers to be contrary to the public interest.

ARTICLE XXIII - LITIGATION AND CLAIMS

1. Initiation of Litigation. If the Government requires the University to initiate litigation, including proceedings before administrative agencies, in connection with this contract, the University shall proceed with the litigation in good faith as directed from time to time by the Contracting Officer.

2. Defense and Settlement of Claims. The University shall give the Contracting Officer immediate notice in writing (a) of any action, including any proceeding before an administrative agency, filed against the University arising out of the performance of this contract, and (b) of any claim against the University the cost and expense of which is allowable under the article entitled "Allowable Costs." Except as otherwise directed by the Contracting Officer, in writing, the University shall furnish immediately to the Contracting Officer copies of all

pertinent papers received by the University with respect to such action or claim. To the extent not in conflict with any applicable policy of insurance, the University may with the Contracting Officer's approval settle any such action or claim, shall effect at the Contracting Officer's request an assignment and subrogation in favor of the Government of all the University's rights and claims (except those against the Government) arising out of any such action or claim against the University, and, if required by the Contracting Officer, shall authorize representatives of the Government to settle or defend any such action or claim and to represent the University in, or to take charge of, any action. If the settlement or defense of an action or claim against the University is undertaken by the Government, the University shall furnish all reasonable assistance in effecting a settlement or asserting a defense. Where an action against the University is not covered by a policy of insurance, the University shall, with the approval of the Contracting Officer, proceed with the defense of the action in good faith, and in such event the defense of the action shall be at the expense of the Government; provided, however, that the Government shall not be liable for such expense to the extent that it would have been compensated for by insurance which was required by law or by the written direction of the Contracting Officer, but which the University failed to secure through its own fault or negligence.

ARTICLE XXIV - STATE AND LOCAL TAXES

1. The University agrees to notify the Commission of any State or local tax, fee, or charge levied or purported to be levied on or collected from the University with respect to the contract work, any transaction thereunder, or property in the custody or control of the University and constituting an allowable item of cost if due and payable, but which the University has reason to believe, or the Commission has advised the University, is or may be inapplicable or invalid; and the University further agrees to refrain from paying any such tax, fee, or charge unless authorized in writing by the Commission. Any State or local tax, fee, or charge paid with the approval of the Commission or on the basis of advice from the Commission that such tax, fee, or charge is applicable and valid, and which would otherwise be an allowable item of cost, shall not be disallowed as an item of cost by reason of any subsequent ruling or determination that such tax, fee, or charge was in fact inapplicable or invalid.

2. The University agrees to take such action as may be required or approved by the Commission to cause any State or local tax, fee, or charge which would be an allowable cost to be paid under protest; and to take such action as may be required or approved by the Commission to seek

recovery of any payments made, including assignment to the Government or its designee of all rights to an abatement or refund thereof, and granting permission for the Government to join with the University in any proceedings for the recovery thereof or to sue for recovery in the name of the University. If the Commission directs the University to institute litigation to enjoin the collection of or to recover payment of any such tax, fee, or charge referred to above, or if a claim or suit is filed against the University for a tax, fee, or charge it has refrained from paying in accordance with this article, the procedures and requirements of the article entitled "Litigation and Claims" shall apply and the costs and expenses incurred by the University shall be allowable items of cost, as provided in this contract, together with the amount of any judgment rendered against the University.

3. The Government shall save the University harmless from penalties and interest incurred through compliance with this clause. All recoveries or credits in respect of the foregoing taxes, fees, and charges (including interest) shall inure to and be for the sole benefit of the Government.

ARTICLE XXV - BONDS AND INSURANCE

The University shall procure and maintain such bonds and insurance as are required by law or by the written direction of the Contracting Officer. The terms of any such bond or insurance policy shall be submitted to the Contracting Officer for approval, upon request. In view of the provisions of the article entitled "Government Property," the University shall not procure or maintain for its own protection any insurance (including self-insurance or reserves) covering loss or destruction of or damage to Government-owned property.

