Per the Federal Facility Agreement for Iowa Army Ammunition Plant, Article X.B.1, the attached document is the final version of the submitted document.

Iowa Army Ammunition Plant (IAAAP)
Middletown, IA

Draft Final

Explanation of Significant Differences
for the
Final Record of Decision (ROD)
for the
Soils Operable Unit (OU-1)

January 2003

ACRONYMS

AEC	Atomic Energy Commission
ARAR	Applicable or Relevant and Appropriate Requirement
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
DDESB	Department of Defense Explosives Safety Board
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
IDA	Inert Disposal Area
IAAAP	Iowa Army Ammunition Plant
LAP	Load, Assemble, and Pack
LDRs	Land Disposal Restrictions
LTTD	Low Temperature Thermal Desorption
mg/kg	Milligrams per Kilogram
NCP	National Contingency Plan
NPL	National Priorities List
OU	Operable Unit
ppm	Parts Per Million
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RDX	1,3,5-Trinitro-1,3,5-triazacyclohexane
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SVOC	Semi-Volatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TNT	2,4,6-Trinitrotoluene
VOCs	Volatile Organic Compounds
WBPA	West Burn Pads Area

1. Introduction to the Site and Statement of Purpose

1.1. Site Name and Location

Iowa Army Ammunition Plant (IAAAP)
Soils Operable Unit (OU-1)
Middletown, Iowa

1.2. Statement of Purpose

This Explanation of Significant Differences (ESD) is intended to formally document significant changes to the August 1998 Soils Operable Unit Record of Decision (ROD) for IAAAP which was selected pursuant to CERCLA, the NCP, and the IAAAP FFA. These ROD changes are the result of new/updated information regarding soil treatment technologies, the discovery of a larger quantity of contaminated soil than was expected at the West Burn Pads Area (WBPA), and to include a remedy for soils contaminated with metals-only. The ROD stated 1,451 cubic yards of contaminated soil would be removed from the WBPA, however approximately 45,000 cubic yards were actually removed.

1.3. Identification of Lead and Support Agencies

Lead Agency: U.S. Army

The U.S. Army is the lead agency under CERCLA with responsibility for implementing remedial actions at IAAAP.

Support Agency: U.S. Environmental Protection Agency (EPA)

The U.S. EPA oversees cleanup activities conducted by the Army to ensure that the requirements of CERCLA/SARA, the NCP, and the Federal Facilities Agreement (FFA) between the Army and the EPA have been met. EPA also must concur with the selected remedy chosen for cleanup. The State of Iowa declined to comment upon the selected remedy presented in the IAAAP Soils Operable Unit ROD.

1.4. Legal and Administrative Record Requirements for Explanation of Significant Differences (ESD) document

Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Section 300.435(c)(2)(i) of the NCP require that this ESD be published to document changes to the remedy originally selected in the August 1998 ROD. These changes do not fundamentally alter the ROD with respect to scope, performance, or cost.

In accordance with Section 300.825(a)(2) of the NCP, this ESD document must be included in the Administrative Record file for the IAAAP.

1.5. **Date of Record of Decision (ROD)**

August 1998

1.6. **Summary of the circumstances that led to the need for an ESD**

The final ROD for the Soils Operable Unit, dated August 1998, addressed various remedies for the treatment of soil contaminated with three general classes of contaminants, as listed below:

Explosives (only)
Explosives plus metals
Semi-Volatile Organic Compounds (SVOCs)

The Selected Remedy for the explosives-contaminated soils was on-site treatment using a mobile direct-fired Low Temperature Thermal Desorption (LTTD) unit. However, due to safety and performance considerations, a Contingency Remedy, using biological treatment for the explosives-contaminated soils, was also identified in the ROD. In year 2001, the Army determined that it would be appropriate to implement the biological treatment Contingency Remedy in lieu of the LTTD Selected Remedy. In accordance with EPA guidance, this change requires the preparation of an ESD document. The decision to implement the Contingency Remedy was primarily based upon new/updated information about improvements in biological treatment technology for explosives-contaminated soil. That new information demonstrated that significant reductions in costs for biological treatment, with minimal biological incompatibility problems due to high-level metals contamination, was possible using current enhanced biological treatment technologies. Site-specific treatability studies were performed on IAAAP soil to verify that the selected biological treatment technology would be able to meet or exceed performance standards established in the ROD.

