SEC Petition Evaluation Report
Petition SEC-00203

Report Rev #: 0 Report Submittal Date: May 31, 2012

Subject Expert(s):	Jason Davis
Site Expert(s):	N/A

Petitioner Administrative Summary			
Petition Under Evaluation			
Petition #	Petition Type	Petition A Receipt Date	DOE/AWE Facility Name
SEC-00203	83.14	May 30, 2012	Medina Modification Center

NIOSH-Proposed Class Definition
All employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Medina Modification Center in San Antonio, Texas, from January 1, 1958 through December 31, 1966, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort.

Related Petition Summary Information			
SEC Petition Tracking #(s)	Petition Type	DOE/AWE Facility Name	Petition Status
N/A	N/A	N/A	N/A

Related Evaluation Report Information	
Report Title	DOE/AWE Facility Name
N/A	N/A

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SEC Evaluation Approved By:	[Signature on File] *Stuart L. Hinnefeld*	6/1/2012 *Date*

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Evaluation Report Summary: SEC-00203, Medina Modification Center

This evaluation report by the National Institute for Occupational Safety and Health (NIOSH) addresses a class of employees proposed for addition to the Special Exposure Cohort (SEC) per the *Energy Employees Occupational Illness Compensation Program Act of 2000*, as amended, 42 U.S.C. § 7384 *et seq.* (EEOICPA) and 42 C.F.R. pt. 83, *Procedures for Designating Classes of Employees as Members of the Special Exposure Cohort Under the Energy Employees Occupational Illness Compensation Program Act of 2000*.

NIOSH-Proposed Class Definition

All employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Medina Modification Center in San Antonio, Texas, from January 1, 1958 through December 31, 1966, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees included in the Special Exposure Cohort.

Feasibility of Dose Reconstruction Findings

NIOSH initiated the review of the Medina Modification Center based on its operational relationship with the Pantex Plant in Amarillo, Texas, and the results of the SEC-00068 Pantex petition evaluation that culminated in the recommendation to add a class to the SEC. The Board, in its review of the SEC-00068 Pantex evaluation report, determined that access to process and source term information for various production activities was insufficient to support estimation of internal exposures for the period from January 1, 1958 through December 31, 1983. As in the case of Pantex, NIOSH has not located any information indicating that urinalysis or other forms of internal monitoring were conducted at the Medina Modification Center.

NIOSH lacks sufficient information, which includes internal personnel monitoring data, air monitoring data, process data, and radiological source term information, to allow it to estimate with sufficient accuracy the potential internal exposures to uranium, plutonium, and tritium to which the proposed class may have been subjected. NIOSH finds that it is likely feasible to reconstruct external and occupational medical dose for Medina facility workers with sufficient accuracy.

The NIOSH dose reconstruction feasibility findings are based on the following:

- Principal sources of internal radiation for members of the proposed class included exposures to tritium, enriched uranium, depleted uranium and plutonium during the assembly, inspection, and disassembly of weapons components, and to enhanced radon in structures that were required to safely test nuclear weapons or components.

- NIOSH has found indications that air monitoring for tritium and for alpha emissions was routinely performed. However, NIOSH has been unable to locate any recorded results of this monitoring.

- NIOSH has access to information suggesting that baseline tritium urinalyses were performed for military personnel working in the plant and that these analyses were intended to be repeated every 2-3 months. Mason and Hanger employees were also required to submit tritium urine samples as of April 1962. At the time of this writing, however, NIOSH does not have access to the results of the baseline urinalyses or any confirmation that the intended follow-up analyses were performed. NIOSH has not located any information suggesting that uranium or plutonium urinalyses were conducted.

- Principal sources of external radiation for members of the proposed class included exposures to enriched uranium, depleted uranium, and plutonium during the assembly, inspection, and disassembly of weapons components.

- NIOSH has access to individual external monitoring records and summary exposure records from the years 1959 through 1966. NIOSH intends to use neutron-to-photon ratios based on data from similar operations to support reconstructing external neutron doses for members of the proposed class. NIOSH has identified no information describing the medical X-ray examination requirements for the covered period at the site. Therefore NIOSH intends to use its available methodology and its knowledge of the technology of that era to support reconstructing medical X-ray exposures for members of the proposed class.

- Based on this data availability, and the external and medical X-ray dose reconstruction methods available to NIOSH for the Medina Modification Center, NIOSH believes that it is possible to either: (1) estimate the maximum external dose for every type of cancer for which radiation doses are reconstructed that could have been incurred under plausible circumstances by any member of the class; or (2) estimate the external doses to members of the class more precisely than a maximum dose estimate.

- Pursuant to 42 C.F.R. § 83.13(c)(1), NIOSH determined that there is insufficient information to either: (1) estimate the maximum radiation dose, for every type of cancer for which radiation doses are reconstructed, that could have been incurred under plausible circumstances by any member of the class; or (2) estimate the radiation doses of members of the class more precisely than a maximum dose estimate.

Although NIOSH found that it is not possible to completely reconstruct internal radiation doses for the proposed class, NIOSH intends to reconstruct external exposures and use any internal monitoring data that may become available for an individual claim (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures). Therefore, dose reconstructions for individuals employed at the Medina Modification Center during the period from January 1, 1958 through December 31, 1966, but who do not qualify for inclusion in the SEC, may be performed using these data as appropriate.

Health Endangerment Determination

The NIOSH evaluation did not identify any evidence supplied by the petitioners or from other resources that would establish that the class was exposed to radiation during a discrete incident likely to have involved exceptionally high-level exposures, such as nuclear criticality incidents or other events involving similarly high levels of exposures. However, the evidence reviewed in this

evaluation indicates that some workers in the class may have accumulated chronic radiation exposures through intakes of uranium, plutonium, and tritium and from direct exposure to radioactive materials. Therefore, 42 C.F.R. § 83.13(c)(3)(ii) requires NIOSH to specify that health may have been endangered for those workers covered by this evaluation who were employed for a number of work days aggregating at least 250 work days within the parameters established for this class or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

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SEC Petition Evaluation Report for SEC-00203

ATTRIBUTION AND ANNOTATION: This is a single-author document. All conclusions drawn from the data presented in this evaluation were made by the ORAU Team Lead Technical Evaluator: Jason Davis; Oak Ridge Associated Universities. The rationales for all conclusions in this document are explained in the associated text.

1.0 Purpose and Scope

This report evaluates the feasibility of reconstructing doses for employees who worked at a specific facility during a specified time. It provides information and analysis germane to considering a petition for adding a class of employees to the Congressionally-created SEC.

This report does not make any determinations concerning the feasibility of dose reconstruction that necessarily apply to any individual energy employee who might require a dose reconstruction from NIOSH, with the exception of the employee whose dose reconstruction could not be completed, and whose claim consequently led to this petition evaluation. The finding in this report is not the final determination as to whether or not the proposed class will be added to the SEC. This report will be considered by the Advisory Board on Radiation and Worker Health (the Board) and by the Secretary of Health and Human Services (HHS). The Secretary of HHS will make final decisions concerning whether or not to add one or more classes to the SEC in response to the petition addressed by this report.

This evaluation, in which NIOSH provides its findings both on the feasibility of estimating radiation doses of members of this class with sufficient accuracy and on health endangerment, was conducted in accordance with the requirements of EEOICPA and 42 C.F.R. § 83.14.

