



OCCUPATIONAL RADIATION PROTECTION PROGRAM AUDIT

Defense National Stockpile Center; New Haven Depot

AUGUST 2002



DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER

OCCUPATIONAL RADIATION PROTECTION PROGRAM AUDIT

NEW HAVEN DEPOT

AUGUST 2002

Prepared by

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Occupational Radiation Protection Program Audit

NEW HAVEN DEPOT

EXECUTIVE SUMMARY

On August 13, 2002, Mr. James Reese, Sr. Health Physicist, ERS Solutions, Inc. performed an audit of the radiological operations at the Defense National Stockpile Center (DNSC), New Haven Depot in New Haven, Indiana. The results of the audit indicated that the New Haven depot had an effective Occupational Radiation Protection Program (ORPP). One item was identified that did not meet the requirements of the DNSC Nuclear Regulatory Commission (NRC) license is described in section X of the report. There were no health and safety concerns identified as a result of the storage and handling of radioactive material at New Haven Depot. Exposures for New Haven Depot personnel have been maintained ALARA.

Implementation of the following recommendations will improve the overall management and regulatory compliance of the ORPP at New Haven.

- a. Post signs with the words, "Caution – Radioactive Material" on the entry doors to warehouse 214, Section 3. [10 CFR 1902(e) and the ORPP section 8.3]
- b. Obtain a radioactive check sources that emits gamma and alpha radiation to permit the performance of operational checks of the portable radiation detection instrumentation. [Occupational Radiation Protection Program (ORPP) Manual, paragraph 13.1]
- c. Establish a contract with an NRC or Agreement State licensed calibration provider to calibrate portable radiation detection instrumentation. [ORPPM, paragraph 13.3]
- d. Additional detail should be included in the annual survey to ensure it is a stand-alone document.
- e. A statement should be placed in the annual survey to indicate compliance with the dose limits to members of the public. [10 CFR 20.1302]

INTRODUCTION

This audit was performed to assist you in your efforts to store, sample, repackage, and transfer natural uranium and thorium ores safely and in accordance with current regulatory requirements and the ORPP dated March 6, 2000. Specifically, this audit was performed to alert you to any previously unknown potential health hazards or areas of noncompliance with regulatory requirements, and provide recommendations to correct any deficiencies.

The audit was performed using a checklist and by conducting a review of records described below and observing the storage condition of the radioactive material. A copy of the completed checklist is contained in the appendix to this report. A limited radiation survey was also conducted to verify the results of previous on-site radiations surveys. Program areas reviewed include: Nuclear Regulatory Commission (NRC) license conditions, ORPP Manual requirements, radiation exposure records and notifications, training of radiation workers and the radiation safety staff, radiation surveys conducted by on-site personnel, inventory compared to license limits, receipt, shipment and disposal records, any internal uptake or planned exposure records, radiation measurement instruments used, theft or loss of radioactive material records, incidents and response by appropriate emergency personnel, and Standing Operating Procedures. Operational areas reviewed include: security of radioactive material, posting of appropriate signs, and the storage condition of radioactive material.

PERSONS INTERVIEWED

The persons listed below attended the in brief and out brief on August 13, 2002 and also participated in the audit. An additional out brief was held on August 14, 2002 with the depot manager at the Hammond Depot.

John Olszewski, DNSC, Depot Manager

William Till, DNSC, Quality Assurance, Radiation Safety Officer (RSO)

Lois Huddlestun, DNSC, Storage Specialist, Radiation Protection Officer (RPO)

The assistance provided by these persons in the performance of the audit is greatly appreciated. They provided all the documentation needed to make an assessment; they were very cordial in discussing any issues; and they were extremely helpful in obtaining data in the storage buildings.

DISCUSSION

I. ADMINISTRATION

Ms. Lois Huddleston was designated as the Radiation Protection Officer (RPO) and Mr. William Till was designated as the Radiation Safety Officer (RSO) for the depot. A review of the individual training records indicated each had received appropriate training to qualify for their assigned radiation protection positions.