In addition, it has become necessary for the Army to treat soil contaminated with metals-only, a situation that was not directly addressed by the August 1998 Soils Operable Unit ROD. This situation was encountered in a significant manner during the remediation of the West Burn Pads Area (WBPA) in calendar year 2000, when large quantities of barium contamination were found to exist within the WBPA soils. Nearly half of the 45,000 cubic yards of contaminated soil excavated from the WBPA required treatment for metals contamination that was primarily barium and, to a lesser degree, lead. A large fraction of those soils required treatment for metals contamination only, due to barium concentrations ranging as high as 40% by weight within the soil.

Finally, in year 2001, new information regarding available treatment technologies led the Army and EPA to determine that soil contaminated with explosives-only or with explosives-plus-metals could be treated in a less-expensive manner and with improved treatment results than was believed possible in year 1998, when the subject IAAAP Soils Operable Unit ROD was written and signed.

As a result of these combined factors, the Army and EPA have concluded that it is appropriate to revise the August 1998 Soils Operable Unit ROD to address applicable changes. In accordance with EPA guidance, it has been determined that the subject ROD changes fall within the range of "significant" (i.e., greater than "minor" but less than "fundamental"), thereby dictating the need to document the ROD changes with an ESD.

1.7. Administrative Record availability

Copies of the Administrative Record file for the IAAAP site are 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

2. Site History, Contamination, and Selected Remedy

2.1. Summary of contamination problems and site history

The Iowa Army Ammunition Plant (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 site contains drainage ways with steep slopes down to the creek beds. Elevations within the IAAAP range from 730 feet above mean sea level in the north to 530 feet in the south.

The IAAAP contains four watersheds. Brush Creek drains the central portion of the site, exits at the southeastern boundary, and flows into the confluence of the Skunk and Mississippi Rivers. Spring Creek drains the eastern portion of the site, exits at the southeastern comer, and flows off site 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 site. The Skunk River then flows into the Mississippi River. The Long Creek drainage way has been dammed near the center of the site 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 site's perimeter on the southwest comer. The Skunk River provides year-round recreational use.

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 Atomic Energy Commission operated at Line 1 from 1948 through mid-1975, at which time operation reverted to U.S. Army (Army) control. The Army continues to own the IAAAP, which has been 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 load, assemble, and pack (LAP) munitions, including projectiles, mortar rounds, warheads, demolition charges, anti-tank 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 site 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 NPDES permit, is discharged to surface. Pink/red wastewaters from trinitrotoluene (TNT) operations are a listed hazardous waste (K047) according to the Resource Conservation and Recovery Act (RCRA).

The U. S. Environmental Protection Agency (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 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), that are within the responsibility of the DOD. The Army, as an agency within the DOD, is the lead

agency for implementing environmental restoration activities at the IAAAP. As the support agency, the EPA oversees cleanup activities conducted by the Army to ensure that the requirements of CERCLA/SARA and the National Contingency Plan (NCP) have been met. The EPA and the Army signed a Federal Facility Agreement (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 State of Iowa has declined to participate as a signatory party to this FFA.

Between 1948 and 1975, the former U.S. Atomic Energy Commission (AEC) used portions of the IAAAP facility for production, testing, and storage operations. Some areas of IAAAP are known to contain special contamination (e.g., depleted uranium) resulting from AEC operations. Additional studies are required to clearly determine whether other areas used by AEC have radiological or other special contamination problems resulting from former AEC operations.

