

DEPARTMENT OF THE ARMY U.S. ARMY JEFFERSON PROVING GROUND MADISON, INDIANA 47250-5100

REPLY TO ATTENTION OF STEJP-TD-D

18 November 1985

Encla ...

SUBJECT: Amendment to License SUB-1435

THRU:

Commander US Army Test & Evaluation Command ATTN: AMSTE-ST (T. Palmateer) Aberdeen Proving Ground, MD 21005-5055

2.

Commander HQ, US Army Materiel Command ATTN: AMCSF-P (D. Taras) 5001 Eisenhower Avenue Alexandria, VA 11222-0001

TO:

D. J. Sreniawski, Chief Nuclear Materials Safety Section 2 US Nuclear Regulatory Commission Region III 799 Roosevelt Road Glen Ellyn, IL 60137

1. Reference 10 CFR 2.101.

2. Request the following changes be made to license SUB-1435:

a. Thomas L. Roller be deleted as Alternate Radiation Protection Officer.

b. Warren S. Hubbard, Safety Manager, be deleted as a member of the Radiation Control Committee (RCC), and be replaced by the current Safety and Occupational Health Manager, Timothy W. Wilson.

c. Richard H. Herring be named as Primary Alternate Radiation Protection Officer. Resume and appointment are at Encls 1 and 2, respectively.

d. Allan M. Herrbach be named as Secondary Alternate Radiation Protection Officer. Resume and appointment are at Encls 3 and 4, respectively.

e. The maximum amount of uranium that may be possessed at any one time (item 8A in the license) be changed to 100,000 kg. This change is required by an increase in testing over that projected at the time of the license application.

f. NRC license SUB-1299 for 50kg of depleted uranium used as the collimator for a 4 Mev Linac become a part of license SUB-1435.

8610200420 860929 REG3 LIC40 SUB-1299 PDR

#### STEJP-TD-D SUBJECT: Amendment to License SUB-1435

g. The restriction of 35 pci/gm of uranium in the soil as a result of testing be increased to 300 pci/gm. This limit is the same as that discussed in option 2 for insoluable uranium compounds in the notice "Disposal or On-site Storage of Thorium or Uranium Wastes From Past Operations", Federal Register, Vol. 46, No. 205, Friday, October 23, 1981.

US Army Jefferson Proving Ground (JPG) is the primary Army test site for production acceptance testing of large caliber ammunition. In addition, other munitions and munition related items such as mines, bombs, grenades, weapons, small caliber ammunition and simulators are tested at JPG. Access to JPG is strictly controlled. The installation is completely enclosed by a chain link fence with armed guards at the entrance gates. Employees must show their ID card to enter and all visitors must have a JPG sponsor in order to enter the installation. Once inside the installation, movement into the testing areas is strictly controlled. One must obtain permission to travel North of the main firing line at all times, duty or non-duty. Travel routes are prescribed to protect those unaware of the various hazards. Roads into the more hazardous areas are barricaded and locked to assure that no one enters except those qualified to do so.

Access to the DU impact area is restricted to health physics and explosive ordnance disposal personnel who have received health physics training on the hazards of DU or, occassionally, to others deemed qualified. Each of the aforementioned personnel wear a personal dosimetry device, currently a film badge, and are monitored when leaving the area. In no case is a member of the general public allowed in the DU impact area.

Therefore, we feel that an increase in the surface contamination limit for the DU impact area at JPG from 35 pci/gm to 300 pci/gm is justified for the life of license SUB-1435.

3. Request the following replace the corresponding sections of the license:

a. The enclosed map (Encl 5) shows the area of impact and the area containing the ricochets from the impact area. The map also shows the existing and proposed lines of fire into the impact area. This replaces the map following page E-1-4 in the application dated 8 April 1983.

b. JPGM 385-7, which is supplement A for the original application, has been updated. A copy of the new memorandum is enclosed (Encl 6) to replace the old memorandum as the description of the radiation protection program at JPG.

STEJP-TD-D SUBJECT: Amendment to License SUB-1435

4. JPG - Providing Leaders the Decisive Edge.

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# RADIOLOGICAL PERSONNEL TRAINING AND EXPERIENCE RESUME'

RICHARD H. HERRING, Alternate Radiation Protection Officer

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#### EDUCATIONAL BACKGROUND: 1.

B.S. Physics, Indiana University

#### 2. RADIATION TRAINING:

a. Principles and practices of radiation protection

B. Radioactivity measurement standardization and monitoring techniques and instruments
 c. Mathematics and calculations basic to the use and measurement of radioactivity

d. Biological effects of radiation
e. Principles and practices of protection against the chemical toxicity of source materials

T	RAIN	VING	1		1	1
	TYPI	E	WHERE TRAINED		ON THE JOB	COURSE
a, d	b,	с,	Belvoir Research and Development Center, Ft. Belvoir, VA	160 hrs	No	Yes
а,	ь		Chemical Nuclear Systems, Columbia, SC	40 hrs	No	Yes
a,	с,	d	DARCOM Field Safety Activity, Charlestown, IN	48 hrs	No	Yes

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5.	EXPERIENC	E WIIII	KAULAI	1044.

ISOTOPE/ SOURCE	MAXIMUM AMT/ DESCRIPTION	LOCATION	DURATION	TYPE OF USE
X-ray	4 MeV	Jefferson Proving Ground, Madison, IN	2 yrs	HP Supervision
H-3	30 ci	Jefferson Proving Ground, Madison, IN	2 yrs	HP Supervision
Depleted Uranium	10,000 Kg	Jefferson Proving Ground, Madison, IN	2 yrs	HP Supervision
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DISPOSITION	FORM		
For use of this form, ses AR 340-15; the p	roponent agency is TAGO.		
REFERENCE OR OFFICE SYMBOL	SUBJECT		
STEJP-MS-60-83	Announcement of Duty	Appointment	
TO SEE DISTRIBUTION	FROM Cdr, USA JPG	DATE 24 Oct 83	CMT 1
I. Effective 24 Oct 83, HI Engineering Division, JPG Protection Officer and a Me	ERRING, RICHARD H., GS-09, Mec (WO4ZAA) Madison, IN 47250, i ember of the Ionizing Radiatio	hanical Engineering Techn s appointed as an Alterna n Control Committee.	nician, Test ate Radiation
2. Authority: DARCOM REG	385-25	and the second second second	
3. Purpose: To assist in	management of the Ionizing Ra	diation Protection Progra	am
4. Period: Indefinite			
5. Special instructions: advisor to the Commander and and staff supervisor of Rad	RAD Protection Officer and Con ad is a technical member of the liation Protection Program.	mmittee Chairperson acts e Ionizing Radiation Cont	as staff trol Committee
FOR THE COMMANDER:			
	CLIFFORD B Administra	MORPHUND TU tive officer	-
DISTRIBUTION:		V	
B, D, H I - Ea Indiv Named 1 - Ea Indiv OPF			
2 USACC - Jefferson 2 - Chairperson-Ionizing Ra Control Committee	diation		
1 - THRU: Commander TO: Admin Ofc (file)			
<pre>L - Mail Room L - CDR, TECOM, ATTN: DRST</pre>	'E-SG-A		

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# RADIOLOGICAL PERSONNEL TRAINING AND EXPERIENCE RESUME!

ALLAN M. HERRBACH

GS-018-11 US Army Jefferson Proving Ground

EDUCATIONAL BACKGROUND: 1.

BA -University of Redlands, Redlands, CA Public Service Admin. US Army Safety Courses, Charlestown, IN; Ft. Rucker, ALJ and Savanna, IL.

#### RADIATION TRAINING: 2.

1. . .

Principles and practices of radiation protection

b. Radioactivity measurement standardization and monitoring techniques and instruents c. Mathematics and calculations basic to the use and measurement of radioactivity d. Biological effects of radiation

e. Principles and practices of protection against the chemical toxicity of source materials

TRAINING:	RAINING: FOR									
TYPE	WHERE TRAINED	DURATION	ON THE JOB	COU						
Radiaton Detectors and Instrumentation b	Sierra Army Depot, Herlong, CW	24 hours	x	x						
Depleted Uranuim Monitoring a,b,c	Sierra Army Depot, Herlong, CA	12 hours	x	x						
Hazardous Materials Transportation a,b	Savanna, IL	40 hours								
Radiological Safety Fundamentals a,b,c,d,e	Sierra Army Depot, Herlong, CA	40 hours	5	x						
Health Physics Aspects of Depleted Uranium a,b,c,d	,e. Ft.Belvoir, VA	40 hours	5	x						
Special Nuclear Weapons a,b,cd,e	; Savanna, IL	40 hours	5	x						
Radioactive Waste Seminar a,b,c	Columbia, SC	40 hours	5	×						
Radiological Protection Program Management a,b,c,d,	e Charlestown, IN	24 hours	5	>						
Industrial Hygiene Measurements b,c,d,e	Cincinnati, OH	72 hour	s	x						

z	EVDEDIENCE	WITH	RADIA	TION:
·			145.741	

ISOTOPE/ SOURCE	MAXIMUM AMT/ DESCRIPTION	LOCATION	DURATION	TYPE OF USE
U 235 U 238 Am 241 Pu 239 Kr 85 Th 230 Co 60. Cs 137 Pn 147 Tc 99 DU AN/UDM2 Sr-y 90 AN/UDM-6 Pu 239	1.5 uCi 6.8 uCi .135 uCi .01 uCi 5 mCi 9 uCi 7.7 uCi .05 uCi 1.3701 uCi 3 mCi 7.7 uCi 5,000,000 Kg 40,000 Kg 200 mCu 1.4 mCi	Sierra Army Depot Sierra Army Depot Sierra Army Depot Sierra Army Depot Sierra Army Depot Sierra Army Depot Sierra Army Depot Jefferson Pvg Gr Sierra Army Depot Jefferson Pvg Gr Sierra Army Depot Sierra Army Depot Sierra Army Depot	2 Years 2 years 2 years 2 years 2 years 1.5 years 2 years 1.5 years 2 years 1.5 years 2 years 2 years 2 years 2 years 2 years	check source check source check source check source check source check source check source check source radioactive rifle sight/LAW rocket check source storage and test firing calibration calibration



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# SEE APERTURE CARDS

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APERTURE CARD/HARD COPY AVAILABLE FROM RECORD SERVICES BRANCH, TIDC FTS 492-2989

DEPARTMENT OF THE ARMY US ARMY JEFFERSON PROVING GROUND Madison, Indiana 47250-5100

JPG MEMORANDUM NUMBER 385-7

18 October 1985

#### Safe'ry IONIZING RADIATION PROTECTION

1. PURPOSE. To establish policies and responsibilities for the control and recording of occupational exposures to sources of ionizing radiation at US Army Jefferson Proving Ground (JPG) and to implement applicable procedures, rules and regulations promulgated by the Department of The Army (DA) and the Nuclear Regulatory Commission (NRC).

