*AR 40–14

*DLAR 1000.28

ARMY REGULATION
NO. 40–14
DEFENSE LOGISTICS
AGENCY REGULATION
NO. 1000.28

DEPARTMENT OF THE ARMY AND

DEFENSE LOGISTICS AGENCY

WASHINGTON, DC, *15 March 1982*

MEDICAL SERVICES

CONTROL AND RECORDING PROCEDURES FOR EXPOSURE TO IONIZING RADIATION AND RADIOACTIVE MATERIALS

This revision requires that the Radiation Control Committee, Radiation Protection Officers, and individuals who maintain DD Forms 1141 and DD Forms 1952 will be designated in writing. It also includes the requirements for the investigation and evaluation of alleged or actual overexposures to ionizing radiation.

Local limited supplementation of this regulation is permitted but is not required. If supplements are issued, HQDA agencies and major Army commands will furnish two copies of each supplement to HQDA(DASG-PSP), WASH DC 20310; other commands will furnish one copy of each to their next higher headquarters.

Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

The words "he," "his," and "him," when used in this regulation, represent both the masculine and feminine genders unless otherwise specifically stated.

This publication may be released to foreign governments (sec 1719, title 44, US Code).

*This regulation supersedes AR 40–14/DLAR 4145.24, 20 May 1975, including all changes.

Encl 2

1. Purpose. This regulation prescribes procedures and responsibilities for the control and recording of exposures to ionizing radiation from radiation producing devices and radioactive materials. It implements the rules and regulations set forth in Title 10, Code of Federal Regulations (CFR), Parts 19 and 20; 29 CFR 570.57; and 29 CFR 1910.96.

2. Applicability. *a.* This regulation applies to the Active Army, Army National Guard (ARNG), the US Army Reserve (USAR), persons employed by the Department of the Army (DA), and the Defense Logistics Agency (DLA). Except as specified by formal written agreement, it also applies to Federal and non-Federal agencies, including civilian contractors, whose personnel are occupationally exposed to ionizing radiation on an Army or DLA installation or activity.

b. This regulation does not apply to the following:

(1) Personnel exposed to ionizing radiation and radioactive materials resulting from the use of nuclear or thermonuclear weapons in combat military operations.

(2) Personnel exposed to ionizing radiation while being examined or treated for medical or dental purposes.

c. For DA and DLA installations or activities holding US Nuclear Regulatory Commission (NRC) licenses, the appropriate provisions of 10 CFR apply. However, the DD Form 1141 (Record of Occupational Exposure to Ionizing Radiation) and DD Form 1952 (Dosimeter Application and Record of Occupational Radiation Exposure) will be used in lieu of Form NRC–4 (Occupational External Radiation Exposure History) and Form NRC–5 (Current Occupational External Radiation Exposure).

3. Explanation of terms. *a. Absorbed Dose (D).* The amount of energy imparted by ionizing radiation to the matter in a volume element divided by the mass of the matter in that volume element. It is commonly expressed in rads. One rad equals 0.01 joule per kilogram (J/kg) or 100 ergs per gram. (In the International System of Units (SI), the unit for absorbed dose is the gray (Gy). One Gy is equal to 1 J/kg which is equal to 100 rad.) See rem and roentgen.

b. Bioassay. The determination of kinds, amounts or concentrations, and locations of radioactive materials in the human body. This may be by in vivo counting (e.g., whole-body counting, selected organ counting) or by analysis of materials excreted or removed from the human body.

c. Calendar quarter. A period of not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year will begin in January. Subsequent calendar quarters will be such that no day is included in more than one calendar quarter or omitted from a calendar quarter (10 CFR 20.3).

d. Controlled (restricted) area. Any area to which access is controlled for the purpose of protecting persons from exposure to ionizing radiation or radioactive materials. This means that a controlled (restricted) area requires control of access, occupancy, working conditions, and egress. Areas not included are those used as residential quarters or areas where food is stored, prepared, or served. However, a separate room or rooms in a residential building or a building in which food is stored, prepared, or served may be set apart as a controlled (restricted) area. This does not apply to facilities which use ionizing radiation sources for food preservation.

e. Critical organ. That organ which will receive the greatest exposure and whose damage by a radionuclide entering the human body will result in the greatest potential impairment to the body.

f. Curie. A unit of activity, or degree of radioactivity, of a radioactive substance. One curie (Ci) equals 3.70×10^{10} nuclear transformations per second.

g. Dose (D). A general term denoting the quantity of radiation absorbed, or energy absorbed per unit of mass, by the body or any portion of the body. For special purposes, it must be appropriately qualified. The special unit of absorbed dose is the rad. See absorbed dose.

h. Dose commitment.

(1) *Individual dose commitment.* The total dose equivalent to a part of the human body that results from radioactive material having entered the human body. In estimating the dose commitment, the period of exposure to retained radioactive material is assumed not to exceed 50 years from the time of intake (10 CFR 32.2).

(2) *Environmental dose commitment.* The sum of all radiation dose equivalents to persons over the entire time period the radioactive material can adversely affect humans. The unit of measure for this total population dose is the person-rem.

i. Dose equivalent (H). The product of absorbed dose (D), quality factor (Q), and other modifying factors (N). It is a measure of the effects of radiation

received by exposed persons, taking into account different radiation characteristics and external and internal exposure. The special name for the unit of dose equivalent is the sievert (Sv). The special unit of dose equivalent, rem, may be used temporarily. (One Sv is equal to 1 J/kg which is equal to 100 rem.)

j. Dose to whole-body. The dose equivalent to the whole-body, gonads, active blood-forming organs, head and trunk, or lens of the eye.

k. Dosimeter. A device for measuring exposure to radiation.

l. Exposure.

(1) A measure of the ionization produced in air by x or gamma radiation. It is the sum of the electrical charges on all of the ions of one sign produced in air when all electrons liberated by photons (x or gamma radiation) in a suitably small element of volume of air are completely stopped in air, divided by the mass of the air in the volume element. The special unit of exposure is the roentgen (R).

(2) The condition of being irradiated by ionizing radiation.

m. High radiation area. Any area, accessible to personnel, where ionizing radiation exists at such levels that a major portion of the body could receive in any 1 hour a dose equivalent in excess of 100 millirems (mrem).

n. Investigation level. The amount of radioactive material incorporated into the human body which justifies further investigation or inquiry. This may be a review of the circumstances or the assessment of the consequences.

o. Ionizing radiation. Electromagnetic or particulate radiation capable of producing ions as it passes through matter. Alpha and beta particles, gamma rays, X-rays, and neutrons are examples of ionizing radiation.

p. Ionizing radiation Protection Program. The management effort by command that includes monitoring the use of ionizing radiation producing devices and radioactive materials. The purpose of this program is to ensure that the exposure to persons from ionizing radiation and the release of radioactive effluents to the environment is as low as is reasonably achievable (ALARA) (as far below specified radiation exposure standards as is practicable).

q. Occasionally exposed individual. An individual whose work is not normally performed in a controlled (restricted) area and whose duties do not normally involve exposure to ionizing radiation or radioactive material. However, such individuals may have reason to enter a controlled (restricted) area in the performance of their duties. Examples are messengers, deliverymen, and maintenance workers. These individuals will not be permitted to receive an exposure to ionizing radiation in excess of that allowed to any individual in the population at large. See paragraph 7*b*.

r. Occupational exposure to ionizing radiation. Exposure to ionizing radiation that is incurred as a result of an individual's (military or civilian) employment or duties which are in direct support of the use of radioactive materials or equipment capable of producing ionizing radiation. Occupational exposure does not include the exposure of an individual, as a patient, to sources of ionizing radiation or radioactive material for the purpose of medical or dental diagnosis or therapy of that person. Occupational exposure does not include exposure to naturally occurring ionizing radiation.

s. Occupationally exposed individual (radiation worker). An individual whose work is performed in a controlled (restricted) area and who might be exposed to more than 10 percent of the radiation exposure standards in paragaph 7*a*(1) as a result of employment or duties in a controlled (restricted) area. The term "occupationally exposed individual" is synonymous with the term "radiation worker."

t. Person-rem. The product of the mean individual whole-body dose equivalent in a population times the number of individuals in the population. The term "person-rem" is synonymous with the term "man-rem."

u. Quality factor (Q). A number by which the absorbed dose is multiplied to obtain the dose equivalent. The magnitude of this number is determined by the effect on the body of different kinds of radiation. For beta particles, gamma rays, and X-rays, the quality factor is 1. For neutrons and protons having energies up to 10 million electron volts (MeV), the quality factor is 10. For alpha particles and other particles heavier than protons, the quality factor is 20.

v. Personnel monitoring device. A device designed to be worn or carried by a person for measuring radiation exposure. Examples are film badges, thermoluminescent dosimeters (TLD), self-reading pocket dosimeters, pocket chambers, and finger dosimeters. The term "personnel monitoring device" is synonymous with the term "personnel dosi-

meter."

w. Rad. The special unit of absorbed dose. One rad equals 0.01 J/kg or 100 ergs per gram. See rem and roentgen.

x. Radiation area. Any area, accessible to personnel, where radiation exists at such levels that a major portion of the body could receive in any 1 hour a dose equivalent in excess of 5 millirems (mrem), or in any 5 consecutive days a dose equivalent in excess of 100 mrem. Practically, this would be any area in which the exposure rate is greater than 2 milliroentgens per hour (mR/hr) but less than 100 mR/hr. See also "high radiation area."

y. Radiation sources. These are materiel, equipment, or devices which generate or are capable of generating ionizing radiation. They include the following:

(1) Nuclear reactors.

(2) Radiographic or fluoroscopic x-ray systems.

(3) Particle generators and accelerators.

(4) Klystron, magnetron, rectifier, cold-cathode, and other electron tubes operating at potentials above 10 kilovolts (kV).

(5) X-ray diffraction and spectrographic equipment.

(6) Electron microscopes.

(7) Electron-beam welding, melting, and cutting equipment.

(8) Radioactive materials.

(*a*) Natural or accelerator produced radioactive materials.

(*b*) By-product materials.

(*c*) Source materials.

(*d*) Special nuclear materials.

(*e*) Fission products.

(*f*) Materials containing induced or deposited radioactivity.

(*g*) Radioactive commodities.

z. Radiation Work Permit (RWP). A locally developed form completed by the area supervisor and countersigned by the Radiation Protection Officer (RPO) prior to the start of any work in a controlled (restricted) area. It describes the potential radiation hazards and protective clothing and equipment requirements for a given work assignment. It also provides a record of radiation exposures received by persons during a given work assignment. The RWP will be initiated by the area supervisor or the RPO when required to minimize the exposure of the radiation worker.

aa. Radiation worker. The term "radiation worker" is synonymous with the term "occupationally exposed individual."

ab. Radiation Protection Officer (RPO). A person designated by the commander and tasked with the supervision of the radiation protection program. The RPO ensures compliance with current directives for radiation protection. This person will be technically qualified by education, training, and professional experience commensurate with the responsibilities of the assignment. The RPO will provide consultation and advice on the degree of hazards associated with radiation and the effectiveness of measures to control these hazards. The term "radiation protection officer" is not intended to denote a commissioned status. The RPO may be military or civilian of any grade.

ac. Rem. The special unit of dose equivalent. The dose equivalent (H) in rems is numerically equal to the absorbed dose (D) in rads multiplied by the quality factor (Q) and other modifying factors (N). For the purposes of this regulation, N equals 1. One rem is equal to 0.01 Sv.

ad. Roentgen (R). The special unit of exposure. One roentgen (R) equals 2.58×10^{-4} coulombs per kilogram of air. See "exposure."

ae. Termination. The end of employment with DA, ARNG, USAR or DLA; also, the end of a work assignment in a controlled (restricted) area. The expectation or specific scheduling of reentry into a controlled (restricted) area would not be permitted during the remainder of the terminating calendar quarter (10 CFR 20.3).

af. User. A person who has been delegated the authority for the use, operation, or storage of radiation sources.

