USACE ST. LOUIS DISTRICT
FUSRAP
RADIATION SAFETY MANUAL

May 1999

Prepared For

U.S. Army Corps of Engineers
St. Louis District

CONTENTS

TABLES AND ATTACHMENTS

1. Purpose

1.1. The St. Louis District U.S. Army Corps of Engineers (USACE) Radiation Safety Program, as defined within this manual, is developed to ensure work activities involving potential exposure to ionizing radiation are performed in accordance with applicable regulatory requirements. This USACE St Louis District radiation safety manual provides the following commitments:

1.1.1. The USACE St Louis District shall comply with all regulatory requirements regarding the use of radioactive materials.

1.1.2. The USACE St Louis District shall maintain a radiation safety program to keep individual and collective radiation exposures to workers and the public below regulatory limits and ALARA.

2. Scope

2.1. This manual applies to USACE employees and visitors to a worksite under the jurisdiction of the St. Louis District of the USACE where radioactive materials are present. This manual is designed to provide the methodology to demonstrate compliance with USACE ER-385-1-80, EM 385-1-80, EM 385-1-1, and 10 CFR Part 20.

3. References

3.1. U.S. Army Corps of Engineers Regulation No. ER 385-1-80, "Ionizing Radiation Safety"

3.2. U.S. Army Corps of Engineers Manual No. EM 385-1-80, "Radiation Protection Manual"

3.3. U.S. Army Corps of Engineers Manual No. EM 385-1-1, "Safety and Health Requirements Manual"

3.4. 10 CFR 20, "Standards for Protection Against Radiation"

3.5. Regulatory Guide 8.29, February 1996, "Instructions Concerning Risk From Occupational Radiation Exposure"

3.6. 29 CFR 1910, "Occupational Safety and Health Standards"

3.7. 29 CFR 1926.53 "Ionizing Radiation"

4. Responsibilities

4.1. The USACE St. Louis District Radiation Protection Officer (RPO) shall:

4.1.1. Conduct USACE St. Louis District oversight operations to ensure compliance with all USACE, NRC, DOT, OSHA, or Agreement State regulations, and the requirements established in any applicable license, permit, registration, or equivalent documentation.

4.1.2. Prepare and submit to the RPSO, through USACE channels within assigned time frames, all applications, amendments or submittals necessary for compliance with all applicable regulations concerning radioactive materials.

4.1.3. Ensure that all exposures of workers and the general public to ionizing radiation are kept as low as is reasonably achievable (ALARA), with technical and socioeconomic factors being taken into account. This shall be accomplished by ensuring compliance with all applicable regulations concerning radioactive materials by all users of radioactive materials.

4.1.4. Provide competent technical guidance for all users of radioactive material.

4.1.5. Ensure that all personnel who may be exposed to ionizing radiation, including occupationally exposed personnel (radiation workers) and frequenters (individuals who are likely to receive an exposure of 100 millirem per year, such as janitorial staff) to areas where radiation is present, receive the appropriate training.

4.1.6. Maintain all documents, correspondence, reports, and records that this regulation and other applicable Federal and Army regulations, licenses, and authorizations may require.

4.1.7. Disseminate all guidance and providing services as described in ER 385-1-80.

4.1.8. Audit activities involving radioactive materials within the Saint Louis District on an annual basis.

4.1.9. Provide timely reports to the Commander or Director of his or her USACE Command, of the current status of activities involving radioactive material.

4.1.10. Randomly audit personnel, organizations, and subcontractors, and training content to which this manual is applicable.

4.1.11. Submit reports and notifications consistent with applicable regulations, permits, regulatory and license requirements, good health physics practices, and this manual.

4.1.12. Designate responsibility for an effluent monitoring service and dosimetry service to facilitate compliance with ER 385–1-80.

4.1.13. Designate a site primary contractor for every USACE St. Louis site containing radioactive material.

4.1.14. Limit or cease operations where there is an eminent and legitimate radiation safety issue.

5. USACE Radiation Safety Program

5.1. Radiation Safety Program Organization

5.1.1. The USACE RPO is responsible for, and has authority over, all aspects of the USACE St Louis radiation safety program. Performance of the following aspects of the USACE St Louis radiation safety program is administered at radiological FUSRAP sites:

5.1.1.1. A designated dosimetry contractor (DDC) performs all internal and external dosimetry functions for USACE St Louis District employees in conjunction with USAIRDC.

5.1.1.2. A designated effluent contractor (DEC) performs all stationary site radiological effluent sampling and radiological monitoring.

5.1.1.3. Every contractor performs temporary effluent sampling and monitoring made necessary by the activities that contractor is performing. All results are submitted to the DEC within the current quarter, as data is available.

5.1.1.4. Each site primary contractor (SPC), as determined by the RPO, is responsible for:

5.1.1.4.1. Site and site perimeter routine radiation and contamination surveillance in accordance with this manual.

5.1.1.4.2. Posting site radiological conditions at entrances to radiological restricted areas.

5.1.1.4.3. Posting all general area radiological boundaries of the site in accordance with EM 385-1-80.

5.1.1.4.4. Notifying the USACE St Louis District RPO of any radiation accidents, incidents, and overexposures at the site.

5.1.1.5. Every contractor shall provides their own radiological job coverage made necessary by the work activity that the contractor is performing, unless this coverage is provided by the SPC. This job coverage includes;

5.1.1.5.1. Performance of radiation, contamination, and air sampling surveys in areas accessed by their employees.

5.1.1.5.2. Performance of radioactive material transfer and receipt surveys.

5.1.1.5.3. Performance of exit contamination monitoring of their employees.

5.1.1.5.4. Labeling containerized radioactive material.

5.1.1.5.5. Posting their work areas if their work activity elevates the posting requirements of the general area.

5.1.1.5.6. Performing exposure monitoring and reporting of their employees.

5.1.1.5.7. Providing USACE St Louis District employees with personal air samplers when his or her annual exposure is likely to exceed 100 mrem / yr CEDE or he or she enters an airborne radioactivity area.