2.0 Introduction

Both EEOICPA and 42 C.F.R. pt. 83 require NIOSH to evaluate qualified petitions requesting that the Department of Health and Human Services add a class of employees to the SEC. The evaluation is intended to provide a fair, science-based determination of whether it is feasible to estimate, with sufficient accuracy, the radiation doses of the proposed class of employees through NIOSH dose reconstructions.[1]

NIOSH is required to document its evaluation in a report, and to do so, relies upon both its own dose reconstruction expertise as well as technical support from its contractor, Oak Ridge Associated Universities (ORAU). Once completed, NIOSH provides the report to both the petitioners and the Advisory Board on Radiation and Worker Health. The Board will consider the NIOSH evaluation report, together with the petition, comments of the petitioner(s) and such other information as the Board considers appropriate, to make recommendations to the Secretary of HHS on whether or not to add one or more classes of employees to the SEC. Once NIOSH has received and considered the advice of the Board, the Director of NIOSH will propose a decision on behalf of HHS. The Secretary

[1] NIOSH dose reconstructions under EEOICPA are performed using the methods promulgated under 42 C.F.R. pt. 82 and the detailed implementation guidelines available at http://www.cdc.gov/niosh/ocas.

of HHS will make the final decision, taking into account the NIOSH evaluation, the advice of the Board, and the proposed decision issued by NIOSH. As part of this final decision process, the petitioner(s) may seek a review of certain types of final decisions issued by the Secretary of HHS.[2]

3.0 NIOSH-Proposed Class Definition and Petition Basis

NIOSH initiated the review of the Medina Modification Center based on its operational relationship with the Pantex Plant in Amarillo, Texas, and the results of the SEC-00068 Pantex petition evaluation that culminated in the recommendation to add a class to the SEC. The Board, in its review of the SEC-00068 Pantex evaluation report, determined that access to process and source term information for various production activities was insufficient to support estimation of internal exposures for the period from January 1, 1958 through December 31, 1983. As in the case of Pantex, NIOSH has not located any information indicating that urinalysis or other forms of internal monitoring were conducted at the Medina Modification Center.

The NIOSH-proposed class includes all employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Medina Modification Center in San Antonio, Texas from January 1, 1958 through December 31, 1966, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort. During this period, employees at this facility were involved in the storage, maintenance, assembly, and disassembly of uranium and plutonium weapons.

The evaluation responds to Petition SEC-00203 which was submitted by an EEOICPA claimant whose dose reconstruction could not be completed by NIOSH due to a lack of sufficient dosimetry-related information. NIOSH's determination that it is unable to complete a dose reconstruction for an EEOICPA claimant is a qualified basis for submitting an SEC petition pursuant to 42 C.F.R. § 83.9(b).

4.0 Radiological Operations Relevant to the Proposed Class

The following subsections summarize the radiological operations at the Medina Modification Center from January 1, 1958 through December 31, 1966 and the information available to NIOSH to characterize particular processes and radioactive source materials. Using available sources, NIOSH has attempted to gather process and source descriptions, information regarding the identity and quantities of radionuclides of concern, and information describing processes through which the radiation exposures of concern may have occurred and the physical environment in which they may have occurred. The information included within this evaluation report is meant only to be a summary of the available information.

[2] See 42 C.F.R. pt. 83 for a full description of the procedures summarized here. Additional internal procedures are available at http://www.cdc.gov/niosh/ocas.

4.1 Operations Description

The Medina Modification Center was located in San Antonio, Texas on 3,700 acres of land southwest of Lackland AFB, the training center for most Air Force recruits (Lamb, 1995). For the period evaluated by NIOSH, the Medina workforce ranged from a minimum of approximately 95 workers in 1959 to a maximum of 669 workers in 1963. This total then declined to approximately 600 workers in 1965 and 1966 as the facility was nearing closure (Mason, 1966; MED-142, 1970; Tracerlab, 1959; Tracerlab 1960; Tracerlab, 1961; Tracerlab, 1962; Tracerlab, 1963; Tracerlab, 1964; Tracerlab, 1965).

The Air Force's Medina Modification Center was a sister facility to the Clarksville Modification Center, and the two provided similar services to the Department of Defense (DOD) as National Stockpile Sites. Beginning in 1954 and finishing in 1955, the Atomic Energy Commission (AEC) and the Air Force constructed the Medina facility with the code name Site King (Maroncelli, 2002). The AEC reserved most of the acreage at the Medina facility for about 100 earth-covered ammunition igloos arranged in orderly columns across the north-central portion of the site. The military began shipping nuclear warheads there in 1955, and Sandia Corporation specialists managed the day-to-day operations. The AEC shared operation of the facility with the Air Force for five years. The sole mission of the facility during this period was the storage, maintenance, and control of a portion of the nation's nuclear stockpile (Lamb, 1995).

By the late 1950s, the nuclear weapons workers at the Pantex Plant and the Iowa Ordnance Plant were struggling to meet production demands. In 1958, the AEC chose Mason & Hanger to operate the Medina facility, designated it the Medina Modification Center, and constructed substantial new facilities. The AEC also discontinued storage of nuclear weapons at Medina and concentrated solely on the disassembly and modification plants (Maroncelli, 2002).

By 1960, Sandia personnel had left the facility, and Mason & Hanger had taken over the warhead modification activities. The two principal missions of the Medina Modification Center were stockpile surveillance and protection, and weapon modification, retrofit, and retirement. This vital work included routine inspections for corrosion, tritium leaks, and permissive action link reliability; and replacement of short-lived initiators with fresh Po-210 or tritium. In some cases, technicians tested specific weapon components to destruction, replaced obsolete parts with up-to-date technology, or retired the weapon completely from the active stockpile. Also, DOD requested Medina specialists to examine and assess nuclear weapons that had been damaged or destroyed by accidental dropping, plane crashes, fires, or other mishaps. The AEC grouped the Medina Modification Center buildings into three large compounds and surrounded them with multiple fences and vegetation-cleared buffer zones. The site made use of three dome-shaped Gravel Gerties, ten storage buildings, various other support structures, landfills, and burial areas (Maroncelli, 2002).

In January 1965, the AEC designated the Medina Modification Center as a branch of its new Amarillo Area Office. In 1966, the Air Force reacquired the facility and renamed it the Lackland AFB Training Annex (LTA) (Lamb, 1995). Since then, various training units and intelligence and cryptologic operations have used the facilities. Today, the LTA remains off-limits to visitors without official permission and a need to be there. The modification buildings and Gravel Gerties are still in place in varying states of use.

Notable Radiological Incidents During the Period Under Evaluation

September 10, 1959: Ir-192 Source Exposure

A vendor came to the site to demonstrate a new type of portable, air-operated radiography source/shield (apparently called a Puff camera). The device could pneumatically transfer a source from the safe shielded position, through a 30-ft tube, to a radiography exposure location to X-ray an electronic part. The vendor representative and the Medina radiography staff successfully demonstrated moving the capsule out to the end of the tube and back into the lead shield using a nonradioactive dummy. When the vendor representative was leaving the site, he realized he did not have the dummy capsule and returned. An investigation revealed that the dummy was still in the lead shield and when the air flow was reversed, the 30-Ci Ir-192 source could not enter the shield because the dummy was there. When the air flow stopped, the Ir-192 source fell onto the ground near the radiographers. As a result, three individuals received unusually high gamma radiation exposures: Radiographer A – 6,600 mrem; Radiographer B – 3,000 mrem; and Radiographer C – 1,730 mrem. These exposures are included in the summarized records (Mason, 1959).

November 13, 1963: Detonations of High-Explosive Assemblies

Three Mason & Hangar technicians were loading chemical high-explosive assemblies into an ammunition storage igloo when a spark ignited the assemblies and they began to burn uncontrollably. About 45 seconds later, the burning assemblies detonated, setting off additional high-explosive assemblies. The blast from the high explosives created a 20-foot deep crater and a shock wave that broke windows 12 miles away in downtown San Antonio and was audible at least 50 miles away. Several thousand pounds of natural and depleted uranium stored in the igloo disintegrated and dispersed irretrievably into the atmosphere. The three technicians were not seriously injured; damage at the modification center was limited to broken windows. The Texas State Department of Health and the U.S. Public Health Service performed radiological surveys and sampling on site and downwind. The AEC also dispatched a radiologically-instrumented EG&G company aircraft from Colorado to survey hundreds of square miles of the San Antonio metropolitan area. The EG&G and PHS staff reported no radiation detectable above background levels and no traces of the vaporized uranium (Guillou, 1964; Rademacher, 2000).