ARTICLE XXVI - COPYRIGHT

1. The University agrees to and does hereby grant to the Government, and to its officers, agents, servants and employees acting within the scope of their official duties, (a) a royalty-free, nonexclusive and irrevocable license to reproduce, translate, publish, use, and dispose of, and to authorize others so to do, all copyrightable material first produced or composed under this contract by the University, its employees or any individual or concern specifically employed or assigned to originate and prepare such material; and (b) a license as aforesaid under any and all copyrighted or copyrightable work not first produced or composed by the University in the performance of this contract but which is incorporated in the material furnished under the contract,

provided that such license shall be only to the extent the University now has, or prior to completion or final settlement of this contract may acquire, the right to grant such license without becoming liable to pay compensation to others solely because of such grant.

2. The University agrees that it will exert all reasonable effort not to include any copyrighted material in any written or copyrightable material furnished or delivered under this contract, without a license as provided for in Section 1. (b) hereof, or without the consent of the copyright owner, unless specific written approval of the Contracting Officer to the inclusion of such copyrighted material is secured.

3. The University agrees to report to the Commission promptly and in reasonable written detail, any notice or claim of copyright infringement received by the University with respect to any material delivered under this contract.

ARTICLE XXVII - UTILIZATION OF CONCERNS IN LABOR SURPLUS AREAS

It is the policy of the Government to place contracts with concerns which will perform such contracts substantially in or near concentrated unemployment or under-employment sections of States or in areas of persistent or substantial labor surplus, where this can be done consistent with the efficient performance of the contract and at prices no higher than are obtainable elsewhere. The University agrees to use its best efforts to place its subcontracts in accordance with this policy. In complying with the foregoing and with Section 2. of the article of this contract entitled "Utilization of Small Business Concerns" the University in placing its subcontracts shall observe the following order of preference: (a) Certified-eligible concerns which are also small business concerns; (b) other certified-eligible concerns; (c) persistent labor surplus area concerns which are also small business concerns; (d) other persistent labor surplus area concerns; (e) substantial labor surplus area concerns which are also small business concerns; (f) other substantial labor surplus area concerns; and (g) small business concerns which are not labor surplus area concerns.

ARTICLE XXVIII - LABOR SURPLUS AREA SUBCONTRACTING PROGRAM

1. The University agrees to establish and conduct a program which will encourage labor surplus area concerns to compete for subcontracts within their capabilities. In this connection, the University shall -

a. Designate a liaison officer who will (i) maintain liaison with duly authorized representatives of the Government on labor surplus area matters, (ii) supervise compliance with the Utilization of Concerns in Labor Surplus Areas clause, and (iii) administer the University's "Labor Surplus Area Subcontracting Program";

b. Provide adequate and timely consideration of the potentialities of labor surplus area concerns in all "make-or-buy" decisions;

c. Assure that labor surplus area concerns will have an equitable opportunity to compete for subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of labor surplus area concerns;

d. Maintain records showing procedures which have been adopted to comply with the policies set forth in this article; and

e. Include the Utilization of Concerns in Labor Surplus Areas article in subcontracts which offer substantial labor surplus area subcontracting opportunities.

2. A "labor surplus area concern" is a concern which will perform, or cause to be performed, a substantial proportion of any contract awarded to it (i) in or near sections of concentrated unemployment or underemployment as a certified-eligible concern, or (ii) a concern which will perform, or cause to be performed, a substantial proportion of any contract awarded to it in "Areas of Substantial Labor Surplus" (also called "Areas of Substantial Unemployment"), as designated by the Department of Labor. A concern shall be deemed to perform a substantial proportion of a contract in or near sections of concentrated unemployment or underemployment if the costs that the concern will incur on account of manufacturing or production in or near such sections (by itself, if a certified concern, or by certified concerns acting as first-tier subcontractors) amount to more than 30 percent of the contract price. A concern shall be deemed to perform a substantial proportion of a contract in a labor surplus area if the costs that the concern will incur on account of manufacturing or production performed in persistent or substantial labor surplus areas (by itself or its first-tier subcontractors) amount to more than 50 percent of the price of such contract.