Between September 2000 and January 2002, approximately 20,000 cubic yards of contaminated soil of the approximately 45,000 cubic yards excavated from the West Burn Pads Area were treated in accordance with the revised remedy procedures described within this ESD document. Approximately 6,000 cubic yards of that soil required treatment for both explosives and metals contaminants. The remaining volume of approximately 14,000 cubic yards required treatment for metals contaminants only.

Additional future on-site soil treatment requirements are currently projected to be approximately 20,000-30,000 cubic yards for sites addressed by the 1998 Soil Operable Unit RODs. Approximately 10,000 cubic yards of that soil, requiring treatment for explosives contaminants only, are currently stockpiled at the Inert Disposal Area. The remaining volume of approximately 10,000-20,000 cubic yards of soil requiring future treatment has not yet been excavated from various sites distributed throughout the IAAAP facility. Current projections are that approximately 80% of all future on-site soil treatment would be for explosives contaminants only, approximately 10% would be for metals contaminants only, and approximately 10% would be for explosives-plus-metals.

2.2. **Selected Remedy, as originally described in the ROD**

The August1998 Soils Operable Unit ROD selected the remedy for the treatment of contaminated soil that has been, or will be, temporarily placed in a Corrective Action Management Unit (CAMU) located within the Inert Disposal Area (IDA) site at IAAAP, as previously specified within a March 1998 Interim ROD for the Soils Operable Unit at IAAAP.

The CAMU serves as a temporary holding cell, designed for the stockpiling of certain types of highly-contaminated soil removed from various OU-1 sites distributed around the IAAAP facility. The CAMU will be used to store this soil

only until the soil can be treated in accordance with the selected remedy specified within the August 1998 Soils Operable Unit ROD.

The August 1998 Soils Operable Unit ROD specifies the remedy for treatment of soils contaminated with three general classes of contaminants, as listed below:

Explosives (only)
Explosives plus metals
Semi-Volatile Organic Compounds (SVOCs)

The Selected Remedy for an estimated 9,000 cubic yards of explosives-contaminated soil was on-site treatment using a mobile direct-fired Low Temperature Thermal Desorption (LTTD) unit. A Contingency Remedy using biological treatment for explosives-contaminated soils was also specified in the ROD. On-site management of the treated soil was a component of both the Selected Remedy and the Contingency Remedy. As specified within the August 1998 ROD, the Selected Remedy and the Contingency Remedy both require the treatment of explosives contaminants to levels carrying less than 10^{-6} cumulative soil exposure risk. Both remedies also require that the treated soil comply with Land Disposal Restrictions (LDRs). In accordance with the ROD, treated soil must be disposed in on-site engineered landfill cells unless explosives concentrations are reduced to levels that will not produce groundwater contamination above acceptable levels (as defined within the March 1998 Interim Soils ROD, using the Summers model) and unless treatment residuals can be shown to be non-toxic or not bio-available at levels that could pose a threat to human health or the environment.

The Selected Remedy for an estimated 600 cubic yards of soil contaminated with explosives-plus-metals was Solidification/Stabilization With Activated Carbon. This remedy utilizes treatment of explosives contaminants via adsorption to activated carbon and subsequent treatment of metals contaminants (plus explosives contaminants adsorbed to activated carbon) via chemical solidification/stabilization materials (such pozzolanic materials and phosphate additives). After solidification/stabilization is complete the treated soil is to be managed by disposal in an on-site landfill. As specified within the August 1998 ROD, treatment of metals contamination must achieve compliance with Land Disposal Restrictions (LDRs), as measured using Toxicity Characteristic Leaching Procedure (TCLP) limits established under RCRA. Treatment of explosives contamination must also produce leachable contaminants below levels considered protective of groundwater. Treated soil will be disposed in on-site engineered landfill cells.

The Selected Remedy for an estimated 200 cubic yards of soil contaminated with SVOCs was Off-Site Disposal at a commercial waste treatment and storage facility operating in compliance with required RCRA permits.

The August 1998 ROD did not directly address treatment of soils contaminated solely with metals.

