

# **ACTION MEMORANDUM**

## **USDA NATIONAL ANIMAL DISEASE CENTER (NADC) MIXED WASTE DISPOSAL SITE**

**CONTRACT NUMBER  
DAAA09-00-G-0004  
DELIVERY ORDER 0003**

**Submitted to:  
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Rock Island, Illinois 61299-6000**

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## **ATTACHMENTS**

- Attachment A:** Final EE/CA for USDA NADC Waste Site, National Animal  
Disease Center. Ames, Iowa. Revision 1, August 14, 2002.  
**Attachment B:** Removal Action Tentative Schedule

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### **ABBREVIATIONS AND ACRONYMS**

ARAR	Applicable Or Relevant And Appropriate Requirement
COC	Chemical of Concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EE/CA	Engineering Evaluation/Cost Analysis
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MeV	Megaelectron volts
NADC	USDA National Animal Disease Center
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
PA	Preliminary Assessment
PRP	Potentially Responsible Party
ROC	Radionuclide of Concern
TSD	treatment, storage, and disposal facility
USDA	United States Department of Agriculture
yr	years

## **1.0 PURPOSE**

The purpose of this Action Memorandum is to document approval of the proposed removal action to excavate waste materials and soils from the former 10 CFR 20.304 burial site (hereafter referred to as 'Site 1') at the United States Department of Agriculture's (USDA) National Animal Disease Center (NADC), Ames, Iowa. The proposed removal action was developed in the "*Engineering Evaluation and Cost Analysis (EE/CA) for the USDA NADC Waste Site, Ames, Iowa*" appended as Attachment A to this document. All figures for this site are available in Attachment A.

## **2.0 SITE CONDITIONS AND BACKGROUND**

### **2.1 Site Description**

#### *2.1.1 Site Evaluation*

The NADC buried waste at Site 1 beginning in 1971 and continued through 1980. Both chemical and radioactive constituents were introduced into the onsite soils. Site 1 contains 16 burials approximately 6 feet apart to a depth of 6 feet with 2 to 4 feet of clean cover soil at the surface of each burial. The site contains materials associated with conducting bench scale research with radionuclides, such as lead pigs, source vials, pipettes, packaging materials, gloves, absorbent paper, test tubes, scintillation vials, carbon filters, and liquid scintillation counting fluid. The majority of the waste is made up of test tubes and scintillation vials containing hazardous liquid cocktail. In accordance with Nuclear Regulatory Commission (NRC) guidance in effect at the time (10 CFR 20 part 304), NADC double-bagged waste materials in polyethylene bags before placement in the burials.

#### *2.1.2 Physical Location*

The NADC and Site 1 are located on the east side of Ames, Iowa, in Story County, about 33 miles north of Des Moines. Site 1 comprises about 0.25 acres (11,000 ft<sup>2</sup>) situated on the USDA NADC property near Dayton Avenue. Site 1 consists of 16 burials approximately 6 feet apart at a depth up to 6 feet along an existing fence line. Site 1 is bounded on the east by Interstate highway 35, on the south by the USDA's National Veterinary Services Laboratories, and on the west and north by agricultural lands. The facility is entirely within the incorporation limits of Ames. Zoning ordinances in effect around the facility assure continued rural and agricultural land uses (USDA 1988b). Prior to the NADC's inception, the site was used for farmlands (ATKearney 1991b). Land use in the vicinity of the site is commercial to the south, residential to the west, and agricultural to the north and east.

#### *2.1.3 Site Characteristics*

The NADC is owned and operated by the USDA. The burials were used for interim storage of waste materials and were constructed and performed in accordance with NRC requirements in 10 CFR Part 20.304 (USDA 1971a, USDA 1971b, USDA 1975).

The main pathway for contamination from Site 1 to surrounding areas and public drinking water supplies would be groundwater. Six groundwater wells were constructed adjacent to

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Site 1 in 1996 for the purpose of groundwater monitoring. Continual monitoring of these wells has shown no evidence of groundwater contamination at Site 1.