4.2 Radiation Exposure Potential from Operations

The potential for external radiation dose existed throughout the Medina Modification Center. Based on the site operations outlined in Section 4.1, sources of exposure included beta, gamma, and neutrons emitted from plutonium and uranium, and from polonium initiators as well as from an iridium and a cobalt radiography source.

The primary sources of internal radiation exposure at the site were airborne uranium oxide and tritium gases generated during inspection assembly and disassembly of weapons and components, and enhanced radon in structures that were required to safely test nuclear weapons or components (Crismon, 1960; Higgins, 1960; Lamb, 1995). The exposure potential from plutonium was likely small, as the plutonium containing components consisted of clad or plated parts.

4.3 Time Period Associated with Radiological Operations

Per the DOE Office of Health, Safety and Security, the time period associated with DOE operations at the Medina Modification Center is from 1958-1966 (DOE, 2010). Operations at the Medina facility ceased in 1965 when the processes were transferred to the Pantex Plant (Lamb, 1995) and structures were released piecemeal as they were cleaned and decontaminated (Plan, 1966). NIOSH has documentation indicating that all radiological materials were removed from the site and disposed of in accordance with an approved close-down plan, and all buildings had been cleaned and decontaminated as of the February 15, 1966 evaluation (Vespe, 1966). However, decontamination of certain areas of the facility (e.g., the burn pit) was not scheduled for completion until after the March 7, 1966 release from production (Plan, 1966). Because the completion date for final decontamination is not clear, NIOSH proposes that the class period match the facility's covered period of January 1, 1958 through December 31, 1966.

4.4 Site Locations Associated with Radiological Operations

At the Medina Modification Center, specific types of activities were carried out in locations or buildings designed for that purpose. The following subsections describe the various categories of locations/buildings.

"A" Structures

Buildings 301, 402, 403, 404, 552, 556, 562, 566, 571, and 585, known as "A" Structures, were used to store nuclear capsules for weapons systems. These buildings, though massive concrete structures, contained only four small storage rooms. Each room was approximately 10 feet wide, 13 feet deep and 9 feet high. Each room had the capacity to hold approximately 30 capsules in their "critically safe" storage containers. These storage rooms were accessed through bank-vault-type doors equipped with dual combination locks (Lamb, 1995).

Ten-foot-thick walls and massive berming were designed to shield the capsules stored in the vaults from external attacks, rather than as containment of possible accidental detonations. A sophisticated external device was required to arm the capsules, so there was little possibility of an explosion occurring within the structure (Lamb, 1995).

Spacing of the capsules stored in the" A" Structures was designed to prevent nuclear criticality. Although capsules stored closely together would not have detonated, they would have generated a burst of neutrons and endangered maintenance personnel. Storage containers for the capsules were designed to prevent any such accident from occurring. The capsule storage containers consisted of a cylinder approximately 14 inches in diameter and approximately 25 inches in height. Steel braces, welded to the top, bottom, and sides of the cylinder created a frame larger than the cylinder itself. The finished container assemblies were called "bird cages." They were sealed with lead-wire seals (similar to those used to prevent tampering with electrical power meters) to ensure that their contents were not disturbed between authorized maintenance activities (Lamb, 1995).

Maintenance activities always took place in a "C" Structure and never in the vault where the capsules were stored. Therefore, no nuclear material was ever exposed within an "A" Structure and there was little or no potential for any release of radioactive material within this building. Activities within the "A" Structure ceased in 1960 (Lamb, 1995).

"C" Structure

Building 307, known as a "C" Structure, was used as a nuclear materials inspection laboratory/maintenance building for the first nuclear weapons stored at Medina facility. The building was constructed prior to the arrival of special weapons in 1955. The "C" Structure provided bench space to perform required maintenance operations, storage for neutron calibration and assay sources, and support facilities that included a change room and storage areas. Nuclear capsules removed from "A" structures for maintenance were transported in their bird cages (Lamb, 1995).

Early weapons used polonium-beryllium initiators to generate neutrons during the explosion sequence. Because Po-210 has a half-life of approximately 138 days, the initiators had to be replaced periodically. According to former Sandia National Laboratory personnel, these devices were maintained following precise quality control methods that required the following steps (Lamb, 1995):

1. Release pressure from the bird cage container through a filter and check the filter for alpha activity; if no activity, remove capsule from the container using a handling tool.

2. Place the capsule on a table top with an alpha probe at one end. (The table was covered with a large piece of butcher paper to contain any spalling of uranium oxides.)

3. Place a Plexiglas glove box over the capsule.

4. Disassemble the capsule parts and check the integrity of the coatings.

5. Remove the glove box.

6. Remove uranium oxide deposits from the threads using a small cloth or paper swipe and trichloroethylene (TCE). Wipe off the threads with ethyl alcohol to dry the components.

7. Use acetone to remove previous markings made with blue machinist's dye and make new markings. (Later components had serial numbers etched on the surface of the components.)

8. Check the activity of the fissile material using beta and gamma radiation measurements.

9. Assay the nuclear material by accurately weighing it; perform sub-critical multiplication measurements using external neutron sources.

10. Replace the polonium-beryllium initiators. (These were later replaced with nonradioactive initiators.)

11. Reassemble the capsule.

12. Place the capsule and a sack of desiccant in the bird cage container.

13. Screw on the bird cage container top. Re-pressurize and wire seal the bird cage container. (Positive pressure was maintained to ensure dryness and keep the O-rings in place).

After maintenance activities in the "C" Structure were completed, the used initiators were sent to Los Alamos National Laboratory (LANL) in New Mexico, for storage, regeneration, or disposal. The spalled uranium oxides, swipes contaminated with solvents, lead-wire seals, and gloves were wrapped in the butcher paper and placed in 18 x 18 x 24-inch cardboard boxes. The boxes were presumably disposed of in the dry Low-Level Radioactive Waste (LLRW) disposal area (currently RW-17). Documentation indicates that this area received no free liquid waste (Lamb, 1995).

A source safe (a cylindrical apparatus located below the floor surface, with a polyethylene neutron absorber at the top) was located in the corner of the laboratory room of the "C" Structure. Below the neutron absorber, the source safe had a tray for storing check sources used to verify the activity of the fissile material in the weapons (Lamb, 1995).

No accidental releases of plutonium are known to have occurred at Medina Modification Center during the AEC's tenure. Based on sampling performed during closeout and events, there are no indications that any spills or releases of radioactive material occurred in the "C" Structure during its operational lifetime (Lamb, 1995).

Between 1954 and 1957, the polonium/beryllium initiators were phased out and replaced with a newer type of sealed neutron initiator which did not require routine replacement. Maintenance activities were reduced to annual disassembly of capsules to determine their condition and to verify the integrity of the fissile materials. Maintenance of the newer capsules generated the same types of waste, but in smaller quantities because of the infrequent maintenance schedule. By approximately 1960, capsules had been phased out of the stockpile and maintenance activities at Building 7418 ceased. Thereafter, AEC maintenance activities did not involve any exposed nuclear material (Lamb, 1995).

Assembly and Maintenance Buildings

Plants 1 and 2 each consisted of a set of two buildings originally constructed to maintain nonnuclear components of weapons stored at the Medina facility. Early activities in the plants included inspection, testing, and assembly of nonnuclear mechanical and electrical systems (Lamb, 1995). The plants were renovated in 1959 to become more of an integral part of the Medina Modification Center (Davis, 1999).