LICENSE

Radiological operations at the New Haven Depot radiological operations were authorized under NRC license STC-133, application submitted September 10, 1999, and expiration on February 28, 2010 issued to the Defense National Stockpile Center (DNSC). The license authorized the depot to store, sample, repackage, and transfer natural uranium and thorium ores, concentrates or solids. The license was implemented via the Occupational Radiation Protection Program (ORPP) manual dated March 6, 2000.

INVENTORY

The NRC license authorized the DNSC to possess a total of two million kilograms of uranium and thorium in the form of ores, concentrates or solids. Individual depots were not provided a specified limit on the quantity of material that could be held at a single location. An annual inventory of radioactive material was performed during the annual program review performed by the Radiation Safety Officer (RSO). The inventory at the New Haven depot showed a total quantity of Columbian-tantalum of 1,009,133 pounds with a total of 0.29 curies of natural uranium and thorium.

II. DOSIMETRY

Thermoluminescent dosimeters (TLD) were provided to all personnel with access to the radioactive material storage areas. The TLDs were supplied and analyzed by the U.S. Army Ionizing Radiation Dosimetry Center (USAIRDC) located at the U.S. Army Redstone Arsenal. The USAIRDC possessed a current certification by the National Volunteer Laboratory Accreditation Program (NVLAP). All TLDs (those issued and the spares) were stored in the administrative building (T-111) in a file cabinet. A control TLD was maintained at the storage location. TLDs are not issued to the radiation workers until they have to enter the restricted area to work with the radioactive material.

The auditor reviewed the results of the personnel monitoring for the past year. A total of 10 TLDs had been issued to personnel working at the depot. The monitoring results indicated that the exposures received by New Haven radiation workers were far below the limits specified by the ORPP of 5 Rem per year. All exposures for personnel the past two years have been non-detect (i.e., 0 mrem). No abnormal exposures have been reported since 1992.

Each radiation worker issued a TLD had completed and signed an exposure history form, Form 1952. Copies of these forms were maintained by the RPO. Quarterly, and annually, the RPO provided each worker monitored for exposure to ionizing radiation with a report of their exposure for the previous year.

INTERNAL DOSIMETRY

Monitoring for internal deposition of radioactive material is not routinely performed at the depot. A review of the dosimetry records showed that the last time internal monitoring occurred was in 1992 as a result of abnormal personnel dosimetry results.

PUBLIC DOSE COMPLIANCE

Dose rate measurements were made at the boundary of the restricted area (warehouse 214, section 3). The radiation survey meter used by the auditor was not sufficiently sensitive to measure 100 millirem (mrem) in a year in accordance with 10 CFR 20.1301 to ensure compliance with the dose limits to members of the public. However, the RPO makes gamma dose rate measurements at the boundary to the restricted area and documents these measurements in the annual survey. The dose rates at the restricted area boundary were consistent with background levels (i.e., 10 microrem per hour ($\mu\text{Rem/hr}$)). Note that following the guidance issued by the NRC a dose rate of this level at the restricted area boundary would result in a calculated dose to a member of the public in compliance of that allowed by NRC regulation (87.6 mrem). NRC regulations state in part,

*“§20.1302 **Compliance with dose limits for individual members of the public.***

(a) The licensee shall make or cause to be made, as appropriate, surveys of radiation levels in unrestricted and controlled areas and radioactive materials in effluents released to unrestricted and controlled areas to demonstrate compliance with the dose limits for individual members of the public in §20.1301.

(b) A licensee shall show compliance with the annual dose limit in §20.1301 by --

(1) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual dose limit.”

Demonstrating compliance with the dose limits to members of the public can be very difficult as indicated in NUREG – 6204, *Questions and Answers Based on Revised 10 CFR Part 20, 1994*. It is recommended that a formal evaluation be documented annually following the guidance contained in NUREG 1556, *Consolidated Guidance About Material Licensees*, Volume 18 Appendix M, April 1999, to demonstrate compliance with the dose limits for members of the public. (**Recommendation**)

III. TRAINING

The RPO and RSO had recently completed refresher training on May 14 – 16, 2002. The training received by the depot RPO met the requirements of Section 17.1 of the ORPP manual. Both the RPO and the RSO had received training on the Department of Transportation (DOT) regulations in June 2002.

