Radiological Oversight Report
Defense National Stockpile Center;
New Haven Depot

DEFENSE NATIONAL STOCKPILE CENTER
NEW HAVEN DEPOT
RADIOLOGICAL OVERSIGHT REPORT

July 2004

Prepared for:

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Executive Summary

An audit was conducted of the radiological remediation project underway at the Defense National Stockpile Center (DNSC) – New Haven, Indiana (figure 1). The audit was performed on July 12 and 13, 2004 by Mr. Clif Gray of ERS Solutions, Inc. The purpose of the audit was to ensure radiological compliance with federal, state, and local regulations and with documents submitted for this effort by the contractor performing the remediation. The visit was scheduled to coincide with the excavation portion of the project. At the time of the site assessment approximately 50% of excavation had been completed. Figure 1 shows the progress of excavation along the rail line running through the site.

Figure 1, Excavation Site

The audit included observation of excavation work, review of radiological documents, interviews with the contractor and DNSC staff, and review of records. Areas of the project reviewed were the radiological air sampling program, radiological survey reports, general operations, quality assurance/quality control (QA/QC), and radiological controls for worker safety. Additionally, actions taken in response to previous project audit observations were reviewed.

This audit identified 6 observations that can be grouped into two general categories; excavation design and radiation safety. Observations are discussed in detail in the following sections. The overall observation from the site visit indicated that an understanding of the scope of work is not fully understood by the contractor on-site staff, but corrections can be made to achieve success of the project.

During the site visit, surveys performed by ERS Solutions indicated that several of the areas within the excavation site exceeded the acceptance limit of twice the background count rate. This would appear to indicate that additional excavation will be necessary to ensure adequate remediation of the site.

1.0 Observations

The observations have been divided between radiological controls and excavation planning. Observations for each section are discussed below.

1.1 Radiation Safety

The audit included onsite visual observation of excavation work, radiological surveys of the work site, discussion with the contract and DNSC workers, and review of records.

Observation 1

A review of the air sampling data sheets and radiological survey forms indicated that forms were not fully completed or reviewed. For example air sample and survey forms had not been signed reviewed by a senior reviewer. Additionally, fields on the forms were left blank. Air sample forms had fields for the scalar efficiency, net activity (dpm), net activity (µCi), isotope DAC result to be compared with, and the percentage of the DAC for the result (Pangea action level was set at 10% of the DAC). Results when validated showed small errors in the final concentration result that was calculated. Many of the errors could be attributed to rounding errors in calculating the final air concentrations. On sample analysis form A-063004-26 (attached to the report), the final result reported was 5.8E-14 µCi/cc, and the actual result was 5.6E-14 µCi/cc. These errors were found throughout the records. Example Pangea Scalar Daily Log Sheet also shows blanks in the form that should be completed. The efficiency determined during the Chi Square Test for the scalar is used on the daily air sample calculations, but is not present on the form. Attachment A shows the examples.

Observation 2

Radiological survey results conducted by the ERS Solutions of the excavation site perimeter identified areas of increased activity. Radiological surveys performed by the Pangea Radiation Safety Officer indicated levels along the railroad tracks east of the exclusion zone to be 15 microRoentgen (µR) per hour (hr). ERS Solutions performed surveys with an Eberline E600 meter with 2-inch x 2-inch sodium iodide probe calibrated for detection of radium 226 progeny (radium 226 is a progeny of U 238). Instrumentation readings were in cpm. A conversion of cpm to µR was done based upon the detection of the U 238 progeny, lead 214 and bismuth 214. Based upon the detection of these radioisotopes, the ratio is 1:1,000 from µR to cpm conversions. Surveys conducted by ERS Solutions identified areas exceeding 50,000 cpm at waist level and 200,000 cpm at ground surface.

