APPENDIX H

National Environmental Policy Act
(USACOE-Omaha District)

APPENDIX H

ENVIRONMENTAL ASSESSMENT
IOWA ARMY AMMUNITION PLANT
BURLINGTON IOWA

1. PROJECT AUTHORITY & METHOD OF COMPLIANCE

The Iowa Army Ammunition Plant project is a Superfund project which falls under CERCLA, Section 121(e)(1), 42 United States Code 9621(e)(1), as amended. Section (e)(1) addresses permits and enforcement specifically and reads as follows:

> *(e)Permits and enforcement. (1) No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely onsite, where such remedial action is selected and carried out in compliance with this section.*

It is the intention of the US Army Corps of Engineers(COE) to use this Environmental Assessment(EA)in combination with the Engineering Evaluation/Cost Analysis(EE/CA)to demonstrate compliance with the intent of all applicable permits and regulations. This EA will not be a "stand alone" document and will not redescribe project details that have already been described elsewhere in this document. For example, items such as soils, hydrology, and geology are described in detail in the project descriptions elsewhere in this EE/CA. Rather, this appendix will explain, by site, how the COE has complied with the intent of normal permitting procedures for the recommended alternative. It will do so by means of an environmental checklist within which will include discussions of alternatives and impacts to the environment.

Although the nature of this Superfund cleanup activity exempts it from normal permitting procedures, the Corps of Engineers has exerted substantial effort in order to promote and protect the natural environment on the IAAP. The US Fish and Wildlife Service(USFWS)as well as the Iowa Army Ammunition Plant(IAAP)land manager were instrumental in aiding the Corps with information regarding the protection of wildlife and plant communities.

2. PROJECT OUTLINE

This project will entail four major tasks;

A. Inert Landfill Cap
B. Line 800 Pinkwater Cleanup
(includes on site RCRA landfill)
C. Line 1 Pinkwater Cleanup
(includes on site RCRA landfill)
D. Borrow Source Wetland Creation

As was mentioned before, the detailed descriptions for these projects have been presented previously, however, in order to familiarize the reader with each aspect of the project a brief description will accompany each project in this EA.

A. LANDFILL CAP

The proposed work is to construct a landfill cover to isolate waste materials from the environment. Please refer to exhibit H-1, H-2, H-3, and H-4 for a view of the landfill to be covered. Land-filling operations at the Inert Landfill have been conducted since the construction of the Iowa Army Ammunition Plant (IAAP) in 1941 until 1991. The landfill received materials such as cafeteria and residential refuse and garbage, broken pallets, plastic, tin cans, scrap lumber, empty fiber drums (crushed), unsalvageable paper and cardboard, and asbestos insulation (in double plastic bags). The average annual quantity of the materials placed in the landfill has been estimated at 3170 tons.

The southwest corner of the landfill contains an existing unused trench (see exhibit H-3, and H-4). This trench, called trench 6, will be used as a disposal area for contaminated soils excavated from Lines 1 and 800. The soils disposed of in this trench will meet RCRA subtitle C landfill requirements. Prior to disposal in this trench the trench will be lined with a double liner system consisting of a bottom composite liner, inner leachate collection/leak detection layer, geomembrane layer, and upper leachate collection system.

National Environmental Policy Act (NEPA), as amended, 42 U.S.C. 4321, et seq. In compliance. This environmental assessment (EA) will demonstrate compliance by including the need for the proposal when necessary, appropriate alternatives, and copies of the correspondance recieved by other agencies during the analysis

phase of this action. It will also include references to site visits made with cooperating agencies during the analysis phase.

Archeological and Historic Preservation Act, as amended, 16 U.S.C. 469, et seq. and National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq. A letter dated August 16, 1994 was received from the Iowa State Historic Preservation Officer (SHPO) regarding the presence of cultural resources in the landfill area (see exhibit 3). The letter states that no sites are present in the project area which may be eligible for inclusion to the National Register of Historic Places. The remainder of this letter describes the SHPO's stance regarding the use of blast deflection berms for borrow. As recommended by the SHPO the COE and the IAAP have agreed to preserve the value of these berms and seek suitable borrow material elsewhere. The blast deflection berms are no longer a part of this project and will not be disturbed in any way relating to this project. If the proposed project construction subsequently uncovers any item which might be of archaeological interest, or if important new archaeological data come to light in the project area, the COE will make reasonable effort to avoid or minimize harm to the property until the significance of the discovery can be determined.

Caution will be exercised during all phases of work in order to minimize any disturbance to deeply buried cultural resources. The contractor will be explicitly warned about this possibility and instructed that if any resources are found that he or she should stop work and contact the District office immediately.

Clean Air Act, as amended, 42 U.S.C 1857h-7, et seq. Air quality outside of the site perimeter is not expected to be impacted to any measurable degree by construction activities associated with the inert landfill cap closure. As a worker safety precaution the contractor will be required to establish and implement a Contaminant Control Contingency Plan and a Perimeter Air Sampling Plan.

Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq. The proposed work is to construct a landfill cover to isolate waste materials from the environment. A landfill cover isolates waste materials by minimizing the infiltration of surface water, which then greatly reduces the amount of leachate exiting the landfill into the groundwater, collecting leachate exiting the side slopes (if any), preventing human and animal contact with the waste, and controlling the escape of landfill gasses.

The construction of a cover system will normally increase both the total volume and the peak discharge of surface runoff leaving a site. The surface runoff from this site will flow into a tributary of Long Creek. To minimize the effects of potential increased sedimentation both during construction and during normal project operations a small detention structure will be constructed. The drainage area into the detention structure will come exclusively from the area of the landfill cover which consists of 15 acres.

The United States Fish & Wildlife Service (USFWS) has recommended a ground water sampling program to a depth of the existing landfill be conducted due to the absence of a bottom liner in the landfill. This continual monitoring is necessary to determine the presence and concentrations of any contaminants that are leaching into the ground water. The COE and the IAAP will be implementing a 30 year monitoring plan in accordance with EPA guidelines which will identify any contaminants originating from the landfill.

National Pollution Discharge Elimination System (NPDES) The COE will develop and administer a storm water pollution control plan in accordance with good engineering practices, the guidelines found in STORM WATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY FOR CONSTRUCTION ACTIVITIES, *Iowa Department of Natural Resources, NPDES*, and recommendations from the Natural Resource Conservation Service(NRCS). A meeting was held on 20 July 1994 at which the DNR, the NRCS, the IAAP, and the COE outlined concerns relating to sedimentation and erosion control. Among the items discussed were vegetation, erosion control matting, riprap locations, silt fences, and drainage ditch locations. All of these issues will be addressed in the final design package and incorporated into the plans and specs. Wastewater resulting from the decontamination of equipment in this area will be collected, tested, and treated as necessary in accordance with the approved treatment, discharge and effluent standards specified in the IAAP's current NPDES permit (see exhibit 6). Seeding and mulching of all disturbed soil surfaces will be completed after establishment of final grades in the project area.

Endangered Species Act, as amended, 16 U.S.C. 1531, et seq.
The USFWS has indicated that the following species may be present in the area of the proposed action:

Classification	Common Name	(Scientific Name)	Habitat
Endangered	Indiana Bat	(Myotis sodalis)	upland forest
Endangered	Bald Eagle	(Haliaeetus leucocephalus)	wintering trees
Threatened	Prairie Bush Clover	(Lespedeza leptostachya)	dry to mesic praries with gravelly soil
Threatened	Eastern Prairie Fringed Orchid	(Platanthera leucophaea)	mesic to wet praries
Threatened	Western Prairie Fringed Orchid	(Platanthera praeclara)	mesic to wet praries

During the summer, the Indiana bat frequents the corridors of small streams with well developed riparian woods as well as mature upland forests. To avoid disturbing any bats that may be present, all large dead or dying trees with loose bark having the potential of housing these bats will be cleared prior to April 30 or after September 1.

The endangered bald eagle (proposed threatened, proposed rule, Federal Register Vol. 59, No. 132, July 12, 1994) is known to winter along large rivers in Des Moines County, Iowa. They roost in large trees adjacent to the river and perch in large shoreline trees to rest or feed on fish. Cottonwood trees are strongly preferred over other species and dead trees are strongly preferred as daytime perches, with the tallest trees being utilized most often. Generally, eagles perch within 50 meters (164 feet) of a water body. As the area that is proposed to be cleared is out of this range and there is abundant habitat elsewhere along the river, the removal of trees would not likely adversely affect the eagles.

The prairie bush clover, the eastern prairie fringed orchid, and the western prairie fringed orchid are considered to potentially occur statewide in Iowa based on historical habitat. The bush clover occupies dry to mesic prairies with gravelly soil and the orchids occupy wet grassland habitats. The area of the proposed project does not involve this type of habitat; no prairies, wet grasslands, nor gravelly soils. Recent surveys by personnel from the University of Iowa have not found these species on the IAAP.

Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq. The USFWS and the Fish and Wildlife Division of the Iowa Department of Natural Resources (DNR) were contacted. Two letters were received from the USFWS. The first letter dated September 14, 1994(see exhibit 1) detailed the possibilities regarding threatened and endangered species in the area as well as providing suggestions for mitigation in the event that trees will have to be removed due to the project. The second letter, dated January 24, 1995(see exhibit 2) was the result of a meeting which occurred at the IAAP on January 10, 1995. It outlined concerns regarding the plantings on the landfill cover, the mitigation of lost tree habitat, and items relating to the cleanup activities on Lines 1 and 800.

A mixture of native grasses and wildflowers will be developed for planting on the inert landfill following the capping procedures. The mixture will be designed to enhance nesting habitat for various species of birds and mowing of these grasses will be limited to late in the year as to avoid disturbing nesting birds.

The number of trees to be removed to facilitate grading of the cover system is approximately .5 acres. Prior to construction the COE will be conducting a tree survey, at which time the number and types of trees surrounding the landfill will be determined. Following this determination a mitigation plan will be developed which adequately mitigates for lost habitat and includes suggestions from the USFWS.

Hazardous, Toxic, and Radioactive Waste Laws (CERCLA 1980, SARA 1986, OSHA, RCRA). During the period from 18 November 1980 until 18 October 1983, an estimated quantity of 145 drums (55 gallons) of ash was placed in the Inert Landfill. A portion of the ash contained small quantities of EP toxic metals. All of the incineration ash was placed in one landfill trench, Trench 5. This trench has since been closed with a low permeability cover system in accordance with RCRA guidelines.

Contaminated soils originating from lines 1 and 800 which are not considered to be a threat to human health will be placed in trench 6 of the inert landfill. Trench 6 will then be classified as a Subtitle C Resource Conservation and Recovery Act(RCRA) landfill.

Watershed Protection and Flood Prevention Act, 16 U.S.C. 1101, et seq. Soil conservation measures will be specifically designed during the preparation of plans and specifications(see CWA).

Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq. Not applicable. The area in which the proposed activity will occur

is not a wild or scenic river, nor is it on the National Inventory of Rivers potentially eligible for inclusion in the wild and scenic system.

Floodplain Management (E.O. 11988).
According to the National Flood Insurance Program, February 17, 1982 Flood Insurance Rate Map the inert landfill is located in Zone C. Zone C indicates areas of minimal flooding. No portion of this project is located within the 100 year flood plain boundary. It is likely that this project will have no adverse impacts to the floodplain and will not increase flood hazards.

Protection of Wetlands (E.O.11990). The work occurring at the inert landfill will have no effects on wetlands. Soil tests, vegetation sampling, and the lack of surface water indicate that the site has no wetlands.

CEQ Memorandum, August 11, 1980, Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA. This project will cause no impacts to prime or unique agricultural land.

CEQ Memorandum, August 10, 1980, Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory. Their are no rivers on the nationwide inventory or eligible for the nationwide inventory in the project area.

B. LINE 800 PINK WATER CLEANUP

Line 800 Pinkwater Lagoon is located adjacent to Line 800 and is an intermittent tributary to Brush Creek (see exhibit H-1, H-5, aerial photo #3, and aerial photo #4). The Lagoon consists of an unlined 5 acre impoundment 4 feet deep surrounded by an earthen berm. The lagoon was constructed in 1943 for disposal of effluent from line 800 and sludges trucked in from other operations around IAAP. The primary wastes disposed of in the lagoon are from wash down activities ocurring at facilities inside line 800. The leaching field and lagoon, were constructed in 1943 and recieved waste until 1955. It appears that the lagoon was later used as a settling pond to reduce particulate prior to discharge into Brush Creek. There are also five small settling basins to the north of the lagoon which were constructed prior to the lagoon. No known water treatment process was employed at the lagoon. The pond is currently not in use and holds only accumulated sediments and standing water. The settling basins to the north of the lagoon

were found to have no standing water present at the time of a site visit on 10 January 1995.

The overall goal of the removal action is to reduce the risk that the contaminants pose to human health. To accomplish this goal, physical removal, some treatment, and containment of the contaminants is necessary. Details regarding the removal and treatment of these soils are located elsewhere in this EE\CA.

National Environmental Policy Act (NEPA), as amended, 42 U.S.C. 4321, et seq. In compliance. This environmental assessment (EA) will demonstrate compliance by including the need for the proposal when necessary, appropriate alternatives, and copies of the correspondance recieved by other agencies during the analysis phase of this action. It will also include references to site visits made with cooperating agencies during the analysis phase.

Archeological and Historic Preservation Act, as amended, 16 U.S.C. 469, et seq. and National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq. On 10 January 1995 a site visit was made to the IAAP in order to demonstrate the nature of this project to cooperating agencies. Among those attending this meeting were representatives from the COE, USFWS, IAAP, and the NRCS. The Iowa SHPO was invited, however unable to attend. In their absence the COE has incorporated the expertise of it's own staff archeologist(Edward C Brodnicki) to ensure the protection of cultural resources at the IAAP. The following summarizes comments received from the COE staff archaeologist(see exhibit 4).

A cultural resource reconnaissance was completed for the IAAP by Augustana College in 1991. That report was consulted to determine the location of cultural resources near proposed activities on the IAAP. There are no archaeological sites near line 800 pinkwater lagoon and are no restrictions associated with cultural resources in that area.

If the proposed project construction subsequently uncovers any item which might be of archaeological interest, or if important new archaeological data come to light in the project area, the COE will make reasonable effort to avoid or minimize harm to the property until the significance of the discovery can be determined.

Caution will be exercised during all phases of work in order to minimize any disturbance to deeply buried cultural resources. The contractor will be explicitly warned about this possibility and instructed that if any resources are found that he or she should stop work and contact the District office immediately.

Clean Air Act, as amended, 42 U.S.C 1857h-7, et seq. Air quality outside of the site perimeter is not expected to be impacted to any measurable degree by construction activities associated with the Line 800 activities. As a worker safety precaution the contractor will be required to establish and implement a Contaminant Control Contingency Plan and a Perimeter Air Sampling Plan.

Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq. Line 800 Pinkwater Lagoon is approximately 5 acres in size and is occupied by contaminated water that averages about one foot deep. This water is contaminated with RDX and 2,4,6-TNT. This lagoon has no wetland values and it's removal will not impact wetlands. Following the removal and treatment of wastewater the remaining contaminated soil will be excavated and removed from the site. Depending upon the concentration of contaminants, the soil will be either placed in an engineered stockpile for later treatment, placed in an engineered landfill in trench #6, or placed under the landfill cover. After the lagoon is excavated to meet action levels in the soil, the excavation will be regraded into a wetland area. This will be done by excavating below groundwater and by assessing site surface hydrology. Wetland vegetation and green algae will be introduced in an effort to both establish habitat and create potential for bioremediating residual contaminants.

National Pollution Discharge Elimination System (NPDES) The COE will develop and administer a storm water pollution control plan in accordance with good engineering practices, the guidelines found in STORM WATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY FOR CONSTRUCTION ACTIVITIES, *Iowa Department of Natural Resources, NPDES*, and recommendations from the Natural Resource Conservation Service(NRCS). A meeting was held on 20 July 1994 at which the DNR, the NRCS, the IAAP, and the COE outlined concerns relating to sedimentation and erosion control. Among the items discussed were vegetation, erosion control matting, riprap locations, silt fences, and drainage ditch locations. Wastewater resulting from the decontamination of equipment and the dewatering of the lagoon will be collected, tested, treated as necessary, and discharged in accordance with the specifications found in the IAAP's current NPDES permit (see exhibit 6). All of these issues will be addressed in the final design package and incorporated into the plans and specs. Seeding and mulching of all appropriate disturbed soil surfaces shall be completed after establishment of final grades in the project area.

Coastal Zone Management Act, as amended, 16 U.S.C. 1451, et seq. Not applicable. The proposed project area does not involve a coastal zone.

Endangered Species Act, as amended, 16 U.S.C. 1531, et seq. The USFWS has indicated that the following species may be present in the area of the proposed action:

Classification	Common Name	(Scientific Name)	Habitat
Endangered	Indiana Bat	(Myotis sodalis)	upland forest
Endangered	Bald Eagle	(Haliaeetus leucocephalus)	wintering trees
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During the summer, the Indiana bat frequents the corridors of small streams with well developed riparian woods as well as mature upland forests. To avoid disturbing any bats that may be present, all large dead or dying trees with loose bark having the potential of housing these bats will be cleared prior to April 30 or after September 1.

The endangered bald eagle (proposed threatened, proposed rule, Federal Register Vol. 59, No. 132, July 12, 1994) is known to winter along large rivers in Des Moines County, Iowa. They roost in large trees adjacent to the river and perch in large shoreline trees to rest or feed on fish. Cottonwood trees are strongly preferred over other species and dead trees are strongly preferred as daytime perches, with the tallest trees being utilized most often. Generally, eagles perch within 50 meters (164 feet) of a water body. As the area that is proposed to be cleared is out of this range and there is abundant habitat elsewhere along the river, the removal of trees would not likely adversely affect the eagles.

The prairie bush clover, the eastern prairie fringed orchid, and the western prairie fringed orchid are considered to potentially occur statewide in Iowa based on historical habitat. The bush clover occupies dry to mesic prairies with gravelly soil and the orchids occupy wet grassland habitats. The area of the proposed project does not involve this type of habitat; no prairies, wet

grasslands, nor gravelly soils. Recent surveys by personnel from the University of Iowa have not found these species on the IAAP.

Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq. The USFWS was contacted regarding this portion of the project. Two letters were received from the USFWS. The first letter dated September 14, 1994 (see exhibit 1) detailed the possibilities regarding threatened and endangered species in the area as well as providing suggestions for mitigation in the event that trees will have to be removed due to the project. The second letter, dated January 24, 1995 (see exhibit 2) was the result of a meeting which occurred at the IAAP on January 10, 1995. It outlined concerns regarding the plantings on the landfill cover, the mitigation of lost tree habitat, and items relating to the cleanup activities on line 1 and 800.

Approximately three acres of trees will need to be cleared at the line 800 pinkwater location. Most of these will be small trees with a diameter at breast height(DBH) of less than six inches. However, a few larger trees with suitable bark for the Indiana Bat will need to be cleared. As with the landfill cover these trees will be cleared prior to April 30 or after September 1 and all trees will be mitigated for adequately, to include suggestions from the USFWS. Prior to construction activity an inventory will be accomplished so that proper mitigation can occur.

Hazardous, Toxic, and Radioactive Waste Laws (CERCLA 1980, SARA 1986, OSHA, RCRA). Currently there is 1 foot of water in the 5 acre impoundment at the pinkwater lagoon. Before any removal action soils is to take place, the contaminated water will need to be pumped out and treated. The total volume of water is estimated at 1,630,000 gallons. The water existing in the lagoon is contaminated with RDX and 2,4,6-TNT.

The explosives detected in the soils at line 800 are RDX, HMX, 2,4,6-TNT, and 1,3,5-TNB. These contaminants are located primarily in the top two feet of soil and the concentrations decrease with depth. The estimated volume of soils contaminated with these chemicals is 33,000 cubic yards. Those soils considered unsafe for human health and exposure will be stored temporarily in an EPA approved holding area and eventually transported and treated. The soils containing contaminants at levels low enough to remain untreated will be sealed in a Subtitle C RCRA closure in trench 6 of the inert landfill. To review the levels and numbers of contaminants referred to in this section see Appendix E of the EE\CA. The specific portion of the EE\CA detailing this portion of the project will identify exact locations of samples and the level of contaminants detected at those locations.

Watershed Protection and Flood Prevention Act, 16 U.S.C. 1101, et seq. Soil conservation measures will be specifically designed during the preparation of plans and specifications(see CWA).

Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq. Not applicable. The area in which the proposed activity will occur is not a wild or scenic river, nor is it on the National Inventory of Rivers potentially eligible for inclusion in the wild and scenic system.

Floodplain Management (E.O. 11988). According to the National Flood Insurance Program, February 17, 1982 Flood Insurance Rate Map the Line 800 site is located in Zone C. Zone C indicates areas of minimal flooding. No portion of this project is located within the 100 year flood plain boundary. It is likely that this project will have no adverse impacts to the floodplain and will not increase flood hazards.

Protection of Wetlands (E.O.11990). The work occurring at line 800 pinkwater lagoon will have no adverse impacts on wetlands. Following cleanup activities, after exact elevations and contours become available, a wetland will be designed and constructed.

CEQ Memorandum, August 11, 1980, Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA. This project will cause no impacts to prime or unique agricultural land.

CEQ Memorandum, August 10, 1980, Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory. Their are no rivers on the nationwide inventory or eligible for the nationwide inventory in the project area.

C. LINE 1 PINKWATER CLEANUP

Line 1 facilities are located at the northeastern portion of the IAAP, aligned approximately north to south along the upper reaches of Brush Creek (see exhibit H-1, H-6, H-7, aerial photo #1, and aerial photo #2). Contaminants at line 1 are being recommended for removal to reduce human exposure and any further impact to groundwater. In 1948, a dam was constructed along the upper reaches of Brush Creek to impound effluent discharged from line 1. This impoundment extended 1,300 feet upstream and covered approximately 3.6 acres. The dam was breached after 1975 and the area is now overgrown with vegetation, including small trees. The

most dominant contaminants at this site are RDX and HMX. High levels of these contaminants were found along the impoundment extending 1200 feet along the creek. For a more detailed analysis of these contaminants please refer to Appendix E of the EE/CA.

National Environmental Policy Act (NEPA), as amended, 42 U.S.C. 4321, et seq. In compliance. This environmental assessment (EA) will demonstrate compliance by including the need for the proposal when necessary, appropriate alternatives, and copies of the correspondance recieved by other agencies during the analysis phase of this action. It will also include references to site visits made with cooperating agencies during the analysis phase.

Archeological and Historic Preservation Act, as amended, 16 U.S.C. 469, et seq. and National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq. On 10 January 1995 a site visit was made to the IAAP in order to demonstrate the nature of this project to cooperating agencies. Among those attending this meeting were representatives from the COE, USFWS, IAAP, and the NRCS. The Iowa SHPO was invited, however unable to attend. In their absence the COE has incorporated the expertise of it's own staff archeologist (Edward C Brodnicki) to ensure the protection of cultural resources at the IAAP. To follow are the comments received from the staff archaeologist assigned to this project (see exhibit 4).

A cultural resource reconnaissance was completed for the IAAP by Augustana College in 1991. That report was consulted to determine the location of cultural resources near proposed activities on the IAAP. There are no archaeological sites near line 1 pinkwater reservoir and are no restrictions associated with cultural resources in that area.

If the proposed project construction subsequently uncovers any item which might be of archaeological interest, or if important new archaeological data come to light in the project area, the COE will make reasonable effort to avoid or minimize harm to the property until the significance of the discovery can be determined.

Caution will be exercised during all phases of work in order to minimize any disturbance to deeply buried cultural resources. The contractor will be explicitly warned about this possibility and instructed that if any resources are found that he or she should stop work and contact the District office immediately.

Clean Air Act, as amended, 42 U.S.C 1857h-7, et seq. Air quality outside of the site perimeter is not expected to be impacted to any measurable degree by construction activities associated with the

Line 1 activities. As a worker safety precaution the contractor will be required to establish and implement a Contaminant Control Contingency Plan and a Perimeter Air Sampling Plan.

Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq. Brush Creek is located in approximately the center of the line 1 reservoir area. Due to the contaminants involved with this area it will be necessary to excavate the contaminated soil in and around Brush Creek. Because of the threats to animal and human life that these contaminants pose, complete excavation is the least damaging alternative to the environment. Complete excavation will eliminate continual leaching to groundwater and the effects of surface water carried contaminants downstream.

In an effort to enhance the environment at the IAAP and create a source of bioremediation for possibly contaminated groundwater the remaining scar at this location will be graded and planted for the creation of an open water riparian wetland. The goal of this wetland will be to provide waterfowl habitat as well as habitat for furbearers such as muskrats. The design of this wetland will ensure the continued existing flows downstream in Brush Creek in a manner which will not negatively impact downstream resources. The design of the wetland will be done after excavation of the contaminated material is completed.

National Pollution Discharge Elimination System (NPDES) The COE will develop and administer a storm water pollution control plan in accordance with good engineering practices, the guidelines found in STORM WATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY FOR CONSTRUCTION ACTIVITIES, *Iowa Department of Natural Resources, NPDES*, and recommendations from the Natural Resource Conservation Service(NRCS). A meeting was held on 20 July 1994 at which the DNR, the NRCS, the IAAP, and the COE outlined concerns relating to sedimentation and erosion control. Among the items discussed were vegetation, erosion control matting, riprap locations, silt fences, and drainage ditch locations. Wastewater resulting from the decontamination of equipment used at this site will be collected, tested, treated as necessary, and discharged in accordance with the IAAP's current NPDES permit (see exhibit 6). All of these issues will be addressed in the final design package and incorporated into the plans and specs. Seeding and mulching of all appropriate disturbed soil surfaces shall be completed after establishment of final grades in the project area.

Endangered Species Act, as amended, 16 U.S.C. 1531, et seq. The USFWS has indicated that the following species may be present in the area of the proposed action:

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.46	1.05	2.57	3.28	3.48	3.86
	4.71	3.88	4.15	3.10	2.02	1.74
STD. DEVIATIONS	0.65	0.66	1.51	1.37	1.62	1.94
	2.12	2.55	2.35	1.56	1.03	0.87
RUNOFF						
TOTALS	0.000	0.000	0.002	0.002	0.006	0.007
	0.009	0.009	0.020	0.007	0.000	0.000
STD. DEVIATIONS	0.000	0.000	0.010	0.007	0.017	0.023
	0.016	0.018	0.049	0.031	0.000	0.000
EVAPOTRANSPIRATION						
TOTALS	0.594	1.049	2.492	3.039	3.550	4.170
	4.637	3.700	3.032	2.059	1.301	0.675
STD. DEVIATIONS	0.142	0.249	0.400	0.952	1.312	1.348
	1.705	1.839	0.908	0.573	0.317	0.186
LATERAL DRAINAGE FROM LAYER 3						
TOTALS	0.6233	0.5557	0.8962	0.4556	0.2713	0.1209
	0.1018	0.0934	0.3543	0.4446	0.5665	0.5666
STD. DEVIATIONS	0.5352	0.5915	1.0796	0.5696	0.3100	0.1016
	0.1761	0.2059	0.9781	0.7878	0.8076	0.5703
PERCOLATION FROM LAYER 4						
TOTALS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 20

	(INCHES)	(CU. FT.)	PERCENT

PRECIPITATION	35.32	(6.062)	1001.	100.00
RUNOFF	0.063	(0.066)	2.	0.18
EVAPOTRANSPIRATION	30.298	(3.610)	858.	85.79
LATERAL DRAINAGE FROM LAYER 3	5.0501	(3.4169)	143.	14.30
PERCOLATION FROM LAYER 4	0.0012	(0.0000)	0.	0.00
CHANGE IN WATER STORAGE	-0.096	(1.315)	-3.	-0.27

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****

PEAK DAILY VALUES FOR YEARS 1 THROUGH 20

	(INCHES)	(CU. FT.)
PRECIPITATION	2.60	73.7
RUNOFF	0.170	4.8
LATERAL DRAINAGE FROM LAYER 3	0.8965	25.4
PERCOLATION FROM LAYER 4	0.0000	0.0
HEAD ON LAYER 4	0.2	
SNOW WATER	2.15	60.9

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.3454

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.1038

****

****

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(INCHES)	(VOL/VOL)
1	1.13	0.1889
2	2.87	0.1595
3	0.03	0.0501
4	9.48	0.3949

SNOW WATER 0.00

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****
****

IAAP - INERT LANDFILL
MIDDLETOWN, IA
IOWA COVER, K = 1X10(-7) CM/SEC

****
****

FAIR GRASS

LAYER 1

VERTICAL PERCOLATION LAYER

THICKNESS	=	6.00 INCHES
POROSITY	=	0.4730 VOL/VOL
FIELD CAPACITY	=	0.2217 VOL/VOL
WILTING POINT	=	0.1043 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2217 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.001560000004 CM/SEC

LAYER 2

VERTICAL PERCOLATION LAYER

THICKNESS	=	18.00 INCHES
POROSITY	=	0.4730 VOL/VOL
FIELD CAPACITY	=	0.2217 VOL/VOL
WILTING POINT	=	0.1043 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2217 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000520000001 CM/SEC

LAYER 3

BARRIER SOIL LINER

THICKNESS	=	24.00 INCHES
POROSITY	=	0.3949 VOL/VOL
FIELD CAPACITY	=	0.2797 VOL/VOL

WILTING POINT	=	0.1875 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3949 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000000100000 CM/SEC

LAYER 4

VERTICAL PERCOLATION LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.4640 VOL/VOL
FIELD CAPACITY	=	0.3104 VOL/VOL
WILTING POINT	=	0.1875 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3104 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000064000000 CM/SEC

LAYER 5

LATERAL DRAINAGE LAYER

THICKNESS	=	1.00 INCHES
POROSITY	=	0.4640 VOL/VOL
FIELD CAPACITY	=	0.3104 VOL/VOL
WILTING POINT	=	0.1875 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3104 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000064000000 CM/SEC
SLOPE	=	5.00 PERCENT
DRAINAGE LENGTH	=	200.0 FEET

GENERAL SIMULATION DATA

SCS RUNOFF CURVE NUMBER	=	74.26
TOTAL AREA OF COVER	=	200. SQ FT
EVAPORATIVE ZONE DEPTH	=	20.00 INCHES
UPPER LIMIT VEG. STORAGE	=	9.4600 INCHES
INITIAL VEG. STORAGE	=	5.1840 INCHES
INITIAL SNOW WATER CONTENT	=	0.0000 INCHES
INITIAL TOTAL WATER STORAGE IN SOIL AND WASTE LAYERS	=	18.8336 INCHES

SOIL WATER CONTENT INITIALIZED BY PROGRAM.

CLIMATOLOGICAL DATA

SYNTHETIC RAINFALL WITH SYNTHETIC DAILY TEMPERATURES AND SOLAR RADIATION FOR MIDDLETOWN IOWA

MAXIMUM LEAF AREA INDEX = 2.00
START OF GROWING SEASON (JULIAN DATE) = 127
END OF GROWING SEASON (JULIAN DATE) = 280

NORMAL MEAN MONTHLY TEMPERATURES, DEGREES FAHRENHEIT

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
21.00	26.80	37.20	51.90	62.40	71.50
75.50	73.20	65.60	54.80	40.20	27.70

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.46	1.05	2.57	3.28	3.48	3.86
	4.71	3.88	4.15	3.10	2.02	1.74
STD. DEVIATIONS	0.65	0.66	1.51	1.37	1.62	1.94
	2.12	2.55	2.35	1.56	1.03	0.87
RUNOFF						
TOTALS	0.044	0.243	0.228	0.158	0.125	0.041
	0.024	0.013	0.218	0.013	0.020	0.023
STD. DEVIATIONS	0.194	0.604	0.570	0.518	0.340	0.103
	0.053	0.030	0.913	0.035	0.061	0.103
EVAPOTRANSPIRATION						
TOTALS	0.591	1.044	2.484	3.040	3.585	4.453
	6.148	4.158	3.039	2.047	1.276	0.671
STD. DEVIATIONS	0.140	0.247	0.397	0.943	1.288	1.241
	1.922	1.838	0.907	0.536	0.318	0.185
PERCOLATION FROM LAYER 3						
TOTALS	0.1571	0.1484	0.1659	0.1607	0.1636	0.1526
	0.1415	0.1267	0.1214	0.1307	0.1345	0.1464
STD. DEVIATIONS	0.0304	0.0290	0.0260	0.0246	0.0244	0.0222
	0.0185	0.0142	0.0181	0.0246	0.0298	0.0321
PERCOLATION FROM LAYER 5						
TOTALS	0.1421	0.1370	0.1566	0.1560	0.1629	0.1569
	0.1566	0.1450	0.1315	0.1323	0.1291	0.1378

STD. DEVIATIONS	0.0310	0.0287	0.0304	0.0255	0.0247	0.0230
	0.0215	0.0163	0.0135	0.0162	0.0197	0.0254

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 20

	(INCHES)		(CU. FT.)	PERCENT
PRECIPITATION	35.32	(6.062)	589.	100.00
RUNOFF	1.149	(2.177)	19.	3.25
EVAPOTRANSPIRATION	32.537	(4.406)	542.	92.13
PERCOLATION FROM LAYER 3	1.7495	(0.2064)	29.	4.95
PERCOLATION FROM LAYER 5	1.7438	(0.2207)	29.	4.94
CHANGE IN WATER STORAGE	-0.113	(2.899)	-2.	-0.32

****

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 20

	(INCHES)	(CU. FT.)
PRECIPITATION	2.60	43.3
RUNOFF	1.757	29.3
PERCOLATION FROM LAYER 3	0.0068	0.1
HEAD ON LAYER 3	24.3	
PERCOLATION FROM LAYER 5	0.0067	0.1
SNOW WATER	2.15	35.9

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4730
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1040

****

****

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(INCHES)	(VOL/VOL)
1	1.13	0.1891
2	3.57	0.1983
3	9.48	0.3949
4	3.83	0.3189
5	0.32	0.3185
SNOW WATER	0.00	

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IAAP - INERT LANDFILL
MIDDLETOWN, IA
IOWA COVER, K = 1X10(-5) CM/SEC

****
****

FAIR GRASS

LAYER 1

VERTICAL PERCOLATION LAYER

THICKNESS	=	6.00 INCHES
POROSITY	=	0.4730 VOL/VOL
FIELD CAPACITY	=	0.2217 VOL/VOL
WILTING POINT	=	0.1043 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2217 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.001560000004 CM/SEC

LAYER 2

VERTICAL PERCOLATION LAYER

THICKNESS	=	18.00 INCHES
POROSITY	=	0.4730 VOL/VOL
FIELD CAPACITY	=	0.2217 VOL/VOL
WILTING POINT	=	0.1043 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2217 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000520000001 CM/SEC

LAYER 3

BARRIER SOIL LINER

THICKNESS	=	24.00 INCHES
POROSITY	=	0.3949 VOL/VOL
FIELD CAPACITY	=	0.2797 VOL/VOL

WILTING POINT	=	0.1875 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3949 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000010000000 CM/SEC

LAYER 4

VERTICAL PERCOLATION LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.4640 VOL/VOL
FIELD CAPACITY	=	0.3104 VOL/VOL
WILTING POINT	=	0.1875 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3104 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000064000000 CM/SEC

LAYER 5

LATERAL DRAINAGE LAYER

THICKNESS	=	1.00 INCHES
POROSITY	=	0.4640 VOL/VOL
FIELD CAPACITY	=	0.3104 VOL/VOL
WILTING POINT	=	0.1875 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3104 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000064000000 CM/SEC
SLOPE	=	5.00 PERCENT
DRAINAGE LENGTH	=	200.0 FEET

GENERAL SIMULATION DATA

SCS RUNOFF CURVE NUMBER	=	74.26
TOTAL AREA OF COVER	=	200. SQ FT
EVAPORATIVE ZONE DEPTH	=	20.00 INCHES
UPPER LIMIT VEG. STORAGE	=	9.4600 INCHES
INITIAL VEG. STORAGE	=	4.8616 INCHES
INITIAL SNOW WATER CONTENT	=	0.0000 INCHES
INITIAL TOTAL WATER STORAGE IN SOIL AND WASTE LAYERS	=	18.8336 INCHES

SOIL WATER CONTENT INITIALIZED BY PROGRAM.

CLIMATOLOGICAL DATA

SYNTHETIC RAINFALL WITH SYNTHETIC DAILY TEMPERATURES AND SOLAR RADIATION FOR MIDDLETOWN IOWA

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NORMAL MEAN MONTHLY TEMPERATURES, DEGREES FAHRENHEIT

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
21.00	26.80	37.20	51.90	62.40	71.50
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****

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	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.46	1.05	2.57	3.28	3.48	3.86
	4.71	3.88	4.15	3.10	2.02	1.74
STD. DEVIATIONS	0.65	0.66	1.51	1.37	1.62	1.94
	2.12	2.55	2.35	1.56	1.03	0.87
RUNOFF						
TOTALS	0.000	0.000	0.002	0.002	0.006	0.007
	0.009	0.009	0.020	0.007	0.000	0.000
STD. DEVIATIONS	0.000	0.000	0.010	0.007	0.017	0.023
	0.016	0.018	0.049	0.031	0.000	0.000
EVAPOTRANSPIRATION						
TOTALS	0.594	1.049	2.492	3.039	3.550	4.170
	4.637	3.700	3.032	2.059	1.301	0.675
STD. DEVIATIONS	0.142	0.249	0.400	0.952	1.312	1.348
	1.705	1.839	0.908	0.573	0.317	0.186
PERCOLATION FROM LAYER 3						
TOTALS	0.5987	0.5624	0.9006	0.3945	0.2531	0.0713
	0.0632	0.0938	0.3660	0.5064	0.6046	0.6225
STD. DEVIATIONS	0.5439	0.5826	1.1448	0.5655	0.3504	0.0886
	0.2002	0.2905	1.0207	0.8633	0.8222	0.6300
PERCOLATION FROM LAYER 5						
TOTALS	0.6378	0.5486	0.8658	0.5487	0.3089	0.1903
	0.1411	0.1101	0.3064	0.4412	0.4954	0.4787

STD. DEVIATIONS	0.5121	0.5619	0.9246	0.5757	0.2648	0.1382
	0.1166	0.1189	0.8933	0.8579	0.6960	0.4999

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 20

	(INCHES)		(CU. FT.)	PERCENT
PRECIPITATION	35.32	(6.062)	589.	100.00
RUNOFF	0.063	(0.066)	1.	0.18
EVAPOTRANSPIRATION	30.298	(3.610)	505.	85.79
PERCOLATION FROM LAYER 3	5.0370	(3.4317)	84.	14.26
PERCOLATION FROM LAYER 5	5.0728	(3.3737)	85.	14.36
CHANGE IN WATER STORAGE	-0.117	(1.499)	-2.	-0.33

****

****

PEAK DAILY VALUES FOR YEARS 1 THROUGH 20

	(INCHES)	(CU. FT.)
PRECIPITATION	2.60	43.3
RUNOFF	0.170	2.8
PERCOLATION FROM LAYER 3	0.4165	6.9
HEAD ON LAYER 3	6.2	
PERCOLATION FROM LAYER 5	0.3829	6.4
SNOW WATER	2.15	35.8

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3454
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1038

****

****

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(INCHES)	(VOL/VOL)
1	1.13	0.1889
2	2.99	0.1658
3	9.48	0.3949
4	3.59	0.2991
5	0.30	0.3003
SNOW WATER	0.00	

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LABORATORY ANALYSIS OF BORROW SOURCES

APPENDIX E

Supplemental Data by U. S. Army Corps of Engineers
(Omaha District)

FIELD INVESTIGATION REPORT

FOR

LINE 1 AND LINE 800 SAMPLING

AT

IOWA ARMY AMMUNITION PLANT

MIDDLETOWN, IOWA

Prepared by

U.S. Army Corps of Engineers

Omaha District

APRIL 1995

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SUPPLEMENTS

Supplement A - Certificates of Analysis and Chain-of-Custody Forms from USACE (MRD) Laboratory
Supplement B - Daily Reports
Supplement C - Field Notes
Supplement D - Geotechnical Data

1. INTRODUCTION

On 28 February 1995, personnel from the Omaha District of the U.S. Army Corps of Engineers (USACE) conducted a sampling investigation at the "Line 1 Impoundment" and "Line 800 Pinkwater Lagoon" areas at the Iowa Army Ammunition Plant (IAAP). The data quality objectives (DQOs) for this investigation are listed below, in general order of priority.

1.1. Regulatory. Sediment and surface soil samples were to be collected to 1) fill data gaps, and 2) to determine if the soils are TCLP hazardous for explosive constituents. The use of TCLP is to be used to determine the applicability of potential Landban considerations and/or potential disposal alternatives.

1.2. Line 800 Lagoon. Very little analytical data was previously available from the Line 800 lagoon. Therefore, sediment and water samples were to be collected to aid in the design of remedial alternatives and to determine applicability of potential land disposal restrictions (LDRs).

1.3. Sampling for Remedial Alternatives. Additional sediment and surface soil samples were to be collected to determine pH, conductivity, moisture content, nitrates, sulfates, phosphates, BOD, and TOC. This information was to be collected for use in the selection/design of potential remedial alternatives (including stabilization, incineration, biological processes, etc.).

1.4. Reactivity of Explosives. Samples were to be collected to test for potential reactivity and ignitability characteristics of explosives-contaminated sediments and surface soils. This characterization was to be utilized to determine possible regulatory issues for disposal of contaminated soils from the Line 1 & 800 sites.

1.5. Geotechnical Samples. Surface soil samples were to be collected and analyzed to determine geotechnical characteristics of the soil at the Line 1 and Line 800 sites. This information was intended to be used in the design of remedial alternatives for these sites.

1.6. Validate RDX Test Kit. Surface soil samples were to be collected from Line 1 and Line 800 to validate a recently-developed RDX immunoassay field screening test by Ensys, Inc. If the test proves valid, this RDX field test will be used during the excavation phase of future Line 1 & 800 remedial activities to assist in the delineation of contamination limits. As a part of this validation process, 30% of the field tests were to be confirmed by laboratory analysis.

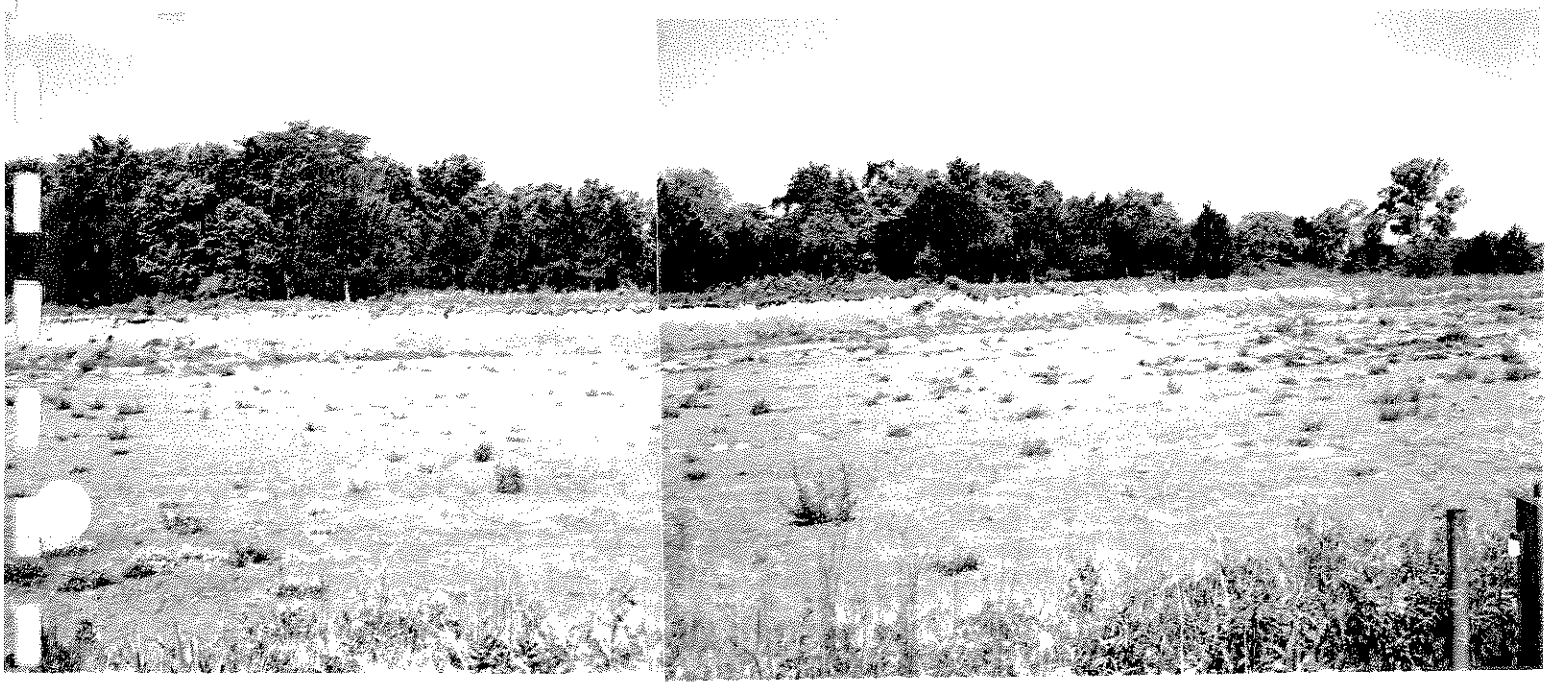
1.7. Rough Delineation of Contamination. The RDX immunoassay test was to be used to generally detect surface contamination at Lines 1 & 800 (including the Line 800 Lagoon sludge dumping area and the settling basins). For this investigation, the top 1 foot of soil was to be analyzed.