#### *2.1.4 Release or Threatened Release into the Environment of a Hazardous Substance*

##### *Under Current Conditions:*

- No direct exposure pathway.
- Possible subsurface release to soil if bag integrity is lost
- No evidence of impact to groundwater.
- No groundwater pathway exists since perched water table not used for drinking, irrigation, or livestock.

##### *Future Considerations:*

- Construction at Site 1 without remediation:
  - Potential for direct exposure if unearthed
  - Potential leaching to subsurface soils and migration to groundwater
- Land use changes
  - If groundwater used for drinking, irrigation or livestock activities in the future

#### *2.1.5 National Priorities List (NPL) Status*

Site 1 is not listed on the National Priorities List (NPL). In February of 1991, a Preliminary Assessment Report (PA, ATKearney, 1991) was prepared for the NADC site. This report indicated that solvents, medical wastes, radioactive wastes, and pesticides have been disposed to the environment at Site 1 on the NADC property. The results of the PA results determined that the Hazard Ranking Score for Site 1 was not high enough to warrant inclusion on the NPL and no further Superfund related action was recommended. The HRS Score for Site 1 was 18.87.

## **2.2 Other Actions to Date**

### *2.2.1 Previous Actions*

On November 6, 1989, NADC personnel used a backhoe to excavate the waste buried in 1971 (the first of the waste burials). NADC indicates that the polyethylene bags did not break during the removal process. Soil samples were assayed by gas chromatograph and showed no organic solvents. Scintillation counts on soil for alpha and beta particles were at background levels and a survey of the burial did not detect gamma emitters (USDA 1989). At that time, the bags appeared to be strong and in much the same condition they were when placed in the burial 18 years prior. There were no indications that groundwater had ever reached the level of the burial material and the soil holding the material is hard yellow clay.

To obtain supplemental information to further characterize Site 1, the USDA contracted Bridge Environmental Management Group (with Environmental Science & Engineering, Inc. as subcontractors) to perform additional monitoring. A report prepared in January 1996 addressed the results of this investigation (ESE 1996). Six (6) soil borings to approximately 15 feet were conducted on-site to characterize the local geology, groundwater occurrence, and

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scan for potential volatile organic compounds in the subsurface. These borings were converted to two-inch diameter groundwater monitoring wells. The boring and well locations were based on historical information; approximated groundwater flow direction based on topographic relief and approximated regional groundwater flow directions, and orientation of the burial sites.

Samples from each monitoring well location have been collected and analyzed for detection of volatile organic compounds in accordance with EPA Method 8240 on a regular basis since installation of the wells. All groundwater sample results have been below the method detection limits (USDA, 2002).

More recent monitoring well sampling results (as of August 2000) continue to show results for volatile organic compounds below method detection limits (TestAmerica, 2002).

#### *2.2.2 Current Actions*

No current actions are underway by Federal, State, or Local Authorities.

### **2.3 Federal, State, and Local Authorities' Roles**

#### *2.3.1 Federal Roles and Actions to Date*

- **USDA**
  - The NADC site is part of a USDA facility. As such, the waste was generated at the USDA facility and USDA has custody and control of the site under the radioactive materials permit for the NADC as issued by USDA headquarters.
- **US NRC**
  - USDA holds a broad scope radioactive materials license from the NRC and as such must meet NRC licensing requirements.
- **US EPA**
  - The site is not on the EPA's Superfund list (i.e., it is not an NPL site). However, EPA Region VII has been active during the development of the PA and eventual removal action alternatives at Site 1.

#### *2.3.2 State and Local Roles and Actions to Date*

- **Iowa Department of Public Health (IDPH)**
  - Administers US NRC licenses since Iowa is an Agreement State. However, the USDA's permitting process through its NRC broad-scope license for radioactive materials use takes precedence at this federal facility. However, the chosen removal action will be performed in coordination with the IDPH.
  - No direct IDPH actions have been taken to date for Site 1.
- **Iowa Department of Natural Resources (IDNR)**
  - The NADC is not currently listed on the IDNR Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste or Hazardous Substances

Disposal Sites. However, the Iowa Administrative Code was consulted for evaluation of ARARs in the EE/CA.