4. Regulatory authority. *a.* The concepts in this regulation are based in part on the recommendations of the following:

(1) The National Council on Radiation Protection and Measurements (NCRP) Report No. 39, Basic Radiation Protection Criteria.

(2) The International Commission on Radiological Protection (ICRP) Report No. 9, Recommendations of the ICRP.

(3) ICRP Report No. 12, General Principles of Monitoring for Radiation Protection for Workers.

(4) Federal Radiation Council Report No. 1, Background Material for the Development of Radiation Protection Standards.

b. Where more precise definitions are required, those provided in the following will be used:

(1) The International Commission on Radiation Units and Measurements (ICRU) Report No. 19, Radiation Quantities and Units.

(2) Supplement to ICUR Report No. 19, Dose Equivalent.

(3) ICRU Report No. 25, Conceptual Basis for the Determination of Dose Equivalent.

5. Responsibilities. *a. The Surgeon General (TSG).*

(1) Approve all Army radiation exposure standards less restrictive than those in paragraph 7 before implementation of such standards.

(2) Provide information resulting from the investigation of alleged or actual overexposure of a person to ionizing radiation and radioactive materials. This information and appropriate recommendations are sent to the following:

(*a*) The Central Dosimetry Record Repository (SB 11-206).

(*b*) The commander of the installation or activity to which the person is assigned or attached.

(*c*) The commander of the organization possessing either the NRC license or DA radiation authorization (DARA) for the radioactive material or ionizing radiation producing device which caused the alleged overexposure.

(3) Provide DA staff supervision on the medical aspects of the personnel dosimetry program.

b. The Commanding General, US Army Materiel Development and Readiness Command (CG, DARCOM).

(1) Provide personnel monitoring devices for the Army.

(2) Establish a Central Dosimetry Record Repository. This office will maintain an ionizing radiation exposure history for each person employed by DA, ARNG, USAR, and DLA who is issued an Army personnel monitoring device.

c. The Central Dosimetry Record Repository.

(1) Prepare separate automated annual consolidated statistical summary reports (RCS NRC-1007) for DA, ARNG, USAR and DLA personnel occupationally exposed to ionizing radiation and radioactive material. Prepare a statistical summary report for each occupational code. These summary reports will contain the information specified in paragraph 15. A copy of these reports will be forwarded through command channels to HQDA (DASG-PSP), WASH DC 20310, by 1 March of each calendar year.

(2) Prepare a separate annual personnel dosimetry report for each employee of DA, ARNG, USAR, and DLA.

(3) Prepare requested histories from current or former employees.

(4) Prepare termination exposure history for each employee.

(5) Provide a flexible computer program. It must be possible to separate total occupational exposure from medical (diagnostic and therapeutic) exposure. The computer program must provide for the following:

(*a*) Additional information such as outside employment (moonlighting), medical exposure, and other radiation exposures.

(*b*) Occupational codes.

(*c*) The identity of radiation sources and other hazardous substances to which the worker is exposed.

Note. The Automated Dosimetry Record will be consistent with the requirements of the Form NRC-5 and DD Form 1141.

d. Director, DLA (DLA-WH).

(1) Approve all DLA radiation exposure standards less restrictive than those in paragraph 7 before such standards are implemented.

(2) Provide information based on the results of investigations of alleged overexposure of persons to ionizing radiation and radioactive materials. This requirement is exempt in accordance with paragraph 7-2*k*, AR 335-15. This information and appropriate recommendations are sent to the following:

(*a*) The Central Dosimetry Record Repository (SB 11-206).

(*b*) The commander of the installation or activity to which the person is assigned or attached.

(*c*) The commander of the organization possessing either the NRC license or DARA for the radioactive material or ionizing radiation producing device causing the alleged overexposure.

e. Commanders of installations or activities which possess or use a radiation source.

(1) Establish appropriate and adequate measures to control ionizing radiation so that the total radiation exposure of each person will be maintained as low as is reasonably achievable. This will be as far below the radiation exposure standards in paragraph 7 as is practicable.

Note. In applying the term "as low as is reasonably achievable," the current state of technology and the economics of improvements in relation to the benefits to safety and health of per-

sonnel, the utilization of nuclear (atomic) energy in the public interest, and other societal and socioeconomic considerations, must be taken into account. (See NRC Regulatory Guides 8.8, 8.10, and 8.18, which are available from USNRC, ATTN: Publications Sales Manager, WASH DC 20555.)

(2) Ensure that personnel radiation exposure is monitored and recorded.

(3) Ensure that when there are operations involving occupational exposure to radiation sources, an adequately trained and qualified RPO and an alternate RPO are designated in writing. The RPO or the alternate will supervise the radiation protection program and advise on the control of hazards to health and safety. If the assignment as RPO is an additional duty, then adequate time will be given to perform these duties.

Note. When a civilian employee is performing the duties of RPO, his job description should be appropriately modified to reflect this additional duty for that time period in which the duty is performed. The job description will be returned to its normal state following termination of the individual's assignment as the RPO.

(4) When an installation or activity possesses radioactive material under a specific NRC license or DARA, designate a Radiation Control Committee (RCC) in writing (unless otherwise specifically exempt). The RCC will review proposals for the use of ionizing radiation sources and recommend protective measures to the commander. An RCC is not required for the use of radioactive check sources or smoke detectors or for in vitro studies. The committee will not exercise the functions of a clinical board or any function in nuclear reactor or nuclear weapons programs administered by DA or DLA. Specific responsibilities of the RCC for US Army Medical Center/Medical Department Activities (MEDCEN/MEDDAC) are given in AR 40–37.

The RCC will include the following:

(*a*) The commander/director or his designated representative, who will serve as chairperson.

(*b*) The RPO.

(*c*) The staff medical officer or his designated representative.

(*d*) The safety manager or his designated representative.

(*e*) Other technically qualified persons as necessary.

(5) Insure that all persons working in or frequenting a controlled (restricted) area are informed of the presence of radioactive materials or equipment capable of producing ionizing radiation. These persons will be instructed in the following:

(*a*) Safety precautions and procedures needed to minimize their exposure.

(*b*) Safety precautions and procedures needed to minimize the exposure of the general public. Purposes and functions of protective clothing and equipment. The extent of these instructions will be commensurate with the potential radiological health protection problem in the controlled (restricted) area (10 CFR 19.12 and 29 CFR 1910.96).

Note. When provided instruction about health protection problems associated with ionizing radiation exposure, female employees who are radiation workers will be given specific instruction about prenatal exposure risks to the developing embryo and fetus. (See NRC Regulatory Guide 8.13, and NCRP Report No. 53.)

(6) Establish procedures for the centralized issue and control of personnel monitoring devices.

(7) Provide adequate resources to implement an effective radiation protection program.

(8) Designate in writing a person responsible for preparing and maintaining DD Forms 1141 and DD Forms 1952.

(9) Forward the results of bioassay procedures or other dosimetry data quarterly to the Central Dosimetry Record Repository. This data will be included in the proper person's exposure history (SB 11-206). If the results or data indicate that a person has exceeded applicable guidelines for exposure, dose, or intake of radionuclides, the appropriate dose equivalent for the whole-body and critical organ(s) will also be included.

(10) Investigate abnormal or alleged overexposures to ionizing radiation or radioactive materials.

Note. The investigation conducted in accordance with the requirements of this regulation will be used for the medical evaluation of abnormal or alleged overexposures to ionizing radiation or radioactive materials. Other investigations may be required under the provisions of AR 385–40.

6. Medical surveillance. *a.* Preplacement and termination medical examinations will be given to all radiation workers (military and civilian) by the supporting medical treatment facility. These medical examinations should include a review of prior occupational radiation exposure. They should also include a description of any unusual radiation exposure resulting from previous occupations, accidents/incidents, or therapeutic procedures. Baseline blood counts (white cell count with differential, platelet count, and hemoglobin) will be performed during the preplacement medical examination. Pre-

placement and termination ophthalmic examinations should be performed on employees working in areas of potential exposure to neutrons, high energy beta particles, and heavy particles. Examinations related to ocular surveillance of ionizing radiation workers may be performed by ophthalmologists, optometrists, or physicians competent in funduscopy and biomicroscopy of the eye. Designated individuals will be appropriately credentialed by the Medical Treatment Facility commander.

b. Periodic medical and ophthalmic examinations, when required, should be performed at a frequency determined by the medical commander or staff medical officer in coordination with the RPO. The frequency and thoroughness of these examinations should be commensurate with potential radiation hazards and the circumstances in which the work is performed. Periodic ophthalmic examinations are required for persons occupationally exposed to high linear energy transfer (LET) ionizing radiation when their exposures exceed 70 percent of the annual limit stated in paragraph 7*a*(1). At such examinations, special attention should be given to changes in the lenses of the eyes. Radiation workers occupationally exposed to more than 1.5 rem to the whole-body within 1 calendar quarter will need more detailed supervision by their immediate supervisor and the RPO. This is required to provide background information which might be useful in the event of an overexposure. It is also needed to detect any condition that would require termination of occupational exposure or employment.

Note. For information concerning medical examinations, see AR 40–501, Standards for Medical Fitness, for DA organizations; and DLAM 1000.1, DLA Safety and Health Program, for DLA organizations.

c. Persons suspected of having received excessive exposure will be referred to a physician. They will receive whatever examination determined appropriate by the local medical authority in consultation with the RPO. When appropriate, this examination should include tests and bioassay procedures to evaluate any potential health hazard or injury and to plan appropriate medical care.

d. A reported overexposure does not necessarily indicate the need for a physical examination. The background related to this reported overexposure must be evaluated. This evaluation should help determine the need for such an examination and the tests that are required. Factors to be considered are as follows:

(1) Total reported dose.
(2) Type and energy of ionizing radiation.
(3) Portion of the body exposed.
(4) Critical/significant organ dose.
(5) Length of wearing period for personnel monitoring devices used to measure this radiation.
(6) Time elapsed between exposure and notification, and other appropriate factors.

7. Radiation exposure standards. Every effort will be made to keep the total radiation dose equivalent and the dose commitment to each person as far below the following radiation exposure standards as is reasonably achievable. The necessity for exposures will be weighed against the benefits expected.

a. Radiation exposure standards adopted by DA, ARNG, USAR, and DLA for the control of total occupational exposure to ionizing radiation and radioactive material include the following:

(1) The accumulated dose equivalent of radiation to the whole-body, head and trunk, active blood-forming organs, gonads, or lens of the eye will not exceed—

(*a*) 1.25 rem in any calendar quarter, nor
(*b*) 5 rem in any 1 calendar year.

Note. During the entire gestation period, the maximum dose equivalent to the embryo-fetus from occupational exposure of the expectant mother should not exceed 0.5 rem (NCRP Reports No. 39 and 53).

(2) The accumulated dose equivalent of radiation to the skin of the whole-body (other than hands, wrists, feet or ankles). and forearms, or cornea of the eye, will not exceed—

(*a*) 7.50 rem in any calendar quarter, nor
(*b*) 30 rem in any 1 calendar year.

(3) The accumulated dose equivalent of radiation to the hands and wrists or the feet and ankles will not exceed—

(*a*) 18.75 rem in any calendar quarter, nor
(*b*) 75 rem in any 1 calendar year.

(4) The accumulated dose equivalent of radiation to the bone, thyroid, and other organs, tissues, and organ systems will not exceed—

(*a*) 5 rem in any calendar quarter, nor
(*b*) 15 rem in any 1 calendar year.

b. Persons entering a controlled (restricted) area but who are not classified as radiation workers or minors will not be exposed to a whole-body dose equivalent of more than—

(1) 2 mrem in any 1 hour.
(2) 100 mrem in any 7 consecutive days.
(3) 500 mrem in any 1 calendar year.