3. The University further agrees to insert, in any subcontract hereunder which may exceed \$500,000 and which contains the Utilization of Concerns in Labor Surplus Areas clause provisions which shall conform substantially to the language of this article, including this Section 3., and to notify the Contracting Officer of the names of such subcontractors.

ARTICLE XXIX - UTILIZATION OF SMALL BUSINESS CONCERNS

1. It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with small business concerns.

2. The University agrees to accomplish the maximum amount of subcontracting to small business concerns that the University finds to be consistent with the efficient performance of this contract.

ARTICLE XXX - SMALL BUSINESS SUBCONTRACTING PROGRAM

1. The University agrees to establish and conduct a small business subcontracting program which will enable small business concerns to be considered fairly as subcontractors and suppliers under this contract. In this connection, the University shall--

a. Designate a liaison officer who will (i) maintain liaison with the Government on small business matters, (ii) supervise compliance with the Utilization of Small Business Concerns and (iii) administer the University's "Small Business Subcontracting Program."

b. Provide adequate and timely consideration of the potentialities of small business concerns in all "make-or-buy" decisions.

c. Assure that small business concerns will have an equitable opportunity to compete for subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of small business concerns. Where the University's lists of potential small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

d. Maintain records showing (i) whether each prospective subcontractor is a small business concern, (ii) procedures which have been adopted to comply with the policies set forth in this clause, and (iii) with respect to the letting of any subcontract (including purchase orders) exceeding \$10,000, information substantially as follows:

(1) Whether the award went to large or small business.

(2) Whether less than three or more than two small business concerns were solicited.

(3) The reason for nonsolicitation of small business if such was the case.

(4) The reason for small business failure to receive the award if such was the case when small business was solicited.

The records maintained in accordance with (iii) above may be in such form as the University may determine, and the information shall be summarized quarterly and submitted by the purchasing department of each individual plant or division to the University's cognizant small business liaison officer. Such quarterly summaries will be considered to be management records only and need not be submitted routinely to the Government; however, records maintained pursuant to this article will be kept available for review.

e. Notify the Contracting Officer before soliciting bids or quotations on any subcontract (including purchase orders) in excess of \$10,000 if (i) no small business concern is to be solicited, and (ii) the Contracting Officer's consent to the subcontract (or ratification) is required by a "Subcontracts" clause in this contract. Such notice will state the University's reasons for nonsolicitation of small business concerns, and will be given as early in the procurement cycle as possible so that the Contracting Officer may give SBA timely notice to permit SBA a reasonable period to suggest potentially qualified small business concerns through the Contracting Officer. In no case will the procurement action be held up when to do so would, in the University's judgment, delay performance under the contract.

f. Include the Utilization of Small Business Concerns article in subcontracts which offer substantial small business subcontracting opportunities.

g. Cooperate with the Contracting Officer in any studies and surveys of the University's subcontracting procedures and practices that the Contracting Officer may from time to time conduct.

h. Submit such information on subcontracting to small business concerns as is called for by the Contracting Officer.

2. A "small business concern" is a concern that meets the pertinent criteria established by the Small Business Administration and set forth in Section 1-1.701 of the Federal Procurement Regulations.

3. The University agrees that, in the event it fails to comply with its contractual obligations concerning the small business subcontracting program, this contract may be terminated, in whole or in part, for default.

4. The University further agrees to insert, in any subcontract hereunder which may exceed \$500,000 and which contains the Utilization of Small Business Concerns clause, provisions which shall conform substantially to the language of this article, including this Section 4., and to notify the Contracting Officer of the names of such subcontractors.

ARTICLE XXXI - SAFETY, HEALTH AND FIRE PROTECTION

The University shall take all reasonable precautions in the performance of the work under this contract to protect the health and safety of employees and of members of the public and to minimize danger from all hazards to life and property, and shall comply with all health, safety, and fire protection regulations and requirements (including reporting requirements) of the Commission. In the event that the University fails to comply with said regulations or requirements of the Commission, the Contracting Officer may, without prejudice to any other legal or contractual rights of the Commission, issue an order stopping all or any part of the work; thereafter a start order for resumption of work may be issued at the discretion of the Contracting Officer. The University shall make no claim for compensation or damages by reason of or in connection with such work stoppage.