Plant 1 consisted of a mechanical bay (M-Bay), electrical bay (E-Bay), and plutonium assembly cell (gravel gertie). The M-Bay was used for the inspection, repair, modification, assembly, disassembly, and salvage of uranium weapons. Some assembly and disassembly of the outer cases of plutonium weapons were also conducted in the M-Bay. However, the majority of plutonium operations were carried out in the gravel gertie. A maximum of 20 kg of plutonium was permitted in the M-Bay at any one time (Davis, 1961).

E-Bay was used for the inspection, testing, and modification of electrical components. This bay contained a small pit inspection and weighing room where both uranium and plutonium pits would be removed from carrying cases, inspected, and weighed. Documentation suggests that alpha monitoring and the badging of all personnel present were both required during inspection activities. Additionally, swipes were taken of all of the nuclear components, bird cages, tools, and equipment used. The individuals performing the inspections as well as the work spaces were surveyed for alpha contamination after each inspection (Davis, 1999, Davis, 1961). E–Bay also contained a tritium reservoir room where squib valves could be assembled and disassembled under a ventilated hood (Davis, 1961).

Plant 2 consisted of one E-Bay, one M-Bay and two gravel gerties, each with functions similar to their counterparts in Plant 1. In addition, Plant 2 had an Auxiliary Process Building (Building 444) that had eight work bays with six being used for general weapons assembly, disassembly, and modification. This building had plutonium limit of 20 kg present at any one time, similar to the M-Bays (Davis, 1961).

Gravel gerties (Buildings 440, 441, and 433) got their names from the several tons of gravel that were present in the ceiling of the structure for containment of fissile material in the event of an accidental detonation of the high-explosive system (Lamb, 1995). The gerties were composed of five bays with a material limit of five complete weapons units per bay. One of the five bays was used for inspection and repair of weapons containing plutonium pits. Another bay was used for removing the high explosives from plutonium pits. Two bays were used as staging areas and one main bay was used as the main assembly bay (Davis, 1960). Use of the gravel gertie modification/disassembly plants ceased in 1965 (Lamb, 1995).

"S" Structure

An "S" (or Surveillance) Structure was constructed at Medina in 1955 for quality assurance inspections and for the testing of weapons in the stockpile at that time. Quality Assurance (QA) activities were the responsibility of the SNL Quality Assurance Inspection Agency (QAIA). This "S" Structure was constructed in order to separate QA activities from the routine maintenance and assembly functions performed at Plants 1 and 2. This building was modified as part of the modification/disassembly center in 1959 (Lamb, 1995). After this time, weapons and components were inspected and tested in the M- and E-Bays of this structure. Alpha monitoring was in place during these operations (Davis, 1961).

Storage Igloos

One hundred standard igloos were constructed at Medina for the storage of weapon components, assembled weapons, and weapon casings (Lamb, 1995). Igloo No. 521 was used as a radiographic building with a 150-300 keV X-ray unit and a Model 150 Multitron with a 100-Ci Co-60 source that was routinely used. A 30-Ci iridium radiography source with puff camera was used in this building prior to 1961. This building was equipped with a fixed gamma alarm. Personnel were required to wear film dosimetry and carry a portable beta/gamma monitor when entering the building (Davis, 1961).

Igloos 522 and 523 were temporarily used as operating structures when the plant workloads became too high. Igloos 519 through 523, 547, and 559 were used as centers for packaging and temporary storage of materials for the plant (Davis, 1961).

Igloo 529 and 553 were used for the storage of weapon pits and tritium reservoirs. These materials were stored in their shipping containers to minimize contamination and criticality risks. Secondary weapon capsule assemblies were stored in Igloo No. 530. Weapons accident wastes and residues were stored in Igloos 528 and 584. It was noted that, during storage, some of the containers of residues had begun to rust and flake, leading to some low-level alpha contamination in these areas (Davis, 1961). Igloo 547 was used for the teardown of Mark 6-type weapons (Davis, 1961).

Modification and Disassembly Plants

In 1959, the AEC built a facility at Medina for modifying and disassembling weapons. This facility was comprised of three gravel gerties (Buildings 440, 441, and 433). High-explosive shells were removed from nuclear assemblies within this structure. Several tons of gravel was present in the ceiling of the structure for containment of fissile material in the event of an accidental detonation. Use of the gravel gertie modification/disassembly plants ceased in 1965 (Lamb, 1995).

Low-Level Radioactive Waste (LLRW) Disposal Areas

Three sites at Medina (PW-15, RW-17, and RW-19) were reportedly designed for the collection of dry and liquid LLRW. RW-15 was a landfill used for the disposal of LLRW from Medina and (according to documentation) from Sandia (Miller, 1962). The landfill may have received classified, limited-life components disposed of during weapons modification and disassembly operations between 1959 and 1965 (Lamb, 1995). Documentation suggests that detailed inventories were kept of all material stored in these landfills; however, NIOSH does not have access to these inventories (Miller, 1962).

Based on information collected by Lackland AFB, the waste was stored below ground in wooden crates (approximately 4 x 4 x 8-feet deep) with radioactive warning signs affixed to crate exteriors. The crates were excavated in 1965 and removed from the area when AEC operations ceased. The site was cleared by federal safety personnel as being decontaminated when AEC closed operations (Lamb, 1995).

The dry LLRW generated in the "C" Structure (e.g., swipes, butcher paper, gloves) was typically contained in 18 x 18 x 24-inch cardboard boxes. The boxes presumably were disposed of on site in the LLRW disposal area known as IRP site RW-l7. RW-17 was an unlined pit measuring 4 x 10 x 6-feet deep (Lamb, 1995).

A former AEC employee indicates that RW-19 was a small gravel leaching area (approximately 20 x 20 feet) located behind Building 444. The site reportedly received intermittent waste water discharges from Building 444. The waste water may have contained LLRW from this building. Gravel and soil from the area were excavated from the site when the AEC left Medina in 1965 (Lamb, 1995).

Although the above-listed areas are specifically identified for the use of AEC-related radiological materials, documentation available to NIOSH does not indicate any definite boundaries between radiological and non-radiological areas for the period being evaluated. Furthermore, documentation available to NIOSH also does not indicate that the above-listed areas are the only ones in which radiological materials were handled.

NIOSH has determined that the site-specific and claimant-specific data available for the time period of this evaluation are insufficient to allow NIOSH to characterize worker movements across the Medina site. NIOSH is therefore unable to define individual worker exposure scenarios based on specific work locations within the Medina Modification Center during the period under evaluation.

4.5 Job Descriptions Affected by Radiological Operations

NIOSH has determined that the site-specific and claimant-specific data available for Medina Modification Center for the time period under evaluation are insufficient to allow NIOSH to determine that any specific work group was not potentially exposed to radioactive material releases or possible subsequent contamination.

NIOSH has insufficient information associating job titles and/or job assignments with specific radiological operations or conditions. Without such information, NIOSH is unable to define potential radiation exposure conditions based on worker job descriptions.

5.0 Summary of Available Monitoring Data for the Proposed Class

The primary data used for determining internal exposures are derived from personal monitoring data, such as urinalyses, fecal samples, and whole-body counting results. If these are unavailable, the air monitoring data from breathing zone and general area monitoring are used to estimate the potential internal exposure. If personal monitoring and breathing zone area monitoring are unavailable, internal exposures can sometimes be estimated using more general area monitoring, process information, and information characterizing and quantifying the source term.

This same hierarchy is used for determining the external exposures to the cancer site. Personal monitoring data from film badges or thermoluminescent dosimeters (TLDs) are the primary data used to determine such external exposures. If there are no personal monitoring data, exposure rate surveys, process knowledge, and source term modeling can sometimes be used to reconstruct the potential exposure.

A more detailed discussion of the information required for dose reconstruction can be found in OCAS-IG-001, *External Dose Reconstruction Implementation Guideline,* and OCAS-IG-002, *Internal Dose Reconstruction Implementation Guideline*. These documents are available at: http://www.cdc.gov/niosh/ocas/ocasdose.html.