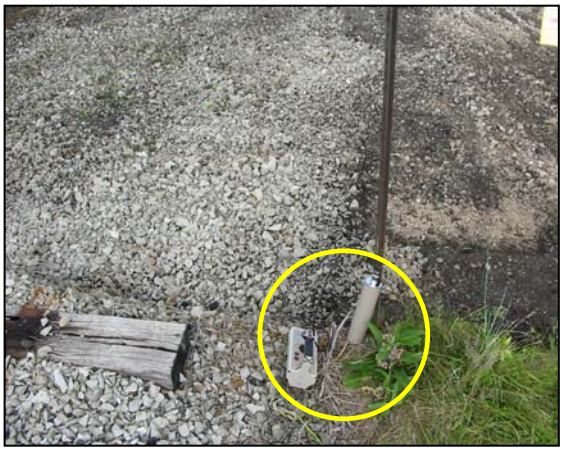

Figure 2. Measurements collected outside the exclusion zone.

Observation 3

Daily surveys have not been conducted prior to excavation or as new materials were uncovered within the exclusion zone. Areas may have been shielded prior to excavation of surface excavation. Surveys should be conducted for worker safety when surface materials are excavated. Darker areas of the excavation zone shown on Figure 3 were approximately 500,000 cpm. Surface had not been collected for comparison to determine whether readings were higher or lower.

Figure 3. Darker areas of excavated area with elevated readings

Observation 4

Worker's break area and contamination reduction zone (CRZ) were located in areas of contamination. Surveys were not being performed for these areas. These areas were identified by ERS Solutions to exceed the action level of twice background. These areas were relocated prior to conclusion of site visit to areas north of the road. Residual ore could be visually identified on the ground surface. In addition materials were not scanned prior to relocation.

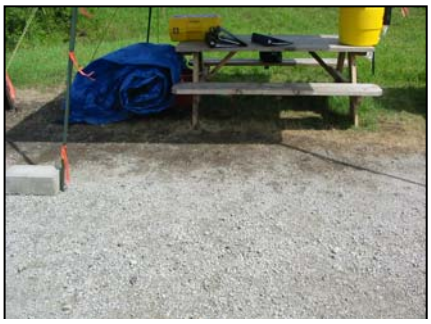

Figure 4. Worker break area located in a contaminated area.

Recommendations

The following recommendations are given to help correct deficiencies in the radiological program:

- Review program of radiological survey forms and records in a timely manner.
- Institute of a review process for approval of radiological survey forms and records.
- Performance of surveys of the excavation area and post them for worker information or inclusion into tailgate safety briefings.
- Addition of a database or use of spreadsheets to their program to aid field projects in calculations of air sampling.

2.0 Excavation Design

Observation 5

Pangea site management was unaware of areas included in the scope of work needing to be excavated. These areas include the road leading to Area 7A and the rail spur leading to Area 7A. Upon review of the contract, it was established that these areas are to be excavated. Figures 5, 6, and 7 show the rail line, access road, and ore that could be visually identified in the support zone.

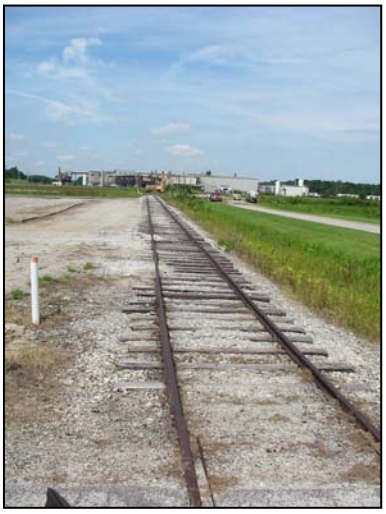

Figure 5. Rail line.

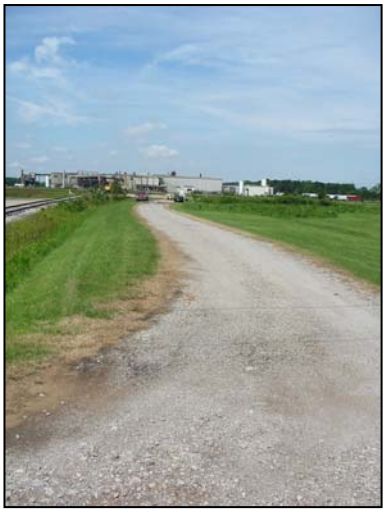

Figure 6. Access Road.

