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EXPLANATION OF SIGNIFICANT DIFFERENCES

**DELETION OF RADIOLOGICAL CONTAMINANTS
FROM INTERIM RECORD OF DECISION (IROD)
SOILS OPERABLE UNIT #1 (OU-1)**

for

**IOWA ARMY AMMUNITION PLANT
MIDDLETOWN, IA**

Prepared by:

**Tetra Tech, Inc.
800 Oak Ridge Turnpike, A-600
Oak Ridge, TN 37830**

JUNE 2006

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June 2006

1.0 INTRODUCTION

An Interim Action Record of Decision (IROD) (1998a) dated March 4, 1998, was issued for the Iowa Army Ammunition Plant (IAAAP) in Middletown, Iowa. The IROD presented the selected interim remedial action for contaminated soils at 15 areas throughout the IAAAP designated as the Soils Operable Unit #1 (OU-1). The remedy, consisting of excavation/stabilization/solidification/disposal, was selected pursuant to Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), the National Contingency Plan (NCP), and the Federal Facilities Agreement (FFA) between the U.S. Army (Army) and the U.S. Environmental Protection Agency (EPA). As a result of a re-evaluation of site data since the issuance of the IROD, the Army and EPA have determined that significant changes to the remedy are necessary. This Explanation of Significant Differences (ESD) for the IROD describes and summarizes the basis for these changes.

The EPA added the IAAAP to the National Priorities List (NPL) in 1990. The NPL is the EPA's list of sites that appear to pose the greatest threat to human health and the environment, based on the site assessment process. The Department of Defense (DOD) has established the Defense Environmental Restoration Program to address sites under the CERCLA, as amended by the SARA, that are within the responsibility of the DOD. The Army, as an agency within the DOD, is the lead DOD agency for implementing environmental restoration activities at the IAAAP. The EPA and the Army signed an FFA for site cleanup, which became effective December 10, 1990, following public comment. The FFA provides a framework for CERCLA response actions to be performed at the IAAAP, including the investigation and cleanup of contamination.

The Army serves as the lead agency for site activities. The EPA oversees the cleanup activities conducted by the Army to ensure that requirements of CERCLA/SARA, the NCP, and the IAAAP FFA have been met. Sections 117 (c) and (d) of CERCLA contain provisions for addressing changes in remedy that occur after the ROD is signed. An ESD is required to document proposed changes in the remedial action, when the scope, performance or cost of the remedial action is significantly different from what is described in the ROD. This ESD for the IROD (1998a) is issued in accordance with the requirements of the CERCLA as amended, and regulations promulgated thereafter.

This ESD explains the changes to the scope of the remedy at OU-1 of IAAAP and the reasons for them. In accordance with the NCP, 40 C.F.R. § 300.435 (c) (2) (i) (A), this ESD and information supporting it are part of the administrative record file and are available for public comment.

2.0 FACILITY HISTORY AND CONTAMINATION PROBLEMS

The IAAAP is a load, assemble, and pack (LAP) munitions facility located in Middletown, a rural area of eastern Iowa, 10 miles west of Burlington in Des Moines County, and approximately nine miles northwest of the Skunk and Mississippi Rivers. The IAAAP is located on about 19,000 acres. Approximately 8,000 acres are leased for agricultural use, about 7,500 acres are forested, and the remaining area is used for administrative and industrial operations.

The northern area of the IAAAP consists of gently undulating terrain. The central portion is characterized by rolling terrain dissected by a shallow drainage system, while the southern area of the facility contains drainage ways with steep slopes down to the creek beds. Elevations within the IAAAP range from 730 feet above mean sea level (amsl) in the north to 530 feet amsl in the south.