2. SCOPE. This memorandum applies to all personnel at JPG engaged in activities or operations involving the procurement, use, handling, transporting, storage and disposal of radioactive materials or other sources of ionizing radiation. It is not applicable to exposure of persons being examined or treated for medical or dental purposes. It provides general requirements for use of all radiation sources and delineates overall responsibilities and requirements for the JPG Ionizing Radiation Protection Program. Approved detailed operating procedures are required to implement this procedure for each operation in which radiation sources are used.

3. POLICY. It is the policy of JPG that occupational exposure of personnel to ionizing radiation will be limited to a minimum consistent with efficient operation and its assigned mission. Full compliance will be made with DA and NRC regulations governing occupational exposure to ionizing radiation. The protection of personnel from the hazards of exposure to ionizing radiation (radiation protection) is an integral part of the JPG overall Accident Prevention Program.

4. DEFINITIONS.

a. APPROVAL: DA Permit: A letter issued by HQ, AMC indicating DA prior approval for use of radioactive materials on DA property by non-Army organizations. It is required for all Federal and non-Federal agencies, including civilian contractors, performing work with radioactive materials on land subject to exclusive DA jurisdiction.

b. AREA, RESTRICTED: "Restricted Area" means any area access to which is controlled for purposes of protection of individuals from exposure to radiation and radioactive materials.

c. AREA, UNRESTRICTED: "Unrestricted Area" means any area access to which is not controlled for purposes of protection of individuals from exposure to radiation and radioactive materials, and any area used for residential quarters.

\*This memorandum supersedes JPG Memorandum 385-7, dated 25 October 1983.

ENCL6

d. DA AUTHORIZATION: A formal numbered authorization entitled "DA Authority for Possession and Use of Radioactive Materials" issued by HQ, AMC. Authorization is required to procure, possess or use accelerator-produced radioactive materials, natural radioactive materials such as radium and radioisotopes which are not under license control of the NRC.

e. CONTAMINATION: A condition in which (1) an undesirable radioactive substance is mixed with a desired substance, (2) radioactive material has spread to places where it may harm persons, spoil experiments, or make products or equipment unsuitable or unsafe for some specific use.

f. CURIE: That quantity of a radioactive nuclide disintegrating at the rate of 3.700 x 10 atoms per second. Several fractions of the curie are in common usage:

(1) MILLICURIE: One thousandth of a curie  $(3.7 \times 10^7$  disintegrations per second).

(2) MICROCURIE: One millionth of a curie  $(3.7 \times 10^4$  disintegrations per second).

g. DOSE: The radiation absorbed by a specific area or volume or the whole body.

h. DOSE METER, DOSIMETER: Any instrument which measure radiation dose.

i. DOSE RATE: Radiation dose delivered per unit time.

j. DOSE RATE METER: Any instrument which measures radiation dose rate.

k. EXPOSURE, OCCUPATIONAL: See "Occupational Exposure to Ionizing Radiation."

1. LICENSE, NRC: A written permission to possess radioactive materials issued by the NRC pursuant to the Atomic Energy Act and Title 10, Code of Federal Regulations.

m. MATERIALS, BYPRODUCT: Any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material.

n. MATERIALS, RADIOACTIVE: Natural occurring radioactive elements and isotopes such as radium and radon as well as byproduct material. Source and special nuclear material or radioactive contaminated materials capable of emitting corpuscular or electromagnetic radiations. (Included are radiosotopes and emitters permanently incorporated into adopted or experimental items of equipment).

o. MATERIAL, SOURCE: Uranium or thorium or any combination thereof, in any physical or chemical form of ores which contain, by weight, 1/20 of 1 percent (0.05 percent) or more of uranium, thorium, or any combination thereof. Source material does not include special nuclear material.

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p. MATERIAL, SPECIAL NUCLEAR: Plutonium, or uranium enriched in the isotope 233 or 235, or any other material the NRC determines to be special nuclear material.

q. MONITORING: Periodic or continuous determination of the amount of ionizing radiation or radioactive contamination present in an occupied region or in a person as a safety measure for purposes of health protection.

r. OCCUPATIONAL EXPOSURE TO IONIZING RADIATION: An exposure incurred as a result of an individual's employment or duties. Occupational exposure shall not be deemed to include the exposure of an individual to sources of ionizing radiation for the purpose of medical or dental diagnosis or therapy of that individual.

s. RAD: A unit of absorbed dose.

l rad = 10<sup>-2</sup> joules/kg = 100 ergs/gm

t. RADIATION INCIDENT:

(1) Loss or theft of radioactive materials or any other source of ionizing radiation.

(2) Any unexpected event that may have caused or threatened to cause:

(a) Personnel exposure in excess of the limits established by Title 10, Part 20, Code of Federal Regulations (CFR).

(b) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits specified for such materials in Appendix B, Table II, 10 CFR 20.

(c) A loss of 1 day or more of the operation of any facilities affected.

(d) Damage to property in excess of \$1,000 (to include cost of decontamination).

(e) Contamination of visiting persons or common carrier personnel and equipment.

(f) Determination of the presence of 0.005 microcuries of removable contamination from a sealed source.

u. RADIATION, IONIZING: Electromagnetic or particulate radiation, which may cause ionization. Alpha and beta particles, gamma rays, X-rays and neutrons are examples of types of ionizing radiation.

v. RADIATION PROTECTION OFFICER: An individual designated by the Commander to provide consultation and advice on the degree of hazards associated with ionizing radiation and the effectiveness of measures to control these hazards.

This individual shall be technically qualified by virtue of education, military training and/or professional experience to assure a capability commensurate with the assignment. The term "Radiation Protection Officer" is a functional title and is not intended to denote a commissioned status or a job classification within the Armed Forces.

w. RADIATION SOURCES: Materials, equipment or devices which generate or are capable of generating ionizing radiation, including: (1) naturally occurring radioactive materials, (2) byproduct materials, (3) source materials, (4) special nuclear materials, (5) fission products, (6) materials containing induced or deposited radioactivity, (7) nuclear reactors, (8) radiographic and fluoroscopic equipment, (9) particle generators and accelerators and (10) radio frequency generators such as certain klystrons and magnetrons which produce X-rays.

x. RADIOACTIVITY: Spontaneous nuclear disintegration with emission of corpuscular (particulate) or electromagnetic radiations.

y. RADIOISOTOPE: Any radioactive isotope of an element. A word loosely used as a synonym for radionuclide.

z. RFM: A unit of dose equivalent. The dose equivalent in rems is numerically equal to the absorbed dose in rads multiplied by the quality factor, the distribution factor and any other modifying factors. For the purposes of this memorandum, any of the following is considered to be equivalent to a dose of 1 rem:

(1) A dose of 1R (Roentgen) due to X or gamma radiation;

(2) A dose of 1 rad due to X, gamma or beta radiation;

(3) A dose of 0.1 rad due to neutrons or high energy protons:

(4) A dose of 0.05 rad due to particles heavier than protons with sufficient energy to reach the lens of the eye.

ab. SOURCE, RADIATION: See Radiation Sources.

ac. SOURCE, SEALED: Any radioactive material that is inclosed in, and is to be used in, a container in a manner intended to prevent leakage of the radioactive material or any of its daughter products.

ad. SURVEY: An evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials, or other sources of radiation under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of materials and equipment and measurements of levels of radiation or concentration of radioactive materials. ae. USER: The activity, section, division or other organizational unit which has been assigned responsibility for the use, operation, storage or disposal of radiation sources. Users include individuals performing the actual work and their supervisors.

5. RESPONSIBILITIES.

a. The Commander, JPG, is responsible for ensuring that measures are established for the effective control of radiation sources so that the occupational exposure of individuals will be as low as reasonably achievable and will not exceed the limitations prescribed by the Army and the NRC. These measures will include the following:

(1) Establishing a formal Radiation Protection Program, publishing regulations and procedures for its implementation; delegating authority to insure the safe use, handling, transporting, storing and disposal of radiation sources, insuring that the necessary measurements of exposures of personnel are made and recorded as required by regulation and insuring that Environmental Radiological Monitoring (ERM) Plans are developed as required.