FIGURE H-2

**EXISTING SUBTITLE C CAP
OVER COMPONENT OF CELL 5
(INSIDE FENCE)**

FIGURE H-3

TEMPORARY PINKWATER STOCKPILE SITE



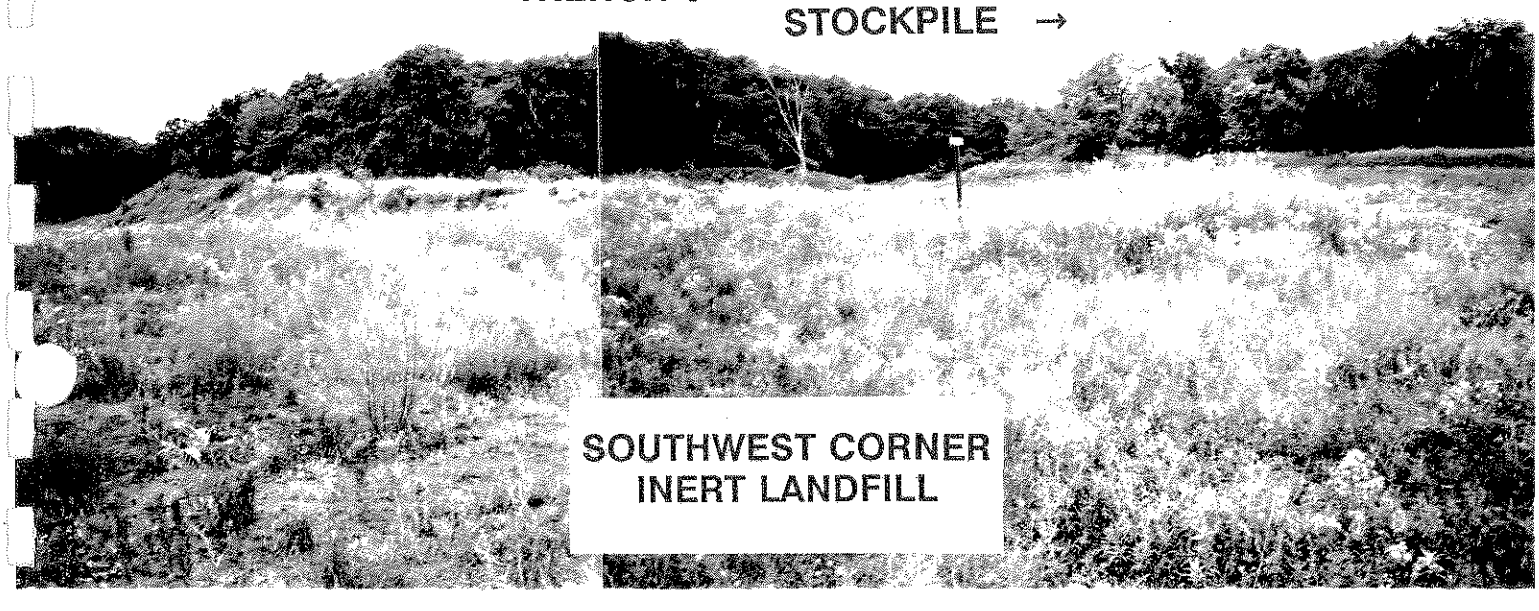


FIGURE H-4

SOUTHWEST CORNER OF INERT LANDFILL

TRENCH 6→

TRENCH 6
LOOKING SOUTH

FIGURE H-5

LINE 800 PINKWATER LAGOON

LOOKING SOUTHWEST

LOOKING NORTH

FIGURE H-6

LINE 1 PINKWATER RESERVOIR

VIEW OF BREACHED IMPOUNDMENT
LOOKING SOUTHEAST

FIGURE H-7

LINE 1
PINKWATER RESERVOIR

LOOKING NORTH
FROM CULVERT

LOOKING SOUTH
TOWARD CULVERT

LOOKING NORTH
FROM IMPOUNDMENT

FIGURE H-8

BORROW/WETLAND CREATION SITE

WETLAND DESIGN SOIL SAMPLING

STUMP LAKE

SOUTH END

MIDDLE STUMP LAKE

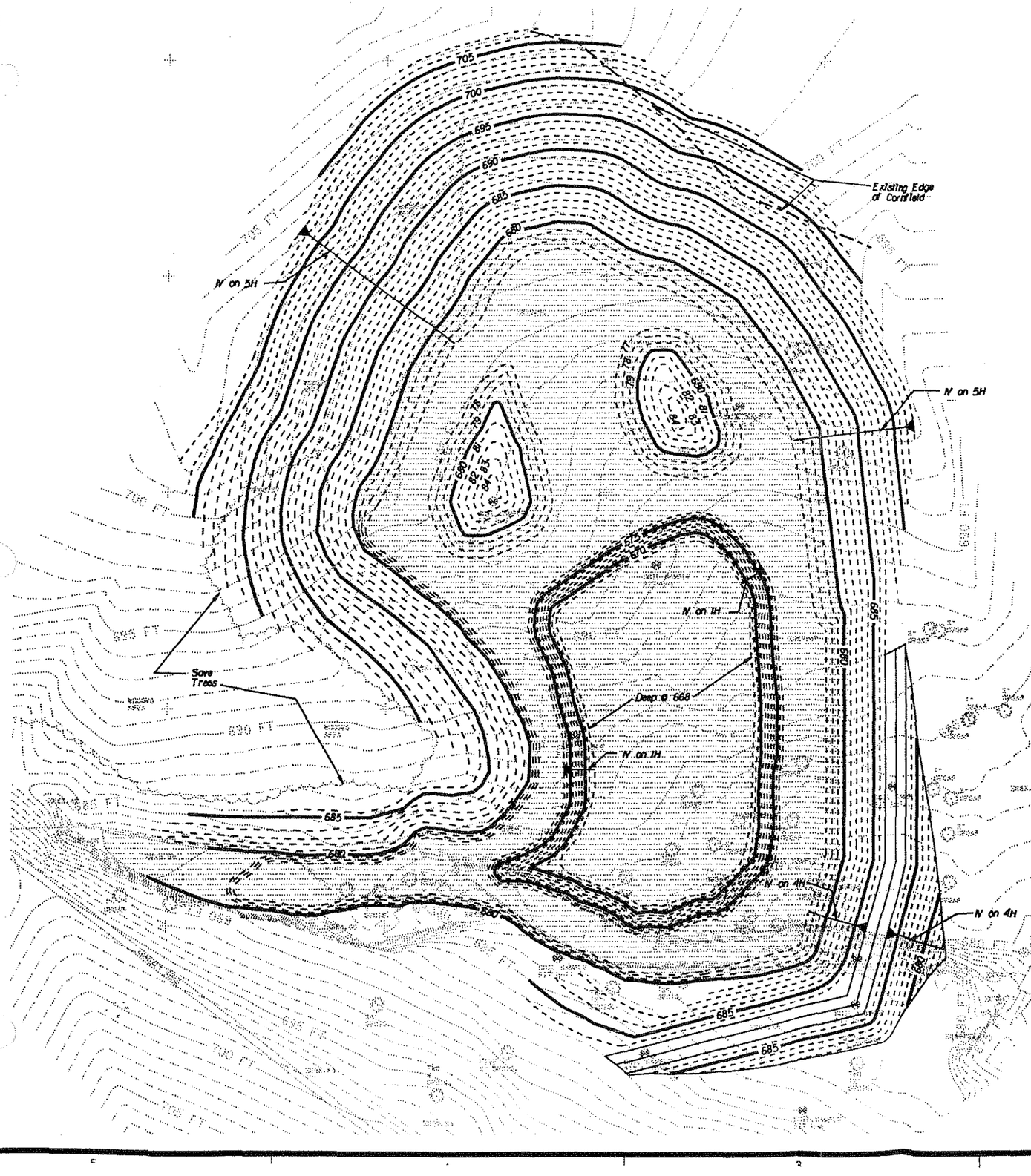
FIGURE H-9

NORTH END STUMP LAKE

SEDIMENT TO BE REMOVED

FIGURE H-10

FIGURE H-11



NOTES:

1. THE CONTRACTOR SHALL CONSTRUCT THE OUTLET WORKS & EMBANKMENT PRIOR TO EXCAVATION OF THE BORROW AREA.
2. THE CONTRACTOR SHALL STOCKPILE TOPSOIL FROM ENTIRE BORROW AREA.

N

SCALE: 1 INCH = 30 FEET

30 0 30

$$ – THINK VALUE ENGINEERING – $$

Revisions			
Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

Designed by: M.S.K.
Drawn by: C.M.C.
Checked by: X
Reviewed by:
Submitted by:
Chief, HTW GEOTECH Section

MIDDLETOWN, IOWA
IOWA ARMY AMMUNITION PLANT
LINE 1/800 AND INERT LANDFILL

GRADING PLAN–BORROW AREA (WETLAND AREA)

Computer Aided Design & Drafting

Plot Scale Ratio: 30:1
Design File: AP01:GLABOR01.DGN
Date: APRIL 1995
Spec. No.: DACA 45
Contract No.: DACA 45
Drawing Code: DER110-400E18
Sheet reference number: 18

APPENDIX I

Mass Concentrations Calculations

REFERENCE COPY

IAAP - Contaminated Sumps

Average Concentrations of 4 Contaminants in Sump Stockpile

These calculations show the weighted averages of 4 contaminants (RDX, TNT, DNT, Lead) in the sump stockpile after excavation of the contaminated sumps. Note that sumps 13, 15 and 32 are excluded from this calculation since they will be moved elsewhere (contained mercury). To calculate this average Tables 1-3 and 1-4 from the EE/CA will be used.

Volume of stockpile (total volume), $V_S = 168\ yd^3 - 18 - 19 - 4.5 = \boxed{131\ yd^3}$ (sump 15, sump 13, sump 32)

The weighted average concentration for each contaminant will be calculated in this way:

$$[X_{Avg}] = \frac{V_1[X_1] + V_2[X_2] + \ldots + V_n[X_n]}{V_S}$$

V is in yd^3
$[X]$ are in mg/g
Volumes are in parentheses

RDX

$$\text{Avg. RDX Concentration} = \frac{1323\ mg/g\ (16\ yd^3) + 92.3\ (18.1) + 1400\ (4.7) + 1526\ (10.4) + 7.2\ (2) + 3.2\ (2) + 64\ (3.7) + 1.6\ (.5) + 1\ (.61)}{131\ yd^3}$$

$$[RDX]_{Avg} = \frac{45548.04}{131} = \boxed{347.69\ mg/g}$$

TNT

$$\text{Avg. TNT Concentration} = \frac{2\ (3) + 5.4\ (16) + 10.4\ (18.1) + 268\ (14) + 515\ (4.7) + 1743\ (10.4) + 1.6\ (2) + 4.3\ (2) + 32\ (3.7) + 2\ (.58) + 4.1\ (.55) + 4.1\ (.55)}{131\ yd^3}$$

$$[TNT]_{Avg} = \frac{24,716.21}{131} = \boxed{188.67\ mg/g}$$

$$\text{Avg DNT Concentration} = \frac{\text{DNT (2,6 and 2,4)}}{\frac{(.6+7.5)}{2}(18.1) + \frac{(7.6+2.8)}{2}(4.7)}{131\ yd^3}$$

$$[DNT]_{Avg} = \frac{85.995}{131}\ 171.99 = \boxed{0.66\ mg/g}\quad 1.32\ mg/g$$

Lead

$$\text{Avg Lead Concentration} = 447\ (4.4) + 65\ (3) + 354\ (16) + 92\ (6) + 1061\ (13.8) + 253\ (4.7) + 255\ (2) + 76.2\ (3.7) + 111\ (.42) + 277\ (.47) + 395\ (.55) + 233\ (.52) + 139\ (.55) + 164\ (.55) + 753\ (4.1) + 171\ (.58) + 137\ (1.2) + 76\ (.55) + 167\ (.69) + 122\ (.61) + 76\ (.55)$$

$$[Pb]_{Avg} = 29306.64/131 = \boxed{223.71\ mg/g}$$

Average Weighted Concentrations in Stockpile

RDX = 347.69 mg/g TNT = 188.67 mg/g DNT = ~~0.66~~ 1.32 mg/g Lead = 223.71 mg/g

Contaminant Mass Calculations - Line 1 and Line 800

Contaminant mass calculations for both Line 1 Impoundment and Line 800 Pint Water Lagoon are based on an average concentration for each of the three degrees of contamination. These are the high concentration soils (RCRA Waste Pile), the medium concentration (Trench 6 Landfill) and low concentration soils (stockpile for fill). The ranges for these degrees (for RDX and TNT) are listed below as well as the average concentration for each range and the treatment type. Site: L - Line 1 P - Pinkwater (Line 800)

TNT

Range (mg/kg)	Site	Average (mg/kg)	Treatment Type
High	L	N/A	RCRA Waste
> 1960	P	5645*	Pile for treatment
Medium	P	1078	Trench 6 Landfill
196 - 1960	L	N/A	Disposal
Low	P	80	Stockpile for
0 - 196	L	N/A	Discretionary Fill

RDX

Range (mg/kg)	Site	Average (mg/kg)	Treatment Type
High	L	550	RCRA Waste
> 530	P	1875*	Pile for treatment
Medium	L	292	Trench 6 Landfill
53 - 530	P	292	Disposal
Low	L	27	Stockpile for Discret.
0 - 53	P	10*	Fill

* These are for Line 800 only and are explained on that page.

These average concentration values are going to be used to find the total mass (in kg) of contaminants in each degree of contamination for RDX and TNT at both sites.

Assumption: 1 yd^3 of soil ≈ 3000 lb for silty clay

N/A - Line 1 does not have (for our purposes) TNT contamination

Line 1 Impoundment

RDX

Low - Fill

$$M = 27 \frac{mg}{kg} \; 13{,}111 \, yd^3 \; \frac{3000 \, lb}{1 \, yd^3} \; \frac{1 \, kg}{2.21 \, lb}$$

$$M = 4.8054 \times 10^8 \, mg = 480.5 \, kg$$

Medium - Trench 6

Conversion factor

$$M = 292 \frac{mg}{kg} \; (11{,}111 \, yd^3) \left(\frac{3000}{2.21}\right)$$

$$M = 4.4042 \times 10^9 \, mg = 4{,}404.2 \, kg$$

High - Waste Pile

M = 0

No soil in high category

TNT

M = 0 No contaminated soils contain TNT at Line 1 Impoundment

Total for Line 1

RDX

Low = 480.5 kg Medium = 4,404.2 kg High = 0 kg Total: 4,884.7 kg

Contaminant Mass Calculations

Line 800 - Pink Water Lagoon

This site has both RDX and TNT contamination. However, the two contaminents occur in different areas on the site but are excavated together. Therefore, the volumes used for these calcs. are different than the excavated volumes calced for seperation.

RDX → Waste Pile: G_2, G_4
Trench 6: G_1, G_3
Fill: remainder

TNT → Waste Pile: G_2, G_4
Trench 6: G_1, G_5, G_6, G_7, G_8
Fill: remainder

RDX

Low - Fill *

$M = 10 \frac{mg}{kg} (63{,}238 yd^3) \frac{(3000 \frac{lb}{c.y.})}{2.21 \frac{lb}{kg}}$

$M = 8.5843 \times 10^8$ mg
$= 858.4$ kg

Medium - Trench 6

$M = 292 (3750) \frac{3000}{2.21}$

$M = 1.4864 \times 10^9$ mg
$= 1{,}486.4$ kg

High - Waste Pile [2]

$M = 1875 \frac{mg}{kg} (10{,}000 yd^3) \frac{3000}{2.21}$

$M = 2.5452 \times 10^{10}$ mg
$= 25{,}452$ kg

TNT

Low - Fill **

$M = 80 \frac{mg}{kg} (57{,}683 yd^3) \frac{3000 \frac{lb}{c.y.}}{2.21 \frac{lb}{kg}}$

$M = 6.2642 \times 10^9$ mg
$= 6{,}264$ kg

Medium - Trench 6

$M = 1078 (9{,}305) \frac{3000}{2.21}$

$M = 1.3616 \times 10^{10}$ mg
$= 13{,}616$ kg

High - Waste Pile [1]

$M = 5645 (10{,}000 yd^3) \frac{3000}{2.21}$

$M = 7.6629 \times 10^{10}$ mg
$= 76{,}629$ kg

1 Avg. based on single sample points G_2 and G_4 (straight avg.)

* Avg. concentration for fill area is around 10 mg/kg due to large volume of soil excavated that had no detect for RDX and the remainder which had RDX levels from 1.1 - 19 mg/kg

** Avg. conc. for fill volume is around 80 mg/kg due to large volume of soil with no hits for TNT that was excavated. 80 mg/kg was determined by the average of 140 mg/kg for the west 1/2 of Line 800 lagoon area and 20 mg/kg for the east 1/2 (the lagoon proper). Both areas are about equal size so averaging is valid.

Totals for Line 800 - PW

RDX

Low = 858.4 kg Medium = 1,486.4 kg High = 25,452 kg Total: 27,796.8 kg

TNT

Low = 6,264 kg Medium = 13,616 kg High = 76,629 kg Total: 96,509 kg

---

Total Mass for Both Sites

RDX: Mass = 32,681.5 kg

TNT: Mass = 96,509 kg

APPENDIX J

Summers Model Calculations

Summers Model Calculations

Conversion Factor

To calculate C_s, we must convert the input values of ug/L and mL/g to mg/kg (soil concentration). The conversion factor is calculated below:

$$\left(\frac{ug}{L}\right)\left(\frac{mL}{g}\right)\left(\frac{1\ L}{1000\ mL}\right)\left(\frac{1000\ g}{1\ kg}\right)\left(\frac{1\ mg}{1000\ ug}\right) \longrightarrow \boxed{\frac{1}{1000}}$$

Conversion factor for mg/kg

factors to be converted

$$C_s = C_p K_d$$

INT

4% (.04), Conversion factor ($\frac{1}{1000}$)

$C_s = 1524.56\ \frac{ug}{L}\ (.04)\left(780\ \frac{mL}{g}\right)\left(\frac{1}{1000}\right)$

$C_s = 47.57\ mg/kg$

RDX

$C_s = 320.96\ \frac{ug}{L}\ (.04)\left(104.5\ \frac{mL}{g}\right)\left(\frac{1}{1000}\right)$

$C_s = 1.34\ mg/kg$

Total

INT

$C_s = 47.57\ mg/kg$

RDX

$C_s = 1.34\ mg/kg$

SUMMERS MODEL CALCULATIONS

2 equations are used

$$C_p = \frac{C_{gw}(Q_p + Q_A) - Q_A C_A}{Q_p}$$

(C_A: Assumed initially 0)

$$C_s = C_p K_d$$

(C_s: Desired value)

Variables:

C_p - concentrations in the infiltration mg/L

C_{gw} - concentration of contaminant in GW mg/L

Q_A - volumetric flow rate of GW ft^3/day

Q_p - volumetric flow rate of infiltration into aquifer ft^3/day
also equals darcy velocity downward times surface area of lagoon

K_d - equilibrium partition coefficient m/g

C_s - soil concentration mg/kg

Given Parameters:

Aquifer is 45' deep by 1000' wide

$$Q_A = 11 \frac{ft}{yr} \frac{1\ yr}{365\ days} \frac{45{,}000\ ft^2}{} = 1{,}356.2\ ft^3/day$$

$$Q_p = 10^{-8} \frac{cm}{s} \frac{1\ in}{2.54\ cm} \frac{1\ ft}{12\ in} \frac{3600\ s}{1\ hr} \frac{24\ hr}{1\ day} \frac{300{,}000\ ft^2}{} = 8.5039\ ft^3/day$$

This is our calculated approx area of PW Lagoon

INT

$C_{GW} = 9.5$ mg/L

$K_d = 4\%$ of 780 mL/g

RDX

$C_{GW} = 2.0$ mg/L

$K_d = 4\%$ of 104.5 mL/g

Calculations

INT

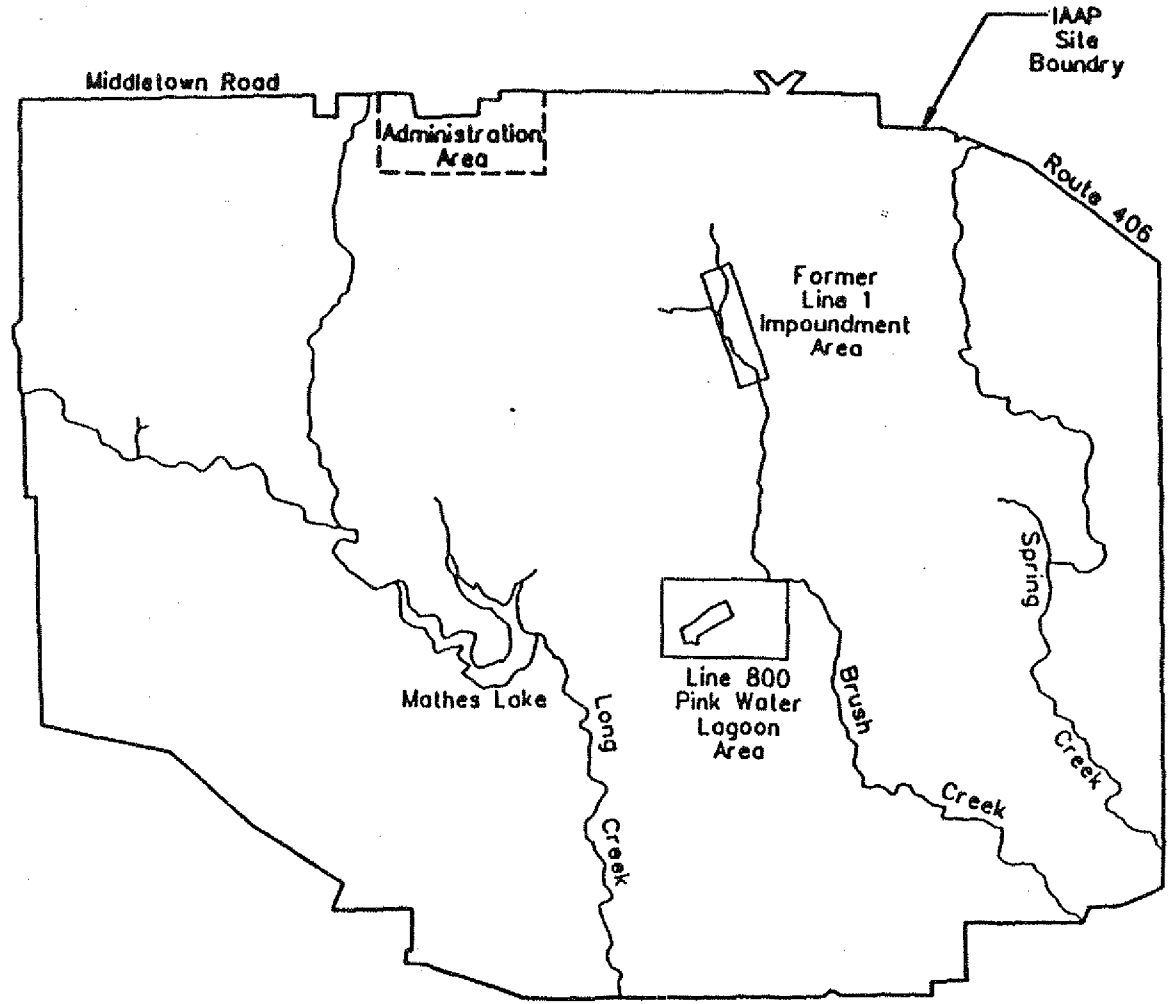
$$C_p = \frac{9.5\ mg/L\ (8.5039 + 1{,}356.2\ ft^3/day)}{8.5039\ ft^3/day}$$

$$C_p = 1{,}524.56\ mg/L$$

RDX

$$C_p = \frac{2.0\ mg/L\ (8.5039 + 1{,}356.2\ ft^3/day)}{8.5039\ ft^3/day}$$

$$C_p = 320.96\ mg/L$$



Not to Scale

Source: Dames & Moore

MCS FILE: IAAP02	Iowa Army Ammunition Plant Middletown, Iowa	Locations of Former Line 1 Impoundment and Line 800 Pink Water Lagoon Areas Relative to Entire Site

Figure No
2

12/9

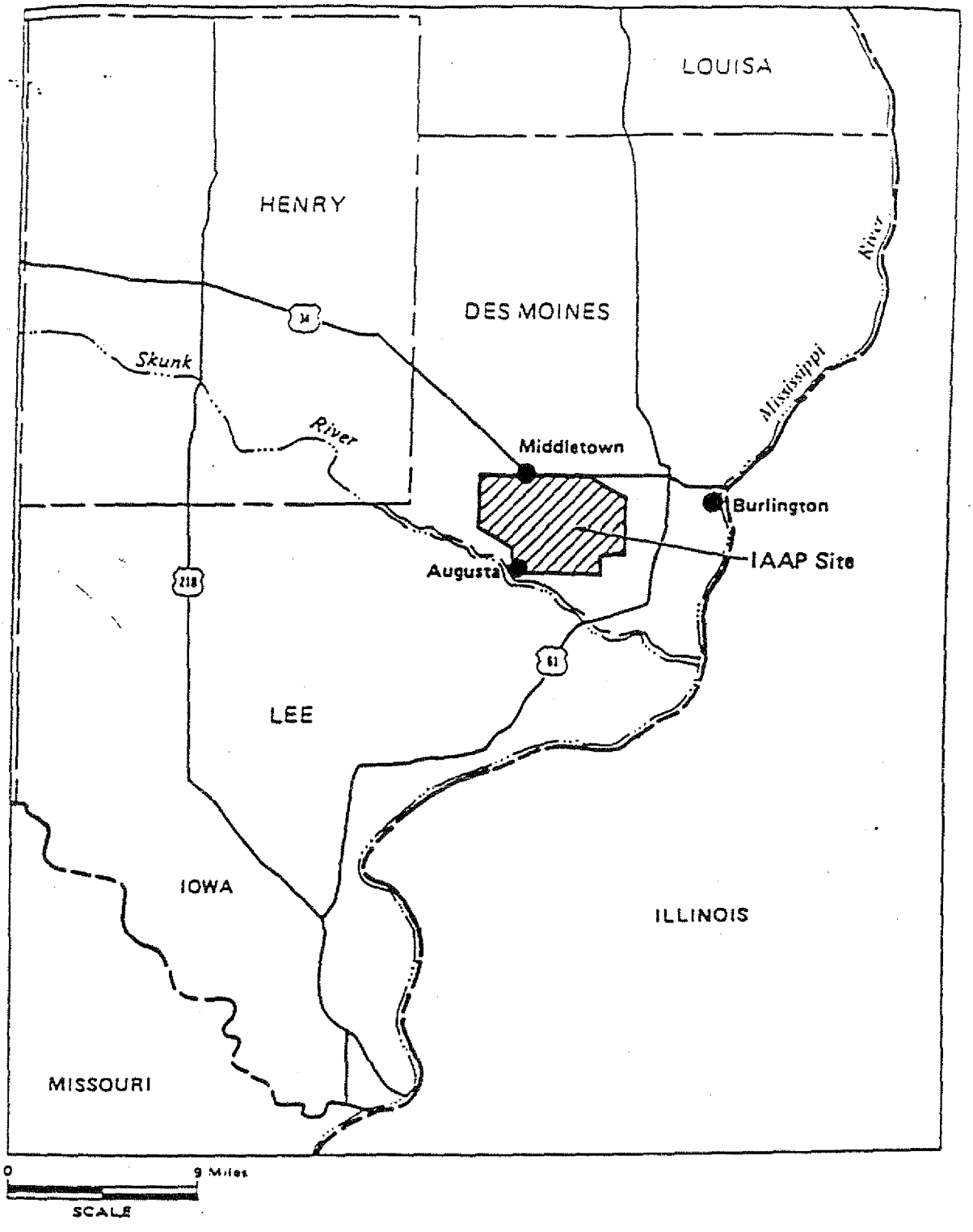
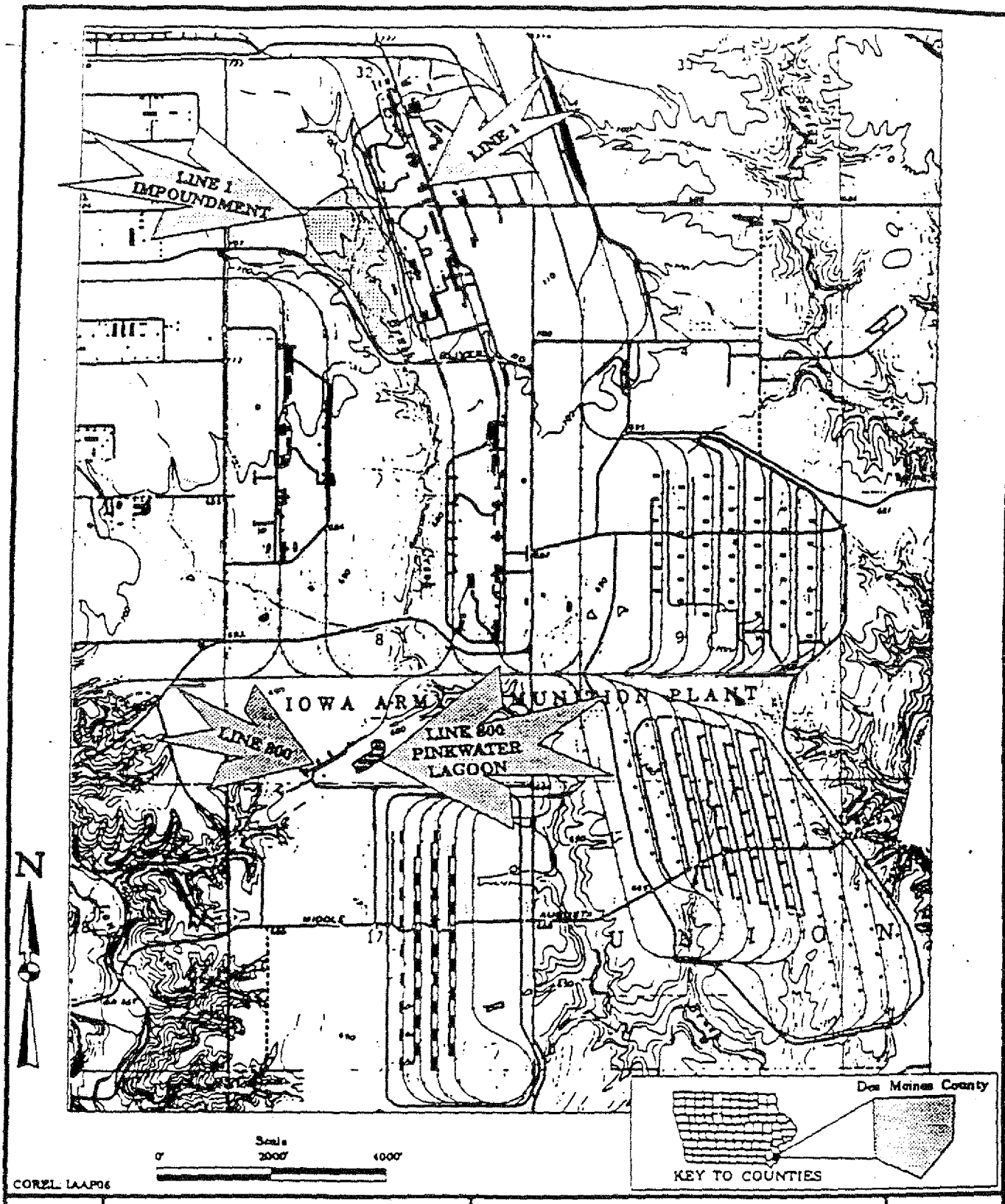


FIGURE 1
LOCATION OF THE IOWA ARMY AMMUNITION PLANT
MIDDLETOWN, DES MOINES COUNTY, IOWA

Dames & Moore



	Iowa Army Ammunition Plant Middletown, Iowa	Site Topography Map	Figure No.: 3
			12/94

LINE 800 SURFACE SOIL SAMPLING RESULTS
USACE SAMPLING EFFORT, FEB. 1995

SAMPLE LOCATION	TNT mg/kg	RDX mg/kg	HMX mg/kg
95-1 (SS)	9290	2950	860.1
95-2 (SS)	0.93	0	0
95-3 (SS)	4.66	0.397	0
95-4 (SS)	41.3	0.447	19.1

NOTE: SS=SURFACE SOIL SAMPLE

LINE 800 LAGOON SURFACE WATER SAMPLING RESULTS
USACE FIELD EFFORT, FEB. 1995

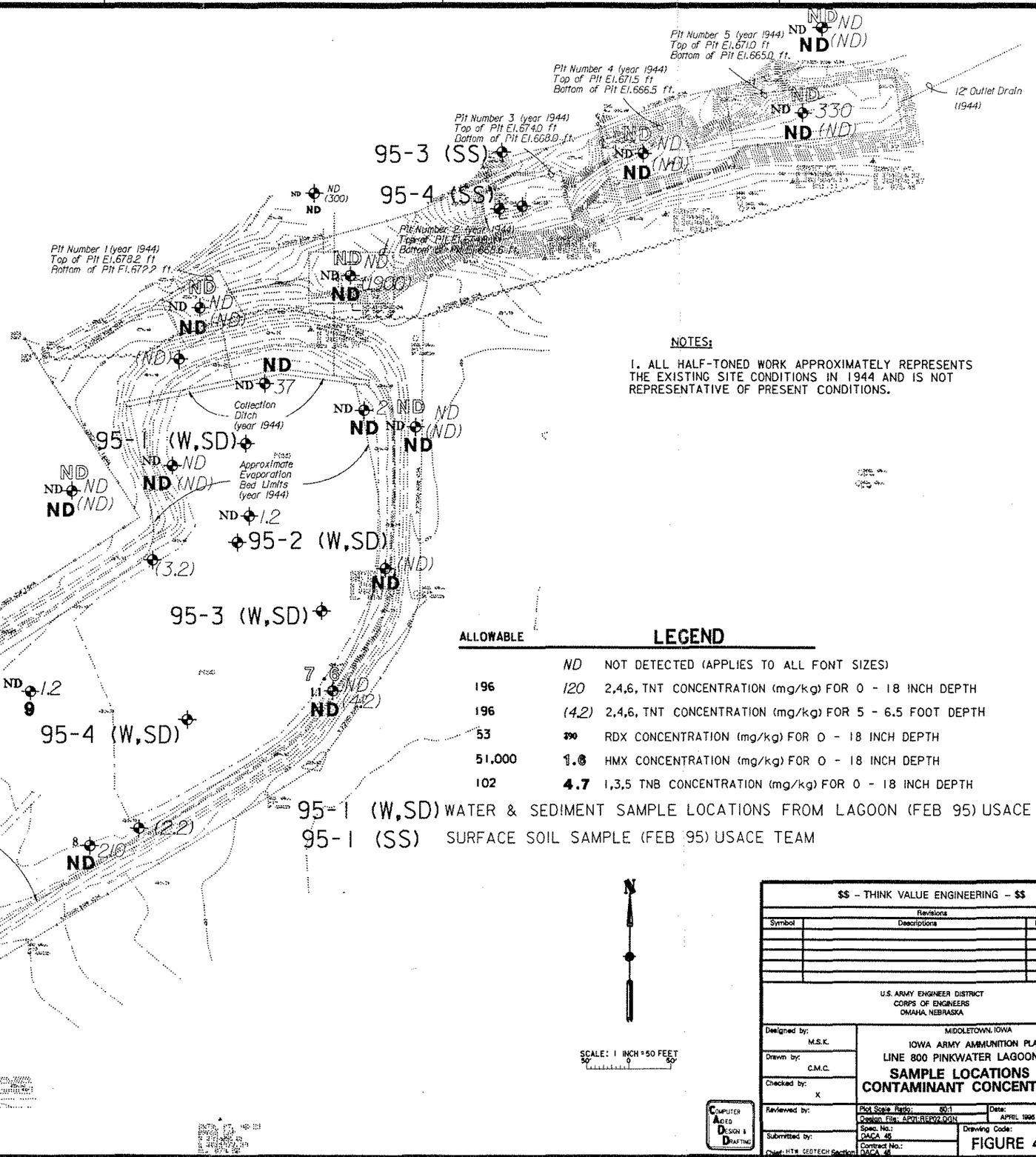
SAMPLE LOCATION	TNT ug/l	RDX ug/l	HMX ug/l
95-1 (W)	0.55	37.74	5.43
95-2 (W)	0.39	40.73	6.03
95-3 (W)	0.42	41.84	6.0
95-4 (W)	0.54	40.84	5.85

NOTE: W=WATER

LINE 800 LAGOON SEDIMENT SAMPLING RESULTS
USACE FIELD EFFORT, FEB. 1995

SAMPLE LOCATION	TNT mg/kg	RDX mg/kg	HMX mg/kg
95-1 (SD)	9.18	0.44	7.68
95-2 (SD)	1.94	0	0
95-3 (SD)	1.12	0	0
95-4 (SD)	1.28	0	0

NOTE: SD=SEDIMENT



NOTES:

1. ALL HALF-TONED WORK APPROXIMATELY REPRESENTS THE EXISTING SITE CONDITIONS IN 1944 AND IS NOT REPRESENTATIVE OF PRESENT CONDITIONS.

ALLOWABLE	LEGEND	
	ND	NOT DETECTED (APPLIES TO ALL FONT SIZES)
196	120	2,4,6, TNT CONCENTRATION (mg/kg) FOR 0 - 18 INCH DEPTH
196	(4.2)	2,4,6, TNT CONCENTRATION (mg/kg) FOR 5 - 6.5 FOOT DEPTH
53	390	RDX CONCENTRATION (mg/kg) FOR 0 - 18 INCH DEPTH
51,000	1.8	HMX CONCENTRATION (mg/kg) FOR 0 - 18 INCH DEPTH
102	4.7	1,3,5 TNB CONCENTRATION (mg/kg) FOR 0 - 18 INCH DEPTH

95-1 (W,SD) WATER & SEDIMENT SAMPLE LOCATIONS FROM LAGOON (FEB 95) USACE TEAM

95-1 (SS) SURFACE SOIL SAMPLE (FEB 95) USACE TEAM

N

SCALE: 1 INCH = 50 FEET (50' 0 50')

$$ - THINK VALUE ENGINEERING - $$

Revisions			
Symbol	Descriptions	Date	Approved

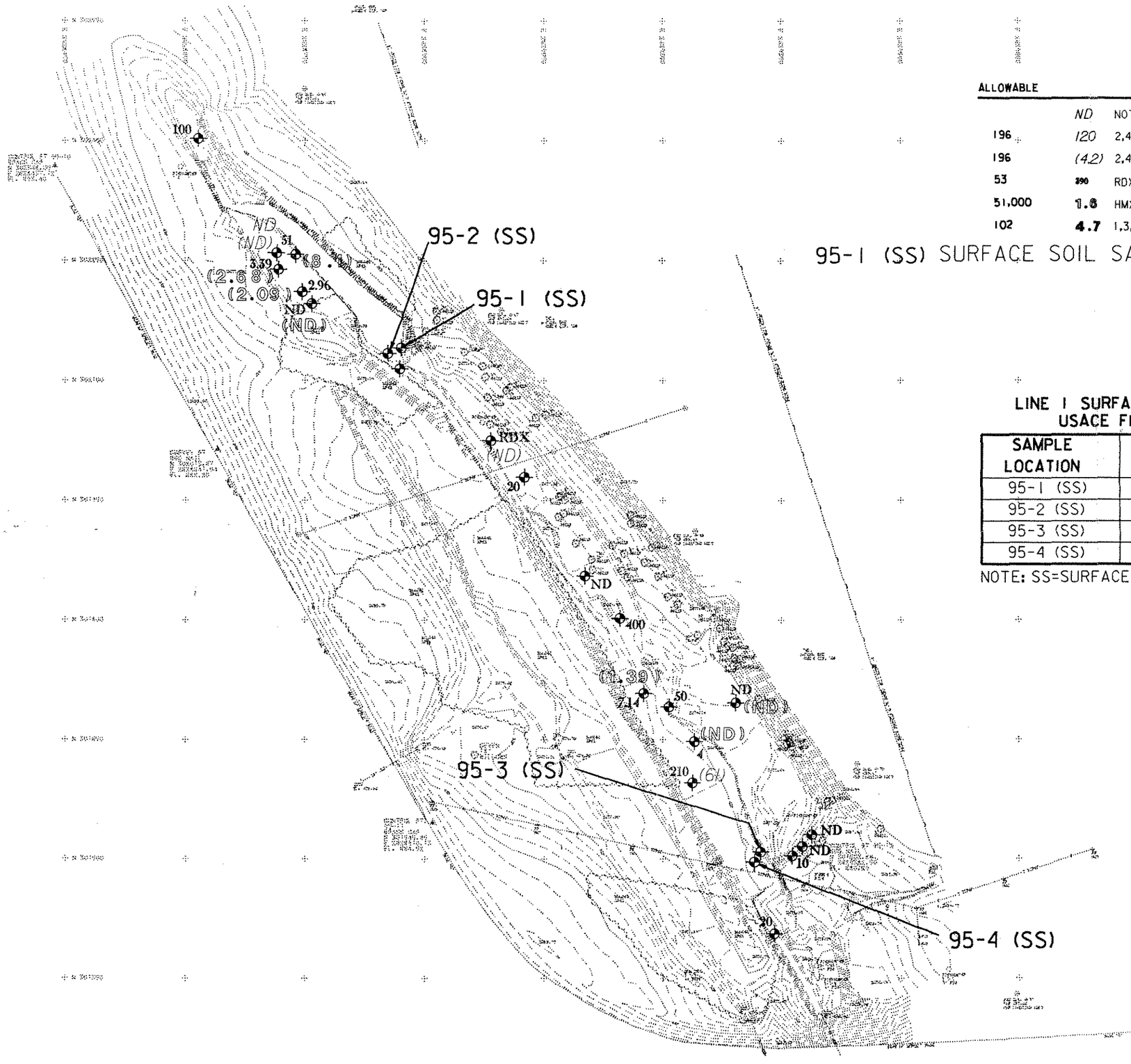
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

Designed by: M.S.K.
Drawn by: C.M.C.
Checked by: X
Reviewed by:
Submitted by:
Chief, HTW GEOTECH Section

MIDDLETOWN, IOWA
IOWA ARMY AMMUNITION PLANT
LINE 800 PINKWATER LAGOON AREA
SAMPLE LOCATIONS AND CONTAMINANT CONCENTRATIONS

Plot Scale Ratio: 50:1 | Date: APRIL 1996
Design File: APPI-REP02.DGN
Spec. No.: DACA 45
Contract No.: DACA 45
Drawing Code:
FIGURE 4
Sheet reference number:

COMPUTER AIDED DESIGN & DRAFTING



ALLOWABLE	LEGEND	
	ND	NOT DETECTED (APPLIES TO ALL FONT SIZES)
196	*120*	2,4,6, TNT CONCENTRATION (mg/kg) FOR 0 - 18 INCH DEPTH
196	*(4.2)*	2,4,6, TNT CONCENTRATION (mg/kg) FOR 5 - 6.5 FOOT DEPTH
53	**390**	RDX CONCENTRATION (mg/kg) FOR 0 - 18 INCH DEPTH
51,000	**1.8**	HMX CONCENTRATION (mg/kg) FOR 0 - 18 INCH DEPTH
102	**4.7**	1,3,5 TNB CONCENTRATION (mg/kg) FOR 0 - 18 INCH DEPTH

95-1 (SS) SURFACE SOIL SAMPLE (FEB 95) USACE TEAM

LINE 1 SURFACE SOIL SAMPLING RESULTS
USACE FIELD EFFORT, FEB. 1995

SAMPLE LOCATION	TNT mg/kg	RDX mg/kg	HMX mg/kg
95-1 (SS)	0	0.325	0
95-2 (SS)	0.55	10.02	4.149
95-3 (SS)	0	2.107	0
95-4 (SS)	1.47	0.924	0

NOTE: SS=SURFACE SOIL SAMPLE

$$ – THINK VALUE ENGINEERING – $$

Revisions			
Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
OMAHA, NEBRASKA

Designed by: M.S.K.
Drawn by: C.M.C.
Checked by: X
Reviewed by:
Submitted by: Chief, HTW GEOTECH Section

MIDDLETOWN, IOWA
IOWA ARMY AMMUNITION PLANT
LINE 1 IMPOUNDMENT AREA

SAMPLE LOCATIONS AND CONTAMINANT CONCENTRATIONS
LINE 1

Plot Scale Ratio: 50:1
Date: APRIL 1995
Design File: AP01REP01.DGN
Spec. No.: DACA 45
Drawing Code:
Contract No.: DACA 45
FIGURE 5
Sheet reference number:

COMPUTER AIDED DESIGN & DRAFTING

SUPPLEMENT A

CERTIFICATES of ANALYSIS

and

CHAIN-of-CUSTODY FORMS

from

USACE (MRD) Laboratory

MRD Lab Project No. 3183

10 MAY 1995

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY
OMAHA, NEBRASKA 68102

Subject: Certificate of Analysis

Project: Iowa AAP - Line 1 and 800 (2/95), Burlington, IA
Intended Use: IRP-ARMY
Source of Material:

Submitted by: Sharon Lehn, CEMRO-ED-ER
Date Sampled: 28 Feb 95 **Date Received:** 01 Mar 95
Method of Test or Specification: See attached test results sheets

References: Omaha District Request No. ENE 5502 dated 28 Feb 95

-- REMARKS --

1. Review comments for project data are presented on the following pages.

2. Sample receipt information and analytical data are provided in the following parts of the report.

   Part A: Sample Receipt Information (3 page)
   Part B: Chain-of-Custody Information (8 pages)
   Part C: Analytical Test Results (217 pages)
   Part D: Quality Assurance Test Results (19 pages)

Submitted by:

David E. Splichal

for DOUGLAS B. TAGGART
Director, MRD Laboratory

LP 5/10/95
Percifield/bab/444-4313

TEST RESULTS

1. SUMMARY

MRD Laboratory compiled the data package according to the USACE HTW minimum chemistry reporting requirements as specified in ER 1110-1-263 (dated 1 Oct 90). MRD Laboratory, Environmental Chemical Corporation (ECC) and Continental Analytical Services (CAS) performed the analyses using EPA methods. Proper quality control procedures were followed and documented. The method quality control results outlined below support the usability of the data.

2. DISCUSSION

a. Eighteen (18) soil and six (6) water samples were received by MRD Laboratory on 01 Mar 95. The samples were analyzed for one or more of the following:

- Explosives (EXP) by EPA a modified method 8330M.
- TCLP explosives by the EPA methods listed above along with the TCLP extraction method of 1311.
- Metals by EPA method: 7060 for arsenic; 7421 for lead; 7740 for selenium; 7471 for mercury; and 6010 for antimony, beryllium, cadmium, calcium, chromium, copper, iron, magnesium, manganese, nickel, potassium, silver, sodium, thallium, and zinc.
- Alkalinity (ALK) by EPA method 310.1.
- Bicarbonate (BICARB) by EPA method 310.1.
- Chloride (Cl) by EPA method 325.1.
- Fluoride (F) by EPA method 340.2.
- Nitrate plus nitrite (NO3) by EPA method 353.2.
- Sulfate (SO4) by EPA method 375.2.
- Sulfide by EPA method 9030.
- Total phosphorus (TP) by EPA method 365.4.
- Total kjeldahl nitrogen (TKN) by method 351.2.
- Total dissolved solids (TDS) by EPA method 160.1.
- pH by EPA method 150.1.
- Cyanide (CN) by EPA method 9012A.
- Total organic carbon (TOC) by EPA method 9060 or 415.1.
- Chemical oxygen demand (COD) by EPA method 410.1.
- Flashpoint by EPA method 1010.

The 100, 300, and 400 series methods are from EPA 600/4-79-020 (1983) "Methods for Chemical Analysis of Water and Wastes." All other methods are from SW-846 (1986), "Test Methods for Evaluation of Solid Waste" and promulgated updates.

Part "A" of this report lists all of the samples received.

b. The following shipping and chain-of-custody errors were noted for the sample shipments received by MRD Laboratory.

1) The coolers that were hand carried to MRD Laboratory on 01 Mar 95 had no custody seals.

2) Water samples received on 01 Mar 95 for metals analysis were not preserved. These samples were preserved at the MRD Laboratory.

Part "B" of this report contains the chain-of-custody information.

c. The field samples were analyzed by MRD Laboratory and Environmental Chemical Corporation (ECC).

Part "C" of this report lists the analytical test results.

d. The quality assurance (QA) samples were analyzed by Continental Analytical Services (CAS).

Part "D" of this report lists the quality assurance test results.

3. METHOD QUALITY CONTROL FOR THE FIELD SAMPLES:

a. EXP:
1) Surrogate spike recoveries were within acceptable limits.
2) The method blanks were free of contamination.
3) Laboratory duplicate results matched the results from the original field samples.
4) Matrix spike/matrix spike duplicate (MS/MSD) recoveries were within acceptable limits. Relative percent differences (RPD) for MS/MSD recoveries were within acceptable limits.
5) Laboratory control sample (LCS) recoveries were within acceptable limits.
6) Holding times were met.

b. TCLP EXP:
1) Surrogate spike recoveries were within acceptable limits.
2) Method blank was free of contamination.
3) Laboratory duplicate results matched the results from the original field samples, except for sample IAAP-SS-1-003 where the RPD for HMX was 27.
4) The MS/MSD recoveries were generally within acceptable limits, except for sample IAAP-SS-1-003 where the HMX and RDX recoveries were outside acceptable limits because a low spike amount was used versus the amount found native to the sample; and the TNT recovery was 127%. RPD for MS/MSD recoveries were generally within acceptable limits, except for HMX and RDX.
5) LCS recoveries were within acceptable limits.
6) Holding times were met.

c. Metals:
1) Method blanks were free of contamination.
2) Laboratory duplicate results generally matched the results from the original field samples, except in one instance where the amount of zinc found was close to the detection limit.