(4) 10 percent of the values in *a*(2), (3), and (4) above for other areas of the body.

c. Persons over 18 years of age, but who have not yet reached their 19th birthday, may be occupationally exposed to ionizing radiation if they do not exceed a dose equivalent of 1.25 rem to the whole-body in any calendar quarter. Persons under 18 years of age will not be exposed to more than 10 percent of the values in *a* above.

d. When a pregnant woman is occupationally exposed to ionizing radiation, the embryo-fetus enters the radiation environment involuntarily. Therefore, the female employee is responsible for advising her employer of the fact that she is pregnant. Special consideration may be necessary to insure that her dose does not exceed the radiation exposure standards in *a* above and that her exposure is kept as low as is reasonably achievable.

e. Radiation exposure standards adopted by DA, ARNG, USAR, and DLA for the control of planned occupational exposures under emergency situations are as follows:

(1) *Life saving situation*. This applies to search for and removal of seriously injured persons, or entry to prevent conditions that may injure a number of people. The following exposure standards then apply:

(*a*) Any person's accumulated total absorbed dose of ionizing radiation to the whole-body should not exceed 100 rad.

(*b*) Any person's accumulated total absorbed dose of ionizing radiation to the hands and forearms should not exceed 300 rad.

(2) *Less severe situation*. This applies when it is desirable to enter a hazardous area to protect property, minimize the release of effluents, or to control fires. The following exposure standards then apply:

(*a*) Any person's accumulated total absorbed dose of ionizing radiation to the whole-body should not exceed 25 rad.

(*b*) Any person's accumulated total absorbed dose of ionizing radiation to the hands and forearms should not exceed 100 rad.

f. Guidelines for selecting personnel to participate in emergency operations are shown below:

(1) Rescue personnel should be professionally trained in rescue operations and techniques. If professional rescue personnel are not available, then only volunteers who have received proper instruction should be allowed to participate in emergency operations.

(2) Rescue personnel will be informed of the potential consequences of exposure to ionizing radiation or radioactive material as well as other hazards associated with the rescue mission.

(3) Rescue personnel will be informed as to the proper use of protective clothing and equipment.

(4) Women capable of reproduction should not be occupationally exposed during a rescue mission to more than the limits set forth in *a* above if other personnel are available for the mission.

g. Radiation exposures incurred under an emergency situation, as stated in *c* above, will not be allowed to occur more than once in the lifetime of a person. The record of such exposures will become part of the person's health record or civilian employee medical file.

h. Radiation exposure standards for nonoccupational exposures to ionizing radiation include limiting the use of sources of ionizing radiation such that:

(1) The accumulated dose equivalent of radiation to the whole-body for a person in the general population will not exceed 0.5 rem in any 1 calendar year. This excludes natural background radiation and medical and dental exposures.

(2) The accumulated dose equivalent of radiation to the whole-body for a suitable sample of the exposed population or for the whole exposed population will not exceed a yearly average of 0.170 rem per person from all sources of ionizing radiation. This excludes natural background radiation and medical and dental exposures.

i. Radiation exposure standards less restrictive than those prescribed above may be used in special circumstances only when approved by TSG (DASG–PSP) or Director, DLA (DLA–WH), as appropriate.

(1) Proposals for the use of alternate radiation exposure standards will contain complete justification. They will describe the procedures by which the alternate standards will be implemented.

(2) Less restrictive radiation exposure standards will not be considered for the following:

(*a*) Persons under 19 years of age.

(*b*) Females known to be pregnant.

(*c*) Occasionally exposed persons.

(*d*) Members of the general public for whom the exposure is considered to be a nonoccupational exposure to ionizing radiation.

8. Personnel Monitoring. *a*. Consideration will be taken of all external and internal occupational expo-

sures a person may receive during each quarter. Each person who may receive an accumulated dose equivalent in excess of 5 percent of the applicable quarterly radiation exposure standard specified in paragraph 7 will wear a personnel monitoring device. This is a person who—

(1) Is occupationally exposed to ionizing radiation.

(2) Periodically enters a controlled (restricted) area.

b. The monitoring of personnel who work only with soft beta emitters (e.g., tritium, carbon-14, calcium-45, and sulfur-35) and alpha emitters will be by bioassay as prescribed by the RPO. In general, requirements for bioassays will be based on considerations of the following:

(1) Chemical and physical forms of the radionuclides involved.

(2) Procedures and equipment which would permit radioactive material to be ingested, inhaled or absorbed into the body.

c. Bioassay measurements should be performed when it is possible for a person to acquire 5 percent or more of the annual radiation exposure standard for a specific radionuclide as established by the NCRP/ICRP. (See NRC Regulatory Guides 8.9, 8.11, 8.15, 8.20, and 8.22.)

Note. The laboratory performing the bioassay analysis should be accredited by either the Center for Disease Control, US Health and Human Service Department, or the American Industrial Hygiene Association.

d. Each person under 18 years of age who enters a controlled (restricted) area and for whom the potential exists to receive an accumulated dose equivalent excess of 5 percent of the applicable quarterly radiation exposure standard in paragraph 7*c* will wear a personnel monitoring device.

e. Each person who enters a high radiation area will wear, in addition to a film badge, one of the following near the film badge to monitor the whole-body exposure:

(1) A pocket chamber.

(2) A self-reading pocket dosimeter.

(3) A TLD.

f. An RWP will be prepared to control ingress and egress from a high radiation area or other controlled (restricted) areas that have been so designated by the RPO. The RWP will include the following:

(1) The person's name and social security number.

(2) Identification (e.g., serial number, badge number) of the assigned dosimeter.

(3) The time of entrance and time of exit.

(4) The initial reading of the dosimeter upon entrance and final reading of the dosimeter upon exit from the controlled (restricted) area, if appropriate.

Note. An RWP is not required for the routine entry into or use of a diagnostic medical or dental X-ray facility or a radiation therapy facility.

g. The RPO will review entries on the RWP periodically to ensure that complete exposure records are maintained for all persons using personnel monitoring devices issued by him.

h. The person designated in writing by the commander to be responsible for preparing and maintaining the exposure records may be one of the following:

(1) The custodian of the health records.

(2) The custodian of the civilian employee medical files.

(3) The person who prepares the DA Form 3484 Photodosimetry Report (Exposure to Ionizing Radiation), and normally controls the issuance and recovery of the personnel monitoring devices.

(4) The RPO.

i. The person responsible for the exposure records will annotate them in accordance with instructions on the reverse side of DD Form 1141 at least once each calendar quarter. The results of each wearing period for the personnel monitoring device will be annotated separately on this record. The normal wearing period for the personnel monitoring device will not exceed the wearing period schedule set by the organization furnishing the dosimetry service.

j. Personnel who may be occupationally exposed to ionizing radiation will wear a personnel monitoring device issued specifically for that purpose. The commander will ensure that the results for monitored visitors for whom personnel monitoring is required (para 8*a*) are forwarded to the custodian of the person's health record, radiation exposure record, or the custodian of the civilian employee medical files.

k. Personnel who may be exposed to ionizing radiation at other installations or activities may wear a personnel monitoring device issued for that specific purpose by the RPO at their duty station. This is in addition to the personnel monitoring device that may be provided by the installation or

activity being visited. However, only the highest value will be recorded.

l. Any person governed by this regulation who is exposed to ionizing radiation at an activity outside the jurisdiction of DA, ARNG, USAR, or DLA will ensure that the required exposure information is furnished to the individual who maintains DD Form 1141 for that person.

m. Separate requirements of DA, ARNG, USAR, and DLA with respect to personnel dosimetry are as follows:

(1) *Department of the Army, ARNG and USAR.* The primary whole-body dosimetric device will be the film badge. Exceptions to this will be when the low-energy (18 kiloelectron-volt (keV) to 1.2 MeV) direct reading personnel dosimeter (0–200 mR range) or TLD has been so designated by TSG as the primary dosimetric device. TLDs will be used to measure localized exposure to the fingers and other parts of the body, except the wrist, in accordance with paragraph 9. All personnel (military, civilian, or contractor) working within DA, ARNG, and USAR will use the dosimetry service provided by DA. The dosimetry service for Army installations and activities is provided by DARCOM. This service will be used solely for personnel dosimetry, except in unusual cases as approved by DARCOM. This requirement in no way precludes the use of supplemental or additional personnel monitoring devices when a particular operation makes such use desirable.

(2) *Defense Logistics Agency.* The primary whole-body dosimetric device will be the film badge. All DLA field activities will use the dosimetry service provided by DA, as outlined in SB 11-206. Exceptions are those DLA activities that have tenant status at a military installation, activity, or base with a personnel monitoring program, in which case they will be included in that program. Government-furnished personnel dosimetry service will be employed exclusively, as approved by the Director, DLA (DLA-WH). This requirement in no way precludes the use of supplemental or additional personnel monitoring devices when a particular operation makes such use desirable.

9. Wearing of personnel monitoring devices. *a.* When monitoring of external whole-body radiation exposure is the critical assessment, the personnel monitoring device will be worn below the shoulders, above the hips, and on the outside of clothing. During certain operations it may be appropriate to protect the film badge from environmental factors such as high humidity, temperature, or radioactive contamination. The film badge window must face outward from the body. Any procedure used will be approved by the RPO prior to initiation.

b. When a lead apron or similar protective garment is worn, the whole-body personnel monitoring device will be worn on the outside of the basic clothing but beneath the protective garment.

c. In certain situations (e.g., fluoroscopy, veterinary radiography, nuclear medicine, and radiation therapy) it is desirable to measure localized exposure to ionizing radiation. Examples are instances of exposure of the head and neck, hands, fingers, or forearms. In these situations, personnel monitoring devices should be worn in each location to assess the localized exposure. This assessment will be in addition to, but never in lieu of, routine personnel monitoring procedures (i.e., assessment of whole-body exposure). A person's regular whole-body personnel monitoring device will never be used on other areas of the body. Conversely, a personnel monitoring device used to record a specific localized exposure will never be used to record exposures at other body sites. (See para 11 for recording procedures.)

d. The wrist or finger dosimeter will be worn when a person could possibly receive an accumulated dose equivalent of radiation to the wrist or finger in excess of 10 percent of the radiation exposure standard in paragraph 7*a*(3). A wrist or finger dosimeter will be worn on the wrist or finger closest to the radiation source and under the protective glove. The wrist or finger dosimeter will be oriented toward the radiation source.

10. Care and handling of personnel monitoring devices. *a.* When personnel monitoring devices are not being worn, they will be stored in locations approved in writing by the RPO. The devices will be located conveniently close to, but outside of, any radiation area. They will be adequately shielded from ionizing radiation produced within the area. A control dosimeter will be stored in each approved personnel dosimeter storage location. To assure that persons wear only their own dosimeter, personnel monitoring devices will display some individual identification. Under *no* circumstances will the personnel monitoring device be permanently inscribed with a name, number, or other identifying symbol. The recommended procedure is to type the persons name on embossing tape or on a small strip of paper which is attached to the front or back of the per-

sonnel monitoring device with transparent tape. The small window on the front of the film badge *will never* be covered with tape or any other material except when authorized in writing by the RPO. This may be required to protect the film badge from environmental factors.

b. A person's immediate supervisor and the RPO will ensure that the personnel monitoring device issued to or used by one person will not be issued to or used by another person during the same wearing period.

c. When persons leave the controlled (restricted) area at the end of the work day or the installation or activity, they will ensure that their personnel monitoring devices are left in a location approved by the RPO.

d. Stocks of unissued dosimeter film should be stored at temperatures below 70° F (21° C), preferably between 35° F (2° C) and 46° F (8° C). Film packets should never be subjected to pressure or other physical stress that could result in sensitization of the film. The storage area for unissued film and TLDs will be as remote from ionizing radiation sources as practical. It will never be near chemical fumes since certain chemicals, such as mercury and formaldehyde, can cause fogging or sensitization.

11. Recording procedures. DD Form 1141 or Automated Dosimetry Record will be prepared and maintained for each person occupationally exposed to ionizing radiation. It may be prepared and maintained by a person other than the custodian of the health records or custodian of the civilian employee medical files. (See para 8*h*.) When the DD Form 1141 or Automated Dosimetry Record is maintained separately from the health record or civilian employee medical file, a Chargeout Record (OF 23) will be placed in each record. (See AR 40–66 for DA procedures.)

a. When a person other than the custodian of the health record or civilian employee medical file prepares DD Form 1141, he will advise the custodian of this fact and furnish the OF 23.

b. Upon notification of the transfer of a radiation worker, the RPO, in coordination with the custodian of DD Forms 1141, will perform the following:

(1) Insure completeness and accuracy of DD Form 1141 and the results of bioassay procedures.

