Radiation Health and Safety Plan

Remedial Construction Services, L.P. (Recon)
Thorium Remediation Project
Tulsa, Oklahoma

Revision 01

April 2004

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Table of Contents

	Page
1.0 Purpose	1
2.0 Scope	2
3.0 References	3
4.0 ALARA	5
5.0 Radiation Safety Organization and Responsibilities	6
5.1 Recon Project Manager	6
5.2 Recon HPA/RSO	6
5.3 Assistant RSO (Lead HP Technician or other designee)	7
5.4 Recon Health and Safety Supervisor	7
5.5 Recon Site Personnel/Individual Workers	7
5.6 Visitors 8	
5.6.1 Visitor Activities	8
5.6.2 Visitor Responsibilities	9
5.6.3 Prohibited Activities	9
5.6.4 Exposure Control	9
5.6.5 Personal Protective Equipment	9
5.6.6 Decontamination	9
6.0 Radiation Protection Program Elements in Recon Radiological Plans	10
6.1 Plans and Procedures	10
6.2 Training	10
6.2.1 General Radiation Safety Training/Monitoring	10
6.2.2 Site Orientation	10
6.2.3 Site-Specific Training	10
6.2.4 Training Verification and Documentation	11
6.3 Work Zones and Access Control Points	12
6.4 Radiation Exposure Control	15
6.5 Personnel External Exposure Monitoring	17
6.6 Internal Exposure Monitoring	18
6.7 ALARA	19
6.8 QA/QC Program	19
6.9 Radiation and Contamination Surveys	20
6.10 Airborne Radioactivity Control	22
6.10.1 Locating Air Sampling Equipment	22
6.11 Respiratory Protection Program	23
6.12 SWP and Work Controls	24
6.13 Emergency Action Procedure	24
6.14 Posting and Labeling	24
6.15 Records and Reports	25

Table of Contents
(Continued)

Page

Attachments:

Attachment 1	Safe Work Permit (SWP)
Attachment 2	RHASP Acceptance Form
Attachment 3	NRC Form 3
Attachment 4	Access Control Log
Attachment 5	Entrance/Unrestricted Release Form
Attachment 6	NRC Release Limit Criteria
Attachment 7	Area Survey Form
Attachment 8	NRC Form 4

Radiation Health and Safety Plan
Remedial Construction Services, L.P. (Recon)
Thorium Remediation Project
Tulsa, Oklahoma

1.0 Purpose

The goals of the Radiation Health and Safety Plan (RHASP) are to minimize the potential exposure to radiation of employees, contractors, visitors, and the general public as a result of working with and around radioactive materials and to demonstrate compliance with applicable laws and regulations related to radiation protection and control of radioactive materials. This RHASP has been developed to guide generation and implementation of Recon radiation safety plans and procedures and to ensure that plans and procedures to implement radiological controls for workers, visitors, and the general public are developed commensurate with the risks associated with Thorium Remediation Project at the Kaiser Aluminum & Chemical Corporation (Kaiser), Tulsa, Oklahoma facility. Reference to the Kaiser site refers to the areas to be remediated and Remedial Construction Services, L.P. (Recon) support areas. Additional work plan contents are described in Sections 9.2.4, 10.0, and 11.0 of the Kaiser Decommissioning Plan (DP). Information about the current radiological status of the Kaiser facility is provided in Section 4.0 of the Kaiser DP and DP Addendum.

2.0 Scope

This RHASP is designed to supplement an Environmental Health and Safety Plan (EHASP), Environmental Monitoring Plan (EMP), and Quality Assurance/Quality Control Plan (QA/QC Plan) and all other Recon prepared plans and applies to all Recon personnel, visitors, and employees at the Kaiser Tulsa, Oklahoma facility. In preparing the EHASP, EMP, QA/QC Plan, and all other plans, Recon shall address all the elements described in this RHASP, the Recon Environmental Health and Safety Plan, and Quality Assurance Plan.

3.0 References

(1) Decommissioning Plan, Tulsa Facility, Tulsa, Oklahoma, Kaiser Aluminum & Chemical Corporation, Revised May 2003.

(2) Decommissioning Plan Addendum, Tulsa Facility, Tulsa, Oklahoma, Kaiser Aluminum & Chemical Corporation, Revised May 2003.

(3) Adjacent Land Remediation Plan for Kaiser Aluminum & Chemical Corporation, Tulsa, Oklahoma, Rev. 1, July 1999.

(4) Environmental Health and Safety Plan, Kaiser Aluminum and Chemical Corporation, Tulsa, Oklahoma, Rev. 3, October 2003.

(5) Quality Assurance Plan, Kaiser Aluminum and Chemical Corporation, Tulsa, Oklahoma, Rev. 2, October 2003.

(6) Title 10, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports for Workers; Inspection and Investigations."

(7) Title 10, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation."

(8) Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."

(9) Title 29, Code of Federal Regulations, Part 1910, "Occupational Safety and Health Standards."

(10) Title 29, Code of Federal Regulations, Part 1926, "Safety and Health Regulations for Construction."

(11) ANSI N323 - American National Standard Institute, "Radiation Protection Instrumentation Test and Calibration," N323-1978, 1978.

(12) Information Notice 96-18, Compliance with 10 CFR Part 20 For Airborne Thorium, dated March 25, 1996.

(13) Information Notice 96-28, Suggested Guidance Relating to Development and Implementation of Corrective Action, dated May 1, 1996.

(14) National Council on Radiation Protection and Measurements Report 127, Operational Radiation Safety Program, 1998.

(15) U.S. Nuclear Regulatory Commission, Regulatory Guide 8.21, Health Physics Surveys for Byproduct Material at NRC-Licensed Processing and Manufacturing Plants, Revision 1, October 1979.

(16) U.S. Nuclear Regulatory Commission, Regulatory Guide 8.25, Air Sampling in the Workplace, Revision 1, June 1992.

(17) U.S. Nuclear Regulatory Commission, Regulatory Guide 8.7, Instructions for Recording and Reporting Occupational Radiation Exposure Data, Revision 1, June 1992.

(18) U.S. Nuclear Regulatory Commission, Regulatory Guide 8.34, Monitoring Criteria and Methods to Calculate Occupational Radiation Doses, July 1992.

(19) U.S. Nuclear Regulatory Commission, Regulatory Guide 8.36, Radiation Dose to the Embryo/Fetus, July 1992.

(20) U.S. Nuclear Regulatory Commission, Regulatory Guide 8.9, Rev. 1, Acceptable Concepts, Models Equations, and Assumptions For A Bioassay Program, Revision 1, July 1993.

(21) U.S. Nuclear Regulatory Commission, NUREG-1460, Guide to NRC Reporting and Recordkeeping Requirements, Rev. 1, July 1994.

(22) U.S. Nuclear Regulatory Commission, NUREG-1506, Measurement Methods for Radiological Surveys in Support of New Decommissioning Criteria, 1995.

(23) U.S. Nuclear Regulatory Commission NUREG-1507, Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions, 1997.

(24) U.S. Nuclear Regulatory Commission NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), Revision 1, 1997.

(25) U.S. Nuclear Regulatory Commission NUREG-1549, Decision Methods for Dose Assessment to Comply With Radiological Criteria for License Termination, July 1998.

(26) U.S. Nuclear Regulatory Commission, Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, Revision 3, June 1999.

(27) U.S. Nuclear Regulatory Commission, Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection, Revision 1, October 1999.

(28) U.S. Nuclear Regulatory Commission, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" in Policy and Guidance Directive FC 83-23.

(29) U.S. Nuclear Regulatory Commission NUREG-1660, Specific Schedules of Requirements for Transport of Specified Types of Radioactive Material Consignments.

4.0 ALARA

ALARA stands for "As Low As Reasonably Achievable." It is Recon's management policy to maintain radiation exposures to its employees, contractors, and the general public as far below the limits specified in 10 Code of Federal Regulations (CFR) 20 as is reasonably achievable. The ALARA program will be implemented through the training of employees and contractors, work procedures and practices, safe work permit use, good housekeeping, dust and contamination control practices, and, as necessary, use of personal protective equipment (PPE).

5.0 Radiation Safety Organization and Responsibilities

5.1 Recon Project Manager

Overall control and authority for management of remediation activities rest with the Recon Project Manager (PM). Recon's Management team (PM, Health Physics Advisor/Radiation Safety Officer HPA/RSO) and Project Administrator collectively will ensure that the guidance provided in the RHASP is followed during the Thorium Remediation Project.