The IAAAP contains five watersheds. Brush Creek drains the central portion of the facility, exits at the southeastern boundary, and flows into the confluence of the Skunk and Mississippi Rivers. Spring Creek drains the eastern portion of the facility, exits at the southeastern corner, and flows directly into the Mississippi River. Long Creek drains the western portion of the IAAAP, exits at the southwestern boundary, and joins the Skunk River just south of the facility. The Skunk River then flows into the Mississippi River. The Long Creek drainage way has been dammed near the center of the facility to create the 85-acre George H. Mathes Lake. Use of this lake by the plant as a water source was discontinued in January 1977. The Skunk River is located south of the IAAAP, bordering the facility's perimeter on the southwest corner. The Skunk River provides year-round recreational use. The Little Flint Creek Watershed is on the north side of the facility. It flows northward away from the site before turning south again and joining the Spring Creek watershed. There are no sites included or impacted by this watershed.

The IAAAP produced munitions for World War II from the plant's inception in September 1941 until August 1945, and munitions for military activities in Southeast Asia in the 1960s and early 1970s. Activities at the IAAAP continued at a reduced level during peacetime. The plant was operated from 1941 - 1946 by Day & Zimmerman Corporation.

The former U.S. Atomic Energy Commission (AEC) operated on portions of IAAAP from 1947 through mid-1975, at which time operation reverted to Army control. The IAAAP was operated by the private contractor Mason & Hanger Corporation between 1951 and 1998. American Ordnance has been the operating contractor of the IAAAP from 1998 to the present.

The IAAAP currently has the capability to LAP munitions, including projectiles; mortar rounds; warheads; demolition charges; antitank mines; anti-personnel mines; and the components of these munitions, including primers, detonators, fuses, and boosters. Since the installation is an active production plant, inactive lines are maintained on a standby status or leased to other contractors.

The primary source of contamination at the facility is attributable to past operating practices in which explosives-contaminated wastewaters and sludges were discharged to uncontrolled on-site lagoons and impoundments. Additional sources of contamination included open burning of explosives materials and munitions and landfilling of waste material. Process wastewaters currently are treated and recycled, while only a small portion of the treated wastewater, containing residual explosives and other contaminants regulated under the plant's National Pollutant Discharge Elimination System (NPDES) permit, is discharged to surface water bodies. Pink/red wastewaters from trinitrotoluene (TNT) operations are a listed hazardous waste (K047) according to the Resource Conservation and Recovery Act (RCRA).

Between 1947 and 1975, the former AEC used portions of the IAAAP facility for production, testing, and storage operations. Some areas of IAAAP are known to contain contamination (e.g.,

depleted uranium, explosives, and metals) resulting from AEC operations. The U.S. Army Corps of Engineers (USACE) as the lead agency responsible for addressing contamination resulting from AEC operations at IAAAP, will take actions to ensure that the environmental impacts associated with past AEC activities at the site are thoroughly investigated and appropriate remedial actions are taken to protect public health, welfare, and the environment. This will be accomplished under the Formerly Utilized Sites Remedial Action Program (FUSRAP).

3.0 SELECTED REMEDY

In the IROD (1998a), the remedy for contaminated soils at the IAAAP facility is to excavate and segregate contaminated soils according to contaminant type and risk level; temporarily store certain soils (awaiting treatment), and treat and/or permanently dispose other soils. The IROD specified that the most highly contaminated soil will be stockpiled in the on-site Corrective Action Management Unit (CAMU). Because of the interim nature of the IROD, final remedial alternatives for the contaminated soils were presented in the soils OU-1 ROD issued on September 29, 1998 (1998b).

The major components of the selected remedy under the IROD (1998a) consist of:

- Excavation of soils contaminated at levels exceeding the soil remediation goals (RGs) for the remediation areas.
- Verification sampling to ensure that RGs are met in the remediation areas.
- Segregation of the excavated soils according to the contaminant type and concentration.
- Temporary storage of the most highly contaminated soils in the on-site CAMU and treatment of those soils in accordance with the specification of the final ROD (1998b) for the soils.
- Permanent disposal of soil contaminated at lesser levels in the on-site Soil Repository or in the on-site Inert Landfill.
- Solidification/stabilization of metals-contaminated soils at levels exceeding the Land Disposal Restriction (LDR) criteria, and permanent disposal in the on-site Soil Repository.

The selected remedy meets the remedial objectives, is protective of human health and the environment, complies with Federal and State of Iowa requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The remedial objectives are not being changed by this ESD.