3) The MS/MSD recoveries were generally within acceptable limits. In two cases, the recoveries for antimony were low. This finding was due to matrix interference. RPD for MS/MSD recoveries were within acceptable limits.
4) LCS recoveries were within acceptable limits.
5) Holding times were met.

d. Cyanide:
1) The method blank was free of contamination.
2) Laboratory duplicate results matched the results from the original field samples.
3) MS/MSD recoveries were within acceptable limits. RPD for MS/MSD recoveries were within acceptable limits.
4) LCS recoveries were within acceptable limits.
5) Holding times were met.

e. WQ parameters:
1) Method blanks were free of contamination.
2) The BS/BSD recoveries were within acceptable limits. RPD for BS/BSD recoveries were within acceptable limits.
3) Laboratory duplicate results matched the results from the original field samples.
4) The MS/MSD recoveries were within acceptable limits. RPD for MS/MSD recoveries were within acceptable limits.
5) LCS recoveries were within acceptable limits.
6) Holding times were met.

f. Sulfide:
1) The method blank was free of contamination.
2) Laboratory duplicate results matched the results from the original field samples.
3) MS/MSD recoveries were within acceptable limits. RPD for MS/MSD recoveries were within acceptable limits.
4) LCS recoveries were within acceptable limits.
5) Holding times were met.

g. TDS:
1) The method blanks were free of contamination.
2) Laboratory duplicate results matched the results from the original field samples.
3) Holding times were met.

h. TOC:
1) The method blanks were free of contamination.
2) Laboratory duplicate results matched the results from the original field samples.
3) MS/MSD recoveries were within acceptable limits, except for sample IAAP-SS-1-001 where the recoveries were -463% and -481% (due to the low amount used in the spike versus the amount found in the original non-spiked sample; see pages C144 and C145). RPD for MS/MSD recoveries were within acceptable limits.
4) LCS recoveries were within acceptable limits.
5) Holding times were met.

i. COD:
   1) The method blank was free of contamination.
   2) Laboratory duplicate results matched the results from the original field samples.
   3) MS/MSD recoveries were within acceptable limits. RPD for MS/MSD recoveries were within acceptable limits.
   4) LCS recoveries were within acceptable limits.
   5) Holding times were met.

4. METHOD QUALITY CONTROL FOR THE QUALITY ASSURANCE SAMPLES:

a. EXP:
   1) Surrogate spike recoveries were within acceptable limits except for one sample which required dilution and recovery could not be calculated. Recoveries for QC samples (blanks and spikes) were not reported.
   2) The method blanks were free of contamination.
   3) Laboratory duplicates were not reported.
   4) Matrix spike/matrix spike duplicate (MS/MSD) recoveries and relative percent differences (RPD) were within acceptable limits for soil samples except for slightly high recovery for o-nitrotoluene (129%) in both the MS and MSD, and for tetryl (103%) in the MS only. There was not enough sample to perform MS/MSDs for the water samples.
   5) Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries were within acceptable limits for both soil and water, except for a slightly high recovery for HMX (132%) in one water LCS.
   6) Holding times were met.

b. Metals:
   1) Method blanks were free of contamination.
   2) Laboratory duplicates were not reported.
   3) The MS/MSD recoveries were within acceptable limits.
   4) LCS/LCSD recoveries were within acceptable limits.
   5) Holding times were met.

c. QA/FIELD SAMPLE COMPARISON: Comparison of the field sample and QA test results are presented in tables 001-004. Data discrepancies were noted for the following sample pairs:

   1) Sample IAAP-SD-8-004 & 005 vs. IAAP-SD-8-006 (Table 003)
      a) EXP: a major discrepancy for 2,4,6-TNT.

   2) Sample IAAP-W-8-001 & 005 vs. IAAP-W-8-006 (Table 004)
      a) EXP: a major discrepancy for 4-Am-2,6-DNT.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & FIELD SAMPLE RESULTS

Project: Iowa AAP - Line 1 & 800 (2/95)
QA Sample ID.: IAAP-SS-1-006
Material Description: Soil
MRD Laboratory Sample ID.: IAAP-SS-1-001 & -005
Date Sampled: 28 Feb 95

Analysis	QA Lab Result	Field Sample Result/Dup.	Units	Analysis	QA Lab Result	Field Sample Result/Dup.	Units
EXPLOSIVES							
HMX	0.29	<2.20	mg/kg	2,4-DNT	<0.25	<0.25	mg/kg
RDX	0.26	0.32J/0.28J	mg/kg	2,6-DNT	<0.25	<0.26	mg/kg
1,3,5-TNB	<0.25	<0.25	mg/kg	2-Am-4,6-DNT	<0.25	<0.25	mg/kg
1,3-DNB	<0.25	<0.25	mg/kg	4-Am-2,6-DNT	<0.25	<0.26	mg/kg
Tetryl	<0.25	<0.65	mg/kg	3,5-Dinitroaniline	-	<0.65	mg/kg
2,4,6-TNT	0.53	<0.25	mg/kg				

Analysis	QA Lab Result	Field Sample Result/Dup.	Units	Analysis	QA Lab Result	Field Sample Result/Dup.	Units
METALS							
Antimony	<6	<10	mg/kg	Mercury	<0.1	0.05/<0.04	mg/kg
Arsenic	3	4.6/7.2	mg/kg	Nickel	9	11/13	mg/kg
Beryllium	<0.5	<1	mg/kg	Selenium	<0.6	0.6 /<0.5	mg/kg
Cadmium	<0.6	<1	mg/kg	Silver	<1	2/<1	mg/kg
Chromium	20	25/20	mg/kg	Thallium	<1	<15	mg/kg
Copper	10	11/10	mg/kg	Zinc	32	46/42	mg/kg
Lead	14	16/14	mg/kg				

COMMENTS:

-: Not analyzed or not reported.
J: Estimated concentration below the quantifiable detection limit.

Data agreed.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & FIELD SAMPLE RESULTS

Project: Iowa AAP - Line 1 & 800 (2/95)
QA Sample ID.: IAAP-SS-8-006
Material Description: Soil
MRD Laboratory Sample ID.: IAAP-SS-8-001 & -005
Date Sampled: 28 Feb 95

Analysis	QA Lab Result	Field Sample Result/Dup.	Units	Analysis	QA Lab Result	Field Sample Result/Dup.	Units
EXPLOSIVES							
HMX	2800	860/1323	mg/kg	2,4-DNT	<50	13.21/20.32++	mg/kg
RDX	15000	2950/6909	mg/kg	2,6-DNT	<50	<0.26	mg/kg
1,3,5-TNB	290	134/ 196	mg/kg	2-Am-4,6-DNT	<50	<0.25	mg/kg
1,3-DNB	<50	4.82/21.75	mg/kg	4-Am-2,6-DNT	<50	<0.26	mg/kg
Tetryl	<50	+	mg/kg	3,5-Dinitroaniline	-	<0.65	mg/kg
2,4,6-TNT	57000	9290/37400	mg/kg				

Analysis	QA Lab Result	Field Sample Result/Dup.	Units	Analysis	QA Lab Result	Field Sample Result/Dup.	Units
METALS							
Antimony	<7	<10	mg/kg	Mercury	0.5	0.21/0.07	mg/kg
Arsenic	9	10.8/9.1	mg/kg	Nickel	19	18/20	mg/kg
Beryllium	0.8	<1	mg/kg	Selenium	<0.7	1/0.9	mg/kg
Cadmium	<0.7	2/1	mg/kg	Silver	<1	<1	mg/kg
Chromium	307	377/145	mg/kg	Thallium	<1	<15	mg/kg
Copper	438	275/ 79	mg/kg	Zinc	233	260/108	mg/kg
Lead	47	66/ 22	mg/kg				

MMENTS:

-: Not analyzed or not reported.
*: Data disagreement.
+: Unknown compound equivalent to 8.38/28.24 mg/kg as tetryl was detected.
++: Results unconfirmed due to matrix interference.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & FIELD SAMPLE RESULTS

Project: Iowa AAP - Line 1 & 800 (2/95)
QA Sample ID.: IAAP-SD-8-006
Material Description: Sediment
MRD Laboratory Sample ID.: IAAP-SD-8-004 & -005
Date Sampled: 28 Feb 95

Analysis	QA Lab Result	Field Sample Result/Dup.	Units	Analysis	QA Lab Result	Field Sample Result/Dup.	Units
EXPLOSIVES							
HMX	1.8	<2.20	mg/kg	2,4-DNT	<0.25	<0.25	mg/kg
RDX	2.1	<1.00	mg/kg	2,6-DNT	<0.25	<0.26	mg/kg
1,3,5-TNB	<0.25	<0.25	mg/kg	2-Am-4,6-DNT	<0.25	<0.25	mg/kg
1,3-DNB	<0.25	<0.25	mg/kg	4-Am-2,6-DNT	<0.25	<0.26	mg/kg
Tetryl	<0.25	<0.65	mg/kg	3,5-Dinitroaniline	-	<0.65	mg/kg
2,4,6-TNT	27	** 1.27/1.13	mg/kg				

Analysis	QA Lab Result	Field Sample Result/Dup.	Units	Analysis	QA Lab Result	Field Sample Result/Dup.	Units
METALS		+				+	
Antimony	<2	<10	mg/kg	Mercury	<0.2	0.09	mg/kg
Arsenic	4	4.7	mg/kg	Nickel	24.5	25	mg/kg
Beryllium	1.0	<1	mg/kg	Selenium	<0.2	0.8	mg/kg
Cadmium	0.7	<1	mg/kg	Silver	<0.4	<1	mg/kg
Chromium	217	287	mg/kg	Thallium	<0.4	<15	mg/kg
Copper	261	280	mg/kg	Zinc	253	283	mg/kg
Lead	24	28	mg/kg				

COMMENTS:

-: Not analyzed or not reported.
**: Major data disagreement.
+: Sample SD-8-005 used for data comparisons. Sample SD-8-004 was not assigned metals analysis as noted on the chain-of-custody.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & FIELD SAMPLE RESULTS

Project: Iowa AAP - Line 1 & 800 (2/95)
QA Sample ID.: IAAP-W-8-006
Material Description: Water
MRD Laboratory Sample ID.: IAAP-W-8-001 & -005
Date Sampled: 28 Feb 95

Analysis	QA Lab Result	Field Sample Result/Dup.	Units	Analysis	QA Lab Result	Field Sample Result/Dup.	Units
EXPLOSIVES							
HMX	8.5	5.43/5.62	µg/L	2,4-DNT	<0.25	0.03++/<0.02	µg/L
RDX	35	37.74/34.34	µg/L	2,6-DNT	<0.26	<0.31	µg/L
1,3,5-TNB	<0.25	<0.26	µg/L	2-Am-4,6-DNT	3.5	1.71/1.61	µg/L
1,3-DNB	<0.25	<0.11	µg/L	4-Am-2,6-DNT	<0.25	** 3.28/3.22	µg/L
Tetryl	<0.65	<0.55	µg/L	3,5-Dinitroaniline	-	0.84/0.72	µg/L
2,4,6-TNT	<0.25	0.55/0.56 ++	µg/L				

Analysis	QA Lab Result	Field Sample Result/Dup.	Units	Analysis	QA Lab Result	Field Sample Result/Dup.	Units
METALS							
Antimony	<6	<50	µg/L	Mercury	<0.2	<0.02	µg/L
Arsenic	<10	3/2	µg/L	Nickel	<40	<10	µg/L
Beryllium	<4	<2	µg/L	Selenium	<5	<2	µg/L
Cadmium	<5	<4	µg/L	Silver	<10	<5	µg/L
Chromium	<10	5/5	µg/L	Thallium	<2	<100	µg/L
Copper	<20	7/7	µg/L	Zinc	<20	10/10	µg/L
Lead	<3	<2	µg/L				

MMENTS:
-: Not analyzed or not reported.
**: Major data disagreement.
++: Result not confirmed due to matrix interference.

PART A

SAMPLE RECEIPT INFORMATION

Sample Number	Customer Sample ID	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	QA Test Results Page Number
001	IAAP-SS-1-001	28 Feb 95	Soil	950302-001	Explosives	C9
				950302-003	TCLP Explosives	C29
				950302-004	Cyanide	C43
				950302-004	Flashpoint	C206
				950302-005	TKN (to ECC)	C162
				950302-005	pH (to ECC)	C204
				950302-005	Nitrate (to ECC)	C190
				950302-005	Sulfate (to ECC)	C202
				950302-005	Total Phosphorus (to ECC)	C192
				950302-005	Sulfide (to ECC)	C148
				950302-005	TOC (to ECC)	C144
				950302-006	Metals	C80,C85-C86
002	IAAP-SS-1-002	28 Feb 95	Soil	950302-007	Metals	C87-C88
				950302-008	TKN (to ECC)	C162
				950302-008	pH (to ECC)	C204
				950302-008	Nitrate (to ECC)	C190
				950302-008	Sulfate (to ECC)	C202
				950302-008	Total Phosphorus (to ECC)	C192
				950302-008	Sulfide (to ECC)	C148
				950302-008	TOC (to ECC)	C144
				950302-009	Explosives	C10
				950302-011	TCLP Explosives	C30
003	IAAP-SS-1-003	28 Feb 95	Soil	950302-012	Explosives	C11
				950302-014	TCLP Explosives	C31
				950302-015	Cyanide	C44
				950302-015	Flashpoint	C207
				950302-016	TKN (to ECC)	C162
				950302-016	pH (to ECC)	C204
				950302-016	Nitrate (to ECC)	C190
				950302-016	Sulfate (to ECC)	C202
				950302-016	Total Phosphorus (to ECC)	C192
				950302-016	Sulfide (to ECC)	C148
				950302-016	TOC (to ECC)	C146
				950302-017	Metals	C90-C92
004	IAAP-SS-1-004	28 Feb 95	Soil	950302-018	Metals	C93-C95
				950302-019	TKN (to ECC)	C162
				950302-019	pH (to ECC)	C204
				950302-019	Nitrate (to ECC)	C190
				950302-019	Sulfate (to ECC)	C202
				950302-019	Total Phosphorus (to ECC)	C192
				950302-019	Sulfide (to ECC)	C148
				950302-019	TOC (to ECC)	C144
				950302-020	Explosives	C12
				950302-022	TCLP Explosives	C32
005	IAAP-SS-1-005	28 Feb 95	Soil	950302-023	Metals	C96-C98
				950302-023	Explosives	C13
006	IAAP-SS-1-006	28 Feb 95	Soil	950302-024	Metals (to CAS, Inc.)	D2
				950302-024	Explosives (to CAS, Inc.)	D2
007	IAAP-SS-8-001	28 Feb 95	Soil	950302-025	Explosives	C14
				950302-027	TCLP Explosives	C33
				950302-028	Cyanide	C45
				950302-028	Flashpoint	C208
				950302-029	TKN (to ECC)	C162
				950302-029	pH (to ECC)	C204
				950302-029	Nitrate (to ECC)	C190
				950302-029	Sulfate (to ECC)	C202
				950302-029	Total Phosphorus (to ECC)	C192
				950302-029	Sulfide (to ECC)	C148
				950302-029	TOC (to ECC)	C146
				950302-030	Metals	C99-C100

Sample Number	Customer Sample ID	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	QA Test Results Page Number
008	IAAP-SS-8-002	28 Feb 95	Soil	950302-031	Metals	C102-C104
				950302-032	TKN (to ECC)	C162
				950302-032	TOC (to ECC)	C144
				950302-032	pH (to ECC)	C204
				950302-032	Nitrate (to ECC)	C190
				950302-032	Sulfide (to ECC)	C148
				950302-032	Sulfate (to ECC)	C202
				950302-032	Total Phosphorus (to ECC)	C192
				950302-033	Explosives	C15
				950302-035	TCLP Explosives	C34
009	IAAP-SS-8-003	28 Feb 95	Soil	950302-036	Explosives	C16
				950302-038	TCLP Explosives	C35
				950302-039	TKN (to ECC)	C162
				950302-039	pH (to ECC)	C204
				950302-039	Nitrate (to ECC)	C190
				950302-039	Sulfate (to ECC)	C202
				950302-039	Total Phosphorus (to ECC)	C192
				950302-039	Sulfide (to ECC)	C148
				950302-039	TOC (to ECC)	C146
				950302-040	Metals	C105-C107
010	IAAP-SS-8-004	28 Feb 95	Soil	950302-041	Metals	C108-C110
				950302-042	TKN (to ECC)	C162
				950302-042	pH (to ECC)	C204
				950302-042	Nitrate (to ECC)	C190
				950302-042	Sulfate (to ECC)	C202
				950302-042	Total Phosphorus (to ECC)	C192
				950302-042	Sulfide (to ECC)	C148
				950302-042	TOC (to ECC)	C144
				950302-043	Cyanide	C46
				950302-043	Flashpoint	C209
				950302-046	TCLP Explosives	C36
				950302-044	Explosives	C17
011	IAAP-SS-8-005	28 Feb 95	Soil	950302-047	Metals	C111-C113
				950302-047	Explosives	C18
012	IAAP-SS-8-006	28 Feb 95	Soil	950302-048	Metals (to CAS, Inc.)	D4
				950302-048	Explosives (to CAS, Inc.)	D4
013	IAAP-SD-8-001	28 Feb 95	Sediment	950302-049	Explosives	C19
				950302-050	TKN (to ECC)	C162
				950302-050	pH (to ECC)	C204
				950302-050	Nitrate (to ECC)	C190
				950302-050	Sulfate (to ECC)	C202
				950302-050	Total Phosphorus (to ECC)	C192
				950302-050	TOC (to ECC)	C144
				950302-051	Metals	C114-C116
014	IAAP-SD-8-002	28 Feb 95	Sediment	950302-052	Metals	C117-C119
				950302-053	TKN (to ECC)	C162
				950302-053	pH (to ECC)	C204
				950302-053	Nitrate (to ECC)	C190
				950302-053	Sulfate (to ECC)	C202
				950302-053	Total Phosphorus (to ECC)	C192
				950302-053	TOC (to ECC)	C144
				950302-054	Explosives	C20
015	IAAP-SD-8-003	28 Feb 95	Sediment	950302-055	Explosives	C21
				950302-056	Cyanide	C47
				950302-056	Flashpoint	C210
				950302-057	TKN (to ECC)	C162
				950302-057	pH (to ECC)	C204
				950302-057	Nitrate (to ECC)	C190
				950302-057	Sulfate (to ECC)	C202
				950302-057	TOC (to ECC)	C144
				950302-057	Total Phosphorus (to ECC)	C192
				950302-057	Sulfide (to ECC)	C148
				950302-058	Metals	C120-C122

A:

Sample Number	Customer Sample ID	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	QA Test Results Page Number
016	IAAP-SD-8-004	28 Feb 95	Sediment	950302-059	Cyanide	C48
				950302-059	Flashpoint	C211
				950302-060	TKN (to ECC)	C162
				950302-060	pH (to ECC)	C204
				950302-060	Nitrate (to ECC)	C190
				950302-060	Sulfate (to ECC)	C202
				950302-060	TOC (to ECC)	C144
				950302-060	Total Phosphorus (to ECC)	C192
				950302-060	Sulfide (to ECC)	C148
				950302-061	Explosives	C22
017	IAAP-SD-8-005	28 Feb 95	Sediment	950302-062	Explosives	C23
				950302-063	Metals	C123-C125
018	IAAP-SD-8-006	28 Feb 95	Sediment	950302-064	Metals (to CAS, Inc.)	D6
				950302-065	Explosives (to CAS, Inc.)	D8
019	IAAP-W-8-001	28 Feb 95	Water	950302-066	Explosives	C1
				950302-067	Metals	C53-C55
020	IAAP-W-8-002	28 Feb 95	Water	950302-068	Chloride	C150
				950302-068	Sulfate	C164
				950302-068	Nitrate/nitrite	C164
				950302-068	Total Phosphorus	C164
				950302-068	pH	C194
				950302-068	Fluoride	C194
				950302-068	COD	C212
				950302-068	TDS	C194
				950302-068	TOC	C138
				950302-068	Alkalinity	C164
				950302-068	Hardness	C74
				950302-068	Metals	C74
				950302-068	TKN	C156
				950302-068	Bicarbonate	C164
				950302-069	Explosives	C2
021	IAAP-W-8-003	28 Feb 95	Water	950302-070	Explosives	C3
				950302-071	Metals	C56-C58
022	IAAP-W-8-004	28 Feb 95	Water	950302-072	Chloride	C151
				950302-072	Sulfate	C177
				950302-072	Total Phosphorus	C177
				950302-072	pH	C195
				950302-072	Fluoride	C195
				950302-072	COD	C213
				950302-072	TKN	C157
				950302-072	Alkalinity	C177
				950302-072	Bicarbonate	C177
				950302-072	Nitrate/nitrite	C177
				950302-072	TDS	C195
				950302-072	Hardness	C75
				950302-072	Metals	C75
				950302-072	TOC	C139
				950302-073	Explosives	C4
023	IAAP-W-8-005	28 Feb 95	Water	950302-074	Explosives	C5
				950302-075	Metals	C59-C61
024	IAAP-W-8-006	28 Feb 95	Water	950302-076	Metals (to CAS, Inc.)	D7
				950302-077	Explosives (to CAS, Inc.)	D9

PART B

CHAIN-OF-CUSTODY INFORMATION

Page No.	Chain-of-Custody No.	Date Signed
B1	3446	01 Mar 95
B3	3448	01 Mar 95
B5	0578	01 Mar 95
B7	3447	01 Mar 95

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
3183	IAAP

SAMPLERS: *(Signature)* Lesere Kahihikolo [signature]

STA. NO.	DATE 1995	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	8330 (4oz)	TCLP 8330 (4oz)	PP Metals (8oz)	Reactive/Ignitable (8oz)	Misc (8oz)	Geotech	REMARKS
1	2/28	1420		X	IAAP-SS-1-001	5	X	X	X	X	X		
2	2/28	1440		X	IAAP-SS-1-002	4	X	X	X		X		
3	2/28	1503		X	IAAP-SS-1-003	5	X	X	X	X	X		
4	2/28	1520		X	IAAP-SS-1-004	4	X	X	X		X		
5	2/28	1420		X	IAAP-SS-1-005	1	X		X				
6	2/28	1420		X	IAAP-SS-1-006	1	X		X				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Lesere Kahihikolo	3/1/95 1430	[signature]			
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		[signature]	3/1/95 2:30	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

B1

B2

COOLER RECEIPT FORM

LIMS# 3183 MRD Cooler # 731 Number of Coolers 1 of 4 Contractor Cooler USACE

PROJECT: Long AAP Date received: 3/1/95

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 3/1/95 C-of-C Number: 3446

by (print) Barb Hunter (sign) Barb Hunter

1. Did cooler come with a shipping slip (air bill, etc.)? ..... YES (NO)

If YES, enter carrier name & air bill number here: hand carried 3183030195

2. Were custody seals on outside of cooler? ..... YES (NO)

How many & where: _____, seal date: _____, seal name _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... (YES) NO

4. Did you screen samples for radioactivity using the Geiger Counter..... (YES) NO

5. Were custody papers sealed in a plastic bag & taped inside to the lid? ..not.sealed.to.lid YES (NO)

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO

7. Did you sign custody papers in the appropriate place? ..... (YES) NO

8. Was project identifiable from custody papers? ..... (YES) NO

9. Type of ice: Mfg ice Temperature: 1-3° Date temperature measured: 3/1/95

10. Describe type of packing in cooler: peanuts

11. Were all bottles sealed in separate plastic bags? ..... (YES) NO

B. LOG-IN PHASE: Date samples were logged-in: 3/2/95

by (print) Shelly Swink (sign) Shelly Swink

12. Did all bottles arrive unbroken & were labels in good condition? ..... (YES) NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... (YES) NO

14. Did all bottle labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Were correct preservatives added to samples? ..... N/A ~~YES~~ ~~NO~~

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Was headspace absent in Volatile samples? If NO, list by QA#: N/A ~~YES~~ ~~NO~~

QA # (cont.) _____

19. Were the custody papers checked against the sample receipt form? By whom? RP Date: 3/2/95

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
3193	IAAP

SAMPLERS: *(Signature)* Leslie Kahikaalo

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	8330 (4oz)	TCLP 8330 (4oz)	PP Metals (8oz)	MISC. (8oz)	Reactivity (8oz)		REMARKS
1	2/28	1535		X	IAAP-SS-8-001	5	X	X	X	X	X		
2	2/28	1545		X	IAAP-SS-8-002	4	X	X	X	X			
3	2/28	1505		X	IAAP-SS-8-003	4	X	X	X	X			
4	2/28	1445		X	IAAP-SS-8-004	5	X	X	X	X	X		
5	2/28	1535		X	IAAP-SS-8-005	1	X		X				
6	2/28	1520		X	IAAP-SS-8-006	1	X		X				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Leslie Kahikaalo	3/1/95 1430				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	
		D. Meade	3/1/95 2:30		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field File

B3

AA

B4

COOLER RECEIPT FORM

LIMS# 3183 MRD Cooler # 746 Number of Coolers 2 of 4 Contractor Cooler USA COE ~~3448~~ ISA

PROJECT: Iowa AAP Date received: 3/1/95

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 3/1/95 C-of-C Number: 3448 ~~ISA~~

by (print) Barb Hunter (sign) Barb Hunter

1. Did cooler come with a shipping slip (air bill, etc.)? ..... YES NO

If YES, enter carrier name & air bill number here: hand carried 3183030195A

2. Were custody seals on outside of cooler? ..... YES NO

How many & where: —, seal date: —, seal name —

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO

4. Did you screen samples for radioactivity using the Geiger Counter..... YES NO

5. Were custody papers sealed in a plastic bag & taped inside to the lid? not sealed to lid YES NO

6. Were custody papers filled out properly (ink, signed, etc.)? ..... YES NO

7. Did you sign custody papers in the appropriate place? ..... YES NO

8. Was project identifiable from custody papers? ..... YES NO

9. Type of ice: reg ice Temperature: 5.1 Date temperature measured: 3/1/95

10. Describe type of packing in cooler: peanuts

11. Were all bottles sealed in separate plastic bags? ..... YES NO

B. LOG-IN PHASE: Date samples were logged-in: 3/2/95

by (print) Shelly Swink (sign) Shelly Swink

12. Did all bottles arrive unbroken & were labels in good condition? ..... YES NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... YES NO

14. Did all bottle labels agree with custody papers? ..... YES NO

15. Were correct containers used for the tests indicated? ..... YES NO

16. Were correct preservatives added to samples? ..... N/A ~~YES NO~~

17. Was a sufficient amount of sample sent for tests indicated? ..... YES NO

18. Was headspace absent in Volatile samples? If NO, list by QA#: N/A ~~YES NO~~

QA # (cont.) _____

19. Were the custody papers checked against the sample receipt form? By whom? LP Date: 3/2/95

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
8183	IAAP

SAMPLERS: *(Signature)* Sharon [illegible] Leslie Kahihikolo

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	DP Metals (8oz)	Explosives 8330 (4oz)	Reactive Ignite (8oz)	Misc. (8oz)			REMARKS
1	2-28	0910		X	IAAP-SD-8-001	3	X	X	[illegible]	X			
2	2-28	0920		X	IAAP-SD-8-002	3	X	X		X			
3	2-28	10:30		X	IAAP-SD-8-003	4	X	X	X	X			
4	2-28	10:45		X	IAAP-SD-8-004	3	·	X	X	X			
5	2-28	10:45		X	IAAP-SD-8-005	2	X	X					
6	2-28	10:45		X	IAAP-SD-8-006	2	X	X					

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Leslie Kahihikolo	3/1/95 1430				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)* [illegible]	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

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B6

COOLER RECEIPT FORM

LIMS# 3183 MRD Cooler # 743 Number of Coolers 4 of 4 Contractor Cooler ISACOE

PROJECT: Iowa AAP Date received: 3/1/95

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 3/1/95 C-of-C Number: 0578

by (print) Barb Hunter (sign) Barb Hunter

1. Did cooler come with a shipping slip (air bill, etc.)? ..... YES (NO)

If YES, enter carrier name & air bill number here: Hand Carried 3183030195C

2. Were custody seals on outside of cooler? ..... YES (NO)

How many & where: _____, seal date: _____, seal name _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES (NO)

4. Did you screen samples for radioactivity using the Geiger Counter..... (YES) NO

5. Were custody papers sealed in a plastic bag & taped inside to the lid? Not Sealed to Lid YES (NO)

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO

7. Did you sign custody papers in the appropriate place? ..... (YES) NO

8. Was project identifiable from custody papers? ..... (YES) NO

9. Type of ice: Wet Ice Temperature: 5.8° Date temperature measured: 3/1/95

10. Describe type of packing in cooler: peanuts

11. Were all bottles sealed in separate plastic bags? ..... (YES) NO

B. LOG-IN PHASE: Date samples were logged-in: 3/2/95

by (print) Sherry Swink (sign) Sherry Swink

12. Did all bottles arrive unbroken & were labels in good condition? ..... (YES) NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... (YES) NO

14. Did all bottle labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Were correct preservatives added to samples? ..... (YES) ~~NO~~

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Was headspace absent in Volatile samples? If NO, list by QA#: _____ ~~YES~~ ~~NO~~

QA # (cont.) _____

19. Were the custody papers checked against the sample receipt form? By whom? LP Date: 3/2/95

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
3183	IAAP

SAMPLERS: *(Signature)* Sharon A Lehn Leslie Kahihikolo

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PP Metals (poly)	Explosives 8330 (amber)	Gen. Chem. (poly)				REMARKS
1	2/28	0845		X	IAAP-W-8-001	2	X	X					1 Liter bottles
2	2/28	0915		X	IAAP-W-8-002	2	[illegible]	X	X				1 Liter bottles
3	2/28	10:30		X	IAAP-W-8-003	2	X	X					1 Liter bottles
4	2/28	10:45		X	IAAP-W-8-004	2	[illegible]	X	X				1 Liter bottles.
5	2/28	0845		X	IAAP-W-8-005	2	X	X					1 Liter bottles
6	2/28	0845		X	IAAP-W-8-006	2	X	X					1 Liter bottles

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Leslie Kahihikolo	3/1/95 14:30				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	
		[illegible]	3/1/95 2:30		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

B8

COOLER RECEIPT FORM

LIMS# 3183 MRD Cooler # 732 Number of Coolers 3 of 4 Contractor Cooler USACOE

PROJECT: Iowa AAP Date received: 3/1/95

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened: 3/1/95 C-of-C Number: 3447

by (print) Barb Hunter (sign) Barb Hunter

1. Did cooler come with a shipping slip (air bill, etc.)? ..... YES (NO)

If YES, enter carrier name & air bill number here: hand carried
3183030195B

2. Were custody seals on outside of cooler? ..... YES (NO)

How many & where: _____, seal date: _____, seal name _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES (NO)

4. Did you screen samples for radioactivity using the Geiger Counter..... (YES) NO

5. Were custody papers sealed in a plastic bag & taped inside to the lid? not sealed to lid (YES) (NO) SH

6. Were custody papers filled out properly (ink, signed, etc.)? ..... (YES) NO

7. Did you sign custody papers in the appropriate place? ..... (YES) NO

8. Was project identifiable from custody papers? ..... (YES) NO

9. Type of ice: regular Temperature: 2.1° Date temperature measured: 3/1/95

10. Describe type of packing in cooler: peanuts

11. Were all bottles sealed in separate plastic bags? ..... (YES) NO

B. LOG-IN PHASE: Date samples were logged-in: 3/2/95

by (print) Shelly Swink (sign) Shelly Swink

12. Did all bottles arrive unbroken & were labels in good condition? ..... (YES) NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? ..... (YES) NO

14. Did all bottle labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Were correct preservatives added to samples? HNO3 added to all Metals (YES) NO

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Was headspace absent in Volatile samples? If NO, list by QA#: N/A ~~YES~~ ~~NO~~

QA # (cont.) _____

19. Were the custody papers checked against the sample receipt form? By whom? LP Date: 3/2/95

PART C

ANALYTICAL TEST RESULTS

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-W-8-001
MRD Lab Sample No: 950302-H066

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: na
Date Extracted: 02 Mar 95
Date Analyzed: 07 Mar 95

Sample Description: Water
Sample Container: 1-1 L amber glass
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92) **Batch:** 9503070918
Analyst: S. Schnitker **Sequence:** 9503070918A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	5.43		1.00
121-82-4	RDX	37.74		0.84
99-35-4	1,3,5-TNB	u		0.26
99-65-0	1,3-DNB	u		0.11
479-45-8	Tetryl	u		0.55
118-96-7	2,4,6-TNT	0.55	C	0.11
121-14-2	2,4-DNT	0.03	C	0.02
606-20-2	2,6-DNT	u		0.31
355-72-78-2	2-Am-4,6-DNT	1.71		0.03
1946-51-0	4-Am-2,6-DNT	3.28		0.06
618-87-1	3,5-Dinitroaniline	0.84		0.55

u: Below Detection Limit
C: Result was unconfirmed due to matrix interference.

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	93	60-110	2.60

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 09 Mar. 95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-W-8-002
MRD Lab Sample No: 950302-H069

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: na
Date Extracted: 02 Mar 95
Date Analyzed: 07 Mar 95

Sample Description: Water
Sample Container: 1-1 L amber glass
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92) **Batch:** 9503070918
Analyst: S. Schnitker **Sequence:** 9503070918A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	6.03		1.00
121-82-4	RDX	40.73		0.84
99-35-4	1,3,5-TNB	u		0.26
99-65-0	1,3-DNB	u		0.11
479-45-8	Tetryl	u		0.55
118-96-7	2,4,6-TNT	0.39	c	0.11
121-14-2	2,4-DNT	0.05	C	0.02
606-20-2	2,6-DNT	u		0.31
355-72-78-2	2-Am-4,6-DNT	1.70		0.03
1946-51-0	4-Am-2,6-DNT	3.34		0.06
618-87-1	3,5-Dinitroaniline	0.80		0.55

u Below Detection Limit
C: Result was unconfirmed due to matrix interference.

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	100	60-110	2.60

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 09 Mar. 95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water
Method: EPA Method 8330M (Nov 92)
Analyst: S. Schnitker

Date Extracted: 02 Mar 95
Date Analyzed: 07 Mar 95
Batch: 9503070918
Sequence: 9503070918A

RESULTS (µg/L)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	QC Limits	Conc MSD	%Rec MSD	RPD	QC Limits
HMX	u	5.20	4.48	86	60-110	4.06	78	10	25
RDX	u	5.20	3.93	76	60-110	3.11	60*	23	25
TNB	u	2.60	2.16	83	60-110	1.92	74	12	25
DNB	u	2.60	2.06	79	60-110	1.79	69	14	25
Tetryl	u	5.20	4.89	94	60-110	4.51	87	8	25
TNT	u	2.60	2.29	88	60-110	2.13	82	7	25
2,4-DNT	u	2.60	2.22	86	60-110	2.03	78	9	25

u: Below Detection Limit
MS: Matrix Spike
MSD: Matrix Spike Duplicate
%Rec: Percent of the spike recovered from the matrix
*: Recovery percentage out of acceptable quality control limits (before rounding)

RPD: Relative Percent Difference;

$$RPD = ((|MS - MSD|)/((MS + MSD)/2)) \times 100$$

Surrogate Standard	Recovery (%) MS	Recovery (%) MSD	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	97	81	60-110	2.60

Laboratory Comments:

Blank spike/blank spike duplicate samples were used in this report due to insufficient sample amount provided.

Approved By: David E. Spickard Date: 09 Mar. 95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: MRD Laboratory
Lot Number: MRD-9332
Analyst: S. Schnitker

Date Analyzed: 07 Mar 95
MRD Lab Code: EXP6
Batch: 9503070918
Sequence: 9503070918A

RESULTS (µg/L))

Analyte	Result	True Value	Acceptable Range	Detection Limit
HMX	u	u		1.00
RDX	u	u		0.84
TNB	u	u		0.26
DNB	3.37	5.00	3.00- 7.00	0.11
Tetryl	u	u		0.55
NT	9.84	10.00	6.00-14.00	0.11
2,4-DNT	5.91	7.50	4.50-10.50	0.02
2,6-DNT	u	u		0.31
2-Am-4,6-DNT	u	u		0.03

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L))
3,4-Dinitrotoluene	81	60-110	2.60

Laboratory Comments:

Approved By: David E. Spliethoff Date: 09 Mar 95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-001
MRD Lab Sample No: 950302-H001

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker

Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	u		2.20
121-82-4	RDX	0.32	J	1.00
99-35-4	1,3,5-TNB	u		0.25
99-65-0	1,3-DNB	u		0.25
479-45-8	Tetryl	u		0.65
118-96-7	2,4,6-TNT	u		0.25
121-14-2	2,4-DNT	u		0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	u		0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

u: Below Detection Limit
J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	87	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-002
MRD Lab Sample No: 950302-H009

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker

Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	4.14	2.20
121-82-4	RDX	10.01	1.00
99-35-4	1,3,5-TNB	u	0.25
99-65-0	1,3-DNB	u	0.25
479-45-8	Tetryl	u	0.65
118-96-7	2,4,6-TNT	0.55	0.25
121-14-2	2,4-DNT	u	0.25
606-20-2	2,6-DNT	u	0.26
355-72-78-2	2-Am-4,6-DNT	0.50	0.25
1946-51-0	4-Am-2,6-DNT	u	0.26
618-87-1	3,5-Dinitroaniline	u	0.65

u Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	98	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal S.S. Date: 22 Mar. 95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-003
MRD Lab Sample No: 950302-H012

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	u	2.20
121-82-4	RDX	2.10	1.00
99-35-4	1,3,5-TNB	u	0.25
99-65-0	1,3-DNB	u	0.25
479-45-8	Tetryl	u	0.65
118-96-7	2,4,6-TNT	u	0.25
121-14-2	2,4-DNT	u	0.25
606-20-2	2,6-DNT	u	0.26
355-72-78-2	2-Am-4,6-DNT	u	0.25
1946-51-0	4-Am-2,6-DNT	u	0.26
618-87-1	3,5-Dinitroaniline	u	0.65

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	90	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95
S.I.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-004
MRD Lab Sample No: 950302-H020

Date Sample Taken: 28 Feb 95
ate Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	u		2.20
121-82-4	RDX	0.92	J	1.00
99-35-4	1,3,5-TNB	u		0.25
99-65-0	1,3-DNB	u		0.25
479-45-8	Tetryl	u		0.65
118-96-7	2,4,6-TNT	1.47		0.25
121-14-2	2,4-DNT	u		0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	0.86		0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

u Below Detection Limit
J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	92	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar 95
S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-005
MRD Lab Sample No: 950302-H023

Date Sample Taken: 28 Feb 95
ate Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	u		2.20
121-82-4	RDX	0.28	J	1.00
99-35-4	1,3,5-TNB	u		0.25
99-65-0	1,3-DNB	u		0.25
479-45-8	Tetryl	u		0.65
118-96-7	2,4,6-TNT	u		0.25
121-14-2	2,4-DNT	u		0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	u		0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

: Below Detection Limit
: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	88	75-125	5.00

aboratory Comments:

less marked by "C," positive results were confirmed on a secondary column.

proved By: David E. Splichal Date: 22Mar.95
S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-001
MRD Lab Sample No: 950302-H025

Date Sample Taken: 28 Feb 95
ate Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	860		2.20
121-82-4	RDX	2950		1.00
99-35-4	1,3,5-TNB	134		0.25
99-65-0	1,3-DNB	4.82		0.25
479-45-8	Tetryl	0.0	P	0.65
118-96-7	2,4,6-TNT	9290		0.25
121-14-2	2,4-DNT	13.21	C	0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	u		0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

u Below Detection Limit
C: Result was unconfirmed due to matrix interference.
P· Unknown compound equivalent to 8.38 mg/kg as tetryl was detected.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	92	75-125	5.00

L oratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95

S.S

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-002
MRD Lab Sample No: 950302-H033

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	u	2.20
121-82-4	RDX	u	1.00
99-35-4	1,3,5-TNB	u	0.25
99-65-0	1,3-DNB	7.14	0.25
479-45-8	Tetryl	u	0.65
118-96-7	2,4,6-TNT	0.91	0.25
121-14-2	2,4-DNT	u	0.25
606-20-2	2,6-DNT	8.48	0.26
355-72-78-2	2-Am-4,6-DNT	u	0.25
1946-51-0	4-Am-2,6-DNT	u	0.26
618-87-1	3,5-Dinitroaniline	u	0.65

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	92	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95

SS.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-003
MRD Lab Sample No: 950302-H036

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	u		2.20
121-82-4	RDX	0.39	J	1.00
99-35-4	1,3,5-TNB	u		0.25
99-65-0	1,3-DNB	u		0.25
479-45-8	Tetryl	u		0.65
118-96-7	2,4,6-TNT	4.66		0.25
121-14-2	2,4-DNT	u		0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	u		0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

u Below Detection Limit
J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	93	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95
S.S

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-004
MRD Lab Sample No: 950302-H044

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	19.10	C	2.20
121-82-4	RDX	0.44	JC	1.00
99-35-4	1,3,5-TNB	0.31		0.25
99-65-0	1,3-DNB	u		0.25
479-45-8	Tetryl	u		0.65
118-96-7	2,4,6-TNT	41.25		0.25
121-14-2	2,4-DNT	u		0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	3.51	C	0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

u: Below Detection Limit
J: Estimated level was below the detection limit.
C: Result was unconfirmed due to matrix interference.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	93	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95

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DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-005
MRD Lab Sample No: 950302-H047

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Soil
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	1323		2.20
121-82-4	RDX	6909		1.00
99-35-4	1,3,5-TNB	196		0.25
99-65-0	1,3-DNB	21.75	C	0.25
479-45-8	Tetryl	28.34	C	0.65
118-96-7	2,4,6-TNT	37400		0.25
121-14-2	2,4-DNT	20.32	C	0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	u		0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

u: Below Detection Limit
C: Result was unconfirmed due to matrix interference.

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95

S.S.

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SD-8-001
MRD Lab Sample No: 950302-H049

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Sediment
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	7.68		2.20
121-82-4	RDX	0.44	J	1.00
99-35-4	1,3,5-TNB	0.20	J	0.25
99-65-0	1,3-DNB	u		0.25
479-45-8	Tetryl	u		0.65
118-96-7	2,4,6-TNT	9.17		0.25
121-14-2	2,4-DNT	u		0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	u		0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

u: Below Detection Limit
J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	101	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95

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DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SD-8-002
MRD Lab Sample No: 950302-H054

Date Sample Taken: 28 Feb 95
ate Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Sediment
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	2.14	J	2.20
121-82-4	RDX	u		1.00
99-35-4	1,3,5-TNB	u		0.25
99-65-0	1,3-DNB	u		0.25
479-45-8	Tetryl	u		0.65
118-96-7	2,4,6-TNT	1.93		0.25
121-14-2	2,4-DNT	u		0.25
606-20-2	2,6-DNT	u		0.26
355-72-78-2	2-Am-4,6-DNT	u		0.25
1946-51-0	4-Am-2,6-DNT	u		0.26
618-87-1	3,5-Dinitroaniline	u		0.65

u Below Detection Limit
J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	87	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95
S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SD-8-003
MRD Lab Sample No: 950302-H055

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Sediment
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	u	2.20
121-82-4	RDX	u	1.00
99-35-4	1,3,5-TNB	u	0.25
99-65-0	1,3-DNB	u	0.25
479-45-8	Tetryl	u	0.65
118-96-7	2,4,6-TNT	1.12	0.25
121-14-2	2,4-DNT	u	0.25
606-20-2	2,6-DNT	u	0.26
355-72-78-2	2-Am-4,6-DNT	u	0.25
1946-51-0	4-Am-2,6-DNT	u	0.26
618-87-1	3,5-Dinitroaniline	u	0.65

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	93	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95

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DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SD-8-004
MRD Lab Sample No: 950302-H061

Date Sample Taken: 28 Feb 95
ate Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Sediment
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	u	2.20
121-82-4	RDX	u	1.00
99-35-4	1,3,5-TNB	u	0.25
99-65-0	1,3-DNB	u	0.25
479-45-8	Tetryl	u	0.65
118-96-7	2,4,6-TNT	1.27	0.25
121-14-2	2,4-DNT	u	0.25
606-20-2	2,6-DNT	u	0.26
355-72-78-2	2-Am-4,6-DNT	u	0.25
1946-51-0	4-Am-2,6-DNT	u	0.26
618-87-1	3,5-Dinitroaniline	u	0.65

u Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	92	75-125	5.00

Laboratory Comments:

U less marked by "C," positive results were confirmed on a secondary column.