The responsibility of the Recon PM includes, but is not limited to, the following:

- Review and approval of plans and procedures to complete remedial actions and consult with the HPA/RSO for guidance on special issues, contractor plans and procedures and review of radiological health and safety issues; and
- Ensure that remediation activities and radiological safety practices meet the established environmental, health and safety, and QA requirements in accordance with the requirements of this RHASP and applicable permits/licenses and/or regulatory and contract requirements.

5.2 Recon HPA/RSO

The HPA/RSO shall be responsible for the radiological health and safety of all remediation activities involving radioactive material including the review of all elements of Recon's radiation protection program and procedures for radiation work, radioactive material handling, packaging and transportation. The HPA/RSO shall have the responsibility and authority to terminate any work activities involving radioactive material at the site. Recon's radiation protection program will be reviewed prior to the start of work and monthly by the HPA/RSO to ensure compliance with commitments.

Other duties and responsibilities of the HPA/RSO shall include the following:

- Reviewing radiological hazard assessments and ensuring the implementation of appropriate radiation safety precautions.
- Performing routine reviews of radiological procedures and of the implementation and documentation of all work activities involving radioactive material.
- Reviewing unusual incidents involving radioactive material and providing recommendations on preventing recurrence of such incidents.

- Ensuring that the contractor has established appropriate criteria for determining the proper level of review and authorization for radiological work such as the safe work permit system.
- Ensuring that the commitments of the DP, RHASP, and permit conditions are met, and that all required records are maintained.
- Reviewing exposure results and ensuring that Recon is issuing dosimetry devices and maintaining personnel dosimetry records, and providing required reports of personnel exposure on a timely basis for review and copies sent to Kaiser.
- Ensuring that Recon is maintaining records of radiological surveys, evaluations, and audits.
- Ensure that Recon is arranging services for bioassay analysis if necessary.
- Ensuring that a training program for all personnel accessing restricted areas has been established.

5.3 Assistant RSO (Lead HP Technician or other designee)

In the onsite absence or unavailability of the HPA/RSO the authority for implementing the radiation protection program will be delegated to a Recon Assistant RSO by the HPA/RSO. This delegation will be assigned to Recon's PM for implementation.

Recon's Assistant RSO shall have "stop work" authority for all activities involving radioactive material at the site and have the responsibilities of the HPA/RSO when the HPA/RSO is not at the site.

5.4 Recon Health and Safety Supervisor

Recon's Health and Safety Supervisor will be responsible for implementing measures that provide safe and healthy work conditions, for assuring radiation exposures are maintained ALARA, and for minimizing release of radioactive material to the environment.

5.5 Recon Site Personnel / Individual Workers

Each individual assigned to the project is responsible for demonstrating familiarity with the radiation protection program, for strict adherence to the radiation protection rules and regulations, and for minimizing radiation exposure to the maximum extent practical. Flagrant or willful disregard of radiological protection rules, regulations, or practices shall result in disciplinary action. Each individual shall be pro-

vided training and, at the discretion of the HPA/RSO, successfully demonstrate competence through testing on the requirements of the radiation safety program.

All individuals working in the restricted area shall have a working knowledge of the radiological protection rules, regulations, and procedures. This knowledge shall be obtained through current training and instruction/briefings commensurate with the individual's work assignment.

The Safe Work Permit "SWP" (see Attachment 4) is the one document that the individual must be most familiar with for radiological conditions and safety precautions in the individual's work area. Each individual working in areas covered by an SWP must comply with and obey all requirements of the SWP and attend a pre-job SWP briefing when stipulated by the SWP.

Individuals shall report unusual conditions or circumstances involving radioactive material that may lead to a hazardous condition or noncompliance with safe radiological work practices.

5.6 Visitors

Persons visiting or conducting work at the Kaiser facility in Tulsa, Oklahoma are required to be familiar with Recon's health and safety requirements of the site. Visitors will be required to attend a briefing covering Radiation Safety Awareness and Site Specific information. Visitors will be accompanied by facility personnel while on the site.

5.6.1 Visitor Activities

While most visitors will be limited to observation, official inspections and sampling will be allowed at the site, such activities will be coordinated through the Recon HPA/RSO. Visitors are not to be present in restricted areas during remediation activities or when intrusive work is being performed. Under these conditions, visitors will have a limited potential for contact with contaminated materials. Persons accessing active remediation areas, exclusion zones, or contamination reduction zones; conducting activities other than observation; and unescorted visitors will be required to read and understand Recon's Environmental Health and Safety Plan and complete the facility orientation program.

5.6.2 Visitor Responsibilities

Visitors to the Kaiser facility are admitted as a courtesy and must leave when requested to do so. Visitors are responsible for signing in and out. All visitors are responsible for behaving in a mature manner and following instructions, particularly in emergency situations.

5.6.3 Prohibited Activities

Visitors may not smoke, drink, eat, chew gum or tobacco, or apply cosmetics while in the restricted areas of the Kaiser facility. Visitors may not enter the restricted areas unescorted.

5.6.4 Exposure Control

Visitors may be required to wear dosimeters to evaluate exposure to radiation. Visitors will be requested to submit to a direct personal survey to detect incidental radiological contamination and prevent the spread of contamination to clean areas.

5.6.5 Personal Protective Equipment

Visitors accessing the restricted areas of the site must wear the required PPE for the area. During the site-specific training, correct PPE usage will be discussed and displayed. Visitors who enter areas where respiratory protection is necessary must provide evidence that they possess the training, medical surveillance, and fit testing required by Occupational Safety and Health Administration (OSHA) regulations.

5.6.6 Decontamination

Decontamination measures will be utilized to remove contamination from persons, clothing, or objects. Overboots will be washed at the boot wash station and removed before leaving the Radiological Buffer Area. Disposable PPE and items requiring additional cleaning will be carefully removed and placed in the designated containers. Decontamination of the skin will consist of washing the affected area with soap and water. Visitors leaving a restricted area must wash their hands and face and complete a successful personal radiation frisk by a qualified Radiation Worker before returning to the support or clean areas of the site (see section 6.3 paragraph 2).

6.0 Radiation Protection Program Elements in Recon Radiological Plans

6.1 Plans and Procedures

Recon radiological plans and procedures shall be consistent with health and safety protection measures and policies as expressed in the appropriate Kaiser Environmental Safety and Health Plan, Kaiser QA and DP as well as Kaiser Site manuals and procedures.

6.2 Training

Recon will establish a radiological training program to meet the applicable training requirements specified by the U.S. Nuclear Regulatory Commission (NRC), OSHA, and the Department of Transportation (DOT). All employees and contractors will also receive training on the DP to ensure that all personnel understand the objectives of the plan and the routine operations and precautions to meet the plan objectives. The training program will include general radiation safety training/monitoring, site orientation, site-specific training, and training verification and documentation.

6.2.1 General Radiation Safety Training/Monitoring

At a minimum, all site personnel will be required to have radiation safety training commensurate with the radiological hazards that they will encounter and be required to wear radiation-monitoring devices. Recon will provide radiation dosimetry to personnel who enter restricted/controlled areas.

6.2.2 Site Orientation

Prior to entry into any restricted area of the Kaiser site, personnel and visitors will be given a site and radiological orientation. Objectives of this orientation will be to familiarize personnel and visitors to:

- Recognize labeled or posted radioactive materials and understand the meaning of radiological warning signs;
- Understand that as long as radiological control procedures and limits are followed, potential harmful effects to personnel and the environment from radioactivity will be minimized; and
- Recognize and understand the meaning of, and proper response to, emergency signals.

6.2.3 Site-Specific Training

Site-specific training will be required for all personnel involved in day-to-day operations of the remediation project, project and management personnel who visit the site regularly, and other personnel

identified by Kaiser's SA. Prior to being allowed unescorted access to the site and issuance of a radiation dosimetry, each person shall demonstrate a basic knowledge of radiation worker training given by the Recon HPA/RSO or designee and sign the Radiation Health And Safety Acceptance Form (see Attachment 2).

Radiation safety training for workers will be commensurate with their duties and responsibilities and the magnitude of the potential exposure to direct radiation and contamination in accordance with 10 CFR Parts 19 and 20.

