

Enclosure II

June 10, 2010

Hanford Radiological Health and Safety Document

Forward

The Richland Operations Office and the Office of River Protection have established a supplemental set of contractual requirements and an expectation that the contractor organizations establish the mechanisms necessary to maintain site consistency, optimize site-wide radiological programs to provide an overall benefit to the government, and support DOE in the management of long-term risks relative to radiological health and safety.

Terms used in this document are as defined in 10 CFR 835. In addition, certain other terms are defined in the attached glossary.

A. Organizational Mechanism

1. Each contractor which conducts activities in accordance with a Radiation Protection Program, as required by 10 CFR 835, shall participate in the development, maintenance and implementation of a set of site-wide radiological requirements that define the radiological practices that are in the best interest of the Hanford site. Accordingly, the participating contract organizations are expected to charter an organizational mechanism (i.e., the Hanford Radiological Control Forum) to address site wide consistency issues, optimize radiological programs in a consistent manner to incorporate site wide best practices, and ensure long-term management of radiological health and safety issues.
2. The chartered organization shall establish administrative protocols for the following elements:
 - Prioritization of potential issues or concerns relative to site needs
 - Justification for decisions
 - Cost-benefit analysis and other methods to decide between alternatives, as appropriate
 - Submittal process to DOE RL/ORP for review
 - Implementation schedule
3. Site-wide radiological requirements derived from the above organization shall be consistent with all relevant statutory and regulatory requirements and shall be revised whenever necessary to ensure such consistency. Whenever there is a conflict, the applicable Radiation Protection Program takes precedence. DOE shall be notified of any conflict identified by the contractor between this document and other requirements.

B. Key Radiation Protection Positions

1. The contractor shall identify those key radiation protection positions critical to effective management of the radiological health and safety program.
2. The contractor shall ensure that individuals fulfilling key radiation protection positions identified above demonstrate technical competence and experience to establish, maintain, and implement their applicable functional areas of the radiological control program, and possess

the management skills to direct radiological control programs within their range of responsibility.

3. Identification of key radiation protection positions and qualification criteria shall be consistent with the guidelines provided in DOE-STD-1107-97, Knowledge, Skills, and Abilities for Key Radiation Protection Positions at DOE Facilities, or equivalent.

C. Administrative Control Levels

1. A DOE maximum Administrative Control Level (ACL) of 2,000 mrem per calendar year per individual is established for all DOE activities on the Hanford Site. Approval by the DOE Site Manager shall be required prior to allowing an individual to exceed 2,000 mrem.
2. The contractor shall establish a corporate administrative control level. The specific value selected shall not exceed the DOE maximum administrative control level above.

D. Radiation Exposure to Minors

1. The contractor shall comply with the following minimum requirements for non-occupational radiation exposure to minors during access to the Hanford site:
 - a. Minors are prohibited access to contamination areas (CAs), high contamination areas (HCAs), radiation areas (RAs), high radiation areas (HRAs), very high radiation areas (VHRAs), airborne radioactivity areas (ARAs), and soil contamination areas (SCAs).
 - b. Minors may be permitted access to radiologically controlled areas (RCAs), radiological buffer areas (RBAs), radioactive material areas (RMAs), and underground radioactive material areas (URMAs) under the following conditions:
 - 1) The purpose for access to radiological areas is for education or contractor sponsored family days (e.g., shadow days, "take your daughter/son to work" days).
 - 2) Written consent (e.g., parental consent and hold harmless clause) is granted by parent/guardian and paperwork requiring the minor's signature is reviewed and signed by the parent/guardian.
 - 3) Minors entering RBAs and RMAs have completed the required orientation for escorted access.
 - 4) Minors are escorted by personnel trained in accordance with 10 CFR 835.
 - 5) Hanford dosimeters are issued for entries to RBAs and RMAs to document radiation dose in accordance with individual contractor implementing procedures.
 - 6) For entry into an RBA for contamination control, the facility will take action to stop work that could spread contamination to the RBA during the visit and verify the accessible portion of the RBA is uncontaminated prior to entry by the visitors.
 - 7) Handling or touching radioactive material labeled or controlled per 10 CFR 835 by the minor is prohibited.
 - 8) Access to RBA and RMAs is prohibited in areas where exposure rates exceed 0.5 mR/hr.

