NOTICE

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Revised February 1989

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO 87108

UMTRA PROJECT

ENVIRONMENTAL, HEALTH, AND SAFETY PLAN

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Approved

Assistant Manager, Office of
Environmental Safety and Health

UMTRA Project Manager

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1.0 INTRODUCTION

1.1 SUMMARY

The basic health and safety requirements established in this plan are designed to provide guidelines to be applied at all UMTRA Project sites. Specific restrictions are given where necessary. However, an attempt has been made to provide guidelines which are generic in nature, and will allow for evaluation of site-specific conditions. Health and safety personnel are expected to exercise professional judgment when interpreting these guidelines to ensure the health and safety of project personnel and the general population.

1.2 POLICY

The U.S. Department of Energy (DOE) and its contractors shall take all reasonable precautions in the performance of the work to protect the health and safety of employees and the public and to protect the environment. The DOE and its contractors shall comply with all applicable Federal, state, tribal, and local health and safety regulations and requirements including, but not limited to, those established pursuant to the Occupational Safety and Health Act (OSHA). Exposures of workers and members of the public to radiological and non-radiological hazards shall be maintained as low as reasonably achievable (ALARA), using DOE/EV/1830-T5 as guidance.

1.3 SCOPE

This UMTRA Project Environmental, Health, and Safety (EH&S) Plan specifies the basic Federal health and safety standards and special DOE requirements applicable to this program. In addition, responsibilities in carrying out this plan are delineated. Some guidance on program requirements and radiation control and monitoring is also included.

An Environmental, Health, and Safety Plan shall be developed as part of the remedial action plan for each mill site and associated disposal site. Special conditions at the site which may present potential health hazards will be described, and special areas that should be addressed by the Remedial Action Contractor (RAC) will be indicated. Site-specific EH&S concerns will be addressed by special contract conditions in RAC subcontracts.

Specific requirements set forth in this is Environmental, Health, and Safety Plan are intended to provide uniformity to the UMTRA Project's health and safety programs for processing sites, disposal sites, and vicinity properties and, in all cases, to be consistent with known standards and regulations.

1.4 HEALTH AND SAFETY GOALS

1. ALARA goal for exposures of project personnel - exposures should not exceed the limit for the public of 100 mrem/year committed effective dose equivalent (CEDE) as per DOE Order 5400.xx.

2. ALARA goal for exposures of the public from project activity - exposures should not exceed 25 mrem/year CEDE.

3. Goal for non-radiological occupational exposures of project personnel - such exposures should be kept at or below 50 percent of the permissible exposure limits (PELs).

4. Safety goals for UMTRA Project personnel - there should be no fatalities; lost workday case, lost workday, and recordable injury incidence rates should be below the Albuquerque Operations Office (AL) and DOE average rates.

2.0 ORGANIZATION AND RESPONSIBILITIES

2.1 ORGANIZATION AND STRUCTURE

Lines of authority for health and safety management must be independent of those for operational management to assure that UMTRA Project health and safety functions are not overridden by operational concerns. Organizational charts shall be provided in EH&S documents prepared by the Technical Assistance Contractor (TAC) and the RAC to indicate the lines of authority for appropriate personnel.

Responsibilities of the UMTRA Project Office, the RAC, and the TAC are provided in the following sections.

2.2 UMTRA PROJECT OFFICE

The UMTRA Project Office, with the assistance of appropriate divisions of Albuquerque Operations Office (AL), shall:

(a) Issue an UMTRA Project Environmental, Health, and Safety Plan. The plan will be periodically revised to reflect current guidelines and experience gained.

(b) Identify which contractors are to be covered by this plan, and include the requirement for plan compliance in applicable contract.

(c) Conduct periodic health and safety audits of contractors in accordance with applicable DOE Orders, DOE good practices, and the UMTRA Project Environmental, Health, and Safety Plan, and issue Health and Safety Audit Reports (HSARs). Audits of contracting organizations shall be conducted initially, and repeated annually or more frequently when warranted.

(d) Act on employee concerns in accordance with procedures outlined in this plan.

(e) Consider, in contract renewal or in reviews of UMTRA Project contractor performance, violations of all prescribed health and safety standards, and the timing and manner of correction. Willful violation or refusal or failure to correct violations of environmental, health, and safety standards or regulations may be justification for contract termination.

(f) Evaluate each project to identify other local, state, tribal, or Federal agencies with health and safety responsibility and assure that contractors comply with all requirements.

(g) Issue guidance to UMTRA Project contractors and participate in the development of new environmental, health, and safety standards and implementation procedures or modification to existing standards to be issued by the DOE's Assistant Secretary for Environment, Safety, and Health.