(2) Appointing a qualified Radiation Protection Officer and a qualified alternate. Training and experience of the Radiation Protection Officer and alternate shall be commensurate with the hazards of the radiation sources being used. As a minimum, their formal training will include satisfactory completion of the occupational radiation protection course conducted by the EPA and US Public Health Service or equivalent formal instruction.

(3) Appointing an Ionizing Radiation Control Committee to assist in management of the Radiation Protection Program. The Committee shall be composed of the following members:

- (a) Radiation Protection Officer.
- (b) Medical Representative (OHN).
- (c) Safety and Occupational Health Manager.
- (d) Others as deemed necessary.
- (4) Providing for necessary training of personnel.

(5) Making final determination in cases of disagreement and in matters of disciplinary action.

b. The Radiation Protection Officer acts as staff advisor to the Commander, a technical member of the Ionizing Radiation Control Committee and staff supervisor of the Radiation Program. Responsibilities include:

(1) Maintaining a knowledge of current DA and NRC regulations pertaining to ionizing radiation protection and disseminating the appropriate information to personnel concerned.

(2) Provide advice and assistance to users and proposed users on the Radiation Protection Program including preparation of requests for approval to use radiation sources, procedures, techniques and methods of using, handling, transporting, storing and disposal of radiation sources.

(3) Providing technical advice and assistance to the Commander and members of the Ionizing Radiation Control Committee and recommending courses of action on the Radiation Protection Program.

(4) Providing necessary properly-calibrated radiation detection instruments and personnel dosimetric devices.

(5) Conducting radiation and radioactive contamination surveys before, during and after work to establish requirements for, as necessary, work time limits, shielding, special handling devices and techniques, protective clothing and equipment, and delineation of work areas.

(6) Conducting radiation surveys of inbound and outbound shipments of radiation sources.

(7) Performance of leak tests of radiation sources.

(8) Maintaining surveillance of personnel radiation exposures to ensure compliance with applicable regulations.

(9) Assisting in investigating radiation accidents and incidents and recommending methods to prevent recurrence.

(10) Maintaining formal records of all actions taken relating to the Ionizing Radiation Protection Program including requests for DA approvals and authorizations, applications for NRC licenses, inspections, radiation surveys, leak tests, personnel exposures and investigations, and 10 CFR Part 21 violations.

(11) Assisting and advising in training of users of radiation sources.

(12) Maintaining an inventory of all sources of ionizing radiation at JPG.

c. The Ionizing Radiation Control Committee serves in an advisory capacity to the Commander to assist in ensuring compliance with applicable regulations. The Committee is responsible for:

(1) Formulation of rules and procedures to minimize hazards from radiation sources.

(2) Review of plans and proposals involving use of radiation sources, including review of proposed procedures, facilities and equipment.

(3) Review of requests for DA authorizations and approvals and applications for NRC licenses for permission to possess radiation sources.

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(4) Recommending suspension of operations or tests involving radiation sources when necessary.

(5) Conducting inspections of operations and facilities in which radiation sources are used and making recommendations, when necessary, for correction.

(6) Conducting meetings and maintaining records of action taken.

(7) In addition to participating in committee actions, individual members of the Committee will provide specialized advice from their primary area of responsibility applicable to the Ionizing Radiation Protection Program. For example, the Safety and Occupational Health Manager is responsible for the integration of the program into the overall Safety Program.

(8) Review of training programs connected with the Ionizing Radiation Protection Program to insure adequacy, examining qualifications of users when necessary.

(9) Conducting periodic review of records of occupational exposure to ionizing radiation and performing other duties in connection with the program as required.

d. Using organizations, their supervisors and employees are responsible for the safe use, handling, transporting, storing and disposal of radiation sources. While technical advice and instructions are available, the ultimate responsibility lies with the users. Complete cooperation in work performance, strict adherence to approved procedures and full compliance with regulations are essential.

(1) Supervisors of users. Any person who directs or affects the actions of others is responsible for radiation protection to the same extent that he/she is responsible for production or services. This responsibility includes:

(a) Establishing approved standard operating procedures and ensuring compliance thereof for each separate use of radiation sources.

(b) Establishing effective training of personnel.

(c) Providing for safe work areas, proper facilities, tools, operating equipment, personal protective clothing and equipment and radiation exposure dosimetric devices.

(d) Establish emergency procedures.

(e) Assuring that preplacement, periodic and terminal physicals are scheduled with the Occupational Health Nurse for each radiation worker.

(f) Assuring new workers are issued film badges, if required, and that film badge service is discontinued when workers leave.

(g) Assure that the RPO, OHN, Safety Manager, Fire Chief and Security are informed of the location and use of radioactive material or radiation producing equipment.

(2) Users. Each employee as a condition of employment shall adhere to all instructions concerning safe work performance, self-protection, protection of other employees and property. Responsibilities of the user include:

(a) Use of personal protective clothing and equipment and radiation monitoring devices as required.

(b) Compliance with established rules, procedures and regulations.

(c) Performance of work in a safe, efficient manner using appropriate methods and techniques, tools and equipment as required.

(d) Contributing suggestions for improvements in radiation protection procedures.

(e) Reporting immediately to their supervisor any fire, explosion, malfunction, spill, theft, suspected personnel over-exposure, any 10 CFR Part 21 violations, loss of control or any other accident or incident involving radiation sources and take action as directed.

e. Other personnel providing support services to users of radiation sources, such as maintenance, transportation, fire protection and security shall be trained in radiation protection as it applies to their assignment.

6. REQUIREMENTS.

a. General. All JPG personnel will comply with requirements of this memorandum, DA regulations and procedures, NRC rules and regulations, the JPG Environmental Radiological Monitoring (ERM) Plans, and with radiation protection as it applies to their assignments.

b. DA Permits and Authorizations and NRC Licenses. DA permits and authorizations and NRC licenses for possession of radiation sources, as appropriate, will be obtained before start of work involving radiation sources. The request will be prepared in the proper format, reviewed and approved by the Ionizing Radiation Control Committee before presentation to the Commander for approval and dispatch to higher headquarters.

c. Personnel Exposure: Every effort shall be made to maintain radiation doses as low as reasonably achievable. Positive efforts shall be carried out to fulfill this objective, and determination of necessity should be weighed against the benefits to be expected. The basic Radiation Protection Standards as adopted by the DA for the control of occupational exposures to ionizing radiation are applicable to all personnel except those being exposed during examination or treatment for medical or dental purposes. See 10 CFR 20, AR 40-14 for specific allowable exposures. d. It is the responsibility of the female employee to advise her employer of the fact that she is pregnant.

e. Training and Experience of Personnel:

(1) All personnel employed in operations involving radiation sources, including those providing support services, will be trained in the hazards of ionizing radiation, safe techniques, methods and procedures applicable to the radiation sources involved. The extent of training is determined by the type, form, size and quantity of the radiation sources and the complexity of the operation. Training will be both theoretical and practical and will include initial, periodic and on-the-job phases. Initial training will be completed prior to start of work with radiation sources.

(2) Supervisors or users will certify by name and job title to the Ionizing Radiation Control Committee that each user is qualified in the safe use of radiation sources in his/her assigned position. When desired, the Ionizing Radiation Control Committee will examine proposed users to determine their qualifications.

(3) Prior to start of any work involving radiation sources, practice drills or "dry runs" will be conducted with simulated radiation sources to assure use of safe techniques, efficient handling methods and procedures. The Radiation Protection Officer will be consulted in planning practice drills and shall observe during drills to suggest improved techniques, and will give notice of approval before start of work with the radiation sources.

(4) JPG personnel and visitors who will be exposed to radiation and/or radioactive materials will be informed of the following prior to exposure:

(a) Presence of radiation and/or radioactive materials.

(b) Safety problems associated with exposure to such materials and/or radiation.

(c) Procedures and precautions to minimize exposure.

(d) Applicable provisions of NRC Licenses, DA Permits, authorizations, regulations and standing operating procedures.

(e) Emergency procedures.

(f) Right to receive report of any exposure incurred.

(g) Proper use of protective clothing and equipment.

(5) Personnel who are occupationally exposed to radiation or to radioactive material will receive the instructions listed in (4) above and in addition, will be instructed in the following:

(a) Health hazards associated with their work.

(b) Maximum exposure and contamination levels.

(c) Safe methods of performing work. The use of safety equipment and the operational steps involved should be demonstrated.

(d) Procedures to minimize contamination and to secure sources of radiation against unauthorized use.

(6) Before an individual uses or supervises the use of sources of radiation, his/her training and experience must be sufficient to deal safely with the radiation or radioactive materials. Before a person is made responsible for using a radioactive source, it must be determined that he/she has had experience with a similar source.

(7) Individuals whose training and experience are not adequate will be required to work under the direct supervision of a person known to be qualified, until such time that he/she can demonstrate ability on the job. In the event such training is not available locally, inquiry will be made into the possibility of the employee receiving the required training and experience at another AMC installation or activity.

(8) Emergency and security personnel will be trained to cope with radiological hazards which may be encountered in the performance of their duty. Training will be sufficient to enable such personnel to function without waiting for the guidance of the Radiation Protection Officer or other individuals not part of their immediate group. Such persons will be informed of the existence of situations which might become hazardous during special or unusual circumstances.

f. Personnel Dosimetry.

(1) Appropriate personnel monitoring devices shall be used to measure the exposure of each individual who is likely to receive an accumulated dose of radiation in excess of 5 percent of the applicable quarterly basic Radiation Protection Standard. Consideration shall be taken of all other occupational exposures the individual may receive during that particular calendar quarter. Dosimetric devices such as film badges, direct reading dosimeters, wrist badges and ring badges will be used as necessary.