E. Radiological Posting, Labeling and Control

1. Criteria used for radiological posting and labeling shall be consistent between Hanford site contractors as members of the Hanford Radiological Control Forum.
2. The contractor shall establish radiological buffer areas for contamination control adjacent to any entrance or exit from a contamination, high contamination, or airborne radioactivity area. A radiological buffer area is not required for high contamination areas or airborne radioactivity areas that are completely within contamination areas or for inactive contamination, high contamination or airborne radioactivity areas (i.e., areas to which entry has been prohibited by postings or barricades).
3. The contractor shall establish radiological buffer areas for exposure control, as necessary, to limit radiation doses to unmonitored individuals to less than 100 millirem per year.
4. The contractor shall establish soil contamination areas or underground radioactive material areas, as appropriate, for outdoor areas with known or suspect soil contamination or underground radioactive material.
5. The contractor shall ensure that postings of soil contamination areas contain the words "CAUTION, SOIL CONTAMINATION AREA" and instructions or special warnings to workers, such as "Consult With Radiological Control Organization Before Digging" or "Subsurface Contamination Exists". In addition:
 - a. Any area in which the transferable contamination exceeds the appropriate "removable" levels in Appendix D, 10 CFR 835, shall be posted and controlled as either a contamination or high contamination area in accordance with the provisions of 10 CFR 835.
 - b. If appropriate direct or indirect measurement demonstrates that there is no radioactive contamination within the top 15 cm of soil for an area in which a direct contamination reading (above background) of the soil surface exceeds the appropriate "total" contamination levels in Appendix D, 10 CFR 835, then the area need not be posted or controlled as a SCA.
 - c. An area, which would otherwise be classified as a SCA, need not be posted and controlled as a SCA if the area is covered by a layer of impervious material, e.g., asphalt, concrete.
6. The contractor shall ensure that any area within a soil contamination area or underground radioactive material area, in which an intrusive activity is performed, is posted as either a Radiological Buffer Area or a Contamination Area.
7. The contractor shall ensure that members of the public shall not perform any intrusive activities within an URMA.

F. External Dosimetry

1. The following elements of the external dosimetry program shall be consistent between Hanford site contractors as members of the Hanford Radiological Control Forum:
 - The issuance, use and return of dosimeters by individuals.
 - The prescribed wear location for dosimetry.
 - The use of supplemental dosimeters.
2. The contractor shall ensure that individuals do not wear dosimeters issued by their organization while being monitored by dosimetry at another facility unless authorized by the resident radiological control manager. The contractor shall also ensure that individuals do not knowingly expose their dosimeters to non-occupational sources of radiation or to high temperatures.
3. The contractor shall participate in the development and maintenance of a Hanford site-wide external dosimetry technical basis document. The contractor's external dosimetry program shall be performed in accordance with this technical basis document. Changes to the external dosimetry technical basis document shall be reviewed and endorsed by each Hanford contractor who conducts activities in accordance with a Radiation Protection Program.
4. The contractor shall perform a dose assessment for each instance in which a dosimeter issued to an individual becomes lost, damaged, or contaminated. This dose assessment shall become part of the individual's radiation exposure monitoring records.
5. The contractor shall ensure that individuals that are likely to exceed the monitoring criteria established in 10 CFR 835.402 from all work performed at the Hanford site are monitored in accordance with 10 CFR 835.402, such that unmonitored exposure does not exceed the criteria in 10 CFR 835.402.
6. The contractor shall ensure that neutron dosimetry (DOELAP accredited) is provided to and used whenever an individual is likely to meet or exceed any of the criteria in 10 CFR 835.402(a), and 10% or more of the dose is likely to be due to neutron exposure.
7. The contractor shall ensure that individuals notify line management and the radiological control organization of pending off-site work involving expected occupational exposures to radiation or radioactive materials. If such work is authorized, records of off-site dose shall be submitted for inclusion into the individual's radiation exposure monitoring records within 30 days upon receipt.
8. The contractor shall ensure that demonstration of an accredited external dosimetry program (DOELAP) shall be conducted through the DOE, Richland Operations Office or Office of River Protection, as appropriate.