(h) Review and evaluate requests for variance from this plan, as submitted by contractor organizations.

2.3 REMEDIAL ACTION CONTRACTORS AND SUBCONTRACTORS

All Remedial Action Contractors shall:

(a) Develop implementation procedures for the requirements set forth in this plan and any site-specific environmental, health, and safety issues identified prior to remedial action.

(b) Execute programs and policies in a manner that shall ensure compliance with the requirements set forth in this plan and the DOE Orders.

(c) Assure that required information is recorded and reported as required by DOE and AL Orders 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements.

(d) Submit requests for variance from the requirements of this plan to the UMTRA Project Manager.

(e) Identify subcontractors that are covered by this plan, and include the requirement for compliance with the plan in applicable subcontracts.

(f) Comply with the UMTRA Project Environmental, Health, and Safety Plan and any other regulatory requirements, and ensure that all of its subcontractors comply, as specified in the contract.

(g) Assist in revision of the UMTRA Project Environmental, Health, and Safety Plan.

(h) Develop specific programs to address requirements including, but not limited to, industrial hygiene, hearing conservation, hazard communication, respiratory protection, and heat stress.

(i) Ensure that adequate personal protective equipment is provided to and used by workers at UMTRA sites.

2.4 TECHNICAL ASSISTANCE CONTRACTOR AND SUBCONTRACTORS

The Technical Assistance Contractor shall:

(a) Maintain and revise the UMTRA Project Environmental, Health, and Safety Plan, as necessary.

(b) Develop an Environmental, Health, and Safety Plan as part of the remedial action plan for each remedial action site and associated disposal site, based upon requirements of this plan and requirements of other local, state, tribal, and Federal agencies Site conditions representing potential health hazards will be described.

(c) Ensure that required information is recorded and reported for the TAC and its subcontractors as required by DOE and AL Orders 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements.

(d) Submit request for variance from the requirements of this plan to the UMTRA Project Manager.

(e) Identify subcontractors that are covered by this plan, and include the requirement for compliance with the plan in applicable subcontracts.

(f) Comply with the UMTRA Project Environmental, Health, and Safety Plan, and ensure that all of its subcontractors comply with the plan, as specified in the contract.

(g) Assist the UMTRA Project Office by conducting health and safety audits of Remedial Action Contractor programs. Prepare Health and Safety Audit Reports (HSARs) based on the findings of health and safety audits. RAC programs will be compared to requirements in this document and to site-specific procedures and plans developed by the RAC.

(h) Develop specific programs to address requirements including, but not limited to, industrial hygiene, hearing conservation, hazard communication, respiratory protection, and heat stress.

(i) Ensure that adequate personal protective equipment is provided to and used by workers at UMTRA sites.

3.0 HEALTH AND SAFETY STANDARDS

3.1 APPLICABLE REGULATIONS

The contractor shall comply with all applicable Federal, state, tribal, and local health and safety regulations and requirements including, but not limited to, those established pursuant to the Occupational Safety and Health Act (OSHA). Special attention should be given to the following OSHA and other Federal regulations.

29 CFR Part 1910,	"Occupational Safety and Health Standards."
29 CFR Part 1926,	"Safety and Health Regulations for Construction."
49 CFR 172-174,	"DOT Transportation of Hazardous Material."
10 CFR Part 20,	"Standards for Protection Against Radiation" (as cited in this plan).
DOE Order 5480.1B,	Environmental Protection, Safety, and Health protection Program for DOE operations (as cited in this plan).
DOE Order 5480.11,	"Radiation Protection for Occupational Workers."
DOE Order 5400.xx	"Radiation Protection of the Public and the Environment."
DOE Order 5480.4,	Environment Protection, Safety, and Health Protection Standards.
DOE Order 5480.10,	"Industrial Hygiene Program for Contractor Employees."
DOE Order 5482.1B,	Environmental Protection, Safety, and Health Protection Appraisal Program
DOE Order 5484.1,	Environmental Protection, Safety, and Health Protection Information Reporting Requirements (as cited in this plan.)
DOE Order 5000.3,	Unusual Occurrence Reporting System.

3.2 RADIATION EXPOSURE STANDARDS

The contractor shall comply with the radiation exposure standards listed in Tables 3.1 and 3.2 unless state and/or local regulations take precedence. In all cases, exposures to workers and members of the public shall be as low as reasonably achievable (ALARA).