5.1.1.5.8. Reporting USACE St Louis District employee personal air sample data to the DDC when monitored under their program, as available.

5.1.1.5.9. Notifying the SPC RPO of any radiation accidents, incidents, and overexposures at the site.

5.2. Contractor Program Review

5.2.1. Prior to performing work on a site controlled by the USACE St Louis District, the contractor shall provide the USACE RPO with written radiological procedures which demonstrate compliance with EM 385-1-1 and other Federal, State, and Local requirements, as applicable.

5.3. Contractor Oversight

5.3.1. The USACE RPO shall periodically review contractor radiation safety programs to identify and address program quality and compliance. This review may be performed in accordance with applicable sections of Attachment 1, "Contractor Radiological Safety Checklist".

5.4. USACE Entry Requirements

5.4.1. All USACE employees who require unescorted access to radiological restricted areas and are likely to receive 100 mrem above background in one year shall receive initial radiological training prior to entry into radiological areas, as required by ER 385-1-80.

5.4.2. The initial radiological training shall consist of instructions on: the material, health and safety problems associated with radiation exposure, potential effects of radiation on the fetus or embryo, precautions and exposure controls, use of dosimetry and instrumentation, the Radiation Safety Program, and the individuals rights and responsibilities, being at least;

5.4.2.1. Forty hours for the RPO, or

5.4.2.2. Eight hours for any unescorted individual working with radioactive material, or

5.4.2.3. Four hours for any escorted individual working with radioactive material

5.4.3. Radiological refresher training is required annually. Radiological refresher training shall consist of the content requirements of EM 385-1-80. There are no minimum time requirements on radiological refresher training. All training records shall be maintained in USACE St Louis District radiation safety files.

5.4.4. All USACE St Louis District employees who require access to a radiological restricted area and meet any of the following conditions shall be monitored for internal and/or external exposure as applicable;

5.4.4.1. the individual is likely to receive a deep dose equivalent of 100 mrem above background in a year, or

5.4.4.2. the individual is likely to receive a committed effective dose equivalent of 100 mrem above background in a year, or

5.4.4.3. entry is required into a radiation, high radiation area, or airborne radioactive materials area, or

5.4.4.4. the individual is a declared pregnant woman, or

5.4.4.5. the USACE RPO determines that monitoring is required.

5.4.5. All USACE monitored employees shall;

5.4.5.1. provide a completed form DD 1952 (Page H-8 of EM 385-1-80) to the DDC, as required by ER 385-1-80, and

5.4.5.2. wear an individual monitoring device as required by 385-1-80, and

5.4.5.3. provide initial and periodic bioassay samples to the DDC as required by ER 385-1-80 and this manual.

5.4.6. All USACE personnel who require access to radiological restricted areas shall comply with the requirements of the contractor radiation safety program in effect for that area. Site Safety and Health Plan training shall be provided to the USACE employee by the contractor responsible for the area prior to entry.

5.5. USACE Employee Dose Limits

5.5.1. USACE Employee St Louis District employees shall never exceed an annual dose greater than any USACE annual limits, as found in Table 1.

5.5.2. USACE Employee St Louis District employees shall never exceed an annual dose greater than any USACE St Louis District annual ALARA limits, as found in Table 1, without the prior written permission of the RPO.

5.5.3. Planned special exposures will not be permitted at the USACE St Louis District.

5.5.4. Persons under the age of 18 shall not be allowed occupational exposure to radiation on USACE sites.

5.5.5. Declared pregnant workers shall be limited to a fetal ALARA level of 40 mrem / month. Should this level be exceeded, the declared pregnant worker will receive immediate notification, and actions will be taken to reduce any further exposure.

Table 1
USACE Dose Limits

Body Part	USACE Annual Limits	USACE St Louis District Annual ALARA Limits
Whole Body	0.5 rem	0.1 rem TEDE
Individual Organ	5.0 rem	0.5 rem DDE + CDE
Lens of Eye	1.5 rem	0.15 rem
Skin or any Extremity	5.0 rem	0.5 rem SDE

5.6. USACE Employee Exit Requirements

5.6.1. Personnel exit monitoring with a frisker or other sensitive radioactive contamination monitor is required for USACE personnel prior to exiting radiological restricted areas. The selection of detection equipment shall be dependent upon the radiological hazard of concern. Instrumentation and release criteria shall be provided by the SPC.

5.7. Exposure Tracking

5.7.1. The DDC shall maintain a dosimetry file for each monitored USACE employee. The file should contain the monitored employees;

5.7.1.1. current radiation safety training record, as required,

5.7.1.2. a completed form DD 1952, and

5.7.1.3. internal and external exposure monitoring results, as applicable.

5.7.2. A visitor log documenting the name and address of USACE visitors who requires access to radiological restricted areas should be maintained by the DDC for any individual not monitored by the program.

5.8. External Monitoring

5.8.1. When external monitoring of USACE employees is required, the DDC shall ensure dosimetry is;

5.8.1.1. supplied by USAIRDC,

5.8.1.2. provided to the monitored individual with instructions for use, and

5.8.1.3. periodically forwarded to USAIRDC for evaluation, as required by ER 385-1-80.

5.8.2. Dosimetry issuance records shall be maintained in USACE St Louis District radiological safety files.

5.9. Internal Monitoring

5.9.1. DAC hour tracking is the primary mechanism of demonstrating compliance with USACE internal dose limits.

5.9.2. Internal dosimetry for USACE St. Louis District employees shall be coordinated with the USACE RPO and USAIRDC.

5.9.3. When internal monitoring is required, the DDC shall;

5.9.3.1. provide two polyethelyne one liter containers to the monitored USACE employee with instructions for use and return,

5.9.3.2. obtain the 24 hour void urine sample provided by the monitored USACE employee prior to entry into radiological restricted areas, and periodically thereafter,

5.9.3.3. label the sample containers with the individuals name and the date the sample was collected, and

5.9.3.4. forward the sample to a vendor for analysis.