4.0 SIGNIFICANT DIFFERENCE AND BASIS FOR THE DIFFERENCE

This ESD modifies the IROD (1998) wherein soil remediation goals were established for metals, explosive compounds, and three radionuclides (i.e., Actinium-228, Bismuth-214, and Potassium-40).

The soil remediation goals for the radionuclides have been re-evaluated by comparison with the background soil analytical data for radiological constituents. Based on the re-evaluation of the data, the proposed change is to delete the soil remediation goals for the specific radionuclides (Actinium-228, Bismuth-214, Potassium-40) from the IROD (1998a).

Re-evaluation of background soil analytical data indicates that the naturally occurring background levels for the radionuclides are higher than the soil RGs previously identified in the IROD (1998). The levels identified in soils at the proposed remediation sites were consistent with the background concentrations and no release of the identified radiological constituents has been established. Subsequent analysis indicated there was no basis for establishing that these radiological constituents were used at the sites. The presence of the specific radionuclides at naturally occurring levels does not constitute a release, there is no threat to human health and the environment and, therefore, no action is required under CERCLA. These changes impact the scope of the IROD but do not fundamentally alter the IROD with respect to performance or cost. This remedy as revised effectively meets the remedial objectives, is protective of human health and the environment, complies with Federal and State of Iowa requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective.

Basis for the Difference

Background soil samples were collected as part of the Remedial Investigation at IAAAP. The background samples were analyzed for a wide range of naturally occurring metals and radionuclides in order to establish the natural background concentration or activity of each analyte. The results of the background analyses for three radionuclides (Actinium-228, Bismuth-214 and Potassium-40, identified in the IROD) are presented in Table 1. In Table 2, the minimum, maximum, average (or mean), upper confidence level (at the 95% confidence level or UCL-95), and upper tolerance limit (UTL-95) on the mean (calculated using the results from 84 soil samples) for background soil data are compared with the soil remediation goals from the IROD (1998a). The background values for the three radionuclides are higher than the corresponding soil remediation goals. In Table 3, the analytical results for the two radionuclides observed in soil samples from Lines 1 and 3 (the presumed sources of contamination) are compared with the corresponding background values. None of these values exceeded the maximum background values. For Bismuth-214, the detected maximum in one sample is essentially the same as the maximum background value (1.51 pCi/g vs. 1.5 pCi/g). The presence of the specific radionuclides at naturally occurring levels does not constitute a release at Lines 1 and 3. Since there is no release and thereby no threat to human health and the environment, no action is required under CERCLA. No radiological contamination was identified at OU-1 and the soil remediation goals established for the specific radionuclides in the IROD (1998a) are not necessary. The protection of human health and the environment per the IROD (1998a) would remain the same due to these changes. Lower remedial costs would result because of these changes. Although no radiological contamination was identified as part of the Army's OU-1 actions, the Formerly Utilized Sites Remedial Action Program (FUSRAP), with the US Army Corps of Engineers as the lead agency, is evaluating other actions that will include radiological constituents.

Summary of the Revised Remedy

This ESD revised the remedy under the IROD (1998a) to the extent that soil remediation goals for selected radionuclides (Actinium-228, Bismuth-214, Potassium-40) are deleted. There is no evidence for a release of these radionuclides at the site and thus no action is required under CERCLA to address the specific radionuclides in OU-1 soils.

5.0 AFFIRMATION OF THE STATUTORY DETERMINATIONS

Based on the re-evaluation of site data, the Army and EPA believe that the remedy satisfies CERCLA Section 121 as the remedy remains protective of human health and the environment, and complies with federal and state requirements that were identified in the IROD as applicable or relevant and appropriate to this remedial action. In addition, the remedy, as revised, utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for OU-1, and provides cost savings. The change contained herein is significant, but does not fundamentally change the remedy.