Table 3.1 Dose limits for members of the public[a]

A. DOSE LIMITS

1. All Pathways

The effective dose equivalent for any member of the public from all routine DOE operations[1] (natural background and medical exposures excluded) shall not exceed the values given below:

	Effective dose equivalent[2] mrem/year	(mSv/year)
Occasional annual exposures[3]	500	(5)
Prolonged period of exposure[3]	100	(1)

No individual organ shall receive a committed effective dose equivalent of 5 rem/year (50 mSv/year) or greater.

2. Air Pathway Only (Limits of 40 CFR 61, Subpart H)

	Dose Equivalent mrem/year	(mSv/year)
Whole body dose	25	(.25)
Any organ	75	(.75)

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1. Routine DOE operations means normal planned operations and do not include actual or potential accidental or unplanned releases.

2. Effective dose equivalent will be expressed in rem (or millirem) with the corresponding value in sievert (or millisievert) in parentheses.

3. For the purposes of these standards, a prolonged exposure will be one that lasts, or it predicted to last, longer than 5 years.

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[a] From DOE Order 5400.xx

Table 3.2 Occupational radiation exposure standards[a]

Radiation protection standards
limiting values for assessed dose to individual workers

Occupational	
Stochastic Effects	5 rem (annual effective dose equivalent)
Non-Stochastic Effects	
Lens of eye	15 rem (dose equivalent)
Extremity	50 rem (dose equivalent)
Skin of the Whole Body	50 rem (dose equivalent)
Organ or Tissue	50 rem (dose equivalent)
Unborn child of a Workers	
Gestation Period	0.5 rem (annual effective dose equivalent)
Planned Special Exposure	
Event Plus Annual Occupational Exposure	10 rem (annual effective dose equivalent)
Minors	One-tenth of occupational radiation protection standards.
Student	0.1 rem (annual effective dose equivalent)

[a] From DOE Order 5480.11.

4.0 PROGRAM REQUIREMENTS

4.1 ORGANIZATION AND STAFFING

The contractor having health and safety responsibilities at a site or associated vicinity properties shall have a qualified individual responsible for health and safety of the workers and public. This individual must be provided properly trained staff, and staff qualifications should be commensurate with the potential hazard and job size.

4.2 OPERATING PROCEDURES

Operating procedures shall be developed and documented for all activities where there is a significant health or safety risk and for activities necessary for quantitatively assessing radiological or industrial hygiene hazards. Examples are dosimeter issuance and control, air sampling and analysis, and control of personnel access.

4.3 WORKER TRAINING

A formal training program shall be provided to all workers. The training should be commensurate with the anticipated work hazard, and should include discussions of the UMTRA Project, industrial and radiological safety procedures, ALARA philosophy, emergency procedures, and the potential for encountering hazardous materials on the site. Industrial hygiene and respiratory protection training will be provided when appropriate. Practical demonstrations should be given when appropriate. Refresher training on a biannual basis is required by DOE Order 5480.11.

All personnel working in jobs involving possible radiation exposure shall be advised of NCRP Report 39 recommendations, indicating that the intent of the recommendations is to minimize exposure to embryos and fetuses. All such workers shall be advised of the biological risks to embryos and fetuses exposed to the various expected levels of ionizing radiation, and shall be made aware that specific efforts and attention should be taken to keep the exposure of an embryo or fetus to radiation or hazardous materials at the very lowest practicable level during the gestation period. The instructor shall also provide each worker with a copy of NRC Regulatory Guide 8.13, "Instructions Concerning Prenatal Radiation Exposure." Training sessions shall be scheduled at a frequency that assures health and safety protection of workers.

Each worker shall pass a written or oral examination with the results documented. The instructor shall discuss and provide workers with literature on the biological effects of radiation, when requested.

4.4 RECORDS AND REPORTING REQUIREMENTS

Each contractor shall notify the UMTRA Project Manager or cognizant DOE Operations Office Safety Programs Division (SPD) of any fatality or serious accident as required in DOE and AL Orders 5484.1. Serious accidents shall be investigated by the tribal, state, Federal, or local office having environmental, health, and safety jurisdiction.

Prior to initiating work, a work-related radiation exposure history (both internal and external exposures) shall be acquired and maintained for each employee working in a controlled area. Results of termination bioassays, if available, shall be obtained from the last employer where exposure to radioactive material occurred. If not available, consideration should be given to providing appropriate bioassays prior to permitting the employee to do radiation-related work.

The contractor shall be responsible for posting the OSHA applicability and employee reporting instructions, DOE Form F-5480.2. The contractor shall also be responsible for recording and reporting recordable illnesses and injuries in accordance with OSHA requirements Copies of these reports shall be forwarded to the UMTRA Project Manager or cognizant DOE Operations Office.* Recordable occupational accidents and illnesses are those defined in the Occupational Safety and Health Act of 1970, and set forth by the Occupational Safety and Health Administration in 29 CFR 1904.12(c), (d), (e), (f), and applicable parts of 1904.12(g).