Prior to the initiation of daily work activities, the PM or designee will hold a "kick-off" meeting to familiarize workers with the day's activities and their associated procedures, SWPs and safety requirements. A roster will be maintained for each daily meeting. Changes to standard procedures as a result of unique project conditions will also be discussed during these "kick off" meetings.

6.2.4 Training Verification and Documentation

Personnel working on site will present evidence of general radiation safety training and past exposure history in accordance with 10 CFR Parts 19 and 20 and pertinent refresher training (e.g., training certificates, letter of certification) prior to performing work in restricted areas of the site. Initial and annual refresher training shall include instruction in the fundamentals of radiation protection. The degree of instruction will be determined by work assignment and will ensure that workers understand how radiation protection relates to their jobs. The minimum training provided to any worker will include, but not necessarily be limited to, the following subjects:

- Radiation monitoring techniques
- Radiation monitoring instrumentation
- Emergency procedures
- Radiation hazards and controls
- Concepts of radiation and contamination
- Provisions of applicable sections of 10 CFR Parts 19 and 20
- Responsibilities of workers and supervisors
- Reporting requirements for workers
- ALARA and exposure control procedures
- PPE
- Biological effects of radiation
- Radiation control zone procedures

- Safe Work Permits
- Waste Management

Records of individual training and qualifications will be maintained at the site until the completion of all remediation activities and will include the trainee's name, training date, subjects covered during training, written test results, and the instructor's name.

Recon personnel will be required to have OSHA 1910.120 training and shall meet all the requirements in OSHA 1910.120. Recon shall provide evidence of this training for each worker. In addition, all site personnel shall sign a statement certifying and acknowledging that they have received site-specific training and that they understand the potential site hazards and the necessary control measures to reduce and/or eliminate those hazards. Training documentation, including the content of site-specific training and any other subsequent training (e.g., periodic safety meetings and specific task safety meetings), will be maintained by Recon for a suitable period. Recon will make training documentation available for inspection.

NRC Form 3 (see Attachment 3) shall be conspicuously posted in a sufficient number of places to permit employees working in or frequenting restricted areas to have access to a copy on the way to or from their place of work.

6.3 Work Zones and Access Control Points

The entrance to Access Control will be located in the Flux Building. There the individual enters, signs in on the Access Control Log (See Attachment 4) and acquires his/her radiation dosimeter. The dosimeter will be placed on the front part of the body between the waist and the neck. Any pertinent SWP or radiological information will be posted in the Access Control area. PPE is located at the boundary of the Radiological Buffer Area where all PPE will be donned. Upon completion of these activities formal entrance into the Restricted Area will be allowed.

Individuals exiting a Restricted Area will proceed to the boot wash station located at the boundary of the Restricted Area and the Radiological Buffer Area, wash their over boots and then doff all other PPE with careful attention not to contaminate personal clothing. PPE will be discarded in the appropriately marked waste disposal container prior to entrance into Access Control, where the individual will wash both face

and hands. Individuals will then proceed to the frisking station where a survey will be conducted utilizing a Ludlum Model 177 or equivalent. Only qualified and trained personnel may complete these surveys. (The Recon RSO or designee will frisk Visitors and this person shall initial the Access Control Log next to the visitor's name). Prior to picking up the probe, or equivalent, carefully frisk hands to prevent cross contamination of the instrument. The whole body will be frisked at a rate not to exceed three inches per second at one half-inch distance away from the body. If contamination is detected, step away from the meter and inform the Recon RSO or designee prior to any decontamination attempt. Decontamination efforts will be taken prior to performing another frisk. Personal clothing or other articles that are unable to be decontaminated will not be allowed to leave Access Control and will be placed in appropriately marked containers. When the frisking procedure is complete and no contamination is detected individuals will then surrender their dosimeter and sign out on the Access Control Log indicating the time of departure.

Radiological Buffer Areas shall be established at the boundary of restricted and unrestricted areas to control radiation exposure and limit the spread of radioactive material.

Unrestricted Area is any area that access is not controlled for the purpose of protection of individuals from exposure to radiation and radioactive materials.

Restricted and Controlled Areas are any area to which access is managed for purposes of protection of individuals from exposure to radiation and radioactive materials. Within the restricted areas, different radiological control zones may be designated to aid in radiation exposure control and control of the radioactive materials present. Such areas include, but are not limited to: RADIOACTIVE MATERIAL AREA (where radioactive materials are stored or located), RADIATION AREA, RADIOLOGICAL BUFFER AREA (decontamination buffer area between restricted areas and clean unrestricted areas), CONTROLLED AREA, CONTAMINATION AREA, and AIRBORNE RADIOACTIVITY AREA.

A Contamination Area is an area which contains radioactive material which can spread. The amount of contamination is measured in disintegrations per minute per 100 cm^2. Contamination limits for materials and equipment specified in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Materials"

(NRC, August 1987) will constitute a Contamination Area. The posting will read "CAUTION - CONTAMINATED AREA".

Contamination reduction areas (Radiological Buffer Areas) will be marked in the field using flagging tape or temporary construction fencing with appropriate signs. Temporary control zone or contamination reduction area barriers will remain in place until the work in the zone is completed or until the potentially hazardous conditions that caused an area to be designated as a control zone are eliminated. Proper radiation postings will be used to warn of potential hazards.

Entry points to restricted areas will be posted in accordance with 10 CFR 20.1902. Instructions describing proper techniques of personal frisking, donning and doffing of protective clothing and other special entry requirements will be posted.

Personnel entering a restricted area shall have received the appropriate training or be escorted by trained personnel. Personnel entering these areas shall read and sign the appropriate SWP, which acknowledges their understanding of and adherence to the requirements set forth in the applicable SWP.

A controlled restricted area may include a step off area (pad) that separates the two sides. A personnel survey meter (frisker) will be available to be used for individuals to perform the required personnel survey upon exiting the Controlled Area.

Unrestricted/clean areas are to consist of areas of the site, which are not contaminated, and not being used for decontamination. Efforts will be taken to prevent the contamination of clean areas and the support zone/clean area. Personnel and equipment that enter clean areas after having been in a controlled/restricted area will be surveyed and decontaminated, if necessary. Large equipment will be subject to unrestricted release survey criteria to measure for both fixed and removable contamination. An Entrance/Unrestricted Release Form (see Attachment 5) will be utilized to complete this survey. Prior to any entrance or unrestricted release survey, the equipment will be de-energized. An inspection will occur to ensure the equipment is visually clean. Using a Ludlum Model Ludlum 3 or equivalent frisking instrument the equipment will be examined for fixed contamination and the disintegrations per minute (DPM) will be documented. A smear survey to measure removable contamination will also be taken covering approximately 100 cm^2 of the same location. The smear will be placed in an envelope and

further evaluated utilizing Ludlum 2929 scaling instrument or equivalent to measure alpha and beta-gamma activity. Entrance survey information may be used as a baseline while unrestricted release survey data counted and measured are subject to NRC release limit criteria (see Attachment 6). Before a piece of equipment receives an unrestricted release survey it will be visually inspected, if contamination is suspected a gross decontamination will occur in the decontamination area. Gross decontamination will consist of utilizing shovels, brooms, brushes, high pressure water, in any combination to remove the contaminate.

Clean areas will be surveyed weekly to ensure proper contamination control and an Area Survey Form (see Attachment 7) will be filled out. Area surveys are utilized to ensure contamination has not occurred in unrestricted/clean areas. A map of the area is drawn or attached to the Area Survey Form and location points are designated. At each location a smear will be swiped covering approximately 100 cm^2 and placed in an envelope identifying where the smear was taken. A Ludlum 2929 scaling instrument or equivalent will be used to measure alpha and beta-gamma activity. Observed activity limits will be below NRC release limit criteria, but if this is not the case the survey area will be isolated and controlled for decontamination and a follow-up survey will be taken.

6.4 Radiation Exposure Control

Remediation activities at the Kaiser site will be controlled such that no occupationally exposed worker will exceed any 10 CFR 20 occupational limits set forth in 10 CFR 20 Subpart C and shall be kept ALARA. These limits apply to all Radiation Workers 18 years of age or older. Internal dose to a specific organ is given as Committed Dose Equivalent (CDE), while the internal dose relative to a whole body exposure is given as Committed Effective Dose Equivalent (CEDE). External dose is expressed as Deep Dose Equivalent (DDE), Shallow Dose Equivalent (SDE) and Lens of the eye Dose Equivalent (LDE).