(2) Insure that the Chargeout Record (OF 23) has been removed and that DD Form 1141 or Automated Dosimetry Records, and the results of bioassay procedures are placed in the health record or civilian employee medical file.

(3) Prepare a copy of DD Form 1141 or Automated Dosimetry Records, DD Form 1952, and results of bioassay procedures to be retained at the installation activity (10 CFR 20.401(c)(1)).

(4) Maintain the address of the gaining organization to which the person has been assigned to insure proper forwarding of dosimetry information. This information may be recorded on the retained copy of DD Form 1952.

(5) Submit a report to the NRC when required by 10 CFR 20.407. Also comply with paragraphs 13, 14, and 15 of this regulation.

c. Upon transfer, if DD Form 1141 or Automated Dosimetry Records, DD Form 1952, and results of bioassay procedures are not present in the person's health record or civilian employee medical file, the custodian of these records at the gaining organization will write to the installation or activity RPO identified on OF 23. He will request that these records be forwarded for inclusion into the person's health record or civilian employee medical file. DD Form 877 (Request for Medical/Dental Records or Information) may be used to request these records from the MEDCEN/MEDDAC. (For DA, see AR 40–3 and AR 340–1.)

d. In the initial preparation of DD Form 1141, the custodian shall try to obtain complete reports of all previous occupational exposures based on recorded personnel dosimetry. DD Form 1952 will be used to record the occupational exposure history and relevant health physics information. A sample DD Form 1952 is at figure 1.

(1) For each period where occupational exposure was probable and no record (or an incomplete record) is available, it shall be assumed that 1.25 rem was incurred per quarter of each calendar year or 00.416 rem was incurred per calendar month. When the person was potentially exposed to ionizing radiation at more than one facility, the cumulative exposures will be calculated and recorded in items 7 through 12 of DD Form 1141, as appropriate. (See fig. 2.) The sum of these whole-body exposures will be entered in item 13 of DD Form 1141. A statement regarding the source of this information will be entered in item 16.

(2) If there were no previous occupational exposures, the statement "no previous occupational exposure" will be entered on the first line of DD Form 1141. A copy of all previous occupational

exposure data obtained from outside employment or administrative doses will be forwarded to the Central Dosimetry Record Repository for proper posting to the person's record (SB 11-206).

Note. When an occupationally exposed individual is reassigned, the gaining organization will initiate a new DD Form 1952 and transpose previous exposure history information to the new form.

e. A separate DD Form 1141 or Automated Dosimetry Record will be maintained to record other than whole-body or skin of the whole-body exposures. Appropriate descriptions shall be made under item 16 of DD Form 1141. Examples are the thyroid, head and neck, wrist, and fingers. These records will be cross-referenced with the whole-body record. Results of bioassay procedures are considered as laboratory studies and should be filed accordingly. Reference to the results of such studies will also be entered under item 16. (See AR 40-66.)

f. The dose equivalent determined by bioassay will be entered on the appropriate DD Form 1141 or Automated Dosimetry Record when it exceeds investigational levels as defined in ICRP Report No. 10 or 10A. A case will be investigated when the amount and distribution of the radionuclide in the human body could deliver in 50 years to the critical organ more than 10 percent of the quarterly exposure standard or 5 percent of the annual exposure standard.

g. A sample DD Form 1141 at figure 2 shows the proper posting and maintenance of a whole-body exposure record. Figure 3 shows the proper posting and maintenance of a partial body (e.g., wrist, finger, etc.) exposure record. Entries in items 9 and 11 may include the abbreviation NU (not used) and NR (none reported).

h. When RWP are used, exposures recorded on supplemental monitoring devices will be recorded on the permits. (For DA, these records will be retained in accordance with AR 340-18-6.) The results from the primary dosimeter device (film badge) will be recorded on the DD Form 1141 or Automated Dosimetry Record unless this device has been lost or damaged beyond usefulness. (See para 13*g*.)

i. At the request of any employee, the RPO, in coordination with the Central Dosimetry Record Repository or custodian of DD Forms 1141, will advise the employee, in writing, annually of his exposure to ionizing radiation or radioactive material. This information will be obtained from the records maintained by the Central Dosimetry Record Repository or installation or activity (see para 5*c*).

12. Retention and disposition of DD Form 1141 or Automated Dosimetry Records, DD Form 1952, and results of bioassay procedures.

a. DD Form 1141 or Automated Dosimetry Records, and results of bioassay procedures are permanent parts of the person's health record or civilian employee medical file. (See AR 40-66 and AR 340-18-9 for Army procedures.) All previous copies of these records will be retained in the person's health record or civilian employee medical file or with the custodian of the person's DD Form 1141.

(1) Commanders will authorize inspecting officials to review exposure records and the results of bioassay procedures. If the above records are being maintained in the health record or civilian employee medical file of the person concerned, then the custodian will provide them.

(2) For policies and procedures on the confidentiality and/or release of medical information, see chapter 2, AR 40-66, AR 50-5, AR 340-1, and AR 340-17.

b. When a civilian employee of the DA, ARNG, USAR, or DLA is not included in a Federal civilian employee health service, his DD Form 1141 or Automated Dosimetry Records, and results of bioassay procedures will be kept as a permanent document in his SF 66 (Official Personnel Folder). For a non-Federal employee, a copy of such records will be retained by the RPO and copies of the results will be forwarded to the person for his personal and employer's files. DD Form 1141 or Automated Dosimetry Records, and results of bioassay procedures will be subject to review by authorized inspecting officials (*a* above).

c. The DD Form 1141 or Automated Dosimetry Records, and results of bioassay procedures will be retained in the health record of any military member retired from DA, ARNG, USAR, or DLA who has been occupationally exposed to ionizing radiation during his service. Disposition of these records for retired or separated civilian personnel will be in accordance with governing civilian personnel directives.

d. If any member of DA, ARNG, USAR, or DLA is released from active duty, or if a civilian employee terminates employment with these agencies, he will, upon request, be furnished information concerning his radiation exposure history. This

information will be requested from the RPO at the employee's last duty station in accordance with paragraph 14.

e. The disposition of "stray" DD Forms 1141 or Automated Dosimetry Records, and results of bioassay procedures for military personnel and DA civilian personnel will be in accordance with AR 40-66 and Civil Service regulations.

13. Control procedures. The RPO will review and evaluate, at intervals not to exceed a calendar quarter, DD Form 1141 or Automated Dosimetry Records and results of bioassay procedures for each person occupationally exposed to ionizing radiation. This review and evaluation will be noted on DD Form 1141 or Automated Dosimetry Records. The RPO will establish procedures to inform and advise the person, his commander, his supervisor, and the responsible medical officer when action is necessary to limit a person's exposure to ionizing radiation. When a person is reassigned or terminates his employment at an installation or activity, the custodian of the health record or civilian employee medical file will insure that all appropriate DD Form 1141's or Automated Dosimetry Records, and results of bioassay procedures are included in the person's health record or civilian employee medical file.

a. When a person has been reported to have received an exposure to ionizing radiation or radioactive materials which exceeds the radiation exposure standards in paragraph 7, the exposure will be classified as a radiation overexposure. Overexposures are classified as follows:

(1) *Type I.* An excessive rate of radiation accumulation to one or more of the following:

(*a*) Whole-body, head and trunk, gonads or lens of the eyes greater than 400 mrem in a calendar month but less than 1.25 rem in a calendar quarter.

(*b*) Skin of the whole-body (other than hands, wrists, feet or ankles), forearms, or cornea of the eye greater than 3 rem in a calendar month but less than 7.5 rem in a calendar quarter.

(*c*) Hands and wrists, or the feet and ankles greater than 6 rem in a calendar month but less than 18.75 rem in a calendar quarter.

(*d*) Other organs including bone, thyroid, tissue, and organ system greater than 1 rem in a calendar month but less than 5 rem in a calendar quarter.

(2) *Type II.* Overexposure exceeding the quarterly radiation exposure standard but less than the annual radiation exposure standard shown in paragraph 7*a*.

(3) *Type III.* Overexposure exceeding the annual radiation exposure standard shown in paragraph 7*a*.

b. When notified of a Type I exposure, the immediate commander will conduct an informal investigation. This will determine if the apparent or actual excessive exposure is the result of a violation of approved operating procedures or indicates the existence of faulty equipment. The commander will take appropriate action to prevent recurrence. If this was in fact an exposure to a person, then the proper data will be entered on the DD Form 1141 or Automated Dosimetry Record. If the investigation reveals that this was not in fact an exposure to a person, then the RPO in coordination with the local medical authority will record the dose which most accurately assesses the dose the individual could have received. The dose assessment data will be forwarded through command channels to the Central Dosimetry Record Repository for posting to the person's record (SB 11-206).

c. When notified of a Type II exposure, the immediate commander will take the following actions:

(1) Promptly remove the person concerned from any duty involving potential exposure to ionizing radiation pending completion of an investigation of the overexposure.

(2) Conduct an investigation to determine if the apparent or actual excessive radiation exposure is the result of a violation of approved operating procedures or indicates the existence of faulty equipment.

(3) Take appropriate action to preclude recurrence.

(4) Forward a report of the investigation, along with corrective actions taken, through command channels to HQDA(DASG-PSP), WASH DC 20310.

(5) Upon completion of the investigation, return the person to duties involving potential exposure to ionizing radiation. This is allowed if the expected dose, when added to the accumulated occupational dose, will not exceed the annual radiation exposure standard shown in paragraph 7*a*. If the exposure was not in fact an exposure to the person, then a recommendation in the investigative report will be made by the RPO in coordination with local medical authority which most accurately assesses

the dose the person received.

d. The action below will be taken when notified of a Type III exposure.

(1) The immediate commander will take the actions prescribed in *c* above, except that the person will not be returned to normal duties involving potential exposure to ionizing radiation without written concurrence of OTSG (DASG-PSP).

(2) The report of investigation will include a copy of the person's DD Forms 1141 or Automated Dosimetry Records, results of bioassay procedures, if applicable, and signed statements from the person and his immediate supervisor similar to the following: "To the best of my knowledge and belief, I (did) (did not) receive this exposure because _____."

(3) If the investigation reveals that the exposure was not in fact an exposure to the person, then a recommendation in the investigative report will be made by the RPO in coordination with local medical authority which most accurately assesses the dose the person received.

(4) TSG will inform the immediate commander of additional medical evaluations, bioassay procedures, or treatment required. TSG will also state when the exposed person may be returned to duties involving potential exposure to ionizing radiation.

e. Reports of alleged or actual overexposures to ionizing radiation or radioactive material which exceed the radiation exposure standards shown herein will be made in accordance with applicable DA or DLA directives. All abnormal exposures or alleged overexposures to ionizing radiation will be investigated as stated above. An information copy of such investigations concerning NRC-licensed or DA-authorized operations or radioactive commodities will be furnished to the licensee or to the command having logistical responsibility for the radioactive commodity.

f. In addition to the above reporting requirements, the following NRC reporting requirements also apply to installations or activities possessing radioactive material under a specific NRC license. A copy of any correspondence submitted to the NRC will be provided to the appropriate MACOM and TSG (HQDA(DASG-PSP) WASH DC 20310) or Director of DLA, (DLA-WH).

(1) *Immediate notification.* Immediate notification of the Director of the appropriate NRC Regional Office listed in appendix D of 10 CFR 20 shall be made by telephone and telegraph, mailgram, or facsimile of any incident involving NRC licensed material which may have caused or threatens to cause the following:

(*a*) Exposure of the whole-body of any person to 25 rem or more of radiation.

(*b*) Exposure of the skin of the whole-body of any person to 150 rem or more of radiation.

(*c*) Exposure of the feet, ankles, hands or forearms of any person to 375 rem or more of radiation.