When worker exposure monitoring is required per Sections 5.5 and 5.6 of this plan, all contractors shall be responsible for maintaining records of employees' exposures to radioactive or toxic materials or other harmful physical agents. Reporting of radiation exposures to DOE shall conform to the revised Radiation Exposure Information Reporting System (REIRS) as specified in DOE 5484.1. Worker notification shall be as required by DOE Order 5480.11.

Each contractor is required by DOE Order 5000.3 to notify the UMTRA Project Manager or cognizant DOE Operations Office of any unusual occurrence. An "unusual occurrence" is any unusual or unplanned event having programmatic significance such that it adversely affects or potentially affects the integrity of the site or the performance, reliability, or safety of the UMTRA Project, Notification of occurrences similar to the following is required:

(a) Any substantial degradation of a barrier designed to contain radioactive or hazardous material or any substantial release of radioactive or hazardous material past this barrier (e.g. overflow of a water treatment pond, tailings release into a stream or river, or tailings released beyond the site boundary).

* The term UMTRA Project Manager or cognizant DOE Operations Office is used in the plan for notification and reporting related to environmental, health, and safety activities. Reporting and notification to cognizant DOE Operations Office(s) are only intended for use where organizations conducting UMTRA Project work are contracted through DOE Operations Offices other than Albuquerque.

(b) Loss of control of radioactive material (e.g., a spill associated with a truck or train accident).

(c) Accidents involving the transport of radioactive or toxic materials.

(d) Any fire or explosion which affects the integrity of the site or project.

(e) Any condition resulting from natural events or man-made activities which substantially affects or threatens performance, reliability, or safe operation (e.g., site flooding, wind damage, soil stability problems, or personnel operating errors which create hazardous conditions).

(f) Any incidence of breach of access control by unauthorized personnel.

(g) Any acts of vandalism or major theft occurring at a site.

(h) Any release of contamination outside the controlled area, including personnel, equipment, and roadways

Reports of "unusual occurrence" shall be made according to the format in "Implementation Guidelines for Unusual Occurrence Reporting," May 29, 1985.

Each contractor shall submit a DOE Form 5484.xx, "Individual Accident/Incident Report", for each occurrence for which reporting is required under DOE 5484.1A, Environmental Protection Safety, and Health Protection Information Reporting Requirements. Forms will be submitted to the UMTRA Project Manager or cognizant DOE Operations Office, who in turn will forward copies to the Safety Programs Divisions, of the DOE Albuquerque Operations Office.

A central file of all enforcement inspections and reports along with violations and abatement actions shall be maintained by contractors for inspection by DOE.

A central file shall be maintained, by the cognizant DOE Operations Office, of formal employee health and safety complaints and their disposition. Upon request, these shall be made available for inspection by affected employees or their authorized representative.

4.5 COMPLAINTS

Employees are encouraged to report to the contractor, either directly or through their authorized employee representative, any conditions or practices which they consider detrimental to their health or safety or which they believe are in violation of applicable health and safety standards. Such complaints may be made orally or in writing.

Any employee, or representative of employees, who believes that a condition or practice with potential for physical harm, or a violation of a health or safety standard exists, may request an inspection by filing a complaint directly with the local agency having health and safety responsibility.

Any employee or authorized representative of employees who believes that an imminent danger exists with the potential to cause death or serous physical harm is encouraged to bring this matter to the immediate attention of the appropriate contractor, supervisor, or designated official for resolution. In the event of inadequate corrective action, the employee and/or authorized representative may also contact the local agency having jurisdiction, the DOE UMTRA Project Office, or the cognizant DOE Operations Office by telephone and set forth with reasonable detail the basis for their request for an immediate inspection.

The DOE, upon receipt of a complainf of inaction concerning alleged imminent danger or upon receipt of notice of alleged imminent danger, shall immediately ascertain whether there is a reasonable basis for the allegation. If it appears to have merit, the DOE shall dispatch an inspector to the workplace involved. When an immediate inspection cannot be made, the DOE shall contact the contractor immediately, gather the pertinent details concerning the situation, and if necessary, have affected employees removed from the danger area. The DOE shall ascertain what steps, if any, the contractor intends to initiate in order to eliminate the danger. The DOE shall conduct appropriate follow-up activities.