The annual occupational exposure limits from 10 CFR 20 is as follows:

- TEDE (CEDE + DDE) 5 rems (0.05 Sv)
- Lens of Eye (LDE) 15 rems (0.15 Sv)
- Other Organs (CDE + DDE) 50 rems (0.5 Sv)
- Skin or Extremity (SDE) 50 rems (0.5 Sv)

The dose to an embryo/fetus due to occupational exposure of a woman who has voluntarily declared her pregnancy in writing is limited to 0.5 rems (0.005 Sv) TEDE during the entire pregnancy. Data relating to dose to the embryo/fetus of a declared pregnant worker or former declared pregnant worker will not appear on her NRC Form 4. Such data will only be provided to other individuals upon written request by the declared pregnant worker authorizing release of the data. The data may be provided to the declared pregnant worker herself upon verbal request. As part of the radiation safety training (and refresher training) and prior to issuance of a radiation dosimeter, women authorized to receive radiation exposure will be given specific instruction regarding prenatal exposure risks to a developing embryo and fetus. This instruction will include information contained in the Appendix to NRC Guide 8.13 "Instruction Concerning Prenatal Radiation Exposure".

Upon their initial visit to the site, personnel will be required to complete and sign a NRC Form 4 (see Attachment 6). Personnel without a signed, up-to-date, NRC Form 4 or equivalent current year occupational exposure history on site shall be limited to a dose accumulation of less than 0.1 rem (0.001 Sv) TEDE until the individual to be monitored provides current year dose history. Visitor's exposures shall be limited too less than 0.1 rem (0.001 Sv) TEDE in a year. Note that persons (visitors) who need to exceed this limit, or enter restricted areas shall complete Radiation Worker Training and fully participate in the personnel monitoring program.

Recon will control the exposure of visitors at the site to levels that are ALARA. For exposure control purposes a "visitor" is defined as a person not qualified as a "radiation worker" and who requires access to a restricted area.

Entry by a visitor to a restricted area will require the following:

(1) Assignment of a temporary radiation dosimeter.

(2) Escort by a qualified radiation worker while in the restricted area.

(3) Documentation:

- (a) Name
- (b) Social Security Number
- (c) Date of Visit
- (d) Area visited and length of time in that area

The annual occupational dose limit for minors (under age 18) is 10 percent of the annual dose limits specified for adult workers in 10 CFR 20.1201. Individuals under the age of 18 will not be permitted to enter any radiologically restricted area at the Kaiser site.

Remediation activities at the Kaiser site will be controlled such that: 1) no member of the public shall receive a TEDE in one calendar year exceeding 0.1 rem (1 mSv) in accordance with 10 CFR 20 Subpart D, 2) the dose in any unrestricted area from external sources shall not exceed 2 mrem (0.02 mSv) in any one hour, and 3) air emissions of radioactive material into the environment (excluding Radon) are controlled to preclude release to the environment of airborne radioactivity greater than the concentration limits of 10 CFR 20, Appendix B, Table 2, Column 1.

6.5 Personnel External Exposure Monitoring

Personnel dose monitoring is performed to demonstrate compliance with the dose limits in 10 CFR 20 and to assess successful implementation of ALARA. Individual dose monitoring includes internal and external exposure. Procedures for the issue, collection, processing, and recording of personnel radiation dosimetry and exposures shall be utilized. Dosimetry will be analyzed quarterly. Written dosimetry reports of exposure will be issued annually.

Personnel dosimetry for radiation workers shall include a whole body radiation badge. When the whole body is exposed uniformly, the radiation dosimeter shall be worn on the frontal area of the torso between the neck and the waist. Deep dose and shallow dose monitoring devices shall be worn in areas receiving the highest applicable dose. If relocation of the whole body dosimeter is required, the SWP will specify where the dosimeter is to be worn.

Radiation dosimeters will be processed only by vendors that maintain a processing program that is currently accredited by the National Voluntary Laboratory Accreditation Program for the energies and types of radiation expected to be encountered at the Kaiser site.

If monitoring is performed for personnel exposure to gamma radiation, it will be done using radiation dosimetry and/or radiation survey meters. The radiation exposure rate survey meter for occupational gamma surveys on this project will have a minimum detection rate of approximately 5 μR/hr.

When not in use, radiation dosimeters are stored in designated low background areas, such as Access Control.

Lost or damaged radiation dosimeters shall be immediately reported to immediate supervisor and Recon's RSO.

Certain radionuclides given to personnel for medical diagnostic purposes can result in measurable radiation levels for some period after receiving the treatment. The dose received from this treatment is exempt from regulation. Badged employees shall notify the HPA/RSO if they have received such treatment. In such a situation, the person may be restricted from wearing dosimetry until the medical isotope is eliminated from the body to the extent that it will not affect dose measurements. The only purpose of restricting this individual from wearing dosimetry is to avoid including radiation exposure from the medical isotope to that received from the remediation activities. Such personnel shall also be restricted from entering areas requiring monitoring for radiation until the medical radionuclide is eliminated from the body to the extent that it will not affect personnel monitoring.

6.6 Internal Exposure Monitoring

Internal exposures will be assessed singly or by a combination of measurements of: 1) airborne radioactivity in work areas; 2) quantities of radionuclides in the body, and 3) quantities of radionuclides excreted from the body.

Internal exposure monitoring shall be performed to assess the dose to personnel who are likely to receive, in 1 year, an intake in excess of 0.1 ALI (annual limit on intake) in 10 CFR 20, Appendix B, Table 1, Column 2 or if the committed effective dose equivalent to declared pregnant worker is likely to exceed 0.05 rem (0.5 mSv).

Recon will maintain the internal exposure of persons to radioactive materials ALARA. The use of engineered controls will be employed to the maximum extent practical. If engineered controls are not adequate as demonstrated by work area air sampling, then respiratory protection will be considered to control internal exposures to radioactive materials. Internal exposure monitoring will generally consist of air sampling.

6.7 ALARA

The radiation protection responsibility at the Kaiser site is to maintain exposures ALARA for employees, visitors, contractors, the public, and the environment. This responsibility is carried out by means of the following:

- Information and policy statements to employees.
- Periodic management audit of operational efforts to maintain exposures ALARA.
- Delegation of sufficient authority to the HPA/RSO to enforce regulations and administrative policies regarding radiation safety.
- Administrative direction to ensure that any new operation that may affect radiation protection will be planned or designed in consultation with or approval from the HPA/RSO or designee.
- Recon prepared ALARA review and approval procedure.

6.8 QA/QC Program

The RHASP is subject to management controls and QA requirements. In addition to general QA review and independent oversight, surveillances and audits shall be performed as needed to assess whether the quality controls are adequate to assure radiological safety requirements are met. Recon shall designate a Quality Control Supervisor (QCS) who will report to the PM. The QCS will communicate and coordinate directly with the PM and will have the delegated responsibility and authority to direct and control contractor QC functions to assure that QC objectives are met. Responsibilities of the QCS include coordination of contractor QC activities and ensuring that appropriate quality management, policy, training, and verification controls are present. The QCS shall provide all necessary QC information to the PM and the RSO/HPA.

Radiological surveys, including sampling and analysis will be performed in order to evaluate the effectiveness of remediation and decontamination efforts in maintaining adequate radiological controls and to evaluate materials for removal and disposal.

Health Physics instrumentation and equipment as well as respiratory protection equipment is inspected prior to use. Equipment failing the inspection due to equipment malfunction, poor calibration, or inappropriateness due to use restrictions, will be tagged out of service.

Periodic surveillances and audits of the Health Physics Program shall be conducted and audited by Kaiser.

Recon personnel will determine the quantity, performance specifications, calibration, maintenance and testing requirements and capabilities for radiation detection, monitoring, and sampling instrumentation and equipment. Recon personnel and/or vendors will be responsible for calibration, maintenance, proper storage of such equipment, and the control of the instrument check sources.

Selection criteria for portable and laboratory counting equipment are based upon the types of radiation to be detected, maintenance and calibration requirements, ruggedness, interchangeability, and upper and lower limits of detection capabilities. MARSSIM contains a list of the typical types of radiation detection instruments to be used during remediation of the Kaiser site. This is the equipment or it's equivalent that Recon intends to utilize during the Thorium Remediation Project : Ludlum Model 3 Survey Meter, Ludlum Model 44-9 Detector, Ludlum Model 177 Alarm Rate Meter, Ludlum Model 2121 Portable Scaler Ratemeter, Ludlum Model 2224 Scaler Ratemeter, Ludlum Model 43-93 Alpha/Beta Scintillator, Ludlum Model 44-6 Beta-Gamma Detector, Ludlum Model 19 μR Meter and Shonkas' Subsurface Multi-specta Contamination Monitor (SMCM).