3. **Summary of Revised Remedy Components**

As compared to the Selected Remedy identified within the August 1998 ROD (summarized in section 2.2 of this ESD document), the revised remedy for the treatment of contaminated soil from the Soils Operable Unit may be summarized as follows:

Soil Contaminated with Explosives only

The revised remedy proposed within this ESD is the ROD-specified Contingency Remedy for biological treatment. The revised remedy will meet the ROD-specified performance standards for treatment of contaminants and it will meet the ROD-specified management standards for treatment residues. This means that the explosives contaminants within the soil will be treated to reduce cumulative soil exposure risk to less than 10^{-6} levels and the treated soil will be tested to ensure that it is in compliance with RCRA Land Disposal Restrictions (LDRs). If the treated soil also meets ROD-specified criteria considered protective of groundwater (based upon Summers model calculations) and if the treatment residuals can be shown to be non-toxic or not bio-available at levels posing a threat to human health and the environment, it will be disposed on IAAAP property in an appropriate manner protective of human health and the environment. Otherwise, successfully treated soil will be disposed in on-site engineered landfill cells such as the "Trench 6" Soil Repository, located at the Inert Disposal Area, or another EPA-approved on-site landfill, as specified in the ROD.

Soil Contaminated with Metals only

The revised remedy proposed within this ESD is solidification/stabilization for metals contaminants. Treatment of metals contamination must achieve compliance with Land Disposal Restrictions (LDRs), as measured using Toxicity Characteristic Leaching Procedure (TCLP) limits established under RCRA. Successfully treated soil will be disposed in on-site engineered landfill cells, such as the "Trench 6" Soil Repository located at the Inert Disposal Area or another EPA-approved on-site landfill, in a manner consistent with management standards for treatment residues described in the ROD.

Soil Contaminated with Explosives-plus-Metals

The revised remedy proposed within this ESD is a two-step treatment process including biological treatment for explosives contaminants plus solidification/stabilization for metals contaminants. This remedy was evaluated in the August 1998 ROD; however, it was not selected as the preferred remedy at that time, primarily due to no-longer-valid cost factors and concerns about possible metals interference with biological treatment processes. The revised remedy presented within this ESD will meet the ROD-specified performance standards for treatment of explosives

contaminants, as identified for soil contaminated with explosives only. The revised remedy will also meet performance standards for treatment of metals contaminants, determined by compliance with Land Disposal Restrictions (LDRs), as measured using Toxicity Characteristic Leaching Procedure (TCLP) limits established under RCRA. Successful soil treatment will require that the applicable treatment standards be met for the explosives treatment and metals treatment steps. Successfully treated soil will be disposed in on-site engineered landfill cells such as the "Trench 6" Soil Repository, located at the Inert Disposal Area, or another EPA-approved on-site landfill, as specified in the ROD.

Soil Contaminated with SVOCs only

This ESD does not propose any changes to the ROD-specified Selected Remedy which is Off-Site Disposal at a RCRA-permitted commercial waste treatment facility.

4. **Basis for the ESD Document**

- Addition of Treatment of Soils Contaminated with Metals Only

  During the remediation of the West Burn Pads Area (WBPA), large quantities of barium contamination were found to exist within the WBPA soils. Nearly half of the approximately 45,000 cubic yards of contaminated soil excavated from the WBPA required treatment for metals contamination and a large fraction of those soils required treatment for metals contamination only. However, the August 1998 ROD did not directly address treatment of soils contaminated solely with metals. Therefore, it was determined that an ESD would be appropriate to add metals-only treatment to the ROD.

- Significant Increase in Volume of Soils Requiring Treatment

  A significant increase in soil volume requiring treatment (compared to the volumes estimated in the ROD) was also a factor in the Army's determination that an ESD should be prepared for the Soils OU ROD. For example, excavation of contaminated soils from the WBPLF site resulted in an increase of approximately 6,000 cubic yards of explosives-plus-metals-contaminated soil requiring treatment (i.e., a 1000% increase compared to the 600 cubic yards estimated within the ROD) and an increase of approximately 12,000-15,000 cubic yards of metals-only contaminated soil requiring treatment (compared to zero cubic yards estimated within the ROD).