4.6 POSTING

Each contractor shall post DOE Form F-5480.2, "Occupational Safety and Health Protection," a poster outlining contractor responsibilities to provide safety and health protection. Each contractor shall also have available in the workplace DOE Form F-5480.4, "Occupational Safety and Health Complaint," a form to be used in reporting violations.

The forms required by this part shall be posted in a sufficient number of places to permit employees working in or frequenting any portion of the workplace to observe a copy on the way to or from their place of employment.

4.7 INTERNAL AUDIT PROGRAM

An internal audit committee made up of the Remedial Action Contractor's health and safety manager, and other managers as appropriate, shall be established to periodically review the health and safety operations and related procedures. A report of this review, recommendations, and follow-up shall be maintained and available for review by DOE.

4.8 RESTRICTIONS

A worker under age 18 shall neither be employed in, nor allowed to enter, controlled areas in such a manner that they will receive doses or radiation in amounts exceeding the standards for minors in Table 3.2.

Administrative limits (developed for each site by the site health physics management) shall be used to assure that workers do not exceed the quarterly or annual limits specified in Table 3.2. If administrative limits or standards are exceeded, workers who were potentially exposed to the elevated levels of radiation shall be placed on work restrictions until the end of the period of concern. Also, the work environment and work procedures will be investigated to ensure that the ALARA program is being properly implemented.

5.0 RADIATION CONTROL AND MONITORING

5.1 CONTROLLED AREAS

Controlled areas shall be established at processing sites, disposal sites, and vicinity properties to protect workers and the general public from unnecessary radiation exposure contamination. Controlled areas include, but are not limited to, any work areas which meet any of the following criteria:

- o Tailings exist in an area such that the Ra-226 concentration, averaged over a 75 foot by 75 foot area, exceeds 200 pCi/g.
- o The estimated external gamma dose equivalent to any individual in that work area exceeds 500 millirem/year (Table 3.1).
- o Airborne concentrations of radionuclides exceed the derived concentrations guides (DCG) in DOE Order 5400.3 (draft) Attachment 1.
- o Transferable surface contamination exceeds 1000 dpm alpha per 100 sq cm (NRC Regulatory Guide 1.86 and DOE Order 5400.3 (draft)).

Access to these areas shall be controlled for people, vehicles, and equipment by fencing the area or using other methods to prevent inadvertent exposure to contaminated materials.

Smoking, chewing, drinking, and eating are prohibited in controlled areas.

Access may also be restricted at construction areas which do not meet the "controlled area" criteria if it is necessary to protect the public from potential construction hazards.

5.2 POSTING

Controlled areas at processing sites and disposal sites must be conspicuously marked at points of potential access with a sign bearing the radiation symbol and the words:

CAUTION
RADIOACTIVE MATERIAL

Controlled areas at vicinity properties may instead utilize other signs which indicate that potentially hazardous materials or conditions exist in the area, and that access in restricted for the general public.

All other applicable posting and labeling requirements set forth in 10 CFR 20 and DOE Order 5480.11 must be followed.

5.3 PERSONNEL AND EQUIPMENT MONITORING

All personnel leaving controlled areas that shall be monitored with appropriate instrumentation. Contamination on personnel, as indicated by any detection of contamination above natural background levels, will be removed prior to leaving the site. A personnel contamination log shall be maintained to document monitoring results and decontamination measures. Monitoring instruments must be able to reliably detect less than 500 dpm/100 sq cm of the appropriate radiation type. Appropriately trained personnel may monitor themselves.

Tools and equipment that are potentially contaminated with mill tailings and are to be released for unrestricted use shall be monitored and decontaminated, if necessary, before release. Release limits, for natural uranium and its daughters, as specified in NRC Regulatory Guide 1.86 and DOE Order 5400.3 (draft), are 5000 dpm alpha per 100 sq cm (average), 15,000 dpm alpha per 100 sq cm (maximum) and 1000 dpm alpha per 100 sq cm (removable). If conditions are such that alpha contamination may be temporarily shielded (e.g. wet & muddy), beta gamma monitoring is acceptable. The uranium decay series produces about 0.7 beta-gamma decays for every one alpha decay, even if 85 percent of the uranium is removed. Therefore, if contamination is monitored with beta-gamma instruments, the measured levels should be only 0.7 of the specified alpha levels to insure that the alpha limits are not exceeded. In all cases, an extensive effort shall be made to reduce contamination levels to levels as low as reasonably achievable (ALARA). Site specific release limits may be necessary in areas where specific alpha emitters such as Ra-226 or Th-230 are found without appreciable amounts of the other uranium daughter isotopes. All vehicles shall be cleaned of all visible soil prior to leaving controlled areas. The following criteria shall then be applied to a representative fraction (not less than 10 percent) of the vehicles:

> For vehicles potentially in contact with material having elevated Ra-226 concentrations, the tires (and cab interior, if potentially contaminated) shall be monitored and decontaminated to meet the limits described above. Appropriate spot checks shall be made of other potentially contaminated truck surfaces.