5.1 Data Capture Efforts and Sources Reviewed

As a standard practice, NIOSH completed an extensive database and Internet search for information regarding the Medina Modification Center. The database search included the DOE Legacy Management Considered Sites database, the DOE Office of Scientific and Technical Information (OSTI) database, the Energy Citations database, and the Hanford Declassified Document Retrieval System. In addition to general Internet searches, the NIOSH Internet search included OSTI OpenNet Advanced searches, OSTI Information Bridge Fielded searches, Nuclear Regulatory Commission (NRC) Agency-wide Documents Access and Management (ADAMS) web searches, the DOE Office of Human Radiation Experiments website, and the DOE-National Nuclear Security Administration-Nevada Site Office-search. Attachment 1 contains a summary of the Medina Modification Center documents. The summary specifically identifies data capture details and general descriptions of the documents retrieved.

NIOSH is awaiting responses from the Fort Worth Federal Records Center and Mason and Hanger Corporation for access to some information regarding the Medina Modification Center. However, after review of the outstanding document titles by the DCAS Health Physics Lead Evaluator and DCAS Director, NIOSH feels that these documents would not provide any information that would change the feasibility determination for this site.

In addition to the database and Internet searches listed above, NIOSH identified and reviewed numerous data sources to determine information relevant to determining the feasibility of dose reconstruction for the class of employees under evaluation. This included determining the availability of information on personal monitoring, area monitoring, industrial processes, and radiation source materials. The following subsections summarize the data sources identified and reviewed by NIOSH.

5.2 Worker Interviews

Based on its reviews of the NOCTS files and information/documentation in the SRDB, NIOSH identified no obvious interview candidate for this evaluation.

5.3 Internal Personnel Monitoring Data

Documentation available to NIOSH indicates that an industrial medicine program was in place, including a part-time physician from the Minter Clinic as well as a registered nurse and a registered laboratory technician. The dispensary was located in Building 111 and contained a first-aid room and laboratory facilities (Miller, 1962). This building contained facilities for the performance of tritium urinalysis. NIOSH has access to information suggesting that baseline tritium urinalyses were performed for military personnel working in the plant and that these analyses were intended to be repeated every 2-3 months (Davis, 1999). Mason and Hanger employees were also required to submit urine samples as of April 1962 (Vespe, 1966). At the time of this writing, NIOSH does not have access to the results of the baseline tritium urinalyses or any confirmation that the intended follow-up tritium analyses were performed. NIOSH has not located any information suggesting that uranium or plutonium urinalyses were conducted.

NIOSH found indications that air monitoring for tritium and for alpha emissions were routinely performed (Blackwell, 1960; Davis, 1960; Davis, 1999; Higgins, 1960). However, NIOSH has been unable to locate any recorded results of this monitoring.

The NOCTS database was reviewed for claimants whose work history included the Medina Modification Center during part or all of the covered period (1958 through 1966). A total of 47 claimants were identified. The files for 47 claimants were thoroughly reviewed and no internal monitoring data were found. This is consistent with above determination that insufficient monitoring existed.

5.4 External Personnel Monitoring Data

Mason & Hanger used weekly dosimetry services provided by Tracerlab from April 1959 until July 1964. From July 1964 until January 1966, weekly dosimeters were provided by Nuclear Service Laboratories of Knoxville, Tennessee (Everett, 1964). The clerical maintenance of the dosimetry records was not rigorous. For example, individual names were consistently assigned to only a maximum of eleven film badge numbers and some numbers were reused when an individual left the program. Over 100 other film badges were assigned to different people each week and the individual names, for non-zero results only, were then recorded on the film badge dose report after it was received. Some weeks, the task of recording names associated with non-zero dose results was not completed, so it is impossible to reconstruct who received the non-zero doses. Because more than one individual was assigned to a given film badge number, the quarterly and annual totals maintained by the film badge processor were not useful.

The records contained hand-written tally sheets for 1959, 1960, 1961, and 1962 that showed the dosimetry records were routinely transcribed to maintain individual dose totals by calendar quarter, calendar year, and total Medina doses. These records were later compiled by computer and printed each quarter during 1964 and 1965. Although the tally sheets for 1963 are missing from the records, the vendor dosimetry reports are available and appear to be complete and reasonably accurate.

- 1959 Records: Only three individuals were consistently identified with assigned film badge numbers. There were also three visitor badges, but there were no notes as to whether the visitor badges were used or to whom they may have been assigned. Most of the reported results were less than the minimum reported dose (5 mrem for X-ray, 10 mrem for gamma, 30 mrem for beta, and 15 mrem for neutron). There was no indication of the radiography incident of September 7, 1959 (discussed in Section 4.1). (Tracerlab, 1959)

- 1960 Records: Only three individuals were consistently identified with assigned film badge numbers through June 26, 1960. Beginning on June 27, 1960, seven individuals were consistently identified with assigned film badge numbers, and there were three visitor badges. There were no notes as to whether the visitor badges were used or to whom they may have been assigned. Most of the reported results were less than the minimum detectable dose. (Tracerlab, 1960)

- 1961 Records: Only seven individuals were consistently identified with assigned film badge numbers through July 2, 1961. As of July 3, 1961 there were only six individuals who were consistently identified with assigned film badge numbers, and there were four visitor badges. There were no notes as to whether the visitor badges were used or to whom they may have been assigned. Most of the reported results were less than the minimum detectable dose. (Tracerlab, 1961)

- 1962 Records: Only six individuals were consistently identified with assigned film badge numbers, and there were four visitor badges. There were no notes as to whether the visitor badges were used or to whom they may have been assigned. Most of the reported results were less than the minimum detectable dose. (Tracerlab, 1962)

- 1963 Records: Only six individuals were consistently identified with assigned film badge numbers through June 2, 1963. As of June 3, 1963, there were 11 individuals consistently identified with assigned film badge numbers, and nine visitor badges. There were no notes as to whether the visitor badges were used or to whom they may have been assigned. As of November 18, 1963, 40 more film badges were added to the service, but no individual names were associated with any of these badges. On December 16, 1963, 20 more film badges were added to the service for a total of 60 badges with no assigned names. It was apparent that work activities increased significantly as of November 18, 1963, as there are non-zero results reported for X-ray or gamma and beta exposures. However, the non-zero results for the unidentified badges cannot be linked to any individuals. (Tracerlab, 1963)

- 1964 Records: The records for early 1964 showed 11 individuals consistently identified with assigned film badge numbers, nine visitors, and 60 film badges with no names assigned. However, as of January 20, 1964, names were handwritten on the dosimetry report adjacent to the non-zero results. On the February 24, 1964 dosimetry report, names were handwritten adjacent to all the film badges issued, including the visitor badges, for a total of 72 names recorded. Also, 40 more twin-film badges (NTA film for neutrons) were added to the service. From March 2, 1964 through April 19, 1964, names were recorded only with non-zero results. During this same period, there were many notes of spurious non-zero neutron results on badges that were not assigned to anyone. The 40 extra film badges with NTA film for neutrons were discontinued as of April 19, 1964. On May 25, 1964, these 40 extra film badges with NTA film were added to the service. Through July 5, 1964, names were hand-written adjacent to all non-zero results. As of July 6, 1964, Tracerlab film badges service (including NTA film) was discontinued and service (with no neutron monitoring) started with Nuclear Service Laboratories, Inc., of Knoxville, Tennessee. A total of 80 film badges were provided, with no individual names associated with any film badge number. In most (but not all) cases, names were handwritten adjacent to the non-zero results. On September 7, 1964, 20 more film badges were added to the service. A few dosimetry reports for Mason & Hanger employees who visited other sites during 1964 were included in the records; these data were added to the individual totals. (Tracerlab, 1964)

- 1965 Records: The records through June 27, 1965 showed 100 film badges provided but no names associated with any specific film badge number. In most (but not all) cases, names were handwritten adjacent to the non-zero results (X-ray or gamma only). As of June 28, 1965, the service was reduced to 67 film badges, still with no names identified with any specific film badge number. A few dosimetry reports for Mason & Hanger employees who visited other sites during 1965 were included in the records; these data were added to the individual totals. (Tracerlab, 1965)

- 1966 Records: Dosimetry service provided by Nuclear Service Laboratories was reduced to 25 film badges as of January 3, 1966 and the service was terminated on January 24, 1966 when weapons-related work ended at Medina. There were no non-zero dosimeter results reported for 1966. (Dose Records, 1966)

5.5 Workplace Monitoring Data

Although the NIOSH has indication that routine air monitoring, area monitoring, and contamination swipes were performed at Medina, NIOSH has not been able to recover the results of any of these activities or sufficient documentation of these practices (Blackwell, 1960; Davis, 1960b; Davis, 1999; Higgins, 1960).