Radiation detection and sampling instrumentation and laboratory counting instruments utilized for radiation safety purposes will be calibrated before initial use, after major maintenance, and on a routine basis. A qualified vendor will calibrate portable radiation detection and sampling equipment/instrumentation annually consistent with a radioactive source of known activity traceable to the National Institute of Standards and Technology. Portable instrumentation operability criteria and QA procedures (such as source checks each day the instrument is in use) in compliance with Table 10.1 of NCRP Report 127 shall be implemented.

6.9 Radiation and Contamination Surveys

Routine radiation and contamination surveys will be performed in accordance with written procedures using calibrated instrumentation to ensure that personnel do not exceed occupational exposure limits and

minimize personnel exposures ALARA. Contamination surveys will be performed to ensure that personnel do not spread surface contamination beyond the controlled area and to minimize unnecessary external and internal exposure resulting from the intake of loose radioactive material by inhalation, ingestion, or skin absorption.

Radiation and contamination surveys will also be used to determine the effectiveness of the overall radiological contamination control and protection program. Information obtained from radiation and contamination surveys are used to evaluate operations and activities as well as operation processes and methods to assure personnel exposures are ALARA.

Radiation and contamination control surveys will be performed by qualified personnel, using instruments appropriate to the type of radiation and / or contamination and type of survey required.

Types of routine radiation and contamination control surveys include the following:

- Personnel Contamination Surveys (Self-Monitoring or frisking) - Personnel contamination surveys (self-monitoring or frisking) are performed to detect and quantify the possible presence of radioactive material on the body or clothing. Self-monitoring (frisking) is a critical element of the contamination control program. Only individuals who are trained and qualified as radiation workers are permitted to perform self-monitoring. Qualified individuals will survey visitors and non-radiation workers.

  Personnel will be instructed in the proper method of removing protective clothing and monitoring for personal contamination as part of the formal radiation safety training program. Friskers will be available at each exit from a controlled area or control point. In the event that personnel contamination is suspected or detected, appropriate HP personnel will be notified and appropriate action taken. In the event a person becomes radioactively contaminated that is not removed by simple decontamination techniques, then appropriate HP personnel will supervise further decontamination activities and evaluate the need for bioassay follow-up. Bioassay samples will be performed at the discretion of the HPO/RSO.

- Area Contamination Surveys - Routine surveys for radioactive contamination shall be conducted during remediation activities at the Kaiser site commensurate with the potential for contamination in the area. In general, area contamination surveys will be performed to provide data for determining radiological conditions that will be used for the issuance of SWPs and for termination of the SWP. (See Attachment 3)

- Remedial Action Surveys - Surveys and sampling will be conducted to assess the effectiveness of decontamination activities.

- Tools, Equipment, and Vehicle Surveys - Tools, equipment, and vehicles in a restricted area will be surveyed for radioactive contamination before release into unrestricted/clean environs. (See Attachment 2)

- Shipping Surveys - Radiation and contamination surveys will be performed on radioactive material packaged to be shipped off site in accordance with 49 CFR requirements. Shipping surveys are considered QA records and will be stored and maintained as part of the Kaiser Project file.

6.10 Airborne Radioactivity Control

Engineering controls will be utilized to the maximum extent possible to control the production of dust and airborne radioactivity during the Kaiser Remediation Project. Engineered controls may be, but are not limited to, water misting with or without dust control additives.

6.10.1 Locating Air Sampling Equipment

The combination of airborne radioactivity samplers and sample counting systems should have a Minimum Detectable Activity (MDA) less than 10 percent of the most restrictive applicable derived air concentration (DAC). Airborne particulate surveys are performed with portable high- or low-volume air samplers as follows:

Following the decay of thoron progeny, measure radioactivity by alpha counting and compare the results with 10 CFR Part 20, Appendix B, Table 1, DAC limit, (2×10^{-12} µCi/ml). If the analytical results for the air samples exceed 10 percent of the DAC or 2×10^{-13} µCi/ml, respiratory protection such as supplied air or particulate masks may be provided for any workers in the affected area.

(1) In work areas when the potential or existing conditions exist that may generate airborne radioactivity at levels approaching 10 percent of the DAC.

(2) To ensure compliance with Airborne Radioactivity Area posting requirements.

(3) Sampling locations should be downstream of potential airborne radioactivity release points.

(4) The combination of sample collection volume, collection efficiency and counting system MDA should allow detection of intakes exceeding 10 percent of the applicable DAC.

(5) Signs shall be posted at entrances to areas where airborne radioactivity levels exceed or have the potential to exceed 30 percent of a DAC. These signs shall contain the conventional three-bladed

magenta symbol on yellow background and the words "CAUTION, AIRBORNE RADIOACTIVITY AREA."

(6) In areas where there is the potential for airborne radioactivity in excess of 10 percent of the DAC, personal and/or area air samples will be collected to evaluate worker exposure. The results of air filter measurements in conjunction with worker stay times will be used to control worker inhalation (i.e., DAC-hour tracking). Dust will be collected on filters using standard industrial hygiene methods. Personal sampling pumps will be attached to a representative number of workers. Radioactivity of the dusts captured on the filters will be determined.

The following process shall be used to assess compliance with Regulatory Guide 8.25 surveillance requirements.

(1) Review characterization survey(s) for thorium concentration in soil where work will be performed that will disturb soil or create dust.

(2) If the Th-232 + Th-228 are less than 200 picocuries per gram (pCi/g) soil, perform occasional air sampling near the dust source. If the Th-232 + Th-228 concentration is 200 pCi/g soil or greater, perform continuous, stationary air sampling near the dust source while workers are present.

6.11 Respiratory Protection Program

With the application of process controls, engineering controls, and procedures to control concentrations of radioactive materials in air as required by 10 CFR 20.1701, the use of respiratory protection during the project is not anticipated. If engineering and process controls do not reduce the levels of airborne radioactivity below 1 derived air concentrations (DAC) limit (or when a worker could receive 12 DAC-hours in a week), the use of respiratory protection will be considered based on a prospective intake evaluation and consideration of industrial safety factors in accordance with 10 CFR 20.1702. The purpose of the respiratory protection program is to adequately limit intakes of airborne radioactive materials for workers in restricted areas and to keep the TEDE ALARA. The respiratory protection program shall incorporate the applicable requirements of 20.1701 - 20.1704, Appendix A of 10 CFR Part 20, and the applicable guidance in Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection," and NUREG-0041, Rev. 1, "Manual of Respiratory Protection Against Airborne Radioactive Material." The program will be implemented using written procedures to address all the elements of the respiratory protection program as required by 10 CFR 20.1703. Training, medical screening, and fit testing shall be performed prior to the issuance of National Institute for Occupational Safety and Health-certified respiratory protection equipment that is used to limit intakes of airborne radioactivity.

6.12 SWP and Work Controls

The SWP is an administrative tool used to control work occurring inside a restricted area and to inform personnel involved with the work of specific hazards and precautions in the work area when safety precautions and controls are not specified in a procedure.

Additionally, the SWP will instruct the workers as to what protective equipment will be needed and what monitoring will be required. Work involving thorium in a restricted area at the Kaiser site will be performed under the authority of a SWP or a procedure. Work will be administratively controlled via SWP and/or procedures. An SWP will be issued as necessary and reviewed weekly by the HPA/RSO or his designee. At a minimum, the SWP will include the following information:

- Task(s) to be performed
- Location of Task(s)
- Nonradiological Hazards Involved with the Task(s)
- Radiological Hazards Involved with the Task(s)
- Representative Radiological Survey Results
- Protective Measures and Engineering Controls
- Survey, Monitoring, and Dosimetry Requirements
- Special Use or Restraints
- Names and signatures of individuals performing the task(s)
- Issue and Expiration Dates

Prior to the initial start of work, a pre-job briefing shall be given to all personnel involved in performing the work. Personnel working under the SWP shall document (by their signature) that they have read and understand the SWP and that they have received and understand the instructions from the pre-job briefing, if performed. This applies to any and all subsequent SWP revisions.

6.13 Emergency Action Procedure

A procedure containing detailed instructions for medical, security, fire, and adverse weather emergency response is included with the Recon HASP.