(2) The issue of the appropriate personnel monitoring devices is the responsibility of the user supervisor. When personnel monitoring is indicated, personnel dosimeters will be issued. The type of device and wearing requirements will be determined by the Radiation Protection Officer.

(3) Loss of any personnel monitoring devices will be reported immediately to the Radiation Protection Officer by the individual to whom it was issued. The individual will furnish a written statement describing the circumstances surfounding the loss to the Radiation Protection Officer within 5 days. Copies of the statement with an exposure evaluation for the lost period by the Radiation Protection Officer will be sent to the Medical Officer.

(4) Pocket dosimeter readings will be recorded on either the Dosimeter Reading-Daily Record Form or Dosimeter Log Form, whichever the Radiation Protection Officer determines to be used. Weekly totals will be noted by the Radiation Protection Officer.

(5) The custodian of the medical records shall prepare and maintain DD Form 1141 for each person occupationally exposed to ionizing radiation. All exposure entries shall be made in rem.

(a) In the initial preparation of a DD Form 1141, reasonable efforts should be made to obtain complete reports of all previous exposure based on recorded personnel dosimetry. For each period in which the radiation was probable and no record, or only an incomplete record of his/her exposure during the period, can be obtained, it shall be assumed that an occupational exposure of 1.25 rem was incurred per quarter of each calendar year or fraction thereof. In cases where the nature of the radiation is unknown, it shall be assumed to be gamma radiation. If an individual was potentially exposed at more than one facility, the cumulative exposure shall be calculated and recorded as appropriate. The sum of these whole body exposures shall be entered and a statement regarding the source of that information shall be included.

(b) Appropriate entries on each individual's DD Form 1141 shall be made periodically, at least quarterly, from the exposure records supplied under the provisions of SF 11-206. Separate DD Forms 1141 shall be maintained to record exposures other than whole body, with appropriate descriptions noted.

(6) The Radiation Protection Officer shall evaluate and initial, at intervals not to exceed a calendar quarter, the DD Form 1141 of each individual engaged in duties involving occupational exposure to ionizing radiation.

(7) When an individual has received a dose of ionizing radiation in an amount exceeding 100 mrem/week or 1.25 rem per calendar quarter, he/she shall be removed from duties involving occupational exposure to ionizing radiation until subsequent exposure limitations are established in consultation with competent medical authority.

g. Radiological History and Medical Examinations.

(1) Personnel assigned to ionizing radiation work will complete a signed statement of previous exposure (DD Form 1952). The statement will be submitted to the Radiation Protection Officer who will forward it to the Medical Officer. The statement will contain the name of the individual, Social Security number/rank/rate, title of position, date of birth and a tabulation of all previous occupational exposure history as follows:

Employee's Name	Date of	Periods of
and Address	Employment	Exposure

(2) The Radiation Protection Officer will provide the Medical Officer with the names and telephone extension numbers of personnel for whom radiological medical examinations are required. The Medical Officer will contact the individual workers and arrange appointments.

(3) The general medical requirements for radiological personnel are identical to those for duty in the military service or for Civil Service employment with the exception of women known to be pregnant and persons under the age of 19 who will not be occupationally exposed to ionizing radiation.

(4) Preplacement medical examinations should be given personnel assigned to radiation work prior to commencing work. (If a similar examination has been conducted within the past 6 months, it will be accepted, provided a record of such examination is available as part of the individual's medical record).

(5) Special medical examinations will be given a person defined as a "radiation casualty" who (a) has received or is suspected of having received an external exposure dose exceeding 25 rem, or (b) has received or is suspected of having received an internal exposure dose via ingestion, inhalation, absorption through the unbroken skin or contamination of a wound.

(6) All personnel engaged in ionizing radiation work should be given a periodic (3 years) medical examination similar to the preplacement examination. In addition, some personnel may require more frequent examination.

(7) With the termination of work involving ionizing radiation, personnel should be given a final medical examination similar to the preplacement examination. Results of medical examinations will be entered within the appropriate medical records.

h. Protective Clothing and Equipment. Protective clothing does not protect the wearer from penetrating radiation but is intended to prevent particles of radioactive materials from contacting the body. Protective equipment may also prevent contact or provide shielding or permit an increased working distance, thereby reducing the dose to the worker. The Radiation Protection Officer will determine the type and the extent that protective clothing and/or equipment will be used.

i. Procedures for Receiving and Opening Packages Containing Radioactive Material: To comply with 10 CFR 20.205 and AR 385-11, the following procedures will be taken.

(1) Notify the Radiation Protection Officer of the receipt of the package. Any incoming package with any signs of damage or leakage will not be opened nor moved until after such package has been inspected by the Radiation Protection Officer or appointed assistant.

(2) Packages in good condition will be opened only by assigned responsible individual. Such packages will be opened with care, i.e., avoid using sharp tools, etc., which could break or otherwise compromise the safety of radiological items.

(3) Incoming packages will be monitored by the Radiation Protection Officer or his/her designee within 3 hours of receipt during duty hours or 18 hours during non-duty periods.

#### j. Facilities and Equipment.

(1) Adequate radiation detection instrumentation shall be immediately available for operations involving ionizing radiation.

(2) Working surface materials should be nonporous and resistant to attack by unsealed radioisotope solutions and construction should be seamless or flush seam. (In addition, disposable absorbent material may be used to cover the immediate work area). Floor covering should be nonporous material such as vinyl tile, asphalt tile or rubber tile and should have a heavy wax coating.

(3) Temporary or permanent shielding will be employed to prevent excessive exposure when time and distance factors alone would not be adequate. Shielding will also be used whenever feasible to minimize exposure.

(4) Remote handling equipment such as tongs, forceps, mechanical arms and slave manipulators; and remove viewing equipment such as mirrors, telescopes and closed circuit television will be used as necessary to reduce both whole body exposure and exposure to the hands.

k. Calibration of Radiation Protection Instruments.

Radiation protection instruments will be procured through normal supply channels. Calibration services will be requested from:

Commander Lexington-Bluegrass Army Depot ATTN: DRXLX-ME-I Lexington, KY 40507

1. Safety Rules. The following safety rules will be observed by personnel who are exposed to radioactive material or any other source of ionizing radiation:

(1) Individuals are required to wear personnel dosimetry when a dose in excess of 5% of the allowable quarterly dose may be received. In addition to the film badge or TLD, pocket dosimeters will be worn by each individual while in an area in which there exists radiation at a level of 100 mR's per hour or higher.

(2) No individual will work alone in the radiation area.

(3) Smoking, eating, drinking or chewing tobacco or gum within the area is prohibited. The chewing of gum or tobacco and the use of cigarettes in "hot" areas can result in the transference of activity to the lips and skin into the body.

(4) The practice of good housekeeping will help reduce the personnel hazard.

(5) Visitors in the radiation area will be escorted by individuals assigned to the area.

(6) Personnel working in a potential contamination area will be responsible for monitoring themselves and any visitors. Contaminated individuals will be required to shower, using soap and hot water. Except in an emergency, no person will leave the area after being in an area where he/she may have been contaminated until he/she has been monitored and determined to be free of contamination. In the event of an accident, injured personnel will be removed under the supervision of medical personnel.

(7) Personnel will wear and use such protective clothing and equipment as prescribed, to prevent both external or internal exposure to radiation.

(8) A high degree of compliance with industrial safety standards will avoid accidents which are aggravated by the presence of radioactive material.

(9) Radiac survey meters used for radiation protection purposes will be calibrated every 3 months or more frequently as required. Dosimeters should be calibrated at least once every 12 months.

m. Control of Sources, Personnel Access, Warning Signs and Labels.

(1) All radiation caution signs shall be magenta or purple on a bright yellow background and display the standard radiation caution symbol. The Radiation Protection Officer is responsible for assuring the posting of signs as necessary.

(2) The term "restricted area" will be used as defined in 10 CFR 20, which is: "Any area access to which is controlled (either by physical barrier or continuous surveillance) for purposes of protection of individuals from exposure to radiation and radioactive materials." Restricted areas will be established and posted according to the following criteria:

(a) An area will be included when a person could receive more than 2 millirem in any 1 hour if continuously present, or 100 millirem in 7 consecutive days (168 hours) if continuously present, or 500 millirem in any 1 calendar year considering reasonable occupancy.

(b) Areas used for residential quarters will not be included.

(3) All restricted areas shall be conspicuously posted with radiation caution signs with wording as specified in 10 CFR 20.203, for example:

#### CAUTION

#### RADIATION AREA

(4) Each container in which it is transported, stored or used in an amount exceeding the quantities specified in 10 CFR 20 shall bear a durable, clearly visible label bearing the radiation caution symbol and the words:

#### CAUTION

#### RADIOACTIVE MATERIAL

(5) Where the containers are used for storage, the labels shall also state the quantities and kinds of radioactive material in the containers and the date of measurement of the quantities.

n. Inventory of Radioactive Material.

(1) Using organizations will maintain a log of all transactions involving radioactive material. Entries will be kept current at all times and will indicate receipts, withdrawals, disposal and related information.

(2) Immediately following receipt, shipment, disposal, firing, etc., of radioactive material, using organizations will prepare an inventory form indicating the change and will forward one copy to the Radiation Protection Officer.

(3) Using organizations will furnish a monthly inventory report showing all radioactive material in their possession and its location to the Radiation Protection Officer, Safety Office, Fire Chief, Provost Marshal and Medical Officer.

o. Records. The following is a typical list of records which are to be maintained to document work with radiation.