There were no declared pregnant workers or minors in the radiation protection program at the time of the audit. General worker training of depot employees and security personnel had occurred November and December 2001. The training contained the necessary information required by the ORPPM section 17.2. The RPO maintained a detailed outline of the training topics presented during the class.

Emergency response personnel had been informed in writing of the location of radioactive material stored at the depot in a memo dated August 23, 2001.

IV. RADIATION SURVEYS

The last annual radiation survey by the RSO was conducted July 2, 2002. The annual survey was comprehensive in that it reviewed all aspects of the ORPP at the New Haven depot. However, the survey failed in that it did not provide sufficient detail in the descriptions to permit the reader to gain a full understanding of the item being described. The annual radiation survey is used to document the radiological status of the material in storage and to demonstrate compliance with the ORPP, the NRC license and regulations. Compliance is difficult to demonstrate without adequate detail describing the depot's program included in the annual survey. For example, section 6.b of the July 2002 survey stated that there were "...no over doses for this annual report." A better method of stating this would be to list the minimum and maximum personnel exposure for the past year and add a statement that all exposures were within the limits specified in the ORPPM.

(Recommendation)

A copy of the annual survey was provided to DNSC HQ electronically. Comments from DNSC were received via email on July 31, 2002 and incorporated.

The depot currently does not have a source or method to perform an instrument source check prior to performing a survey. The annual survey conducted in July 2002 contains radiation measurements performed using instruments that were not source checked. The source check is used to verify that the instrument is operating with the parameters established during calibration. This is especially important when the calibration cycle is 1 year. Failure to perform the source check makes the measurements obtained suspect. ***(Observation)***

During the audit the auditor performed gamma dose rate measurements of the radioactive material storage buildings. These survey results were consistent with the data obtained by the RSO during the annual survey. Gamma dose rate measurements on the Columbian-Tantalum ranged from 0.05 – 0.07 millirem per hour (mr/hr). Gamma dose rate measurements at the restricted area boundary were less than 0.5 mr/hr. A direct survey on contact with a burlap bag using the alpha scintillation count rate detector indicated 226 counts per minute (cpm). Figure 1 shows the burlap bag.



Figure 1 Burlap bag with Columbian-Tantalum Ore

V. RECEIPTS, SHIPMENTS, AND DISPOSAL

No receipts, shipments or disposal were made since the last audit. One container holding four masslin swipes contaminated with natural uranium and thorium from the Columbian-tantalum ore was located in a 55 gallon drum in the storage area. The swipes were generated during the sampling activity conducted in 2000. Coordination with the Department of Defense Executive Agent for Low Level Radioactive Waste (DOD EALLRW) is necessary to properly dispose of the contaminated material. Removal of the waste from the storage area should occur as soon as practical. ***(Recommendation)***

VI. INSTRUMENTATION

The depot has an adequate supply of instruments to ensure successful operation of the radiological program. Instrumentation consisted of an Eberline E520 with a HP 270 geiger-müller (GM) detector, a FAG 40F6 GM detector, and an Eberline E-600 with a SPA-3 external sodium iodide (NaI) detector and a SHP-380A alpha scintillation count rate detector. However, at the time of the review, two of the three instruments were either out of calibration or would be out of calibration within the next day (August 14, 2002). The remaining instrument (Eberline E-600) was schedule to be out of calibration in April 2003. Due to problems with the previous calibration provider a change in provider was in process. At the time of the review, a new provider had not been identified. In order to ensure a sufficient number of working instruments, a new calibration provider should be identified as soon as possible to permit calibration of the remaining instrumentation. (*Observation*)

The auditor provided assistance to the RSO in the operation of the E-600 survey instrument and in the differences in readings obtained from the three gamma dose rate survey instruments in use at New Haven. Figure 2, shows the portable survey instrumentation in use at New Haven at the time of the audit.

Figure 2 RADIAC instruments



VII. INCIDENTS

In December 2001 the radioactive check source used with the portable instruments was lost during transfer to the calibration facility. In a memo dated July 2002, DNSC Headquarters RSO (DNSC HQ RSO) informed the NRC of the loss of the check source. Due to the small quantity of material in the source (less than 5.0 microcuries (μCi)) no further action was necessary on the part of DNSC.