- Improvements in Biological Treatment Technology for Explosives-Contaminated Soil

  Information about improvements in biological treatment technology for explosives-contaminated soil became available to the Army at approximately the same time that barium-contaminated soils were

discovered during remediation of the WBPA site. These technology improvements primarily involved significant reductions in unit costs for biological treatment and demonstration of minimal biological incompatibility problems due to high-level metals contamination co-existing in treated soil with explosives contamination. As a result of this new information, the Army and EPA determined that the Contingency Remedy, using biological treatment, should be used in lieu of the LTTD Selected Remedy. In accordance with the August 1998 ROD, treatability studies were performed on WBPA soil to determine the best biological treatment option and to verify that the selected biological treatment technology would be able to meet or exceed performance standards established in the ROD. Supporting information from applicable treatability studies and actual treatment performance data for WBPA soils is available in the Remedial Action Report for the Focused Feasibility Study Soil Sites, Phase III (WBPA).

- Implementation of the Contingency Remedy as permitted by the Final ROD, dated August 1998

  Per EPA guidance, implementation of a Contingency Remedy typically requires an ESD to document the change.

5. Description of Significant Differences

5.1 Description of Significant Differences between the Selected Remedy as presented in the ROD and the revised remedy.

Soil Contaminated with Explosives only

Regarding the treatment of soils contaminated with explosives-only, implementation of the Contingency Remedy (biological treatment) in lieu of the Selected Remedy (LTTD) is the primary significant difference that needs to be recorded within this ESD document. Biological treatment of explosives was fully evaluated as the contingent remedy in the feasibility study, proposed plan, and ROD process. The most significant change in the ESD is that per unit costs for the remedy are now known to be much less than estimated in the ROD. The Contingent Remedy will meet the performance standards as described in the ROD.

Soil Contaminated with Metals only

Regarding the treatment of soils contaminated with metals-only, the Soils OU ROD did not include a Selected Remedy for this situation. However, the revised remedy for treatment of metals-only-contaminated soil (i.e., solidification/stabilization) utilizes applicable components of the metals-plus-explosives Selected Remedy. The options available for treatment of metals contaminants within soil remain essentially the same whether the metals contamination stands alone or whether it co-exists with other contaminants (e.g., explosives). Unless the metals contamination could be

removed from the soil by a separation technique, the only other viable choice for treatment of metals contamination in soil uses conventional solidification/stabilization techniques. Removal of metals contaminants from the soil was determined to be cost-prohibitive for the types and levels of contaminants in the IAAAP OU-1 soils. Therefore, solidification/stabilization remains the only viable option for treatment of metals-contaminated soils whether the soils are also contaminated with explosives or not. Treatment of metals contamination must achieve compliance with Land Disposal Restrictions (LDRs), as measured using Toxicity Characteristic Leaching Procedure (TCLP) limits established under RCRA. These performance metrics for metals-only soil treatment are the same as those already outlined in the August 1998 ROD for metals contaminants within "explosives-plus-metals" contaminated soil. Treated soil will be disposed in on-site engineered landfill cells such as the "Trench 6" Soil Repository, located at the Inert Disposal Area, or another EPA-approved on-site landfill, in a manner consistent with management standards for treatment residues as described in the ROD.

Soil Contaminated with Explosives-plus-Metals

Regarding the treatment of soils contaminated with explosives-plus-metals, the Army received new/updated information regarding biological treatment of explosives contaminants in soil and regarding solidification/stabilization of metals contaminants in soil and regarding compatibility of the two processes within soil containing both explosives and metals contamination. This new information demonstrated that the two processes could be compatible within a single soil matrix contaminated with both explosives and metals and could achieve the ROD-specified remediation criteria at a cost which is significantly less than that estimated within the ROD. This two-step treatment process will comply with the requirements of the explosives only and metals only treatment processes as identified above. Treated soil will be disposed in on-site engineered landfill cells such as the "Trench 6" Soil Repository, located at the Inert Disposal Area, or another EPA-approved on-site landfill, as specified in the ROD.