5.9.4. The bioassay sample analytes, minimum detection level, and frequency of sampling shall be calculated for the expected source term encountered.

5.9.5. Fecal sampling and other internal monitoring methodology may be used at the discretion of the USACE RPO.

5.9.6. Sample results shall be maintained in USACE St Louis District radiological safety files and forwarded to USAIRDC.

5.10. Exposure Reporting

5.10.1. The DDC shall perform a quarterly review of USACE personnel exposures upon availability of dosimetry and bioassay results to ensure exposures are kept ALARA. Personnel exposures shall be also be evaluated against the exposure limits in ER 385-1-80.

5.10.2. Any exposure in excess of the ALARA limits found in section 5.5 of this manual shall be reported to the USACE RPO.

5.10.3. The DDC, in conjunction with USAIRDC, shall furnish monitored employees with exposure reports in accordance with ER 385-1-80. Exposure reports shall be furnished annually, within 30 days upon request, or upon termination.

5.11. Radiological Restricted Area Release Criteria

5.11.1. Adequate surveys using currently calibrated instrumentation shall be used to verify that all USACE tools and equipment used within a radiological restricted area only be unconditionally released when surface contamination levels are below the respective limits specified in Table 2.

Table 2.
Surface Contamination Limits

Nuclide[a]	Average[b,c]	Maximum[b,d]	Removable[b,e]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm^2	3,000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 dpm β-γ/100 cm^2	15,000 dpm β-γ/100 cm^2	1,000 dpm β-γ/100 cm^2

[a] Where surface contamination by both alpha and beta-gamma-emitting nuclides exist, the limits established for alpha and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination of objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

5.12. Site Surveillance and Postings

5.12.1. Site radiological surveillance and site postings shall be maintained, as required by ER-385-1-1, by the SPC.

5.12.2. Radiological surveillance is established to ensure compliance with applicable regulations while ensuring that radiation exposures are maintained ALARA.

5.12.3. Radiological surveys are performed with survey instruments calibrated for the types and ranges of radiation expected or actually present.

5.12.4. Radiological restricted areas are surveyed to determine posting requirements as defined in EM 385-1-1. General area measurements are made at twelve (12) inches (30 centimeters) from any relevant component or source. Surveillance schedules are maintained to assure compliance with EM 385-1-1.

5.12.5. Radiological restricted areas are posted and controlled to ensure that personnel in unrestricted areas will not receive greater than 2 mrem in any one (1) hour or 100 mrem total effective dose equivalent in one (1) year. Sites shall be posted in accordance with USACE EM 385-1-1.

5.12.6. Current radiological surveys shall be posted at entrances to radiological restricted areas to allow personnel accessing the area to maintain their exposures ALARA.

5.13. Site Routine Surveillance

5.13.1. The SPC is responsible for performing routine surveys (radiation, contamination, and airborne) in specified areas. Survey frequencies are established to adequately assess trends within the radiological restricted area and ensure adequate controls are being maintained to prevent contamination of areas outside of radiological restricted areas.

5.13.2. Routine surveys within the radiological restricted areas are sufficient to assess significant changes in radiological conditions, to provide a method for establishing controls, and to ensure proper controls already established are adequate.

5.13.3. Site general areas of contaminated soil shall be surveyed monthly when access is required, or at greater frequency dependent upon work activities.

5.13.4. Outside of radiological restricted areas of the site, surveys are routinely performed in areas used frequently by personnel who extensively work in the restricted areas of the site. Radiological restricted area exit points, assembly areas, support trailers and offices, lunch areas, and other high traffic areas should be surveyed weekly.

5.13.5. Areas outside, but adjacent to radiological restricted areas shall be surveyed quarterly.

5.13.6. All surveys shall be appropriately documented, with copies posted at the radiological restricted area access point.

5.13.7. Any survey which reveals results which are out of the ordinary shall be investigated to determine the cause of the abnormal results and the method for returning the area back to normal. The USACE RSO shall be informed of significant abnormal survey results and actions taken to correct the situation.

5.14. Effluent Monitoring

5.14.1. Stationary site effluent monitoring, as required by ER 385-1-80, shall be performed by the DEC.

5.14.2. Effluent air sampling shall be of sufficient sensitivity to determine that each USACE St Louis District radiological site is in compliance with the annual airborne particulate limit of 10 mrem.

5.14.3. Effluent air sampling should be accomplished in accordance with Regulatory Guide 8.25.

5.14.4. Radon monitoring shall be conducted to ensure Rn-222 releases do not exceed 20 pCi/m2/sec or 0.5 pCi/L above background in air.

5.14.5. All documentation of effluent monitoring shall be maintained in USACE St Louis District radiation safety files.

5.15. Radiation Accidents, Incidents, and Overexposure Investigations and Reporting

5.15.1. The USACE RPO will investigate and report any accidents, incidents, loss or theft involving radioactive material or radiation as required by EM 385-1-80.

5.15.2. Documentation of accidents, incidents, loss, or theft involving radioactive material or radiation shall be maintained in USACE St Louis District radiation safety files.

6. Recordkeeping

6.1. Audit reports, site effluent monitoring, incident reports, and USACE dosimetry files shall be maintained in USACE St Louis District radiation safety files in accordance with the Modern Army Record Keeping System, as required by ER 385-1-80.

Attachment 1

Contractor Radiological Safety Checklist

The checklists on the following pages address requirements for Radiation Safety and Control Programs required in the U.S Army Corps of Engineers Safety and Health Requirements Manual EM 385-1-1, and referenced regulations such as 10 CFR 20, 10 CFR 19, and 49 CFR.