Figure 7. Ore on access road.

Observation 6

Pangea site management were unaware of areas within the already excavated areas as exceeding twice background. These areas include the darker areas shown on Figure 3. In accordance with the Pangea contract, areas exceeding twice background will necessitate a scope change. Areas traversing the site west to east, showed levels greater than twice background.

Recommendations

The following recommendations are given to help ensure that objectives of the removal action of radiological contamination are met. They include:

- Review of contractual obligations of areas to be excavated.
- Submittal of estimated areas, depth and volumes that need to be excavated due to levels greater than the action level.

3.0 Conclusion

The purpose of the site visit was to determine if activities were being performed in accordance with applicable regulations and guidance documents. Findings identified were not sufficient in severity that the public or worker safety is in danger. Findings did identify issues mainly with QA/QC, radiological documentation, and site management that should be corrected. These corrections should ensure a quality project.

Previous inspections during the mobilization phase had identified several findings that had not been corrected (ERS Solutions Inc., 2004). Previous findings not corrected included missing work plans, training of individuals so that they are familiar with the scope of work, and decontamination facilities for workers.

Certification

The following certification applies to a audit conducted on 12th and 13th of July 2004 at the following facility:

Defense National Stockpile Center, New Haven, Indiana
15411 Dawkins Road
New Haven, IN 46774-9644

I certify that the information stated in this report is based on a thorough review and investigation of the DNSC facilities and completion of site radiological surveys of the storage locations for radioactive commodities, and interviews with selected personnel at DNSC. The contents of this report are true and correct to the best of my knowledge and belief.

Clifton A. Gray
Health Physicist
ERS Solutions, Inc.

Date

APPENDIX B
AIR PARTICULATE SAMPLE ANALYSIS FORM

Air Sample Number (A-mmddyy-xx): A-062904-22

Collection Device: Lapel Pump [X] High Flow Pump [ ] Pump Number F184E03

Collection Date 6/29/04 Respirator Use: PAPR [ ] Neg. Pressure [ ]

Start Time	End Time	Total Run Time (min)
0915	1605	530
		Start Time - End Time

Start Flow Rate (Lpm)	End Flow Rate (Lpm)	Average Flow Rate
3.6	3.4	3.5
		(Start Flow + End Flow)/2

Total Volume (Liters)	Worker ID #	RWP #
1.855 E3	Trackloc	1101-04
Total Run Time X Ave Flow Rate		

1st Initial Count Counter ID 171589 Bkgd (cpm) 51.04 CF

Count Date	Initials of Tech	Count Time (min)	Gross Counts	Net Activity (dpm)
7/1/04	K	20	1097	
				(Gross / Time - BG) X CF

Net Activity (µCi)	Conc. (µCi/ml)	Isotope DAC (µCi/ml)	% of DAC
	2.6 E-12		
Net Activity / 2.2E6	Activity (µCi) / (Tot Vol. X 1000)		Conc. / DAC

2nd Second Count Counter ID 171589 Bkgd (cpm) 0.9 CF

Count Date	Initials of Tech	Count Time (min)	Gross Counts	Net Activity (dpm)
7/1/04	K	20	10	
				(Gross / Time - BG) X CF

Net Activity (µCi)	Conc. (µCi/ml)	Isotope DAC (µCi/ml)	% of DAC
	<MDC		
Net Activity / 2.2E6	Activity (µCi) / (Tot Vol. X 1000)		Conc. / DAC

Third Count Counter ID Bkgd (cpm) CF

Count Date	Initials of Tech	Count Time (min)	Gross Counts	Net Activity (dpm)
				(Gross / Time - BG) X CF