Soil Contaminated with SVOCs

This ESD does not recommend any change to the ROD regarding soil contaminated with SVOCs.

5.2. **Changes in Expected Outcomes resulting from the ESD.**

Changes in expected outcomes resulting from this ESD include the following:

Cost Issues

a. A significant decrease in unit costs for the treatment of explosives-contaminated soil (approximately $175 per cubic yard for the revised

remedy versus $510 per cubic yard estimated in the ROD for LTTD and versus $490-$785 per cubic yard estimated in the ROD for biological treatment). Cost data for the revised remedy is based upon actual costs for the August-October 2001 treatment of approximately 6,000 cubic yards of WBPA soil for explosives contamination.

b. A significant decrease in unit costs for the treatment of metals-contaminated soil (approximately $35 per cubic yard for the revised remedy versus $150 per cubic yard estimated in the ROD for solidification/stabilization of metals contaminants in soil). Cost data for the revised remedy is based upon actual costs for the December-2001-January-2002 treatment of approximately 6,000 cubic yards of WBPA soil for metals contamination.

c. A decrease in unit costs for the treatment of explosives-plus-metals-contaminated soil (approximately $210 per cubic yard for the revised remedy versus $220-$380 per cubic yard estimated in the ROD for the selected Solidification/Stabilization With Activated Carbon remedy). Cost data for the revised remedy is based upon combined actual costs for the August-2001-January-2002 treatment of approximately 6,000 cubic yards of WBPA soil for explosives and metals contamination.

d. Due to complex combinations/ranges of unit treatment costs and soil treatment volumes/types, it is difficult to clearly/concisely quantify the total cost differences between the ESD-revised remedy and the ROD-specified remedy. This is especially true when considering the large increases in soil quantities requiring treatment that are not related to the implementation of the revised remedy treatment methods when comparing current estimates to volumes estimated in the ROD. Nevertheless, Table 1 (attached to the end of this ESD document) uses unit cost and soil treatment volumes/types identified within this ESD to demonstrate a very significant total cost reduction, ranging approximately from $7 million to $18 million, that can be expected to result from the implementation of the ESD-revised treatment remedy.

Performance Issues

a. Efficient and effective biological treatment of explosives-contaminated soil with minimal increase in soil volume when using the revised remedy (as compared to the large volumetric increase expected in the ROD for soil treated by composting). This is possible due to enhanced biological treatment techniques that have become available since the ROD was prepared.

b. The revised remedy and the ROD-selected (LTTD) remedy for explosives-only-contaminated soil will both permanently reduce

contaminant levels to below ROD-specified treatment goals and the two remedies are considered equally protective of human health and the environment. However, a lesser degree of reduction in contaminant toxicity and mobility is expected from the implementation of the revised remedy for explosives-only-contaminated soil compared to the ROD-selected remedy. This is due to the fact that thermal treatment will permanently destroy explosives contaminants that are present above remediation goals, while biological treatment will degrade and stabilize them. Since destruction of explosives contaminants may be less complete using biological treatment compared to thermal treatment, the revised remedy may also be considered less effective than the ROD-selected remedy. However, biological treatment residuals will be managed in EPA-approved on-site engineered landfill cells that significantly diminish possible concerns about contaminant toxicity/mobility or effectiveness issues associated with the biological treatment process.

c. Greater long-term effectiveness and greater reduction in contaminant toxicity/mobility for explosives-plus-metals-contaminated soil due to destruction/degradation of explosives contaminants treated via the revised remedy versus immobilization/containment of explosives contaminants treated via the selected remedy.

d. Compared to the selected remedy, the revised remedy provides for soil treatment that has equivalent or greater effectiveness and permanence, reduction of toxicity/mobility/volume, implementability, overall protection of human health and the environment, and compliance with ARARs. In addition, no significant change is expected in time required to implement any of the revised remedy components versus the selected remedy. In summary, the revised remedy will provide equivalent or greater performance (compared to the Selected Remedy) in meeting remedial action objectives established in the ROD.