The controlling documents for working with radioactive materials under contract with the USACE are:

EM 385-1-1 Department of the Army, U.S. Army Corps of Engineers Manual No. 385-1-1, Safety and Health Requirements

Sections
- 6.A Hazardous Substances, Agents and Environments - General
- 06.E Hazardous Substances, Agents and Environments - Ionizing Radiation
- 05.E Respiratory Protection

CEGS-01351 Guide Specification for Military Construction

10 CFR 20 Standards for Protection Against Radiation

10 CFR 19 Notices, Instructions, and Reports to Workers; Inspection

The "Requirement" column of the attached tables follows the USACE Manual. Where additional criteria specific to 10 CFR 19 or 20 are included, the applicable 10 CFR paragraph reference is provided. An example of a contractor document that would be considered acceptable for meeting the USACE and 10 CFR requirement is listed in the column labeled "Contractor Document Type (example)". In many cases other documents may be acceptable, assuming the necessary content and detail is provided to ensure compliance. Some of the documents may not be available until after the start of work {examples: NRC Form 4, and physician's certification for individuals to wear respiratory protection}. However, procedures that describe the requirements for these should be available for review to determine competency of the program.

CEGS-01351 describes the content of the Site Safety and Health Plan (SSHP). Only sections that are specific to radiation protection were included in these checklists.

Table of Contents

Acronyms

ALARA	As Low As Reasonably Achievable
DAC	Derived Air Concentration
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
EDE	Eye Dose Equivalent
EPA	Environmental Protection Agency
IRSC	Ionizing Radiation Safety Committee
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PPE	Personal Protective Equipment
RSO	Radiation Safety Officer
SDE	Shallow Dose Equivalent
TEDE	Total Effective Dose Equivalent
TODE	Total Organ Dose Equivalent
USACE	United States Army Corps of Engineers

Licenses / Permits and Authorizations Page 1 of 1		Contractor Document		
Regulation	Requirement	Type (example)	Doc #	Sat/ Unsat
EM 385-1-1 06.E.01 Hazardous Substances, Agents and Environments - Ionizing Radiation	Anyone who procures, uses, possesses, transports, transfers or disposes of regulated radioactive materials shall: a. Notify in writing the Designated Authority of the material, intended use, location and storage, and all transportation and disposal requirements. b. Secure appropriate authorization or permit if a licensed or DOD regulated radioactive material is to be used (a lead time of 45 days should be allowed for obtaining DOD authorization) c. Provide the Designated Authority a copy of all NRC or Agreement State licenses, Department of the Army Radiation Authorization (DARA), and reciprocity forms (to include NRC Form 241) *Comments:* *These requirements are interpreted to mean that to perform work on a site that contains radioactive material, the contractor must obtain authorization from the "Designated Authority" which should include submittal of a Radiation Protection Program (to cover the scope of work to be performed) for review and approval. If regulated radioactive material will be brought on site, (such as radiation sources greater than exempt quantities for calibration or performance testing of instrumentation) a license to possess the materials must be provided - reciprocity agreements for the license must also be demonstrated.*	Letter and Program DOD Authorization License(s) and Reciprocity Forms		

Qualified Personnel Page 1 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc #	Sat/ Unsat
EM 385-1-1 06E.02 Hazardous Substances, Agents and Environments - Ionizing Radiation	Qualified Personnel a. Operations involving... use of radioactive material ... shall be performed under the direct supervision of a **person** designated by the Radiation Safety Officer (RSO), who is **qualified and responsible for radiological safety**. This person shall conduct surveys, ... to assure compliance with radiation protection standards. b. **RSO technical qualifications** Formal Training in Physics of radiation; mathematics; biological effects; instrumentation; monitoring and surveying; radiation safety techniques and procedures; the use of time, distance and shielding; engineering controls; and PPE. Hands-On Training Knowledge of Regulations including NRC, EPA, DOE, DOT and DOE pertaining to radioactive materials, radiation generating devices, radioactive and mixed waste. Knowledge of USAEC radiation safety program, and record keeping requirements for work with radioactive materials.	1. Procedure for qualifying personnel 2. Technician resumes, work history, and degrees 3. Certificates of training ... 1. RSO Resume, work history, degrees, certificates of training.		

Qualified Personnel Page 2 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc #	Sat/ Unsat
USACE CEGS-01351 Guide Specification for Military Construction Section 1.11	The Guide Specification for Military Construction discusses the contents of the Site Safety and Health Plan. Section 1.11 discusses determining the need for qualified Safety and Health professionals. The guide specifies that a CIH will be required to serve as the Safety and Health Manager. The type of expertise is determined based on the type of remedial action involved. The need for additional expertise (CSP or CHP) should be considered. NOTE: Each CEGS may differ, they are edited prior to each contracting action.	Site Safety and Health Plan that describes the organization and individual qualifications.		

General Requirements - Hazard Evaluation Page 1 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.A.01 Hazardous Substances, Agents and Environments - Ionizing Radiation	06.A.01. c. ...comply with all applicable standards and regulations to reduce contaminant concentration levels as low as reasonably achievable ALARA. 06.A.02.b. Hazard evaluation Engineering and administrative controls shall be used to control hazards; in cases where engineering or administrative controls are not feasible, PPE may be used. 06.A.02.c. Certification of Hazardous Assessment shall include: work place and activity evaluated, name of person certifying the evaluation, date of the evaluation... 06.A.02.d. Program must be approved by the USACE designated authority before the start of Work. Program must include the routine evaluation by a "qualified industrial hygienist, or other competent person" of operations, materials and equipment...	ALARA Policy Statement AND/OR Procedure Respiratory Protection Policy Statement AND Procedures for Hazard Evaluation Procedure for Radiological and Hazardous Work Permit which includes review by a qualified Industrial Hygienist and Health Physicist		