VIII. STORAGE AREAS

At the time of the audit, radioactive material in the form of Columbian-tantalum ore was stored in warehouse 214, Section 3. The storage area was a very well secured brick building with locks on all doors. While not all commodities stored in section 3 were radioactive, the entire section was designated as a restricted area. The designation was reasonable in that it provided good security and control over the radioactive material. The ore was stored in metal drums of various sizes. Figures 1 and 3 show the various containers in which the ore was stored.



Figure 3 Columbian-Tantalum Ore

IX. POSTING

A copy of 10 CFR 19 and 20, NRC Form 3, Notice to Employees, the license, operating procedures and Section 206 of Public Law 93-438, were posted in the administration building. The administration building (T-111) is located such that personnel working at the depot typically enter the building prior to beginning work.

The storage locations (bays) were posted using the barrier tape as shown in figures 1 and 3 containing the words, “CAUTION, RADIATION HAZARD”. Not all of the individual containers were labeled with as containing radioactive material. Since the containers are not moved out of the posted restricted area (defined as Section 3 of warehouse 214) labeling of the individual containers was not required.



The outside of the warehouse was posted with a National Fire Protection Association (NFPA) sign with the radiation symbol (figure 4).

Figure 4 Outside Posting of Warehouse 214 Section 3

No signs were posted on the entry ways to the restricted area that indicated radioactive material was present inside the warehouse. 10 CFR 20.1902(e) states,

“(e) Posting of areas or rooms in which licensed material is used or stored. The licensee shall post each area or room in which there is used or stored an amount of licensed material exceeding 10 times the quantity of such material specified in appendix C to part 20 with a conspicuous sign or signs bearing the radiation symbol and the words “CAUTION, RADIOACTIVE MATERIAL(S)” or “DANGER, RADIOACTIVE MATERIAL(S).””

Appendix C of 10 CFR 20 lists the quantity of natural thorium and uranium as 100 μCi . Thus posting is required for each area or room containing more than 1,000 μCi of these materials. Warehouse 214, Section 3 contained more than 1,000 μCi of natural uranium and thorium. Therefore a sign stating – “CAUTION, RADIOACTIVE MATERIAL”, should be posted on the outside of the building or at each entry door into the warehouse. (**Finding P.1**).

X. MATERIAL HANDLING OPERATION

Records associated with the ore sampling activity were reviewed during the audit. The records consisted of the results of swipes taken on the containers and outer protective clothing of the workers and dose rate measurements taken on contact with the containers. Results of the swipes were recorded as disintegrations per minute (dpm) and compared to the DNSC contamination limit for alpha radiation of 200 dpm/100 cm^2 . In general the survey records were thorough and provided adequate documentation of surveys and radiological conditions during the sampling activity. Some enhancements in documentation were recommended by the auditor.

ASSISTANCE PROVIDED

Assistance was provided on the operation of the E-600 portable radiation detection instrument and the use of the detectors provided with the unit. The auditor and the RSO utilized the SPA-3 sodium iodide (NaI) and the SHP-380A alpha scintillation detector. Measurements were taken using the various operational modes of the E-600 (i.e. rate meter, integrate, scaler).

In addition, surveys were performed using all three instruments used at New Haven to provide the RSO with an understanding of the difference in measurements obtained with each. In general the two GM detectors provided higher dose rates than did the E-600 with the SPA-3 detector by a factor of 1.5. During previous surveys performed at the depot, dose rates were marked on the storage drums. The dose rates measured during this visit with the GM detectors were consistent with the dose rates on the drums. Gaining and understanding of how the different instruments respond is important in interpreting the results of surveys. This is particularly true at New Haven since the E-600 is the only instrument remaining in calibration.

CONCLUSION

The ORPP at the DNSC, New Haven Depot, was effective. There was good documentation of many of the program attributes. Implementing the following recommendations will improve the overall management and regulatory compliance of the ORPP.