- The chosen removal action will be performed in coordination with the IDPH.
- No direct IDNR actions have been taken to date for Site 1.

### **3.0 THREATS TO PUBLIC HEALTH OR WELFARE OF THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES**

#### **3.1 Threat to Public Health or Welfare**

There is a potential threat to the public by direct contact to the Radionuclides of Concern (ROCs) or the Chemicals of Concern (COCs) through exposure to contaminated groundwater or contaminated soil from Site 1. The ROCs and COCs are identified in Table 1 and Table 2, respectively.

**Table 1 - Radionuclides of Concern (ROCs)**

<b>Radionuclide</b>	<b>Name</b>	<b>Half Life</b>	<b>Principal Modes of Decay</b>
H-3	Tritium	12.3 yr	$\beta$ (0.0185 MeV)
C-14	Carbon-14	5,730 yr	$\beta$ (0.157 MeV)
Ni-63	Nickel-63	100 yr	$\beta$ (0.0669 MeV)



**Table 2 - Chemicals of Concern (COCs)**

<b>Chemical</b>	<b>CASRN</b>	<b>Information</b>
Benzene	71-43-2	Liquid Scintillation
Ethyl Benzene	100-41-4	Liquid Scintillation
Toluene	108-88-3	Liquid Scintillation
Xylene	1330-20-7	Laboratory Chemical
Lead	7439-92-1	Lead Shield Pigs
Cyanide	57-12-5	Laboratory Chemical
Formaldehyde	50-00-0	Laboratory Chemical
PPO (2,5-Diphenyloxazole)	92-71-7	Liquid Scintillation
POPOP [2-(5-Phenyloxazolyl)Benzene]	1806-34-4	Liquid Scintillation

### **3.2 Threat to the Environment**

Most of the undeveloped lands on the NADC are utilized for animal foraging and pasture. Hence, the vegetation on the site is primarily introduced grasses and alfalfa. Animals that may inhabit the site are moles, deer mice, red fox, striped skunk, raccoon, badger, and an occasional whitetail deer. Birds such as horned larks, killdeer, vesper sparrow, and ringnecked pheasants would likely inhabit the site (USDA 1988b). No unusual, threatened, or endangered species of vegetation or wildlife are known or expected to occur on the site (USDA 1988b). Based on conversations with NADC and the U.S. Fish and Wildlife Service personnel, there are no habitats of endangered species or wetlands on the NADC property (ATKearney 1990).

There are approximately 15 acres of wetlands in a ravine approximately one-half mile to the east of NADC. Other wetlands areas were identified within 2 miles of the site (ATKearney 1991a). There is no impact anticipated to these wetlands from conditions at Site 1. The Skunk River, located approximately 1 mile from Site 1, has the potential to contain for sensitive habitats or species. Other areas surrounding the NADC are used for agricultural cash crop farming or are commercial or industrial in nature.

The Story County Conservation Board indicated that there are not any listed environmentally sensitive habitats or species in the immediate area (USDA 1995a)

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#### **4.0 ENDANGERMENT DETERMINATION**

Available data indicates that the buried wastes are still contained within the original burial configurations at Site 1. However, the nature of these burials is insufficient for long-term control. Thus, actual or threatened releases of hazardous or mixed wastes from Site 1 may present an imminent and substantial endangerment to public health, or welfare, or the environment if not addressed by implementing the response action selected in this Action Memorandum.