(1) DD Form 1141. Official record of personnel exposure will be recorded on DD Form 1141 and will be filed in the medical folder. This form will not be filed by the Radiation Protection Officer. Locally-prepared forms containing all of the information necessary will be used by the Radiation Protection Officer for programming personnel exposure. At least quarterly, the Radiation Protection Officer will review and initial the DD Forms 1141.

(2) Minutes of meetings of Radiation Control Committee.

- (3) Radiation survey reports.
- (4) Inventory records.
- (5) Transportation records.
- (6) Records of disposal.

(7) Instrument calibration showing dates, source and instrument identification, calibration data and names of persons performing calibration.

(8) Record of personnel instruction to include name of persons instructed and date, scope and duration of instruction.

(9) Incident and accident records to include reports and histories as required.

(10) Environmental monitoring records.

. 7. PROCEDURES.

a. Radiation Protection Surveys.

(1) Records of all surveys will be kept by the Radiation Protection Officer to include the following:

(a) Initial. The initial survey will be performed by the Radiation Protection Officer. This survey will be completed with satisfactory results before work is begun.

(b) Routine. Routine surveys will be made at least monthly of all radioisotope areas. These surveys will be directed toward detection of contamination, excessive radiation levels and poor health physics practices such as inadequate control of sources and/or exposure areas and infraction of regulations.

(c) Special. The Radiation Protection Officer or designee will perform special surveys during particularly hazardous operations and following spills, loss of control, suspected or known overexposures or other accidents. A special survey shall also be performed for each radioactive material shipment and receipt in accordance with AR 385-11 and AMCR 385-25. This will include a survey of the vehicle and certification to the operator that the residual contamination does not exceed the limits given in AMCR 385-25. A special survey will also be conducted to determine the presence of contamination on the clothing or shoes for those workers clearing the DU impact area. The object is to prevent the spread of contamination to uncontaminated areas. Contaminated clothing or shoes will not be worn outside the impact area. If clothing or shoes are being contaminated, protective coveralls and/or shoes will be required in the impact area.

(d) Renewal. This survey will be performed prior to the start of work after suspension. The procedures are as given for the initial survey.

(e) Final. After the completion of work a final survey will be performed by the Radiation Protection Officer or alternate. Final surveys will also be performed for individual rooms and areas removed form radiation work. The final survey will insure that:

-All areas and equipment listed are free from radioactive contamination except those remaining in use.

-All sources of ionizing radiation are properly disposed of or transferred.

-All signs and labels marking radiological hazards are removed.

(2) In addition to these surveys the Ionizing Radiation Control Committee may conduct special surveys of all facilities where materials or devices which emit ionizing radiation are utilized. (3) Inspections will also be conducted by the NRC, the US Army Environmental Hygiene Agency and other Army organizations having responsibility and authority to do so.

b. Leak Testing Sealed Sources will be conducted in accordance with AR 385-11.

c. Contamination Levels and Decontamination.

(1) Contamination Levels. Maximum permissible concentration levels in air and in water above natural background are listed in Tables I and II of Appendix B, 10 CFR 20.

(2) Personnel Decontamination.

(a) Thorough washing with nonabrasive soap and lukewarm water is the best general method of decontamination of the hands and other parts of the body regardless of the contaminant. If the contaminant is localized, it is often more practical to mark off the affected area and cleanse with swabs, rather than risk the danger of spreading the contaminant by general washing. Organic solvents must be avoided as decontamination agents because they may increase the probability of the radioactive materials penetrating through the pores of the skin. Special attention must be given to the areas between the fingers and around the nails.

(b) After repeated washings the skin will tend to chap. To avoid this, apply lanolin or hand cream and then continue to wash. If repeated washing with soap and water is unsuccessful in the personnel decontamination, the individual should be referred to the local Medical Officer for application of the more drastic chemical decontamination listed in National Bureau of Standards Handbook Number 48.

(c) If it is suspected that any person by ingestion, inhalation or any other manner has introduced radioactive materials into the body, the local Medical Officer will be notified immediately so that medical procedures can be initiated to facilitate the elimination of such material. If a person has been contaminated over a large area of the body, or if the face has been contaminated, this shall be a basis for suspecting that the person is internally contaminated.

(d) In the event an individual is contaminated on a large portion of the body, the decontamination procedures will be followed as prescribed by the Radiation Protection Officer.

(e) In all cases of personnel contamination, the Radiation Protection Officer will be consulted.

(3) Equipment and Area Decontamination.

(a) Care must be taken during the decontamination process to avoid further spread of the contaminant. This can be accomplished by:

-Always working from the area of least contamination towards area of heaviest contamination.

-Taking precautions to contain the contamination by the use of monitoring and protective clothing and shoe covers.

-Using a minimum amount of decontamination liquids and being aware that the run-off solutions, mops, rags and brushes will all be contaminated.

(b) The methods listed below should be tried in the following sequence:

-Damp mopping. The area is wiped with a damp cloth.

-Water and detergent. The area is wetted with a minimum amount of detergent solution and this wiped dry.

-Steam cleaning.

-Cleaning with solvents other than water.

-Surface removal by use of chemicals, abrasives, sandblasting, etc.

(c) Specific Methods. If the above decontamination methods do not work, specific methods as prescribed by the Radiation Protection Officer may be tried.

(d) Decontamination of Clothing. Contaminated clothing will be disposed of as contaminated waste.

d. Storage and Transportation of Radioactive Materials.

(1) Storage of Radioactive Materials.

(a) Areas will be set aside for the secure storage of radioactive materials. These areas will be used to store only radioactive materials and will be approved by the Radiation Protection Officer and Chief, Fire Prevention and Protection Branch.

(b) Each storage container will be marked as required by 10 CFR 20 whether or not the radicactive material is under the license control of the NRC.

(c) Radioisotopes will not be transferred from one storage container to another within the storage area. A system shall be provided to control and record the "check in" and "check out" of radioactive materials.

(d) Storage areas will be provided adequate ventilation if gaseous sources are being stored.

(2) On-Post Transportation of Radioactive Material. Within the installation, it usually is not convenient to package and to transport radioactive material in the manner required for off-post shipments. However, the following precautions should be observed.

(a) In loading the vehicles, weight limitations should be maintained, containers should be kept away from the cab of the vehicle, limit loads to keep radiation levels, to which personnel will be exposed during transportation, as low as possible.

(b) Do not haul loose radioactive materials. All radioactive material must be secured to prevent shifting during transit. Tail gates will be closed to minimize chance of cargo lost.

(c) Containers should be sturdily constructed and be free of removable contamination. Each container must have a completed label - CAUTION: RADIO-ACTIVE MATERIALS, if amount of material exceeds the amounts in 10 CFR 20.203.

(d) A suitable vehicle will be used. We hick are difficult to decontaminate should not be used.

(3) Off-Post Transportation of Radioactive Material will be in accordance with 49 CFR 172 and 10 CFR 71.

e. Disposal of Radioactive Material will be in accordance with 10 CFR 20.301 and AR 385-11.

f. Security.

(1) Radioactive materials will be secured against unauthorized removal in accordance with appropriate security regulations.

(2) In those cases where national security is involved, plans and procedures for handling, storage and movement of the radioactive material will be coordinated with the appropriate Security Officer.

8. EMERGENCY PROCEDURES.

a. Procedures establishing responsibilities and actions to be taken in case of emergencies involving radiation sources will be a part of the JPG Emergency Control Plan. Names and telephone numbers of individuals capable of responding to an emergency situation will be posted with NRC Form 3. The key radiation emergency personnel, i.e., RPO, Provost Marshal, Fire Chief, Safety Manager and Medical Officer will approve all emergency procedures involving sources of ionizing radiation.

b. In view of the complicating factors that may arise in an emergency, it is impossible to establish simple rules of procedure to cover all situations of radiation danger. However, in any emergency, the primary concern must always be the protection of personnel. Second, should be the confinement of the contamination to the local area of the accident.

c. Emergencies will probably be of the following types:

(1) Spill of radioactive material.

(2) Explosion.

(3) Fire.

(4) Overexposure.

(5) Injury to personnel.

d. Emergency procedures will be pre-planned and rehearsed at the start of new operations that may lead to emergencies and at least once every year thereafter. In the event of an emergency, the actions to be taken for each type emergency anticipated will be included in standing operating procedures and/or JPG Emergency Control Plan.

e. Emergency reports covering the emergency situations will be as required by 10 CFR 20 and AMC Suppl 1 to AR 385-40.

f. Key emergency personnel for radiation accidents or incidents are the Radiation Protection Officer, Provost Marshal, Fire Chief, Safety Manager and Medical Officer.

9. REFERENCES.

a.	AR 360-43	10 Feb 72	Information Guidance - Nuclear Accidents and Nuclear incidents.
b.	AR 385-11	1 May 80	Ionizing Radiation Protection.
с.	AR 700-64	Apr 75	Radioactive Commodities in the DoD Supply.
d.	FM 3-15	17 Jun 66	Nuclear Accident Contamination Control w/Chg 1.
e.	TM 3-220	22 Nov 67	Chemical, Biological and Radiological (CBR) Decontamination, w/Chgs 1 and 2.
f.	TM 3-261	20 May 66	Handling and Disposal of Unwanted Radioactive Material, w/Chg 1.
g.	TM 5-805-12	1 Aug 66	X-Ray Shielding.
h.	TM 8-280	1 Aug 74	Radiological Technology.
1.	TB MED 522	1 Aug 80	Occupational and Environmental Health Control of Health Hazards from Protec- tive Material Used in Self-luminous Devices.
j.	TB 43-0197	10 Jun 77	Instructions for Safe Handling, Mainte- nance, Storage and Disposal of Radioac- tive Items Managed by US Army Armament Materiel Readiness Command.