General Requirements - Testing and Monitoring Page 2 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.A.03 Hazardous Substances, Agents and Environments - Ionizing Radiation	Testing and Monitoring a. Approved and Calibrated Testing Devices - labeled with person performing the calibration and calibration date b. Individuals shall be trained in monitoring procedures and hazards. Testing devices shall be maintained in accordance with manufacturer's instructions, a copy of which shall be maintained with the devices. c. Approved sampling and analytical methods shall be used; laboratories used for analysis shall be USACE validated and accredited by nationally recognized bodies for the type of analysis performed. d. Determinations of the concentrations shall be made by a... competent person. e. Records of monitoring shall be maintained on site and available to the USACE designated authority upon request.	Program Procedure describing instrument calibration requirements Training records for individuals using equipment. Procedure for operating instruments which requires manufacturer's manuals Contract laboratory selection procedure and documented proficiency Records Procedure		

Radiation Safety Program Page 1 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.03 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart B - Radiation Protection Programs §20.1101	a. A Radiation Safety Program shall be managed by an RSO and shall be based on principles that maintain occupational doses and doses to the public ALARA. An Ionizing Radiation Safety Committed (IRSC) shall be established in accordance with 10 CFR 20 and DOD regulations. The program shall be reviewed annually. 10 CFR 20.1101 (b) requires the use of procedures and engineering controls to achieve doses that are ALARA. 10 CFR 20.1101(d) requires ALARA air emissions (excluding radon and it's daughters) such that the highest dose to a member of the public will not exceed a total effective dose equivalent, TEDE of 10 mrem/yr. If this level will be exceeded on a NRC licensed site, a report shall be submitted to the NRC within 30 days describing the exceedance and the corrective action to ensure against recurrence.	Documented Radiation Safety Program, committee members, philosophy and policy statements. Evidence of the program annual review. Policy statements for ALARA and Respiratory Protection should be available Policy Statement on Emissions and procedure for compliance and reporting		

Radiation Safety Program Page 2 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.03 Hazardous Substances, Agents and Environments - Ionizing Radiation 385-1-1 06.E.03 b AND 10 CFR 19.12 Instructions to Workers	Instructions to Workers (06.E.03 b.) All persons entering an area where there is a potential for an individual to receive a TEDE of 100 mrem or more in a year shall receive instructions on: the material, health and safety problems associated with radiation exposure, potential effects of radiation on the fetus or embryo, precautions and exposure controls, use of dosimetry and instrumentation, the Radiation Safety Program, and the individuals rights and responsibilities.	Procedures and Lesson Plans for providing Instructions to Workers		

Radiation Dose Limits Page 1 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.04 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart C - Dose Limits	a. Occupational doses for adults shall meet the most limiting of the following annual limits: Total Effective Dose Equivalent, TEDE ≤ 5 rem Total Organ Dose Equivalent, TODE ≤ 50 rem Eye Dose Equivalent, EDE ≤ 15 rem Shallow (Skin) Dose Equivalent, SDE ≤ 50 rem Extremity Dose Equivalent, ≤ 50 rem Without written approval of the RSO, the annual dose limits shall not exceed 10% of the above limits. To keep Doses ALARA the USACE recommends the following administrative action levels Total Effective Dose Equivalent, TEDE ≤ 0.1 rem Total Organ Dose Equivalent, TODE ≤ 0.5 rem Eye Dose Equivalent, EDE ≤ 0.15 rem Shallow (Skin) Dose Equivalent, SDE ≤ 0.50 rem Extremity Dose Equivalent, ≤ 0.50 rem Compliance with requirements for summation of internal and External doses {10 CFR 20.1202} Determination of dose from airborne radioactive materials {10 CFR 20.1203}. Determination of internal exposure {10 CFR 20.1204}	1. Procedure describing the external and internal dosimetry programs as well as implementing procedures covering: 2. Issue, Use and Collection of Dosimetry 3. Dosimetry Termination, Records and Reports 4. Bioassay Sampling 5. Internal Dose Calculations 6. Approval for Exceeding Administrative Limits 7. Skin Dose Calculations 8. Summation of Internal and External Dose		

Radiation Dose Limits Page 2 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.04 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20.1206 Planned Special Exposures 10 CFR 20.1207 Occupational Dose Limits for Minors 10 CFR 20.1208 Dose to an Embryo/Fetus	06.E.04 (3) b. Planned special exposures shall not be used without the written consent of the RSO and the Ionizing Radiation Safety Committee. c. No employee under 18 years of age shall receive occupational exposure to ionizing radiation. {USACE policy} d. The dose to an embryo/fetus shall not exceed 0.5 rem during the entire gestation period.	The limit to minors is a USACE policy and could either be described in the dosimetry program procedure or in the SSHP, Site Safety and Health Plan Required by USACE CEGS-01351 The embryo/fetus limit should be provided in the dosimetry program procedure since this is also the limit in 10 CFR 20.		

Radiation Monitoring, Surveys and Dosimetry Page 1 of 4		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.05 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart F - Surveys and Monitoring §20.1501	a. Users of radioactive material... shall conduct surveys b. Instruments used for radiation monitoring and surveying shall be: (1) available (2) properly calibrated to a National Institute of Standards and Technology (NIST) traceable source (3) appropriate for the type and intensity of the radiation surveyed and (4) operationally checked using a dedicated source before each use. c. Users of radioactive material ....visitors... or workers shall coordinate with the RSO for appropriate dosimetry whenever: (1) an individual enters a Radiation Area (> 5 mrem/hr), or a High Radiation Area (> 100 mrem/hr) or a Very High Radiation Area (> 500 rad/hr) or (2) an individual has the potential to receive greater than 10% of any of the dose limits contained in 10 CFR 20.1201	1. Procedure for performing and documenting surveys 2. Instrument Program procedure which specifies the (a) instrument calibration requirements (b)the selection of instruments (c)operational checks prior to use. 3. Procedures for each instrument used.		