G. Internal Dosimetry

1. The following elements of the internal dosimetry program shall be consistent between Hanford site contractors as members of the Hanford Radiological Control Forum:
 - Baseline bioassay monitoring requirements
 - Establish routine bioassay monitoring requirements
 - Follow-up bioassay monitoring requirements
 - Termination bioassay monitoring requirements
2. The contractor shall ensure that appropriate bioassay monitoring methods, analytical procedures, and frequencies for the collection of bioassay samples, such as urine or fecal samples, and appropriate participation in bioassay monitoring, such as whole body or lung counting are established for personnel who are likely to receive intakes in a calendar year resulting in a committed effective dose equivalent greater than 100 mrem.
3. The contractor shall participate in the development and maintenance of a Hanford site-wide internal dosimetry technical basis document to include the technical basis for the methods and frequency of bioassay monitoring. The contractor's internal dosimetry program shall be performed in accordance with this technical basis document. Changes to the internal dosimetry technical basis document shall be reviewed and endorsed by each Hanford contractor who conducts activities in accordance with a Radiation Protection Program.
4. The contractor shall ensure that the internal dosimetry technical basis document addresses the interpretation of bioassay results and subsequent dose assessments including the following:
 - a. Characteristics of the radionuclide(s), such as chemical and physical form
 - b. Bioassay results and the individual's previous exposure history pertinent to the dose assessment
 - c. Exposure information, such as route of intake and time and duration of exposure
 - d. Biological models used for dosimetry of radionuclides
 - e. Models to estimate intake or deposition and to assess dose.
5. The contractor shall use air monitoring data to assess and assign internal dose when:
 - a. The accumulated exposures to airborne radioactivity exceed 40 DAC-hrs in a calendar year, and,
 - b. The minimum detectable dose for the applicable bioassay technology available at Hanford exceeds the anticipated dose (committed effective dose equivalent) from these exposures.
6. The contractor shall develop and maintain a technical basis document for the collection, analysis, and assessment of air monitoring data used to assess and assign internal dose.

7. The contractor shall ensure that demonstration of an accredited internal dosimetry program (DOELAP) shall be conducted through the DOE, Richland Operations Office or the Office of River Protection, as appropriate.

H. Instrumentation

1. The contractor shall calibrate radiological measurement instruments and equipment with appropriate standards that are traceable to the National Institute of Standards and Technology (NIST) or equivalent international standards.
2. The contractor shall ensure that calibration of radiological measurement instruments is performed in accordance with "radiation protection instrumentation test and calibration", ANSI N323-1978.
3. The contractor shall ensure that where an area radiation monitor is incorporated into a safety interlock system, the circuitry shall be such that a failure of the monitor either prevents entry into the area or prevents operation of the radiation-producing device.
4. The contractor shall evaluate the potential radiological consequences and document any corrections to the original monitoring results upon determination of the use of an out-of-calibration or failed radiation measurement instrument.

I. Radiation Safety Training

1. The contractor shall establish radiation safety training programs that utilize DOE standardized core training material to the maximum extent practical. The contractor shall supplement the radiation safety training programs with program-specific training material.
2. The contractor shall use examinations and performance demonstrations, appropriate to the level of training, for initial and biennial qualification of Radiological Worker I, Radiological Worker II, and Radiological Control Technician training
3. The Hanford Radiological Control Forum shall ensure that radiation safety training programs, including course content, examinations, performance demonstrations, and re-qualification, for GERT, Radiological Worker I, and Radiological Worker II, will be sufficiently consistent to maintain reciprocity of this training between contractors for core training materials and Hanford site-specific training.
4. The contractor shall ensure that individuals meet the applicable minimum radiation safety training requirements in Table 1 for access to areas requiring control for radiological health and safety.
5. The Hanford Radiological Control Forum shall develop a singular site radiological orientation to be presented to escorted, non-Hanford individuals prior to site access to Radiological Controlled Areas or Radiological Areas. This orientation is to be a basic presentation that informs the escorted individual of the site-wide information needed for safe

radiological access as well as meet knowledge requirements prior to occupational exposure, when appropriate. Demonstration of knowledge will not be required.

6. The Hanford Radiological Control Forum shall exercise paragraph 10 CFR 835.901(d) to the fullest extent, including the utilization of escorts for access to Radiological Controlled Areas or Radiological Areas for short duration visits by non-Hanford individuals in lieu of training.