A proved By: David E. Splichal Date: 22 Mar 95

S S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SD-8-005
MRD Lab Sample No: 950302-H062

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95

Sample Description: Sediment
Sample Container: 1-4 oz glass
Dilution Factor: 1.0
Concentration Units: mg/kg

Analysis Method: EPA Method 8330
Analyst: S. Schnitker
Batch: 9503090757
Sequence: 9503090757A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	u	2.20
121-82-4	RDX	u	1.00
99-35-4	1,3,5-TNB	u	0.25
99-65-0	1,3-DNB	u	0.25
479-45-8	Tetryl	u	0.65
118-96-7	2,4,6-TNT	1.13	0.25
121-14-2	2,4-DNT	u	0.25
606-20-2	2,6-DNT	u	0.26
355-72-78-2	2-Am-4,6-DNT	u	0.25
1946-51-0	4-Am-2,6-DNT	u	0.26
618-87-1	3,5-Dinitroaniline	u	0.65

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	95	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 22 Mar. 95

S.S

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank

Sample Description: Soil
Method: EPA Method 8330
Analyst: S. Schnitker

Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95
Batch: 9503090757
Sequence: 9503090757A

RESULTS (mg/kg)

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	u	2.20
121-82-4	RDX	u	1.00
99-35-4	1,3,5-TNB	u	0.25
99-65-0	1,3-DNB	u	0.25
479-45-8	Tetryl	u	0.65
118-96-7	2,4,6-TNT	u	0.25
121-14-2	2,4-DNT	u	0.25
606-20-2	2,6-DNT	u	0.26
355-72-78-2	2-Am-4,6-DNT	u	0.25
1946-51-0	4-Am-2,6-DNT	u	0.26
618-87-1	3,5-Dinitroaniline	u	0.65

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	87	75-125	5.00

Laboratory Comments:

Approved By: David E. Splichal Date: 22 Mar. 95

SS

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Soil
MRD Lab Sample No.: 950302-H001
Client Sample No.: IAAP-SS-1-001
Method: EPA Method 8330
Analyst: S. Schnitker

Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95
Batch: 9503090757
Sequence: 9503090757A

RESULTS (mg/kg)

Analyte	Run #1	Run #2	RPD(*)	Acceptable RPD	Detection Limit
HMX	u	u		25	2.20
RDX	0.32 J	0.38 J	16	25	1.00
TNB	u	u		25	0.25
DNB	u	u		25	0.25
Tetryl	u	u		25	0.65
TNT	u	u		25	0.25
2,4-DNT	u	u		25	0.25
2,6-DNT	u	u		25	0.26
2-Am-4,6-DNT	u	u		25	0.25
4-Am-2,6-DNT	u	u		25	0.26
3,5-DNAniline	u	u		25	0.65

u: Below Detection Limit
*: Relative Percent Difference calculated from both sample and duplicate sample results. When a result is below the detection limit, RPD is not reported.
J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%) Run #1	Run #2	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	86	94	75-125	5.00

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column

Approved By: David E. Splichal Date: 22 Mar. 95
S. S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

ample Description: Soil
MRD Lab Sample No.: 950302-H001
Client Sample No.: IAAP-SS-1-001
Method: EPA Method 8330
Analyst: S. Schnitker

Date Dried: 01 Mar 95
Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95
Batch: 9503090757
Sequence: 9503090757A

RESULTS (mg/kg)

nalyte	Sample Result		Spike Added	Conc MS	%Rec MS	QC Limits	Conc MSD	%Rec MSD	RPD	QC Limits
HMX	u		2.00	2.12	106	75-125	2.19	110	3	25
RDX	0.32	J	2.00	2.22	95	75-125	2.47	107	10	25
TNB	u		1.00	.96	96	75-125	.97	97	0	25
DNB	u		1.00	.96	96	75-125	.96	96	1	25
ryl	u		2.00	2.05	102	60-110	2.08	104	1	25
NT	u		1.00	.97	97	75-125	.98	98	1	25
2,4-DNT	u		1.00	.95	95	75-125	.92	92	3	25

u: Below Detection Limit
MS: Matrix Spike
MSD: Matrix Spike Duplicate
Rec: Percent of the spike recovered from the matrix

RPD: Relative Percent Difference;

$$RPD = ((|MS - MSD|)/((MS + MSD)/2)) \times 100$$

J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%) MS	MSD	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	85	92	75-125	5.00

I boratory Comments:

A proved By: David E. Splichal Date: 22 Mar. 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank Spike

Sample Description: Soil
Method: EPA Method 8330
Analyst: S. Schnitker

Date Extracted: 07 Mar 95
Date Analyzed: 09 Mar 95
Batch: 9503090757
Sequence: 9503090757A

RESULTS (mg/kg)

Analyte	Spike Added	Conc MS	%Rec MS	QC Limits
HMX	2.00	2.04	102	60-110
RDX	2.00	1.90	95	60-110
TNB	1.00	.96	96	60-110
DNB	1.00	.97	97	60-110
Tetryl	2.00	2.16	108	60-110
TNT	1.00	.87	87	60-110
2,4-DNT	1.00	.95	95	60-110

MS: Method Blank Spike
%Rec: Percent of the spike recovered from the matrix

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	88	75-125	5.00

Laboratory Comments:

Approved By: David E. Splichal Date: 22 Mar. 95

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DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

ample Description: Soil
LCS Source: MRD Laboratory
Lot Number: MRD-93S11
Analyst: S. Schnitker

Date Analyzed: 09 Mar 95
MRD Lab Code: EXP5
Batch: 9503090757
Sequence: 9503090757A

RESULTS (mg/kg)

Analyte	Result	True Value	Acceptable Range	Detection Limit
HMX	u	u		2.20
RDX	u	u		1.00
TNB	u	u		0.25
DNB	u	u		0.25
Tetryl	u	u		0.65
NT	1.68	1.38	0.83- 1.93	0.25
2,4-DNT	u	u		0.25
2,6-DNT	u	u		0.26
2-Am-4,6-DNT	~~u~~ 0.21 J SS.	0.48	0.29- 0.67	0.25

u: Below Detection Limit
J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(mg/kg)
3,4-Dinitrotoluene	91	75-125	5.00

Laboratory Comments:

Approved By: David E. Splichal Date: 22 Mar. 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-001
MRD Lab Sample No: 950302-H003

Date Sample Taken: NA
Date Sample Received: 01 Mar 95
Date Dried: NA
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95

Sample Description: Tclp leachate
Sample Container: 1-same
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92)
Analyst: S. Schnitker
Batch: 9503080853
Sequence: 9503080853A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	0.63	J	1.00
121-82-4	RDX	1.36		0.84
99-35-4	1,3,5-TNB	u		0.26
99-65-0	1,3-DNB	u		0.11
479-45-8	Tetryl	u		0.55
118-96-7	2,4,6-TNT	0.56		0.11
121-14-2	2,4-DNT	u		0.02
606-20-2	2,6-DNT	u		0.31
355-72-78-2	2-Am-4,6-DNT	u		0.03
1946-51-0	4-Am-2,6-DNT	u		0.06
618-87-1	3,5-Dinitroaniline	u		0.55

u: Below Detection Limit
J: Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	105	60-110	2.60

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 20 Mar. 95
S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-002
MRD Lab Sample No: 950302-H011

Date Sample Taken:	NA	Sample Description:	Tclp leachate
Date Sample Received:	01 Mar 95	Sample Container:	1-same
Date Dried:	NA	Dilution Factor:	1.0
Date Extracted:	07 Mar 95	Concentration Units:	µg/L
Date Analyzed:	08 Mar 95		

Analysis Method: EPA Method 8330M (Nov 92) Batch: 9503080853
Analyst: S. Schnitker Sequence: 9503080853A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	47.14		1.00
121-82-4	RDX	58.93		0.84
99-35-4	1,3,5-TNB	u		0.26
99-65-0	1,3-DNB	u		0.11
479-45-8	Tetryl	u		0.55
118-96-7	2,4,6-TNT	0.18	C	0.11
121-14-2	2,4-DNT	u		0.02
606-20-2	2,6-DNT	u		0.31
355-72-78-2	2-Am-4,6-DNT	0.16		0.03
1946-51-0	4-Am-2,6-DNT	u		0.06
618-87-1	3,5-Dinitroaniline	u		0.55

u: Below Detection Limit
C: Result was unconfirmed due to matrix interference.

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	98	60-110	2.60

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 20 Mar. 95
S.S

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-003
MRD Lab Sample No: 950302-H014

Date Sample Taken: NA
Date Sample Received: 01 Mar 95
Date Dried: NA
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95

Sample Description: Tclp leachate
Sample Container: 1-same
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92) **Batch:** 9503080853
Analyst: S. Schnitker **Sequence:** 9503080853A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	10.88	1.00
121-82-4	RDX	62.83	0.84
99-35-4	1,3,5-TNB	u	0.26
99-65-0	1,3-DNB	u	0.11
479-45-8	Tetryl	u	0.55
118-96-7	2,4,6-TNT	u	0.11
121-14-2	2,4-DNT	u	0.02
606-20-2	2,6-DNT	u	0.31
355-72-78-2	2-Am-4,6-DNT	0.19	0.03
1946-51-0	4-Am-2,6-DNT	u	0.06
618-87-1	3,5-Dinitroaniline	u	0.55

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	100	60-110	2.60

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 20 Mar. 95
S. S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

'AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-1-004
MRD Lab Sample No: 950302-H022

Date Sample Taken: NA
ate Sample Received: 01 Mar 95
Date Dried: NA
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95

Sample Description: Tclp leachate
Sample Container: 1-same
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92) **Batch:** 9503080853
Analyst: S. Schnitker **Sequence:** 9503080853A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	0.48	J	1.00
121-82-4	RDX	3.48		0.84
99-35-4	1,3,5-TNB	0.38		0.26
99-65-0	1,3-DNB	u		0.11
479-45-8	Tetryl	u		0.55
118-96-7	2,4,6-TNT	11.06		0.11
121-14-2	2,4-DNT	u		0.02
606-20-2	2,6-DNT	u		0.31
355-72-78-2	2-Am-4,6-DNT	u		0.03
1946-51-0	4-Am-2,6-DNT	u		0.06
618-87-1	3,5-Dinitroaniline	u		0.55

u : Below Detection Limit
J : Estimated level was below the detection limit.

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	96	60-110	2.60

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 20 Mar. 95
S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-001
MRD Lab Sample No: 950302-H027

Date Sample Taken: NA
Date Sample Received: 01 Mar 95
Date Dried: NA
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95
Sample Description: Tclp leachate
Sample Container: 1-same
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92) **Batch:** 9503080853
Analyst: S. Schnitker **Sequence:** 9503080853A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	1244		1.00
121-82-4	RDX	3986		0.84
99-35-4	1,3,5-TNB	1790		0.26
99-65-0	1,3-DNB	150		0.11
479-45-8	Tetryl	u		0.55
118-96-7	2,4,6-TNT	53000		0.11
121-14-2	2,4-DNT	u		0.02
606-20-2	2,6-DNT	341	C	0.31
355-72-78-2	2-Am-4,6-DNT	u		0.03
1946-51-0	4-Am-2,6-DNT	u		0.06
618-87-1	3,5-Dinitroaniline	u		0.55

u: Below Detection Limit
C: Result was unconfirmed due to matrix interference.

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Spliethoff Date: 20 Mar. 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-002
MRD Lab Sample No: 950302-H035

Date Sample Taken: NA
ate Sample Received: 01 Mar 95
Date Dried: NA
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95

Sample Description: Tclp leachate
Sample Container: 1-same
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92) **Batch:** 9503080853
Analyst: S. Schnitker **Sequence:** 9503080853A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	3.65	1.00
121-82-4	RDX	2.46	0.84
99-35-4	1,3,5-TNB	u	0.26
99-65-0	1,3-DNB	u	0.11
479-45-8	Tetryl	u	0.55
118-96-7	2,4,6-TNT	0.99	0.11
121-14-2	2,4-DNT	u	0.02
606-20-2	2,6-DNT	u	0.31
355-72-78-2	2-Am-4,6-DNT	u	0.03
1946-51-0	4-Am-2,6-DNT	u	0.06
618-87-1	3,5-Dinitroaniline	u	0.55

u Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	93	60-110	2.60

Laboratory Comments:

U less marked by "C," positive results were confirmed on a secondary column.

proved By: David E. Splichal Date: 20 Mar. 95
S. S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-003
MRD Lab Sample No: 950302-H038

Date Sample Taken: NA
Date Sample Received: 01 Mar 95
Date Dried: NA
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95

Sample Description: Tclp leachate
Sample Container: 1-same
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92) **Batch:** 9503080853
Analyst: S. Schnitker **Sequence:** 9503080853A

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	3.97	1.00
121-82-4	RDX	13.12	0.84
99-35-4	1,3,5-TNB	u	0.26
99-65-0	1,3-DNB	u	0.11
479-45-8	Tetryl	u	0.55
118-96-7	2,4,6-TNT	31.48	0.11
121-14-2	2,4-DNT	0.37	0.02
606-20-2	2,6-DNT	1.08	0.31
355-72-78-2	2-Am-4,6-DNT	3.86	0.03
1946-51-0	4-Am-2,6-DNT	u	0.06
618-87-1	3,5-Dinitroaniline	u	0.55

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	100	60-110	2.60

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Spliethoff Date: 20 Mar. 95
S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Customer Sample No: IAAP-SS-8-004
MRD Lab Sample No: 950302-H046

Date Sample Taken: NA
ate Sample Received: 01 Mar 95
Date Dried: NA
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95

Sample Description: Tclp leachate
Sample Container: 1-same
Dilution Factor: 1.0
Concentration Units: µg/L

Analysis Method: EPA Method 8330M (Nov 92) **Batch:** 9503080853
Analyst: S. Schnitker **Sequence:** 9503080853A

CAS Number	Compound Name	Result		Det Limit
2691-41-0	HMX	628		1.00
121-82-4	RDX	69.72		0.84
99-35-4	1,3,5-TNB	6.15		0.26
99-65-0	1,3-DNB	0.53		0.11
479-45-8	Tetryl	u		0.55
118-96-7	2,4,6-TNT	5800		0.11
121-14-2	2,4-DNT	2.07	C	0.02
606-20-2	2,6-DNT	4.26	C	0.31
355-72-78-2	2-Am-4,6-DNT	115		0.03
1946-51-0	4-Am-2,6-DNT	u		0.06
618-87-1	3,5-Dinitroaniline	u		0.55

u Below Detection Limit
C. Result was unconfirmed due to matrix interference.

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column.

Approved By: David E. Splichal Date: 20 Mar. 95
S.S.

Project: Iowa AAP - Line 1 & 800 (2/95)
FAMIS No.: 3183

NARRATIVE FOR TCLP EXPLOSIVES

Batch 950308053

For these samples, the following sequence of events occurred:

Date Sampled: 28 February 1995

Date Received: 01 March 1995

Date TCLP Extraction Started: 03 March 1995

Date TCLP Extract Prepared: 07 March 1995

Date Analyzed: 08 March 1995

Approved by: David E. Splichal Date: 20 Mar. 95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank

ample Description: Tclp leachate
Method: EPA Method 8330M (Nov 92)
Analyst: S. Schnitker

Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95
Batch: 9503080853
Sequence: 9503080853A

RESULTS (µg/L)

CAS Number	Compound Name	Result	Det Limit
2691-41-0	HMX	u	1.00
121-82-4	RDX	u	0.84
99-35-4	1,3,5-TNB	u	0.26
99-65-0	1,3-DNB	u	0.11
479-45-8	Tetryl	u	0.55
118-96-7	2,4,6-TNT	u	0.11
121-14-2	2,4-DNT	u	0.02
606-20-2	2,6-DNT	u	0.31
355-72-78-2	2-Am-4,6-DNT	u	0.03
1946-51-0	4-Am-2,6-DNT	u	0.06
618-87-1	3,5-Dinitroaniline	u	0.55

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	100	60-110	2.60

Laboratory Comments:

Approved By: David E. Splichal Date: 20 Mar 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Tclp leachate
MRD Lab Sample No.: 950302-H014
Client Sample No.: IAAP-SS-1-003
Method: EPA Method 8330M (Nov 92)
Analyst: S. Schnitker

Date Dried:
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95
Batch: 9503080853
Sequence: 9503080853A

RESULTS (µg/L)

Analyte	Run #1	Run #2	RPD(*)	Acceptable RPD	Detection Limit
HMX	10.88	8.26	27*	25	1.00
RDX	62.83	57.76	8	25	0.84
TNB	u	u		25	0.26
DNB	u	u		25	0.11
Tetryl	u	u		25	0.55
TNT	u	u		25	0.11
2,4-DNT	u	u		25	0.02
2,6-DNT	u	u		25	0.31
2-Am-4,6-DNT	0.19	0.17	11	25	0.03
4-Am-2,6-DNT	u	u		25	0.06
3,5-DNAniline	u	u		25	0.55

u: Below Detection Limit
*: Relative Percent Difference calculated from both sample and duplicate sample results. When a result is below the detection limit, RPD is not reported.

Surrogate Standard	Recovery (%) Run #1	Run #2	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	100	99	60-110	2.60

Laboratory Comments:

Unless marked by "C," positive results were confirmed on a secondary column

Approved By: David E. Splichal Date: 20 Mar. 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

ample Description: Tclp leachate
MRD Lab Sample No.: 950302-H014
Client Sample No.: IAAP-SS-1-003
Method: EPA Method 8330M (Nov 92)
Analyst: S. Schnitker

Date Dried: N/A
Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95
Batch: 9503080853
Sequence: 9503080853A

RESULTS (µg/L)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	QC Limits	Conc MSD	%Rec MSD	RPD	QC Limits
HMX	10.88	(≠) 5.20	10.82	-1*	75-125	15.19	83	34+	25
RDX	62.83	(≠) 5.20	53.15	****	75-125	87.66	477*	49+	25
NB	u	2.60	2.55	98	75-125	2.50	96	2	25
DNB	u	2.60	2.32	88	75-125	2.35	89	1	25
ryl	u	5.20	5.10	98	60-110	5.06	97	1	25
	u	2.60	3.30	127*	75-125	3.09	119	7	25
2,4-DNT	u	2.60	2.46	95	75-125	2.40	92	2	25

u: Below Detection Limit
MS: Matrix Spike
MSD: Matrix Spike Duplicate
%Rec: Percent of the spike recovered from the matrix
*: Recovery percentage out of acceptable quality control limits.
+: RPD above acceptance limit.

RPD: Relative Percent Difference;

$$RPD = ((|MS - MSD|)/((MS + MSD)/2)) \times 100$$

Surrogate Standard	Recovery (%) MS	Recovery (%) MSD	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	101	100	60-110	2.60

Laboratory Comments:
(≠) Spike amount low vs. amount found in the actual Sample resulting in meaningless QC data provided.

Approved By: David E. Splichal Date: 20 Mar. 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank Spike

Sample Description: Tclp leachate
Method: EPA Method 8330M (Nov 92)
Analyst: S. Schnitker

Date Extracted: 07 Mar 95
Date Analyzed: 08 Mar 95
Batch: 9503080853
Sequence: 9503080853A

RESULTS (µg/L)

Analyte	Spike Added	Conc MS	%Rec MS	QC Limits
HMX	5.20	4.78	92	60-110
RDX	5.20	4.81	93	60-110
TNB	2.60	2.34	90	60-110
DNB	2.60	2.28	88	60-110
Tetryl	5.20	4.90	94	60-110
TNT	2.60	2.58	99	60-110
2,4-DNT	2.60	2.44	94	60-110

MS: Method Blank Spike
%Rec: Percent of the spike recovered from the matrix

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L)
3,4-Dinitrotoluene	102	60-110	2.60

Laboratory Comments:

Approved By: David E. Splichal Date: 20 Mar. 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Explosives

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Tclp leachate
LCS Source: MRD Laboratory
Lot Number: MRD-9332
Analyst: S. Schnitker

Date Analyzed: 08 Mar 95
MRD Lab Code: EXP6
Batch: 9503080853
Sequence: 9503080853A

RESULTS (µg/L))

Analyte	Result	True Value	Acceptable Range	Detection Limit
HMX	u	u		1.00
RDX	u	u		0.84
TNB	u	u		0.26
DNB	4.42	5.00	3.00- 7.00	0.11
Tetryl	u	u		0.55
TNT	12.55	10.00	6.00-14.00	0.11
2,4-DNT	6.82	7.50	4.50-10.50	0.02
2,6-DNT	u	u		0.31
2-Am-4,6-DNT	u	u		0.03

u: Below Detection Limit

Surrogate Standard	Recovery (%)	Acceptable	Spike(µg/L))
3,4-Dinitrotoluene	96	60-110	2.60

Laboratory Comments:

Approved By: David E. Spickard Date: 20 Mar. 95

S.S.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
Sample Container: 1-8 oz glass
MRD Lab Sample No.: 950302-H004
Client Sample No.: IAAP-SS-1-001
Analysis Method: EPA-9012A
Analyzed By: Conrad German

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Distilled: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503141122A

RESULTS (mg/kg)

Analysis	Result	Detection Limit
Total Cyanide	u	0.500

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3-20-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description:	Soil	**Date Sample Taken:**	28 Feb 95
Sample Container:	1-8 oz glass	**Date Sample Received:**	01 Mar 95
MRD Lab Sample No.:	950302-H015	**Date Distilled:**	13 Mar 95
Client Sample No.:	IAAP-SS-1-003	**Date Analyzed:**	14 Mar 95
Analysis Method:	EPA-9012A	**Dilution Factor:**	1.0
Analyzed By:	Conrad German	**Batch:**	9503141122A

RESULTS (mg/kg)

Analysis	Result	Detection Limit
Total Cyanide	u	0.500

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description:	Soil	**Date Sample Taken:**	28 Feb 95
Sample Container:	1-8 oz glass	**Date Sample Received:**	01 Mar 95
MRD Lab Sample No.:	950302-H028	**Date Distilled:**	13 Mar 95
Client Sample No.:	IAAP-SS-8-001	**Date Analyzed:**	14 Mar 95
Analysis Method:	EPA-9012A	**Dilution Factor:**	10.0
Analyzed By:	Conrad German	**Batch:**	9503141122A

RESULTS (mg/kg)

Analysis	Result	Detection Limit
Total Cyanide	54.000	5.000

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
Sample Container: 1-8 oz glass
MRD Lab Sample No.: 950302-H043
Client Sample No.: IAAP-SS-8-004
Analysis Method: EPA-9012A
Analyzed By: Conrad German

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Distilled: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503141122A

RESULTS (mg/kg)

Analysis	Result	Detection Limit
Total Cyanide	u	0.500

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3-20-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description:	Sediment	**Date Sample Taken:**	28 Feb 95
Sample Container:	1-8 oz glass	**Date Sample Received:**	01 Mar 95
MRD Lab Sample No.:	950302-H056	**Date Distilled:**	13 Mar 95
Client Sample No.:	IAAP-SD-8-003	**Date Analyzed:**	14 Mar 95
Analysis Method:	EPA-9012A	**Dilution Factor:**	1.0
Analyzed By:	Conrad German	**Batch:**	9503141122A

RESULTS (mg/kg)

Analysis	Result	Detection Limit
Total Cyanide	0.540	0.500

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description:	Sediment	**Date Sample Taken:**	28 Feb 95
Sample Container:	1-8 oz glass	**Date Sample Received:**	01 Mar 95
MRD Lab Sample No.:	950302-H059	**Date Distilled:**	13 Mar 95
Client Sample No.:	IAAP-SD-8-004	**Date Analyzed:**	14 Mar 95
Analysis Method:	EPA-9012A	**Dilution Factor:**	1.0
Analyzed By:	Conrad German	**Batch:**	9503141122A

RESULTS (mg/kg)

Analysis	Result	Detection Limit
Total Cyanide	0.530	0.500

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank

Sample Description: Soil
Analysis Method: EPA-9012A
Analyzed By: Conrad German

Date Distilled: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503141122A

RESULTS (mg/kg)

Analysis	Result	Detection Limit
Total Cyanide	u	0.500

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Soil
Sample Container: 1-8 oz glass
MRD Lab Sample No.: 950302-H043
Client Sample No.: IAAP-SS-8-004
Analysis Method: EPA-9012A
Distilled By: Conrad German
Analyzed By: Conrad German

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Distilled: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503141122A

RESULTS (mg/kg)

Analysis	Run #1	Run #2	RPD	Acceptable RPD	Detection Limit
Cyanide	u	u	NC	25	0.500

RPD: (|Run 1 - Run 2| x 100)/([Run 1 + Run 2] / 2)
u: Below Detection Limit
NC: Not Calculable

Laboratory Comments:

Approved By: Prem N. Arora Date: 3-20-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike/Matrix Spike Duplicate

Sample Description: Soil
Client Sample No.: IAAP-SS-8-004
Analysis Method: EPA-9012A
Distilled By: Conrad German
Analyzed By: Conrad German

MRD Lab Sample No.: 950302-H043
Date Distilled: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503141122A

RESULTS (mg/kg)

Test	Sample Result	Spike Added	Conc MS	%Rec MS	Spike Added	Conc MSD	%Rec MSD	RPD	QC Limits RPD	QC Limits %Rec
CN	u	2.730	3.060	112	2.730	3.150	115	3	25	75-125

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Cyanide

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: HIGH-PURITY
Lot Number: 490120
Analysis Method: EPA-9012A
Analyzed By: Conrad German

MRD Lab Code: CN1
Expiration Date: 30 Apr 95
Date Distilled: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503141122A

RESULTS (mg/L)

Analysis	Sample Result	True Value	Percent Recovery	Detection Limit
Total CN	0.197	0.200	99	0.010

Laboratory Comments:

Approved By: Prem N. Arora Date: 3-20-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H067
Client Sample No.: IAAP-W-8-001
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (μg/L)

Analyte	Result	Method Det Limit
Sb	u	50
Be	u	2
Cd	u	4
Cr	5	5
Cu	7	5
Ni	u	10
Ag	u	5
Tl	u	100
Zn	10	4

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem.N. Arora Date: 3.16.95
TCS

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H067
Client Sample No.: IAAP-W-8-001
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Batch Id: 9503070800

RESULTS (µg/L)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	3	2	07 Mar 95	950307125321
Lead	(Pb)	7421	u	2	08 Mar 95	950307125321
Selenium	(Se)	7740	u	2	08 Mar 95	950308114011

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora AMH Date: 3-15-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H067
Client Sample No.: IAAP-W-8-001
Method: EPA Method 7470
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503140830A

RESULTS (µg/L)

Analyte	Result	Det Limit
Hg	u	0.20

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.22.95

DESG

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H071
Client Sample No.: IAAP-W-8-003
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Result	Method Det Limit
Sb	u	50
Be	u	2
Cd	u	4
Cr	6	5
Cu	8	5
Ni	u	10
Ag	u	5
Tl	u	100
Zn	13	4

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem N. Misra Date: 3.16.95

TCS

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Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H071
Client Sample No.: IAAP-W-8-003
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Batch Id: 9503070800

RESULTS (µg/L)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	2	2	07 Mar 95	950307125321
Lead	(Pb)	7421	u	2	08 Mar 95	950307125321
Selenium	(Se)	7740	u	2	08 Mar 95	950308114011

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora
AMH

Date: 3.15.95

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Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H071
Client Sample No.: IAAP-W-8-003
Method: EPA Method 7470
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503140830A

RESULTS (µg/L)

Analyte	Result	Det Limit
Hg	u	0.20

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora DESA Date: 3.22.95

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Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H075
Client Sample No.: IAAP-W-8-005
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Result	Method Det Limit
Sb	u	50
Be	u	2
Cd	u	4
Cr	5	5
Cu	7	5
Ni	u	10
Ag	u	5
Tl	u	100
Zn	10	4

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem N. Brar Date: 3.16.95

TLS

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Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H075
Client Sample No.: IAAP-W-8-005
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Batch Id: 9503070800

RESULTS (µg/L)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	2	2	07 Mar 95	950307125321
Lead	(Pb)	7421	u	2	08 Mar 95	950307125321
Selenium	(Se)	7740	u	2	08 Mar 95	950308114011

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora AMH Date: 3.15.95

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Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H075
Client Sample No.: IAAP-W-8-005
Method: EPA Method 7470
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503140830A

RESULTS (µg/L)

Analyte	Result	Det Limit
Hg	u	0.20

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora DESA Date: 3.22.95

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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank

Sample Description: Water
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Result	Det Limit
Sb	u	50
Be	u	2
Cd	u	4
Cr	u	5
Cu	u	5
Ni	u	10
Ag	u	5
Tl	u	100
Zn	u	4

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.16.95

TCS

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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Water
MRD Lab Sample No.: 950310-H077
Client Sample No.: Batch Specific
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 09 Mar 95
Date Sample Received: 10 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Sample Result	Duplicate Result	RPD	Method Detection Limit
Sb	u	u	NC	50
Be	u	u	NC	2
Cd	u	u	NC	4
Cr	u	u	NC	5
Cu	u	u	NC	5
Ni	u	u	NC	10
Ag	u	u	NC	5
Tl	u	u	NC	100
Zn	6	4	40.0 *	4

u: Below Method Detection Limit (MDL)
NC: Not Calculable
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

Laboratory Comments:

Approved By: Preston Brown Date: 3.16.95

TCS

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Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

ample Description: Water
MRD Lab Sample No.: 950310-H077
Client Sample No.: Batch Specific
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 09 Mar 95
Date Sample Received: 10 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

nalyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
Sb	u	500	532	106	539	108	1.3
Be	u	50	52	104	51	102	1.9
Cd	u	50	53	106	53	106	0.0
	u	200	218	109	217	109	.5
J	u	250	260	104	258	103	.8
Ni	u	500	544	109	542	108	.4
Ag	u	50	50	100	52	104	3.9
Tl	u	2000	2140	107	2170	109	1.4
Zn	6	500	542	107	539	107	.6

u: Below Method Detection Limit (MDL)
Rec Control Limit: 75-125
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

I boratory Comments:

Approved By: Prem N. Arora Date: 3.16.95

TCS

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Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: VHG Labs, Inc.
Lot Number: 500022E,500022F,401300E
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Analyzed: 14 Mar 95
MRD Lab Code: ICPW5
Expiration Date: 30 Jan 96
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Result	True Value	%Rec	Method Detection Limit
Sb	2170	2000	109	50
Be	872	800	109	2
Cd	1090	1000	109	4
Cr	2270	2000	114	5
Cu	2100	2000	105	5
Ni	2280	2000	114	10
Ag	417	400	104	5
Tl	2150	2000	108	100
Zn	2200	2000	110	4

u: Below Method Detection Limit (MDL)
NC: Not Calculable
%REC Control Limit: 75 to 125

Laboratory Comments:

Approved By: Prem N. Brar Date: 3-16-95

TLS

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Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank

ample Description: Water **Batch Id:** 9503070800
Analyst: A. Hindemith

RESULTS (µg/L)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	u	2	07 Mar 95	950307125321
Lead	(Pb)	7421	u	2	08 Mar 95	950307125321
Selenium	(Se)	7740	u	2	08 Mar 95	950308114011

u: Below Detection Limit

oratory Comments:

Approved By: Prem N. Arora Date: 3.15.95
AMH

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Water
MRD Lab Sample No.: 950223-H021
Client Sample No.: Batch Specific
Analyst: A. Hindemith

Date Sample Taken: 21 Feb 95
Date Sample Received: 22 Feb 95
Date Digested: 07 Mar 95
Batch Id: 9503070800

RESULTS (µg/L)

Analyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed	Sequence Identifier
As	7060	114	113	0.9	2	07 Mar 95	950307125321
Pb	7421	149	148	0.7	2	08 Mar 95	950307125321
Se	7740	116	116	0.0	2	08 Mar 95	950308114011

u: Below Detection Limit
NC: Not Calculable
Control Limits: ± 20 (for >5X CRDL)

Laboratory Comments:

Approved By: Prem N. Mora AMH Date: 3.15.95

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Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water
MRD Lab Sample No.: 950223-H021
Client Sample No.: Batch Specific
Analyst: A. Hindemith

Date Sample Taken: 21 Feb 95
Date Sample Received: 22 Feb 95
Date Digested: 07 Mar 95
Batch Id: 9503070800

RESULTS (µg/L)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
As	114	20	135	105	134	100	0.7
Pb	149	20	165	80	164	75	0.6
Se	116	20	140	120	138	110	1.4

u: Below Detection Limit
ec: Percent of the spike recovered from the matrix
trol Limits: 75-125 (if [spike added] > [sample]/4)

Analyte		EPA Method	Detection Limit	Analysis Date MS	Analysis Date MSD	Sequence Identifier
Arsenic	(As)	7060	2	07 Mar 95	07 Mar 95	950307125321
Lead	(Pb)	7421	2	08 Mar 95	08 Mar 95	950307125321
Selenium	(Se)	7740	2	08 Mar 95	08 Mar 95	950308114011

aboratory Comments:

Approved By: Prem N. Brar (ANH) Date: 3.15.95

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: VHG Labs, Inc.
Lot Number: 400723D 400723E
Analyst: A. Hindemith

MRD Lab Code: PEGF3
Expiration Date: 30 Apr 95
Batch Id: 9503070800

RESULTS (µg/L)

Analyte	EPA Method	True Value	Result	%Rec	Detection Limit	Date Analyzed	Sequence Identifier
As	7060	20	20	100	2	07 Mar 95	950307125321
Pb	7421	20	23	115	2	08 Mar 95	950307125321
Se	7740	20	21	105	2	08 Mar 95	950308114011

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.15.95
AMH

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank

ample Description: Water
Method: EPA Method 7470
Analyst: T. Shannon

Date Analyzed: 14 Mar 95
Batch: 9503140830A

RESULTS (µg/L)

Analyte	Result	Det Limit
Hg	u	0.20

u: Below Detection Limit

aboratory Comments:

pproved By: Prem. N. Arora DESA

Date: 3.22.95

DEPARTMENT OF THE ARMY
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Division Laboratory
Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Water
MRD Lab Sample No.: 950312-H034
Client Sample No.: Batch Specific
Method: EPA Method 7470
Analyst: T. Shannon

Date Sample Taken: 10 Mar 95
Date Sample Received: 11 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503140830A

RESULTS (µg/L)

Analyte	Sample Result	Duplicate Result	RPD	Detection Limit
Hg	u	u	NC	0.20

u: Below Detection Limit
NC: Not Calculable

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.22.95

DESB

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water
MRD Lab Sample No.: 950312-H034
Client Sample No.: Batch Specific
Method: EPA Method 7470
Analyst: T. Shannon

Date Sample Taken: 10 Mar 95
Date Sample Received: 11 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Dilution Factor: 1.0
Batch: 9503140830A

RESULTS (µg/L)

Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
u	1.00	1.00	100	1.00	100	0.0

u: Below Detection Limit
ec: Percent of the spike recovered from the matrix
crol Limits: 75-125 (if [spike added] > [sample]/4)

aboratory Comments:

Approved By: Prem N. Arora Date: 3.22.95
DESA

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: Fisher Scientific
Lot Number: 936694A-24
Method: EPA Method 7470
Analyst: T. Shannon

Date Analyzed: 14 Mar 95
MRD Lab Code: HG8
Expiration Date: 31 Dec 95
Batch: 9503140830A

RESULTS (µg/L)

Analyte	Result	True Value	%Rec	Detection Limit
Hg	0.96	1.00	96	0.20

Laboratory Comments:

Approved By: Prem. N. Arora DESA Date: 3.22.95

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Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
RD Lab Sample No.: 950302-H068
Client Sample No.: IAAP-W-8-002
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Result	Method Det Limit
Ca	15100	100
Fe	642	10
Mg	5390	50
Mn	61	4
K	2640	800
Na	7680	100

u: Below Method Detection Limit (MDL)

Hardness	60	7 (mg equivalent CaCO3/L)

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.21.95

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H072
Client Sample No.: IAAP-W-8-004
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Result	Method Det Limit
Ca	14700	100
Fe	602	10
Mg	5280	50
Mn	55	4
K	2600	800
Na	7440	100

u: Below Method Detection Limit (MDL)

Hardness	59	7 (mg equivalent CaCO3/L)

Laboratory Comments:

Approved By: Prem. N. Amra Date: 3.21.95

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Missouri River Division, Corps of Engineers
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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank

ample Description: Water
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Result	Det Limit
Ca	115	100
Fe	u	10
Mg	u	50
Mn	u	4
K	u	800
Na	u	100

u: Below Detection Limit

Hardness	u	7	(mg equivalent CaCO3/L)

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.21.95

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Missouri River Division, Corps of Engineers
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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Matrix Duplicate

Sample Description: Water
MRD Lab Sample No.: 950310-H077
Client Sample No.: Batch Specific
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 09 Mar 95
Date Sample Received: 10 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Sample Result	Duplicate Result	RPD	Method Detection Limit
Ca	91400	91900	.5	100
Fe	141	157	10.7	10
Mg	13500	13600	.7	50
Mn	48	49	2.1	4
K	3200	3090	3.5	800
Na	27400	27500	.4	100

u: Below Method Detection Limit (MDL)
NC: Not Calculable
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

Hardness	284	285	.4	7

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.21.95

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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

ample Description: Water
RD Lab Sample No.: 950310-H077
Client Sample No.: Batch Specific
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Sample Taken: 09 Mar 95
Date Sample Received: 10 Mar 95
Date Digested: 13 Mar 95
Date Analyzed: 14 Mar 95
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

nalyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
Fe	141	1000	1190	105	1190	105	0.0
Mn	48	500	578	106	576	106	.3

u: Below Method Detection Limit (MDL)
.ec Control Limit: 75-125
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

aboratory Comments:

Approved By: Prem. N. Arora Date: 3.21.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
LCS Source: VHG Labs, Inc.
Lot Number: 500022E,500022F,401300E
Method: EPA Method 3005/6010
Analyst: T. Shannon

Date Analyzed: 14 Mar 95
MRD Lab Code: ICPW5
Expiration Date: 30 Jan 96
Batch: 9503140534
Sequence: 9503141114

RESULTS (µg/L)

Analyte	Result	True Value	%Rec	Method Detection Limit
Ca	21200	20000	106	100
Fe	2150	2000	108	10
Mg	20200	20000	101	50
Mn	2180	2000	109	4
K	21300	20000	107	800
Na	19900	20000	100	100

u: Below Method Detection Limit (MDL)
NC: Not Calculable
%REC Control Limit: 75 to 125

Laboratory Comments:

Approved By: Preman. Arora Date: 3.21.95

DEPARTMENT OF THE ARMY
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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
IRD Lab Sample No.: 950302-H006
Client Sample No.: IAAP-SS-1-001
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150557

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	25	1
Cu	11	1
Pb	16	3
Ni	11	2
Ag	2	1
Tl	u	15
Zn	46	1

ercent Solids: 71.7

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.20.95

-TCS

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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Method Blank

Sample Description: Soil
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150557

RESULTS (mg/kg)

Analyte	Result	Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	u	1
Cu	u	1
Pb	u	3
Ni	u	2
Ag	u	1
Tl	u	15
Zn	u	1

u: Below Detection Limit

Laboratory Comments:

Approved By: Brian N. Arora Date: 3.20.95

TCS

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Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Matrix Duplicate

ample Description: Soil
RD Lab Sample No.: 950224-H007
Client Sample No.: Batch Specific
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 15 Feb 95
Date Sample Received: 23 Feb 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150557

RESULTS (mg/kg)

Analyte	Sample Result	Duplicate Result	RPD	Method Detection Limit
Sb	u	u	NC	10
Be	u	u	NC	1
Cd	u	u	NC	1
Cr	5	5	0.0	1
Cu	3	3	0.0	1
Pb	5	6	18.2	3
Ni	9	9	0.0	2
Ag	u	u	NC	1
Tl	u	u	NC	15
Zn	17	15	12.5	1

u: Below Method Detection Limit (MDL)
NC: Not Calculable
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.20.95

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Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Soil
MRD Lab Sample No.: 950224-H007
Client Sample No.: Batch Specific
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 15 Feb 95
Date Sample Received: 23 Feb 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150557

RESULTS (mg/kg)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
Sb	u	200	111	55*	107	54*	3.7
Be	u	20	20	100	21	105	4.9
Cd	u	20	19	95	19	95	0.0
Cr	5	80	89	105	92	109	3.3
Cu	3	100	100	97	102	99	2.0
Pb	5	200	196	96	201	98	2.5
Ni	9	200	207	99	211	101	1.9
Ag	u	20	17	85	18	90	5.7
Tl	u	800	778	97	794	99	2.0
Zn	17	200	210	97	217	100	3.3

u: Below Method Detection Limit (MDL)
%Rec Control Limit: 75-125
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

Laboratory Comments: * The percent recovery of Antimony is low for this set of samples. This poor recovery may be due to the matrix problem/interference, not the digestion process. The Laboratory Control Sample recoveries are within laboratory acceptance limits. MS was repeated and similar results were obtained.

Approved By: Peggy N. Arne Date: 3.20.95

TCS

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Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Laboratory Control Sample (LCS)

ample Description: Soil
LCS Source: VHG Labs, Inc.
Lot Number: 500022E,500022F,401300E
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Analyzed: 15 Mar 95
MRD Lab Code: ICPS5
Expiration Date: 30 Jan 96
Batch: 9503150557
Sequence: 9503150557

RESULTS (mg/kg)

Analyte	Result	True Value	%Rec	Method Detection Limit
Sb	194	200	97	10
Be	80	80	100	1
Cd	95	100	95	1
Cr	204	200	102	1
Cu	193	200	97	1
Pb	194	200	97	3
Ni	200	200	100	2
Ag	36	40	90	1
Tl	192	200	96	15
Zn	193	200	97	1

u: Below Method Detection Limit (MDL)
NC: Not Calculable
%REC Control Limit: 75 to 125

Laboratory Comments:

Approved By: Prem. N. Amin Date: 3-20-95

TCS

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Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H006
Client Sample No.: IAAP-SS-1-001
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	4.6	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	0.6	0.5	10 Mar 95	950310132911

Percent Solids: 71.7

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora
AMH

Date: 3.15.95

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Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description:	Soil	**Date Sample Taken:**	28 Feb 95
MRD Lab Sample No.:	950302-H006	**Date Sample Received:**	01 Mar 95
Client Sample No.:	IAAP-SS-1-001	**Date Digested:**	08 Mar 95
Method:	EPA Method 7471	**Date Analyzed:**	08 Mar 95
Analyst:	T. Shannon	**Dilution Factor:**	1.0
		Batch:	9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.05	0.04

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.14.95
DESA

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Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H007
Client Sample No.: IAAP-SS-1-002
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	20	1
Cu	12	1
Pb	19	3
Ni	12	2
Ag	u	1
Tl	u	15
Zn	46	1

Percent Solids: 72.7

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem N. Arora Date: 3-20-95

TLS

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Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

ample Description: Soil
RD Lab Sample No.: 950302-H007
Client Sample No.: IAAP-SS-1-002
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	5.3	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	u	0.5	10 Mar 95	950310132911

ercent Solids: 72.7

u: Below Detection Limit

Laboratory Comments:

pproved By: Preman. Arora Date: 3.15.95
AMH

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Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H007
Client Sample No.: IAAP-SS-1-002
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.06	0.04

Laboratory Comments:

Approved By: Prem N. Brar DESA Date: 3.14.95

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Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
IRD Lab Sample No.: 950302-H017
Client Sample No.: IAAP-SS-1-003
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	14	1
Cu	16	1
Ni	21	2
Ag	u	1
Tl	u	15
Zn	39	1

Percent Solids: 84.3

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.20.95

TCS

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Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H017
Client Sample No.: IAAP-SS-1-003
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	7.5	0.5	10 Mar 95	950309122321
Lead	(Pb)	7421	7.6	0.5	09 Mar 95	950309122321
Selenium	(Se)	7740	u	0.5	10 Mar 95	950310132911

Percent Solids: 84.3

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora AMH Date: 3.15.95

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Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H017
Client Sample No.: IAAP-SS-1-003
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	u	0.04

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.14.95
DCSD

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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H018
Client Sample No.: IAAP-SS-1-004
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	36	1
Cu	14	1
Pb	16	3
Ni	13	2
Ag	3	1
Tl	u	15
Zn	61	1

Percent Solids: 66.6

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Preston Arms Date: 3.20.95

TLS

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Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

ample Description: Soil
RD Lab Sample No.: 950302-H018
Client Sample No.: IAAP-SS-1-004
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	4.3	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	0.6	0.5	10 Mar 95	950310132911

ercent Solids: 66.6

u: Below Detection Limit

Laboratory Comments:

pproved By: Prem. N. Arora AMH Date: 3.15.95

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Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H018
Client Sample No.: IAAP-SS-1-004
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.11	0.04

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.14.95

DCSR

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Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H023
Client Sample No.: IAAP-SS-1-005
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	20	1
Cu	10	1
Pb	14	3
Ni	13	2
Ag	u	1
Tl	u	15
Zn	42	1

ercent Solids: 94.4

u: Below Method Detection Limit (MDL)

aboratory Comments:

Approved By: Prem N. Arora Date: 3.20.95

TLS

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Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H023
Client Sample No.: IAAP-SS-1-005
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	7.2	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	u	0.5	10 Mar 95	950310132911

Percent Solids: 94.4

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem. N. Arora
AMH

Date: 3.15.95

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Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
RD Lab Sample No.: 950302-H023
Client Sample No.: IAAP-SS-1-005
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	u	0.04

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3-14-95

DESD

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Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H030
Client Sample No.: IAAP-SS-8-001
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	2	1
Cr	377	1
Cu	275	1
Pb	66	3
Ni	18	2
Ag	u	1
Tl	u	15
Zn	260	1

Percent Solids: 76.3

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem. N. Arora Date: 3.20.95

TLJ

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Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
RD Lab Sample No.: 950302-H030
Client Sample No.: IAAP-SS-8-001
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	10.8	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	1.0	0.5	10 Mar 95	950310132911

Percent Solids: 76.3

u: Below Detection Limit

Laboratory Comments:

Approved By: Robert N. Brown AMH Date: 3.15.95

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Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H030
Client Sample No.: IAAP-SS-8-001
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.21	0.04

Laboratory Comments:

Approved By: Prem N. Arre Date: 3.14.95

DESA

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Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
RD Lab Sample No.: 950302-H031
Client Sample No.: IAAP-SS-8-002
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	21	1
Cu	16	1
Pb	27	3
Ni	16	2
Ag	u	1
Tl	u	15
Zn	64	1

Percent Solids: 76.7

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.20.95

TCS

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Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H031
Client Sample No.: IAAP-SS-8-002
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	7.1	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	1.0	0.5	10 Mar 95	950310132911

Percent Solids: 76.7

u: Below Detection Limit

Laboratory Comments:

Approved By: Pam N. Brown AMH Date: 3.15.95

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Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
RD Lab Sample No.: 950302-H031
Client Sample No.: IAAP-SS-8-002
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.06	0.04

Laboratory Comments:

Approved By: Prem. N. Arora DESA Date: 3-14-95

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Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H040
Client Sample No.: IAAP-SS-8-003
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	14	1
Cu	12	1
Pb	14	3
Ni	15	2
Ag	u	1
Tl	u	15
Zn	34	1

Percent Solids: 84.8

u: Below Method Detection Limit (MDL)

Laboratory Comments:

Approved By: Prem. N. Brar Date: 3.20.95

TCG

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

ample Description: Soil
RD Lab Sample No.: 950302-H040
Client Sample No.: IAAP-SS-8-003
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	5.6	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	0.5	0.5	10 Mar 95	950310132911

ercent Solids: 84.8

u: Below Detection Limit

Laboratory Comments:

pproved By: Prem N. Arora Date: 3.15.95
AMH

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H040
Client Sample No.: IAAP-SS-8-003
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	u	0.04

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem. N. Amin Date: 3.14.95

DESH

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

ample Description: Soil
RD Lab Sample No.: 950302-H041
Client Sample No.: IAAP-SS-8-004
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	36	1
Cu	16	1
Pb	14	3
Ni	16	2
Ag	u	1
Tl	u	15
Zn	61	1

ercent Solids: 72.1

u: Below Method Detection Limit (MDL)

aboratory Comments:

Approved By: Prem N. Arora Date: 3-20-95

TC9

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Soil
MRD Lab Sample No.: 950302-H041
Client Sample No.: IAAP-SS-8-004
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	5.9	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	u	0.5	10 Mar 95	950310132911

Percent Solids: 72.1

u: Below Detection Limit

Laboratory Comments:

Approved By: Thomas N. Brown AMH Date: 3.15.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

S Number: 3183
e_t Name: Iowa AAP - Line 1 & 800 (2/95)

e Description: Soil
a Sample No.: 950302-H041
nt Sample No.: IAAP-SS-8-004
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	u	0.04

: Below Detection Limit

a Comments:

ved By: Prem.N. Arora Date: 3.14.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

MIS Number: 3183
oject Name: Iowa AAP - Line 1 & 800 (2/95)

ple Description: Soil
Lab Sample No.: 950302-H047
ient Sample No.: IAAP-SS-8-005
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	1	1
Cr	145	1
Cu	79	1
Pb	22	3
Ni	20	2
Ag	u	1
Tl	u	15
Zn	108	1

cent Solids: 75.4

u: Below Method Detection Limit (MDL)

oratory Comments:

roved By: Thomas A. Brown Date: 3.20.95

LG

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

I Number: 3183
j ct Name: Iowa AAP - Line 1 & 800 (2/95)

I Description: Soil
I b Sample No.: 950302-H047
ent Sample No.: IAAP-SS-8-005
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

nalyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
rsenic	(As)	7060	9.1	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	0.9	0.5	10 Mar 95	950310132911

e t Solids: 75.4

u: Below Detection Limit

ratory Comments:

c ed By: Prem N. Arora AMH Date: 3.15.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

IS Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)

le Description: Soil
Lab Sample No.: 950302-H047
ient Sample No.: IAAP-SS-8-005
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.07	0.04

oratory Comments:

roved By: Prem N. Arora Date: 3.14.95
ESA

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

[illegible] Number: 3183
[illegible]ect Name: Iowa AAP - Line 1 & 800 (2/95)

[illegible]e Description: Sediment
[illegible]ab Sample No.: 950302-H051
[illegible]ent Sample No.: IAAP-SD-8-001
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	61	1
Cu	59	1
Pb	20	3
Ni	37	2
Ag	u	1
Tl	u	15
Zn	105	1

[illegible]t Solids: 54.5

u: Below Method Detection Limit (MDL)

[illegible]tory Comments:

[illegible]roved By: Prem.N. Arora Date: 3.20.95

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DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

IIS Number: 3183
)ject Name: Iowa AAP - Line 1 & 800 (2/95)

)le Description: Sediment
Lab Sample No.: 950302-H051
.ent Sample No.: IAAP-SD-8-001
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	7.1	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	0.7	0.5	10 Mar 95	950310132911

:ent Solids: 54.5

u: Below Detection Limit

)ratory Comments:

:oved By: Prem N. Arora AMH Date: 3.15.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

Job Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Sediment
Lab Sample No.: 950302-H051
Client Sample No.: IAAP-SD-8-001
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.04	0.04

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.14.95

DESA

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Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

IIS Number: 3183
)ject Name: Iowa AAP - Line 1 & 800 (2/95)

)le Description: Sediment
Lab Sample No.: 950302-H052
.ent Sample No.: IAAP-SD-8-002
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	240	1
Cu	132	1
Pb	22	3
Ni	22	2
Ag	u	1
Tl	u	15
Zn	180	1

:ent Solids: 39.5

u: Below Method Detection Limit (MDL)

)ratory Comments:

'oved By: Prem.N.Arora Date: 3-20-95

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

I Number: 3183
j ct Name: Iowa AAP - Line 1 & 800 (2/95)

l Description: Sediment
L b Sample No.: 950302-H052
ent Sample No.: IAAP-SD-8-002
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
rsenic	(As)	7060	5.0	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	0.8	0.5	10 Mar 95	950310132911

e t Solids: 39.5

u: Below Detection Limit

ratory Comments:

o ed By: Prem N. Arora AMH Date: 3.15.95

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

IS Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)

le Description: Sediment
Lab Sample No.: 950302-H052
ent Sample No.: IAAP-SD-8-002
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.06	0.04

ratory Comments:

oved By: Prem N. Amin Date: 3.14.95
ESD

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

M S Number: 3183
o ect Name: Iowa AAP - Line 1 & 800 (2/95)

p e Description: Sediment
ab Sample No.: 950302-H058
ient Sample No.: IAAP-SD-8-003
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	271	1
Cu	128	1
Pb	21	3
Ni	21	2
Ag	u	1
Tl	u	15
Zn	176	1

c nt Solids: 47.3

": Below Method Detection Limit (MDL)

o atory Comments:

roved By: Prem. N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

:S Number: 3183
ect Name: Iowa AAP - Line 1 & 800 (2/95)

.e Description: Sediment
.ab Sample No.: 950302-H058
ent Sample No.: IAAP-SD-8-003
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	5.0	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	1.0	0.5	10 Mar 95	950310132911

ent Solids: 47.3

ı: Below Detection Limit

ratory Comments:

oved By: Prem.N. Arora
AMH

Date: 3.15.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Description: Sediment
Lab Sample No.: 950302-H058
Client Sample No.: IAAP-SD-8-003
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.06	0.04

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.14.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

IIS Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)

le Description: Sediment
Lab Sample No.: 950302-H063
ent Sample No.: IAAP-SD-8-005
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg) Dry Weight

Analyte	Result	Method Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	287	1
Cu	280	1
Pb	28	3
Ni	25	2
Ag	u	1
Tl	u	15
Zn	283	1

cent Solids: 56.7

u: Below Method Detection Limit (MDL)

oratory Comments:

roved By: Prem.N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

I MIS Number: 3183
I oject Name: Iowa AAP - Line 1 & 800 (2/95)

a ple Description: Sediment
I Lab Sample No.: 950302-H063
Client Sample No.: IAAP-SD-8-005
Analyst: A. Hindemith

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
Arsenic	(As)	7060	4.7	0.5	10 Mar 95	950309122321
Selenium	(Se)	7740	0.8	0.5	10 Mar 95	950310132911

e cent Solids: 56.7

u: Below Detection Limit

aboratory Comments:

p roved By: Rem N Arora Date: 3.15.95
AMH

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

IS Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)

le Description: Sediment
Lab Sample No.: 950302-H063
ent Sample No.: IAAP-SD-8-005
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	0.09	0.04

ratory Comments:

oved By: Prem N. Arora Date: 3.14.95

ESD

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

A IS Number: 3183
r ject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Method Blank

n le Description: Soil
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg)

Analyte	Result	Det Limit
Sb	u	10
Be	u	1
Cd	u	1
Cr	u	1
Cu	u	1
Pb	u	3
Ni	u	2
Ag	u	1
Tl	u	15
Zn	u	1

u: Below Detection Limit

oratory Comments:

roved By: Prem. N. Arora Date: 3.20.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

IS Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)
lentifier: Laboratory Matrix Duplicate

e Description: Soil
Lab Sample No.: 950225-H034
ent Sample No.: Batch Specific
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 22 Feb 95
Date Sample Received: 24 Feb 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg)

Analyte	Sample Result	Duplicate Result	RPD	Method Detection Limit
Sb	u	u	NC	10
Be	1	1	0.0	1
Cd	u	u	NC	1
Cr	18	20	10.5	1
Cu	16	17	6.1	1
Pb	16	18	11.8	3
Ni	18	20	10.5	2
Ag	u	u	NC	1
Tl	18	16	11.8	15
Zn	58	64	9.8	1

u: Below Method Detection Limit (MDL)
NC: Not Calculable
) Control Limit: ± 20% (RPD could be higher if the sample results are low)

ratory Comments:

oved By: Prem N. Arora Date: 3-20-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

MIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Soil
RL Lab Sample No.: 950225-H034
Client Sample No.: Batch Specific
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Sample Taken: 22 Feb 95
Date Sample Received: 24 Feb 95
Date Digested: 07 Mar 95
Date Analyzed: 15 Mar 95
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
Sb	u	200	70	35*	75	38*	6.9
Be	u	20	21	100	21	100	0.0
Cd	u	20	18	90	18	90	0.0
Cr	18	80	100	103	102	105	2.0
Cu	16	100	113	97	114	98	.9
Pb	16	200	203	94	205	95	1.0
Ni	18	200	207	95	209	96	1.0
Ag	u	20	17	85	17	85	0.0
Fe	18	800	774	95	780	95	.8
Zn	58	200	255	99	258	100	1.2

u: Below Method Detection Limit (MDL)
%Rec Control Limit: 75-125
RPD Control Limit: ± 20% (RPD could be higher if the sample results are low)

Laboratory Comments: * The percent recovery of Antimony is low for this set of samples. This poor recovery may be due to the matrix problem/interference, not the digestion process. The Laboratory Control Sample recoveries are within laboratory acceptance limits. MS was repeated and similar results were obtained.