ARTICLE XXXII - UNIVERSITY'S ORGANIZATION

1. Organization Chart. As promptly as possible after the execution of this contract the University shall furnish to the Contracting Officer a chart showing the names, duties, and organization of key personnel to be employed in connection with the work, and shall furnish from time to time supplementary information reflecting changes therein.

2. Supervising Representative of University. Unless otherwise directed by the Contracting Officer the work shall be under the direction of a Laboratory Director and a Project Leader mutually satisfactory to the University and the Commission. No person shall be selected by the University to serve as Laboratory Director until there has been submitted to and approved by the Commission a statement of qualifications, experience, and compensation of the nominee for such assignment.

3. Control of Employees. The University shall be responsible for maintaining satisfactory standards of employee competency, conduct, and integrity and shall be responsible for taking such disciplinary action with respect to its employees as may be necessary. The University shall establish such standards and procedures as are necessary to implement effectively the provisions set forth in Atomic Energy Commission Procurement Regulation 9-12.54, and such standards and procedures shall be subject to the approval of the Contracting Officer.

4. Consultant or Other Comparable Employment Services of University Employees. The University shall require all employees who are employed full time (an individual who performs work under the cost-type contract on a full-time annual basis) or part time (50 percent or more of regular annual compensation received under terms of a contract with the Commission) on the contract work to disclose to the University all consultant or other comparable employment services which the employees propose to undertake for others. The University shall transmit to the Contracting Officer all information obtained from such disclosures. The University will require any employee who will be employed full time on this contract work to agree, as a condition of his participation in such work, that he will not perform consultant or other comparable employment services for another Commission cost-type contractor or in the atomic energy field for another organization except with the prior approval of the University. If the University believes with respect to any employee who is employed full time on this contract work, that any proposed consultant or other comparable employment service for an organization in the atomic energy field other than a Commission cost-type contractor may involve: (1) A rate of remuneration significantly in excess of the employee's regular rate of remuneration; (2) a significant question concerning possible conflict with the Commission's policies regarding conduct of employees of the Commission's contractors; (3) the University's responsibility to report fully and promptly to the Commission all significant research and development information; or (4) the patent provisions of the University's contract with the Commission, the University shall obtain the prior approval of the Contracting Officer for such consultant or other comparable employment service.

ARTICLE XXXIII - WALSH-HEALEY PUBLIC CONTRACTS ACT

If this contract is for the manufacture or furnishing of materials, supplies, articles, or equipment in an amount which exceeds or may exceed \$10,000.00 and is otherwise subject to the Walsh-Healey Public Contracts Act, as amended (41 U. S. Code 35-45), there are hereby incorporated by reference all representations and stipulations required by said Act and regulations issued thereunder by the Secretary of Labor, such representations and stipulations being subject to all applicable rulings and

interpretations of the Secretary of Labor which are now or may hereafter be in effect. The University shall insert the foregoing in all subcontracts or purchase orders for the manufacture or furnishing of materials, supplies, articles or equipment in an amount which exceeds or may exceed \$10,000.00.

ARTICLE XXXIV - DEFINITIONS

As used throughout this contract, the following terms shall have the meanings set forth below:

1. The term "Contracting Officer" means the person executing this contract on behalf of the Government and includes his successors or any duly authorized representative of any such person.

2. The term "Commission" means the United States Atomic Energy Commission or any duly authorized representative thereof, including the Contracting Officer except for the purpose of deciding an appeal under the article entitled "Disputes."

3. Except as otherwise provided in this contract, the term "subcontracts" includes purchase orders under this contract.

IN WITNESS WHEREOF, the parties have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: *S. R. Sapirie*

S. R. Sapirie
Manager, Oak Ridge Operations
(Contracting Officer)

ATTEST:

John C. Bunch
Secretary
(Title)

UNIVERSITY OF TENNESSEE

BY: *Donna Reed*

TITLE: Vice President

(SEAL)

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