(2) *Twenty-four hour notification.* Notification of the Director of the appropriate NRC Regional Office listed in appendix D of 10 CFR 20 shall be made by telephone and telegraph, mailgram, or facsimile within 24 hours of any incident involving NRC-licensed material which may have caused or threatens to cause the following:

(*a*) Exposure of the whole-body of any person to 5 rem or more of radiation.

(*b*) Exposure of the skin of the whole-body of any person to 30 rem or more of radiation.

(*c*) Exposure of the feet, ankles, hands, or forearms to 75 rem or more of radiation.

(3) Thirty-day report.

(*a*) In addition to any notification required by paragraph 15, the following will be submitted within 30 days:

1. A written report to the appropriate NRC Regional office listed in appendix D of 10 CFR 20.

2. A copy of the above report to the Director of Inspection and Enforcement, US Nuclear Regulatory Commission, Washington, DC 20555.

3. An information copy to the appropriate MACOM and to HQDA (DASG-PSP), Washington, DC 20310.

(*b*) The above report and copies will be submitted for the following:

1. Each exposure of a person to radiation in excess of the applicable limits in 10 CFR 20.101 or 10 CFR 20.104(a) or the NRC license.

2. Each exposure of a person to airborne concentrations of radioactive material in excess of the applicable limits in 10 CFR 20.103(a)(1), 10 CFR 20.103(a)(2), 10 CFR 20.104(b), or the NRC license.

3. Levels of radiation of concentrations of radioactive material in a controlled (restricted) area in excess of any other applicable limit in the NRC license.

4. Any incident for which notification is required by paragraph 13(c)(1) and (2), or 10 CFR

20.403.

g. Any report filed with the NRC and HQDA(DASG-PSP) shall be prepared so that names of persons who have received exposure to radiation will be stated in a separate part of the report. For each individual exposed, this will include, the name, social security number, date of birth, and an estimate of the person's exposure.

h. When a person's dose equivalent cannot be determined because his primary dosimetric device has been lost or damaged, he will be assigned an administrative dose by the RPO for each month the device was used. Use any of the following methods to determine the administrative dose:

(1) Calculate the person's exposure based on occupancy information and exposure levels.

(2) Assign the dose measured by a supplemental monitoring device if one was worn during this period.

(3) Average the person's previous occupational exposure over the preceding calendar year. This value may be used if the radiation exposure during the period in question is not likely to have been significantly different from that of a similar period the previous year.

(4) Assign 00.416 rem for each month during the period in question. This is the monthly average of the whole-body limit of 5 rem over 12 months.

i. The RPO should select the method, in *h* above, which will determine the most accurate assessment. The method of determining the administrative dose will be noted in the REMARKS section of the DD Form 1141. The Form will also be annotated to indicate an "administrative dose." The RPO will forward this information to the Central Dosimetry Record Repository for proper posting to the individual's record (SB 11-206).

14. Report of personnel exposure on termination of employment or work assignment.

a. When a person who has been occupationally exposed to ionizing radiation terminates employment, he will be provided, at his request, with a report of his exposure to ionizing radiation. This report will be provided by the RPO in coordination with the custodian of DD Forms 1141 or Automated Dosimetry Records. The information will be obtained from the records maintained by the Central Dosimetry Record Repository or the installation or activity (see para 5c). Such reports will be furnished within 30 days from the time the request is made and will cover each quarter of the person's employment involving exposure to ionizing radiation or a lesser monitored period if requested by the employee. The report will also include the results of any calculations and analyses of radioactive material deposited in the body of the employee.

b. The former employee's request will include appropriate identifying data, such as social security number and dates and location of employment.

c. The report furnished the employee will be in writing and contain the following statement:

"This report is furnished to you under the provisions of the US Nuclear Regulatory Commission Regulations (10 CFR 19) or the Department of Labor Regulations (29 CFR 1910). You should preserve this report for future reference."

15. Personnel radiation exposure RCS NRC–1007. *a.* A yearly report must be filed by NRC licensees which conduct industrial activities requiring substantial quantities of radioactive material (10 CFR 20.407 and 20.408). These include the following:

(1) Operators of Army nuclear reactors designed to produce electrical or heat energy, or used as research and testing facilities. Their reports normally are included in their annual operating report in accordance with AR 385-80.

(2) Installations or activities that use or possess byproduct materials for radiographic purposes (10 CFR 34).

(3) Installations or activities that possess or use at any one time, for the purposes of fuel processing, fabrication or reprocessing, special nuclear material in quantities exceeding 5,000 grams of contained uranium-235, uranium-233, plutonium, or any combination of these.

(4) Installations or activities that possess or use at any one time, for processing or manufacturing for distribution pursuant to 10 CFR 30, 32 or 33, byproduct material whose activity exceeds any of the following:

Radionuclide	*Activity in Curies*
Cesium-137	1
Cobalt-60	1
Gold-198	100
Iodine-131	1
Iridium-192	10
Krypton-85	1,000
Promethium-147	10
Technetium-99m	1,000

b. Each NRC licensee described in *a* above, will, within the first quarter of each calendar year, sub-

mit a Personnel Radiation Exposure report (RCS NRC-1007) for the previous calendar year. This report will be sent to the Director of Management and Program Analysis, US Nuclear Regulatory Commission, Washington, DC 20555. DA licensees will forward information copies to HQDA(DASG-PSP), WASH DC 20310.

c. The report will contain the following information:

(1) Either the total number of persons for whom personnel monitoring was required or the total number for whom personnel monitoring was furnished during the calendar year. This total must include at least the number of persons required to wear personnel monitoring devices.

(2) A statistical summary report of personnel monitoring information recorded for persons for whom personnel monitoring was required. It shall indicate the number of persons whose total whole-body exposure recorded during the previous calendar year was in each of the dose equivalent ranges shown below.

Estimated whole-body dose equivalent range (rem)	*Number of individuals*
No measurable dose	
Measurable, less than 0.10	
0.10 to 0.25	
0.25 to 0.50	
0.50 to 1.00	
1.00 to 2.00	
2.00 to 3.00	
3.00 to 4.00	
4.00 to 5.00	
5.00 to 6.00	
6.00 to 7.00	
7.00 to 8.00	
8.00 to 9.00	
9.00 to 10.00	
10.00 to 11.00	
11.00 to 12.00	
12.00 or greater	

Note. Individual values exactly equal to the values separating dose equivalent ranges will be reported in the next higher range.

d. When a person terminates employment with an NRC licensee or work assignment in an NRC licensee's facility as described in *a* above, the NRC licensee will furnish the Director of Management and Program Analysis, US Nuclear Regulatory Commission, Washington, DC 20555, a report of the person's exposure to radiation and radioactive materials incurred during the period of employment or work assignment in the NRC licensee's facility. An information copy of this report for each DA licensee will be forwarded through the appropriate MACOM to HQDA (DASG-PSP), WASH DC 20310. Such report will be furnished within 30 days after exposure of the person has been determined or 90 days after the date of termination of employment or work assignment, whichever is earlier. A copy of this report will also be provided to the person concerned.

16. Careless and intentional exposure of the personnel dosimeter to ionizing radiation.

a. The personnel dosimeter is a device used to measure how much radiation a person has been exposed to such that his accumulated dose equivalent will not exceed the radiation exposure standards. These data may be used for "medical-legal" purposes. All reported overexposures will be investigated to ensure that unsafe practices and improper procedures are corrected and that overexposed persons are provided suitable medical care (see para 13). Improper use of the personnel dosimeter may result in misleading reports and unnecessary expenditure of resources to conduct an investigation.

b. It is incumbent upon each commander, supervisor, and person issued a personnel dosimeter to ensure that it is used correctly.

17. Privacy Act Statements. The following statements implement the Privacy Act of 1974 (PL 93-579). (See AR 340-21 for Army requirements.)

a. The Privacy Act statement for the DD Form 1141 or Automated Dosimetry Record is DD Form 2005 (Privacy Act Statement—Health Care Records)

b. The Privacy Act statement for the DD Form 1952 will be found on the reverse side of the form. See figure 1.

DOSIMETER APPLICATION AND RECORD OF OCCUPATIONAL RADIATION EXPOSURE

Print legibly or type all information requested. See Privacy Act Statement on reverse.

1. FULL NAME (Last, First, Middle)	2. DATE OF BIRTH (YYMMDD)	3. SOCIAL SECURITY NO.
JARVIS, Whitney N.	42-04-15	777-07-3000

4. DUTY SECTION (Dept., Ward, Unit, etc.)	5. JOB TITLE	6. DUTY PHONE
Research Laboratory	Chemist	283-1814

7. PAY GRADE		8. HAVE YOU WORN A DOSIMETER ISSUED BY THIS COMMAND IN THE PAST	9. DATE OF RADIATION PHYSICAL (YYMMDD)
CIVILIAN	MILITARY	☐ YES ☒ NO	
GS-12			81-05-01

10. DUTY STATUS	IF TRANSIENT SHOW MAILING ADDRESS (street address, city, state, zip code) OF LOCATION OF HEALTH RECORDS
☒ PERMANENT ☐ TRANSIENT 6 WEEKS OR LESS	

EXPOSURE INFORMATION *(ITEMS 11 THROUGH 20 FOR HEALTH PHYSICS USE ONLY)*

11. CLASSIFICATION OF EXPOSURE: ☒ EXTERNAL ☐ NEUTRON ☐ INTERNAL

12. BADGES REQUIRED	13. TLD REQUIRED
☐ WRIST ☒ WHOLE-BODY ☐ NEUTRON	☐ WRIST ☐ WHOLE-BODY ☐ FINGER

14. BIOASSAYS REQUIRED

WHOLE-BODY COUNT	THYROID UPTAKE	URINALYSIS	FREQUENCY
☐ YES ☐ NO	☐ YES ☐ NO	☐ α ☐ β ☐ β-γ	☐ MONTHLY ☐ QUARTERLY ☐ ANNUALLY

GIVE DATES FOR ITEMS 15 THROUGH 20 (YYMMDD)

15. DOSIMETER(S) ISSUED	16. DD FORM(S) 1141 INITIATED	17. DOSIMETER(S) DISCONTINUED
81-05-03	81-05-03	

18. LAST DOSIMETER(S) RETURNED	19. LOCATOR CARD TO HEALTH RECORD	20. DD FORM(S) 1141 TO MEDICAL RECORDS
	81-05-03	

OCCUPATIONAL EXPOSURE HISTORY

NOTE: This section only applies to the individual who has worked with radiation-producing devices or radioisotopes in a permanent status. List only those employers for whom you worked with radiation.

NAME OF EMPLOYER	ADDRESS (street address, city, state, zip code)	FROM YR	FROM MO	TO YR	TO MO	Do not write in this space
Nuclear Services, Inc	Shickshinny, PA	78	08	80	04	
Rosewater University	Portland, OR	80	04	81	04	
TOTAL EXPOSURE DATA						

REMARKS

SAMPLE

DD FORM 81 NOV 1952 EDITION OF 1 SEP 74 IS OBSOLETE. (see reverse)

Figure 1. Sample DD Form 1952.

PRIVACY ACT STATEMENT
DATA REQUIRED BY THE PRIVACY ACT OF 1974
(5 USC 552a)

1. TITLE OF FORM: Dosimeter Application and Record of Occupational Radiation Exposure.

2. PRESCRIBING DIRECTIVE: AR 40-14 and DLAR 4145.24.

3. AUTHORITY: 5 USC 301-Departmental Regulation; 10 USC 1071, Medical and Dental Care, Purposes; 42 USC 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(o). The authority for soliciting the social security number is 10 CFR 20; 44 USC 3101-Record Management by Agency Heads, General Duties.

4. PRINCIPAL PURPOSE(S): To establish qualification of personnel monitoring and document previous exposure history. The information is used in the evaluation of risk of exposure to ionizing radiation or radioactive materials. The data permits meaningful comparison of both current (short-term) and long-term exposure to ionizing radiation or radioactive material. Data on your exposure to ionizing radiation or radioactive materials is available to you upon request.