Approved By: Steven N. Brown Date: 3.20.95

765

DEPARTMENT OF THE ARMY
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Division Laboratory
Omaha, Nebraska

Thermo Jarrell Ash ICAP Metals

[S Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)
lentifier: Laboratory Control Sample (LCS)

le Description: Soil
LCS Source: VHG Labs, Inc.
Lot Number: 500022E,500022F,401300E
Method: EPA Method 3050/6010
Analyst: T. Shannon

Date Analyzed: 15 Mar 95
MRD Lab Code: ICPS5
Expiration Date: 30 Jan 96
Batch: 9503150557
Sequence: 9503150951

RESULTS (mg/kg)

Analyte	Result	True Value	%Rec	Method Detection Limit
Sb	190	200	95	10
Be	79	80	99	1
Cd	93	100	93	1
Cr	201	200	101	1
Cu	193	200	97	1
Pb	192	200	96	3
Ni	196	200	98	2
Ag	35	40	88	1
Tl	190	200	95	15
Zn	191	200	96	1

u: Below Method Detection Limit (MDL)
NC: Not Calculable
: Control Limit: 75 to 125

ratory Comments:

oved By: Thomas A. Arora Date: 3-20-95
'5

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

] Number: 3183
j ct Name: Iowa AAP - Line 1 & 800 (2/95)
dentifier: Method Blank

] Description: Soil **Batch Id:** 9503081000
Analyst: A. Hindemith

RESULTS (mg/kg)

nalyte		EPA Method	Result	Detection Limit	Date Analyzed	Sequence Identifier
rsenic	(As)	7060	u	0.5	10 Mar 95	950309122321
Lead	(Pb)	7421	u	0.5	09 Mar 95	950309122321
Selenium	(Se)	7740	u	0.5	10 Mar 95	950310132911

u Below Detection Limit

r ory Comments:

o ed By: Prem. N. Arora Date: 3.15.95
AMH

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

:S Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)
lentifier: Laboratory Matrix Duplicate

.e Description: Soil
Lab Sample No.: 950225-H034
ent Sample No.: Batch Specific
Analyst: A. Hindemith

Date Sample Taken: 22 Feb 95
Date Sample Received: 24 Feb 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

yte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed	Sequence Identifier
	7060	4.8	4.8	0.0	0.5	10 Mar 95	950309122321
	7421	15.9	15.1	5.2	0.5	09 Mar 95	950309122321
	7740	u	0.5	NC	0.5	10 Mar 95	950310132911

u: Below Detection Limit
C: Not Calculable
rol Limits: ± 20 (for >5X CRDL)

ratory Comments:

oved By: Prem N. Amin Date: 3.15.95
AMH

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

WIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Type Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Soil
LIMS Lab Sample No.: 950225-H034
Client Sample No.: Batch Specific
Analyst: A. Hindemith

Date Sample Taken: 22 Feb 95
Date Sample Received: 24 Feb 95
Date Digested: 08 Mar 95
Batch Id: 9503081000

RESULTS (mg/kg)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
As	4.8	4.0	8.5	93	8.5	93	0.0
Pb	15.9	4.0	20.9	125	19.7	95	5.9
Se	u	4.0	4.2	105	4.3	108	2.4

u: Below Detection Limit
%R: Percent of the spike recovered from the matrix
Control Limits: 75-125 (if [spike added] > [sample]/4)

Analyte	EPA Method	Detection Limit	Analysis Date MS	Analysis Date MSD	Sequence Identifier
Arsenic (As)	7060	0.5	10 Mar 95	10 Mar 95	950309122321
Lead (Pb)	7421	0.5	09 Mar 95	09 Mar 95	950309122321
Selenium (Se)	7740	0.5	10 Mar 95	10 Mar 95	950310132911

Laboratory Comments:

Approved By: Prem N. Arora 4/14 Date: 3.15.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Perkin Elmer AAGF Metals

IS Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)
dentifier: Laboratory Control Sample (LCS)

le Description: Soil
LCS Source: VHG Labs, Inc. **MRD Lab Code:** PEGF3
Lot Number: 400723D 400723E **Expiration Date:** 30 Apr 95
Analyst: A. Hindemith **Batch Id:** 9503081000

RESULTS (mg/kg)

yte	EPA Method	True Value	Result	%Rec	Detection Limit	Date Analyzed	Sequence Identifier
	7060	4.0	4.1	103	0.5	10 Mar 95	950309122321
	7421	4.0	4.2	105	0.5	09 Mar 95	950309122321
	7740	4.0	4.1	103	0.5	10 Mar 95	950310132911

ratory Comments:

oved By: Prem N. Arora AMH Date: 3.15.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

LIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Method Blank

Sample Description: Soil
Method: EPA Method 7471
Analyst: T. Shannon

Date Analyzed: 08 Mar 95
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	Det Limit
Hg	u	0.04

u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.14.95
DESA

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

Number: 3183
:t Name: Iowa AAP - Line 1 & 800 (2/95)
ıtifier: Laboratory Matrix Duplicate

Description: Sediment
› Sample No.: 950302-H063
: Sample No.: IAAP-SD-8-005
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Sample Result	Duplicate Result	RPD	Detection Limit
Hg	0.09	0.08	11.8	0.04

tory Comments:

ed By: Prem. N. Arora Date: 3.14.95
SA

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

MRD IDS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Sample Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Sediment
MRD Lab Sample No.: 950302-H063
Client Sample No.: IAAP-SD-8-005
Method: EPA Method 7471
Analyst: T. Shannon

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95
Date Digested: 08 Mar 95
Date Analyzed: 08 Mar 95
Dilution Factor: 1.0
Batch: 9503081544A

RESULTS (mg/kg)

Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
0.09	0.10	0.20	110	0.20	110	0.0

BD: Below Detection Limit
%R: Percent of the spike recovered from the matrix
Control Limits: 75-125 (if [spike added] > [sample]/4)

Laboratory Comments:

Approved By: Prem. N. Amin Date: 3-14-95
ESD

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Mercury by AACV

IS Number: 3183
ject Name: Iowa AAP - Line 1 & 800 (2/95)
dentifier: Laboratory Control Sample (LCS)

le Description: Soil
LCS Source: SPEX Industries, Inc.
Lot Number: 3-88HG
Method: EPA Method 7471
Analyst: T. Shannon

Date Analyzed: 08 Mar 95
MRD Lab Code: HG7
Expiration Date: 28 Feb 95
Batch: 9503081544A

RESULTS (mg/kg)

Analyte	Result	True Value	%Rec	Detection Limit
Hg	0.10	0.10	100	0.04

ratory Comments:

oved By: Prem.N. Arora Date: 3.14.95

ESA

C138

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Total Organic Carbon (TOC)

LIMS#: 3183
oject: Iowa AAP - Line 1 & 800 (2/95)

Date Sample Taken:	28 Feb 95	Customer Sample:	IAAP-W-8-002
ate Sample Received:	01 Mar 95	Lab Sample No:	950302-H068
ample Description:	Water	Container:	1-1 L poly

traction/Analysis Method: EPA Method 415.1
Date Analyzed: 08 Mar 95
Analyst: D. Sanders

RESULTS (mg/L)

Analysis for	Result	Detection Limits
Total Organic Carbon	10	2

u: Below Detection Limit

oratory Comments:

proved by: Prem N. Arora Date: 3.14.95
ESA

C139

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Total Organic Carbon (TOC)

S#: 3183
ct: Iowa AAP - Line 1 & 800 (2/95)

ate Sample Taken: 28 Feb 95 Customer Sample: IAAP-W-8-004
Sample Received: 01 Mar 95 Lab Sample No: 950302-H072
mple Description: Water Container: 1-1 L poly

ction/Analysis Method: EPA Method 415.1
Date Analyzed: 08 Mar 95
Analyst: D. Sanders

RESULTS (mg/L)

Analysis for	Result	Detection Limits
Total Organic Carbon	10	2

Below Detection Limit

atory Comments:

ved by: Prem N. Arora Date: 3.14.95

SP

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Total Organic Carbon (TOC) Method Blank

LIMS#: 3183
oject: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
traction/Analysis Method: EPA Method 415.1
Date Analyzed: 08 Mar 95

Analyst: D. Sanders

RESULTS (mg/L)

Analysis for	Result	Detection Limits
Total Organic Carbon	u	2

: Below Detection Limit

bo ory Comments:

p. ved by: Prem N Arora Date: 3.10.95

DESA

C141

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Total Organic Carbon (TOC) Matrix Duplicate

MS#: 3183
ject: Iowa AAP - Line 1 & 800 (2/95)

MRD Lab Sample No: 950302-H068
Client Sample No: IAAP-W-8-002
Sample Description: Water
action/Analysis Method: EPA Method 415.1
Date Analyzed: 08 Mar 95

Analyst: D. Sanders

RESULTS (mg/L)

Analysis for	Run #1	Run #2	Detection Limits	RPD*	Acceptable RPD
TOC	10	10	2	0	25

Below Detection Limit

Relative Percent Difference (RPD) is calculated from both results, and is not reported when either result is below the detection limit.

oved by: Prem. N. Amin Date: 3.14.95

DESP

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Total Organic Carbon (TOC)
Matrix Spike, Matrix Spike Duplicate

LIMS#: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

MRD Lab Sample No: 950302-H068
Client Sample No: IAAP-W-8-002
Sample Description: Water
Extraction/Analysis Method: EPA Method 415.1
Date Analyzed: 08 Mar 95

Analyst: D. Sanders

RESULTS (mg/L)

Analyte	Sample Res #1	Spike Added	Conc MS	%Rec MS	Sample Res #2	Conc MSD	%Rec MSD	RPD	Recovery Limits
TOC	10	10	20	100	10	10	100	0	80-120

u: Below Detection Limit
MS: Matrix Spike
MSD: Matrix Spike Duplicate
%Rec: Percent of the spike recovered from the matrix
PD: Relative Percent Difference;

$RPD = ((|MS - MSD|)/((MS + MSD)/2)) \times 100$
Acceptable RPD = 25

Approved by: Prem N. Arora Date: 3.14.95
DESA

C143

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Total Organic Carbon (TOC)
Laboratory Control Sample (LCS)

MS#: 3183
ect: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
LCS Source: Mallinckrodt
Lot Number: 6704 KBRZ
action/Analysis Method: EPA Method 415.1
Date Analyzed: 08 Mar 95

Analyst: D. Sanders

RESULTS (mg/L)

lyte	Sample Results	True Value	%Rec	Recovery Limits	Detection Limit
C	10.2	10.0	102	80-120	2

c: Percent of the spike recovered from the matrix

oved by: Prem. N. Arora Date: 3.14.95

255A

ENVIRONMENTAL CHEMICAL CORPORATION

C144

ul. r:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
)ur	Iowa AAP - Line 1 & 800 (2/95)	Project No.:	20673
n ysis:	TOC-Tot Org Carbon	Date Received:	03/03/95
e od:	EPA 9060	Date Analyzed:	03/08/95
ıb Notebook:	454, pg. 14	**Prep. Batch:**	TOCS0308
et tion Limit:	50.0 mg/kg	**Instr. Batch:**	TOC0308

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
0673-001	950302-H005	SOIL	IAAP-SS-1-001	29600
0 73-002	950302-H008	SOIL	IAAP-SS-1-002	54300
0673-004	950302-H019	SOIL	IAAP-SS-1-004	21800
0673-006	950302-H032	SOIL	IAAP-SS-8-002	51600
0 73-008	950302-H042	SOIL	IAAP-SS-8-004	10100
0673-009	950302-H050	SEDIMENT	IAAP-SD-8-001	20300
0 73-010	950302-H053	SEDIMENT	IAAP-SD-8-002	25800
0 73-011	950302-H057	SOIL	IAAP-SD-8-003	26700
0673-012	950302-H060	SOIL	IAAP-SD-8-004	30700

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL 145

ɔmer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
ɛe:	N/A	Project No.:	20673
ysis:	TOC-Tot Org Carbon	Date Received:	N/A
ɪod:	EPA 9060	Date Analyzed:	03/08/95
Notebook:	454, pg. 14	**Prep. Batch:**	TOCS0308
ɛtion Limit:	50.0 mg/kg	**Instr. Batch:**	TOC0308

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
;73-001DUP	950302-H005	SOIL	IAAP-SS-1-001	33800
.ank	N/A	SOIL	N/A	BDL

			SPIKE mg/kg	RECOVERED mg/kg	% RECOVERY
	N/A	Water	56.6mg/L	58.3mg/L	103
'3-001MS	950302-H005	SOIL	6400	-29600.00	-463
'3-001MSD	950302-H005	SOIL	6150	-29600.00	-481

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

mer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
e:	Iowa AAP - Line 1 & 800 (2/95)	Project No.:	20673
nalysis:	TOC-Tot Org Carbon	Date Received:	03/03/95
ethod:	EPA 9060	Date Analyzed:	03/08/95-03/09/95
Lab Notebook:	454, pg. 16	**Prep. Batch:**	TOCS0309
tection Limit:	50.0 mg/kg	**Instr. Batch:**	TOC0309

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
20673-003	950302-H016	SOIL	IAAP-SS-1-003	1310
0673-005	950302-H029	SOIL	IAAP-SS-8-001	11700
20673-007	950302-H039	SOIL	IAAP-SS-8-003	4360

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL C147

ımer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
:e:	N/A	Project No.:	20673
ysis:	TOC-Tot Org Carbon	Date Received:	N/A
od:	EPA 9060	Date Analyzed:	03/08/95-03/09/95
Notebook:	454, pg. 16	**Prep. Batch:**	TOCS0309
tion Limit:	50.0 mg/kg	**Instr. Batch:**	TOC0309

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
73-003DUP	950302-H016	SOIL	IAAP-SS-1-003	1240
ank	N/A	SOIL	N/A	BDL

			SPIKE mg/kg	RECOVERED mg/kg	% RECOVERY
	N/A	Water	56.6mg/L	57.8mg/L	102
3-003MS	950302-H016	SOIL	5930	5590	94
3-003MSD	950302-H016	SOIL	5710	5380	94

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

Customer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
Source:	Iowa AAP - Line 1 & 800 (2/95)	Project No.:	20673
Analysis:	Sulfide (Total)	Date Received:	03/03/95
Method:	EPA 9030	Date Analyzed:	03/03/95
Lab Notebook:	458, Pg. 2-3	**Prep. Batch:**	SUDS0303
Detection Limit:	16. mg/kg	**Instr. Batch:**	SUD0303

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
20673-001	950302-H005	SOIL	IAAP-SS-1-001	32.0
20673-002	950302-H008	SOIL	IAAP-SS-1-002	16.0
20673-003	950302-H016	SOIL	IAAP-SS-1-003	16.0
20673-004	950302-H019	SOIL	IAAP-SS-1-004	16.0
20673-005	950302-H029	SOIL	IAAP-SS-8-001	32.0
20673-006	950302-H032	SOIL	IAAP-SS-8-002	32.0
20673-007	950302-H039	SOIL	IAAP-SS-8-003	16.0
20673-008	950302-H042	SOIL	IAAP-SS-8-004	16.0
20673-011	950302-H057	SOIL	IAAP-SD-8-003	32.0
20673-012	950302-H060	SOIL	IAAP-SD-8-004	16.0

BDL: Below Detection Limit

ıer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
	N/A	Project No.:	20673
is:	Sulfide (Total)	Date Received:	N/A
l:	EPA 9030	Date Analyzed:	03/03/95
tebook:	458, Pg. 2-3	**Prep. Batch:**	SUDS0303
on Limit:	16. mg/kg	**Instr. Batch:**	SUD0303

AB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
3-001DUP	950302-H005	SOIL	IAAP-SS-1-001	32.0
nk	N/A	SOIL	N/A	BDL

			SPIKE mg/kg	RECOVERED mg/kg	% RECOVERY
	N/A	SOIL	40.0	32.0	80
-001MS	950302-H005	SOIL	40.0	32.0	80
-001MSD	950302-H005	SOIL	40.0	32.0	80

BDL: Below Detection Limit

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

r ject: Iowa AAP - Line 1 & 800 (2/95) (3183)
ate Sample Taken: 28 Feb 95 **Customer Sample No:** IAAP-W-8-002
ate Sample Received: 01 Mar 95 **Lab Sample No:** 950302-H068
a ple Description: Water **Analyst:** Matthew Wauson
a..ple Container Used: 1-1 L poly

r cedure	Analysis	Result	Detection Limit	Date Analyzed
PA 325.1	Chloride	2 mg/L	1 mg/L	08 Mar 95

a pratory Comments:

pproved By: Prem N. Arora Date: 3.9.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

ect: Iowa AAP - Line 1 & 800 (2/95) (3183)
Sample Taken: 28 Feb 95 **Customer Sample No:** IAAP-W-8-004
Sample Received: 01 Mar 95 **Lab Sample No:** 950302-H072
le **Description:** Water **Analyst:** Matthew Wauson
le **Container Used:** 1-1 L poly

edure	Analysis	Result	Detection Limit	Date Analyzed
325.1	Chloride	2 mg/L	1 mg/L	08 Mar 95

ratory Comments:

oved By: Prem N. Arora Date: 3.9.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Blank, Blank Spike, Blank Spike Duplicate

Project: Iowa AAP - Line 1 & 800 (2/95) (3183)
mple Description: Water
Analyst: Matthew Wauson
Date Analyzed: 08 Mar 95

a'yte	EPA Method	Blank Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD	Detection Limit
	325.1	u	40	40	100	41	103	2	1
i s		mg/L	mg/L	mg/L	%	mg/L	%	%	mg/L

= Below Detection Limit

e Recovery

= Blank Spike
D = Blank Spike Duplicate

D = Relative Percent Difference
D = [|BS - BSD| x 100] / [(BS + BSD) / 2]

n rol Limits: 75-125 for %Rec, 25 for RPD

boratory Comments:

p: oved By: Prem N. Arora Date: 3.9.95

C153

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Matrix, Matrix Duplicate

ect: Iowa AAP - Line 1 & 800 (2/95) (3183)
Sample No: 950306-H012
le Description: Water Analyst: Matthew Wauson
le Container Used: 1-500 mL poly Date Analyzed: 08 Mar 95

yte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit
	325.1	5	5	0	1
s		mg/L	mg/L	%	mg/L

= Recovery

= Relative Percent Difference
= [|Sample - Duplicate| x 100] / [(Sample + Duplicate) / 2]

rol Limits: 25 for RPD

: The duplicate sample from this batch is not from the above project

ratory Comments:

oved By: Prem.N.Arora Date: 3.9.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Matrix Spike, Matrix Spike Duplicate

oject: Iowa AAP - Line 1 & 800 (2/95) (3183)
b Sample No: 950306-H012
le Description: Water **Analyst:** Matthew Wauson
ple Container Used: 1-500 mL poly **Date Analyzed:** 08 Mar 95

yte	EPA Method	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD	Detection Limit
Cl	325.1	5	20	25	100	25	100	0	1
s		mg/L	mg/L	mg/L	%	mg/L	%	%	mg/L

ec = Recovery

Matrix Spike
D = Matrix Spike Duplicate

D = Relative Percent Difference
D = [|MS - MSD| x 100] / [(MS + MSD) / 2]

rol Limits: 75-125 for %Rec, 25 for RPD

te: The spiked sample from this batch is not from the above project.

boratory Comments:

oved By: Prem N. Arora Date: 3.9.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Laboratory Control Sample (LCS)

Project: Iowa AAP - Line 1 & 800 (2/95) (3183)
le Description: Water
Analyst: Matthew Wauson
Date Analyzed: 08 Mar 95

yte	EPA Method	True Value	Result	%Rec	Detection Limit
	325.1	26	26	100	1
s		mg/L	mg/L	%	mg/L

yte	LCS Source	LCS Lot Number	Expiration Date
	SPEX Industries, Inc.	2-18 MIN 1, 2-19 MIN 2	15 Aug 95

c: Percent of the LCS recovered
rol Limits: 75-125 for %Rec

rtory Comments:

oved By: Prem N. Arora Date 3.9.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H068
Client Sample No.: IAAP-W-8-002
Analyst: Deb Dereshkevich

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95

RESULTS (mg/L)

Procedure	Analysis	Result	Detection Limit	Date Analyzed
EPA-351.2	Total Kjeldahl Nitrogen-N	1.0	0.1	07 Mar 95

Laboratory Comments:

Sample needs to be preserved according to analysis before running

Approved By: Prem. N. Arora Date: 3-8-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
oject Name: Iowa AAP - Line 1 & 800 (2/95)

ple Description: Water
Lab Sample No.: 950302-H072
ient Sample No.: IAAP-W-8-004
Analyst: Deb Dereshkevich

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95

RESULTS (mg/L)

cedure	Analysis	Result	Detection Limit	Date Analyzed
-351.2	Total Kjeldahl Nitrogen-N	1.3	0.1	07 Mar 95

oratory Comments:

Sample needs to be preserved according to analysis before running

roved By: Prem N. Arora Date: 3-8-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Blank, Blank Spike, Blank Spike Duplicate

Sample Description: Water
Analyst: Deb Dereshkevich

RESULTS (mg/L)

Analyte	Blank Result	Spike Added	Conc BS	%Rec BS	Conc BSD	%Rec BSD	RPD
TKN	u	1.0	1.0	100	1.0	100	0

Analyte	Procedure	Analysis	Detection Limit	Analysis Date Blank	Analysis Date BS/BSD
TKN	EPA-351.2	Total Kjeldahl Nitrogen-N	0.1	07 Mar 95	07 Mar 95

u: Below Detection Limit
%Rec: Percent of the spike recovered from the matrix
RPD: Relative percent difference = [|BS - BSD| x 100] / [(BS + BSD) / 2]
Control Limits: 75-125 for %Rec, 25 for RPD

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.8.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMIS Number: 3183
roject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Matrix Duplicate

nple Description: Water
D Lab Sample No.: 950302-H072
lient Sample No.: IAAP-W-8-004
Analyst: Deb Dereshkevich

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95

RESULTS (mg/L)

alyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
TKN	351.2	1.3	1.3	0	0.1	07 Mar 95

boratory Comments:

proved By: Prem N. Arora Date: 3.8.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water
MRD Lab Sample No.: 950302-H072
Client Sample No.: IAAP-W-8-004
Analyst: Deb Dereshkevich

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95

RESULTS (mg/L)

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD
TKN	1.3	0.8	2.0	88	2.0	88	0

Analyte	Procedure	Analysis	Detection Limit	Analysis Date Sample	MS/MSD
TKN	EPA-351.2	Total Kjeldahl Nitrogen-N	0.1	07 Mar 95	07 Mar 95

%Rec: Percent of the spike recovered from the matrix
RPD: Relative percent difference = [|MS - MSD| x 100] / [(MS + MSD) / 2]
Control Limits: 75-125 for %Rec, 25 for RPD

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.8.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
oject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Control Sample (LCS)

ple Description: Water
Analyst: Deb Dereshkevich

RESULTS (mg/L)

lyte	EPA Method	True Value	Result	%Rec	Detection Limit	Date Analyzed	MRD Lab Code	Expiration Date
KN	351.2	5.0	4.8	96	0.1	07 Mar 95	TKN4	14 Oct 95

lyte	LCS Source	LCS Lot Number
KN	SPEX Industries, Inc.	1-2 NUT-2

ec: Percent Recovery
trol Limits: 75-125 for %Rec

oratory Comments:

proved By: Prem N. Arora Date: 3.8.95

to er:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
rce	Iowa AAP - Line 1 & 800 (2/95)	Project No.:	20673
ly s:	TKN	Date Received:	03/03/95
h :	EPA 351.2	Date Analyzed:	03/06/95
Notebook:	427, Pg. 84	**Prep. Batch:**	TKNW0306
ec n Limit:	0.80 mg/kg	**Instr. Batch:**	TKNW0306

AB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
673-001	950302-H005	SOIL	IAAP-SS-1-001	1020
6 -002	950302-H008	SOIL	IAAP-SS-1-002	1490
6 -003	950302-H016	SOIL	IAAP-SS-1-003	3.2
673-004	950302-H019	SOIL	IAAP-SS-1-004	926
6 -005	950302-H029	SOIL	IAAP-SS-8-001	1160
673-006	950302-H032	SOIL	IAAP-SS-8-002	1870
6 -007	950302-H039	SOIL	IAAP-SS-8-003	446
6 -008	950302-H042	SOIL	IAAP-SS-8-004	756
673-009	950302-H050	SEDIMENT	IAAP-SD-8-001	1430
6 -010	950302-H053	SEDIMENT	IAAP-SD-8-002	1430
6 -011	950302-H057	SOIL	IAAP-SD-8-003	1980
67 12	950302-H060	SOIL	IAAP-SD-8-004	1850

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL C163

tomer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
rce:	N/A	Project No.:	20673
alysis:	TKN	Date Received:	N/A
thod:	EPA 351.2	Date Analyzed:	03/06/95
Notebook:	427, Pg. 84	**Prep. Batch:**	TKNW0306
ection Limit:	0.80 mg/kg	**Instr. Batch:**	TKNW0306

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
)673-006DUP	950302-H032	SOIL	IAAP-SS-8-002	1920
3lank	N/A	SOIL	N/A	BDL

			SPIKE mg/L	RECOVERED mg/L	% RECOVERY
;	N/A	Water	8.0mg/L	7.8mg/L	98
ınk Spike	N/A	Water	1.0mg/L	0.95mg/L	95
ınk Spike Dup	N/A	Water	1.0mg/L	0.93mg/L	93

BDL: Below Detection Limit

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
MRD Lab Sample No.: 950302-H068
Client Sample No.: IAAP-W-8-002
Analyst: Deb Dereshkevich

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95

RESULTS (mg/L)

Procedure	Analysis	Result	Detection Limit	Date Analyzed
EPA-310.2	Alkalinity (as $CaCO_3$)	65	20	09 Mar 95
EPA-310.2	Bicarbonate (as $CaCO_3$)	65	20	09 Mar 95
EPA-375.2	Sulfate	11	10	21 Mar 95
EPA-353.2	Nitrate/Nitrite (as N)	0.12	0.01	15 Mar 95
EPA-365.4	Total Phosphorus (as P)	0.08	0.01	20 Mar 95

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
oject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Blank, Blank Spike, Blank Spike Duplicate

ple Description: Water
Analyst: Deb Dereshkevich

RESULTS (mg/L)

lyte	Blank Result	Spike Added	Conc BS	% Rec BS	Conc BSD	%Rec BSD	RPD
	u	100	87	87	91	91	4
3	u	100	87	87	91	91	4
	u	50	49	98	50	100	2
/NO2	0.01	1.00	1.06	105	1.02	101	4
	u	0.25	0.22	88	0.24	96	9

lyte	Procedure	Analysis	Detection Limit	Analysis Date Blank	BS/BSD
	EPA-310.2	Alkalinity (as CaCO3)	20	09 Mar 95	09 Mar 95
3	EPA-310.2	Bicarbonate (as CaCO3)	20	09 Mar 95	09 Mar 95
	EPA-375.2	Sulfate	1	21 Mar 95	21 Mar 95
/NO2	EPA-353.2	Nitrate/Nitrite (as N)	0.01	15 Mar 95	15 Mar 95
	EPA-365.4	Total Phosphorus (as P)	0.01	20 Mar 95	20 Mar 95

u: Below Detection Limit
ec: Percent of the spike recovered from the blank
PD: Relative percent difference = [BS - BSD x 100] / [(BS + BSD) / 2]
trol Limits: 75-125 for %Rec, 25 for RPD

oratory Comments:

oved By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
oject Name: Iowa AAP - Line 1 & 800 (2/95)
I entifier: Laboratory Matrix Duplicate

ple Description: Water **Date Sample Taken:** 01 Mar 95
ab Sample No.: 950303-H016 **Date Sample Received:** 02 Mar 95
ic at Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

lyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
	310.2	190	186	2	20	09 Mar 95

oratory Comments:

duplicate sample for this batch is not from the above project.

oved By: Prem. N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

IIS Number: 3183
)ject Name: Iowa AAP - Line 1 & 800 (2/95)
:dentifier: Laboratory Matrix Duplicate

)le Description: Water
Lab Sample No.: 950303-H016
ent Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 01 Mar 95
Date Sample Received: 02 Mar 95

RESULTS (mg/L)

yte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
	310.2	190	186	2	20	09 Mar 95

ratory Comments:

duplicate sample for this batch is not from the above project.

oved By: Prem N. Arora Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMIS Number: 3183
roject Name: Iowa AAP - Line 1 & 800 (2/95)
dentifier: Laboratory Matrix Duplicate

mple Description: Water w/seds
D Lab Sample No.: 950321-H035
l ent Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 20 Mar 95
Date Sample Received: 21 Mar 95

RESULTS (mg/L)

alyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
1	375.2	u	u	NC	0.01	21 Mar 95

u: Below Detection Limit
NC: Not Calculable because the sample and duplicate results were both below the detection limit.

oratory Comments:

e duplicate sample for this batch is not from the above project.

ved By: Prem.N Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
oject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Matrix Duplicate

ple Description: Water
Lab Sample No.: 950312-H031
ient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 10 Mar 95
Date Sample Received: 11 Mar 95

RESULTS (mg/L)

lyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
/NO2	353.2	0.01	0.01	0	0.01	15 Mar 95

oratory Comments:

duplicate sample for this batch is not from the above project.

roved By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
oject Name: Iowa AAP - Line 1 & 800 (2/95)
I. entifier: Laboratory Matrix Duplicate

ple Description: Water
l ab Sample No.: 950316-W002
i. it Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 15 Mar 95
Date Sample Received: 16 Mar 95

RESULTS (mg/L)

lyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
	365.4	0.04	0.04	0	0.01	20 Mar 95

oratory Comments:

duplicate sample for this batch is not from the above project.

oved By: Prem N. Amin Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
oject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Matrix Spike, Matrix Spike Duplicate

ple Description: Water — Date Sample Taken: 01 Mar 95
) Lab Sample No.: 950303-H016 — Date Sample Received: 02 Mar 95
ient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

lyte	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
	190*	100	265	94	270	99	2

lyte	Procedure	Analysis	Detection Limit	Analysis Date Sample	MS/MSD
	EPA-310.2	Alkalinity (as CaCO3)	20	09 Mar 95	09 Mar 95

0 mL of sample & 10 mL of standard (190)(.90) = 171 used in calculation
ec: Percent of the spike recovered from the matrix
PD: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
trol Limits: 75-125 for %Rec, 25 for RPD

oratory Comments:

roved By: Prem N. Arm Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMTS Number: 3183
r ject Name: Iowa AAP - Line 1 & 800 (2/95)
identifier: Matrix Spike, Matrix Spike Duplicate

m le Description: Water
) Lab Sample No.: 950303-H016
lient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 01 Mar 95
Date Sample Received: 02 Mar 95

RESULTS (mg/L)

a.	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
)3	190*	100	265	94	270	99	2

al te	Procedure	Analysis	Detection Limit	Analysis Date Sample	Analysis Date MS/MSD
)3	EPA-310.2	Alkalinity (as CaCO3)	20	09 Mar 95	09 Mar 95

90 mL of sample & 10 mL of standard (190)(.90) = 171 used in calculation
Re : Percent of the spike recovered from the matrix
RPD: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
ntrol Limits: 75-125 for %Rec, 25 for RPD

oc atory Comments:

orc d By: Prem.N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
QC Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water w/seds **Date Sample Taken:** 20 Feb 95
MRD Lab Sample No.: 950321-H035 **Date Sample Received:** 21 Feb 95
Client Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

Analyte	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
O4	u	50	48	96	50	100	4

Analyte	Procedure	Analysis	Detection Limit	Analysis Date Sample	MS/MSD
O4	EPA-375.2	Sulfate	1	21 Mar 95	21 Mar 95

u: Below Detection Limit
Rec: Percent of the spike recovered from the matrix
RPD: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
Control Limits: 75-125 for %Rec, 25 for RPD

Laboratory Comments:

Approved By: Prem N. Arora Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MRS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water — Date Sample Taken: 10 Mar 95
Lab Sample No.: 950312-H031 — Date Sample Received: 11 Mar 95
Client Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

Analyte	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
NO2	0.01	1.00	0.87	86	0.87	86	0

Analyte	Procedure	Analysis	Detection Limit	Analysis Date Sample	Analysis Date MS/MSD
N 2	EPA-353.2	Nitrate (as N)	0.01	15 Mar 95	15 Mar 95

c Percent of the spike recovered from the matrix
D: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
rol Limits: 75-125 for %Rec, 25 for RPD

r tory Comments:

ov' By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

'AMIS Number: 3183
'roject Name: Iowa AAP - Line 1 & 800 (2/95)
' Identifier: Matrix Spike, Matrix Spike Duplicate

mple Description: Water — Date Sample Taken: 15 Mar 95
D Lab Sample No.: 950316-W002 — Date Sample Received: 16 Mar 95
lient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

alyte	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
	0.04	0.20	0.24	100	0.23	95	4

alyte	Procedure	Analysis	Detection Limit	Analysis Date Sample	MS/MSD
	EPA-365.4	Total Phosphorus (as P)	0.01	20 Mar 95	20 Mar 95

Rec: Percent of the spike recovered from the matrix
RPD: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
ntrol Limits: 75-125 for %Rec, 25 for RPD

boratory Comments:

e spiked sample for this batch is not from the above project.

proved By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Control Sample (LCS)

Sample Description: Water
Analyst: Deb Dereshkevich

RESULTS (mg/L)

Analyte	EPA Method	True Value	Result	%Rec	Detection Limit	Date Analyzed	MRD Lab Code	Expiration Date
Alk	310.2	80	70	88	20	09 Mar 95	ALK4	31 Jul 95
TC	310.2	80	70	88	20	09 Mar 95	ALK4	31 Jul 95
SO4	375.2	80	84	105	10	21 Mar 95	SO43	15 Aug 95
NO3/NO2	353.2	2.00	2.04	102	0.01	15 Mar 95	NO34	14 Oct 95
P	365.4	1.50	1.51	101	0.01	20 Mar 95	TP4	14 Oct 95

Analyte	LCS Source	LCS Lot Number
Alk	SPEX Industries, Inc.	1-1 COR-A, 1-2 COR-B
TC	SPEX Industries, Inc.	1-1 COR-A, 1-2 COR-B
SO4	SPEX Industries, Inc.	2-4 Anions
NO3/NO2	SPEX Industries, Inc.	1-1 NUT-1
P	SPEX Industries, Inc.	1-2 NUT-2

%Rec: Percent Recovery
Control Limits: 75-125 for %Rec

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

FAMIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)

ample Description: Water
RD Lab Sample No.: 950302-H072
Client Sample No.: IAAP-W-8-004
Analyst: Deb Dereshkevich

Date Sample Taken: 28 Feb 95
Date Sample Received: 01 Mar 95

RESULTS (mg/L)

rocedure	Analysis	Result	Detection Limit	Date Analyzed
PA-310.2	Alkalinity (as $CaCO_3$)	72	20	09 Mar 95
PA-310.2	Bicarbonate (as $CaCO_3$)	72	20	09 Mar 95
PA-375.2	Sulfate	10	10	21 Mar 95
PA-353.2	Nitrate/Nitrite (as N)	0.37	0.01	15 Mar 95
PA-365.4	Total Phosphorus (as P)	0.12	0.01	20 Mar 95

aboratory Comments:

pproved By: Prem. N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

M[illegible]S Number: 3183
o[illegible]ect Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Blank, Blank Spike, Blank Spike Duplicate

p[illegible]e Description: Water
Analyst: Deb Dereshkevich

RESULTS (mg/L)

L[illegible]te	Blank Result	Spike Added	Conc BS	% Rec BS	Conc BSD	%Rec BSD	RPD
	u	100	87	87	91	91	4
3	u	100	87	87	91	91	4
	u	50	49	98	50	100	2
/NO2	0.01	1.00	1.06	105	1.02	101	4
	u	0.25	0.22	88	0.24	96	9

.yte	Procedure	Analysis	Detection Limit	Analysis Date Blank	BS/BSD
	EPA-310.2	Alkalinity (as CaCO3)	20	09 Mar 95	09 Mar 95
3	EPA-310.2	Bicarbonate (as CaCO3)	20	09 Mar 95	09 Mar 95
	EPA-375.2	Sulfate	1	21 Mar 95	21 Mar 95
'N 2	EPA-353.2	Nitrate/Nitrite (as N)	0.01	15 Mar 95	15 Mar 95
	EPA-365.4	Total Phosphorus (as P)	0.01	20 Mar 95	20 Mar 95

u: Below Detection Limit
c: Percent of the spike recovered from the blank
D Relative percent difference = [BS - BSD x 100] / [(BS + BSD) / 2]
r l Limits: 75-125 for %Rec, 25 for RPD

ratory Comments:

c ed By: Prem N. Arora Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMIS Number: 3183
roject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Matrix Duplicate

mple Description: Water
) Lab Sample No.: 950303-H016
lient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 01 Mar 95
Date Sample Received: 02 Mar 95

RESULTS (mg/L)

alyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
c	310.2	190	186	2	20	09 Mar 95

oratory Comments:

e duplicate sample for this batch is not from the above project.

proved By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MIS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Matrix Duplicate

Sample Description: Water **Date Sample Taken:** 01 Mar 95
Lab Sample No.: 950303-H016 **Date Sample Received:** 02 Mar 95
Client Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

Analyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
	310.2	190	186	2	20	09 Mar 95

Laboratory Comments:

Duplicate sample for this batch is not from the above project.

Approved By: Prem N. Arora Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMIS Number: 3183
roject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Matrix Duplicate

mple Description: Water w/seds
D Lab Sample No.: 950321-H035
lient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 20 Mar 95
Date Sample Received: 21 Mar 95

RESULTS (mg/L)

alyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
4	375.2	u	u	NC	0.01	21 Mar 95

u: Below Detection Limit
NC: Not Calculable because the sample and duplicate results were both below the detection limit.

boratory Comments:

e duplicate sample for this batch is not from the above project.

proved By: Prem.N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

A..IS Number: 3183
roject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Matrix Duplicate

mple Description: Water
) Lab Sample No.: 950312-H031
l: ent Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 10 Mar 95
Date Sample Received: 11 Mar 95

RESULTS (mg/L)

alyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
3,	353.2	0.01	0.01	0	0.01	15 Mar 95

oratory Comments:

uplicate sample for this batch is not from the above project.

r ved By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

'AMIS Number: 3183
'roject Name: Iowa AAP - Line 1 & 800 (2/95)
: Identifier: Laboratory Matrix Duplicate

ımple Description: Water
:D Lab Sample No.: 950316-W002
:lient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 15 Mar 95
Date Sample Received: 16 Mar 95

RESULTS (mg/L)

ıalyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit	Date Analyzed
)	365.4	0.04	0.04	0	0.01	20 Mar 95

ıboratory Comments:

ıe duplicate sample for this batch is not from the above project.