#### **5.0 PROPOSED ACTIONS AND ESTIMATED COSTS**

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) provides eight criteria for evaluating the need for and selection of removal actions in Section 300.415(b)(2). If conditions at a CERCLA site satisfy the conditions of one or more of these criteria, then the NCP suggests that it is appropriate to consider conducting a removal action. They include the following:

- Actual or potential exposure to nearby human populations, animals, or food chain from hazardous substances or pollutants or contaminants;
- Actual or potential contamination of drinking water supplies or sensitive ecosystems;
- Hazardous substances, pollutants, or contaminants in drums, barrels, tanks or other bulk storage containers, that may pose a threat of release;
- High levels of hazardous pollutants or contaminants in soils largely at or near the surface that may migrate;
- Weather conditions that may cause hazardous substances, pollutants, or contaminants to migrate or be released; and,
- Threat of fire or explosion.

Several other factors listed may also apply to the site including the existence of perched local water tables near the surface. However, they are considered to be potential threats that may occur after a long period of time if no action is taken at the site and if access to the site is no longer restricted. For example, people could be exposed to hazardous and/or radioactive material in the future if drinking water wells were installed at, or close to, the burial pits. If the top three to six feet of soil were removed, people could be exposed to the waste material through direct contact, inhalation of dust, or through exposure to gamma and/or beta radiation.

The disposal records illustrate that the following types of materials may be present:

- Hazardous substances, pollutants, or contaminants as defined by the NCP (40 CFR 300.5);
- Byproduct materials as defined by the Atomic Energy Act (AEA); and mixed waste.

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## **5.1 Proposed Actions**

### *5.1.1 Alternative 1: No Action.*

Site monitoring and control would be continued, but no cleanup actions would be performed.

### *5.1.2 Alternative 2: Excavation and Disposal.*

This alternative includes excavation and treatment/offsite disposal of all waste chemical and radioactive materials above Preliminary Remediation Goals (PRGs) as developed for Site 1 (see Attachment A); a final status survey in accordance with the Multi-Agency Site Survey and Investigation Manual (MARSSIM; NRC, 2000) to support unrestricted release of the land; and restoration of the area by backfilling with clean soil to support potential land re-use.

### *5.1.3 Alternative 3: Containment and Institutional Controls.*

This alternative includes capping the material with additional soil cover and providing continued institutional and engineering controls to help ensure that the waste materials remain contained within the burial site.

### *5.1.4 Alternative 4: Temporary Onsite Storage/Offsite Disposal*

This alternative includes excavation and onsite storage of all waste chemical and radioactive materials above PRGs as developed for Site 1 (see Attachment A); a final status survey in accordance with the MARSSIM to support unrestricted release of the land; and restoration of the area by backfilling with clean soil to support potential land re-use. Due to cost constraints, a limited amount of material would be shipped to a permanent offsite permitted disposal facility each year until all of the material has been removed from the site.

Alternatives 1, 2, 3, and 4 were independently evaluated for effectiveness, implementability, and cost. Alternatives 1 and 3 were determined to not meet the removal action objectives and therefore, were eliminated from further consideration as viable alternatives.

## **5.2 Contribution to Remedial Performance**

Both Alternatives 2 and 4 fully support the efficient performance of long-term remedial actions at Site 1. Both alternatives include excavation of wastes and transportation of the excavated material to an offsite, permitted treatment, storage, and disposal (TSD) facility. As a result, long-term risks due to contact with soils and potential groundwater infiltration would be reduced because all material above established criteria would be removed from the site and transferred to a permitted offsite facility. Alternative 2 was chosen as the preferred removal action due to the promptness of completion potential and because it was shown to be more cost effective.

## **5.3 Description of Alternative Technologies**

Installation of a low permeability clay cap over all waste and soil was considered in Alternative 3. Capping would not affect the toxicity or volume of the hazardous constituents

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of concern currently present at Site 1, but it would likely promote drainage of surface water sources and reduce erosion. It could also potentially reduce the mobility of some of the constituents to sources of groundwater by preventing percolation of surface sources of water through the burial site. Despite the proposed benefits, installation of a low permeability clay cap did not support the removal action objective for future land use and thus, was not considered further.