6.14 Posting and Labeling

Areas where radioactive materials are present will be posted in accordance with the requirements of 10 CFR 20.1902. Containers of radioactive materials and sealed source materials will be marked with the

standard radiation symbol and the words CAUTION RADIOACTIVE MATERIAL. Areas will be classified and posted as RADIATION AREAS or RADIOACTIVE MATERIAL AREAS, per 10 CFR 20.1902. In addition, areas where radioactive material is handled in a dispersible form, such that the potential for inhalation of airborne radioactivity exists, are designated as controlled contamination areas and will be posted as CONTAMINATION AREAS OR AIRBORNE RADIOACTIVITY AREAS. The Recon RSO or designee will routinely inspect the site for proper postings, damaged or missing postings, and evaluate the need for additional postings.

6.15 Records and Reports

The Recon HPA/RSO will review exposure results. A copy of the dosimetry results as they relate to each named employee will be maintained on site and available for inspection. Personnel monitoring reports will be maintained in accordance with guidance from NRC Regulatory Guide 8.7, Rev. 1, 1992. Records of surveys and radiation dosimetry results will be considered quality records and will be stored and maintained as part of the Kaiser Remediation Project Files. Summation of internal and external doses will be performed in accordance with 10 CFR 20 and appropriate regulatory guidance such as NRC Regulatory Guide 8.34.

Air sampling results will be periodically reviewed by the HPA/RSO. Records of all air sampling results and air sampling instrumentation calibrations will be considered quality records and will be stored and maintained as part of the Kaiser Remediation Project Files.

Records of individual exposures to radiation, radiation surveys and monitoring results, and the disposal of material will be maintained in accordance with 10 CFR 20 Subpart L (Records). Records related to the radiation safety program will be maintained as part of the Kaiser Remediation Project Files.

Safe Work Permit (SWP)
Attachment 1

Revision 01

April 2004

Remedial Construction Services, L.P.
9720 Derrington
Houston, Texas 77064
(281) 955-2442

Attachment 1

Safety Work Permit

****Copy To Be Posted In The Work Area****

Project Name:	Start Date:	Expiration Date:
Emergency Contact(s):	Phone No.:	
Job Description:		

Personnel Monitoring	Protective Equipment and Clothing
Whole Body Count/Bioassay:	Respiratory Protection:
SRD/TLD	
Area Airborne Monitoring	Protection Clothing:
Breathing Zone on Representative Workers	
	Other:
Other	

Waste Disposal Instructions	Radiological Conditions
	Exposure Rate:
	Contamination:
	Air Sample Results:

Access Control Instructions	Survey Requirements

Review and Approvals	
Review:	**Date:**
Approval:	**Date:**

SWP Authorized Personnel List

****To Be Signed By All Personnel Performing Work On-Site****

By signing the form below, the Radiation Worker agrees to comply with all of the requirements listed in the Safety Work Permit and the instructions given by the RSO or Project RSO.

Name (Print):	Signature:	ID Number	Date

Attach to SWP

RHASP Acceptance Form
Attachment 2

Revision 01

April 2004

Remedial Construction Services, L.P.
9720 Derrington
Houston, Texas 77064
(281) 955-2442

Attachment 2

REMEDIAL CONSTRUCTION SERVICES, L.P. (RECON)
THORIUM REMEDIATION PROJECT

RADIATION HEALTH AND SAFETY PLAN
ACCEPTANCE FORM

Instructions: This form is to be completed by each person prior to working on the subject project work site and returned to the Project Radiation Safety Officer or Health and Safety Officer.

Project: _____

Date: _____

I understand my health and safety responsibilities and agree to perform my work in accordance with those responsibilities.

Signed _____

Print Name _____

Company Name _____

Date_____

NRC Form 3
Attachment 3

Revision 01

April 2004

Remedial Construction Services, L.P.
9720 Derrington
Houston, Texas 77064
(281) 955-2442

NRC Form 3
(8/1999)
Part 1

UNITED STATES NUCLEAR REGULATORY COMMISSION

NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION (PART 20); NOTICES; INSTRUCTIONS AND REPORTS TO WORKERS; INSPECTIONS (PART 19); EMPLOYEE PROTECTION

WHAT IS THE NUCLEAR REGULATORY COMMISSION?

The Nuclear Regulatory Commission is an independent Federal regulatory agency responsible for licensing and inspecting nuclear power plants and other commercial uses to radioactive materials.

WHAT DOES THE NRC DO?

The NRC's primary responsibility is to ensure that workers and the public are protected from unnecessary or excessive exposure to radiation and that nuclear facilities, including power plants, are constructed to high quality standards and operated in a safe manner. The NRC does this by establishing requirements in Title 10 of the Code of Federal Regulations (10 CFR) and in licenses issued to nuclear users.

WHAT RESPONSIBILITY DOES MY EMPLOYER HAVE?

Any company that conducts activities licensed by the NRC must comply with the NRC's requirements. If a company violates NRC requirements, it can be fined or have its license modified, suspended or revoked.

Your employer must tell you which NRC radiation requirements apply to your work and must post NRC Notices of Violation involving radiological working conditions.

WHAT IS MY RESPONSIBILITY?

For your own protection and the protection of your co-workers, you should know how NRC requirements relate to your work and should obey them. If you observe violations of the requirements or have a safety concern, you should report them.

WHAT IF I CAUSE A VIOLATION?

If you engaged in deliberate misconduct that may cause a violation of the NRC requirements, or would have caused a violation if it had not been detected, or deliberately provided inaccurate or incomplete information to either the NRC or to your employer, you may be subject to enforcement action. If you report such a violation, the NRC will consider the circumstances surrounding your reporting in determining the appropriate enforcement action, if any.

HOW DO I REPORT VIOLATIONS AND SAFETY CONCERNS?

If you believe that violations of NRC rules or the terms of the license have occurred, or if you have a safety concern, you should report them immediately to your supervisor. You may report violations or safety concerns directly to the NRC. However, the NRC encourages you to raise your concerns with the licensee since it is the licensee who has the primary responsibility for, and is most able to ensure, safe operation of nuclear facilities. If you choose to report your concern directly to the NRC, you may report this to an NRC inspector or call or write to the NRC Regional Office serving your area. If you send your concern in writing, it will assist the NRC in protecting your identity if you clearly state in the beginning of your letter that you have a safety concern or that you are submitting an allegation. The NRC's toll-free SAFETY HOTLINE for reporting safety concerns is listed below. The addresses for the NRC Regional Offices and the toll-free telephone numbers are also listed below.

WHAT IF I WORK WITH RADIOACTIVE MATERIAL OR IN THE VICINITY OF A RADIOACTIVE SOURCE?

If you work with radioactive materials or near a radiation source, the amount of radiation exposure that you are permitted to receive may be limited by NRC regulations. The limits on your exposure are contained in sections 20.1201, 20.1207, and 20.1208 of Title 10 of the Code of Federal Regulations (10 CFR 20) depending on the part of the regulations to which your employer is subject. While these are the maximum allowable limits, your employer should also keep your radiation exposure as far below those limits as "reasonably achievable."

MAY I GET A RECORD OF MY RADIATION EXPOSURE?

Yes. Your employer is required to advise you of your dose annually if you are exposed to radiation for which monitoring was required by NRC. In addition, you may request a written report of your exposure when you leave your job.

HOW ARE VIOLATIONS OF NRC REQUIREMENTS IDENTIFIED?

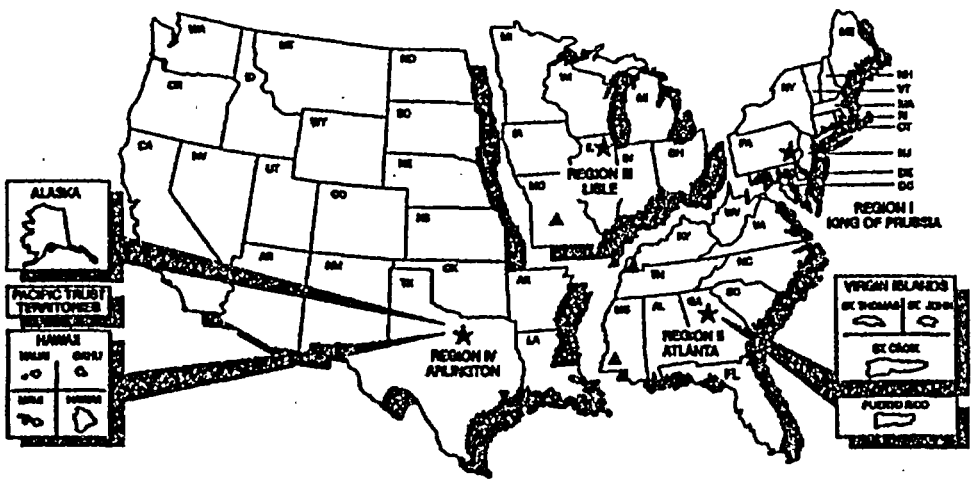
NRC conducts regular inspections at licensed facilities to assure compliance with NRC requirements. In addition, your employer and site contractors conduct their own inspections to assure compliance. All inspectors are protected by Federal law. Interference with them may result in criminal prosecution for a Federal offense.