1. Post signs with the words, “Caution – Radioactive Material” on the entry doors to warehouse 214, Section 3. [10 CFR 1902(e) and the ORPP section 8.3]
2. Obtain a radioactive check sources that emits gamma and alpha radiation to permit the performance of operational checks of the portable radiation detection instrumentation. [Occupational Radiation Protection Program (ORPP) Manual, paragraph 13.1]
3. Establish a contract with an NRC or Agreement State licensed calibration provider to calibrate portable radiation detection instrumentation. [ORPPM, paragraph 13.3]
4. Additional detail should be included in the annual survey to ensure it is a stand-alone document.
5. A statement should be placed in the annual survey to indicate compliance with the dose limits to members of the public. [10 CFR 20.1302]

APPENDIX A

CHECKLIST

DNSC ORPP Review Checklist

Cat	Item	Question	Reference	Comments
R	001	Verify that the ORPM has designated in writing a Depot RSO and Depot RPO	ORPP 3.1	Designation by the ORPPM; March 6, 2002
R	002	Verify that the RPO has extended the training program among depot personnel	ORPP 3.3	Training provided Nov/Dec 2001
P	003	Verify that the RPO has the most recent copy of the ORPP	ORPP 4.1	Most recent copy dated March 6, 2002
P	004	Verify that the RPO has periodically reviewed all plans and procedures, continued training of old and new employees, maintained instruments, inspected records and materials in storage.	ORPP 4.1	Review completed during annual audit in July 2002
P	005	Verify that all personnel entering a restricted area shall first complete a DD Form 1952, "Dosimeter Application And Record Of Occupational Radiation Exposure".	ORPP 4.2	Reviewed to personnel files all documentation complete
P	006	Verify that dosimetry results have been mailed to all non-DNSC personnel annually.	ORPP 4.2	Copies provided to employers for dispersment to employees if no address available
P	007	Verify that a permanent record (DD 1141 or ADR) has been maintained for all potentially exposed individuals	ORPP 4.2	Copies of ADR maintained in all employee exposure files
P	008	Verify that Section 206 of Public Law 93-438 "Energy Reorganization Act of 1974", NRC Form 3 "Notice To Employees", and the location of the NRC license will be posted so as to be clearly visible to employees.	ORPP 4.3; 10 CFR 19.11 and 21.6	Posted in Admin Bldg, T-111
P	009	Verify that the depot has at least 1 GM counter, 1 alpha counter, and TLDs for each employee	ORPP 4.4	Depot has 2 GM detectors, one alpha scintillation detector, and a NaI detector
P	010	Verify that sufficient TLDs are available for visitors	ORPP 4.4	A total of 7 extra TLDs are available
P	011	Date of the last RSO survey	ORPP 4.5	2-Jul-02

DNSC ORPP Review Checklist

Cat	Item	Question	Reference	Comments
P	012	Verify that the survey included: 1) records, 2) inventories of instruments and licensed materials, 3) instrument calibration, 4) dosimetry services, and 5) Emergency protection Plans 6) monitored all licensed material and evaluated radiation safety procedures through observation and discussion with the Depot RPO's, managers, supervisors, and other employees.	ORPP 4.5	Report contained all necessary information but not sufficient detail
P	013	Verify that a report of the survey was completed and forwarded to the ORPPM	ORPP 4.5	Review documented from DNSC RSO on July 31, 2002
P	014	Verify that the RPO has reviewed and documented all exposure records quarterly	ORPP 4.6	RPO signature on all forms
P	015	Verify that the RPO has notify each employee of his/her accumulated dose and obtain written acknowledgements from the employees that shall be placed in the depot records annually	ORPP 4.6	Employee signature on forms
P	016	Verify that the RPO monitored such operations as material handling, repackaging, spills, clean-ups, and/or any other operational activities relating to these materials, and maintain appropriate records of such operations.	ORPP 4.6	Results of ore sampling were thorough and complete
P	017	Verify that the RPO has coordinated any shipments and paperwork associated with the shipment including NRC Form 741.	ORPP 4.7	NA
P	018	Verify that radiation protection training has been provided at least once per fiscal year to depot employees	ORPP 4.8	Provided Nov/Dec 2001
P	019	Verify that the RPO notified the ORPPM in writing of the names of all attendees at the training	ORPP 4.8	List provided via email
C	020	Verify that the layout of storage facilities shall be such that it minimizes exposure to ionizing radiation.	ORPP 5.1	Spacing okay. Shielding not necessary