Radiation Monitoring, Surveys and Dosimetry Page 2 of 4		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.05 Hazardous Substances, Agents and Environments - Ionizing Radiation	d. All external dosimetry (with the exception of extremity dosimetry and pocket ionization chambers) shall be processed by a National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratory.	1. Procedure for Selection and Placement of Dosimetry		
10 CFR 20 §20.1501	10 CFR 20.1501(c)(2) further requires that the dosimetry processor be NVLAP approved for the type of radiation(s) that most closely approximates the type of radiation(s) for which the individual wearing the dosimeter is monitored.	2. Name and NVLAP certification for the Dosimetry Processor		
USACE CEGS-01351 Guide Specification for Military Construction Sections 1.15 and 1.16	Dosimetry requirements are contained in section 1.15 of CEGS-01351. The Site Safety and Health Plan, SSHP shall describe the radiation protection and dosimetry program. The following is required: 1. Dosimetry processor is required to hold a current accreditation from NVALP. 2. Documentation of previous exposure in accordance with 10 CFR 20.2104 for compliance with exposure standards prior to allowing the employee access to a restricted area. If the employee has no exposure history, the employee shall provide a signed statement. 3. Bioassays when the possibility of internal radioactive contamination exists *comment: documentation of previous exposure is covered under "Records" in these checklists*	Site Safety and Health Plan must include sections on Dosimetry, Bioassay, Documentation, and Reporting		

Radiation Monitoring, Surveys and Dosimetry Page 3 of 4		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.05 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20.1501 EM 385-1-1 06.A.03	10 CFR 20.1501 specifies that surveys must be performed which....evaluate (i) The extent of radiation levels; and (ii) Concentrations or quantities of radioactive material; and (iii) The potential radiological hazards that could be present 385-1-10 06.A.03 Requires Testing and Monitoring to be performed with NIOSH sampling and analytical methods, or other approved sampling and analytical methods. 06.E.05 e. Users of unsealed radioactive material shall institute an internal dosimetry program (1) when there is a potential for an individual to receive an internal dose of greater than 0.5 rem per year. (2) which is reviewed and approved by a qualified health physicist as defined by ER 385-1-92, and (3) provisions for pre-exposure bioassay, bioassay method capable of detecting 10% of an ALI for each radionuclide used, appropriate action levels for requiring additional bioassay, actions for individuals found to have internally deposited radionuclides and post-exposure bioassay	1. Procedure for Air Sampling and Analysis 2. Procedure for Use of Air Sampling Pumps and Filter Media 3. Procedure for Periodic Calibration of Sample Pump and Flow Meters with Filter Media 4. Procedure for Collection of Soils and Water 5. Procedures and Technical Basis Documents for Internal Dosimetry Program, including Dose-based Derived Investigation Levels and Derived Action Levels		

Radiation Monitoring, Surveys and Dosimetry Page 4 of 4		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
USACE CEGS-01351 Guide Specification for Military Construction Section 1.16	The Site Safety and Health Plan must include exposure monitoring and air sampling. The SSHP should include: - monitoring frequencies and durations - parameters monitored - monitoring locations - methods and instruments used - action levels	Site Safety and Health Plan with sections on monitoring and air sampling		

Access, Storage and Control Page 1 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.06 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart I Storage and Control of Licensed Material §20.1801 10 CFR 20 Subpart D Radiation Dose Limits for Individual Members of the Public 10 CFR 20 Subpart G Control of Exposure from External Sources in Restricted Areas	a. Design, construction, installation, storage, transportation and disposal must assure personnel exposures are kept ALARA b. ..Post signs and control access in accordance with 06.E.08 c. Where radiation levels exceed 2 mrem/hr, users shall use engineering controls, shielding, access time limitation, and/or physical separation to keep doses to the public ALARA d. . Secure radioactive material against theft or unauthorized use. e. Storage shall be in accordance with any license or permit requirements. f. Radioactive material not in storage shall be under constant control and surveillance. g. . shall conduct surveys to ensure that the public dose limit of 0.01 rem is not exceeded.	1. Procedure for ALARA review 2. Procedure for Access Control 3. Procedure for Personnel Survey and Decontamination 4. Procedure for Posting Radiologically Controlled Areas 5. Procedure for Storage of Radioactive Materials 6. Procedure for Source Inventory and Control 7. Procedure for Perimeter Surveys		

Access, Storage and Control Page 2 of 2		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.06 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart G Control of Exposure from External Sources in Restricted Areas	§20.1601 and §20.1602 (a) The licensee shall ensure that each entrance or access point to a high radiation area (> 100 mrem/hr) has one or more of the following: (1) control device which causes the radiation level to be reduced below 100 mrem/hr. (2) a control device that energizes a visible or audible alarm so that the individual entering and the supervisor are made aware of the entry. (3) entryways are locked, except during periods when access to the areas is required. *Comment: exceptions are listed within §20.1601 (b),(c), and (e)*			

Respiratory Protection and Other Controls Page 1 of 4		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.07 Hazardous Substances, Agents and Environments - Ionizing Radiation EM 385-1-1 05.E Personal Protective and Safety Equipment 10 CFR 20 Subpart H - Respiratory Protection and Controls to Restrict Internal Exposure.. §20.1701 §20.1702 §20.1703 §20.1704	a. ..to the extent practicable, institute process or engineering controls to limit concentrations of radioactive materials in air. b. Where process or engineering controls are unable to control airborne radioactive material concentrations, users shall increase monitoring and limit intakes through use of respiratory protection, or other controls c. The use of respiratory protection shall be in compliance with paragraph 05.E. of EM 385-1-1, and shall be limited by the protection factors listed in Appendix A of 10 CFR 20. 05.E Whenever respiratory protective equipment... is required, employers shall develop and implement a respiratory protection program. The program shall be in accordance with OSHA, ANSI Z88.2, and NIOSH for: a. selection, fit testing, use, maintenance and storage b. training of personnel required to use respiratory protective equipment. c. determining if employees are physically qualified A competent person shall develop and implement a written program. Qualifications shall be submitted to the designated authority.	Respiratory Protection Policy Statement Lesson Plans covering training of personnel on respiratory protection devices Procedure describing use and protection factors. Physicians Certification stating an individual is fit to wear respiratory protection		