)proved By: Prem. N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MRS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water — Date Sample Taken: 01 Mar 95
Lab Sample No.: 950303-H016 — Date Sample Received: 02 Mar 95
Client Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

Line	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
	190*	100	265	94	270	99	2

Line	Procedure	Analysis	Detection Limit	Analysis Date Sample	Analysis Date MS/MSD
	EPA-310.2	Alkalinity (as CaCO3)	20	09 Mar 95	09 Mar 95

0 mL of sample & 10 mL of standard (190)(.90) = 171 used in calculation
e : Percent of the spike recovered from the matrix
PD: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
trol Limits: 75-125 for %Rec, 25 for RPD

atory Comments:

ro d By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMIS Number: 3183
roject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Matrix Spike, Matrix Spike Duplicate

mple Description: Water **Date Sample Taken:** 01 Mar 95
D Lab Sample No.: 950303-H016 **Date Sample Received:** 02 Mar 95
lient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

alyte	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
)3	190*	100	265	94	270	99	2

alyte	Procedure	Analysis	Detection Limit	Analysis Date Sample	MS/MSD
)3	EPA-310.2	Alkalinity (as CaCO3)	20	09 Mar 95	09 Mar 95

)0 mL of sample & 10 mL of standard (190)(.90) = 171 used in calculation
Rec: Percent of the spike recovered from the matrix
RPD: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
ntrol Limits: 75-125 for %Rec, 25 for RPD

)oratory Comments:

roved By: Prem N. Arora Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

MTS Number: 3183
Project Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Matrix Spike, Matrix Spike Duplicate

Sample Description: Water w/seds
Lab Sample No.: 950321-H035
Client Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 20 Feb 95
Date Sample Received: 21 Feb 95

RESULTS (mg/L)

Lab	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
	u	50	48	96	50	100	4

Lab	Procedure	Analysis	Detection Limit	Analysis Date Sample	MS/MSD
	EPA-375.2	Sulfate	1	21 Mar 95	21 Mar 95

u Below Detection Limit
Rec: Percent of the spike recovered from the matrix
RPD: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
Control Limits: 75-125 for %Rec, 25 for RPD

Laboratory Comments:

Approved By: Prem N. Arora Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMIS Number: 3183
roject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Matrix Spike, Matrix Spike Duplicate

mple Description: Water
D Lab Sample No.: 950312-H031
lient Sample No.: Batch Specific
Analyst: Deb Dereshkevich

Date Sample Taken: 10 Mar 95
Date Sample Received: 11 Mar 95

RESULTS (mg/L)

alyte	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
3/NO2	0.01	1.00	0.87	86	0.87	86	0

alyte	Procedure	Analysis	Detection Limit	Analysis Date Sample	MS/MSD
3/NO2	EPA-353.2	Nitrate (as N)	0.01	15 Mar 95	15 Mar 95

Rec: Percent of the spike recovered from the matrix
RPD: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
ntrol Limits: 75-125 for %Rec, 25 for RPD

oratory Comments:

proved By: Prem N. Arora Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

I Number: 3183
j ct Name: Iowa AAP - Line 1 & 800 (2/95)
dentifier: Matrix Spike, Matrix Spike Duplicate

l Description: Water — Date Sample Taken: 15 Mar 95
L b Sample No.: 950316-W002 — Date Sample Received: 16 Mar 95
ent Sample No.: Batch Specific
Analyst: Deb Dereshkevich

RESULTS (mg/L)

y	Sample Result	Spike Added	Conc MS	% Rec MS	Conc MSD	%Rec MSD	RPD
	0.04	0.20	0.24	100	0.23	95	4

y e	Procedure	Analysis	Detection Limit	Analysis Date Sample	MS/MSD
	EPA-365.4	Total Phosphorus (as P)	0.01	20 Mar 95	20 Mar 95

c Percent of the spike recovered from the matrix
D: Relative percent difference = [MS - MSD x 100] / [(MS + MSD) / 2]
rol Limits: 75-125 for %Rec, 25 for RPD

r tory Comments:

spiked sample for this batch is not from the above project.

ov d By: Prem N. Arora Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Alpkem Wet Chemistry

AMIS Number: 3183
roject Name: Iowa AAP - Line 1 & 800 (2/95)
Identifier: Laboratory Control Sample (LCS)

mple Description: Water
Analyst: Deb Dereshkevich

RESULTS (mg/L)

alyte	EPA Method	True Value	Result	%Rec	Detection Limit	Date Analyzed	MRD Lab Code	Expiration Date
c	310.2	80	70	88	20	09 Mar 95	ALK4	31 Jul 95
)3	310.2	80	70	88	20	09 Mar 95	ALK4	31 Jul 95
4	375.2	80	84	105	10	21 Mar 95	SO43	15 Aug 95
3/NO2	353.2	2.00	2.04	102	0.01	15 Mar 95	NO34	14 Oct 95
	365.4	1.50	1.51	101	0.01	20 Mar 95	TP4	14 Oct 95

alyte	LCS Source	LCS Lot Number
c	SPEX Industries, Inc.	1-1 COR-A, 1-2 COR-B
)3	SPEX Industries, Inc.	1-1 COR-A, 1-2 COR-B
4	SPEX Industries, Inc.	2-4 Anions
3/NO2	SPEX Industries, Inc.	1-1 NUT-1
	SPEX Industries, Inc.	1-2 NUT-2

ec: Percent Recovery
ntrol Limits: 75-125 for %Rec

oratory Comments:

roved By: Prem N Arora Date: 3.23.95

ENVIRONMENTAL CHEMICAL CORPORATION

to...	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
rce	Iowa AAP - Line 1 & 800 (2/95)	Project No.:	20673
ul... s:	Nitrate	Date Received:	03/03/95
hod:	EPA 300	Date Analyzed:	03/06/95-03/08/95
Notebook:	440, Pg. 83	**Prep. Batch:**	ICNOS0308
ec... n Limit:	2.0 mg/kg	**Instr. Batch:**	ICNO0308

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
673-001	950302-H005	SOIL	IAAP-SS-1-001	11.4
6...-002	950302-H008	SOIL	IAAP-SS-1-002	BDL
6...-003	950302-H016	SOIL	IAAP-SS-1-003	3.6
673-004	950302-H019	SOIL	IAAP-SS-1-004	4.7
6...-005	950302-H029	SOIL	IAAP-SS-8-001	18.7
673-006	950302-H032	SOIL	IAAP-SS-8-002	7.9
6...-007	950302-H039	SOIL	IAAP-SS-8-003	20.9
6...-008	950302-H042	SOIL	IAAP-SS-8-004	6.6
673-009	950302-H050	SEDIMENT	IAAP-SD-8-001	2.3
6...-010	950302-H053	SEDIMENT	IAAP-SD-8-002	BDL
673-011	950302-H057	SOIL	IAAP-SD-8-003	BDL
67...12	950302-H060	SOIL	IAAP-SD-8-004	BDL

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL C191

ustomer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
ource:	N/A	Project No.:	20673
nalysis:	Nitrate	Date Received:	N/A
lethod:	EPA 300	Date Analyzed:	03/06/95-03/08/95
ab Notebook:	440, Pg. 83	**Prep. Batch:**	ICNOS0308
etection Limit:	2.0 mg/kg	**Instr. Batch:**	ICNO0308

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
20673-006DUP	950302-H032	SOIL	IAAP-SS-8-002	7.4
Blank	N/A	SOIL	N/A	BDL

			SPIKE mg/kg	RECOVERED mg/kg	% RECOVERY
SS	N/A	SOIL	40.0	36.7	92
673-006MS	950302-H032	SOIL	20.0	18.0	90
673-006MSD	950302-H032	SOIL	20.0	17.8	89

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

('192)

or:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
ce:	Iowa AAP - Line 1 & 800 (2/95)	Project No.:	20673
y:	Phosphorus	Date Received:	03/03/95
o:	EPA 365.4	Date Analyzed:	03/08/95
Notebook:	427, pg. 85	**Prep. Batch:**	POS0307
ti n Limit:	0.20 mg/kg	**Instr. Batch:**	POS0308

I B I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
73-001	950302-H005	SOIL	IAAP-SS-1-001	160
7 -002	950302-H008	SOIL	IAAP-SS-1-002	210
7 -003	950302-H016	SOIL	IAAP-SS-1-003	380
73-004	950302-H019	SOIL	IAAP-SS-1-004	256
7 -005	950302-H029	SOIL	IAAP-SS-8-001	105
73-006	950302-H032	SOIL	IAAP-SS-8-002	270
7 -007	950302-H039	SOIL	IAAP-SS-8-003	105
7 -008	950302-H042	SOIL	IAAP-SS-8-004	125
73-009	950302-H050	SEDIMENT	IAAP-SD-8-001	226
7 -010	950302-H053	SEDIMENT	IAAP-SD-8-002	216
73-011	950302-H057	SOIL	IAAP-SD-8-003	170
73 ?	950302-H060	SOIL	IAAP-SD-8-004	226

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL C193

Customer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
Source:	N/A	Project No.:	20673
Analysis:	**Phosphorus**	Date Received:	N/A
Method:	EPA 365.4	Date Analyzed:	03/08/95
Lab Notebook:	427, pg. 85	**Prep. Batch:**	POS0307
Detection Limit:	0.20 mg/kg	**Instr. Batch:**	POS0308

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
20673-003DUP	950302-H016	SOIL	IAAP-SS-1-003	340
Blank	N/A	Water	N/A	0.090 mg/L

			SPIKE mg/L	RECOVERED mg/L	% RECOVERY
LCS	N/A	Water	4.1mg/L	3.9mg/L	95
Blank Spike	N/A	Water	3.5mg/L	3.2mg/L	91
Blank Spike Dup	N/A	Water	3.5mg/L	3.3mg/L	94

BDL: Below Detection Limit

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

AMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Date Sample Taken: 28 Feb 95 Customer Sample No: IAAP-W-8-002
Date Sample Received: 01 Mar 95 MRD Lab Sample No: 950302-H068

Sample Description: Water
Sample Container: 1-1 L poly
Analyst: Matthew Wauson

Procedure	Analyses	Result mg/L	Detection Limits	Date Analyzed
EPA-340.2	Fluoride	0.20	0.1	20 Mar 95
EPA-310.2	Carbonate (as $CaCO_3$)	nrq	20	
EPA-160.1	Total Dissolved Solids	86	5	03 Mar 95
EPA-160.2	Total Suspended Solids	nrq	4	
EPA-180.1	Turbidity (FTU)	nrq	1	
EPA-150.1	pH	7.66		03 Mar 95
EPA-120.1	Conductivity (µmhos/cm)	nrq	10	

nrq: Not Requested
na: Not analyzed
< Below Detection Limit

Laboratory Comments:

Approved By: Fern N. Arms Date: 3.27.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

FAMIS No: 3183
Project: Iowa AAP - Line 1 & 800 (2/95)

Date Sample Taken: 28 Feb 95 **Customer Sample No:** IAAP-W-8-004
Date Sample Received: 01 Mar 95 **MRD Lab Sample No:** 950302-H072

Sample Description: Water
Sample Container: 1-1 L poly
Analyst: Matthew Wauson

Procedure	Analyses	Result mg/L	Detection Limits	Date Analyzed
EPA-340.2	Fluoride	0.18	0.1	20 Mar 95
EPA-310.2	Carbonate (as $CaCO_3$)	nrq	20	
EPA-160.1	Total Dissolved Solids	92	5	03 Mar 95
EPA-160.2	Total Suspended Solids	nrq	4	
EPA-180.1	Turbidity (FTU)	nrq	1	
EPA-150.1	pH	7.62		03 Mar 95
EPA-120.1	Conductivity (μmhos/cm)	nrq	10	

nrq: Not Requested
na: Not analyzed
u: Below Detection Limit

Laboratory Comments:

Approved By: Prem N. Arora Date: 3.22.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Blank, Blank Spike, Blank Spike Duplicate

Project: Iowa AAP - Line 1 & 800 (2/95) (3183)
le Description: Water
Analyst: Matthew Wauson
ate Analyzed: 20 Mar 95

yte	EPA Method	Blank Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD	Detection Limit
	340.2	u	0.50	0.47	94	0.49	98	4	0.10
s		mg/L	mg/L	mg/L	%	mg/L	%	%	mg/L

Below Detection Limit

= Recovery

Blank Spike
= Blank Spike Duplicate

Relative Percent Difference
= [|BS - BSD| x 100] / [(BS + BSD) / 2]

r l Limits: 75-125 for %Rec, 25 for RPD

r tory Comments:

ɔ ed By: Prem N. Arora Date: 3-27-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Matrix, Matrix Duplicate

oject: Iowa AAP - Line 1 & 800 (2/95) (3183)
te Sample Taken: 28 Feb 95 **Customer Sample No:** IAAP-W-8-002
te Sample Received: 01 Mar 95 **Lab Sample No:** 950302-H072
mple Description: Water **Analyst:** Matthew Wauson
mple Container Used: 1-1 L poly **Date Analyzed:** 20 Mar 95

alyte	EPA Method	Sample Result	Duplicate Result	RPD	Detection Limit
?	340.2	0.18	0.17	7	0.10
.ts		mg/L	mg/L	%	mg/L

c = Recovery

= Relative Percent Difference
= [|Sample - Duplicate| x 100] / [(Sample + Duplicate) / 2]

trol Limits: 75-125 for %Rec, 25 for RPD

oratory Comments:

roved By: Prem. N. Arora Date: 3.27.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Matrix Spike, Matrix Spike Duplicate

j ct: Iowa AAP - Line 1 & 800 (2/95) (3183)
e **Sample Taken:** 28 Feb 95 **Customer Sample No:** IAAP-W-8-002
e **Sample Received:** 01 Mar 95 **Lab Sample No:** 950302-H072
p e **Description:** Water **Analyst:** Matthew Wauson
ple **Container Used:** 1-1 L poly **Date Analyzed:** 20 Mar 95

ly e	EPA Method	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD	Detection Limit
	340.2	0.18	0.50	0.68	100	0.68	100	0	0.10
cb		mg/L	mg/L	mg/L	%	mg/L	%	%	mg/L

= Recovery

Matrix Spike
= Matrix Spike Duplicate

Relative Percent Difference
[|MS - MSD| x 100] / [(MS + MSD) / 2]

l Limits: 75-125 for %Rec, 25 for RPD

tory Comments:

oved By: Prem N. Arora Date: 3.27.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Laboratory Control Sample (LCS)

Project: Iowa AAP - Line 1 & 800 (2/95) (3183)
ample Description: Water
Analyst: Matthew Wauson
Date Analyzed: 20 Mar 95

nalyte	EPA Method	True Value	Result	%Rec	Detection Limit
F	340.2	1.0	1.0	100	0.10
nits		mg/L	mg/L	%	mg/L

nalyte	LCS Source	LCS Lot Number	Expiration Date
F	High-Purity Standards	490204	Apr 95

Rec: Percent of the LCS recovered
ontrol Limits: 75-125 for %Rec

aboratory Comments:

pproved By: Prem N. Arora Date 3.27.95

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Matrix, Matrix Duplicate

c : Iowa AAP - Line 1 & 800 (2/95) (3183)
ample No: 950303-H017
e Description: Water **Analyst:** Matthew Wauson
e Container Used: 1-500 mL poly **Date Analyzed:** 03 Mar 95

sis	Sample Run # 1	Results Run # 2	RPD	Acceptable RPD	Detection Limit
	334	332	0.6	25	5
	mg/L	mg/L	%	%	mg/L

= Total Dissolved Solids

= lative Percent Difference
= [Run 1 - Run 2] x 100 / [(Run 1 + Run 2) / 2]

The duplicate sample from this batch is not from the above project.

a ory Comments:

oved By: Prem.n. Arma Date: 3.27.95

C201

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Wet Chemistry

Blank

Project: Iowa AAP - Line 1 & 800 (2/95) (3183)
ıple Description: Water
Analyst: Matthew Wauson
Date Analyzed: 03 Mar 95

ılysis	Result	Units	Detection Limit
	u	mg/L	5

= Total Dissolved Solids

= Below Detection Limit

oratory Comments:

roved By: Prem N. Arora Date: 3.27.95

ENVIRONMENTAL CHEMICAL CORPORATION

tc er:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
rce	Iowa AAP - Line 1 & 800 (2/95)	Project No.:	20673
dy is:	Sulfate	Date Received:	03/03/95
h :	EPA 300	Date Analyzed:	03/08/95
Notebook:	440, Pg. 84	**Prep. Batch:**	ICSOS0308
ec n Limit:	3.0 mg/kg	**Instr. Batch:**	ICSO0308

AB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
673-001	950302-H005	SOIL	IAAP-SS-1-001	38.3
67 -002	950302-H008	SOIL	IAAP-SS-1-002	11.9
6 -003	950302-H016	SOIL	IAAP-SS-1-003	19.0
673-004	950302-H019	SOIL	IAAP-SS-1-004	111
6 -005	950302-H029	SOIL	IAAP-SS-8-001	65.9
67 -006	950302-H032	SOIL	IAAP-SS-8-002	13.8
67 -007	950302-H039	SOIL	IAAP-SS-8-003	19.1
6 -008	950302-H042	SOIL	IAAP-SS-8-004	7.6
673-009	950302-H050	SEDIMENT	IAAP-SD-8-001	216
6 -010	950302-H053	SEDIMENT	IAAP-SD-8-002	23.4
6 -011	950302-H057	SOIL	IAAP-SD-8-003	23.2
673 12	950302-H060	SOIL	IAAP-SD-8-004	62.0

BDL: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL C203

Customer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
Source:	N/A	Project No.:	20673
Analysis:	Sulfate	Date Received:	N/A
Method:	EPA 300	Date Analyzed:	03/08/95
Lab Notebook:	440, Pg. 84	Prep. Batch:	ICSOS0308
Detection Limit:	3.0 mg/kg	Instr. Batch:	ICSO0308

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE mg/kg
20673-006DUP	950302-H032	SOIL	IAAP-SS-8-002	13.6
Blank	N/A	SOIL	N/A	BDL

			SPIKE mg/kg	RECOVERED mg/kg	% RECOVERY
LCSS	N/A	SOIL	300	293	98
20673-006MS	950302-H032	SOIL	240	230	96
20673-006MSD	950302-H032	SOIL	240	235	98

BDL: Below Detection Limit

E. VIRONMENTAL CHEMICAL CORPORATION

ıe	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
	Iowa AAP - Line 1 & 800 (2/95)	Project No.:	20673
is	pH	Date Received:	03/03/95
l:	EPA 150.1	Date Analyzed:	03/03/95
tebook:	458, Pg. 4	**Prep. Batch:**	PHS0303
		Instr. Batch:	PH0303

AI	I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE
3-001		950302-H005	SOIL	IAAP-SS-1-001	7.051
3-002		950302-H008	SOIL	IAAP-SS-1-002	7.046
3-003		950302-H016	SOIL	IAAP-SS-1-003	7.637
3-004		950302-H019	SOIL	IAAP-SS-1-004	7.226
3-005		950302-H029	SOIL	IAAP-SS-8-001	7.140
3-006		950302-H032	SOIL	IAAP-SS-8-002	7.474
3-007		950302-H039	SOIL	IAAP-SS-8-003	7.173
3-008		950302-H042	SOIL	IAAP-SS-8-004	7.428
3-009		950302-H050	SEDIMENT	IAAP-SD-8-001	7.090
3-010		950302-H053	SEDIMENT	IAAP-SD-8-002	6.923
3-011		950302-H057	SOIL	IAAP-SD-8-003	7.088
3-012		950302-H060	SOIL	IAAP-SD-8-004	6.980

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

Customer:	US ARMY CORPS OF ENGINEERS	WORK ORDER:	1623
Source:	N/A	Project No.:	20673
Analysis:	pH	Date Received:	N/A
Method:	EPA 150.1	Date Analyzed:	03/03/95
Lab Notebook:	458, Pg. 4	**Prep. Batch:**	PHS0303
		Instr. Batch:	PH0303

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	LOCATION	VALUE
20673-006DUP	950302-H032	SOIL	IAAP-SS-8-002	7.492

			TRUE VALUE	RECOVERED	% RECOVERY
LCS	N/A	Water	5.1	5.4	106

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

O: 3183
ct: Iowa AAP - Line 1 & 800 (2/95)
S aple Taken: 28 Feb 95 **Customer Sample No:** IAAP-SS-1-001
S aple Received: 01 Mar 95 **Lab Sample No:** 950302-H004
e **Description:** Soil

sis No.	Analysis	Result	Units	Detection Limits	Date Completed
0)	Flash Point	>160 *	°F	N/A	22 Mar 95

Not Applicable

s : Bob Jordan

> = Greater Than
* The submitted soil sample is not flammable.

ved by: Norman Arora Date: 3-23-95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

IS NO: 3183
ject: Iowa AAP - Line 1 & 800 (2/95)
e Sample Taken: 28 Feb 95 Customer Sample No: IAAP-SS-1-003
e Sample Received: 01 Mar 95 Lab Sample No: 950302-H015
ple Description: Soil

lysis c. No.	Analysis	Result	Units	Detection Limits	Date Completed
-1010	Flash Point	>160 *	°F	N/A	22 Mar 95

= Not Applicable

lyst: Bob Jordan

> = Greater Than
* = The submitted soil sample is not flammable.

:oved by: Prem N. Arora Date: 3.23.95

C208

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

S NO: 3183
e t: Iowa AAP - Line 1 & 800 (2/95)
Sample Taken: 28 Feb 95 **Customer Sample No:** IAAP-SS-8-001
ample Received: 01 Mar 95 **Lab Sample No:** 950302-H028
l Description: Soil

ysis No.	Analysis	Result	Units	Detection Limits	Date Completed
1010	Flash Point	>160 *	°F	N/A	22 Mar 95

= Not Applicable

y t: Bob Jordan

> = Greater Than
* = The submitted soil sample is not flammable.

o ed by: Prem. N. Amar Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

MIS NO: 3183
oject: Iowa AAP - Line 1 & 800 (2/95)
te Sample Taken: 28 Feb 95 **Customer Sample No:** IAAP-SS-8-004
te Sample Received: 01 Mar 95 **Lab Sample No:** 950302-H043
mple Description: Soil

alysis oc. No.	Analysis	Result	Units	Detection Limits	Date Completed
A-1010	Flash Point	>160 *	°F	N/A	22 Mar 95

A = Not Applicable

alyst: Bob Jordan

> = Greater Than
* = The submitted soil sample is not flammable.

proved by: Prem. N. Arm Date: 3.23.95

C210

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

I. NO: 3183
ject: Iowa AAP - Line 1 & 800 (2/95)
e Sample Taken: 28 Feb 95 **Customer Sample No:** IAAP-SS-8-003
e Sample Received: 01 Mar 95 **Lab Sample No:** 950302-H056
ple Description: Sediment

lysis No.	Analysis	Result	Units	Detection Limits	Date Completed
-1010	Flash Point	>160 *	°F	N/A	22 Mar 95

= Not Applicable

lyst: Bob Jordan

> = Greater Than
= The submitted sediment sample is not flammable.

oved by: Prem. N. Arna Date: 3.23.95

C211

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

IS NO: 3183
ject: Iowa AAP - Line 1 & 800 (2/95)
e Sample Taken: 28 Feb 95 **Customer Sample No:** IAAP-SD-8-004
e Sample Received: 01 Mar 95 **Lab Sample No:** 950302-H059
ple Description: Sediment

lysis c. No.	Analysis	Result	Units	Detection Limits	Date Completed
-1010	Flash Point	>160 *	°F	N/A	22 Mar 95

= Not Applicable

lyst: Bob Jordan

> = Greater Than
* = The submitted sediment sample is not flammable.

roved by: Lynn N. Brown Date: 3.23.95

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Chemical Oxygen Demand (COD)

LIMS#: 3183
oject: Iowa AAP - Line 1 & 800 (2/95)

ate Sample Taken: 28 Feb 95
ate Sample Received: 01 Mar 95
Sample Description: Water

Customer Sample: IAAP-W-8-002
Lab Sample No: 950302-H068
Container: 1-1 L poly

traction/Analysis Method: EPA Method 410.1
Date Analyzed: 24 Mar 95
Analyst: D. Sanders

RESULTS (mg/L)

Analysis for	Result	Detection Limits
Chemical Oxygen Demand	u	5

u: Below Detection Limit

oc ..ory Comments:

roved by: Prem N. Arora Date: 3.28.95

X: CA

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Chemical Oxygen Demand (COD)

LIMS#: 3183
'roject: Iowa AAP - Line 1 & 800 (2/95)

Date Sample Taken:	28 Feb 95	Customer Sample:	IAAP-W-8-004
Date Sample Received:	01 Mar 95	Lab Sample No:	950302-H072
Sample Description:	Water	Container:	1-1 L poly

:xtraction/Analysis Method: EPA Method 410.1
Date Analyzed: 24 Mar 95
Analyst: D. Sanders

RESULTS (mg/L)

Analysis for	Result	Detection Limits
Chemical Oxygen Demand	u	5

u: Below Detection Limit

aboratory Comments:

pproved by: Prem N. Arora Date: 3.28.95
DESA

C214

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Chemical Oxygen Demand (COD) Method Blank

LMS#: 3183
ject: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
raction/Analysis Method: EPA Method 410.1
Date Analyzed: 24 Mar 95

Analyst: D. Sanders

RESULTS (mg/L)

Analysis for	Result	Detection Limits
Chemical Oxygen Demand	u	5

u Below Detection Limit

oratory Comments:

r ved by: Prem N. Arora Date: 3.28.95
ESA

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Chemical Oxygen Demand (COD) Matrix Duplicate

IMS#: 3183
oject: Iowa AAP - Line 1 & 800 (2/95)

MRD Lab Sample No: 950322-H036
Client Sample No: Batch Specific
Sample Description: Water
raction/Analysis Method: EPA Method 410.1
Date Analyzed: 24 Mar 95

Analyst: D. Sanders

RESULTS (mg/L)

Analysis for	Run #1	Run #2	Detection Limits	RPD*	Acceptable RPD
COD	5	5	5	0	25

Below Detection Limit

Relative Percent Difference (RPD) is calculated from both results, and is not reported when either result is below the detection limit.

roved by: Prem N. Arora Date: 3-28-95
DESA

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Chemical Oxygen Demand (COD)
Matrix Spike, Matrix Spike Duplicate

IMS#: 3183
j ct: Iowa AAP - Line 1 & 800 (2/95)

MRD Lab Sample No: 950322-H036
Client Sample No: Batch Specific
Sample Description: Water
raction/Analysis Method: EPA Method 410.1
Date Analyzed: 24 Mar 95

Analyst: D. Sanders

RESULTS (mg/L)

l te	Sample Res #1	Spike Added	Conc MS	%Rec MS	Sample Res #2	Conc MSD	%Rec MSD	RPD	Recovery Limits
D	5	25	30	100	5	29	98	1.7	80-120

: Below Detection Limit
M : Matrix Spike
SD: Matrix Spike Duplicate
ec: Percent of the spike recovered from the matrix
P : Relative Percent Difference;

RPD = ((|MS - MSD|)/((MS + MSD)/2)) x 100
Acceptable RPD = 25

roved by: Frem. N. Amn Date: 3-28-95
) SA

C217

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Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Chemical Oxygen Demand (COD)
Laboratory Control Sample (LCS)

LIMS#: 3183
:oject: Iowa AAP - Line 1 & 800 (2/95)

Sample Description: Water
LCS Source: Mallinckrodt
Lot Number: 6704 KBRZ
:traction/Analysis Method: EPA Method 410.1
Date Analyzed: 24 Mar 95

Analyst: D. Sanders

RESULTS (mg/L)

:nalyte	Sample Results	True Value	%Rec	Recovery Limits	Detection Limit
COD	49	50	98	80-120	5

Rec: Percent of the spike recovered from the matrix

proved by: Poem N. Arna Date: 3-28-95
DESA

PART D

QUALITY ASSURANCE TEST RESULTS

01

Continental Analytical
SERVICES, INC.

03/23/95

US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Received: 03/03/95
CAS File No.: 5409
CAS Order No.: 27732
Project No.: 3183, WO#375
Your P.O.: DACW45-93-A-0025

Dear Ms. Percifield:

Enclosed are the laboratory reports for the following samples:

CAS LAB ID #	SAMPLE DESCRIPTION	DATE SAMPLED
95030246	950302-H024	02/28/95
95030247	950302-H048	02/28/95
95030248	950302-H064	02/28/95
95030249	950302-H076	02/28/95
95030250	950302-H065	02/28/95
95030251	950302-H077	02/28/95

Thank you for choosing CAS for this project. If you have any questions, please contact me at 800-535-3076.

CONTINENTAL ANALYTICAL SERVICES, INC.

Gregory J. Groene
Project Manager

1804 Glendale Road • Salina, Kansas 67401-6675
913-827-1273 • 800-535-3076 • FAX 913-823-7830

Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/23/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 95030246
Sample Description: 950302-H024

Date Sampled: 02/28/95
Time Sampled: 1420

Analysis	Concentration	Units	Date Analyzed	Book/Page
Explosives Method 8330			03/17/95	/
1,3,5-Trinitrobenzene	ND(0.25)	mg/kg Air Dry		2289/142
1,3-Dinitrobenzene	ND(0.25)	mg/kg Air Dry		2289/142
2,4,6-Trinitrotoluene	0.53	mg/kg Air Dry		2289/142
2,4-Dinitrotoluene	ND(0.25)	mg/kg Air Dry		2289/142
2,6-Dinitrotoluene	ND(0.25)	mg/kg Air Dry		2289/142
2-Amino-4,6-Dinitrotoluene	ND(0.25)	mg/kg Air Dry		2289/142
4-Amino-2,6-Dinitrotoluene	ND(0.25)	mg/kg Air Dry		2289/142
HMX	0.29	mg/kg Air Dry		2289/142
m-Nitrotoluene	ND(0.25)	mg/kg Air Dry		2289/142
Nitrobenzene	ND(0.25)	mg/kg Air Dry		2289/142
o-Nitrotoluene	ND(0.25)	mg/kg Air Dry		2289/142
p-Nitrotoluene	ND(0.25)	mg/kg Air Dry		2289/142
RDX	0.26	mg/kg Air Dry		2289/142
Tetryl	ND(0.25)	mg/kg Air Dry		2289/142
Solids, Total	77.	% By Weight	03/06/95	2511/81
Antimony, Total	ND(6)	mg/kg Dry Wt.	03/10/95	2461/52
Arsenic, Total	3.	mg/kg Dry Wt.	03/10/95	2580/14
Beryllium, Total	ND(0.5)	mg/kg Dry Wt.	03/13/95	2602/30
Cadmium, Total	ND(0.6)	mg/kg Dry Wt.	03/13/95	2602/30
Chromium, Total	20.	mg/kg Dry Wt.	03/13/95	2602/30
Copper, Total	10.	mg/kg Dry Wt.	03/13/95	2602/30
Lead, Total	14.	mg/kg Dry Wt.	03/10/95	2551/37
Mercury, Total	ND(0.1)	mg/kg Dry Wt.	03/06/95	2514/69
Nickel, Total	9.	mg/kg Dry Wt.	03/13/95	2602/30
Selenium, Total	ND(0.6)	mg/kg Dry Wt.	03/10/95	2409/99
Silver, Total	ND(1)	mg/kg Dry Wt.	03/15/95	2602/37
Thallium, Total	ND(1)	mg/kg Dry Wt.	03/13/95	2485/28
Zinc, Total	32.	mg/kg Dry Wt.	03/15/95	2602/35

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Explosives Method 8330	03/08/95	950308-2	JDL	8330
Solids, Total	NA	950306-1	BLP	160.3/SM2540 B
Antimony, Total	03/09/95	950309-2	MLH	204.2/7041
Arsenic, Total	03/09/95	950309-1	MLH	206.2/7060
Beryllium, Total	03/09/95	950309-2	MAG	200.7/6010A
Cadmium, Total	03/09/95	950309-2	MAG	200.7/6010A
Chromium, Total	03/09/95	950309-2	MAG	200.7/6010A
Copper, Total	03/09/95	950309-2	MAG	200.7/6010A
Lead, Total	03/09/95	950309-1	MLH	239.2/7421

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CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT Page: 2

Client: US Army Corps of Engineers
Lab Number: 95030246

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Mercury, Total	03/06/95	950306-1	BAB	245.1/7470/7471
Nickel, Total	03/09/95	950309-2	MAG	200.7/6010A
Selenium, Total	03/09/95	950309-1	MLH	270.2/7740
Silver, Total	03/09/95	950309-2	MAG	200.7/6010A
Thallium, Total	03/09/95	950309-1	MLH	279.2/7841
Zinc, Total	03/09/95	950309-2	MAG	200.7/6010A

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CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker

Clifford J. Baker
Laboratory Director

CAS

D4

Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/23/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 95030247
Sample Description: 950302-H048

Date Sampled: 02/28/95
Time Sampled: 1535

Analysis	Concentration	Units	Date Analyzed	Book/Page
Explosives Method 8330			03/17/95	/
1,3,5-Trinitrobenzene	290.	mg/kg Air Dry		2289/142
1,3-Dinitrobenzene	ND(50)	mg/kg Air Dry		2289/142
2,4,6-Trinitrotoluene	57000.	mg/kg Air Dry		2289/142
2,4-Dinitrotoluene	ND(50)	mg/kg Air Dry		2289/142
2,6-Dinitrotoluene	ND(50)	mg/kg Air Dry		2289/142
2-Amino-4,6-Dinitrotoluene	ND(50)	mg/kg Air Dry		2289/142
4-Amino-2,6-Dinitrotoluene	ND(50)	mg/kg Air Dry		2289/142
HMX	2800.	mg/kg Air Dry		2289/142
m-Nitrotoluene	ND(50)	mg/kg Air Dry		2289/142
Nitrobenzene	ND(50)	mg/kg Air Dry		2289/142
o-Nitrotoluene	ND(50)	mg/kg Air Dry		2289/142
p-Nitrotoluene	ND(50)	mg/kg Air Dry		2289/142
RDX	15000.	mg/kg Air Dry		2289/142
Tetryl	ND(50)	mg/kg Air Dry		2289/142
Solids, Total	72.	% By Weight	03/06/95	2511/81
Antimony, Total	ND(7)	mg/kg Dry Wt.	03/10/95	2461/52
Arsenic, Total	9.	mg/kg Dry Wt.	03/10/95	2580/14
Beryllium, Total	0.8	mg/kg Dry Wt.	03/13/95	2602/30
Cadmium, Total	ND(0.7)	mg/kg Dry Wt.	03/13/95	2602/30
Chromium, Total	307.	mg/kg Dry Wt.	03/13/95	2602/30
Copper, Total	438.	mg/kg Dry Wt.	03/13/95	2602/30
Lead, Total	47.	mg/kg Dry Wt.	03/10/95	2551/38
Mercury, Total	0.5	mg/kg Dry Wt.	03/06/95	2514/69
Nickel, Total	19.	mg/kg Dry Wt.	03/13/95	2602/30
Selenium, Total	ND(0.7)	mg/kg Dry Wt.	03/10/95	2409/99
Silver, Total	ND(1)	mg/kg Dry Wt.	03/15/95	2602/37
Thallium, Total	ND(1)	mg/kg Dry Wt.	03/13/95	2485/27
Zinc, Total	233.	mg/kg Dry Wt.	03/15/95	2602/35

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Explosives Method 8330	03/08/95	950308-2	JDL	8330
Solids, Total	NA	950306-1	BLP	160.3/SM2540 B
Antimony, Total	03/09/95	950309-2	MLH	204.2/7041
Arsenic, Total	03/09/95	950309-1	MLH	206.2/7060
Beryllium, Total	03/09/95	950309-2	MAG	200.7/6010A
Cadmium, Total	03/09/95	950309-2	MAG	200.7/6010A
Chromium, Total	03/09/95	950309-2	MAG	200.7/6010A
Copper, Total	03/09/95	950309-2	MAG	200.7/6010A
Lead, Total	03/09/95	950309-1	MLH	239.2/7421

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CONTINENTAL ANALYTICAL SERVICES, INC.

LABORATORY REPORT Page: 4

Client: US Army Corps of Engineers
Lab Number: 95030247

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Mercury, Total	03/06/95	950306-1	BAB	245.1/7470/7471
Nickel, Total	03/09/95	950309-2	MAG	200.7/6010A
Selenium, Total	03/09/95	950309-1	MLH	270.2/7740
Silver, Total	03/09/95	950309-2	MAG	200.7/6010A
Thallium, Total	03/09/95	950309-1	MLH	279.2/7841
Zinc, Total	03/09/95	950309-2	MAG	200.7/6010A

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CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

CAS

Continental Analytical
SERVICES, INC.

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/23/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 95030248
Sample Description: 950302-H064

Date Sampled: 02/28/95
Time Sampled: 1045

Analysis	Concentration	Units	Date Analyzed	Book/Page
Solids, Total	49.	% By Weight	03/06/95	2511/81
Antimony, Total	ND(2)	mg/kg Dry Wt.	03/10/95	2461/52
Arsenic, Total	4.	mg/kg Dry Wt.	03/10/95	2580/15
Beryllium, Total	1.0	mg/kg Dry Wt.	03/13/95	2602/30
Cadmium, Total	0.7	mg/kg Dry Wt.	03/13/95	2602/30
Chromium, Total	217.	mg/kg Dry Wt.	03/13/95	2602/30
Copper, Total	261.	mg/kg Dry Wt.	03/13/95	2602/30
Lead, Total	24.	mg/kg Dry Wt.	03/10/95	2551/38
Mercury, Total	ND(0.2)	mg/kg Dry Wt.	03/06/95	2514/69
Nickel, Total	24.5	mg/kg Dry Wt.	03/13/95	2602/30
Selenium, Total	ND(0.2)	mg/kg Dry Wt.	03/10/95	2409/99
Silver, Total	ND(0.4)	mg/kg Dry Wt.	03/15/95	2602/37
Thallium, Total	ND(0.4)	mg/kg Dry Wt.	03/13/95	2485/28
Zinc, Total	253.	mg/kg Dry Wt.	03/15/95	2602/35

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Solids, Total	NA	950306-1	BLP	160.3/SM2540 B
Antimony, Total	03/09/95	950309-2	MLH	204.2/7041
Arsenic, Total	03/09/95	950309-1	MLH	206.2/7060
Beryllium, Total	03/09/95	950309-2	MAG	200.7/6010A
Cadmium, Total	03/09/95	950309-2	MAG	200.7/6010A
Chromium, Total	03/09/95	950309-2	MAG	200.7/6010A
Copper, Total	03/09/95	950309-2	MAG	200.7/6010A
Lead, Total	03/09/95	950309-1	MLH	239.2/7421
Mercury, Total	03/06/95	950306-1	BAB	245.1/7470/7471
Nickel, Total	03/09/95	950309-2	MAG	200.7/6010A
Selenium, Total	03/09/95	950309-1	MLH	270.2/7740
Silver, Total	03/09/95	950309-2	MAG	200.7/6010A
Thallium, Total	03/09/95	950309-1	MLH	279.2/7841
Zinc, Total	03/09/95	950309-2	MAG	200.7/6010A

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CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/23/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 95030249
Sample Description: 950302-H076

Date Sampled: 02/28/95
Time Sampled: 0845

Analysis	Concentration	Units	Date Analyzed	Book/Page
Antimony, Total	ND(0.006)	mg/L	03/08/95	2220/90
Arsenic, Total	ND(0.01)	mg/L	03/07/95	2401/66
Beryllium, Total	ND(0.004)	mg/L	03/10/95	2602/25
Cadmium, Total	ND(0.005)	mg/L	03/10/95	2602/25
Chromium, Total	ND(0.01)	mg/L	03/10/95	2602/26
Copper, Total	ND(0.02)	mg/L	03/10/95	2602/25
Lead, Total	ND(0.003)	mg/L	03/07/95	2551/33
Mercury, Total	ND(0.0002)	mg/L	03/10/95	2514/71
Nickel, Total	ND(0.04)	mg/L	03/10/95	2602/25
Selenium, Total	ND(0.005)	mg/L	03/07/95	2409/96
Silver, Total	ND(0.01)	mg/L	03/10/95	2602/25
Thallium, Total	ND(0.002)	mg/L	03/08/95	2370/20
Zinc, Total	ND(0.02)	mg/L	03/10/95	2602/25

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Antimony, Total	03/06/95	950306-2	HJW	204.2/7041
Arsenic, Total	03/06/95	950306-3	MLH	206.2/7060
Beryllium, Total	03/06/95	950306-2	MAG	200.7/6010A
Cadmium, Total	03/06/95	950306-2	MAG	200.7/6010A
Chromium, Total	03/06/95	950306-2	MAG	200.7/6010A
Copper, Total	03/06/95	950306-2	MAG	200.7/6010A
Lead, Total	03/06/95	950306-3	MLH	239.2/7421
Mercury, Total	03/09/95	950309-1	BAB	245.1/7470/7471
Nickel, Total	03/06/95	950306-2	MAG	200.7/6010A
Selenium, Total	03/06/95	950306-3	MLH	270.2/7740
Silver, Total	03/06/95	950306-2	MAG	200.7/6010A
Thallium, Total	03/06/95	950306-3	HJW	279.2/7841
Zinc, Total	03/06/95	950306-2	MAG	200.7/6010A

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CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/23/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 95030250
Sample Description: 950302-H065

Date Sampled: 02/28/95
Time Sampled: 1045

Analysis	Concentration	Units	Date Analyzed	Book/Page
Explosives Method 8330			03/17/95	/
1,3,5-Trinitrobenzene	ND(0.25)	mg/kg Air Dry		2289/143
1,3-Dinitrobenzene	ND(0.25)	mg/kg Air Dry		2289/143
2,4,6-Trinitrotoluene	27.	mg/kg Air Dry		2289/143
2,4-Dinitrotoluene	ND(0.25)	mg/kg Air Dry		2289/143
2,6-Dinitrotoluene	ND(0.25)	mg/kg Air Dry		2289/143
2-Amino-4,6-Dinitrotoluene	ND(0.25)	mg/kg Air Dry		2289/143
4-Amino-2,6-Dinitrotoluene	ND(0.25)	mg/kg Air Dry		2289/143
HMX	1.8	mg/kg Air Dry		2289/143
m-Nitrotoluene	ND(0.25)	mg/kg Air Dry		2289/143
Nitrobenzene	ND(0.25)	mg/kg Air Dry		2289/143
o-Nitrotoluene	ND(0.25)	mg/kg Air Dry		2289/143
p-Nitrotoluene	ND(0.25)	mg/kg Air Dry		2289/143
RDX	2.1	mg/kg Air Dry		2289/143
Tetryl	ND(0.25)	mg/kg Air Dry		2289/143
Solids, Total	79.	% By Weight	03/06/95	2511/81

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Explosives Method 8330	03/08/95	950308-2	JDL	8330
Solids, Total	NA	950306-1	BLP	160.3/SM2540 B

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CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/23/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 95030251
Sample Description: 950302-H077

Date Sampled: 02/28/95
Time Sampled: 0845

Analysis	Concentration	Units	Date Analyzed	Book/Page
Explosives Method 8330			03/08/95	/
1,3,5-Trinitrobenzene	ND(.25)	µg/L		2289/139
1,3-Dinitrobenzene	ND(.25)	µg/L		2289/139
2,4,6-Trinitrotoluene	ND(.25)	µg/L		2289/139
2,4-Dinitrotoluene	ND(.25)	µg/L		2289/139
2,6-Dinitrotoluene	ND(.26)	µg/L		2289/139
2-Amino-4,6-Dinitrotoluene	3.5	µg/L		2289/139
4-Amino-2,6-Dinitrotoluene	ND(.25)	µg/L		2289/139
HMX	8.5	µg/L		2289/139
m-Nitrotoluene	ND(.25)	µg/L		2289/139
Nitrobenzene	ND(.26)	µg/L		2289/139
o-Nitrotoluene	ND(.25)	µg/L		2289/139
p-Nitrotoluene	ND(.25)	µg/L		2289/139
RDX	35.	µg/L		2289/139
Tetryl	ND(.65)	µg/L		2289/139

Analysis	Date Prepared	QC Batch	Analyst	Analytical Method
Explosives Method 8330	03/07/95	950307-1	JDL	8330

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CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

ab Number: 950306BLK1 — Date Prepared: 03/06/95

Analysis	Concentration	Units	QC Batch	Book/Page
olids, Total	100.	% By Weight	950306-1	2511/80
Mercury, Total	ND(0.1)	mg/kg	950306-1	2514/69

Conclusion of lab number 950306BLK1

ab Number: 950306BLK2 — Date Prepared: 03/06/95

Analysis	Concentration	Units	QC Batch	Book/Page
ntimony, Total	ND(0.006)	mg/L	950306-2	2220/90
eryllium, Total	ND(0.004)	mg/L	950306-2	2602/25
Cadmium, Total	ND(0.005)	mg/L	950306-2	2602/25
mium, Total	ND(0.01)	mg/L	950306-2	2602/26
er, Total	ND(0.02)	mg/L	950306-2	2602/25
ickel, Total	ND(0.04)	mg/L	950306-2	2602/25
Silver, Total	ND(0.01)	mg/L	950306-2	2602/25
inc, Total	ND(0.02)	mg/L	950306-2	2602/25

Conclusion of lab number 950306BLK2

ab Number: 950306BLK3 — Date Prepared: 03/06/95

nalysis	Concentration	Units	QC Batch	Book/Page
rsenic, Total	ND(0.01)	mg/L	950306-3	2401/66
Lead, Total	ND(0.003)	mg/L	950306-3	2551/33
elenium, Total	ND(0.005)	mg/L	950306-3	2409/96
hallium, Total	ND(0.002)	mg/L	950306-3	2370/20

Conclusion of lab number 950306BLK3

ab Number: 950307BLK1 — Date Prepared: 03/07/95

nalysis	Concentration	Units	QC Batch	Book/Page
Explosives Method 8330			950307-1	

-Continued-

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 950307BLK1 Date Prepared: 03/07/95

Analysis	Concentration	Units	QC Batch	Book/Page
1,3,5-Trinitrobenzene	ND(.25)	µg/L		2289/139
1,3-Dinitrobenzene	ND(.25)	µg/L		2289/139
2,4,6-Trinitrotoluene	ND(.25)	µg/L		2289/139
2,4-Dinitrotoluene	ND(.25)	µg/L		2289/139
2,6-Dinitrotoluene	ND(.26)	µg/L		2289/139
2-Amino-4,6-Dinitrotoluene	ND(.25)	µg/L		2289/139
4-Amino-2,6-Dinitrotoluene	ND(.25)	µg/L		2289/139
HMX	ND(2.2)	µg/L		2289/139
m-Nitrotoluene	ND(.25)	µg/L		2289/139
Nitrobenzene	ND(.26)	µg/L		2289/139
o-Nitrotoluene	ND(.25)	µg/L		2289/139
p-Nitrotoluene	ND(.25)	µg/L		2289/139
RDX	ND(1.0)	µg/L		2289/139
Tetryl	ND(.65)	µg/L		2289/139

Conclusion of lab number 950307BLK1

Lab Number: 950308BLK2 Date Prepared: 03/08/95

Analysis	Concentration	Units	QC Batch	Book/Page
Explosives Method 8330			950308-2	
1,3,5-Trinitrobenzene	ND(0.25)	mg/kg		2289/142
1,3-Dinitrobenzene	ND(0.25)	mg/kg		2289/142
2,4,6-Trinitrotoluene	ND(0.25)	mg/kg		2289/142
2,4-Dinitrotoluene	ND(0.25)	mg/kg		2289/142
2,6-Dinitrotoluene	ND(0.25)	mg/kg		2289/142
2-Amino-4,6-Dinitrotoluene	ND(0.25)	mg/kg		2289/142
4-Amino-2,6-Dinitrotoluene	ND(0.25)	mg/kg		2289/142
HMX	ND(0.25)	mg/kg		2289/142
m-Nitrotoluene	ND(0.25)	mg/kg		2289/142
Nitrobenzene	ND(0.25)	mg/kg		2289/142
o-Nitrotoluene	ND(0.25)	mg/kg		2289/142
p-Nitrotoluene	ND(0.25)	mg/kg		2289/142
RDX	ND(0.25)	mg/kg		2289/142
Tetryl	ND(0.25)	mg/kg		2289/142

Conclusion of lab number 950308BLK2

-Continued-

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
METHOD BLANK DATA

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 950309BLK1 — Date Prepared: 03/09/95

Analysis	Concentration	Units	QC Batch	Book/Page
Arsenic, Total	ND(1)	mg/kg	950309-1	2580/14
Lead, Total	ND(0.5)	mg/kg	950309-1	2551/37
Mercury, Total	ND(0.0002)	mg/L	950309-1	2514/73
Selenium, Total	ND(0.5)	mg/kg	950309-1	2409/99
Thallium, Total	ND(1)	mg/kg	950309-1	2485/27

Conclusion of lab number 950309BLK1

Lab Number: 950309BLK2 — Date Prepared: 03/09/95

Analysis	Concentration	Units	QC Batch	Book/Page
Antimony, Total	ND(5)	mg/kg	950309-2	2461/52
Beryllium, Total	ND(0.4)	mg/kg	950309-2	2602/30
Cadmium, Total	ND(0.5)	mg/kg	950309-2	2602/30
Chromium, Total	ND(1)	mg/kg	950309-2	2602/30
Copper, Total	ND(2)	mg/kg	950309-2	2602/30
Nickel, Total	ND(4)	mg/kg	950309-2	2602/30
Silver, Total	ND(1)	mg/kg	950309-2	2602/37
Zinc, Total	ND(2)	mg/kg	950309-2	2602/35

Conclusion of lab number 950309BLK2

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in EPA publication, SW-846, 3rd edition, Nov. 1986 and the latest promulgated update.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 950306LCS1

Date Prepared: 03/06/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Mercury, Total	950306-1	2.5	mg/kg	102	108	105	80-120	5.7	20
Solids, Total	950306-1	80	% By	100	100	100	90-110	0.0	20

Conclusion of Lab Number 950306LCS1

Lab Number: 950306LCS2

Date Prepared: 03/06/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Antimony, Total	950306-2	0.05	mg/L	105	115	110	80-120	9.1	20
Beryllium, Total	950306-2	0.50	mg/L	89.0	90.0	89.5	80-120	1.1	20
Cadmium, Total	950306-2	0.50	mg/L	86.0	86.0	86.0	80-120	0.0	20
Chromium, Total	950306-2	5.0	mg/L	102	103	103	80-120	1.0	20
Copper, Total	950306-2	5.0	mg/L	88.0	91.0	89.5	80-120	3.4	20
Nickel, Total	950306-2	5.0	mg/L	87.0	87.0	87.0	80-120	0.0	20
Silver, Total	950306-2	0.50	mg/L	92.0	92.0	92.0	80-120	0.0	20
Zinc, Total	950306-2	5.0	mg/L	86.0	88.0	87.0	80-120	2.3	20

Conclusion of Lab Number 950306LCS2

Lab Number: 950306LCS3

Date Prepared: 03/06/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Arsenic, Total	950306-3	0.05	mg/L	101	105	103	80-120	3.9	20
Lead, Total	950306-3	0.05	mg/L	97.0	97.0	97.0	80-120	0.0	20
Selenium, Total	950306-3	0.05	mg/L	107	102	105	80-120	4.8	20
Thallium, Total	950306-3	0.03	mg/L	111	113	112	80-120	1.8	20

-Continued-

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 950306LCS3

Date Prepared: 03/07/95

Conclusion of Lab Number: 950306LCS3

Lab Number: 950307LCS1

Date Prepared: 03/07/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Explosives Method 833	950307-1								
1,3,5-Trinitrobenze		1.3	µg/L	104	102	103	50-125	1.9	40
1,3-Dinitrobenzene		1.3	µg/L	90.0	90.0	90.0	50-125	0.0	40
2,4,6-Trinitrotolue		1.3	µg/L	87.0	88.0	87.5	50-125	1.1	40
2,4-Dinitrotoluene		1.3	µg/L	102	102	102	50-125	0.0	40
2,6-Dinitrotoluene		1.3	µg/L	73.0	75.0	74.0	50-125	2.7	40
2-Amino-4,6-Dinitro		1.3	µg/L	93.0	96.0	94.5	50-125	3.2	40
4-Amino-2,6-Dinitro		1.3	µg/L	88.0	89.0	88.5	50-125	1.1	40
HMX		1.3	µg/L	123	117	120	50-125	5.0	40
-Nitrotoluene		1.3	µg/L	90.0	94.0	92.0	50-125	4.3	40
trobenzene		1.3	µg/L	105	102	104	50-125	2.9	40
o-Nitrotoluene		1.3	µg/L	94.0	96.0	95.0	50-125	2.1	40
p-Nitrotoluene		1.3	µg/L	89.0	91.0	90.0	50-125	2.2	40
RDX		1.3	µg/L	73.0	71.0	72.0	50-125	2.8	40
Tetryl		1.3	µg/L	87.0	88.0	87.5	5-100	1.1	40

Conclusion of Lab Number 950307LCS1

Lab Number: 950308LCS2

Date Prepared: 03/08/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Explosives Method 833	950308-2								
1,3,5-Trinitrobenze		1.0	mg/kg	112	107	110	50-125	4.6	40
1,3-Dinitrobenzene		1.0	mg/kg	105	108	107	50-125	2.8	40
2,4,6-Trinitrotolue		1.0	mg/kg	96.0	98.0	97.0	50-125	2.1	40
2,4-Dinitrotoluene		1.0	mg/kg	109	111	110	50-125	1.8	40
2,6-Dinitrotoluene		1.0	mg/kg	86.0	90.0	88.0	50-125	4.5	40
2-Amino-4,6-Dinitro		1.0	mg/kg	103	100	102	50-125	3.0	40

-Continued-

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 950308LCS2 Date Prepared: 03/08/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
4-Amino-2,6-Dinitro		1.0	mg/kg	95.0	98.0	96.5	50-125	3.1	40
HMX		1.0	mg/kg	116	132 N	124	50-125	13.	40
m-Nitrotoluene		1.0	mg/kg	117	108	113	50-125	8.0	40
Nitrobenzene		1.0	mg/kg	100	108	104	50-125	7.7	40
o-Nitrotoluene		1.0	mg/kg	121	125	123	50-125	3.3	40
p-Nitrotoluene		1.0	mg/kg	114	114	114	50-125	0.0	40
RDX		1.0	mg/kg	96.0	100	98.0	50-125	4.1	40
Tetryl		1.0	mg/kg	74.0	77.0	75.5	5-100	4.0	40

N - Exceeds quality control limits. Current control limits of 50-125% are target limits only.