5. ROUTINE USES: The information may be used to provide data to other Federal agencies, academic institutions, and non-governmental agencies, such as the National Council on Radiation Protection and Measurement and the National Research Council, involved in monitoring/evaluating exposures of individuals to ionizing radiation or radioactive materials who are employed as radiation workers on a permanent or temporary basis and exposure received by monitored visitors. The information may also be disclosed to appropriate authorities in the event the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding.

6. MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION: It is voluntary that you furnish the requested information, including social security number; however, the installation or activity must maintain a completed DD Form 1141 on each individual occupationally exposed to ionizing radiation or radioactive material as required by 10 CFR 20, 29 CFR 1910.96 and AR 40-14/DLAR 4145.24. If information is not furnished, individual may not become a radiation worker. The social security number is used to assure that the Army/Agency has accurate identifier not subject to the coincidence of similar names or birthdates among the large number of persons on whom exposure data is maintained.

STATEMENT

Under the provisions of 10 CFR 19.13, 29 CFR 1910.96 and the Privacy Act of 1974, I hereby authorize the release of, and request that all of my radiation exposure records be furnished appropriate authorities in accordance with the "Routine Uses" portion of the above Privacy Act Statement. As a radiation worker, I have been provided instructions in radiation protection as required by 10 CFR 19.12 and 29 CFR 1910.96. As a female radiation worker, I have been informed of the biological affects and the risks from ionizing radiation on the embro-fetus and received a copy of NRC (Nuclear Regulatory Commission) Guide 8.13. I will contact my supervisor or the radiation protection officer if I have any questions. I hereby certify that the exposure history listed on the obverse is correct and complete, to the best of my knowledge and belief. I have read and understand the above Privacy Act Statement.

88-04-25
Date (YYMMDD)

Whitney M. Jarvis
Signature of Applicant

Figure 1. Sample DD Form 1952—Continued.

RECORD OF OCCUPATIONAL EXPOSURE TO IONIZING RADIATION

FOR INSTRUCTIONS, SEE REVERSE OF SHEET.

1. IDENTIFICATION NUMBER	2. NAME (Last, first, middle initial)	3. SOCIAL SECURITY NUMBER	4. RANK/RATE TITLE OF POSITION	5. DATE OF BIRTH (Day, month, year)
074	JARVIS, WHITNEY N.	777-07-3000	TDR	15 Apr 42

PLACE WHERE EXPOSURE OCCURRED	PERIOD OF EXPOSURE		DOSE THIS PERIOD (rem) 1. Method of monitoring is presumed to be film badge reading unless otherwise specified under Item 16, "REMARKS."				ACCUMULATED DOSE (rem)		INITIAL
ACTIVITY	FROM (Day-Mo-Yr)	TO (Day-Mo-Yr)	SKIN DOSE (Soft)	GAMMA AND X-RAY	NEUTRON	TOTAL THIS PERIOD	TOTAL LIFETIME	PERMISSIBLE LIFETIME 5(N-18)	PERSON MAKING ENTRY
6	7	8	9	10	11	12	13	14	15
WHOLE BODY									
Previous Exposure[1]	Aug66	Apr68	NR	00.107	NU	00.107	00.107	-	CED
Admin Dose[2]	Apr68	Apr69	-	-	-	05.000	05.107	45.000	CED
APG-EA, MD	3May69	4Jun69	NR	00.000	NU	00.000	05.107	45.000	CED
do	6Jun69	6Jun69	Quarterly Review by RPO				-	-	JER
do	5Jun69	4Jul69	00.003	00.010	NU	00.010	05.117	45.000	CED
do	5Jul69	7Aug69	NR	00.078	NU	00.078	05.195	45.000	CED
do	8Aug69	6Sep69	Film Badge Lost[3]		NU	00.416	05.611	45.000	CED
do	8Sep69	8Sep69	Quarterly Review by RPO				-	-	JER
do	7Sep69	4Oct69	NR	00.064	NU	00.064	05.675	45.000	CED
do	5Oct69	4Nov69	NR	00.075	NU	00.075	05.750	45.000	WLW
do	5Nov69	6Dec69	00.016	00.070	NU	00.070	05.820	45.000	WLW
do	Film Badge Service Discontinued 6 Dec 69						-	-	WLW
do	6Dec69	6Dec69	Quarterly Review by RPO				-	-	JER
Fort Plunkett	2Jan70	3Feb70	NR	00.000	00.000	00.000	05.820	45.000	RKO
do	4Feb70	3Mar70	NR	00.178	00.062	00.240	06.060	45.000	RKO
do	4Mar70	2Apr70	00.052	02.504	00.126	02.630	08.690	45.000	RKO
do	22Mar70	22Mar70	Quarterly Review by RPO				-	-	MJM
do	3Apr70	4May70	Relieved From Duties				08.690	50.000	RKO
do	5May70	3Jun70	Involving Exposure to RAD[5]				08.690	50.000	RKO
do	4Jun70	2Jul70	00.017	00.100	00.043	00.143	08.833	50.000	RKO
Fort Smith, CA	Aug70	Jul71	No Film Badge Worn or Exposure Received				08.833	55.000	GML
			SAMPLE						

16. REMARKS (Continue on additional sheet if necessary)

1. Nuclear Services, Inc., Shickshinny, PA
2. Rosewater University, Portland, OR
   No film badge records (AR 40-14).
   NR - none reported; NU - not used
   Has wrist badge No. 086.
3. Admin Dose = $\frac{5 \text{ rem}}{12 \text{ months}}$ = 00.416 rem
4. Alleged overexposure.
5. Pending investigation IAW AR 40-5.

TO BE RETAINED PERMANENTLY IN INDIVIDUAL'S MEDICAL RECORD

DD FORM 1 MAY 67 1141 PREVIOUS EDITIONS ARE OBSOLETE.

Figure 2. Sample DD Form 1141 for whole-body exposure.

RECORD OF OCCUPATIONAL EXPOSURE TO IONIZING RADIATION

FOR INSTRUCTIONS, SEE REVERSE OF SHEET.

1. IDENTIFICATION NUMBER	2. NAME (Last, first, middle initial)	3. SOCIAL SECURITY NUMBER	4. RANK/RATE TITLE OF POSITION	5. DATE OF BIRTH (Day, month, year)
086	JARVIS, WHITNEY N.	777-07-3000	TDR	15 Apr 42

PLACE WHERE EXPOSURE OCCURRED	PERIOD OF EXPOSURE		DOSE THIS PERIOD (rem) 1. Method of monitoring is presumed to be film badge reading unless otherwise specified under Item 16, "REMARKS."				ACCUMULATED DOSE (rem)		INITIAL
ACTIVITY	FROM (Day-Mo-Yr)	TO (Day-Mo-Yr)	SKIN DOSE (Soft)	GAMMA AND X-RAY	NEUTRON	TOTAL THIS PERIOD	TOTAL LIFETIME	PERMISSIBLE LIFETIME 5(N-18)	PERSON MAKING ENTRY
6	7	8	9	10	11	12	13	14	15
Previous Exposure[2]	Aug66	Apr68	-	-	-	00.204	00.204	NA	CED
Admin Dose[3]	Apr68	Apr69	-	-	-	75.000	75.204	NA	CED
APG-EA, MD	3May69	4Jun69	NR	00.009	NU	00.009	75.213	NA	CED
do	6Jun69	6Jun69	Quarterly Review by RPO				-	NA	JER
do	5Jun69	4Jul69	00.007	00.018	NU	00.018	75.231	NA	CED
do	5Jul69	7Aug69	NR	00.159	NU	00.159	75.390	NA	CED
do	8Aug69	6Sep69	Film Badge Lost[4]		NU	06.250	81.640	NA	CED
do	8Sep69	8Sep69	Quarterly Review by RPO				-	NA	JER
do	7Sep69	4Oct69	NR	00.143	NU	00.143	81.783	NA	CED
do	5Oct69	4Nov69	NR	00.162	NU	00.162	81.945	NA	WLW
do	5Nov69	6Dec69	00.032	00.150	NU	00.150	82.095	NA	WLW
do	Film Badge Service Discontinued 6 Dec 69						-	NA	WLW
do	6Dec69	6Dec69	Quarterly Review by RPO				-	NA	JER
Fort Plunkett	2Jan70	3Feb70	NR	00.015	NU	00.015	82.110	NA	RKO
do	4Feb70	3Mar70	NR	00.420	NU	00.420	82.530	NA	RKO
do	4Mar70	2Apr70	00.140	18.125[5]	NU	18.125	100.655	NA	RKO
do	22Mar70	22Mar70	Quarterly Review by RPO				-	NA	MJM
do	3Apr70	4May70	Relieved From Duties[6]				100.655	NA	RKO
do	5May70	3Jun70	Involving Exposure to RAD				100.655	NA	RKO
do	4Jun70	2Jul70	00.025	00.200	NU	00.200	100.855	NA	RKO
Fort Smith, CA	Aug70	Jul71	No Film Badge Worn or Exposure Received				100.855	NA	GML
			SAMPLE						

16. REMARKS (Continue on additional sheet if necessary)

1. Wrist Record (WB Record 074)
2. Nuclear Services, Inc., Shickshinny, PA
3. Rosewater University, Portland, OR
   No film badge records (AR 40-14)
   NR - none reported; NU - not used.
4. Admin Dose = $\frac{75 \text{ rem}}{12 \text{ months}}$ = 06.250
5. Accidental Exposure. Case documented IAW AR 40-5.
6. Necessary to avoid exceeding quarterly limit

TO BE RETAINED PERMANENTLY IN INDIVIDUAL'S MEDICAL RECORD

DD FORM 1 MAY 67 1141 PREVIOUS EDITIONS ARE OBSOLETE.

Figure 3. Sample DD Form 1141 for wrist exposure.

15 March 1982

AR 40–14/DLAR 1000.28

The Army office of primary interest in this joint regulation is the Office of The Surgeon General. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to HQDA (DASG–PSP–E) WASH DC 20310.

By Order of the Secretary of the Army and Director, Defense Logistics Agency:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

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Supplement F

1. Item 10, NRC Form 313.

2. The radiation protection program established at Fort Monmouth is under the management of the CECOM Safety Office on behalf of the Commander, CECOM. CECOM Regulation 385-18 (enclosure 1), establishes policies, responsibilities and procedures for possession/use of radioactive materials at Fort Monmouth.

3. The completion of a radiological permit application is required of all potential users of radioactive material at Fort Monmouth. In this document, the researcher indicates radioactive materials required, available facilities for research, safety equipment available, training/experience of research personnel and provides a standard operating procedure. The application is reviewed by the RPO for completeness and accuracy, and a recommendation for approval/disapproval is given to the RCC. The RCC has final approval/disapproval authority.

4. The RPO insures that monthly inspections of all facilities where radioactive material are used and/or stored are performed and results maintained. Included in these inspections are radiation surveys, wipe tests (where appropriate), evaluation of shielding procedures, postings and overall adherence to required regulations.

Headquarters
US Army Communications-Electronics Command
Fort Monmouth, NJ 07703-5000

CECOM REGULATIONS
No. 385-18

Safety
Ionizing Radiation Protection Program

1. Purpose. This regulation establishes policy, procedures, and responsibilities for the use of ionizing radiation sources at Fort Monmouth (FM).

2. Scope. This regulation applies to all activities utilizing ionizing radiation sources at FM.

3. Policy. The utilization of ionizing radiation sources at FM will be conducted in such a manner that the radiation dose to user personnel will be kept as low as reasonably achievable (ALARA) in accordance with the guidelines set forth by the US Nuclear Regulatory Commission (NRC).

4. Responsibilities.

a. The Commanding General (CG), CECOM will:

(1) Publish guidance on the safe use, storage, maintenance, transportation and disposal of ionizing radiation sources.

(2) Procure and maintain all necessary licenses, authorizations and permits for the use of ionizing radiation sources.