Respiratory Protection and Other Controls Page 2 of 4		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.07 Hazardous Substances, Agents and Environments - Ionizing Radiation EM 385-1-1 05.E Personal Protective and Safety Equipment 10 CFR 20 Subpart H - Respiratory Protection and Controls to Restrict Internal Exposure.. §20.1701 §20.1702 §20.1703 §20.1704	05.E The medical status of individuals....shall be evaluated and a statement... provided from a qualified physician indicating... the individual is medically qualified to wear a... respirator. Respirators shall not be substituted for engineering ... controls without approval of the designated authority. Approved respiratory protective devices... shall be... used. Approved means the respirator and all of its component parts has been tested and listed as satisfactory by a competent authority (such as NIOSH or MSHA) to provide protection against a particular hazard. The respirator approval number, criteria for use, and limitations will appear on the respirator or its container. Written procedures shall include: a. Selection of respirators b. Fit testing c. Instruction on the proper use and maintenance d. Issuance of respirators e. Cleaning, disinfection, and storage of respirators f. Inspection and testing of respirators including testing immediately prior to each use g. Supervision and training h. Monitoring including air sampling and bioassays i. Record keeping j. Physician determination that the individual is fit to wear a respirator	Procedures for: a. selection b. fit testing c. instruction on use d. cleaning and disinfection f. inspection g. training h. monitoring i. air sampling j. bioassays k. record keeping		

Respiratory Protection and Other Controls Page 3 of 4		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
10 CFR 20 §20.1701 §20.1702 §20.1703 §20.1704	§20.1703(a)(4) The licensee shall issue a written policy statement on respirator usage covering: (i) use of process or other engineering controls, instead of respirators (ii) routine, nonroutine, and emergency use of respirators; and (iii) periods of respirator use and relief from respirator use. (5) The licensee shall advise each respirator user that the user may leave the area at any time for relief from respirator use (6) The licensee shall provide proper visual, communication, and other special capabilities when needed. §20.1703(b) In estimating exposure.. to airborne radioactive materials, the licensee may make allowance for respiratory protection equipment if all the above conditions are met and: (1) The licensee selects respiratory protection ... that provides a protection factor (Appendix A, Part 20) greater than the multiple by which peak concentrations of airborne radioactive materials are expected to exceed the values specified in Appendix B to Part 20, Table 1, column 3..... the licensee may select respiratory protection equipment with a *lower* protection factor only if such a selection would result in keeping the total effective dose equivalent ALARA. §20.1703(c) The licensee shall only use as emergency devices respiratory protection equipment that has been certified for emergency use by NIOSH/MSHA. §20.1703(d) The licensee shall notify, in writing, the... NRC at least 30 days before use.	Written Policy Statement Listing of types of respiratory protection devices, use, and NIOSH/MSHA certification Written notice of intent to use respiratory protection.		

Respiratory Protection and Other Controls Page 4 of 4		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
CEGS-01351 Guide Specification for Military Construction Section 1.13 Personal Protective Equipment	Guide Specification for Military Construction, Section 1.13 Personal Protective Equipment, describes the content of the Site Safety and Health Plan which must discuss PPE including respirators. Only NIOSH approved respirators shall be used.			

Signs, Labels, and Posting Requirements Page 1 of 1		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.08 Hazardous Substances, Agents and Environments - Ionizing Radiation	The RSO shall post in a conspicuous location signs bearing the standard radiation symbol and the following words: (1) "Caution, Radiation Area" for areas ≥ 5 mrem/hr and < 100 mrem/hr (2) "Caution, High Radiation Area" for areas ≥ 100 mrem/hr and < 500 rads/hr (3) "Grave Danger, Very High Radiation Area" for areas ≥ 500 rads/hr (4) "Caution, Airborne Radioactivity Area" for areas with concentrations > DAC from 10 CFR 20 App.B (5) "Caution, Radioactive Material" for rooms where quantities of exceed 10 times the 10 CFR 20 Appendix C quantities	Procedure for Posting Radiologically Controlled Areas		
10 CFR 20 Subpart J - Precautionary Procedures	§20.1904 Labeling Containers The licensee shall insure each container of licensed material is clearly labeled with "Caution, Radioactive Material". The label must also provide sufficient information to permit individuals to minimize exposure (such as radionuclides, activity, date, radiation level)			
10 CFR 19.11	§19.11 The RSO shall post an NRC Form 3 "Notice to Employees"			

Receipt of Radioactive Material Page 1 of 1		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.08 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20.1906	06.E.08 b. Users who receive.... a package containing radioactive material shall follow 10 CFR 20.1906, "Procedures for Receiving and Opening Packages" 10 CFR 20.1906 .... Material in excess of a Type A quantity, as defined in 10 CFR 71.4 shall receive the package from the carrier... §20.1906 (c) Perform receipt surveys within 3 hours after the package is received at the licensee's facility if it is received during normal working hours, or not later than 3 hours from the beginning of the next working day if it is received after working hours. §20.1906 (d) NRC and carrier notification is required if removable contamination in excess of 10 CFR 71.67(i) or external radiation levels exceed the limits of 10 CFR 71.47 §20.1906 (e) each licensee is required to establish and maintain written procedures	Procedure for receipt and opening of packages of radioactive material		

Radioactive Waste Disposal & Spill Control Page 1 of 1		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.09 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart K - Waste Disposal	a. Radioactive sealed sources (and gauges) ... may be returned (transferred) to the manufacturer. The USACE Command RSO must be notified and any applicable licenses or permits amended or terminated. b. Radioactive waste shall not be disposed of except through coordination with the designated authority (the USACE hazardous, Toxic and Radioactive Waste Center of Expertise). c. Tritium, and Carbon-14 used in liquid scintillation counting, at concentrations below 0.05 µCi/g may be disposed without regard to its radioactivity. (Note many liquid scintillation fluids are hazardous wastes and must be disposed of as such).	Procedure for Waste Collection and Disposal		
CEGS-01351 Section 1.18.3.1	The Site Safety and Health Plan must specify procedures for spill and discharge containment/control, which addresses radioactive wastes, prevention measures, PPE, disposal of contaminated material and the use of DOT approved containers for storage of materials.	Site Safety and Health Plan sections on spill control		