Table 1.**DOE-RL RADIOLOGICAL HEALTH & SAFETY CRD MINIMUM TRAINING
REQUIREMENTS MATRIX**

AREA	UNESCORTED	ESCORTED (NON-HANFORD WORKER)	ESCORTED (HANFORD WORKER)
RCA	GERT	ORIENTATION	ORIENTATION
RMA	GERT	ORIENTATION	GERT
URMA	NONE	NONE	NONE
SCA	GERT	ORIENTATION	GERT
RBA	RWI	ORIENTATION	GERT
RA	RWI	ORIENTATION	GERT
HRA	RWI plus HRA module or RWII	RWI plus HRA module or RWII	RWI plus HRA module or RWII
VHRA	RWI plus HRA module or RWII	RWI plus HRA module or RWII	RWI plus HRA module or RWII
CA	RWII	ORIENTATION	GERT
HCA	RWII	RWII	RWII
ARA	RWII	RWII	RWII

J. Radiological Records

1. The contractor shall manage radiological records through an established records management program(s) consistent with processes and requirements established by the contractor. The program(s) shall address the potential legal and technical use of the completed records, including long term storage media requirements. This program(s) shall require records management of the following:
 - Radiological Control Procedures
 - Individual Radiological Doses
 - Internal and External Dosimetry Policies and Procedures (including Bases Documents)
 - Personnel Training (course records and individual records)
 - Radiological Instrumentation Test, Repair and Calibration
 - Radiological Surveys
 - Area Monitoring Dosimetry Results
 - Radiological Work Permits
 - Radiological Incident and Occurrence Reports (and Critique Reports, if applicable)
 - Sealed radioactive source accountability and control
 - Release of material to controlled areas
 - Reports of loss of radioactive material.
 - Minor Consent Forms (see section D)
2. The contractor shall ensure that permanent radiological records are accurate and legible, and that all records are stored in a manner that ensures their integrity, retrievability and security.
3. The contractor shall ensure that completed records contain sufficient detail to be understandable to those that may utilize the record in the future (i.e., intelligible to a person with training and experience equivalent to that of a person with a B.S. in health physics; for the life of the record).
4. The contractor shall ensure that the following records are maintained:
 - a. Records of personnel radiation exposure monitoring in a centralized records database. Hanford site personnel radiation exposure monitoring records are currently maintained by the Hanford Radiological Records Program.
 - b. Records of radiological incidents and occurrences resulting in changes to, or conformation of, recorded exposures within personnel radiation exposure monitoring records. The contractor shall ensure that, when practicable, these records are retained in or cross-referenced to applicable personnel radiation exposure monitoring records.
 - c. Records of employee radiological safety concerns that have been formally investigated and documented.
 - d. Calibration records for the following equipment:

- Portable survey instruments
 - Bioassay measurement equipment
 - Laboratory, counting room, and fixed radiation measuring equipment
 - Process and effluent monitors and sampling equipment
 - Radiation area monitors
 - Portal monitors and other personnel contamination monitors
 - Pocket and electronic dosimeters
 - Air sampling equipment
 - Tool and waste monitoring equipment
 - Protective clothing and equipment monitors
 - Dosimetry processing instrumentation
 - Other devices used in radiation detection or measurement, as applicable.
5. The contractor shall ensure that monitoring and workplace records include sufficient information to clearly identify the location or facility, purpose, results, individual, and contractor performing the monitoring,
 6. The contractor shall ensure that calibration records for instruments and equipment used for monitoring individuals, materials, and areas include frequencies, method, dates, personnel who performed the calibration and traceability of calibration sources to National Institute of Standards and Technology or other acceptable standards.

K. Radiation Generating Devices

1. The contractor shall maintain a current listing of RGDs. This listing shall identify the responsible individual for each listed RGD.
2. The contractor shall ensure that on-site operations of RGDs, conducted by off-site contractors are approved by the cognizant site radiological control organization in coordination with the organization utilizing the off-site contractor. The contractor shall ensure that the off-site contractor possesses an approved DOE Radiation Protection Program, Nuclear Regulatory Commission license or Agreement State license and that operational and emergency procedures are current and available.
3. The contractor shall establish the radiological control and operational requirements for incidental electronic RGD devices such as electron microscopes and electron beam welders.