When contamination in excess of the limits is found, a more extensive monitoring program shall be implemented.

5.4 PROTECTIVE CLOTHING AND CHANGE FACILITIES

A change facility including lockers and a shower shall be provided when construction activities begin at a processing site, to serve workers wearing protective clothing or requiring decontamination. In the case of vicinity properties, a central facility shall be provided to serve many properties in a general area.

Protective clothing shall be made available to workers in contaminated areas at the discretion of site health physics personnel.

Appropriate precautions shall be applied by health physics personnel on a case-by-case basis for visitors and management personnel.

5.5 DOSIMETRY AND BIOASSAY

External Radiation. Personnel dosimetry programs shall be adequate to demonstrate compliance with radiation protection standards (DOE Order 5480.11). Personnel dosimeters shall be routinely calibrated and maintained and shall meet the requirements of the DOE Laboratory Accreditation Program for Personnel Dosimetry as specified in DOE Order 5480.15. Personnel dosimetry shall be provided to radiation workers who have the potential to exceed any one of the following (background exposure excluded):

1. 100 mrem (0.001 sievert) annual effective dose equivalent to the whole body.

2. 5 rem (0.05 sievert) per year to the skin.

3. 5 rem (0.05 sievert) per year to any one of the extremities.

4. 1.5 rem (0.015 sievert) per year to the lens of the eye.

Internal Radiation. Internal dose evaluation programs (including routine bioassay programs) shall be adequate to demonstrate compliance with radiation protection standards. Programs are required for radiation workers exposed to surface or airborne radioactive contamination such that the worker may receive 0.1 rem (0.001 sievert) annual effective dose equivalent from intakes of all radionuclides occurring during the year, or if any organ or tissue dose equivalent may exceed 5 rem (0.05 sievert) per year.

5.6 RESPIRATORY PROTECTION/AIR SAMPLING

Dust suppression techniques, such as vehicle speed control and/or water spray, shall be used to minimize airborne particulates. Respiratory protection devices will only be employed when all reasonable efforts to minimize airborne particulates fail to maintain airborne concentrations at acceptable levels (based on assumed Ra-Th equilibrium, the soluble Th-230 limit and OSHA dust permissible exposure limit).

Representative air-particulate sampling for radionuclides in work areas shall be required when significant quantities of soils averaging 50 pCi/g Ra-226 or greater are exposed during the work shift.

Representative radon daughter concentration (RDC) measurements shall be made in the work environment when work is performed in poorly ventilated conditions.

If respirators are used, radiological protection factors other than 1.0 are acceptable only for respiratory protection programs in full compliance with "Practices for Respiratory Protection," ANSI Z88.2-1980.

5.7 TRANSPORT OF CONTAMINATED MATERIAL

The DOE and all contractors shall comply with the applicable state or Federal regulations regarding the transportation of contaminated material. Site-specific determination of the levels of radioactivity associated with tailings and tailings contaminated material shall be made. If levels do not exceed 2000 pCi/g, the material does not meet the Department of Transportation's definition of "Radioactive Material," and trucks and railroad cars are not required to be placarded.

Site-specific procedures shall be developed for transporting contaminated material to a disposal site. As a minimum, all trucks or train car hauling contaminated material shall be tarped or otherwise covered for transit to eliminated potential tailings loss. All visible contaminated material shall be removed from the exterior. The vehicles shall be monitored according to guidance given in Section 5.3.

6.0 INDUSTRIAL HAZARDS CONTROL

6.1 INDUSTRIAL HYGIENE

A systematic approach shall be used for industrial hazards control. This approach should include a uniform documentation system to allow efficient review and auditing of the records.

A documented general industrial hygiene survey (GIHS) shall be done for each work place or job site. This survey should classify all jobs at the location, determine the number of workers in each job classification, consider all potential worker exposures (material or physical agent), and list proposed control methods for anticipated exposure materials/agents.

Information from the general industrial hygiene (IH) survey and experience from similar job sites should be used to develop an initial IH sampling plan. Sampling for specific exposure materials/agents should be based on the number of workers in each job classification, the toxicity classification of the exposure material/agent, and experience from similar operations. The sampling plan can be adjusted for specific site work schedules (e.g. 9 month construction season versus 12 months for industrial operations) and should insure that seasonal and work variations are sampled.