(3) Establish a Radiation Control Committee (RCC) in accordance with AR 385-11 to advise the Commander on matters pertaining to radiation protection for the purpose of ensuring that ionizing radiation sources are utilized in a safe manner.

b. The FM Radiation Control Committee (RCC) will:

(1) Advise the CG, CECOM on policies and procedures for the safe use, handling, maintenance, transportation and disposal of ionizing radiation sources.

Encl 1

(2) Review applications for NRC licenses and Department of the Army Radiation Authorizations (DARA).

(3) Review and approve all applications for Radiological Permits.

c. The Chief, Safety Office, will:

(1) Implement and maintain the FM Radiation Protection Program (RPP).

(2) Provide a Radiation Protection Officer (RPO) and at least one Alternate RPO (ARPO) for both the RPP and NRC licenses/DARAs.

(3) Provide technical guidance on the safe procurement, use, storage, maintenance and disposal of ionizing radiation sources.

(4) Obtain all NRC licenses and DARAs necessary to conduct approved Research and Development (R&D) operations for FM R&D activities.

(5) Serve as license manager for all NRC licenses/DARAs issued to CECOM.

d. The RPO and ARPO will:

(1) Administer the RPP.

(2) Provide safety guidance to users of ionizing radiation sources.

(3) Maintain all necessary NRC licenses and DARAs for R&D activities at FM.

(4) Conduct monthly evaluations of R&D activities utilizing ionizing radiation sources.

(5) Evaluate all applications for Radiological Permits for RCC review/approval.

(6) Maintain all records on the utilization of ionizing radiation sources required by the NRC, Department of Defense (DOD), Department of the Army (DA), Department of Transportation (DOT), U.S. Army Materiel Command (AMC) and all other applicable agencies.

e. Directors of R&D Activities will:

(1) Ensure all R&D projects in their activity involving the utilization of ionizing radiation sources are conducted in full compliance with all applicable regulations and Standard Operating Procedures (SOP).

(2) Appoint one primary and one alternate member to the RCC.

f. Researchers/Engineers will:

(1) Develop SOPs for the safe utilization of ionizing radiation sources under their control, subject to RCC approval.

(2) Ensure all activities under their control are conducted in a safe manner in full compliance with all applicable regulations.

5. Research and Development.

a. Licensing and Permits.

(1) All R&D projects requiring the acquisition of radioactive material will notify the CECOM Safety Office at least 9 months prior to start-up to ensure the procurement of the necessary NRC licenses, DARAs, and/or amendments. Information provided must include source design, radionuclide activity, facilities and a description of the research project/proposed use.

(2) Only the CECOM Safety Office (CSO) may obtain NRC licenses/amendments and DARAs/amendments for activities utilizing radioactive materials/sources at FM.

b. Radiological Permits.

(1) All researchers requiring the use of radioactive material and/or ionizing radiation producing devices, will, at least 3 months prior to start-up, submit to the CSO a completed Radiological Permit application (Sample at Appendix C).

(2) Additionally, researchers will submit to the CSO an SOP for the use of the radioactive material/ionizing radiation producing device. The SOP will contain information on the safe handling and use of the isotope(s)/device(s), storage, disposal and personnel protection.

(3) Applications must be approved by both the CSO and the RCC. Prior to approval, the RPO or designee will conduct a preliminary survey of the work site.

(4) All research work must be conducted in accordance with the Radiological Permit and SOP.

(5) Changes/modifications of either the Radiological Permit or SOP must be approved of, in writing, by the RPO and concurred with by the RCC.

(6) At the termination of the research project, all radioactive materials will be turned in to the RPO for storage and/or disposal and the facility will be returned for unrestricted use.

6. Ionizing Radiation Protection Program.

a. Personnel Dosimetry.

(1) Personnel involved in handling or use of ionizing radiation sources will utilize personnel monitoring devices as prescribed by the RPO.

(2) Personnel requiring film badges will submit to the RPO a completed DD Form 1952 (Appendix C).

(3) Exposure records will be kept on DD Forms 1141 (Appendix C) by the CSO in accordance with AR 40-14.

(4) Bioassays will be conducted, as applicable, by the Medical Officer and RPO, at an interval not to exceed 3 years.

b. Surveys.

(1) Health physics surveys of areas where ionizing radiation sources are utilized will be conducted monthly by the RPO or qualified designee.

(2) Wipe tests will be conducted monthly by the RPO or qualified designee in those areas where unsealed radioisotopes are used and/or stored.

(3) Periodic leak testing of sealed sources of radioactive material will be conducted by the RPO or qualified designee at a frequency determined by the applicable NRC license/DARA.

(4) Surveys will include determination as to adequacy of personnel protection, adherance to operating procedures, record keeping, etc.

c. Procurement:

(1) All requests for the procurement of radioactive material will be routed through the RPO to ensure that the proper NRC license/DARA is available.

(2) No procurement of ionizing radiation sources are authorized without an approved Radiological Permit (see paragraph 5b).

d. Transportation.

(1) All incoming/outgoing shipments of radioactive material must be surveyed and wipe tested by the RPO or qualified designee.

(2) Currently, all shipments enter/leave FM through Building 116. Any radiological shipments arriving/leaving FM from some other location must be coordinated with both the Transportation Division and the RPO/Radiological Safety Branch, CSO.

(3) In addition to all other records required, each shipment of radioactive material must include one copy of a Radioactive Material Movement form (Appendix C) signed by the RPO or designee.

e. Disposal.

(1) All disposal of radioactive material must be coordinated with the RPO.

(2) Only the CSO may request disposition instructions from the US Army Armament, Munitions & Chemical Command (AMCCOM).

(3) Currently, Buildings T-383 and 45, Evans Area, are the only approved radioactive waste storage areas at FM. No additional storage areas will be authorized without the written approval of the RPO and RCC.

f. Instrumentation.

The RPO will maintain radiological detection instrumentation sufficient to detect all of the types of radiation present at FM.

g. Training.

(1) Operational training of personnel in the use of ionizing radiation sources is the responsibility of the individual(s) issued the authorizing Radiological Permit. Experience and training of researchers is to be included on the Radiological Permit (paragraph 5b).

(2) Annual training required under Title 10, Code of Federal Regulations (CFR), 19 of all personnel involved in the use, storage, transportation, maintenance and disposal of ionizing radiation sources will be conducted by the RPO or qualified designee. Personnel failing to attend this training will not be permitted to continue using ionizing radiation sources.

(3) Annual training will include, but is not limited to, a review of the rules and regulations contained in Title 10, CFR, Parts 19, 20, and 21, and this regulation.

h. Emergency Procedures.

(1) Any accident or incident involving the loss of radioactive materials, contamination of property, contamination of personnel, or exposure of personnel to more than 100 millirem (mrem) in one week will be reported to the RPO within 1 hour by telephonic means (notification will be made to the staff duty officer within 1 hour during off-duty hours).

(2) Decontamination of facililties will be supervised by the RPO or qualified designee.

(3) Decontamination of personnel will be supervised by the RPO and Medical Officer.

(4) In any emergency situation, priority must be given to minimizing risk to personnel. Secondary to this is the protection of property.

Appendix A: Definitions

ALARA. An acronym for "as low as reasonably achievable"; refers to an operating philosophy in which occupational exposures are reduced as far below specified limits as is reasonably achievable.

Contamination (radioactive). The deposition of radioactive material in any place where it is not desired, and particularly in any place where its presence might be harmful.

Curie (Ci). A unit of activity. One Ci equals 3.700 E10 nuclear transformations per second. A microcurie (uCi) equals one-millionth of a curie (3.7 E04 disintegrations per second or 2.22 E06 disintegrations per minute).

DARA. Department of the Army Radioactive Material Authorization or Permit, DA Form 3337.

Decontamination. The reduction or removal of radioactive contamination from any given surface.

Dose. A general term denoting the quantity of radiation or energy absorbed.

Exposure (occupational). Exposure to ionizing radiation incurred by an employee whose duties may result in such exposure. It does not include exposures that are incident to medical or dental diagnosis or therapy.

Film Badge. A pack of appropriate photographic film and filters used to determine radiation exposure.

Ionizing radiation. Electromagnetic or particulate radiation capable of producing ions, directly or indirectly in its passage through matter. For purposes of this regulation, alpha and beta particles, gamma rays, x-rays, and neutrons are examples of ionizing radiation. This type of radiation does not include sound or radiowaves, infrared, visible, or ultraviolet light, or lasers.

Ionizing radiation producing devices. Electronic devices that are capable of making ionizing radiation. Examples are x-ray machines, linear accelerators, electron microscopes, cyclotrons, and radio frequency generators that use klystrons, magenetrons, or other tubes that produce x-rays.

Leak test. A determination of the integrity of a sealed source encapsulation by measurement of the amount of radioactive material escaping the encapsulation.

Licensed material. Source, special nuclear, or byproduct material received, stored, possessed, used, or transferred under a general or specific license issued by the NRC.

License (specific). A document issued by the NRC under 10 CFR that gives the right to the bearer to procure, receive, store, transfer, use, export, and import specified radioactive items under specific terms.

Rad. The unit of absorbed dose equal to 0.01 Joules/kilogram in any medium.

Radiation. Emission of energy through space in the form of waves or particles.

Radiation Control Committee (RCC). A group of qualified personnel officially appointed by a commander to set local policy and to guide the radiation protection program.

Radiation Protection Officer (RPO). An individual designated by the commander to provide consultation and advice on the degree of hazards associated with radiation and the effectiveness of measures to control these hazards. This individual shall be technically qualified by virtue of education, training, and/or professional experience to assure a capability commensurate with the type and hazard of the radiation sources for which he/she is responsible. (The term "Radiation Protection Officer" is a functional title and is not intended to denote a commissioned status or job classification.)

Radiation sources. Materials or devices that make or are capable of generating radiation, including:

a. Naturally occurring radioactive materials.
b. Byproduct materials.
c. Source materials.
d. Special nuclear materials.
e. Fission products.
f. Materials containing induced or deposited radioactivity.
g. Radiographic and fluoroscopic equipment.
h. Particle generators and accelerators.
i. Electronic equipment that uses klystrons, magnetrons, or other electron tubes that produces x-rays.

Radiation survey. An evaluation of the radiation hazard associated with the production, use, release, storage, or presence of radiation sources under a specific set of conditions, and the adequacy of required protective measures.

Radiation worker. Any person occupationally exposed to ionizing radiation and/or radioactive materials.

Radioactive material. Any material or combination of materials that emits ionizing radiation. This includes natural elements such as radium and accelerator-made radionuclides.

Radioactive waste. Includes the following:

a. Property contaminated to the extent that decontamination is economically unsound.
b. Surplus radioactive material whose sale, transfer, or donation is prohibited.
c. Surplus radioactive material that is determined to be unwanted after being advertised as surplus.
d. Waste that is radioactive due to production, possession, or use of radioactive material.

Rem. A special unit of dose equivalent. The dose equivalent in rems is numerically equal to the absorbed dose in rads multiplied by the quality factor and any other necessary modifying factors.

Sealed source. Any radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent the release or dispersal of such radioactive material under the most severe conditions that may be encountered in normal use or handling.

Survey (radiation). Evaluation of the radiation hazard incident to the production, use, or existence of radioactive materials, or other sources of radiation under specific conditions. The evaluation usually includes:

a. A physical survey of the disposition of materials and equipment.
b. Measurements or estimates of the levels of radiation involved.
c. Predictions of hazards resulting from expected or possible changes in materials or equipment.
d. Determination of required corrective measures.

Wipe test. A procedure in which a swab or piece of absorbent material (paper or cloth) is rubbed on a surface and its radioactivity measured to determine if the surface is contaminated with removable or non-fixed radioactive material.

X-rays. Penetrating electromagnetic radiation whose wavelengths are shorter than visible light. They are usually produced by bombarding a metallic target with fast electrons in a high vacuum. In nuclear reactions photons that originate in the nucleus are called gamma rays. In atomic reactions photons that originate from the electronic orbits are called x-rays.

Appendix B: References

1. AR 40-14, Control and Recording Procedures for Exposure to Ionizing Radiation and Radioactive Materials, 15 March 1982.