DNSC ORPP Review Checklist

Cat	Item	Question	Reference	Comments
C	021	Verify that prior to the beginning of a repackaging, relocation, or decontamination project, an assessment was made by the DNSC ORPP Manager, the radiological officers, and other stockpile personnel, to determine if there is a need for additional controls.	ORPP 5.1	Procedure to perform work developed by RPO and followed during work
C	022	Verify that where necessary shielding has been used to reduce exposures	ORPP 5.2	NA
C	023	Verify that Time, Distance, and Shielding have been used as necessary to reduce exposures to depot personnel	ORPP 5.2;5.3;5.4	NA
C	024	Verify that the use of respirators has been IAW DNSC Occupational Health Guidelines for Respiratory Protection	ORPP 5.5	Reviewed documentation from sampling
C	025	Verify that personnel using PPE have received appropriate training in the use and care of the PPE	ORPP 5.5	Reviewed documentation from sampling
PM	026	Verify that eating, drinking, smoking, and chewing gum is prohibited in areas containing radioactive material	ORPP 6	Discussed in training; no posting relating to this
PM	027	Verify that watches, rings, combs, etc are not worn while working in areas containing radioactive material		Personal items are not specifically prohibited from storage area
PM	028	Verify that persons with open wounds are not permitted to work in areas containing radioactive material	ORPP 6	Discussed in training
PM	029	Verify that containers with licensable quantities of radioactive material are surveyed for contamination and leakage prior to storage	ORPP 6	No material received but surveyed after sampling
PM	030	Verify that radioactive material is handled in a manner to preclude damage to the container	ORPP 6	Material not routinely handled
PM	031	Verify that personnel use good personal hygiene when in contact with radioactive materials	ORPP 6	Verified by sampling procedure

DNSC ORPP Review Checklist

Cat	Item	Question	Reference	Comments
PM	032	Verify that personnel are monitored during and after contact with licensed radioactive material	ORPP 6	Verified by sampling procedure and survey results
PM	033	Verify that any shipment of radioactive material has been in accordance with federal regulations	ORPP 6	Reviewed shipments of samples from ore. No deviations from DOT
W	034	Review waste shipments for the past 2 years and verify that all shipments were properly labeled, stored, and shipped to a license disposal facility	ORPP 7	No waste shipped in past two years. 4 hot swipes awaiting shipment
PL	035	Verify that postings, labeling, marking and placards are IAW federal regulations contained in 29 CFR 1910.96 and 10 CFR 19, 20, 40 and 71	ORPP 8.1	Restricted area posting missing. Not all containers labeled
PL	036	Verify that areas with dose rates in excess of 5.0 mr/hr at any point are posted IAW 10 CFR 20.1902(a)	ORPP 8.2	No readings exceed 5.0 mr/hr
PL	037	Verify that areas containing more than 1,000 microcuries of licensed material are posted with conspicuous signs IAW 10 CFR 20.1902(e)	ORPP 8.3	Posting missing
E	038	Verify that no exposures have exceeded 5.0 Rem/yr	ORPP 9.1.1	Exposures were non detect
E	039	Verify through surveys and record review that the dose rate within a controlled area does not exceed 0.5 mr/hr	ORPP 9.1.2	No readings exceed 0.5 mr/hr
E	040	Verify that a restricted area has been established in those areas where the dose rate exceeds 0.5 mr/hr at one foot from the material	ORPP 9.1.2	No readings exceed 0.5 mr/hr
E	041	Verify that TLDs and pocket dosimeters are used by all personnel entering an area where thorium nitrate or oxide is stored	ORPP 9.1.3	NA
E	042	Verify that TLDs are used by all personnel entering a restricted area likely to receive an exposure in excess of 500 millirem in a year	ORPP 9.1.3	No persons expected to receive in excess of 500 millirem. However all personnel issued TLDs.