Conclusion of Lab Number 950308LCS2

Lab Number: 950309LCS1 Date Prepared: 03/09/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Arsenic, Total	950309-1	5.0	mg/kg	88.0	96.0	92.0	80-120	8.7	20
Lead, Total	950309-1	5.0	mg/kg	101	106	104	80-120	4.8	20
Mercury, Total	950309-1	0.0050	mg/L	100	89.0	94.5	80-120	12.	20
Selenium, Total	950309-1	5.0	mg/kg	100	99.0	99.5	80-120	1.0	20
Thallium, Total	950309-1	2.5	mg/kg	107	105	106	80-120	1.9	20

Conclusion of Lab Number 950309LCS1

Lab Number: 950309LCS2 Date Prepared: 03/09/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Antimony, Total	950309-2	5.0	mg/kg	91.0	96.0	93.5	80-120	5.3	20

-Continued-

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE / LABORATORY CONTROL SAMPLE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Lab Number: 950309LCS2

Date Prepared: 03/09/95

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) LCS	LCSD	Avg.	Limits	PRECISION DATA RPD	Limits
Beryllium, Total	950309-2	50	mg/kg	94.0	94.0	94.0	80-120	0.0	20
Cadmium, Total	950309-2	50	mg/kg	92.0	91.0	91.5	80-120	1.1	20
Chromium, Total	950309-2	500	mg/kg	95.0	94.0	94.5	80-120	1.1	20
Copper, Total	950309-2	500	mg/kg	101	100	101	80-120	1.0	20
Nickel, Total	950309-2	500	mg/kg	90.0	90.0	90.0	80-120	0.0	20
Silver, Total	950309-2	50	mg/kg	87.0	89.0	88.0	80-120	2.3	20
Zinc, Total	950309-2	500	mg/kg	85.0	85.0	85.0	80-120	0.0	20

Conclusion of Lab Number 950309LCS2

Quality control analyses were performed on samples at time of analysis in accordance with procedures published in Title 40 of the Code of Federal Regulations, Parts 136 141, or in EPA publication, SW-846, 3rd edition, Nov. 1986 and the latest promulgated update.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
Laboratory Director

Jacqueline Cairo
Quality Assurance Officer

D11

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
SURROGATE DATA

nt: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Number: 95030246
le Description: 950302-H024

ogate Data	Date Prepared	Date Analyzed	Q.C. Results % Recovered	Acceptable % Recovery Range
DNT (Surrogate)	03/08/95	03/17/95	74.0 at 1.0	50.0 - 150

Number: 95030247
le Description: 950302-H048

ogate Data	Date Prepared	Date Analyzed	Q.C. Results % Recovered	Acceptable % Recovery Range
DNT (Surrogate)	03/08/95	03/17/95	C at 1.0	50.0 - 150

Due to matrix interference(s) and/or high concentration(s) of analyte(s) present in the le, dilution was required causing the spike level for this analyte to be below the rting limit.

Number: 95030250
le Description: 950302-H065

ogate Data	Date Prepared	Date Analyzed	Q.C. Results % Recovered	Acceptable % Recovery Range
DNT (Surrogate)	03/08/95	03/17/95	91.0 at 1.0	50.0 - 150

Number: 95030251
le Description: 950302-H077

ogate Data	Date Prepared	Date Analyzed	Q.C. Results % Recovered	Acceptable % Recovery Range
DNT (Surrogate)	03/07/95	03/08/95	100 at 2.6	50.0 - 150

ity control analyses were performed on samples at time of analysis in accordance with edures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in publication, SW-846, 3rd edition, Nov. 1986 and the latest promulgated update.

INENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker
ford J. Baker
ratory Director

Jacqueline Cairo
Jacqueline Cairo
Quality Assurance Officer

D18

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Client: US Army Corps of Engineers
Attn: Laura Percifield
420 South 18th Street
Omaha, NE 68102-2586

Date Sample Rptd: 03/24/95
Date Sample Recd: 03/03/95
CAS File No: 5409
CAS Order No: 27732
Client P.O.: 3183, WO#375

Number: Matrix Spike Data from Sample Batch

Analysis	QC Batch	Spike Level	Units	ACCURACY DATA (% RECOVERY) MS	MSD	Avg.	Limits	PRECISION DATA RPD	Limits	Laboratory Number
Antimony, Total	950309-2	5.0	mg/kg	102	93.0	97.5	66-126	9.2	20	95030207
Beryllium, Total	950309-2	50	mg/kg	94.0	94.0	94.0	78- 99	0.0	20	95030207
Cadmium, Total	950309-2	50	mg/kg	91.0	91.0	91.0	69-103	0.0	20	95030207
Chromium, Total	950309-2	500	mg/kg	94.0	94.0	94.0	62-116	0.0	20	95030207
Copper, Total	950309-2	500	mg/kg	105	105	105	73-110	0.0	20	95030207
Nickel, Total	950309-2	500	mg/kg	89.0	89.0	89.0	73-103	0.0	20	95030207
Silver, Total	950309-2	50	mg/kg	87.0	89.0	88.0	73-113	2.3	20	95030207
Thallium, Total	950309-1	2.5	mg/kg	96.0	103	99.5	81-126	7.0	20	95030207
Zinc, Total	950309-2	500	mg/kg	87.0	89.0	88.0	73-102	2.3	20	95030207
Arsenic, Total	950309-1	5.0	mg/kg	98.0	96.0	97.0	45-134	2.1	20	95030207
Selenium, Total	950309-1	5.0	mg/kg	92.0	88.0	90.0	24-129	4.4	20	95030207
Lead, Total	950309-1	20	mg/kg	81.0	88.0	84.5	41-142	8.3	20	95030207
Mercury, Total	950306-1	4.0	mg/kg	80.0	71.0	75.5	34-132	12.	20	95030118
Explosives Method 83	950308-2									95030246 +
1,3,5-Trinitrobenz		1.0	mg/kg	98.0	102	100	25-125	4.0	40	
1,3-Dinitrobenzene		1.0	mg/kg	108	114	111	25-125	5.4	40	
2,4,6-Trinitrotolu		1.0	mg/kg	121	124	123	25-125	2.4	40	
2,4-Dinitrotoluene		1.0	mg/kg	113	120	117	25-125	6.0	40	
2,6-Dinitrotoluene		1.0	mg/kg	107	114	111	25-125	6.3	40	
2-Amino-4,6-Dinitr		1.0	mg/kg	121	124	123	25-125	2.4	40	
4-Amino-2,6-Dinitr		1.0	mg/kg	100	109	105	25-125	8.6	40	
HMX		1.0	mg/kg	116	120	118	25-125	3.4	40	
m-Nitrotoluene		1.0	mg/kg	117	121	119	25-125	3.4	40	
Nitrobenzene		1.0	mg/kg	110	110	110	25-125	0.0	40	
o-Nitrotoluene		1.0	mg/kg	129.N	129.N	129	25-125	0.0	40	
p-Nitrotoluene		1.0	mg/kg	119	119	119	25-125	0.0	40	
RDX		1.0	mg/kg	93.0	104	98.5	25-125	11.	40	
Tetryl		1.0	mg/kg	97.0	103.N	100	5-100	6.0	40	
Antimony, Total	950306-2	0.05	mg/L	103	103	103	74-124	0.0	20	95030242
Beryllium, Total	950306-2	0.50	mg/L	96.0	97.0	96.5	80-106	1.0	20	95030242
Cadmium, Total	950306-2	0.50	mg/L	91.0	94.0	92.5	75-101	3.2	20	95030242
Chromium, Total	950306-2	5.0	mg/L	93.0	94.0	93.5	77-104	1.1	20	95030242
Copper, Total	950306-2	5.0	mg/L	95.0	97.0	96.0	79-115	2.1	20	95030242
Nickel, Total	950306-2	5.0	mg/L	91.0	94.0	92.5	80-101	3.2	20	95030242
Silver, Total	950306-2	0.50	mg/L	98.0	98.0	98.0	82-109	0.0	20	95030242
Thallium, Total	950306-3	0.03	mg/L	106	101	104	91-118	4.8	20	95030249 +
Zinc, Total	950306-2	5.0	mg/L	93.0	93.0	93.0	80-102	0.0	6	95030242
Arsenic, Total	950306-3	0.05	mg/L	105	100	103	59-126	4.9	20	95030249 +
Selenium, Total	950306-3	0.05	mg/L	99.0	94.0	96.5	59-119	5.2	20	95030249 +
Lead, Total	950306-3	0.05	mg/L	93.0	102	97.5	66-126	9.2	20	95030249 +
Mercury, Total	950309-1	0.0080	mg/L	103	110	107	10-145	6.6	20	95030353
Solids, Total	950306-1	0.0000	% By	66.0J	63.0J	64.5	#	4.7	#	95030257
Explosives Method 83	950307-1	0.0000	mg/L	*	*	**	#	**	#	95030251

- MSD cannot be performed for this analysis. Value shown is the result of

-Continued-

Continental Analytical
SERVICES, INC.

QUALITY CONTROL REPORT
MATRIX SPIKE / MATRIX SPIKE DUPLICATE

umber: Matrix Spike Data from Sample Batch(s)

.icate analysis of the sample.

:ceeds quality control limits. Current control limits are target limits only.

:D data unavailable due to insufficient sample volume.

ıality control limits are currently unavailable for this analysis.

.verage and/or RPD cannot be calculated.

ıe quality control analysis was performed on a sample from this CAS order number.

:y control analyses were performed on samples at time of analysis in accordance with lures published in Title 40 of the Code of Federal Regulations, Parts 136 or 141, or in ıblication, SW-846, 3rd edition, Nov. 1986 and the latest promulgated update.

/ENTAL ANALYTICAL SERVICES, INC.

Floyd J. Baker
rd J. Baker
ıtory Director

Jacqueline Cairo
Jacqueline Cairo
Quality Assurance Officer

1804 Glendale Road • Salina, Kansas 67401-6675
913-827-1273 • 800-535-3076 • FAX 913-823-7830

SUPPLEMENT B

DAILY REPORTS

LABOR — SHIFT NO. ____

EMPLOYEE	HOURS	RATE	AMOUNT
L. KAHIHIKOLO	8		
D. MUSILEK	8		
K. THOMAS	8		
S. LEHN ~~(Eng)~~ → Tech mgr	8		

Direct Labor

Indirect Overhead ____ %

Per Diem No. ____ X ____

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE27349	3/4T P/U			
CE43182	SAMPLE			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
TOTAL MATERIALS	

Hole No. N/A

Location ____

Land Owner ____

Type of Drill ____

Drilled: from ____

to ____

Footage ____

Casing Set ____

Casing Pulled ____

Casing Lost ____

Hours Drilling ____

Hours Moving ____

Hours Shut Down ____

No. of Samples ____ Type ____

Project IOWA ARMY AMMO PLANT

Cost Code QX50a355PC7254F

Request No. ____

Total Labor ____

Total Materials ____

Total Equipment ____

Total Cost ____

WEATHER and GROUND CONDITIONS: 10°F, windy, cloudy.

Remarks: Left boatyard at 1600 hrs.

Drove to Burlington, IA. Arrived at hotel at approx 10:00 pm. Leslie & Sharon prepared labels, located hospital in Burlington, and retrieved SAP & SSHP.

Signature: Leslie R Kahihikolo

MRD FORM 074 (Previous Editions May Be Used Until Supply Is Exhausted)

Date of Work [illegible]

LA[illegible]R SHIFT NO. ____

EMPLOYEE	HOURS	RATE	AMOUNT
L. KAHIHIKOLO	8		
D. MUSILEK	8		
K. THOMAS	8		
S. LEHN (TM)	8		

Direct Labor

Indirect Overhead ____ %

Per Diem No. ____ X ____

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE27349				
CE43182				

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
TOTAL MATERIALS	

Hole No. N/A

Location

Land Owner

Type of Drill

Drilled: from ____ to ____

Footage

Casing Set

Casing Pulled

Casing Lost

Hours Drilling

Hours Moving

Hours Shut Down

No. of Samples ____ Type ____

Project Iowa Army Ammo Plant

Cost Code QX506355PC7254F

Request No.

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: 10°, windy, snowing/sleet COLD!

Remarks: Met at IAAP visitor center 0700 for security badges & coordination. Went to Line 800. With Dwayne & Kirk acting as safety personnel, Sha[illegible] & Leslie went into lagoon with boat & collected sediment & H_2O samples. No problems encountered. 1130 left for lunch. Prepared labels/jars for afternoon effort. 1330, dropped Sharon & Kirk at Line 1 to collect soil samples. Dwayne & Leslie collected samples at Line 800. Finished 1[illegible] returned to hotel. Sharon & Leslie packed samples in cooler & filled out field book

Signature: Finished 1930.

Leslie P. Kahihikolo [illegible]

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

LABOR SHIFT NO. _____

EMPLOYEE	HOURS	RATE	AMOUNT
L. KAHIHIKOLO	8		
D. MUSILEK	8		
K. THOMAS	8		
S. LEHN			

Direct Labor
Indirect Overhead _____ %
Per Diem No. _____ X _____
Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE2734				
CE43185				

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
TOTAL MATERIALS	

Hole No. N/A
Location _____
Land Owner _____
Type of Drill _____
Drilled: from _____
to _____
Footage _____
Casing Set _____
Casing Pulled _____
Casing Lost _____
Hours Drilling _____
Hours Moving _____
Hours Shut Down _____
No. of Samples _____ Type _____

Project Iowa Army Ammo Plant
Cost Code QX506355PC7254F
Request No. _____

Total Labor _____
Total Materials _____
Total Equipment _____
Total Cost _____

WEATHER and GROUND CONDITIONS: 10°-20°, partly cloudy, windy.

Remarks: 0800, Dwayne left with surveyors to assist them for 1-2 days. Sharon caught flight to MN for meeting. Leslie & Kirk went to IAAP visitor center, turn in security badges & do final coordination w/ plant personnel. Left for Omaha at 0900. Leslie dropped coolers with samples at MRD lab 1430. Arrived Godyard 1500.

Signature: Leslie K. Kahihikolo

MRD FORM 074 (Previous Editions May Be Used Until Supply Is Exhausted)

SUPPLEMENT C

FIELD NOTES

Weather

10° F
windy
Snow in morning
afternoon - partly
(cloudy) sunny.

Personnel

Leslie Kahlikolo
Sharon Zehn
Dwayne Musilek
Kirk Thomas.

LINE 800 LAGOON

28 Feb 95

0700 Reported to Admin Bldg for security badges.

Kirk Thomas & Dwayne Musilek read SAP & SSHP, three times

0800 Arrived at Line 800. 14' Al. boat was provided by installation contractor. Found boat beside the lagoon.

Unloaded & prepared sampling supplies. Placed sampling equip in boat.

Reviewed plan for safety precautions while Sharon & Leslie were in boat. Had 2 ropes attached to boat - one at each end. Kirk & Dwayne took ends of each rope

Leslie Kahlikolo

2/28/95

LOCATION 2

0930 Collected water samples & Attempted use of trailer, due to shallow depth of water (1.5 ft) sediment entered trailer. Decided to proceed with sampling per location 1.

1 ea 8330
1 ea Gen Chem

Sediment Samples Approx ~~depth~~ thickness of sediment LRK was 8". Collection method per location 1

1 ea PP metals
1 ea 8330
1 ea Misc.

Leslie Kahihikolo

~~LOCA~~ LRK

1000 Went to Shore -

1. placed & cleaned samples & put in cooler.
2. Reevaluate set-up for sampling @ location 3+4 - needed to position Dwayne & Kirk for new locations.
3. Due to weather ~~LOCA~~ conditions, took precautions for cold weather stress & warmed up in vehicles.

Leslie Kahihikolo

LOCATION 3

1030 Collected water samples per location 1.
1 ea PP metals
1 ea 8330 explosives
Approx water depth 8"-10"

Collected sediment samples. Sediment thickness was 1"-2". Details per Location 1.

1 ea PP metals
1 ea 8330
1 ea Reactive/Ignite
1 ea Misc

Lessie Kahikolo

LOCATION 4

1045 Collected water samples per location 1.
1 ea 8330
1 ea Gen Chem
Approx water depth 8"

Collected sediment samples per location 1. Sediment thickness ≥ 4".

1 ea 8330
1 ea React/Ignite
1 ea Misc

* missed 1 ea priority pollutant metal sample
Dup 1 ea metals/8330 (005)
QA 1 ea metals/8330 (006)

Lessie Kahikolo

NOTE: Sediment thickness appears to ~~thicken as~~ ck Ck be thick (12") around shore but varies from 0 to 8" in the center.

DECONTAMINATION:
Removed gross contam between sampling locations. Due to sampling from a boat formal decon procedures were hampered. Sample Equip was decon'ed on shore. Was then bagged & will be decon'ed again at boatyard. Too cold!

All disposable equipment & trash were placed in trash bags for disposal by IAAP facility.

Leslie Kalkhekolo

Hip waders & vests - gross contamination removed & bagged for cleaning at boatyard.

NOTE: Preservative (HNO_3) for PP metals was not provided with jars from lab. Phone call to Chemist - Todd Wilson - Todd said no problem lab will add when receive samples.

Biotech Sample jars provided. Used 8 oz Chem jars.

1115 Left Line 800 for lunch & to prepare for subsequent Soil Sampling. (labels, jars, etc)

Leslie Kalkhekolo

Feb 28, 1995 ~~Line 800 Lek~~

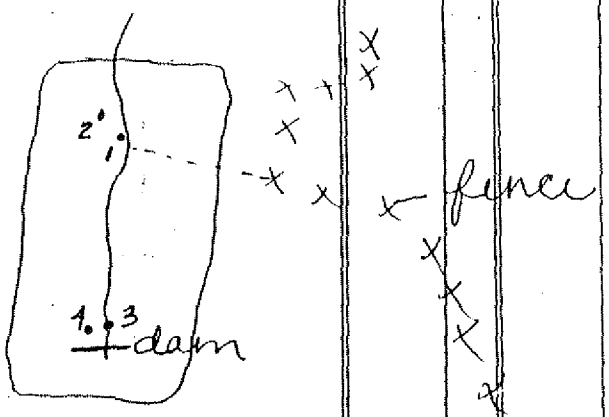
0330 Stopped at IANP Admin to make arrangements for boat pick up. No one was available to pick up boat

In preparation for sampling, equip was divided between 2 trucks. Sharon & Kirk will sample Line 1 & Leslie & Dwayne will sample Line 800.

1345 Drove to line 1. Leslie explained to Sharon sampling locations Leslie & Dwayne moved on to Line 800.

Leslie Kabilikolo

LINE 1



1345 Prepared sampling equip & walked to location 1 - 1½ - 2 ft west of stream, in line w/ corner of fence

1420 Soil samples were collected w/ hand auger (done by Kirk) to approx ~~0" - 6"~~ Lek 0" - 12". offsets were made for additional sampling material.

Leslie Kabilikolo

Dup 8330, metals - DONE 2/28/95

12 * NOTE QA PP metals, 8330 - MISSED 2/28/95

Samples at location 1
1 ea 8330
1 ea TCLP 8330
1 ea PP metals
1 ea React / Ignite
1 ea Misc.
1 ea Geotech

Decon - Gross Contam or hand auger was removed with a brush & auger washed in Brush Creek.

1440 ~~So~~ LKK LOCATION 2

Located approx 8 ft NW of location 1.

Sampling procedure same as location 1
1 ea 8330
1 ea TCLP 8330
1 ea PP metals
1 ea Misc
1 ea Geotech

1455 Cleaned & packaged jars in cooler. Deconned hand auger with liquinox. Prepared jars with labels for next 2 sites.

LOCATION 3

1503 Location approx 20 ft North of dam, in middle of stream.

Same sampling proced. as location 1
1 ea 8330
1 ea TCLP 8330
1 ea metals
1 ea Misc
1 ea Geotech
1 ea React / Ignite

Decon same as location 1.

Leslie Kahihikolo

13

7/28/95

LOCATION 4

1520 Located approx 8 ft SW of location 3

Sampling procedures same as ~~Line~~ location 1

1 ea 8330
1 ea TCLP 8330
1 ea metals (PP)
1 ea misc
1 ea Geotech

Deconned w/ liquinox. Hand auger placed in bag after final decon at boatyard.

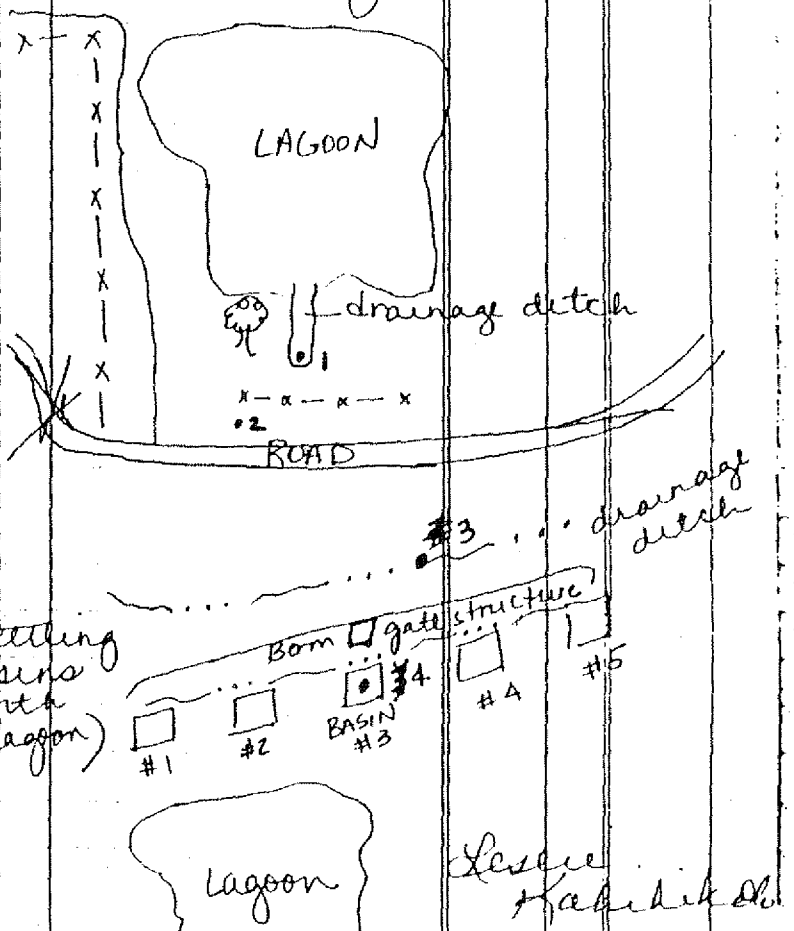
1530 Left for Line 800 to meet Leslie & Dwayne.

Leslie Kahekoko

7/28/95

LINE 800

1400 Leslie & Dwayne arrived at Line 800. Prepared labels & jars. Packed sampling & decon equip into cooler & wheeled 1/2 mile to Setting Basin #3.



Leslie Kahekoko

2/28/95

LOCATION ~~3~~ 4 LRR

1445 ~~1505~~ LRR. Location ~~3~~ 4 at bottom of Settling Basin #3, directly below control structure / gate.

Dwayne used hand auger to collect sample. Native clay encountered approx 8" below grade. Samples taken 0-8". from Sfc. Offsets were made for additional samples.

1 ea 8330
1 ea TCLP 8330
1 ea PP metals
1 ea Misc
1 ea Geotech
1 ea React / Ignite

Gross Contam removed by washing auger in stream. Liquinox used to wash. Decon

Leslie Kahihikoh

2/28/95

Water dumped on site.

LOCATION ~~3~~ 3 LRR

1505 ~~1445~~ LRR Moved to location ~~3~~ 3 located approx 50 ft N of control structure, bottom of drainage ditch, east bank. Drainage ditch slopes approx 8 ft tall took samples at base of slope next to water.

Sampling per location 4.

Decon per location 4.

1 ea 8330
1 ea TCLP 8330
1 ea PP metals
1 ea Misc
1 ea Geotech

1515 Walked back to truck + prepared for sample location 1 & 2.

~~LOCATION~~

Cleaned & placed jars from 3+4 in cooler.

1535 LOCATION 1

Located at South end of drainage channel that leads to lagoon.

Sampling & decon same as location 4.

1 ea 8330
1 ea TCLP 8330
1 ea PP metals
1 ea Misc
1 ea Geotech
1 ea React / Sulfide

Dup - 8330 (005)
QA - PP metals (006)

1540 Sharon + Kirk arrived at Line 800

Lesree Kahikilolo

LOCATION 2

1545 Located approx 50 ft South of corner fence post.

Sampling & decon same as location 4.

1 ea 8330
1 ea TCLP 8330
1 ea PP metals
1 ea Misc
1 ea Geotech

Sharon, Lesli, Duane & Kirk cleaned & placed all samples in coolers, cleaned up site & left! (1600)

1615 Arrived at hotel & began packing samples for shipment by USACE sample team to MRD lab

Lesree Kahikilolo

4/28/95

20

Leslie + Sharon –

Double bagged ice & peanuts placed in coolers with samples to maintain 4°C preservation & protection from breakage.

Completed Chain of Custody.

Completed log book.

1930 Sampling event COMPLETE

Leslie Sharon

Leslie Kahilikolo

Cooler stored in hotel room - prevent freezing in truck

3/1/95

21

1430 4 coolers w/ samples delivered to MKD lab by Leslie Kahilikolo.

Leslie Kahilikolo

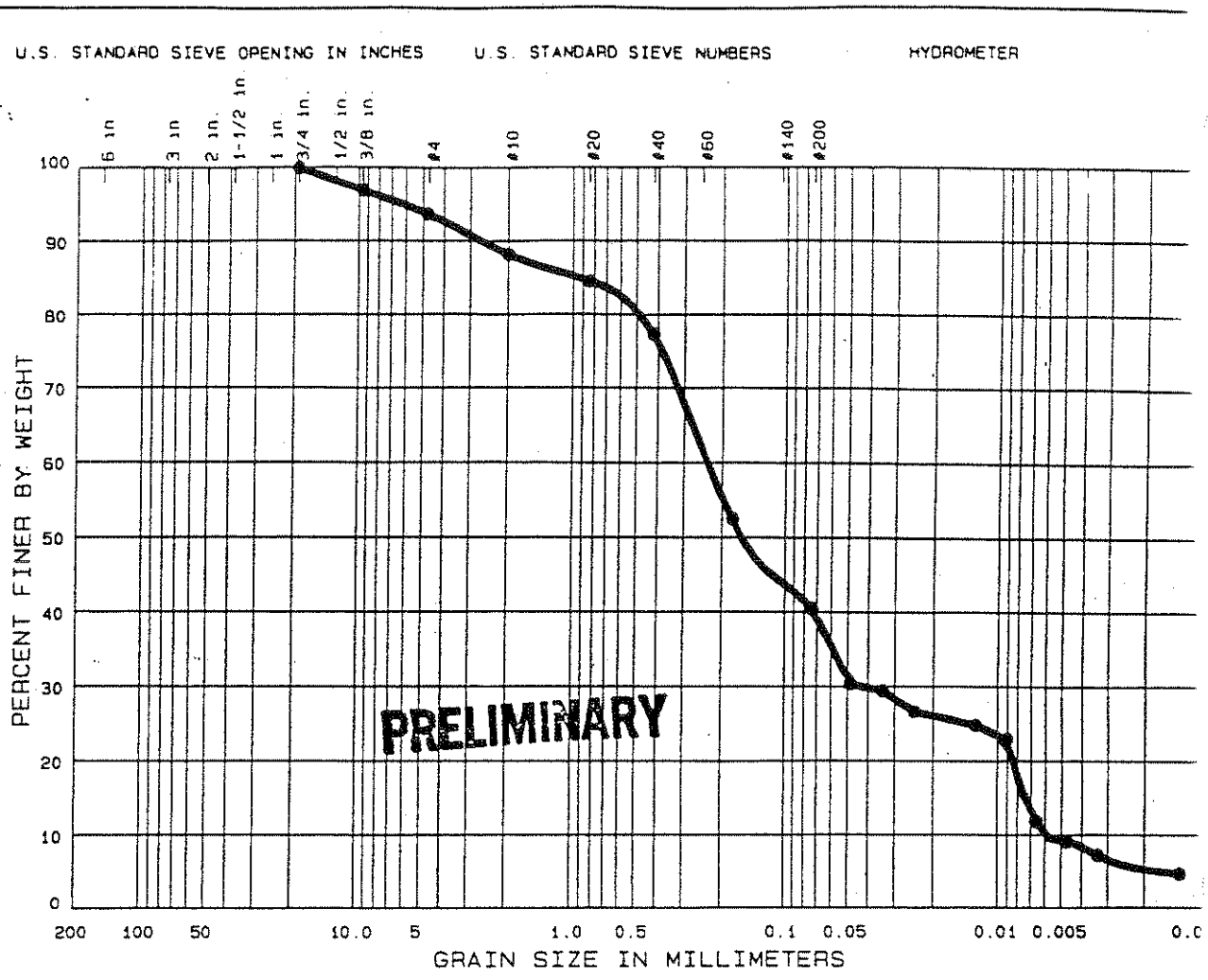
prior to packing the water samples in the coolers, Sharon tested the pH of the water w/ pH paper. The pH of each water sample was 5.0.

SUPPLEMENT D

GEOTECHNICAL DATA

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. IAAP1-1
Req. No.
Contract No.



	% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
●	0.0	6.3	53.2	31.3	9.2

	Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C_c	C_u
●	001						1.23	39.6

CLASSIFICATION

● SILTY SAND, SM
EST. SPGR = 2.7

Remarks:

Project IOWA AAP

Lab No. 3220

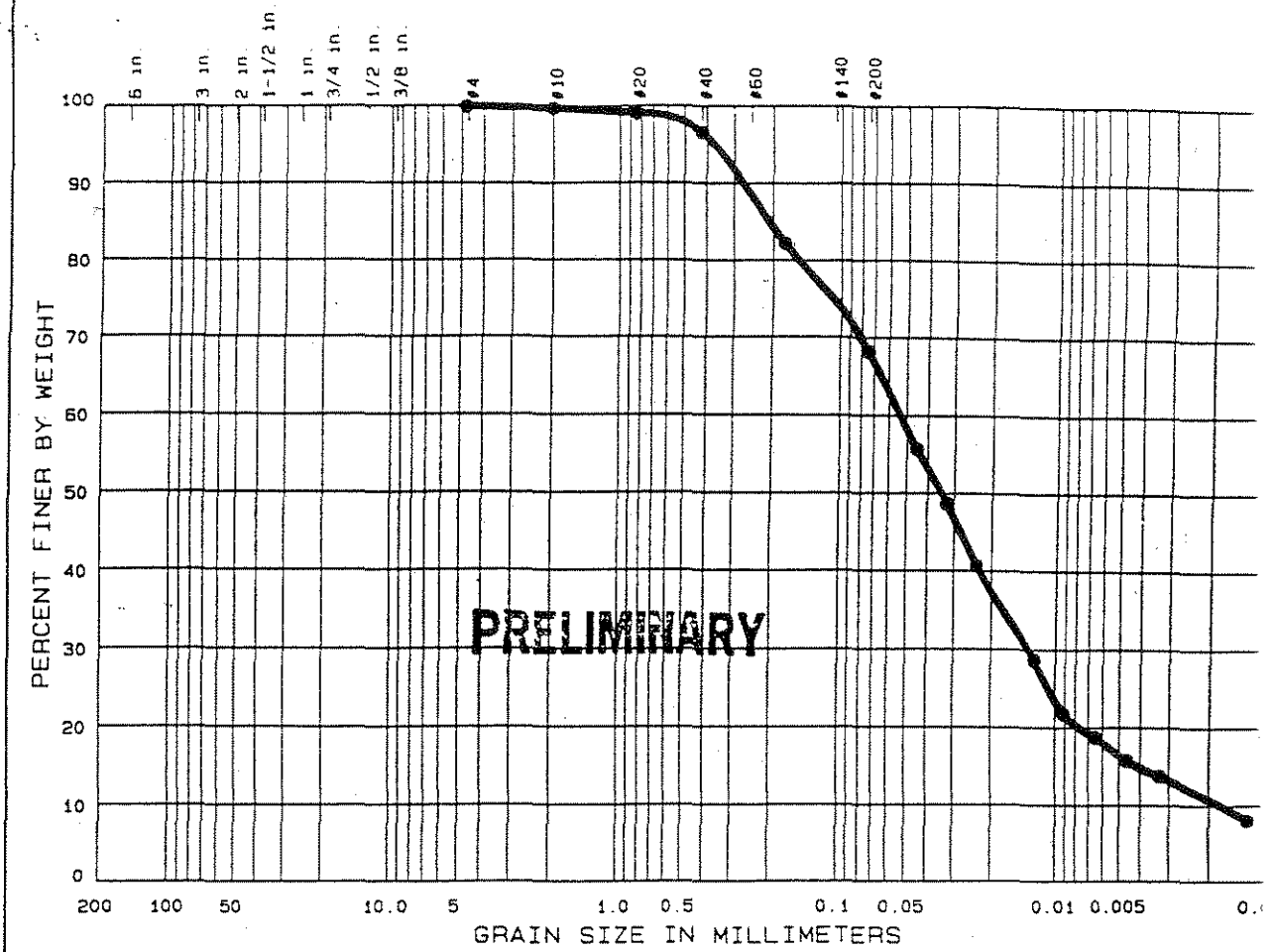
Area

Boring No. SS-1-001 Date 3/16/95

GRADATION CURVES

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. IAAP1-2
Req. No.
Contract No.



	% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
●	0.0	0.0	31.8	51.8	16.4

	Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C_c	C_u
●	002						1.88	29.9

CLASSIFICATION

● SANDY SILT OR CLAY
EST. SPGR = 2.7

Remarks:

Project IOWA AAP

Lab No. 3220

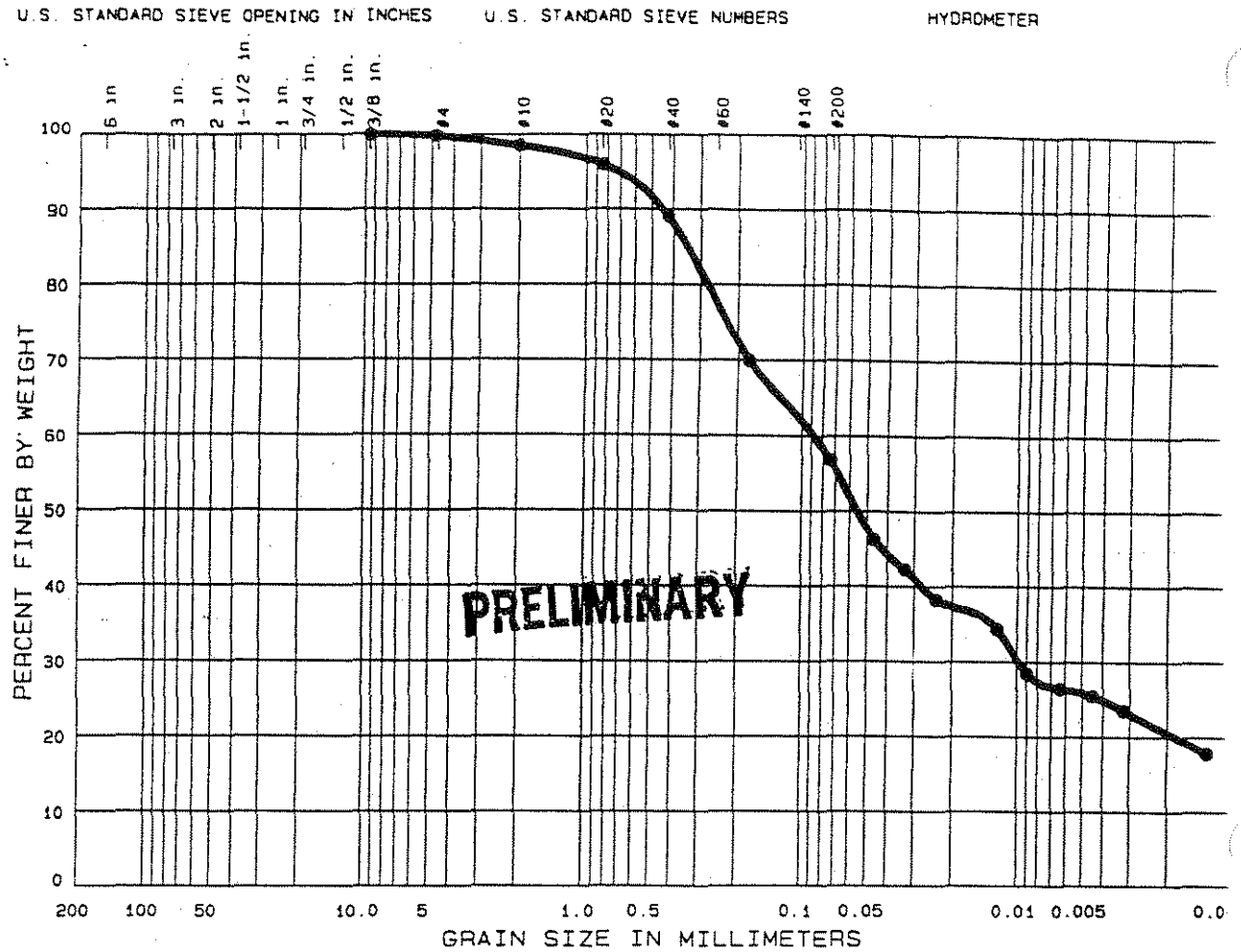
Area

Boring No. SS-1-002 Date 3/16/95

GRADATION CURVES

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. IAAP1-3
Req. No.
Contract No.



	% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
●	0.0	0.1	43.0	31.0	25.9

	Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C_C	C_U
●	003							

CLASSIFICATION

● SANDY CLAY OR SILT
EST. SPGR = 2.7

Remarks:

Project IOWA AAP

Lab No. 3220

Area

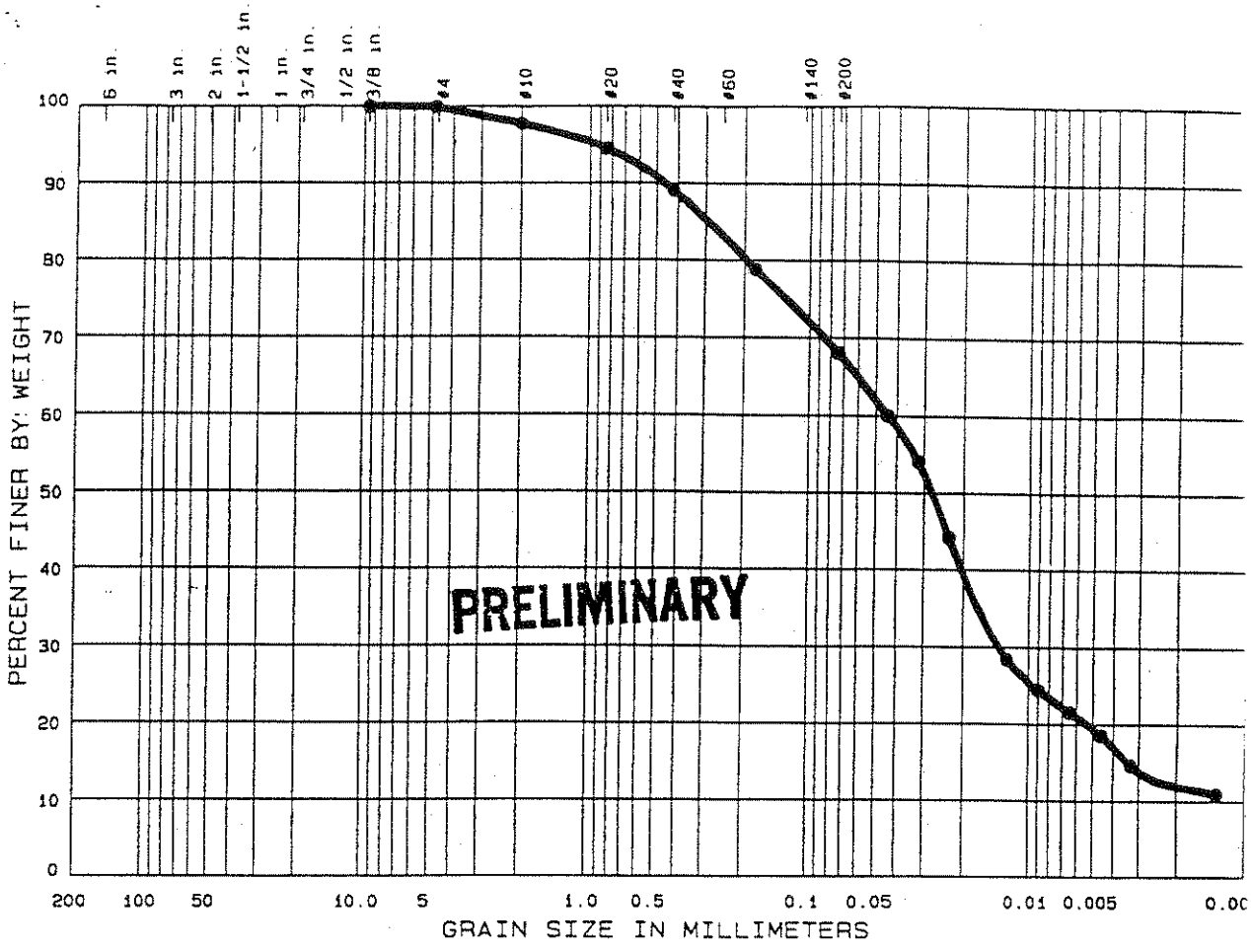
Boring No. SS-1-003 Date 3/16/95

GRADATION CURVES

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. IAAP1-4
Req. No.
Contract No.