6.0 ROLE OF COMMUNITY IN THE PROCESS

This ESD, along with other documents depicting the nature and extent of contamination at OU-1 and describing the selected remedy, can be found in the Administrative Record file. The Army encourages the public to review these documents to gain a more comprehensive understanding of OU-1 and ongoing activities at the facility. The Administrative Record file for the IAAAP facility is located in the following information repositories:

Burlington Public Library
501 North 4th Street
Burlington, Iowa 52601
(319) 753-1647

Danville City Hall
105 West Shepard
Danville, Iowa 52623
(319) 392-4685

Lee County Health Department
2218 Avenue H
Fort Madison, Iowa 52627
(319) 372-5225

In accordance with the NCP requirements § 300.435 (c) (2) (i), the Army has published a notice of availability and a brief description of the ESD in The Burlington Hawk Eye newspaper. In addition, the Army provided informational briefings regarding soil treatment plans and related

project activities to the Restoration Advisory Board during multiple public meetings held during calendar years 2004 through 2006.

A public meeting to address this change is not currently planned. However, a meeting will be scheduled upon public request.

The point of contact for public inquires is:

Rodger Allison
SJMIA-INE
Iowa Army Ammunition Plant
17571 State Highway 79
Middletown, IA 52638-5000
319-753-7130

Table 1. Background soil sample results for selected radionuclides at the IAAAP

ANALYTE	SAMPLE ID (Activity in pCi/g)													
	BKSS0101	BKSS0201	BKSS0301	BKSS0401	BKSS0501	BKSS0601	BKSS0701	BKSS0801	BKSA0901	BKSS1001	BKSS1101	BKSS1201	BKSS1301	BKSS1401
Actinium 228	1.7	1.3	1.4	1.6	1.5	1.9	1.6	1.4	1.7	1.4	1.7	1.7	1.3	1.4
Bismuth 214	1.3	1.1	1.3	1.2	1.3	0.8	0.99	0.86	1	1.2	0.94	0.9	1.4	0.8
Potassium 40	12	8.1	8.5	17	18	17	15	16	9.8	16	15	16	18	13
	BKSS1501	BKSS1601	BKSS1701	BKSS1801	BKSS1901	BKSS2001	BKSS2101	BKSS2201	BKSS2301	BKSS2401	BKSS2501	BKSS2601	BKSS2701	BKSS2801
Actinium 228	1.6	1.7	1.5	1.4	1.9	1.7	1.3	1.4	1.5	2	1.4	1.4	1.4	1.4
Bismuth 214	1.1	1.2	1.1	1.2	1.4	1.1	1	1.1	1.1	1.4	0.99	0.97	1.3	1.2
Potassium 40	14	16	15	13	17	8.2	13	11	10	9.1	14	12	17	15
	BKSA0102	BKSA0202	BKSA0302	BKSA0403	BKSA0502	BKSA0603	BKSA0702	BKSA0801	BKSA0902	BKSA1002	BKSA1102	BKSA1202	BKSA1302	BKSA1402
Actinium 228	1.5	1.5	1.5	2	1.8	1.4	1.7	1.7	1.6	1.6	1.7	1.6	1.5	1.6
Bismuth 214	1.2	1.5	1.3	0.94	1.5	1	1.1	0.97	1	1.2	0.91	0.95	1.4	0.73
Potassium 40	12	7.4	9.4	17	17	15	15	16	16	15	14	18	16	15
	BKSA1502	BKSA1602	BKSA1702	BKSA1802	BKSA1902	BKSA2002	BKSA2102	BKSA2202	BKSA2302	BKSA2402	BKSA2502	BKSA2602	BKSA2702	BKSA2802
Actinium 228	1.7	1.4	1.4	1.1	1.6	1.8	1.3	1.6	1.3	1.3	1.5	1.3	1.7	1.9
Bismuth 214	0.79	1.2	1.2	1.3	1.1	0.83	0.77	1	1.3	1.1	1.3	1.1	1.3	1.2
Potassium 40	14	11	14	14	17	15	14	16	14	7.6	14	13	13	14
	BKSA0103	BKSA0203	BKSA0303	BKSA0404	BKSA0503	BKSA0604	BKSA0703	BKSA0803	BKSS0903	BKSA1003	BKSA1103	BKSA1203	BKSA1303	BKSA1403
Actinium 228	1.8	0.38	1.4	1.4	1.9	1.5	1.5	1.8	1.5	1.9	1.6	1.9	0.38	1.6
Bismuth 214	1.3	1.2	1.2	1.2	1.4	1.3	1.1	1.2	1	0.86	0.91	1.5	0.82	0.97
Potassium 40	9.1	7.1	8.3	15	14	16	15	18	16	12	13	15	14	11
	BKSA1503	BKSA1603	BKSA1703	BKSA1803	BKSA1903	BKSA2003	BKSA2103	BKSA2203	BKSA2303	BKSA2403	BKSA2503	BKSA2603	BKSA2703	BKSA2803
Actinium 228	1.8	1.2	1.3	1.1	1.6	1.6	1.3	2	1.6	1.7	1.5	1.8	1.7	1.6
Bismuth 214	0.84	1	0.92	0.93	0.7	1.5	1.2	1.3	1.3	1.2	1	1.2	1.3	1.2
Potassium 40	15	11	15	13	14	11	16	14	15	13	17	16	13	15