Net Activity (µCi)	Conc. (µCi/ml)	Isotope DAC (µCi/ml)	% of DAC
Net Activity / 2.2E6	Activity (µCi) / (Tot Vol. X 1000)		Conc. / DAC

Reviewed by:

Signature

Date

APPENDIX B
AIR PARTICULATE SAMPLE ANALYSIS FORM

Air Sample Number (A-mmddyy-xx): A-063004 -26

Collection Device: Lapel Pump ☐ High Flow Pump ☒ Pump Number 2/AP

Collection Date 6/30/04 Respirator Use: PAPR ☐ Neg. Pressure ☐

Start Time	End Time	Total Run Time (min)
0720	1600	520
		Start Time - End Time

Start Flow Rate (Lpm)	End Flow Rate (Lpm)	Average Flow Rate
90	90	90
		(Start Flow + End Flow)/2

Total Volume (Liters)	Worker ID #	RWP #
$4.68E^{4}$	Boundary	NH01-04
Total Run Time X Avg Flow Rate		

Initial Count Counter ID 171589 Bkgd (cpm) 52.15 CF

Count Date	Initials of Tech	Count Time (min)	Gross Counts	Net Activity (dpm)
7/7/04	K	20	1086	
				(Gross / Time - BG) X CF

Net Activity (µCi)	Conc. (µCi/ml)	Isotope DAC (µCi/ml)	% of DAC
	$5.8E^{-14}$		
Net Activity / 2.2E6	Activity (µCi) / (Tot Vol. X 1000)		Conc. / DAC

Second Count Counter ID 171589 Bkgd (cpm) 0.45 CF

Count Date	Initials of Tech	Count Time (min)	Gross Counts	Net Activity (dpm)
7/7/04	K	20	17	
				(Gross / Time - BG) X CF

Net Activity (µCi)	Conc. (µCi/ml)	Isotope DAC (µCi/ml)	% of DAC
	$1.3E^{-14}$		
Net Activity / 2.2E6	Activity (µCi) / (Tot Vol. X 1000)		Conc. / DAC

Third Count Counter ID Bkgd (cpm) CF

Count Date	Initials of Tech	Count Time (min)	Gross Counts	Net Activity (dpm)
				(Gross / Time - BG) X CF

Net Activity (µCi)	Conc. (µCi/ml)	Isotope DAC (µCi/ml)	% of DAC
Net Activity / 2.2E6	Activity (µCi) / (Tot Vol. X 1000)		Conc. / DAC

Reviewed by: _____ _____

Signature Date

ATTACHMENT 234-4

Scaler Daily Log Sheet

Model 2929 Calibrated 2/8/04 Min Source (NCPM) 7401.84 Bkg Min (CPM) -0.2

Serial 17,585 Cal Due ~~2/8/05~~ Max Source (NCPM) ~~11672~~36 Bkg Max (CPM) 2.6

Probe Type/# 43-10-1 Efficiency _____ Source Limits Due Th230/3999

Date	Time	Background Count Min	Gross bkg Counts	Cb Bkg cpm	Cg Source cpm	C_g-C_b Source NCPM	MDC* cpm	MDA* dpm	Technician
6/23/04	0800	~~2.7~~ 20	14	0.7	10526	10525.3			K
6/24/04	0800	20	14	0.7	10607	10606.3			K
6/28/04	0715	20	5	0.25	10496 ~~11705~~	10495.75			K
6/29/04	0735	20	12	0.6	10580	10579.4			K
6/30/04	0725	20	12	0.6	10487	10486			K
7/1/04	0735	20	18	0.9	10629	10628			K
7/7/04	0820	20	9	0.45	10566	10565			K
7/8/04	0730	20	18	0.9	10587	10586			K
7/9/04	0700	20	12	0.6	10513	10512			K
7/12/04	0705	20	12	0.6	10662	10661			K

*for 1 minute sample count time