MAY I TALK WITH AN NRC INSPECTOR?

Yes. NRC inspectors want to talk to you if you are worried about radiation safety or have other safety concerns about licensed activities, such as the quality of construction or operations at your facility. Your employer may not prevent you from talking with an inspector. The NRC will make all reasonable efforts to protect your identity where appropriate and possible.

MAY I REQUEST AN INSPECTION?

Yes. If you believe that your employer has not corrected violations involving radiological working conditions, you may request an inspection. Your request



▲ - Callaway Plant Site in Missouri and Grand Gulf Plant Site in Mississippi are under the purview of Region IV. The Paducah Gaseous Diffusion Plant in Kentucky is under the purview of Region III.

NRC Form 3
(8/1999)
Part 2

should be addressed to the nearest NRC Regional Office and must describe the alleged violation in detail. It must be signed by you or your representative.

HOW DO I CONTACT THE NRC?

Talk to an NRC inspector on-site or call or write to the nearest NRC Regional Office in your geographical area (see map below). If you call the NRC's toll-free SAFETY HOTLINE during normal business hours, your call will automatically be directed to the NRC Regional Office for your geographical area. If you call after normal business hours, your call will be directed to the NRC's Headquarters Operations Center, which is manned 24 hours a day.

CAN I BE FIRED FOR RAISING A SAFETY CONCERN?

Federal Law prohibits an employer from firing or otherwise discriminating against you for bringing safety concerns to the attention of your employer or the NRC. You may not be fired or discriminated against because you:

- ask the NRC to enforce its rules against your employer;
- refuse to engage in activities which violate NRC requirements;
- provide information or are about to provide information to the NRC or your employer about violations of requirements or safety concerns;
- are about to ask for, or testify, help, or take part in an NRC, Congressional, or any Federal or State proceeding.

WHAT FORMS OF DISCRIMINATION ARE PROHIBITED?

It is unlawful for an employer to fire you or discriminate against you with respect to pay, benefits, or working conditions because you help the NRC or raise a safety issue or otherwise engage in protected activities. Violations of Section 211 of the Energy Reorganization Act (ERA) of 1974(42 U.S.C. 5851) include actions such as harassment, blacklisting, and intimidation by employers of (i) employees who bring safety concerns directly to their employers or to the NRC; (ii) employees who have refused to engage in an unlawful practice, provided that the employee has identified the illegality to the employer; (iii) employees who have testified or are about to testify before Congress or in any Federal or State proceeding regarding any provision (or proposed provision) of the ERA or the Atomic Energy Act (AEA) of 1954; (iv) employees who have commenced or caused to be commenced a proceeding for the administration or enforcement of any requirement imposed under the ERA or AEA or who have, or are about to, testify, assist, or participate in such a proceeding.

HOW DO I FILE A DISCRIMINATION COMPLAINT?

If you believe that you have been discriminated against for bringing violations or safety concerns to the NRC or your employer, you may file a complaint with the NRC or the U.S. Department of Labor (DOL) if you desire a personal remedy, you must file a complaint with the DOL pursuant to Section 211 of the ERA. Your complaint to the DOL must describe in detail the basis for your belief that the employer discriminated against you on the basis of your protected activity, and it must be filed in writing either in person or by mail within 180 days of the discriminatory occurrence. Additional information is available at the DOL website at www.osha.gov. Filing an allegation, complaint, or request for action with the NRC does not extend the requirement to file a complaint with the DOL within 180 days. You must file the complaint with the DOL. To do so you may contact the Allegation Coordinator in the appropriate NRC Region, as listed below, who will provide you with the address and telephone number of the correct OSHA Regional office to receive your complaint. You may also check your local telephone directory under the U.S. Government listings for the address and telephone number of the appropriate OSHA Regional office.

WHAT CAN THE DEPARTMENT OF LABOR DO?

If your complaint involves a violation of Section 211 of the ERA by your employer, it is the DOL, NOT THE NRC, that provides the process for obtaining personal remedy. The DOL will notify your employer that a complaint has been filed and will investigate your complaint.

If the DOL finds that your employer has unlawfully discriminated against you it may order that you be reinstated, receive back pay, or be compensated for any injury suffered as a result of the discrimination and be paid attorney's fees and costs.

Relief will not be awarded to employees who engage in deliberate violations of the Energy Reorganization Act or the Atomic Energy Act.

WHAT WILL THE NRC DO?

The NRC will evaluate each allegation of harassment, intimidation, or discrimination. Following this evaluation, an investigator from the NRC's Office of Investigations may interview you and review available documentation. Based on the evaluation, and, if applicable, the interview, the NRC will assign a priority and a decision will be made whether to pursue the matter further through investigation. The assigned priority is based on the specifics of the case and its significance relative to other ongoing investigations. The NRC may not pursue an investigation to the point that a conclusion can be made whether the harassment, intimidation, or discrimination actually occurred. Even if NRC decides not to pursue an investigation, if you have filed a complaint with DOL the NRC will monitor the results of the DOL investigation.

If the NRC or DOL finds that unlawful discrimination has occurred, the NRC may issue a Notice of Violation to your employer, impose a fine, or suspend, modify, or revoke your employer's NRC license.

UNITED STATES NUCLEAR REGULATORY COMMISSION REGIONAL OFFICE LOCATIONS

A representative of the Nuclear Regulatory Commission can be contacted by employees who wish to register complaints or concerns about radiological working conditions or other matters regarding compliance with Commission rules and regulations at the following addresses and telephone numbers.

REGIONAL OFFICES

REGION	ADDRESS	TELEPHONE
I	U.S. Nuclear Regulatory Commission, Region I 475 Allendale Road King of Prussia, PA 19406-1415	(800) 432-1156
II	U.S. Nuclear Regulatory Commission, Region II Atlanta Federal Center 61Forsyth Street, S.W., Suite 23T85 Atlanta, GA 30303-3415	(800) 577-8510
III	U.S. Nuclear Regulatory Commission, Region III 801 Warrenville Road Lisle, IL 60532-4351	(800)522-3025
IV	U.S. Nuclear Regulatory Commission, Region IV 611 Ryan Plaza Drive, Suite 400 Arlington, TX 76011-8064	(800) 952-9677

To report safety concerns or violations of NRC requirements by your employer, telephone: **NRC SAFETY HOTLINE** **1-800-695-7403**	To report incidents involving fraud, waste, or abuse by an NRC employee or NRC contractor, telephone: **OFFICE OF THE INSPECTOR GENERAL** **HOTLINE** **1-800-233-3497**

Access Control Log
Attachment 4

Revision 01

April 2004

Remedial Construction Services, L.P.
9720 Derrington
Houston, Texas 77064
(281) 955-2442

Attachment 4

Remedial Construction Services, L.P. (RECON)
Thorium Remediation Project
Access Control Log

Date	Name	SSN / ID #	Signature	Time In	Time Out	Frisking Results

Reviewed by: _____

Entrance/Unrestricted Release Form
Attachment 5

Revision 01

April 2004

Remedial Construction Services, L.P.
9720 Derrington
Houston, Texas 77064
(281) 955-2442

Attachment 5

Remedial Construction Services, L.P. (RECON)
Thorium Remediation Project
Entrance / Unrestricted Release Form

Instrument:	Calibration Due:	Instrument:	Calibration Due:

Company	VIN/ID #	Survey Location	CPM - Fixed	CPM - Removable	DPM - Fixed	DPM - Removable

Completed by: _____

Reviewed by: _____

NRC Release Limit Criteria
Attachment 6

Project No. 2-1719

March 2004

Remedial Construction Services, L.P.
9720 Derrington
Houston, Texas 77064
(281) 955-2442

TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

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	1000 dpm/100 cm^2	3000 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.	5000 dpm β-γ/100 cm^2	15,000 dpm β-γ/100 cm^2	1000 dpm β-γ/100 cm^2

[a]Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, 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 square meter. 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 on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

Area Survey Form
Attachment 7

Project No. 2-1719

March 2004

Remedial Construction Services, L.P.
9720 Derrington
Houston, Texas 77064
(281) 955-2442

Attachment 7

Remedial Construction Services, L.P. (RECON)
Thorium Remediation Project
Area Survey Form

Instrument	Calibration Due

Area Surveyed	Survey Location	CPM - Activity	DPM - Activity

Completed by: _____

Reviewed by: _____

NRC Form 4
Attachment 8

Project No. 2-1719

March 2004

Remedial Construction Services, L.P.
9720 Derrington
Houston, Texas 77064
(281) 955-2442

NRC FORM 4
(10/2001)
10 CFR PART 20

U.S. NUCLEAR REGULATORY COMMISSION

CUMULATIVE OCCUPATIONAL DOSE HISTORY

APPROVED BY OMB NO. 3150-0005 EXPIRES: 10/31/2004

Estimated burden per response to comply with this mandatory information collection request: 30 minutes. The record is used to ensure that doses to individuals do not exceed regulatory limits. This information is required to record an individual's lifetime occupational exposure to radiation to ensure that the cumulative exposure to radiation does not exceed regulatory limits. Send comments regarding the burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bis1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0005), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. NAME (LAST, FIRST, MIDDLE INITIAL)	2. IDENTIFICATION NUMBER	3. ID TYPE	4. SEX: MALE ☐ FEMALE ☐	5. DATE OF BIRTH (MM/DD/YYYY)

6. MONITORING PERIOD (MM/DD/YYYY - MM/DD/YYYY)	7. LICENSEE NAME	8. LICENSE NUMBER	9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐

11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE

6. MONITORING PERIOD	7. LICENSEE NAME	8. LICENSE NUMBER	9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐

11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE

6. MONITORING PERIOD	7. LICENSEE NAME	8. LICENSE NUMBER	9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐

11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE

6. MONITORING PERIOD	7. LICENSEE NAME	8. LICENSE NUMBER	9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐

11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE

6. MONITORING PERIOD	7. LICENSEE NAME	8. LICENSE NUMBER	9. RECORD ☐ ESTIMATE ☐ NO RECORD ☐	10. ROUTINE ☐ PSE ☐

11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE

19. SIGNATURE OF MONITORED INDIVIDUAL	20. DATE SIGNED	21. CERTIFYING ORGANIZATION	22. SIGNATURE OF DESIGNEE	23. DATE SIGNED

INSTRUCTIONS AND ADDITIONAL INFORMATION PERTINENT TO THE COMPLETION OF NRC FORM 4

(All doses should be stated in rems)

1. Type or print the full name of the monitored individual in the order of last name (include "Jr," "Sr," "III," etc.), first name, middle initial (if applicable).

2. Enter the individual's identification number, including punctuation. This number should be the 9-digit social security number if at all possible. If the individual has no social security number, enter the number from another official identification such as a passport or work permit.

3. Enter the code for the type of identification used as shown below:

CODE	ID TYPE
SSN	U.S. Social Security Number
PPN	Passport Number
CSI	Canadian Social Insurance Number
WPN	Work Permit Number
PADS	PADS Identification Number
OTH	Other

4. Check the box that denotes the sex of the individual being monitored.

5. Enter the date of birth of the individual being monitored in the format MM/DD/YYYY.

6. Enter the monitoring period for which this report is filed. The format should be MM/DD/YYYY - MM/DD/YYYY.

7. Enter the name of the licensee or facility not licensed by NRC that provided monitoring.

8. Enter the NRC license number or numbers.

9. Place an "X" in Record, Estimate, or No Record. Choose "Record" if the dose data listed represent a final determination of the dose received to the best of the licensee's knowledge. Choose "Estimate" only if the listed dose data are preliminary and will be superseded by a final determination resulting in a subsequent report. An example of such an instance would be dose data based on self-reading dosimeter results and the licensee intends to assign the record dose on the basis of TLD results that are not yet available.

10. Place an "X" in either Routine or PSE. Choose "Routine" if the data represent the results of monitoring for routine exposures. Choose "PSE" if the listed dose data represents the results of monitoring of planned special exposures received during the monitoring period.

    If more than one PSE was received in a single year, the licensee should sum them and report the total of all PSEs.

11. Enter the deep dose equivalent (DDE) to the whole body.

12. Enter the eye dose equivalent (LDE) recorded for the lens of the eye.

13. Enter the shallow dose equivalent recorded for the skin of the whole body (SDE,WB).

14. Enter the shallow dose equivalent recorded for the skin of the extremity receiving the maximum dose (SDE,ME).

15. Enter the committed effective dose equivalent (CEDE).

16. Enter the committed dose equivalent (CDE) recorded for the maximally exposed organ.

17. Enter the total effective dose equivalent (TEDE). The TEDE is the sum of items 11 and 15.

18. Enter the total organ dose equivalent (TODE) for the maximally exposed organ. The TODE is the sum of items 11 and 16.

19. Signature of the monitored individual. The signature of the monitored individual on this form indicates that the information contained on the form is complete and correct to the best of his or her knowledge.

20. Enter the date this form was signed by the monitored individual.

21. [OPTIONAL] Enter the name of the licensee or facility not licensed by NRC, providing monitoring for exposure to radiation (such as a DOE facility) or the employer if the individual is not employed by the licensee and the employer chooses to maintain exposure records for its employees.

22. [OPTIONAL] Signature of the person designated to represent the licensee or employer entered in item 21. The licensee or employer who chooses to countersign the form should have on file documentation of all the information on the NRC Form 4 being signed.

23. [OPTIONAL] Enter the date this form was signed by the designated representative.

PRIVACY ACT STATEMENT

Pursuant TO 5 U.S.C. 552a(e)(3), enacted into law by Section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the U.S. Nuclear Regulatory Commission (NRC) on NRC Form 4. This information is maintained in a system of records designated as NRC-27 and described at 65 Federal Register 56434 (September 18, 2000), or the most recent Federal Register publication of the Nuclear Regulatory Commission's "Republication of Systems of Records Notices" that is available at the NRC Public Document Room, 11555 Rockville Pike, Rockville, Maryland, or located in NRC's Agencywide Documents Access and Management System (ADAMS).

1. **AUTHORITY:** 42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(o) (1996); 10 CFR 20.2106, 20.2201-20.2204, and 20.2206 (2000); Executive Order 9397, November 22, 1943.

2. **PRINCIPAL PURPOSE(S):** The information is used by the NRC in its evaluation of the risk of radiation exposure associated with the licensed activity and in exercising its statutory responsibility to monitor and regulate the safety and health practices of its licensees. The data permits a meaningful comparison of both current and long-term exposure experience among types of licensees and among licensees within each type. Data on your exposure to radiation is available to you upon your request.

3. **ROUTINE USE(S):** The information may be used to provide data to other Federal and State agencies involved in monitoring and/or evaluating radiation exposure received by individuals monitored for radiation exposure while employed by or visiting or temporarily assigned to certain NRC licensed facilities; to return data provided by licensee upon request. The information may also be disclosed to an appropriate Federal, State, local, or Foreign agency in the event the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, local, or Foreign agency to the extent relevant and necessary for an NRC decision about you or to the extent relevant and necessary for that agency's decision about you. Information from this form may also be disclosed, in the course of discovery and in presenting evidence, to a Congressional office to respond to their inquiry made at your request, or to NRC-paid experts, consultants, and others under contract with the NRC, on a need-to-know basis.

4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION:** It is voluntary that you furnish the requested information, including social security number (identification number). The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birth dates among the large number of persons on whom data is maintained and to assure that there are no missed doses or monitoring periods and an individual gets a complete dose history when requested. The licensee must complete NRC Form 5 on each individual for whom personnel monitoring is required under 10 CFR 20.2106. Failure to do so may subject the licensee to enforcement action in accordance with 10 CFR 20.2401.

5. **SYSTEM MANAGER(S) AND ADDRESS:** REIRS Project Manager, Radiation Protection and Health Effects Branch, Division of Regulatory Applications, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.