Monitoring is required when exposures to any material/agent are expected to average 25 percent or more of the applicable permissible exposure limit (PEL) or threshold limit value (TLV). Initial monitoring may be necessary to assess exposure potential or to comply with specific regulations.

Monitoring equipment shall be calibrated using written procedures. The calibrations shall be documented in calibration logs. Information and data generated during sampling shall be documented on sample field sheets or equivalent forms. Documentation of laboratory analyses of IH samples should include both sample analysis requests and certificates of analysis.

Field data, laboratory results, and calculated monitoring results should be documented on IH sample summaries. Periodically, written summaries of exposures by job classification should be prepared. Periodic exposure summaries and updated GIHSs are used to develop recommended IH sampling programs for the next year.

At least annually, the feasibility of engineering controls to reduce exposures should be considered. This review shall be documented and feasible controls should be applied.

If feasible engineering or administrative controls are not sufficient to reduce exposures to acceptable levels, worker protection programs shall be instituted. Worker protection programs include respiratory protection programs, hearing conservation programs and personnel protective equipment programs. Respiratory protection programs shall be in compliance with ANSI Z88.2-1980, "Practices for Respiratory Protection."

Some of the more significant non-radiological exposure materials that may be encountered at UMTRA Project sites are crystalline silica, asbestos, uranium (as a toxic chemical), sulfuric acid, nitric acid, carbon monoxide (from power equipment), petroleum products, ammonia, metal fume (from demolition), chlorate compounds, and PCBs. Significant exposure agents may include noise, cold, IR/UV (from solar exposure), and heat stress.

6.2 EXPOSURE LIMITS

Exposure limits used shall be either OSHA PELs (29 CFR 1910 or 1926) or the current ACGIH TLVs, whichever are more stringent. The noise exposure limits in the DOE-AL prescribed noise standard, AF 161-35, shall be complied with.

6.3 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment shall be provided based on projected need. Such apparatus may include respirators, safety glasses or goggles, hearing protectors, coveralls, hardhats, gloves, shoe covers, rubber boots, or safety shoes.

6.4 FIRE SAFETY

Contractors shall maintain a fire prevention and control effort appropriate for the needs at the site. Training shall be provided to employees. Where appropriate, fire extinguishers shall be provided and maintained and employees instructed in their use. Good housekeeping practices and proper storage of flammable and combustible materials and liquids shall be required.

6.5 CONSTRUCTION SAFETY

Management shall assure that all provisions of 29 CFR 1926 are addressed prior to initiating any construction activity. Particular attention shall be paid to Excavations, Trenching, and Shoring (Subpart P); Signs, Signals, and Barricades (Subpart G); Motor Vehicle, Mechanized Equipment, and Marine Operations (Subpart O); Electrical (Subpart K); and Power Transmission and Distribution (Subpart V). All management shall be familiar with the requirements and direct the workers accordingly.

6.6 SANITATION

Toilet facilities shall be provided in accordance with 29 CFR 1926.51.

Potable water for drinking and for washing prior to eating shall be provided for all employees. Employees shall not eat, drink or smoke in areas where there is the possibility of exposure to radioactive or hazardous materials above their PELs.

6.7 HAZARD COMMUNICATION

Hazard communications programs as specified in 29 CFR 1910.1200 shall be developed and instituted by UMTRA Project contractors (DOE Order 5480.4). The programs should include maintenance of a materials list for each site, procurement and use of material safety data sheets for site materials, training of and communication with workers, and the use of hazard communication information as input to the industrial hygiene program.

Industrial hygiene sampling results should be communicated to affected workers. Employees shall be notified in writing when sampling results indicate they may have been over-exposed. Documentation of these over-exposure notifications shall be kept in employees' files.

7.0 ENVIRONMENTAL MONITORING

An environmental monitoring program shall be conducted at all processing sites and disposal sites. Additionally, at large vicinity properties with tailings Ra-226 concentrations of 200 pCi/g or more averaged over an area of 75 feet by 75 feet, routine grab sampling will be conducted to determine if a more intensive monitoring program is warranted. Data collection at the sites requiring monitoring shall be done prior to construction in order to characterize the pre-remedial action radiation levels. Monitoring during remedial action shall be performed to ensure that the nearby population does not receive radiation dose equivalents greater than those presented in Table 3.1, and that potential releases from the site are kept at ALARA levels.

The environmental monitoring program is designed to monitor non-radioactive particulate concentrations in air, radionuclide concentrations in air and in surface water where applicable, and groundwater at processing sites and disposal sites. The justification for the choice of environmental sampling locations shall be documented for each remedial action environmental monitoring program. Monitoring requirements are described in the following sections. Additional requirements may result from the permitting processes outlines in the remedial action plan for processing sites.