Scope Issues

A significant increase in quantity of soil requiring treatment is associated with the implementation of the revised remedy, primarily due to the fact that the Selected Remedy did not include consideration for treatment of soil containing metals-only contamination and due to the discovery of larger-than-expected volumes of contaminated soil at the WBPA site. However, this may be considered to be the result of an expansion in the nature and volume of soils requiring treatment and not truly the result of implementation of the revised remedy. Based upon information from the WBPA remediation project alone, a 1000% increase in volume (from 600 cubic yards to 6,600 cubic yards) has occurred for treatment of soil contaminated with explosives-plus-metals and an increase of 12,000-

15,000 cubic yards has occurred for treatment of soil contaminated with metals-only (compared to zero cubic yards addressed by the ROD).

6. **Statutory Determinations**

Considering the new information that has been developed and the changes that have been made to the selected remedy, the Army and EPA believe that the remedy remains protective of human health and the environment, complies with Federal and State of Iowa requirements that are legally applicable or relevant and appropriate to this remedial action, and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site and satisfies the statutory preference for remedies that employ treatment to reduce toxicity, mobility, or volume as a principle element. Therefore, the revised remedy satisfies the statutory requirements of Section 121 of CERCLA.

7. **Public Participation Compliance**

The Army provided an advanced announcement regarding its intentions to issue the subject ESD by publicly issuing a "Notice of Changes for Treatment of Contaminated Soil at the Iowa Army Ammunition Plant" in the Burlington "Hawk Eye" newspaper on 20 December 2001. 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 2000 and 2001.

In accordance with the requirements of Section 300.435(c)(2)(i) of the NCP, the Army will publish a notice of availability and a brief description of the ESD in a major local newspaper of general circulation. This ESD will also be made available to the public by placing it in the Administrative Record file and information repositories.

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 inquiries is:

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

Explanation of Significant Differences
for the
Final Record of Decision (ROD)
for the
Soils Operable Unit (OU-1)

Yolanda C. Dennis-Lowman
Lieutenant Colonel, US Army
Commanding

29 Jan 03
Date

Andrea Jirka
Acting Director
Superfund Division
U.S. Environmental Protection Agency
Region VII

4/16/03
Date

Table 1

Cost Comparison for ESD-Revised Remedy versus ROD-Selected Remedy

			ROD-Selected Remedy		ESD-Revised Remedy		Total Cost Reduction from ROD-Selected Remedy to ESD-Revised Remedy
	Type of Soil Treatment	Volume of Soil Treatment (cubic yards)	Treatment Unit Cost (per cubic yard)	Total Treatment Cost	Treatment Unit Cost (per cubic yard)	Total Treatment Cost	
Treatment Completed in years 2000-2002	Explosives + Metals	6,000	$220 - $380	$1,320,000 - $2,280,000	$210	$1,260,000	$60,000 - $1,020,000
	Metals-only	14,000	$150	$2,100,000	$35	$490,000	$1,610,000
Future Treatment Projections	Explosives-only	16,000 - 24,000	$510 (LTTD)	$8,160,000 - $12,240,000	$175	$2,800,000 - $4,200,000	$5,040,000 - $14,640,000
			$490 - $785 (biological)	$7,840,000 - $18,840,000			
	Explosives + Metals	2,000 - 3,000	$220 - $380	$440,000 - $1,140,000	$210	$420,000 - $630,000	$20,000 - $510,000
	Metals-only	2,000 - 3,000	$150	$300,000 - $450,000	$35	$70,000 - $105,000	$230,000 - $345,000
Totals		40,000 - 50,000		$12,000,000 - $24,810,000		$5,040,000 - $6,685,000	$6,960,000 - $18,125,000