5.6 Radiological Source Term Data

Routine operations at the Medina Modification Center involved uranium metals, uranium oxides, tritium, and plutonium. These materials were sources of potential exposure at the site. Given that these operations involved complete weapons, it is reasonable to assume that a detailed inventory was kept of the materials. However, NIOSH has been unable to locate a detailed inventory of the facility for the years under evaluation, possibly due to classification issues. No information regarding radon levels in the facility has been located by NIOSH.

It is clear from the available research reports that Medina operations involved the use of uranium, tritium, and plutonium; however, the documentation does not provide sufficient information on specific radionuclides, quantities, or forms of the source materials used at any given time during the period under evaluation. Given this lack of information, NIOSH is unable to make reasonable assumptions about source terms, concentrations, or radiological equilibrium conditions at the Medina facility.

6.0 Feasibility of Dose Reconstruction for the Proposed Class

42 C.F.R. § 83.14(b) states that HHS will consider a NIOSH determination that there was insufficient information to complete a dose reconstruction, as indicated in this present case, to be sufficient, without further consideration, to conclude that it is not feasible to estimate the levels of radiation doses of individual members of the class with sufficient accuracy.

In the case of a petition submitted to NIOSH under 42 C.F.R. § 83.9(b), NIOSH has already determined that a dose reconstruction cannot be completed for an employee at the DOE or AWE

facility. This determination by NIOSH provides the basis for the petition by the affected claimant. Per § 83.14(a), the NIOSH-proposed class defines those employees who, based on completed research, are similarly affected and for whom, as a class, dose reconstruction is similarly not feasible.

This section of the report summarizes research findings by which NIOSH determined that it lacked sufficient information to complete the relevant dose reconstruction and on which basis it has defined the class of employees for which dose reconstruction is not feasible. NIOSH's determination relies on the same statutory and regulatory criteria that govern consideration of all SEC petitions.

6.1 Feasibility of Estimating Internal Exposures

NIOSH has evaluated the available personnel and workplace monitoring data and source term information and has determined that there are insufficient data for estimating internal exposures, as described below.

NIOSH has access to information suggesting that baseline urinalyses were performed for military personnel working in the plant and that these analyses were intended to be repeated every 2-3 months (Davis, 1999). Mason and Hanger employees were also required to submit urine samples as of April 1962 (Blackwell, 1962). However, at the time of this writing NIOSH does not have access to the results of these baseline urinalyses or any confirmation that the intended follow-up analyses were performed. NIOSH has not located any information suggesting that uranium or plutonium urinalyses were conducted.

Although NIOSH has indication that routine air monitoring, area monitoring, and contamination swipes were performed at Medina, NIOSH has not been able to locate the results of any of these monitoring activities (Blackwell, 1960; Davis, 1960b; Davis, 1999; Higgins, 1960).

NIOSH has located very little documentation regarding the quantities of radiological materials shipped to Medina for processing or testing. It is clear from reports and worker communications that Medina worked with uranium, tritium, and plutonium. However, without additional documentation, ORAUT can make no assumption about what quantities of the source materials may have been used or stored on site at any time during the period under evaluation.

In the absence of adequate internal dose monitoring criteria and adequate personnel monitoring data, NIOSH has not found sufficient general area air sampling, breathing zone air sampling, site survey, or source term information to allow it to bound potential exposures, or to demonstrate that workers were adequately monitored for potential exposures to radioactive materials at Medina during the period under evaluation. NIOSH has determined that reconstruction of the total internal doses received from exposures to uranium, uranium progeny, plutonium, and tritium is not feasible using the information available to NIOSH for the period from January 1, 1958 through December 31, 1966.

Although NIOSH found that it is not possible to completely reconstruct internal radiation doses for the period from January 1, 1958 through December 31, 1966, NIOSH intends to use any internal monitoring data that may become available for an individual claim (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures). Dose reconstructions for individuals employed at Medina Modification Center during the period from January 1, 1958 through December

31, 1966, but who do not qualify for inclusion in the SEC, may be performed using these data as appropriate.

6.2 Feasibility of Estimating External Exposures

This evaluation responds to a petition based on NIOSH determining that internal radiation exposures to uranium, plutonium, and tritium could not be reconstructed for a dose reconstruction referred to NIOSH by the Department of Labor (DOL). As noted above, HHS will consider this determination to be sufficient without further consideration to determine that it is not feasible to estimate the levels of radiation doses of individual members of the class with sufficient accuracy. Consequently, it is not necessary for NIOSH to fully evaluate the feasibility of reconstructing external radiation exposures for the class of workers covered by this report.

NIOSH has access to individual external monitoring records and summary exposure records from the years 1959 through 1966 (Mason, 1966). The routine practice at Medina appears to have required assigning dosimeters to personnel designated as radiation workers who could receive an external radiation dose greater than 10% of the Radiation Protection Guidelines in effect. Because these individuals would have been the workers with direct exposure to the devices being maintained at the plant, it is reasonable to assume that these badges represent the maximally-exposed individuals. NIOSH intends to use neutron-to-photon ratios based on data from similar operations to support reconstructing external neutron doses for members of the proposed class. NIOSH has identified no information describing the medical X-ray examination requirements for the covered period at the site. Therefore, NIOSH intends to use its available methodology and its knowledge of the technology of that era to support reconstructing medical X-ray for members of the proposed class.

Based on this data availability, and the external and medical X-ray dose reconstruction methods available to NIOSH for the Medina Modification Center, NIOSH believes that it is possible to either: (1) estimate the maximum external dose for every type of cancer for which radiation doses are reconstructed that could have been incurred under plausible circumstances by any member of the class; or (2) estimate the external doses to members of the class more precisely than a maximum dose estimate.

6.3 Class Parameters Associated with Infeasibility

As indicated in Section 4.3, NIOSH has documentation indicating that all radiological materials were removed from the site and disposed of in accordance with an approved close-down plan as of a February 15, 1966 evaluation. However, decontamination of certain areas of the facility (e.g., the burn pit) was not scheduled for completion until March 7, 1966 (Plan, 1966). Therefore, NIOSH recommends a class period from January 1, 1958 through December 31, 1966.

As stated in Section 4.4, documentation available to NIOSH does not indicate any definite boundaries between radiological and non-radiological areas at the Medina Modification Center for the period under evaluation. NIOSH is therefore unable to define individual worker exposure scenarios based on specific work locations. NIOSH recommends that the class definition include all areas of the Medina facility during the specified time period.

As stated in Section 4.5, it is not possible to determine that any specific work group was not potentially exposed to radioactive material releases or possible subsequent contamination. Given the lack of information regarding job descriptions or associations between job titles and/or job assignments with specific radiological conditions, NIOSH recommends that the class include all workers who worked in any area at the site.