7.1 PARTICULATES

The following criteria are provided as guidance in selecting sampling locations for environmental particulate sampling:

- Site boundary, predominant upwind direction.
- Site boundary, predominant downwind direction.
- Nearest off-site occupied structure.
- Nearest occupied residence.
- Locations of particular interest to the local community.
- Background locations.

When environmental monitoring is required, continuous air particulate sampling shall be performed at points around this site or property boundary during periods of major activity. The choice of sampling locations should take into consideration meteorological conditions, site topography, and site locations where activities will be concentrated.

Gross activity measurements shall be compared to the DOE Order 5400.xx limit for Th-230, 4E-14 uCi/ml. Where radionuclides other than Th-230 are of particular concern, such as uranium in yellowcake areas of former mill buildings, appropriate analyses shall be conducted and results compared with applicable standards. Continuous air particulate sampling may also be required for non-radioactive material such as those that might be specific in air quality permits or be of concern to health.

Sampling methods and equipment used for environmental sampling of particulates should be capable of yielding results with a lower limit of detection (LLD) no greater than 25 percent of the MPC or PEL being monitored for. The LLD should be calculated following the guidance in Appendix B of NRC Regulatory Guide 8.30 (June, 1983). Calculations of LLDs shall be documented.

7.2 RADON

For sites and vicinity properties meeting the requirements in paragraph 7.0, monitoring for Rn-222 shall be performed at or near the site boundaries. During the period of remedial action construction, radon monitoring locations shall be located at areas downwind from the site. Additionally, at least one sampler shall be located at an area not influenced by site operations to determine background radon concentrations.

Guidance for Rn-222 sampling at UMTRA Project processing sites shall be provided in the "Generic Radon Monitoring Plan for the UMTRA Project Sites." Grab sampling techniques may be used to determine radon concentrations around vicinity properties requiring environmental monitoring.

7.3 WATER

Surface waters caught in catch basins, shower water in catch tanks, and any other potentially contaminated water shall be sampled and analyzed prior to release from the site. Gross alpha measurements may be used to assure that the concentrations of radionuclides are below acceptable release criteria providing the gross measurement is less than the most restrictive radionuclide. Parameters as required by the National Pollutant Discharge Elimination System (NPDES) permit shall be monitored prior to release. In the absence of other radiological release limits, releases are permitted if concentrations do not exceed derived concentration guides (DCGs) specified in DOE Order 5400.xx. For former processing sites, pre-operational, operational, and post-operational samples of water and sediment from nearby streams and in some cases, monitoring wells, shall be taken and analyzed for radiological constituents and for hazardous chemical constituents as required by applicable permits. Groundwater monitoring shall be instituted, as appropriate, to comply with groundwater regulations.

7.4 METEOROLOGICAL DATA

For sites where adequate local meteorological data are not available from another source, the remedial action contractor shall obtain wind speed, wind direction, and stability data for the period of remedial action. The meteorological parameter data shall be stored for potential subsequent evaluation of environmental monitoring data.

7.5 SOIL SAMPLING

During site characterization, numerous soil samples are collected for radiological analysis. Some of these soil samples should also be analyzed for heavy metals and metalloids to generate information on which metals should be monitored during the remedial action. Some of the verification soils samples taken after completion of remedial action should also be analyzed for heavy metals to verify that they are at acceptable levels in the remediated soil.

8.0 EMERGENCY PROCEDURES

Site-specific emergency procedures are to be developed by the RAC prior to remedial action. The emergency procedures should indicate a severe weather action plan for those sites where there is a potential for significant dispersion of contaminated material through wind or water erosion. The procedures should include a truck or train accident/spill response section and an emergency medical assistance section. Medical and first-aid supplies and telephone/radio contact numbers for all emergency response personnel and organizations should be provided.

Procedures should take into account the roles and responsibilities of state/tribal and local emergency response agencies, the UMTRA Project Office, and the DOE/AL operations Office. In the event of a significant emergency, the DOE-UMTRA Project Office should be notified promptly. The names and numbers of these individuals shall be provided to the contractors. Contact should be made with state health department agencies to coordinate what activities are allowable by the contractor in advance of health department personnel arrival at the scene of an accident. Nearby hospitals and fire department should be briefed on what might be expected in terms of radioactive or toxic materials during their involvement with remedial action accidents.

Portions of emergency response procedures should be routinely exercised to determine if they are adequate and can provide a timely response.

END

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