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k.	SB 11-206	18 Apr	69	Film Badge (Photodosimetry) Supply and Service for Technical Radiation Exposure Control.
1.	TECOM PAM 385-1	Oct	71	Radiation Safety Primer.
ш.	TECOM PAM 385-2	Nov	72	Radiation Safety Swipes and Surveys.
n.	DARCOM Reg 385-25	Aug	68	Radiation Protection.
0.	DARCOM Reg 385-30	Sep	70	Particle Accelerators.
p.	AR 40-5	l Jun	85	Preventive Medicine.
q.	AR 40-14	15 Mar	82	Control and Recording Procedures for Occupational Exposure to Ionizing Radiation.
r.	AR 385-30	18 Nov	71	Safety Color Code Marking and Signs.
s.	AR 385-40	1 Sep	80	Accident Reporting and Records.
t.	JPG ERM(s)	Vario	us	Environmental Radiological Monitoring

(STEJP-SO)

FOR THE COMMANDER:

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DENNIS H. JERRELL Administrative Officer

DISTRIBUTION: C, D, H, I Ea Mbr Ionizing Radiation Control Committee Radiation Protection Officer 2 -- CDR, TECOM, ATTN: AMSTE-ST 1 - CDR, TECOM, ATTN: AMSTE-SG-A



U.S. ARMY JEFFERSON PROVING GROUND MADISON, INDIANA 47250-5100

REPLY TO ATTENTION OF

STEJP-TD-D

0 4 FEB 1986

SUBJECT: Additional Information for Inclusion with the Amendment to NRC License SUB1435 dated 18 Nov 85

Commander US Army Test & Evaluation Command ATTN: AMSTE-ST/T. Palmateer Aberdeen Proving Ground, MD 2100-5055

1. Reference FONECON between T. Palmateer, TECOM, and N. Wykoff, JPG, on 12 Dec 85, subject as above.

2. The following Enclosures are submitted to satisfy the above request:

a. Encl 1: Record of Environmental Consideration.

b. Encl 2: Resume of Allan Herrbach.

c. Encl 3: Semi-Annual Soil Sample Data, including data from the primary and quality control laboratories and a few graphs highlighting the semi-annual data.

3. Test for the Best.

FOR THE COMMANDER:

HUR B. ALPHIN

3 Encls

ARTHUR B. ALPHIN MAJ, ARM Director, Materiel Testing

#### RECORD OF ENVIRONMENTAL CONSIDERATION

1. Title: Amendment to NRC License SUB 1435 dated 18 Nov 1985.

2. Description of Proposed Action: There are two changes requested in the amendment that have the potential to be environmentally controversial. They are:

i) The maximum amount of uranium that may be possessed at any one time (item 8 in the license) be changed to 100,000 kg.

ii) The restriction of 35 pCi/gm of uranium in the soil as a result of testing be increased to 300 pCi/gm.

3. It has been determined that the action is adequately covered in the existing EA entitled: Supplement E to the application for Source Material License, Soft Impact of DU Munitions, dated 4 April 1983.

Signed: RTHUR B. ALPHIN

MAJ, ARM Dir, Materiel Testing

Date: 4Fet 86

Concurrence:

Bithren Phoneri-

BEHRAM P. SHROFF Environmental Engineer

Date: 42/16



Area @ SS6 was decontaminated in Jun 85

U-234 TO U-238 RATIO

SAMPLE	MAR. 84	APR.84	DEC. 84	APR. 85
SOIL 6	.71/.76	.69/.77	1.99/10.2	7.84/61.24
SOIL 8	.68/.74	0.42/2.57 0.89/2.81 0.25/2.44	3.80/22.6	4.61/30.84
501L -10	.61/.71	.59/.66	1.13 / 3.35	.843/2.24
501L 12	.67/.70	,84 /90	.818 ./.862	.817/.816
SOIL "19	.72/.77 _	.87/.88	.856/.849	.753/878
SOIL "26	.67/.77	.75/.76	.881/.924 ;	:859/913
SOIL "32	.78/.83	.74/,81	.839/,868	1928/.969
SOIL * 36	.95/.93	.93/.94	1.00/1.04	1.03/1.13
SW - NW	.036/.042	.140/.153	.116 /.045	.078 /.091
SW - N	.063/.046	.093/.117	.093 /.095	.106 /128
SW - NE	,028 1.054	.107/.120	.129/.088	.034/.082 .
SW - 5W	.028/.030	.041/.036	.093/.032	.037/.053
SW - S	< LOL	.044/.034	.041/.041	.0611.012
SW - SE	< LDL	.043/.055	.057/.049	.081/.046
SW - BN	.052/.030	.096/.117	.111/.083	.102/.084
SW - BS	.042/.052	.102/.107	.093/.090	.091/.075
M-2	.18/.17	.56/.55	.655/.657	.138/.13.4
M-4	.33/.39	18/.15	.196/.19/	.204/.185
M- 5	.26/.27	.28/.32	.146/.141	.135/.144
NI- 8		.12/.11	.159/.217	.142/.140
M-1	.22/.25	.52/.53	.29/.31	.57/.48
m-3	.871.94	.74/.81	. 39/. 38	. 36/.33
m-6	. 90/.85	.71/.73	.96/1.01	.51/.51
m-7		.5d/.42	.34/.33	.29/.30

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NOTE: ACTIVITY IS MEASURED IN PCI/g FOR SOIL AND SEDIMENT AND PCI/L FOR WATER .

> AREA AT SAMPLING POINT 6 WAS DECONTAMINATED. AN ANALYSIS IN JUN 85 GAVE 2.36/13.6.

### - Impact Area Soil

errors are 2 sigma counting of peak and tracer

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Sample grid #	U-234 - pCi/g	U-235 pCi q	U-238 pCi/q	234 238	238
an - 1000 - 100 - 10 - 100 - 000 - 100 - 100	100 Art 10 - 10 000 Art 11 Art 11 Art	and and all the and the and the and the			
1	Ø.37+Ø.09	0.03+0.01	0.92+0.09	.945	36
2	0.75+0.08	∅.∅∵+∅.∞1	1,86+0,09	.884	27
3	Ø.72+Ø.08	0.03+0.01	0.74+0.08	.973	25
4	0.84+0.04	0.03+0.01	0.89+0.04	. 944	50
5	0.82+3.08	0.03+0.01	0.93+0.09	.882	21
6	Ø.71+Ø.06	0.03+0.01	0.76+0.35	.934	25
7	Ø.74+0.95	0.03+0.01	0.77+0.06	. 761	24
8	0.63+0.00	0.03+0.01	0.74+9.Ø6	.919	2.5
9	0.73+0.06	Ø.02+Ø.01	0.79+0.05	.924	40
10	0.61+0.96	0.02+0.01	Ø.71+Ø.Ø6	.859	36
11	0.62+0.06	Ø.03+Ø.01	0.68+0.06	.912	23
12	0.67+0.06	0.03+0.01	0.70+0.06	.957	20
13	0.68+0.06	0.03+0.01	0.48+0.04	1.00	23
14	0.81+0.05	0.03+0.01	Ø.87+Ø.06	.931	29
15	Ø.31+0.08	Ø.Ø5+0.01	0.81+0.05	1.00	16
16	Ø.83+0.09	0.03+0.01	0.85+0.08	.978	20
17 '	0.81+0.08	0.0j+0.01	0.80+0.06	1.01	: '
13	0.61+0.00	$\emptyset \bullet \oplus $	0.45+0.05	.938	60
19	0.72+0.04	0.03+0.01	Ø.77+Ø.Ø5	.935	25
20	0.76+0.06	0.03+0.01	0.83+0.06	.918	28
21	0.55+0.98	0.04+0.01	0.75+0.06	. 889	19
22a 22b	0.51+0.60	0.00+0.01	0.70+0.05	.971	21
23	0.79+0.05	0.0.100.01	0.81+0.05	.975	413

CONTROL NO. 81351

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MAR 84

#### Impact Area Soil

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Sample grid #	U-234 pCi/g	U-205 pCi/g	U-238 pCi∕a	234 238	238
					*** * * * **
24	0.75+0.05	0.03+0.01	0.78+0.05	.962	26
25	0.86+0.05	Ø.Ø3+Ø.01	0.99+0.06	.869	33
26	Ø.67+Ø.04	0.02+0.01	₫.77+₫.@4	.870	30
27	Ø.71+Ø.Ø5	Ø.02+0.01	3.73+0.06	.973	36
28	Ø.64+Ø.04	0.03+0.01	0.54+0.04	1.00	21
29	0.73+0.05	0.03+0.01	0.81+0.05	.901	27
30	Ø.77+Ø.05	Ø.24+Ø.C1	0.81+0.05	.951	210
31	0.80+0.05	0.02+0.01	0.83+0.05	.964	42
32	Ø.78+Ø.07	0.03+0.01	9.83.9.07	. 94:4	28
33	0.58+0.05	0.05+0.01	0.71+0.06	.958	1 1
34	0.63+0.05	$\emptyset \cdot v^{\epsilon_{n}} + \emptyset \cdot v^{\epsilon_{1}}$	1.69+0.06	.913	34
35	0.83+0.08	0.02+0.01	0.87+0.Ø8	.954	44
36	0.95+0.09	0.03+0.01	0.93+0.09	1.02	31
37	Ø.62+Ø.Ø4	0.02.0.01	0.65+0.04	.954	32
38	Ø.88+Ø.Ø5	0.02+0.01	0.89+0.05	. 989	44
39	Ø.53+Ø.Ø4	0.02+0.01	0.55+0.04	.964	28
40	0.92+0.11	0.03+0.01	1.01+0.11	.911	34
LDL	Ø.01	Ø.@1	0.02		
mean	0.739	0.028	0.787	.939	30.2
sigma	0.095	0.0078	0,093	.042	9.1
relative error	12.9%	27.9%	12.5%	4.5%	50%
ratio of means	234/238 = 0.93	:9			

ratio of means 238/235 = 28.1

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a,b denote duplicate aliquots from same sample

Uranium concentrations in soil samples collected April 24 and 25, 1984, at JPG. Activities are pDi/q and erford are 2 sigma for both the sample and tracer.