#### **5.4 EE/CA**

The Final EE/CA for Site 1 was completed in August 2002. Attachment A contains the document in its entirety. No Responsiveness Summary was required for the chosen removal action as no written comments were received from the public during the public comment period (August 21, 2002 through September 20, 2002).

#### **5.5 Applicable or Relevant and Appropriate Requirements (ARARs)**

ARARs are Federal and State human health and environmental requirements used to define the appropriate extent of site cleanup, identify sensitive land areas or land uses, develop remedial alternatives, and direct site remediation. CERCLA and the NCP require that remedial actions comply with State ARARs that are more stringent than Federal ARARs, are legally enforceable, and are consistently enforced statewide.

The EE/CA (Attachment A) contains detailed discussion of the chosen ARARs. Implementation of Alternative 2 will be compliant with all identified ARARs.

#### **5.6 Project Schedule**

The time period required to implement Alternative 2 is approximately 6 months, including shipment of all waste materials for treatment and disposal. The removal action schedule will be designed within a time frame that ensures adequate protection of public health and the environment. A tentative removal action schedule is included in Attachment B.

## 5.7 Removal Project Cost Estimate

The estimated cost for Alternative 2 is provided in Table 3.

**Table 3 - Cost Analysis of Alternative 2**

<b>Task</b>	<b>Description</b>	<b>Excavation &amp; Treatment/ Disposal</b>
1	Site Monitoring (Prior to Mobilization)	\$10,000
2	Mobilization	\$55,000
3	Site Preparation	\$24,000
4	Excavation & Remediation Surveys	\$275,000
5	Final Status Survey and Sampling	\$310,000
6	Waste Sort, Segregate & Repackage	\$125,000
7	Site Restoration	\$10,400
8	Waste Characterization	\$85,000
9	Waste Transportation	\$104,000
10	Waste Treatment / Disposal	\$655,000
11	Water Treatment / Disposal	\$270,000
12	Final Report	\$30,000
13	Project Management	\$30,000
	<b>TOTAL ESTIMATED COST</b>	<b>\$1,983,400</b>

## 6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Multiple potential pathways of human exposure to radiation and toxic chemicals under unrestricted commercial or residential future use scenarios currently exist. Delayed action could result in a threat to public health and welfare. Should the proposed action not be taken, it is anticipated that these waste materials could be released to the environment at unacceptable levels and lead to a difficult and costly remediation, including groundwater.

The following are key factors contributing to change by delay:

- Indications are waste bags are intact. However, they may deteriorate and leak over time.

- The current soil cover up to 4 feet may erode or be removed over time due to land use changes
- No evidence that groundwater has been impacted yet. Delays in executing removal action increase risk of contamination migration to perched groundwater table.

## 7.0 OUTSTANDING POLICY ISSUES

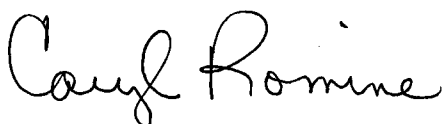
None.

## 8.0 ENFORCEMENT

The USDA is the principal potentially responsible party (PRP) with respect to the remediation of the mixed waste disposal pits at Site 1. Because these actions are not funded by Superfund, the statutory limits on CERCLA removal actions of 1 year and \$2 million dollars (40CFR 300.415 (b)(5)) do not apply to Site 1. However, the removal action is also being governed by the US NRC, with whom the USDA holds a broad scope radioactive materials license. As such, the chosen removal action must also comply with NRC guidance on decommissioning of licensed facilities.

## 9.0 RECOMMENDATION

This decision document presents the selected removal action for Site 1, Excavation and Treatment/Disposal (Alternative 2), developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the site.



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Area Health & Safety Manager  
USDA - Agricultural Research Service  
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September 24, 2002

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Date

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NADC Site, Final. August 2002.



## ATTACHMENT A

### Final EE/CA for NADC Waste Site USDA National Animal Disease Center

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## ATTACHMENT B

### Removal Action Tentative Schedule

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