	DATA SUMMARY (Activity in pCi/g)								
	AVERAGE	NUMBER	MINIMUM	MAXIMUM	MEDIAN	STD DEV	CV	UCL-95	UTL-95
Actinium 228	1.537619	84	0.38	2	1.6	0.2739696	0.1781778	1.588526	2.0855582
Bismuth 214	1.1189286	84	0.7	1.5	1.1	0.1969039	0.1759754	1.1555158	1.5127363
Potassium 40	13.792857	84	7.1	18	14	2.7606	0.2001471	14.305811	19.314057

NOTES:

1. UTL-95 = average + 2 standard deviations = value below which (approximately) 95% of normally distributed population is expected to occur (i.e., values greater than UTL-95 may be considered likely to NOT be within background population)
2. CV = Coefficient of Variation
3. UCL-95 = average + (1.703 x standard deviation / square root of number of samples) = value below which the TRUE average value of a normally distributed population is expected to exist with a 95% level of confidence.
4. Shaded cells represent "non-detect" data reported at the method detection limit.
5. Depth of sample 0'-3'

Table 2. Background soil sample results for selected radionuclides at the IAAAP

Analyte	Average pCi/g	# Of Samples	Minimum pCi/g	Maximum pCi/g	UCL-95 pCi/g	UTL-95 pCi/g	Soil RG pCi/g
Actinium 228	1.54	84	0.38	2	1.59	2.09	0.014
Bismuth 214	1.12	84	0.7	1.5	1.16	1.51	0.008
Potassium 40	13.8	84	7.1	18	14.3	19.31	0.74

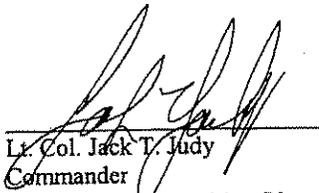
Table 3. Comparison of IAAAP (Lines 1 and 3) radionuclide sample results with background soil values

Sample Location	Actinium-228 Activity (pCi/g)	Bismuth-214 Activity (pCi/g)
B 1-155-1: North Side	0.80	0.67
B 1-70-1: SE Corner		0.99
B-3-10: X-ray Bay		1.51
Average Background (pCi/g)		
	1.54	1.12
Maximum Background (pCi/g)		
	2	1.5

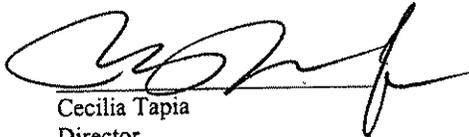
EXPLANATION OF SIGNIFICANT DIFFERENCES

**DELETION OF RADIOLOGICALLY CONTAMINATED SOILS FROM
RECORD OF DECISION (ROD)**

SOILS OPERABLE UNIT #1 (OU-1)


Lt. Col. Jack T. Judy
Commander
Iowa Army Ammunition Plant

JUN 13 2006
Date


Cecilia Tapia
Director
Superfund Division
USEPA, Region VII

7-12-07
Date

**RESPONSE TO USEPA COMMENTS
13 FEBRUARY 2006**

**Responses to Comments from EPA Region 7
ESD for Deletion of Radiological Contaminants from Soils at OU 1
February 13, 2006**