Grid #	U-234	U-235	U-238	234/
				238
1	10.90+0.06	Ø.02+0.02	0.97+0.07	Ø.93
2	0.74+0.05	0.02+0.01	0.75+0.05	0.99
3	0.77+0.06	Ø.03+0.01	0.82+0.05	0.94
4	Ø.82+Ø.Ø6	Ø.Ø3+Ø.01	0.84+0.05	0.98
5	0.82+Ø.Ø8	0.03+0.01	0.30+0.08	1.02
6	Ø.69+Ø.ØS	0.03+0.01	9,77+0,95	0.90
7	Ø.79+Ø.Ø5	0.03+0.01	0.84+0.05	0.93
2a	0.92+0.06	$\emptyset, (14 + (4, 0))$	2,57+0,13	6. 34
ар	0.89+0.06	0.06+0.01	2.51+0.13	0.36
Sc	0.85+0.05	0.05+0.01	2.44+0.12	0.35
9	W.7Ø+Ø.Ø5	0.05+0.01	0.63+0.05	1.03
10	0.59+0.05	0.04+0.01	0.66+0.05	0.89
11	0.65+0.05	Ø.03+Ø.01	0.75+0.05	0.87
12	Ø.84+Ø.Ø8	Ø.04+0.01	0.90+0.09	0.93
13	0.67+0.05	0.03+0.01	0.70+0.05	0.96
14	0.84+0.06	0.03+0.01	0.91+0.06	0.92
15	0.68+0.05	Ø.02+Ø.01	0.79+0.05	Ø.87
16	0.79+0.05	Ø.Ø3+Ø.01	Ø.89+Ø.Ø5	Ø.89
17	Ø.91+Ø.Ø7	Ø.Ø3+Ø.01	0.97+0.08	0.94
18	0.54+0.05	0.02+0.01	0.59+0.05	Ø.93
19	6.37+0.Ø6	Ø.02+Ø.01	0.88+0.06	0.99
20	0.31+0.05	Ø.02+Ø.21	0.85+0.05	0.95
21	0.75+0.05	₫.03+0.01	0.81+0.35	0.94
22	0.64+0.05	0.0250.01	0.65+0.05	0.97
23	0.84+0.05	0.00+0.01	0.93+0.06	0.93

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Grid #	U-234	0-235	U-238	234/
	·····			238
24	0.76+0.08	0.07+0.02	0.73+0.08	Ø. 97
25	Ø.82+Ø.Ø7	0.03+0.01	Ø.94+Ø.07	12.94
26	0.75+0.05	0.03+0.01	Ø.75+Ø.Ø5	0.99
27	Ø.72+Ø.05	Ø.Ø3+0.Ø1	0.65+0.05	1.11
28	0.73+0.07	0.02+0.01	0.79+0.07	0.92
29	0.73+0.05	0.03+0.01	0.75+0.05	0.95
30	Ø.82+Ø.Ø6	0.03+0.01	Ø.79+Ø.05	1.04
31	Ø.78+Ø.Ø6	0.02+0.01	0.81+0.05	0.95
32	0.74+0.05	0.03+0.01	0.81+0.05	0.91
33	Ø.72+Ø.05	0.06+0.01	0.72+0.05	1.00
34	0.74+0.05	0.03+0.01	0.80+0.05	0.92
35	Ø.72+Ø.Ø5	∅.@4+ø.@1	0.75+0.05	0.96
36	Ø.93+Ø.08	0.05+0.01	0.74+0.08	Ø. 79
37a	Ø.60+Ø.04	0.02+0.01	0.65+0.04	0.92
376	0.62+9.04	0.02+0.01	0.66+0.04	0.94
38	Ø.80+0.05	0.04+0.01	0.85+0.06	0.93
39	Ø.61+Ø.05	0.03+0.01	0.63+0.05	0.97
4ø	Ø.82+Ø.Ø5	0.04+0.01	0.85+0.05	0.95
LDL	0.0203	0.0033	0.0:49	

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a,b denote duplicate aliquots

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CONTROL NO. 81351

The following results were produced for JPG samples collected in Socember, 1989. For water samples units are pCi/liter; for soil and sediment units are pCi/gras. For error terms see chain of custody forms.

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JPG I.D.	Mound T.D.	Тур≘	529   <sup>1</sup>	532 U	23*	2340/2380
D1 blank	H85-226	water	0.00.22	9. 6924	0.0045	
DI black	H85-227	stat or	6	0	01.0151	
DI blank	14941-0119	water	ST 1418771	0 00 40	0 0047	
Di blank	H95-000	water	63 - 53 4 HE 4	1 00051	174	
	trained managers	17 CT C 21	the second s		2.4	
1	105-005	a Marane	3 033	a a:0	0 705	
Mid-7	NOE-784	g weter	a coa	0.010	1 90	1.40
MU-2	duplicate	y water	01 6 CO (3	0.000 8 050	1.07	2.30
1 / V ·	LOF-ONT	in states	0.070	0.000 *** 660#	1.78	2.00
Wid-A	NG0-207	g water	0.010	+0.0023	0.034	1.51
NP.1	H00-220	g water	0.122	10.1025	0.240	1.47
NUL-L	H05-207	g water	0.100	*0.9003	0.151	1.51
MU-0	1100-210	g water	1.2/	0.053	4.44	1.41
1100-6	cupilcate	g water	1.41	0.060	1.85	1.31
Mid	H30-211	g water	0.698	0.024	1.08	1.57
MW - /	duplicate	g weter	0.614	9.034	0.737	1.61
MM-8	H95-212	g water	0.642	0.042	0.537	Ø.84
SW-NE	H85-013	a water	0.000	* 01 0111	Ø 129	1 47
SW-SE	195-214	a watar	0 0 0 0 0	×G 067	0 0 7	1 14
SM-N	H25-215	a without	a aqua	20 · 20 20 20	8 807	0.00
· Shi-hi	dustiests	an is a descent	0 805	×0 013.4	6 640	13 77
Chi_C	HQE_OIL	a underso	6 6 P 1	A 10 . 50 10 4	0.007	1 000
CH-QH	105-017		N NOT		0.041	1.00
G10-50	105-210		0.020	*** 000	3 207	1 07
CH-NIN	H00-210	a water	0.070	*10.004	12 . 12 7 3	1.05
SW-NW Chi -NW	MOD-117	a Water	0.1273	712	0.110	1.22
DW-NW CLI-CLI	upplicate upplicate	s water	10 - 1.10 -2.	*0.008	0.110	1.15
30-30	H80-220	s water	~0.0.002	*2.000	0.075	-
*		water	10.10322	0.0111	0.0283	
TC Mat Li	0584538	mand i mana k	01 710		0 001	0.07
MD	0000200	Seurnant.	S 457	0.010	0.271	2.70
M-7	0000202	and i ments	0.007	0.2042	9.600	1.00
M-0	00/00000	Sections to	0.3/8	0.013	0.085	1.02
11	0300700	seciment	W 17/	0.005	10.170	0.77
M-0	830/24/	sediment	10.141	10.0107	0.140	1.04
M-8	82107431	sediment	1.191	6.018	0.983	0.95
m-/	8507625	sediment	19. 3.24	0,019	.0.337 -	1.01
r-8	8507606	sediment	0.217	0.208	0.159	0.73
+LDL		sediment	0.0214	0.0042	0.0242	
- 12	0507400	mari 1	1.0 0	0 15/1	+ 00	a 0.8
G	0537437	9011 	1232	0.100	1.77	10.210
1.0	000/00/	in Data		Ward L	1 17	10.17
10	00002107	BULL BULL	a. 01 a.	0.005	0.010	0.04
12	0507310	501 L	0.002	0.045	9.318	0.73
17	8507811	3011	0.549	10.121912	0.856	1.01
20	0507812	5011	10.724	0.045	0.881	0.93
22 7977	85.97313	2011	10.363	0.035	0.839	0.97
30	8507814	5011	1.6.4	0.047	1.22	0.96
#CDL		SOLL	10.8214	0.0042	0.0242	

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JPG I.D.	Mound I.D.	Týpe	23eU	238	234	234U/230U
M7-85-1	8509170	sediment	Ø.295	0.020	Ø.289	0.98
M8-95-1	8509171	sediment	0.140	0.006	0.142	1.01
6-1-85	8509172	soil	61.24	0.687	7.84	Ø.13
8-85-1	8509173	soil	30.84	0.413	4.61	Ø.15
10-85-1	8509174	soil	2.24	0.066	Ø.843	Ø.38
12-85-1	8509175	soil	Ø.816	0.026	Ø.817	1.00
19-85-1	8509176	soil	Ø.878	0.037	Ø.753	0.86
26-85-1	8509177	soil	0.913	Ø.Ø47	Ø.859	10.94
32-85-1	8509178	soil	0.969	Ø.Ø22	Ø.928	10.96
36-85-1	8509179	soi l	1.13	0.052	1.03	Ø.91
*LDL precision	8 blanks 8 duplicates	4.65sigma 2.Øsigma	Ø.0214 13%	Ø.ØØ42 26%	Ø.Ø242 7%	

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Concentrations of granium in special samples collected at Jefferson Proving Ground in June and July, 1985. Error terms for soil are one standard deviation of replicate samples. Error terms for water and the filter are two standard deviations based on counting statistics only. Units of measurement are pCi/g for soil and pCi/liter for water and particulates in water. Water and soil results below are mean values of replicates; for individual values and values of blanks see chain of custody forms.