DNSC ORPP Review Checklist

Cat	Item	Question	Reference	Comments
E	043	Verify through surveys that the dose rate at the perimeter fence of the storage facility does not exceed background	ORPP 9.1.4	Verified through survey
E	044	Verify that minors are not permitted into restricted areas	ORPP 9.1.5	No minors permitted onsite
E	045	Verify that all female employees likely to receive an occupational dose, and all supervisors at NRC licensed sites, shall be given a copy of NRC Regulatory Guide 8.13, "Instructions Concerning Prenatal Radiation Exposure".	ORPP 9.1.6	All females provided copy of RG 8.13
E	046	Review any declarations of pregnancy reported to the RPO for the past 2 years for compliance with 10 CFR 20.1208	ORPP 9.1.6	None reported
R	047	Verify that the RPO/RSO have a current copy of federal and DLA regulations listed in Appendix B of the ORPP	ORPP 10	Copies available in library or on web
S	048	Verify that the annual radiological survey includes a physical survey of the material and equipment, review of records, review of training, and interviews of the Depot Manager and RPO.	ORPP 11	Reviewed July 2002 survey. All data included
S	049	Verify that the annual radiological survey includes measurements of dose rates at contact with the container (where practical), at one foot distance, at the perimeter of any restricted area, and at the depot perimeter if the depot contains a restricted area.	ORPP 11	Verified as part of annual survey
S	050	Verify that the RSO has documented the location of licensed material and performed an inventory within the past 365 days.	ORPP 11	Part of annual survey
DD	051	Verify that decommissioning has been performed IAW Reg Guide DG-4006 and NMSS Guidance Document July 1982	ORPP 12	Surveys in progress for areas effected by movement of zirconium ore.
I	052	Verify that monitoring instruments have sufficient sensitivity and are capable of monitoring the types of radiation found at the depot.	ORPP 13.1	Verified through use of instruments

DNSC ORPP Review Checklist

Cat	Item	Question	Reference	Comments
I	053	Verify that annual calibration and maintenance of all monitoring instruments is MANDATORY. Pocket dosimeters shall be verified every three years.	ORPP 13.3	Pocket dosimeters not used. Instruments under annual cal but new provider needed.
I	054	Verify that TLDs are received from the USAIRDC	ORPP 13.4	USAIRDC is the provider
EP	055	Verify that emergency procedures have been developed and implemented by the manager of the depot	ORPP 14.1	Reviewed current plan. Adequate
EP	056	Verify that emergency procedures are reviewed and updated annually	ORPP 14.1	Review with annual survey
EP	057	Verify that prior arrangements have been made with local police and fire departments, hospitals, in-house and outside emergency squads and other medical facilities. Evacuation routes and assembly points should be designated.	ORPP 14.2	Documentation of meeting minutes
EP	058	Verify that the RPO maintains documentation of meetings/contacts with outside agencies	ORPP 14.2	Documentation of meeting minutes
M	059	Verify that a pre-employment and annual medical examination program for stockpile employees potentially exposed to hazardous and radioactive materials have been provided	ORPP 15	Physicals provided to all workers

DNSC ORPP Review Checklist

Cat	Item	Question	Reference	Comments
R	060	Verify that the depot RPO has established a Radiological Data Book containing license data, exposure data, calibration data, the DNSC ORPP and all other documents related to the source material at the site. Included shall be written records of quarterly exposure reviews, annual radiation exposure notifications, and initial and annual radiation safety training	ORPP 16.2	Book in good condition. All material contained in library
R	061	Verify that personnel dosimetry records are maintained IAW DLAR 1000.28 and DLAI 1000.30	ORPP 16.3	Reviewed records. Adequate
T	062	Verify that each RPO/RSO has been provided 40 hours of formal classroom training that includes the fundamentals of ionizing radiation, its characteristics, and appropriate units of measure, evaluation techniques, instrumentation, biological effects, NRC Regulations, and control measures.	ORPP 17.1	Training complete. RPO attended in May 2002.
T	063	Verify that the RPO/RSO have received training in DOT regulations	ORPP 17.1	June 2002 for both RPO and RSO
T	064	Verify that all depot personnel (except clerical staff) have received annual training which includes potential hazards, precautions to minimize exposure, work practices and operating procedures, personal hygiene, information contained in NRC Regulatory Guide 8.13, and use of personal protective clothing and equipment.	ORPP 17.2	Training provided Nov/Dec 2001
T	065	Verify that the RPO developed and maintained a detailed site specific training outline and maintained attendance rosters for each training session	ORPP 17.2	RPO maintained good documentation of training
T	066	Verify that security personnel who may encounter radiological hazards are properly instructed annually	ORPP 17.3	Training provided Nov/Dec 2001