L. Glossary

All terms used in this document are used as defined in 10 CFR 835 with the following additions:

contamination: The presence of residual or unwanted radioactive material resulting from a DOE activity in or on a material or property.

direct contamination reading: The apparent surface contamination level, expressed in disintegrations per minute per a given area, resulting when an appropriate contamination probe or detector is placed in close proximity (e.g., ~1/4 inch) to the soil surface. Appropriate efficiency and geometry correction factors should be applied to such a reading.

dose assessment: Process of determining radiation dose and uncertainty included in the dose estimate, through the use of exposure scenarios, bioassay results, monitoring data, source term information, and pathway analysis.

fixed contamination: Radioactive material that has been deposited onto a surface and cannot be readily removed by non-destructive means, such as casual contact, wiping, brushing, or laundering. Fixed contamination does not include radioactive material that is present in a matrix, such as soil or cement, or radioactive material that has been induced in a material through activation processes.

intrusive activity: Any human activity that disturbs the surface and/or subsurface of the soil which has a reasonable possibility of increasing the amount of transferable contamination within a soil contamination area or an underground radioactive material area.

key radiation protection position: A person specifically designated within the radiological health and safety organization to exercise discretionary authority and/or make independent judgments and decisions beyond those covered by established procedures concerning radiation protection issues associated with the design, construction, operation and maintenance, or decommissioning of facilities and/or activities.

personnel dosimeters: Devices designed to be worn by a single individual for the assessment of dose equivalent such as film badges, thermoluminescent dosimeters (TLDs), and pocket ionization chambers.

personnel monitoring: Systematic and periodic estimate of radiation dose received by individuals during working hours. Also, the monitoring of individuals, their excretions, skin, or any part of their clothing to determine the amount of radioactive material present.

radiation generating device: An electronic device capable of generating a dose rate of 0.5 mrad per hour at 2 inches for any accessible region of the device or a device designed to produce a radiation field that contains a sealed radioactive material source exceeding 10 times the values for the applicable nuclide specified in 10 CFR 835, Appendix E

radioactive material: Any material that spontaneously emits ionizing radiation (e.g., X- or gamma rays, alpha or beta particles, neutrons). The term “radioactive material” also includes materials onto which radioactive material is deposited or into which it is incorporated. For purposes of practicality, 10 CFR 835 establishes certain threshold levels below which specified actions, such as posting, labeling, or individual monitoring, are not required. These threshold levels are usually expressed in terms of total activity or concentration, contamination levels, individual doses, or exposure rates.

radiological buffer area (RBA): An intermediate area established to prevent the spread of radioactive contamination and to protect personnel from radiation exposure.

radiologically controlled area (RCA): Any area to which access is managed by or for DOE to protect individuals from exposure to radiation and/or radioactive material.
(Defined as “controlled area” in 10 CFR 835.)

removable contamination: Radioactive material that can be removed from surfaces by non-destructive means, such as casual contact, wiping, brushing, or washing.

soil: The upper layer of earth that can be tilled and in which vegetation may grow, and including organic material such as vegetation or animal wastes that are deposited or mixed into the soil, and rubble construction or deactivation and decommissioning debris.

soil contamination area (SCA): An area in which radioactive material exists within the top 15 cm of soil such that:

- 1) A direct contamination reading of the soil surface exceeds the appropriate “total” contamination levels in Appendix D, 10 CFR 835, and
- 2) The transferable contamination from the area does not exceed the appropriate “removable” levels in Appendix D, 10 CFR 835.

survey: An evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. When appropriate, such an evaluation includes a physical survey of the location of radioactive material and measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present.

transferable contamination: The total contamination levels, expressed in terms of disintegrations per minute per a given area, on items such as shoes, shoe covers, vehicle tires, tools, or other equipment which has come into contact with contaminated soils.

underground radioactive material area (URMA): An area in which known or presumed radioactive material above naturally-occurring background levels exists below the top 15 cm of soil, or below any layer of impervious soil cover material, e.g., asphalt, concrete.

worker (Hanford): A “general employee” as defined in 10 CFR 835 who is either a DOE or DOE contractor employee assigned to the Hanford site; an employee of a subcontractor to a Hanford DOE contractor; or an individual who performs work for or in conjunction with DOE or utilizes DOE facilities on the Hanford site.

worker (non-Hanford): A “general employee” as defined in 10 CFR 835 who is not a Hanford worker.