Sample	U-238 +-error	U-234 +-error	U-235 +-error	234/
				208
41-85-1	Ø.73 +-Ø.Ø3	Ø.56 +-Ø.Ø1	Ø.Ø32 +-Ø.Ø11	0.90
42-85-1	1.06 +-0.02	Ø.87 +-Ø.Ø1	0.037 +-0.003	Ø.82
6A-85-1	13.6 +-1.Ø	2.35 +-0.11	Ø.18 +-Ø.ØØ7	12.17
SW-NB-85-1	Ø.57 +-Ø.Ø7	Ø.11 +-Ø.Ø3	Ø.010 +-Ø.009	0.19
SW-NB-F-85-1	0.069+-0.010	0.012+-0.005	<0.001	0.18
LDL soil pCi	0.015	0.020	0.0033	
LDL water pCi	0.006	0.010	0.005	



U.S. ARMY JEFFERSON PROVING GROUND CUSTOMER MADISON, IN 47250 ATTENTION

# ADDRESS

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CITY

S.O. NO. E-3985

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ALDUGUENQUE LADUNATUNT

Radiochemical analyses of water, soil, sediment, filter, & dear. P.O. #DAADO3-84-M-0650 CUSTOMER ORDER NUMBER SAMPLES RECEIVED 6/29/84

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SAMPLES RECEIVED 6/29/84

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Customer Identification	Date Collected	Type of Analysis	U-234	pCi/1 U-235	U-238	Total Vol.(ml)
(NW-1)8410027-1 (water)	4/30/84		<0.3	<0.1	<0.4	3850
(SW Bn)8410041-1 (Water)	5/30/84		<0.1	<0.1	<0.1	3820
(MW-5) split (water)	1/10/84		<0.1	<0.1	<0.1	3870
(SW-SE)AEHA Split (water)	12/6/83		<0.1	<0.1	<0.1	610
(SW-NE)AEHA Split (water)	12/6/83		<0.1	<0.1	<0.1	3680
				pCi/g (dry)		wet/dry(g)
14A (Soil)			1.2±0.1	<0.1	1.1±0.1	621/488
15A (Soil)			1.0±0.1	<0.1	1.0±0.1	420/359
17A (Soil)			1.0±0.1	<0.1	1.1±0.1	463/362
27A (Soil)			0.7±0.2	0.4±0.1	0.6±0.2	641/477
26A (Soil)			0.6±0.1	<0.1	0.5±0.1	501/385
28A (Soil)			0.5±0.1	<0.1	0.6±0.1	596/476
29A (Soil)			0.7±0.1	0.2±0.1	0.6±0.1	497/381
30A (Soil)			0.7±0.1	<0.1	0.6±0.1	563/429
37A (Soil)			0.6±0.1	<0.1	0.7±0.1	575/440
38A (Soil)			0.7±0.1	<0.1	0.7±0.1	474/372
4 Sediment	4/30/84		0.7±0.1	<0.1	0.7±0.1	586/426
6 Sediment	4/30/84		0.6±0.1	<0.1	0.7±0.1	547/431
19 Sediment	4/30/84		0.7±0.1	<0.1	0.7±0.1	437/335
26 Sediment 32 Sediment Dig Cr WP	4/30/84 4/30/84 4/30/84		0.5±0.1 0.5±0.1 0.2±0.1	<0.1 <0.1 <0.1	$0.6\pm0.1$ $0.6\pm0.1$ $0.4\pm0.1$	499/353 346/259 646/385

REPORTED VIA TELEPHONE

REPORTED VIA TWX



A DIVISION OF Thermo Electron GRATION

P O BOX 3874 ALBUQUERQUE, NEW MEXICO 87190 PHONE (505) 345-3461 twx 910 985 0678 PAGE 1 OF 2 PAGE

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~ 8/13/84 DATE

CHANDRASEKARAN, E.S., MANAGER

· ARMY

ESS CITY E-3985

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Radiochemical analyses of filter & deer.

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SAMPLES RECEIVED

Customer	Date	Type of		pCi/g (dry)		Total Vol.(g)
identification	Collected	Analysis	U-234	U-235	U-238	wet/dry
A-5 Split (filter)	2/23/84		0.2±0.2	<0.1	<0.1	
A-6 (filter)	1/10/84		<0.2	<0.2	<0.2	
#1 (Deer)			<0.001	<0.001	<0.001	430/144
#2 (Deer)			<0.001	<0.001	<0.001	594/238
#3 (Deer)			<0.001	<0.001	<0.001	624/270
#4 (Deer)			<0.001	<0.001	<0.001	697/295

CUSTOMER ORDER NUMBER

REPORTED VIA TELEPHONE

REPORTED VIA TWX



P. O. BOX 3974 ALBUQUERQUE, NEW MEXICO 87 190 PHONE (505) 345-3461 IWX 910-985-0678 CONTROL NO. 8 1 3 5 LAGE 2 OF 2 PAGE

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8/13/84

CHANDRASEKARAN, E.S., MANAGER

ALBUQUERQUE LABORATORY



U.S. ARMY JEFFERSON PROVING GROUND ATTENTION MADISON, IN 47250

ADDRESS

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CITY

S.O NO. E-4671

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ALDUGULNUUL LADUNATUNT

Radiochemical analyses of soil,		sediment	& Water: CUSTOMEN ORDER NUMBER	SAMPLES RECEIVED	2/25/85	
Customer	Date	Type of			wet/dry	
Identification	Collected	Analysis	pCi/g(dry)	) To	otal Wt.(g)	
Sample Point 146	1985	U-234	0.5±0.1		438/298	
(Soil)	3:15 am	U-235	0.02±0.02			
		U-238	0.7±0.1			
Sample Point 10	12/2/84	U-234	1.5±0.1		558/444	
Q-A (Soil)		U-235	0.11±0.03			
		U-238	8.0±0.3			
M-EPERM	1/29/85	U-234	0.7±0.1		385/657	
(Sediment)		U-235	0.03±0.02			
		U-238	0.7±0.1			
M-3	12/2/84	U-234	0.5±0.1		823/623	
QA (Sediment)		U-235	0.02±0.02			
		U-238	0.5±0.1			
			pCi/1		Vol. (ml)	
TAP (water)	1/29/85	U-234	0.4±0.2		3700	
		U-235	0.0±0.2			
		U-238	0.5±0.2			
SW-EPER (water)	1/29/85	U-234	0.2±0.2		3700	
		U-235	0.0±0.1			
		U-238	0.2±0.1			
MW-1 (water)	12/2/84	U-234	0.3±0.1		4000	
		U-235	0.0±0.1			
		U-238	0.3±0.1			
SW-S (water)	12/2/84	U-234	-0.1±0.4		4100	
		IJ-235	0.1±0.3			
		U-238	0.1±0.4			

REPORTED VIA TELEPHONE

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P 0 BOX 3874 ALBUQUERQUE, NEW MEXICO 87190 PHONE (505) 345-3461 NVX 910-985-0678 PAGE 1 OF 1 PAGE

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5/10/85

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CHANDRASERARAN, E.S., MANAGER

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Report of An

COSTOMINE U.S. ARMY JEFFERSON PROVING GROUND ATTENTION PROCUREMENT DIV. 5-125, WYCOSS ADDRESS RECEIVING DEPT. BLDG. 108A GITY MADISON, IN 47250 SO NO. E-4893



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DAAD03-85-M-0099

SAMPLES RECEIVED 5/13/85

Customer Identification	Date Collected	Type of Analysis	pCi/l	Total Vol. (ml)
SW-NW		U-234	$0.30 \pm 0.10$	3720
(Water)		U-235	<0.10	
		U-238	$0.22 \pm 0.11$	
SW-BN		U-234	$0.23 \pm 0.08$	3605
(Water)		U-235	$1.05 \pm 0.18$	
(		U-238	0.95 ± 0.16	
MW-2		U-234	$2.04 \pm 0.22$	3655
(Water)			$2.00 \pm 0.23*$	
(		U-235	$0.07 \pm 0.04$	
			$0.10 \pm 0.06*$	
		U-238	$1.08 \pm 0.16$	
			1.04 ± 0.17*	
MU-3		U-234	$0.25 \pm 0.06$	3324
(Water)		U-235	$0.04 \pm 0.03$	
(noter)		U-238	$0.19 \pm 0.07$	

\*Duplicate analysis

REPORTED VIA TELEPHONE

REPORTED VIA TWX



Thermo Electron

P 0 B0X 3874 ALBUQUERQUE, NEW MEXICO 87190 PHONE (505) 345 3461 twx 910 985 0678 CONTROL NO. 81351 PAGE 1 OF 2 PAGE

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ERNEST A. SANCHEZ, MANAGER

6/28/85

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