APPENDIX B

OUT BRIEF NOTES

**DEFENSE NATIONAL STOCKPILE CENTER
NEW HAVEN DEPOT, NEW HAVEN, IN**

**RADIOLOGICAL HEALTH INSPECTION
OUT-BRIEF**

13 August 2002

The findings presented during this out-brief are preliminary. All findings will be coordinated with the DNSC RSO prior to becoming final. Should the evaluation of a finding change (either to be more or less significant) then the depot RPO/RSO will be contacted and informed of the proposed change prior to issuance of the final report.

Positive Radiological Health Practices Identified at the Depot

- There were no health and safety concerns identified as a result of the storage and handling of radioactive material at New Haven Depot. Exposures for New Haven Depot personnel have been maintained ALARA.

Shipping and Receiving

- No findings were identified.

Storage Location

- Storage of radioactive material is limited to various bays in warehouse 214, section 3. The radioactive material is identified by use of a tape barrier with the words, "CAUTION RADIOACTIVE MATERIAL". The entire section has been identified by the RPO as a "restricted area" in accordance with the definition provided in the ORPP. At the time of the review, postings as required by 10 CFR 1902(e) and the ORPP section 8.3 were not posted on the outside doors leading to section 3. *Finding*
- A survey performed by the auditor and the RSO confirmed that dose rates at the boundaries of the restricted area meet the requirement of the ORPP (i.e., < 0.5 mr/hr).

Instrumentation

- The depot has an adequate supply of instruments to ensure successful operation of the radiological program.
- However, at the time of the review, two of the three instruments were either out of calibration or would be out of calibration within the next day (August 14, 2002). The remaining instrument (Eberline E-600) was schedule to be out of calibration in April

2003. Due to problems with the previous calibration provider a change in provider was in process. At the time of the review, a new provider had not been identified. In order to ensure a sufficient number of working instruments, a new calibration provider should be assigned ASAP. **Observation**

- In December 2001 the radioactive check source used with the portable instruments was lost during transfer to the calibration facility. The depot currently does not have a source or method to perform instrument source check prior to performing a survey. The annual survey conducted in July 2002 contains radiation measurements performed using instruments that were not source checked. The source check is used to verify that the instrument is operating with the parameters established during calibration. This is especially important when the calibration cycle is 1 year. Failure to perform the source check makes the measurements obtained suspect. **Observation**

Dosimetry

- No findings in this area.

Radiation Survey

- The auditor and the RSO performed surveys of the radioactive material storage area. All readings were consistent with previous measurements performed during the annual survey.
- During the review of annual survey the auditor noted that while comprehensive the survey additional details could be added to enhance the surveys usefulness. For example, section 6.b states that there were "...no over doses for this annual report." A better method of stating this would be to state the minimum and maximum personnel exposure for the past year.
- 10 CFR 20.1302 states,
 - "(b) A licensee shall show compliance with the annual dose limit in §20.1301 by -
 - Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual dose limit."
- The radiological storage area perimeter survey data had not been fully analyzed as required to demonstrate compliance with the public dose limits. The dose rates at the depot perimeter are equal to the background dose rates. This would imply that members of the public have not been exposed to a radiation dose in excess of 0.1 Rem/yr. It is recommended that a positive statement to this effect be added to the annual survey. The guidance contained in NUREG 1556, *Consolidated Guidance About Material Licensees*, Volume 18, Appendix M should be used in the evaluation. **Recommendation.**