2. AR 385-11, Safety, Ionizing Radiation Protection (Licensing, Control, Transportation, Disposal, and Radiation Safety), 1 May 1980.

3. AR 700-64, Radioactive Commodities in the DoD Supply System, April 1985.

4. Title 10, Code of Federal Regulations, Energy.

5. Title 49, Code of Federal Regulations, Transportation.

RADIOLOGICAL PERMIT APPLICATION

DATE	NEW	AMENDMENT
TO: SAFETY OFFICE AMSEL-SF-RIR	FROM:	
RESPONSIBLE INVESTIGATOR _____	AREA SUPERVISOR _____	

RADIOISOTOPES AND/OR DEVICES TO BE USED

ELEMENT & MASS NUMBER	CHEMICAL FORM	PHYSICAL FORM	ACTIVITY(mCi)

LOCATION(S) OF USE

BUILDING	ROOMS

OTHER USER PERSONNEL

RADIATION DETECTION INSTRUMENTATION

NOMENCLATURE	RANGE	RADIATION DETECTED	QUANTITY

DESCRIPTION OF OPERATING PROCEDURES/ SAFETY PROCEDURES

FACILITIES DESCRIPTION (INCLUDING STORAGE AREAS, SHIELDING, SAFETY DEVICES)

SIGNATURE OF DIVISION CHIEF/ DIRECTOR

SUPPLEMENT

RADIOLOGICAL PERMIT APPLICATION

NAME:			
EXPERIENCE WITH RADIOISOTOPES/ IONIZING RADIATION PRODUCING DEVICES			
ISOTOPE	ACTIVITY	LOCATION	DURATION

DOSIMETER APPLICATION AND RECORD OF OCCUPATIONAL RADIATION EXPOSURE

Print legibly or type all information requested. See Privacy Act Statement on reverse.

1. FULL NAME (Last, First, Middle)	2. DATE OF BIRTH (YYMMDD)	3. SOCIAL SECURITY NO.
JARVIS, Whitney N.	42-04-15	777-07-3000

4. DUTY SECTION (Dept., Ward, Unit, etc.)	5. JOB TITLE	6. DUTY PHONE
Research Laboratory	Chemist	283-1814

7. PAY GRADE		8. HAVE YOU WORN A DOSIMETER ISSUED BY THIS COMMAND IN THE PAST	9. DATE OF RADIATION PHYSICAL (YYMMDD)
CIVILIAN	MILITARY	☐ YES ☒ NO	81-05-01
GS-12			

10. DUTY STATUS	IF TRANSIENT SHOW MAILING ADDRESS (street address, city, state, zip code) OF LOCATION OF HEALTH RECORDS
☒ PERMANENT ☐ TRANSIENT 6 WEEKS OR LESS	

EXPOSURE INFORMATION *(ITEMS 11 THROUGH 20 FOR HEALTH PHYSICS USE ONLY)*

11. CLASSIFICATION OF EXPOSURE
☒ EXTERNAL ☐ NEUTRON ☐ INTERNAL

12. BADGES REQUIRED
☐ WRIST ☒ WHOLE-BODY ☐ NEUTRON

13. TLD REQUIRED
☐ WRIST ☐ WHOLE-BODY ☐ FINGER

14. BIOASSAYS REQUIRED

WHOLE-BODY COUNT	THYROID UPTAKE	URINALYSIS	FREQUENCY
☐ YES ☐ NO	☐ YES ☐ NO	☐ α ☐ β ☐ β-γ	☐ MONTHLY ☐ QUARTERLY ☐ ANNUALLY

GIVE DATES FOR ITEMS 16 THROUGH 20 (YYMMDD)

15. DOSIMETER(S) ISSUED	16. DD FORM(S) 1141 INITIATED	17. DOSIMETER(S) DISCONTINUED
81-05-03	81-05-03	
18. LAST DOSIMETER(S) RETURNED	**19. LOCATOR CARD TO HEALTH RECORD**	**20. DD FORM(S) 1141 TO MEDICAL RECORDS**
	81-05-03	

OCCUPATIONAL EXPOSURE HISTORY

NOTE: This section only applies to the individual who has worked with radiation-producing devices or radioisotopes in a permanent status. List only those employers for whom you worked with radiation.

NAME OF EMPLOYER	ADDRESS (street address, city, state, zip code)	FROM YR	FROM MO	TO YR	TO MO	Do not write in this space
Nuclear Services, Inc	Shickshinny, PA	78	08	80	04	
Rosewater University	Portland, OR	80	04	81	04	
	TOTAL EXPOSURE DATA					

REMARKS

DD FORM 81 NOV 1952 EDITION OF 1 SEP 74 IS OBSOLETE. (see reverse)

Figure 1. Sample DD Form 1952.

RECORD OF OCCUPATIONAL EXPOSURE TO IONIZING RADIATION

FOR INSTRUCTIONS, SEE REVERSE OF SHEET.

1. IDENTIFICATION NUMBER	2. NAME (Last, first, middle initial)	3. SOCIAL SECURITY NUMBER	4. RANK/RATE TITLE OF POSITION	5. DATE OF BIRTH (Day, month, year)
074	JARVIS, WHITNEY N.	777-07-3000	TDR	15 Apr 42

6 PLACE WHERE EXPOSURE OCCURRED	7 PERIOD OF EXPOSURE FROM (Day-Mo-Yr)	8 TO (Day-Mo-Yr)	9 DOSE THIS PERIOD (rem) SKIN DOSE (Soft)	10 GAMMA AND X-RAY	11 NEUTRON	12 TOTAL THIS PERIOD	13 ACCUMULATED DOSE (rem) TOTAL LIFETIME	14 PERMISSIBLE LIFETIME 5(N-18)	15 INITIAL PERSON MAKING ENTRY
WHOLE BODY									
Previous Exposure[1]	Aug66	Apr68	NR	00.107	NU	00.107	00.107	-	CED
Admin Dose[2]	Apr68	Apr69	-	-	-	05.000	05.107	45.000	CED
APG-EA, MD	3May69	4Jun69	NR	00.000	NU	00.000	05.107	45.000	CED
do	6Jun69	6Jun69	Quarterly Review by RPO				-	-	JER
do	5Jun69	4Jul69	00.003	00.010	NU	00.010	05.117	45.000	CED
do	5Jul69	7Aug69	NR	00.078	NU	00.078	05.195	45.000	CED
do	8Aug69	6Sep69	Film Badge Lost[3]		NU	00.416	05.611	45.000	CED
do	8Sep69	8Sep69	Quarterly Review by RPO				-	-	JER
do	7Sep69	4Oct69	NR	00.064	NU	00.064	05.675	45.000	CED
do	5Oct69	4Nov69	NR	00.075	NU	00.075	05.750	45.000	WLW
do	5Nov69	6Dec69	00.016	00.070	NU	00.070	05.820	45.000	WLW
do	Film Badge Service Discontinued 6 Dec 69						-	-	WLW
do	6Dec69	6Dec69	Quarterly Review by RPO				-	-	JER
Fort Plunkett	2Jan70	3Feb70	NR	00.000	00.000	00.000	05.820	45.000	RKO
do	4Feb70	3Mar70	NR	00.178	00.062	00.240	06.060	45.000	RKO
do	4Mar70	2Apr70	00.052	02.504	00.126	02.630	08.690	45.000	RKO
do	22Mar70	22Mar70	Quarterly Review by RPO				-	-	MJM
do	3Apr70	4May70	Relieved From Duties				08.690	50.000	RKO
do	5May70	3Jun70	Involving Exposure to RAD[5]				08.690	50.000	RKO
do	4Jun70	2Jul70	00.017	00.100	00.043	00.143	08.833	50.000	RKO
Fort Smith, CA	Aug70	Jul71	No Film Badge Worn or Exposure Received				08.833	55.000	GML
			SAMPLE						

16. REMARKS (Continue on additional sheet if necessary)

1. Nuclear Services, Inc., Shickshinny, PA
2. Rosewater University, Portland, OR
   No film badge records (AR 40-14).
   NR - none reported; NU - not used
   Has wrist badge No. 086.
3. Admin Dose = $\frac{5 \text{ rem}}{12 \text{ months}}$ = 00.416 rem
4. Alleged overexposure.
5. Pending investigation IAW AR 40-5.

TO BE RETAINED PERMANENTLY IN INDIVIDUAL'S MEDICAL RECORD

DD FORM 1 MAY 67 1141

PREVIOUS EDITIONS ARE OBSOLETE.

Figure 2. Sample DD Form 1141 for whole-body exposure.

RADIOACTIVE MATERIAL MOVEMENT

____ Shipment ____ Receipt

TCN/GBL;	Containers:
NSN:	Nomenclature:

Proper Shipping Name:

____ Radioactive material,empty packages,UN 2908
____ Radioactive material,articles,manufactured from natural OR depleted uranium OR natural thorium,UN 2909
____ Radioactive material,limited quantity,n.o.s.,UN 2910
____ Radioactive material,instruments and articles,UN 2911
____ Radioactive material,low specific activity OR LSA,n.o.s.,UN 2912
____ Radioactive material,fissile,n.o.s.,UN 2918
____ Radioactive material,special form,n.o.s.,UN 2974
____ Radioactive material,n.o.s.,UN 2982

Label: ____ White I ____ Yellow II ____ Yellow III ____ None	Marking: ____ Radioactive ____ Radioactive LSA ____ Waste Class A, B, or C ____ Other ( ) ____ None
Radiation Level: Surface _____mR/hr One Meter _____mR/hr	Transportation Index _____

Comments:

Name/Title:	Date:

Supplement G

1. Reference: Item 11, NRC Form 313.

2. Disposal of the radioactive materials indicated at Supplement B may be accomplished by return to the appropriate manufacturer, as applicable, and/or through established DA channels in accordance with 10 CFR, AR 385-11 and AR 700-64. Headquarters U.S. Army Armament, Munitions and Chemical Command (AMCCOM), has been delegated the responsibility of management coordination for radioactive waste disposal. AMCCOM assures that all radioactive wastes are packaged and shipped in accordance with all applicable requirements for ultimate transfer of the radioactive waste to an authorized burial site. Requests for disposal of transuranic elements are provided to the U.S. Department of Energy (DOE) through AMCCOM. The DOE provides disposition instructions, inclusive of compliance requirements to U.S. Department of Transportation regulations, for shipment to specified DOE installations for ultimate disposal of the material as radioactive waste.

RECORD OF ENVIRONMENTAL CONSIDERATION

TITLE: U.S. Nuclear Regulatory Commission Broad Scope License Application

DESCRIPTION:

1. The U.S. Army Communications-Electronics Command (CECOM) as proponent for the U.S. Army in Research and Development of electronics and optical systems, has prepared subject broad scope license application.

2. This document covers the life cycle of subject material to include use, storage, possession, transportation and disposal.

DETERMINATION:

1. It has been determined that the above item/action qualifies as categorically excluded (paragraph A-11 and A-28, Appendix A, AR 200-2) from the requirements for an Environmental Assessment or an Environmental Impact Statement. The extraordinary circumstances defined in paragraph 4-3 or AR 200-2 do not apply.

2. Implementation of the proposed action is not expected to result in a significant adverse impact on the existing human environment, nor is it expected to be environmentally controversial.

PROPONENT OFFICE: CECOM Safety Office

ORIGINATOR: for Joseph M Santarsiero DATE: 9 Mar 87
Joseph T. Furia

ENVIRONMENTAL COORDINATOR: for Christopher Kenck DATE: 9 Mar 87
Louis Soffer

REVIEWED BY: Christopher Kenck DATE: 9 Mar 87
Christopher Kencik

APPROVED BY: Steven A Horne DATE: 9 Mar 1987
STEVEN A. HORNE
Chief, Safety Office

SECURITY VERIFICATION: THIS DOCUMENT HAS BEEN REVIEWED IN FULL CONSIDERATION OF THE REQUIREMENTS OF OPERATIONS SECURITY (OPSEC) AND HAD BEEN DETERMINED TO BE ACCEPTABLE FOR PUBLIC RELEASE.