Comment No.	Section, Page	Comment	Response
1.	Sec 3.0, 1 st paragraph	Paragraph 1 discusses the IROD and "final remedy", which is inconsistent terminology. What is the remedy in the IROD for rad soils? Need to discuss.	Paragraphs 1 and 2 in Section 3.0 have been revised to remove the term "final remedy" and include description of remedy suggested previously in the IROD for radionuclide contaminated soils.
2	Sec 4.0, 2 nd paragraph	Probably should be revised. Seems to have some redundancy.	The 1 st and 2 nd paragraphs in Section 4.0 have been revised based on the reevaluation of analytical data which indicated that radioactive elements have been found in background soil at concentrations higher than the soil RG established in OU-1 IROD for some of the radionuclides. Additionally, there was no basis for establishing that these radiological constituents were used at these locations. Therefore previously identified radionuclide contaminated soils will not be excavated as indicated in the IROD. [See Section 4.0 in pages 4 and 5 for detail]
3	Sec 4.0, 3 rd paragraph	Need some revisions to last 4-5 sentences of the paragraph.	The 3 rd paragraph in Section 4 has been revised. [See pages 5 and 6 for detail]
4	Sec 6.0	In paragraph 1, probably should delete the first sentence. In paragraph 2, need to check ESD requirement in NCP (300.345(c)(2)(i)). Why mention 'soil treatment plans'?	The first sentence has been deleted. Paragraph 2 has been revised to state that, as per NCP requirement § 300.435 (c) (2) (i) the Army has published a brief version of the ESD in The Burlington Hawk Eye newspaper. The line about 'soil treatment plans' has been deleted.
5	New Comment	Do we need to include somewhere in the a Summary of the Revised Remedy? It may not be a guidance element, but seems to make sense.	A Summary of the revised remedy has been included at the end of section 4.0 [See page 6 for detail]

RESPONSE TO FUSRAP COMMENTS
30 MARCH 2006

**Responses to Comments from FUSRAP
ESD for Deletion of Radiological Contaminants from Soils at OU 1
March 30, 2006**

Comment No.	Section, Page	Comment	Response
1.	Section 2, Page 2, Line 21	Change "comer" to corner in the phrase: "perimeter on the southwest comer."	Correction made.
2	Section 2, 8 th paragraph, Page 3	<p>The St. Louis District believes this information is not necessary in the ESD to support the change when neither of the RODs (3/4/1998 or 9/28/1998) discuss AEC activities or the presence of depleted uranium on the site and neither of the RODs provide a remedy to address potential AEC contamination (e.g. depleted uranium). However if this discussion remains in the ESD, then additional information regarding the "path forward" for the AEC contamination should be mentioned. Suggest revising the last paragraph in Section 2.0 to state:</p> <p style="padding-left: 40px;">Between 1947 and 1975, the former AEC used portions of the IAAAP facility for production, testing, and storage operations. Some areas of IAAAP are known to contain contamination (e.g. depleted uranium) resulting from AEC operations. The U.S. Army Corps of Engineers (USACE) as the lead agency responsible for addressing contamination resulting from AEC operations at IAAAP, will take actions to ensure that the environmental impacts associated with past AEC activities at the site are thoroughly investigated and appropriate remedial actions are taken to protect public health, welfare, and the environment. This will be accomplished under the authority of the Formerly Utilized Sites Remedial Action Program (FUSRAP).</p>	<p>The following texts have been added: “The U.S. Army Corps of Engineers (USACE) as the lead agency responsible for addressing contamination resulting from AEC operations at IAAAP, will take actions to ensure that the environmental impacts associated with past AEC activities at the site are thoroughly investigated and appropriate remedial actions are taken to protect public health, welfare, and the environment. This will be accomplished under the Formerly Utilized Sites Remedial Action Program (FUSRAP).”</p>

Responses to Comments from FUSRAP
ESD for Deletion of Radiological Contaminants from Soils at OU 1
March 30, 2006

Comment No.	Section, Page	Comment	Response
3	Section 4, 3 rd paragraph	Change "Used" to "Utilized".	Correction made.