7.0 Summary of Feasibility Findings for Petition SEC-00203

This report evaluates the feasibility for completing dose reconstructions for employees at the Medina Modification Center from January 1, 1958 through December 31, 1966. NIOSH determined that members of this class may have received radiation exposures from uranium, plutonium, and tritium. NIOSH lacks sufficient information, which includes monitoring data, sufficient air monitoring information, or sufficient process and radiological source information that would allow it to estimate the potential concentrations of plutonium, uranium, and tritium to which the proposed class may have been exposed.

NIOSH has documented herein that it cannot complete the dose reconstruction related to this petition. The basis of this finding demonstrates that NIOSH does not have access to sufficient information to estimate either the maximum radiation dose incurred by any member of the class or to estimate such radiation doses more precisely than a maximum dose estimate.

NIOSH has determined that adequate reconstruction of external exposures from all radionuclides, and occupational medical doses for this class of workers is considered likely to be feasible.

Although NIOSH found that it is not possible to completely reconstruct radiation doses for the proposed class, NIOSH intends to reconstruct external exposures and use any internal monitoring data that may become available for an individual claim (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures). Therefore, dose reconstructions for individuals employed at Medina Modification Center during the period from January 1, 1958 through December 31, 1966, but who do not qualify for inclusion in the SEC, may be performed using these data as appropriate.

NIOSH is awaiting responses from the Fort Worth Federal Records Center and Mason and Hanger Corporation for access to some information regarding the Medina Modification Center. However, after review of the outstanding document titles by the DCAS Health Physics Lead Evaluator and DCAS Director, NIOSH feels that these documents would not provide any information that would change the feasibility determination for this site.

8.0 Evaluation of Health Endangerment for Petition SEC-00203

The health endangerment determination for the class of employees covered by this evaluation report is governed by EEOICPA and 42 C.F.R. § 83.14(b) and § 83.13(c)(3). Pursuant to these requirements, if it is not feasible to estimate with sufficient accuracy radiation doses for members of the class, NIOSH must determine that there is a reasonable likelihood that such radiation doses may have endangered the health of members of the class. The regulations require NIOSH to assume that any duration of unprotected exposure may have endangered the health of members of a class when it has been established that the class may have been exposed to radiation during a discrete incident likely to have involved levels of exposure similarly high to those occurring during nuclear criticality incidents. If the occurrence of such an exceptionally high-level exposure has not been established, then NIOSH is required to specify that health was endangered for those workers who were employed for a number of work days aggregating at least 250 work days within the parameters established for the class or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

NIOSH has determined that members of the class were not exposed to radiation during a discrete incident likely to have involved levels of exposure similarly high to those occurring during nuclear criticality incidents. However, the evidence reviewed in this evaluation indicates that some workers in the class may have accumulated chronic radiation exposures through intakes of radionuclides and from direct exposure to radioactive materials. Consequently, NIOSH is specifying that health was endangered for those workers covered by this evaluation who were employed for a number of work days aggregating at least 250 work days within the parameters established for this class or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

9.0 NIOSH-Proposed Class for Petition SEC-00203

The evaluation defines a single class of employees for which NIOSH cannot estimate radiation doses with sufficient accuracy. This class includes all employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Medina Modification Center in San Antonio, Texas from January 1, 1958 through December 31, 1966, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort.

10.0 References

42 C.F.R. pt. 81, *Guidelines for Determining the Probability of Causation Under the Energy Employees Occupational Illness Compensation Program Act of 2000;* Final Rule, Federal Register/Vol. 67, No. 85/Thursday, p 22,296; May 2, 2002; SRDB Ref ID: 19391

42 C.F.R. pt. 82, *Methods for Radiation Dose Reconstruction Under the Energy Employees Occupational Illness Compensation Program Act of 2000*; Final Rule; May 2, 2002; SRDB Ref ID: 19392

42 C.F.R. pt. 83, *Procedures for Designating Classes of Employees as Members of the Special Exposure Cohort Under the Energy Employees Occupational Illness Compensation Program Act of 2000*; Final Rule; May 28, 2004; SRDB Ref ID: 22001

42 U.S.C. §§ 7384-7385 [EEOICPA], *Energy Employees Occupational Illness Compensation Program Act of 2000*; as amended; DCAS website

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Blackwell, 1962, *Industrial Health Survey, Medina Facility, March 22-23, 1962*, H. J. Blackwell; April 19, 1962; SRDB Ref ID: 88915, pdf p. 51

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Guillou, 1964, *Special Aerial Radiometric Survey Medina Base and Vicinity*, R. B. Guillou; February 7, 1964; SRDB Ref ID: 109291

Higgins, 1960, *Tritium Monitoring Requirements – Indoor Operations*, J. M. Higgins; September 1, 1960; SRDB Ref ID: 109242

Lamb, 1995, *Site Summary for the Lackland Air Force Base (Medina Base) Texas Former Weapons Storage Area*, Lamb Associates, Inc.; December 1995; SRDB Ref ID: 24968

Maroncelli, 2002, *The Traveler's Guide To Nuclear Weapons, A Journey Through America's Cold War Battlefields*, J. M. Maroncelli, T. L. Karpin; September 2002; SRDB Ref ID: 44825

Mason, 1959*, Contractor Report Radiation Exposure Incident September 10, 1959,* Mason & Hanger-Silas Mason Co., Inc.; September 22, 1959; SRDB Ref ID: 109307

Mason, 1966, *Pantex Plant Personnel Dosimetry Records, Mason & Hanger Facility At San Antonio*, Mason & Hanger; by context, no earlier than 1966; SRDB Ref ID: 1289

MED-142,1970, *Pantex Plant Personnel Dosimetry Records – Medina, Mason & Hanger-Silas Mason Co., Inc.*, Mason & Hanger-Silas Mason Co.; by context, no earlier than 1970; SRDB Ref ID: 1288

Medina, 1966, *Medina Facility – Mason & Hanger Facility at San Antonio Radiation Exposure Data on Monitored Personnel Time Period 1961-1966;* 1966; SRDB Ref ID: 1289, pdf pp. 3-10

Miller, 1962, *Industrial Health Survey, Medina Base*, *September 12, 13 and 14, 1962*; R. L. Miller; October 8, 1962; SRDB Ref ID: 88915, pdf pp. 53-63

Plan, 1966, *Safety Department Plan – Closedown Actions*, March 7, 1966; SRDB Ref ID: 88920, pdf pp. 15, 18-21

Rademacher, 2000, *Radiological Scoping and Characterization Surveys Work Plan, 1963 Igloo 572 Accident (Former Medina Base) Lackland Training Annex, Lackland Air Force Base, Texas*, S. E. Rademacher; December 2000; SRDB Ref ID: 23255

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Attachment 1: Data Capture Synopsis

Table A1-1: Data Capture Synopsis for the Medina Modification Center

Data Capture Information	General Description of Documents Captured	Date Completed	Uploaded To SRDB
Primary Site / Company Name: Medina Facility; DOE 1958-1966 Alternate Site Names: NA Physical Size of the Site: 3,700 Acres Site Population: Not located	Radiological scoping and characterization survey work plan. Continuing effort with Mason & Hanger Corporation, Government Services, no records identified at this time.	OPEN	1
State Contacted: TX Department of State Health Service, Radiation Safety Licensing [Phone No. redacted]	No relevant documents identified.	04/18/2012	0
DOE Albuquerque Operations Office	Burial of radioactive weapon residue, close-down plan for the Medina Facility, disposal of weapons residue, high explosive and plutonium limits, industrial health survey, MK 6 tear down, neutron dose detectors, neutron exposure evaluation, transfer of administrative control of Medina base, and a trip report.	09/13/2010	14
DOE Hanford	Data classification decision 1946 to present. Awaiting response to Hanford Data Capture Activity 67.	5/16/2012	1
DOE Legacy Management - Grand Junction Office	Radioactive monuments for posterity.	02/10/2010	1
DOE Legacy Management - MoundView (Fernald Holdings, includes Fernald Legal Database)	Mound-vue article discussing shutdown of Medina.	05/18/2010	1
DOE Pacific Northwest National Laboratory (PNNL)	Radiological scoping and characterization survey work plan.	04/02/2006	1
DOE Pantex	Evacuation of building 12-26. Working with Department of Energy Point of Contact and site to access records at Fort Worth Federal Records Center and onsite.	OPEN	1
DOE Pantex / SC&A	Contract AT(29-2)-756, "Scope of Work", burial of radioactive components and waste at Medina Facility, catalog of Medina Facility, change in tritium safety, cleanup of the burial grounds, radiation exposure incident, radiological survey, safety inspection, reports for weapon rebuild and repair, special aerial radiometric survey Medina base and vicinity, radiation safety procedures, and tritium monitoring while breaking gland nut connections.	06/23/2011	23
DOE Sandia National Laboratories, NM	Lackland Air Force Base site summary and a list of Sandia reports on Pantex and Medina.	11/11/2010	4