Records Page 1 of 3		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.10 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart L	a. All users... shall prepare and maintain records of the Radiation Safety Program for three years after termination of the license or permit. 10 CFR 20 §20.2102 requires records required by the Radiation Safety Program to be retained until the license requiring the record is terminated. Records required to be retained until license termination include: - Surveys used to determine dose in the assessment of individual dose equivalent. -Records of the results of measurements and calculations used to determine individual intake and assessment of internal dose. -Records showing the results of air sampling, bioassays and surveys required for the respiratory protection program. -Records of the results of measurements and calculations used to evaluate the release of effluents to the environment. Audits and reviews of the program are to be retained for 3yrs. Survey and calibration records shall be retained for 3 yrs.	1. Records Management Program 2. Records of audits and reviews of the program 3. Procedures which describe how surveys will be documented and records retained 4. Procedures for calculating and recording individual dose and records retention 5. Procedures for air sampling and analysis and record retention		

Records Page 2 of 3		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.10 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart L	b. For any individual... potentially exposed to 100 mrem/yr, the licensee shall maintain records to determine the individuals: (1) occupational dose during the year, (2) cumulative occupational radiation exposure (3) internal and external exposure 10 CFR 20 §20.2104 Determination or Prior Occupational Dose (c)(1)... the licensee may accept as a record of occupational dose for the current year, a written signed statement from the individual, or from the individual's most recent employer for work involving radiation exposure, that discloses the nature and amount of any occupational dose during the year. (c)(2)... the licensee may accept as a record of cumulative radiation dose and **up-to-date NRC form 4** signed by the individual and the individual's most recent employer for work involving radiation exposure, ...and... obtain reports of the individual's dose equivalent(s) from the most recent employer for work involving radiation exposure. §20.2106 Records of Individual Monitoring Results Each licensee shall maintain records of doses received to include where applicable: deep-dose equivalent, eye dose equivalent, shallow-dose equivalent to the skin, shallow-dose equivalent to the extremities, committed effective dose equivalent, total effective dose equivalent, and total organ dose equivalent to the organ receiving the highest dose. The records shall be made at least annually on an **NRC Form 5** .	Procedure for Recording Prior Occupational Exposure Written signed statements from individuals NRC form 4 for each individual Procedures for determining the annual record of individual monitoring which includes the NRC Form 5 and instructions		

Records Page 3 of 3		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.10 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart L	c. All users .... shall maintain records of all calculated or monitored radiation dose to members of the public 10 CFR 20 §20.2107 Records of Dose to Individual Members of the Public (a)... records sufficient to demonstrate compliance with the dose limit to members of the public. (b)... retain records until the Commission terminates each pertinent license.	Procedure or technical basis document for determining dose to members of the public		

Reports Page 1 of 1		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.11 Hazardous Substances, Agents and Environments - Ionizing Radiation 10 CFR 20 Subpart M 10 CFR 19 §19.13 Reports to Individuals	a. Any loss, theft, damage or overexposure shall immediately be reported to the RSO who will then file a report with the NRC in accordance with the requirements of 10 CFR 20. 10 CFR 20 contains numerous requirements for reports. The following sections describe when and what to report for abnormal occurrences: §20.2201 Reports of theft or loss of licensed material. §20.2202 Notification of incidents. §20.2203 Reports of exposures, ...levels, and concentrations exceeding the constraints or limits §20.2204 Reports of planned special exposures. §20.2205 Reports to individuals exceeding dose limits. b. Annual reports shall be issued by the RSO for each individual USACE radiation worker with the recorded or calculated dose assigned to the USACE individual for the year or specific work project. These shall be maintained in .. a manner that accumulated exposure can be determined at a future date. §20.2206 {*when applicable*} requires an annual report for each individual monitored (**NRC Form 5**) on or before April 30 of each year. §19.13 Reports to Individuals, requires the licensee to advise each worker annually (by NRC Form -5) on or before April 30 or within 30 days of request	Procedure(s) for reports and notifications		

Transportation Page 1 of 1		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.12 Hazardous Substances, Agents and Environments - Ionizing Radiation	Transportation shall comply with the requirements of DOT for transportation of radioactive materials contained in 49 CFR	Procedures for packaging, and transporting radioactive materials Individual qualifications		

Medical Surveillance Page 1 of 1		Contractor Document		
Regulation	Requirement	Type (example)	Doc. #	Sat/ Unsat
EM 385-1-1 06.E.13 Hazardous Substances, Agents and Environments - Ionizing Radiation CEGS-01351 Guide Specification for Military Construction- Section 1.11.4 Occupational Physician	a. Medical examinations are not routinely required before occupational exposure to ionizing radiation. For USACE personnel a medical examination shall be conducted in accordance with AR 40-5, when deemed necessary by a physician or referred by the RSO. b. All cases of overexposure and suspected ingestion or inhalation of radioactive materials shall be referred to a physician for examination The Guide Specification for Military Construction contains qualifications of the occupational physician which include certification in occupational medicine and familiarity with the site's hazards and project scope.	Administrative procedures for medical surveillance		

Cataloging Form

{Technical/Project Managers fill in C through G, K through Q. RM completes other fields}

A. Document ID Number: Assigned by database 00-334 B. *Further Information Required?*: ☐

C. *Operable Unit (Choose One):*

USACE	☒
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North County	☐
Madison Sites	☐
Inaccessible Areas	☐
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D. *Site (Optional):*

SLDS VPs	☐
Mallinckrodt	☐
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K. *Subject:/Title:* Radiation Safety Manual

L. *Author:* _____ M. *Author's Company:* SAIC

N. *Recipient(s):* _____ O. *Recipient(s) Company:* Fusrap

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