Table A1-1: Data Capture Synopsis for the Medina Modification Center			
Data Capture Information	**General Description of Documents Captured**	**Date Completed**	**Uploaded To SRDB**
Eastern Kentucky University Library	Analysis of new Medina assembly cell, design and construction of Medina assembly cell facilities, criticisms of Clarksville branch operations, 1962 newsletters, Nuclear Weapon Safety Program for AEC-owned facilities, scrap disposal facility Medina base, and a safety policy.	05/07/2009	15
Internet - Defense Technical Information Center (DTIC)	No relevant documents identified.	04/04/2012	0
Internet - DOE Comprehensive Epidemiologic Data Resource (CEDR)	No relevant documents identified.	04/10/2012	0
Internet - DOE Hanford Declassified Document Retrieval System (DDRS)	No relevant documents identified.	03/29/2012	0
Internet - DOE Legacy Management Considered Sites	No relevant documents identified.	03/23/2012	0
Internet - DOE National Nuclear Security Administration (NNSA) - Nevada Site Office	No relevant documents identified.	04/02/2012	0
Internet - DOE OpenNet	Defense nuclear agency historical documents lists, manufacturing statement for weapons production schedule of transfers, shipping report of assemblies, and a purchase order status report. NOTE: 3 documents added by Site Association Review.	03/29/2012	33
Internet - DOE OSTI Energy Citations	Design progress report.	03/27/2012	1
Internet - DOE OSTI Information Bridge	Missile accident site mitigation review.	03/27/2012	1
Internet - Google	Annual report to Congress of the Atomic Energy Commission for 1964, traveler's guide to nuclear weapons, Environmental Impact Statement for tritium supply, taking stock worldwide nuclear deployments, locations of U.S. nuclear weapons by type, characterization and remediation of 91b radioactive waste site, radiological scoping and characterization survey report, 1963 Igloo 572 accident, appeal filed by Bowers, basewide operable unit draft preliminary assessment, San Antonio remembers, and an explosion that destroyed a weapon storage bunker. NOTE: 13 documents added by Site Association Review.	04/07/2012	30
Internet - Health Physics Journal	No relevant documents identified.	04/10/2012	0
Internet - Journal of Occupational and Environmental Hygiene	No relevant documents identified.	04/10/2012	0
Internet - National Academies Press (NAP)	No relevant documents identified.	04/02/2012	0
Internet - NIOSH	Draft advisory board comments on site profile.	03/26/2012	1
Internet - NRC Agencywide Document Access and Management (ADAMS)	Review of decommissioning plan, Eglin AFB, FL.	03/29/2012	1
Internet - USACE/FUSRAP (Corps Library)	No relevant documents identified.	03/23/2012	0
Internet - USACE/FUSRAP (Ft. Worth District)	No relevant documents identified.	03/26/2012	0

Table A1-1: Data Capture Synopsis for the Medina Modification Center			
Data Capture Information	**General Description of Documents Captured**	**Date Completed**	**Uploaded To SRDB**
Internet - USACE/FUSRAP (Headquarters)	No relevant documents identified.	03/23/2012	0
Internet - USACE/FUSRAP (Southwest Division)	No relevant documents identified.	03/26/2012	0
Internet - US Transuranium and Uranium Registries	No relevant documents identified.	04/02/2012	0
Mound Museum	Manufacturing statement for weapons production schedule of transfers.	07/14/2008	2
National Archives and Records Administration (NARA) - College Park	[Name redacted] case.	07/15/2012	1
ORAU Team	Dose records, contamination levels or limits, and a site profile.	02/09/2007	3
SAIC	Summary of whole body exposures.	09/02/2004	2
Unknown	Pantex Plant personnel dosimetry records, articles on nuclear weapons production processes and history, request for special quota - enriched uranium, and Rocky Flats site history.	08/19/2003	15
TOTAL			**152**

Table A1-2: Databases Searched for the Medina Modification Center			
Database/Source	**Keywords / Phrases**	**Hits**	**Selected**
NOTE: Database terms employed for each of the databases listed below are available in the Excel file called "Medina Facility Rev 00, (83.14) 04-20-12"			
Defense Technical Information Center (DTIC) https://www.dtic.mil/ COMPLETED 04/04/2012	See Note above	689	0
DOE CEDR http://cedr.lbl.gov/ COMPLETED 04/10/2012	See Note above	0	0
DOE Hanford DDRS http://www2.hanford.gov/declass/ COMPLETED 03/29/2012	See Note above	0	0
DOE Legacy Management Considered Sites http://csd.lm.doe.gov/ COMPLETED 03/23/2012	See Note above	14	2

Table A1-2: Databases Searched for the Medina Modification Center			
Database/Source	**Keywords / Phrases**	**Hits**	**Selected**
DOE NNSA - Nevada Site Office www.nv.doe.gov/main/search.htm COMPLETED 04/02/2012	See Note above	0	0
DOE OpenNet http://www.osti.gov/opennet/advancedsearch.jsp COMPLETED 03/29/2012	See Note above	64	30
DOE OSTI Energy Citations http://www.osti.gov/energycitations/ COMPLETED 03/27/2012	See Note above	83	1
DOE OSTI Information Bridge http://www.osti.gov/bridge/advancedsearch.jsp COMPLETED 03/27/2012	See Note above	63	1
Google http://www.google.com COMPLETED 04/07/2012	See Note above	5,813,049	17
HP Journal http://journals.lww.com/health-physics/pages/default.aspx COMPLETED 04/10/2012	See Note above	1	0
Journal of Occupational and Environmental Health http://www.ijoeh.com/index.php/ijoeh COMPLETED 04/10/2012	See Note above	1	0
National Academies Press http://www.nap.edu/ COMPLETED 04/02/2012	See Note above	12,889	0
NRC ADAMS Reading Room http://www.nrc.gov/reading-rm/adams/web-based.html COMPLETED 03/29/2012	See Note above	30	1
USACE/FUSRAP (Corps Library) http://www.corpslibrary.com/search/um/Browse.html COMPLETED 03/23/2012	See Note above	0	0
USACE/FUSRAP (Ft. Worth District) http://www.swf.usace.army.mil/ COMPLETED 03/26/2012	See Note above	22,770	0
USACE/FUSRAP (Headquarters) http://www.usace.army.mil/Home.aspx COMPLETED 03/23/2012	See Note above	8	0

Table A1-2: Databases Searched for the Medina Modification Center			
Database/Source	**Keywords / Phrases**	**Hits**	**Selected**
USACE/FUSRAP (Southwestern Division) http://www.swd.usace.army.mil/ COMPLETED 03/26/2012	See Note above	28,881	0
U.S. Transuranium & Uranium Registries http://www.ustur.wsu.edu/ COMPLETED 04/02/2012	See Note above	0	0

Table A1-3: OSTI Documents Requested for the Medina Modification Center			
Document Number	**Document Title**	**Requested Date**	**Received Date**
No documents requested.			