U.S. STANDARD SIEVE OPENING IN INCHES | U.S. STANDARD SIEVE NUMBERS | HYDROMETER



	% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
●	0.0	0.1	31.8	48.7	19.4

	Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C_c	C_u
●	004						4.20	44.0

CLASSIFICATION

● SANDY CLAY OR SILT
EST SPGR = 2.7

Remarks:

Project IOWA AAP

Lab No. 3220

Area

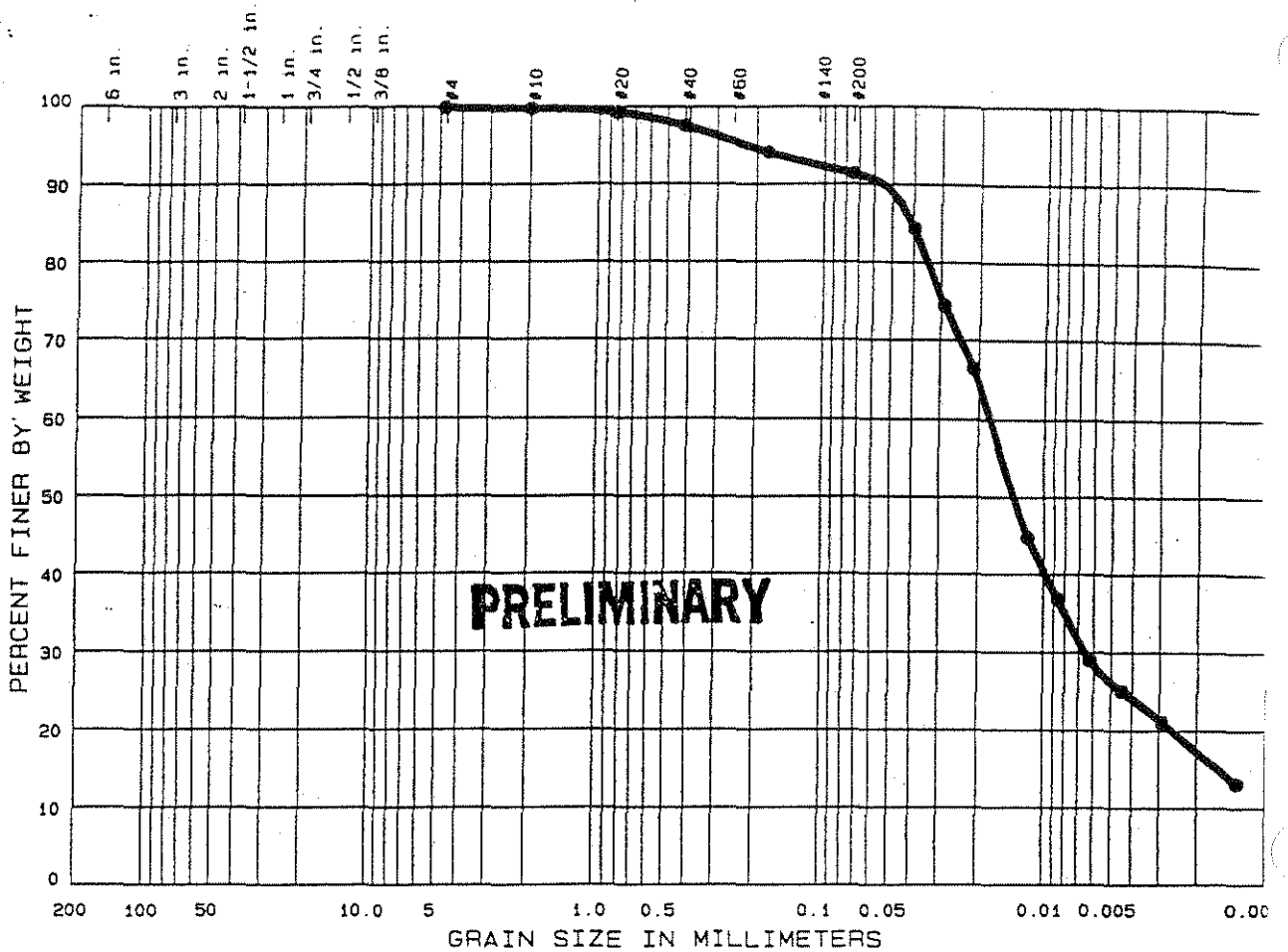
Boring No. SS-1-004 Date 3/16/95

GRADATION CURVES

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. IAAP8-1
Req. No.
Contract No.

U.S STANDARD SIEVE OPENING IN INCHES | U.S. STANDARD SIEVE NUMBERS | HYDROMETER



	% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
●	0.0	0.0	8.6	65.4	26.0

	Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C_c	C_u
●	001						2.35	18.0

CLASSIFICATION

● SILTY CLAY
EST SPGR = 2.7

Remarks:

Project IOWA AAP

Lab No. 3220

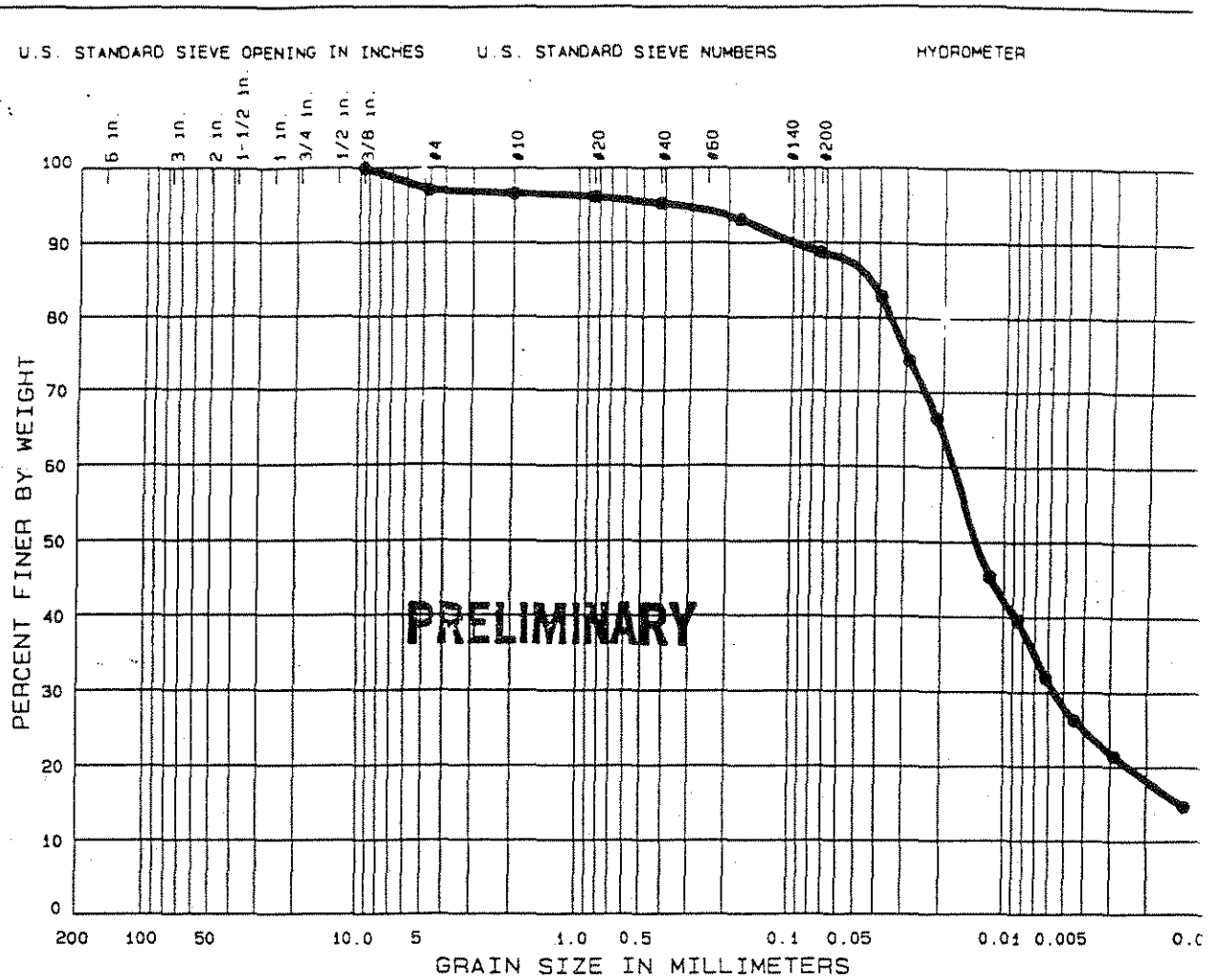
Area

Boring No. SS-8-001 Date 3/16/95

GRADATION CURVES

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. IAAPB-2
Req. No.
Contract No.



	% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
●	0.0	2.9	8.4	60.7	28.0

	Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C_c	C_u
●	002							

CLASSIFICATION

● CLAYEY SILT
EST SPGR = 2.7

Remarks:

Project IOWA AAP

Lab No. 3220

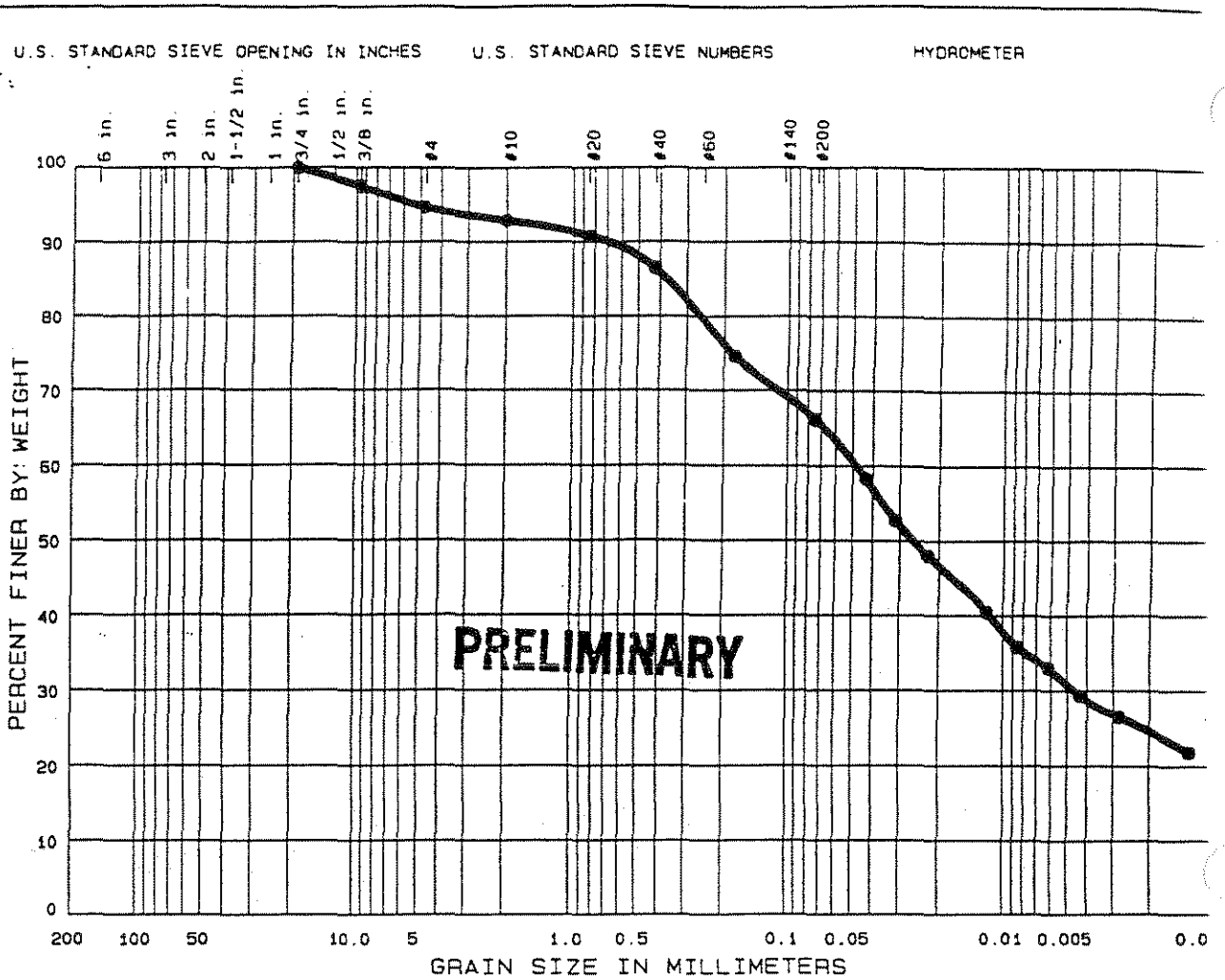
Area

Boring No. SS-8-002 Date 3/16/95

GRADATION CURVES

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. IAAPB-3
Req. No.
Contract No.



	% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
●	0.0	5.3	28.5	35.4	30.8

	Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C_c	C_u
●	003							

CLASSIFICATION

● SANDY CLAY OR SILT
EST SPGR = 2.7

Remarks:

Project IOWA AAP

Lab No. 3220

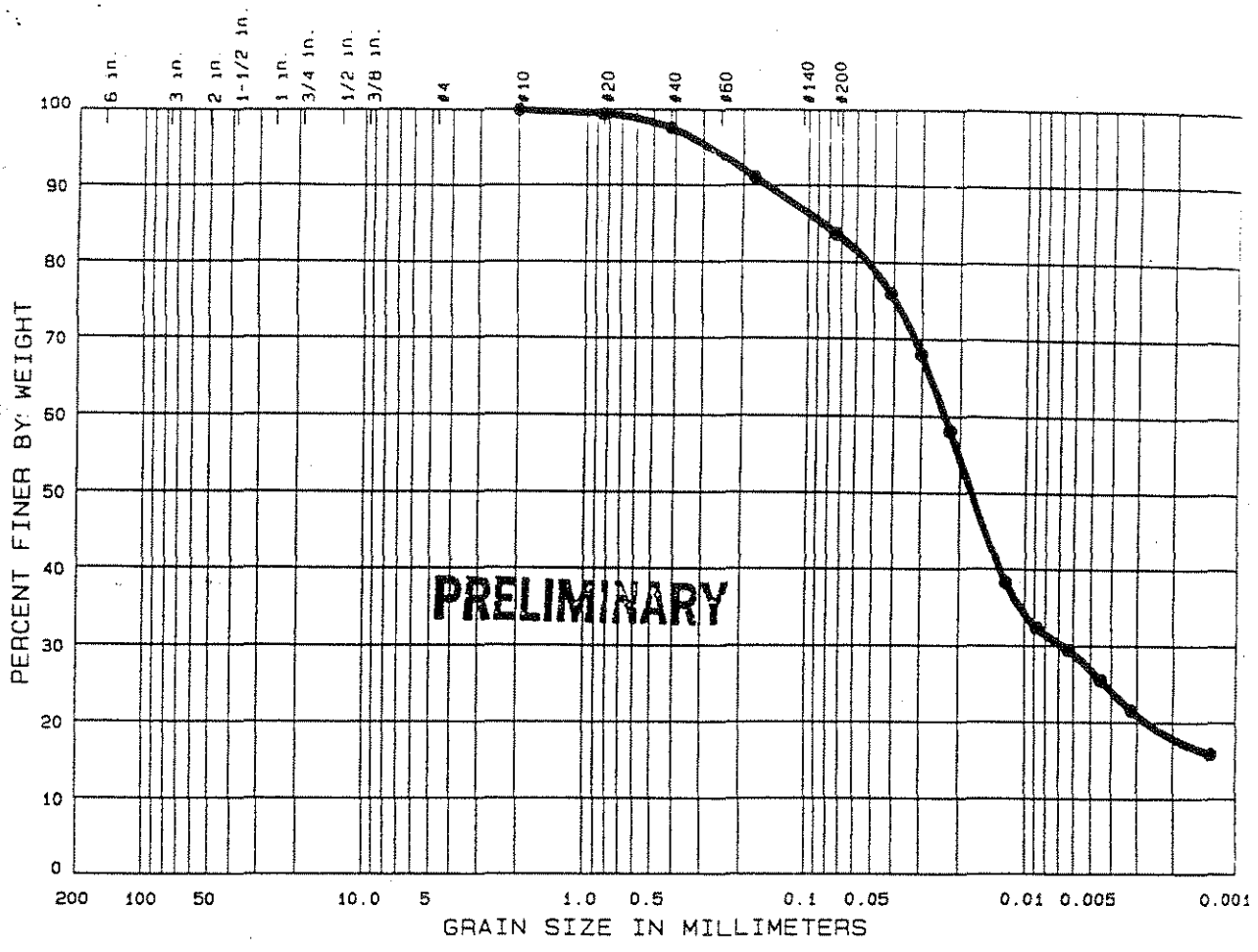
Area

Boring No. SS-8-003 Date 3/16/95

GRADATION CURVES

CORPS OF E. .NEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. IAAP8-4
Req. No.
Contract No.



	% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
●	0.0	0.0	16.3	56.8	26.9

	Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C_c	C_u
●	004							

CLASSIFICATION

● SILT OR CLAY WITH SAND
EST SPGR = 2.7

Remarks:

Project IOWA AAP

Lab No. 3220

Area

Boring No. SS-8-004 Date 3/16/95

GRADATION CURVES

Classification	Common Name	(Scientific Name)	Habitat
Endangered	Indiana Bat	(Myotis sodalis)	upland forest
Endangered	Bald Eagle	(Haliaeetus leucocephalus)	wintering trees
Threatened	Prairie Bush Clover	(Lespedeza leptostachya)	dry to mesic praries with gravelly soil
Threatened	Eastern Prairie Fringed Orchid	(Platanthera leucophaea)	mesic to wet praries
Threatened	Western Prairie Fringed Orchid	(Platanthera praeclara)	mesic to wet praries

During the summer, the Indiana bat frequents the corridors of small streams with well developed riparian woods as well as mature upland forests. To avoid disturbing any bats that may be present, all large dead or dying trees with loose bark having the potential of housing these bats will be cleared prior to April 30 or after September 1.

The endangered bald eagle (proposed threatened, proposed rule, Federal Register Vol. 59, No. 132, July 12, 1994) is known to winter along large rivers in Des Moines County, Iowa. They roost in large trees adjacent to the river and perch in large shoreline trees to rest or feed on fish. Cottonwood trees are strongly preferred over other species and dead trees are strongly preferred as daytime perches, with the tallest trees being utilized most often. Generally, eagles perch within 50 meters (164 feet) of a water body. As the area that is proposed to be cleared is out of this range and there is abundant habitat elsewhere along the river, the removal of trees would not likely adversely affect the eagles.

The prairie bush clover, the eastern prairie fringed orchid, and the western prairie fringed orchid are considered to potentially occur statewide in Iowa based on historical habitat. The bush clover occupies dry to mesic prairies with gravelly soil and the orchids occupy wet grassland habitats. The area of the proposed project does not involve this type of habitat; no prairies, wet grasslands, nor gravelly soils. Recent surveys by personnel from the University of Iowa have not found these species on the IAAP.

Estuary Protection Act, 16 U.S.C. 1221, et seq. Not applicable. The proposed project does not involve an estuary.

Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1(12), et seq. Not Applicable.

Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq. The USFWS was contacted regarding this portion of the project. Two letters were received from the USFWS. The first letter dated September 14, 1994 (see exhibit 1) detailed the possibilities regarding threatened and endangered species in the area as well as providing suggestions for mitigation in the event that trees will have to be removed due to the project. The second letter, dated January 24, 1995 (see exhibit 2) was the result of a meeting which occurred at the IAAP on January 10, 1995. It outlined concerns regarding the plantings on the landfill cover, the mitigation of lost tree habitat, and items relating to the cleanup activities on line 1 and 800.

Approximately one acre of trees will need to be cleared at the line 1 pinkwater location. Most of these will be small trees with a diameter at breast height(DBH) of less than six inches. Prior to construction activity an inventory will be accomplished so that proper mitigation can occur. Tree mitigation will occur at an adequate rate and will include suggestions from the USFWS.

Hazardous, Toxic, and Radioactive Waste Laws (CERCLA 1980, SARA 1986, OSHA, RCRA). The most dominant contaminants at line 1 pinkwater are RDX and HMX. Contaminated soil volumes are estimated at 38,500 cubic yards. These contaminants are located in the reservoir area which is 150 feet wide and extends along Brush Creek approximately 1200 feet.

Those soils considered unsafe for human health and exposure will be stored temporarily in an EPA approved holding area and eventually transported and treated. The temporary wastepile will be located west of the inert landfill in a previously disturbed area (see figure H-3). The soils containing contaminants at levels low enough to remain untreated will be sealed in a Subtitle C RCRA closure in trench 6 of the inert landfill. To review the exact levels and numbers of contaminants referred to in this section, see the appropriate portion of the EE\CA. The specific portion of the EE\CA detailing this portion of the project will identify exact locations of samples and the level of contaminants detected at those locations.

Watershed Protection and Flood Prevention Act, 16 U.S.C. 1101, et seq. Soil conservation measures will be specifically designed during the preparation of plans and specifications(see CWA).

Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq. Not applicable. The area in which the proposed activity will occur is not a wild or scenic river, nor is it on the National Inventory of Rivers potentially eligible for inclusion in the wild and scenic system.

Floodplain Management (E.O. 11988). According to the National Flood Insurance Program, February 17, 1982 Flood Insurance Rate Map the Line 1 site is located in Zone C. Zone C indicates areas of minimal flooding. No portion of this project is located within the 100 year flood plain boundary. It is likely that this project will have no adverse impacts to the floodplain and will not increase flood hazards.

Protection of Wetlands (E.O.11990). The work proposed at line 1 pinkwater will create wetlands (see Clean Water Act).

CEQ Memorandum, August 11, 1980, Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA. This project will cause no impacts to prime or unique agricultural land.

CEQ Memorandum, August 10, 1980, Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory. Their are no rivers on the nationwide inventory or eligible for the nationwide inventory in the project area.

D. BORROW AREA WETLAND CREATION

Borrow material for final grading of the inert landfill will be obtained from clean soil located just north of the line 1 pinkwater cleanup site (see figure H-1, H-8, aerial photo #1, and aerial photo #2). It is estimated that approximately 60,000 cubic yards of fill can be obtained from this 3 acre site. Following the removal of borrow from this location it will be developed into a wetland.

This wetland will be excavated to include deep water areas(8-10 ft.deep), shallow water areas(2-3ft deep), and two islands approximately 10 ft. in diameter(see figure H-11). Fertile topsoil and fringe area seed source will be obtained from nearby Stump Lake

(see figure H-1, H-9, H-10). The mouth of Stump Lake has filled with approximately 2 to 4 feet of sediment and consequently reduced the size of the lake to approximately one-half of the size reflected in figure H-1. In an effort to obtain the most compatible as well as cost efficient topsoil and seed source for the borrow area wetland the Corps will be obtaining sediment from Stump Lake. Prior to excavating any borrow from this site, the Corps will conduct a site survey of the area to ensure that proper water depths for fish survival are available as well as conducting sampling of water and sediment to ensure that neither organic nor metal toxins exist at harmful levels. The IAAP will then introduce it's own erosion control measures to ensure that this rejuvinated lake does not fill with sediment again.

National Environmental Policy Act (NEPA), as amended, 42 U.S.C. 4321, et seq. In compliance. This environmental assessment (EA) will demonstrate compliance by including the need for the proposal when necessary, appropriate alternatives, and copies of the correspondance recieved by other agencies during the analysis phase of this action. It will also include references to site visits made with cooperating agencies during the analysis phase.

Archeological and Historic Preservation Act, as amended, 16 U.S.C. 469, et seq. and National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq. On 10 January 1995 a site visit was made to the IAAP in order to demonstrate the nature of this project to cooperating agencies. Among those attending this meeting were representatives from the COE, USFWS, IAAP, and the NRCS. The Iowa SHPO was invited, however unable to attend. In their absence the COE has incorporated the expertise of it's own staff archeologist(Edward C Brodnicki) to ensure the protection of cultural resources at the IAAP. To follow are the comments received from the staff archaeologist assigned to this project (see exhibit 4).

A cultural resource reconnaissance was completed for the IAAP by Augustana College in 1991. That report was consulted to determine the location of cultural resources near proposed activities on the IAAP. The report revealed the presence of two archaeological sites near the borrow area. These two sites include an isolated find IF80 and site 13DM385.

The isolated find consists of a brick fragment located northwest from the borrow area. The isolated find is not important and activities near the find are not restricted.

Site 13DM385 is the location of a historic farmstead and a lithic scatter. The structures that were associated with this farmstead have been demolished or removed, but farmstead artifacts are still present. Some lithic artifacts associated with the

Native American occupation were also observed in the area. A copy of the site form with a map of the site is on file with the COE.

The archaeologists from Augustana thought that the artifacts on the site may yield important information on the area and may contain buried, intact deposits. They recommended further studies to evaluate the potential eligibility of this site to the National Register of Historic Places be prepared prior to any form of ground disturbance.

An aerial photo (see aerial photo #2) was found of this site that is dated "after 1962". This photo reveals that the proposed borrow\wetland creation area had been used previously as a borrow site for construction activities at Line 1. A copy of this photo is being sent to the Iowa SHPO and their comments will be incorporated into this project when received. A letter received from the Iowa SHPO dated March 8, 1995 (see exhibit 5) indicates their understanding of the IAAP's desire to avoid impacts to any cultural sites in this area. The SHPO's letter states that if "avoidance" is chosen for site 13DM385, excavation should be careful so as not to impact previously unidentified portions of this site.

Borrowing activities associated with the wetland creation area will be restricted to avoid impacts to site 13DM385. If necessary, the periphery of the site will be marked so that excavation crews can avoid it. A staff archaeologist from the COE can be made available to mark this site.

If the proposed project construction subsequently uncovers any item which might be of archaeological interest, or if important new archaeological data come to light in the project area, the COE will make reasonable effort to avoid or minimize harm to the property until the significance of the discovery can be determined. Caution will be exercised during all phases of work in order to minimize any disturbance to deeply buried cultural resources. The contractor will be explicitly warned about this possibility and instructed that if any resources are found that he or she should stop work and contact the District office immediately.

Clean Air Act, as amended, 42 U.S.C 1857h-7, et seq. Air quality is not expected to be impacted to any measurable degree by construction activities associated with the wetland creation area.

Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq. Brush Creek is located to the east of the borrow area and will not be impacted by the borrow activities. There is a small drainage way that intersects the southwest corner of the borrow area. This drainage way and the water it drains will be the primary source of water for the borrow area wetland site.

The wetland will be designed so that this drainage is located in the deepest portion of the wetland and a water control structure such as a small dam will be constructed in order to ensure adequate hydrology exists at the wetland. This structure will be designed and operated in a manner that will not adversely impact downstream resources or wetlands.

National Pollution Discharge Elimination System (NPDES) The COE will develop and administer a storm water pollution control plan in accordance with good engineering practices, the guidelines found in STORM WATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY FOR CONSTRUCTION ACTIVITIES, *Iowa Department of Natural Resources, NPDES*, and recommendations from the Natural Resource Conservation Service(NRCS). A meeting was held on 20 July 1994 at which the DNR, the NRCS, the IAAP, and the COE outlined concerns relating to sedimentation and erosion control. Among the items discussed were vegetation, erosion control matting, riprap locations, silt fences, and drainage ditch locations. All of these issues will be addressed in the final design package and incorporated into the plans and specs. Seeding and mulching of all appropriate disturbed soil surfaces shall be completed after establishment of final grades in the project area.

Endangered Species Act, as amended, 16 U.S.C. 1531, et seq.
The USFWS has indicated that the following species may be present in the area of the proposed action:

Classification	**Common Name**	**(Scientific Name)**	**Habitat**
Endangered	Indiana Bat	(Myotis sodalis)	upland forest
Endangered	Bald Eagle	(Haliaeetus leucocephalus)	wintering trees
Threatened	Prairie Bush Clover	(Lespedeza leptostachya)	dry to mesic praries with gravelly soil
Threatened	Eastern Prairie Fringed Orchid	(Platanthera leucophaea)	mesic to wet praries
Threatened	Western Prairie Fringed Orchid	(Platanthera praeclara)	mesic to wet praries

During the summer, the Indiana bat frequents the corridors of small streams with well developed riparian woods as well as mature

upland forests. This area contains no habitat suitable for the Indiana Bat. It is unlikely that this portion of the project will adversely impact the Indiana Bat.

The endangered bald eagle (proposed threatened, proposed rule, Federal Register Vol. 59, No. 132, July 12, 1994) is known to winter along large rivers in Des Moines County, Iowa. They roost in large trees adjacent to the river and perch in large shoreline trees to rest or feed on fish. Cottonwood trees are strongly preferred over other species and dead trees are strongly preferred as daytime perches, with the tallest trees being utilized most often. Generally, eagles perch within 50 meters (164 feet) of a water body. As the area that is proposed to be cleared is out of this range and there is abundant habitat elsewhere along the river, the removal of trees would not likely adversely affect the eagles.

The prairie bush clover, the eastern prairie fringed orchid, and the western prairie fringed orchid are considered to potentially occur statewide in Iowa based on historical habitat. The bush clover occupies dry to mesic prairies with gravelly soil and the orchids occupy wet grassland habitats. The area of the proposed project does not involve this type of habitat; no prairies, wet grasslands, nor gravelly soils. Recent surveys by personnel from the University of Iowa have not found these species on the IAAP. Also, aerial photo #2 reveals that this area has been altered extensively as it was used for borrow in the past. It is unlikely that this portion of the project will adversely impact these species.

Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq. The USFWS was contacted regarding this portion of the project. Two letters were received from the USFWS. The first letter dated September 14, 1994 (see exhibit #1) detailed the possibilities regarding threatened and endangered species in the area as well as providing direction for a 3:1 ratio of tree planting in the event that trees will have to be removed due to the project. The second letter, dated January 24, 1995 (see exhibit #2) was the result of a meeting which occurred at the IAAP on January 10, 1995. It outlined concerns regarding the plantings on the landfill cover, the mitigation of lost tree habitat, and items relating to the cleanup activities on line 1 and 800.

The USFWS expressed interest and approval for the creation of a wetland at this site. They will be coordinated with further during the design phase of this wetland.

Hazardous, Toxic, and Radioactive Waste Laws (CERCLA 1980, SARA 1986, OSHA, RCRA). The borrow site contains no contaminated soils.

Watershed Protection and Flood Prevention Act, 16 U.S.C. 1101, et seq. Soil conservation measures will be specifically designed during the preparation of plans and specifications (see CWA).

Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq. Not applicable. The area in which the proposed activity will occur is not a wild or scenic river, nor is it on the National Inventory of Rivers potentially eligible for inclusion in the wild and scenic system.

Floodplain Management (E.O. 11988). According to the National Flood Insurance Program, February 17, 1982 Flood Insurance Rate Map the inert landfill is located in Zone C. Zone C indicates areas of minimal flooding. No portion of this project is located within the 100 year flood plain boundary. It is likely that this project will have no adverse impacts to the floodplain and will not increase flood hazards.

Protection of Wetlands (E.O.11990). Following excavation this area will be converted into an open water wetland of approximately 2.5 acres in size. The IAAP and the COE will attempt to establish habitat suitable for waterfowl and some furbearer activity. The USFWS will be coordinated with and requested for input regarding the design of this wetland. The purpose of the wetland area is to enhance the total environmental stewardship program at the IAAP. The creation of wetlands in the excavated areas will exhibit to the public the firm alliance that the IAAP, the EPA, the COE, and the IDNR have in enhancing the environment (see exhibit #7).

CEQ Memorandum, August 11, 1980, Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA. This project will cause no impacts to prime or unique agricultural land.

CEQ Memorandum, August 10, 1980, Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory. Their are no rivers on the nationwide inventory or eligible for the nationwide inventory in the project area.

EXHIBIT #1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office (ES)
Avenue Court
Illinois 61201

COM: 309/793-5800
FAX: 309/793-5804

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 3

To Pat Freeman	From Melanie Kruse
Dept./Agency Omaha COE	Phone # 309-793-5800
Fax # 402-221-4886	Fax # 309-793-5804

NSN 7540-01 317 7368 5099-101 GENERAL SERVICES ADMINISTRATION

September 14, 1994

Department of the Army
Corps of Engineers, Omaha District
215 North 17th Street
Omaha, Nebraska 68102-4978

Dear Sir or Madam:

This letter responds to the proposed closure of the IAAP inert landfill in Des Moines County, Iowa.

The Fish and Wildlife Service (Service) recommends using the blast deflecting barricades as the borrow material, or other non-forested areas to cap the landfill. If virgin forest is to be cleared for this project, the loss will have to be mitigated. Loss of mature trees is not readily mitigated due to the long growth period required between planting and maturity. Therefore, the Service recommends mitigation of at least a 3:1 ratio for replacement of the forest that is disturbed and cleared.

The Service would further recommend a ground water sampling program to a depth of the existing landfill, due to the absence of a bottom liner in the landfill. This continual monitoring is necessary to determine the presence and concentrations of any contaminants that are leaching into the ground water.

Endangered Species:

To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies are required to obtain from the Fish and Wildlife Service information concerning any species, listed or proposed to be listed, which may be present in the area of a proposed action. Therefore, we are furnishing you the following list of species which may be present in the concerned area:

Classification	Common Name (Scientific Name)	Habitat
Endangered	Indiana bat (Myotis sodalis)	upland forests
Endangered	Bald eagle (Haliaeetus leucocephalus)	wintering

Classification	Common Name (Scientific Name)	Habitat
Threatened	Prairie bush clover (Lespedeza leptostachya)	dry to mesic prairies with gravelly soil
Threatened	Eastern prairie fringed orchid (Platanthera leucophaea)	mesic to wet prairies
Threatened	Western prairie fringed orchid (Platanthera praeclara)	mesic to wet prairies

The endangered Indiana bat (Myotis sodalis) is known to occur in Des Moines County, Iowa. During the summer, the Indiana bat frequents the corridors of small streams with well developed riparian woods as well as mature upland forests. It forages for insects by flying beneath the tree canopy, and roosts and rears its young beneath the loose bark of large dead or dying trees. It winters in caves and abandoned mines.

Suitable summer habitat is considered to have the following characteristics within a 1/2 mile radius of the project site:

1) forest cover of 15% or greater;
2) permanent water;
3) one or more of the following tree species 11 inches diameter at breast height (dbh) or greater: shagbark and shellbark hickory that may be dead or alive, and dead bitternut hickory, American elm, slippery elm, eastern cottonwood, silver maple, white oak, red oak, post oak, and shingle oak with slabs or plates of loose bark;
4) at least 1 potential roost tree per 2.5 acres;
5) potential roost trees must have greater than 10% coverage of loose bark (by visual estimation of peeling bark on trunks and main limbs).

If the project site contains any habitat that fits the above description, it may be necessary to conduct a survey to determine whether the bat is present. If Indiana bats are known to be present, they must not be harmed, harassed or disturbed when present. Indiana bat habitat may be altered (i.e trees cleared) only between the dates of September 1 and April 30.

The endangered bald eagle (Haliaeetus leucocephalus) is listed as wintering along large rivers in Des Moines County, Iowa. They roost at night in groups in large trees adjacent to the river in areas that are protected from the harsh winter elements. They perch in large shoreline trees to rest or feed on fish. There is no critical habitat designated for this species and the only restrictions that apply to the eagle are that it not be harassed, harmed or disturbed when present.

The prairie bush clover (Lespedeza leptostachya) is considered to potentially occur statewide in Iowa based on historical habitat. It occupies dry to mesic prairies with gravelly soil. The eastern prairie fringed orchid (Platanthera leucophaea) and the western prairie fringed orchid (Platanthera praeclara) could also potentially occur in Des Moines County. They occupy wet grassland habitats. There is no critical habitat designated for these species. Federal regulations prohibit any commercial activity involving these species or the destruction, malicious damage or removal of these species from Federal land or any other lands in knowing violation of State law or regulation, including State criminal trespass law. These species should be searched for whenever prairie remnants are encountered.

This letter provides comments under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); and the Endangered Species Act of 1973, as amended.

The opportunity to provide our comments regarding resource protection is appreciated. Should you have questions or comments concerning our recommendations, please contact Melanie Kruse at this office.

Sincerely,

Wayne H. Fischer

Richard C. Nelson
Field Supervisor

MK:am

EXHIBIT #2

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office (ES)
4469 - 48th Avenue Court
Rock Island, Illinois 61201

COM: 309/793-5800
FAX: 309/793-5804

IN REPLY REFER TO:

January 24, 1995

Mr. Don Moses
Department of the Army
Corps of Engineers, Omaha District
215 North 17th Street
Omaha, Nebraska 68102-4978

Dear Mr. Moses:

This letter is in response to the ideas brought forth during the site visit on January 10, 1995, for the closure of the inert landfill on the Iowa Army Ammunition Plant in Des Moines County, Iowa.

We had two concerns regarding our review of the Closure Plan/ Final Design Analysis, October 1994 and the Specifications, October 1994. Mitigation for the tree clearing was stated as "six acres of trees to be planted" in the Closure Plan on page 3 and as "nine acres of woody vegetation to be planted" in the Specifications on page 02950-5. Our other question regards the vegetation on the landfill cap. In the Specifications on page 02935-3 it stated that native grasses would be planted, and in the Closure plan on page 7 it stated that fescues would be planted. We would encourage planting native grasses and recommend mowing only once a year, late in the season, to avoid impacts to ground nesting birds. If these plans are to be pursued, these concerns need clarification.

Comments made during the site visit indicated that the previously identified borrow site would not be used or impacted by the closure of the inert landfill. Therefore, new potential borrow sites were identified and examined on the January 10 site visit. We understand that this project has been expanded to include the clean up of two contaminated areas. The following comments represent our preliminary evaluation of the new borrow sites. Proper disposal techniques for these contaminated areas should be coordinated with the US EPA.

Line 1 is a contaminated area along Brush Creek. The contaminated soil is proposed to be removed and landfilled in trench number 6 of the inert landfill. The site will then be

excavated deeper and further upstream to collect clean dirt for the cap on the inert landfill. The entire site will be developed into a wetland site after construction. The only wetlands that currently exist on this site are the creek and a linear wetland along a portion of the right descending bank. If this site is developed into a wetland after construction no further mitigation would be necessary for the impacts to the existing wetlands. We recommend a plant survey be conducted, next summer, to determine if any threatened or endangered plant species are located within this area. Our previous letter dated September 14, 1994, identified the potential threatened or endangered species in the Iowa Army Ammunition Plant area.

The pink water lagoons contaminated area will also be excavated and landfilled in trench number 6. The pink water lagoon area will then also be developed into a wetland site after construction. There are currently no wetlands on this site, except the large lagoon. If this site is developed into a wetland after construction, no further mitigation would be necessary for the impacts to the existing wetlands.

Trench 6 of the inert landfill will require grading before it is useable, which will result in tree clearing. The proposed detention pond below the inert landfill will also require tree clearing. The total area cleared and disturbed will be approximately two acres. To remove the contaminated soil from the pink water lagoons more tree clearing would be required. To mitigate for this total loss, you stated that ten acres would be planted to trees. We concur that this would adequately offset the impacts to the timbered areas currently in existence. Some concern was express over the recommendation of planting the trees the same year as the construction. We understand that this area was originally scheduled to be planted as a result of resource development for the Iowa Army Ammunition Plant. Currently it is proposed to be planted as a mitigation measure and should be expedited as such.

These comments provide technical assistance only and do not constitute the report of the Secretary of the Interior on the project within the meaning of Section 2(b) of the Fish and Wildlife Coordination Act, do not fulfill the requirements under Section 7 of the Endangered Species Act, nor do they represent the review comments of the U.S. Department of the Interior on any forthcoming environmental statement.

We appreciate your early coordination efforts and look forward to working with you on this project. If you have additional questions, please contact Melanie Kruse.

Sincerely,

for Richard C. Nelson
Field Supervisor

cc: Joe Haffner (IAAP)

MK:sjg

EXHIBIT #4

CEMRO-PD-E (1130-2-438) 8 February 1995

MEMORANDUM FOR CEMRO-PD-M (SELLERS)

SUBJECT: Cultural Resources Associated with Iowa Army Ammunition Plant

1. A cultural resource reconnaissance has been completed for the Iowa Army Ammunition Plant (IAAP) by Augustana College in 1991. The report was consulted to determine the location of cultural resources near proposed environmental restoration project at the IAAP, shown on a portion of a USGS topographic map supplied by you.

2. Two archeological sites are reported near the borrow area northwest from the wetland creation site. These two sites, include an isolated find IF80 and site 13DM385.

a. The isolated find consists of a brick fragment located northwest from the borrow area for the wetland creation site. This isolated find is not important and activities near the isolated find are not restricted.

b. Site 13DM385 is the location of a historic farmstead and a lithic scatter. The structures that were associated with this farmstead have been demolished or removed, but farmstead artifacts and features are still present. Some lithic artifacts associated with the Native American occupation were also observed in the area. A copy of the site form, with a map of the site is enclosed.

The archeologists from Augustana thought that the artifacts on the site may yield important information on the area and may contain buried, intact deposits. They recommended further studies to evaluate the potential eligibility of this site to the National Register of Historic Places be prepared prior to any form of ground disturbance.

3. There are no archeological sites located near any other portions of the proposed project, in particular the line 800 pinkwater lagoon, the inert landfill and tree mitigation near the proposed detention dam, the line 1 pinkwater lagoon and associated borrow area. There are no restriction associated with cultural resources issues at these areas.

4. Borrowing activities associated with the wetland creation area should be restricted to avoid impacting site 13DM385. It is recommended that the periphery of the site be marked so that the excavation crews can avoid the site. A staff archeologist from this office can travel to the IAAP and mark the boundary of site 13DM385 prior to construction.

Edward C. Brodnicki

Encl

Edward C. Brodnicki
Archeologist

Historic Preservation Act stipulate that the federal agency treat such properties "as though they are eligible and managed accordingly."

Given mutual agreement as to National Register eligibility of the historic district and of the blast deflection berms as contributing resources, the case must be reviewed under the requirements of 36 CFR Part 800. In accordance with part 800.5 whereby the Agency Official applies the Criteria of Effect, it is our opinion as a consulting party that, if the project as designed will call for affecting any of these eligible properties, the undertaking will pose an adverse effect as defined in Part 800.9(b)(1). It is recommended that COE and DOD initiate the consultation process outlined in Part 800.5(e) to seek ways to avoid or reduce the adverse effects of the project on the properties in consultation with our staff.

With respect to exploring ways to minimize or avoid the project's effect to the blast deflection berms, several questions must be addressed. They include:

1. Can suitable clay soils be gotten from sources other than World War II era installation structures?
2. How many blast deflection berms exist at the facility and where are they situated in relation to World War II activities?
3. How do the blast deflection berms located at Line Number Three compare to others at the installation in terms of representing the best and most intact examples of structures associated with the installation's predominant wartime activities?
4. Do original drawings/plans/specifications exist for constructing the particular blast deflection berms proposed for removal?

If there is no feasible or prudent alternative to demolishing the blast deflection berms, then we recommend that a Memorandum of Agreement be prepared for project approval be granted subject to the following condition:

The blast deflection berms, which are treated here as a contributing resource to the Iowa Ordinance Plant Historic District, a property evaluated as eligible at the national level of significance, will be documented to the archival standards of the Historic American Engineering Record **(HAER)** *prior to* their demolition or alteration. Such documentation will be performed in accordance with the following stipulations:

(1) COE, in consultation with the SHPO, will contact the Historic Preservation Branch of the Denver Regional Office of the National Park Service (NPS) to identify the level of HAER Recording appropriate for the contributing elements in question. Consultation will lead to development of a "Recordation Plan" (scope of work) approved by NPS that specifies items such as number and views of photographs, extent of historical research and written description, and the need for and number/type of measured drawings. Written approval by the NPS of

the proposed scope of work normally must be in hand before actual field work is commenced.

(2) The COE will obtain the services of a qualified consultant to produce the documentation materials required to fulfill the mitigation requirements.

(3) The COE will ensure that the finished documentation is submitted to the NPS for review and approval. Copies of the documentation, including a full set of original, archival-quality contact prints of all photographs, will be provided to the Iowa SHPO for file, once written NPS approval of the full package of materials is received.

Should you have any questions regarding our findings and recommendations, please feel free to contact me (515) 281-3306

Sincerely,

Lowell Soike

Lowell J. Soike, Ph.D.
Historian, Community Programs Bureau

cc: Mary Jane Beck, Headquarters, AMC-COM, Rock Island, IL 61299-6000

EXHIBIT #4

CEMRO-PD-E (1130-2-438) 8 February 1995

MEMORANDUM FOR CEMRO-PD-M (SELLERS)

SUBJECT: Cultural Resources Associated with Iowa Army Ammunition Plant

1. A cultural resource reconnaissance has been completed for the Iowa Army Ammunition Plant (IAAP) by Augustana College in 1991. The report was consulted to determine the location of cultural resources near proposed environmental restoration project at the IAAP, shown on a portion of a USGS topographic map supplied by you.

2. Two archeological sites are reported near the borrow area northwest from the wetland creation site. These two sites, include an isolated find IF80 and site 13DM385.

a. The isolated find consists of a brick fragment located northwest from the borrow area for the wetland creation site. This isolated find is not important and activities near the isolated find are not restricted.

b. Site 13DM385 is the location of a historic farmstead and a lithic scatter. The structures that were associated with this farmstead have been demolished or removed, but farmstead artifacts and features are still present. Some lithic artifacts associated with the Native American occupation were also observed in the area. A copy of the site form, with a map of the site is enclosed.

The archeologists from Augustana thought that the artifacts on the site may yield important information on the area and may contain buried, intact deposits. They recommended further studies to evaluate the potential eligibility of this site to the National Register of Historic Places be prepared prior to any form of ground disturbance.

3. There are no archeological sites located near any other portions of the proposed project, in particular the line 800 pinkwater lagoon, the inert landfill and tree mitigation near the proposed detention dam, the line 1 pinkwater lagoon and associated borrow area. There are no restriction associated with cultural resources issues at these areas.

4. Borrowing activities associated with the wetland creation area should be restricted to avoid impacting site 13DM385. It is recommended that the periphery of the site be marked so that the excavation crews can avoid the site. A staff archeologist from this office can travel to the IAAP and mark the boundary of site 13DM385 prior to construction.

Edward C. Brodnicki

Encl

Edward C. Brodnicki
Archeologist

EXHIBIT #5

State Historical Society of Iowa

The Historical Division of the Department of Cultural Affairs

March 8, 1995

In reply please refer to:
RC#: 890929028

Mr. Randy Sellers
CEMRO-PD-M
Army Corps of Engineers, Omaha District
215 North 17th Street
Omaha, NE 68102

RE: ARMY/COE - DES MOINES COUNTY - IOWA ARMY AMMUNITION PLANT NEAR MIDDLETOWN - DESIGNATION OF BORROW AREAS FOR LANDFILL/WETLAND CREATION - AVOIDANCE OF 13DM385

Dear Mr. Sellers:

We have received and reviewed the information you submitted to our office concerning the above referenced project. Based on your project description and a review of our records and maps, we make the following comments and recommendations.

The proposed borrow area is located adjacent to historic and prehistoric archeological site 13DM385. This site was recorded during a cultural resources survey of the Iowa Army Ammunition Plant (IAAP), but its potential National Register eligibility has not been assessed. There are two main ways in which the proposed project could comply with Section 106 in regard to this known site.

The first option would involve carrying out a Phase II assessment of the site before any land disturbance in the area is initiated. Recommendations regarding use or avoidance of the site area would be made on the basis of the intensive survey results.

We understand from your correspondence that you prefer to avoid the site; this would be the second option. The site would be avoided completely by all land disturbance activity associated with the currently proposed project. We understand that an archeologist from the Omaha COE is planning to flag the boundaries of 13DM385 as defined on the basis of Phase I survey. Excavation crews would avoid disturbing the flagged area.

The only foreseeable problem associated with this approach is the accuracy of site boundaries defined on the basis of Phase I survey. Often, Phase I survey is insufficient to identify the full extent of an archeological site and boundaries are modified based on subsequent survey and testing. 13DM385 may contain subsurface components outside the boundaries designated on the basis of Phase I survey. If the avoidance approach is chosen for this site, excavation should be careful so as not to impact previously unidentified portions of the site. If such

☐ 402 Iowa Avenue
Iowa City, Iowa 52240
(319) 335-3916

☒ ~~Capitol Complex~~ 600 EAST LOCUST
Des Moines, Iowa 50319-0290
(515) 281-5111

☐ Montauk
Box 372
Clermont, Iowa 52135
(319) 423-7173

remains are uncovered during borrow excavation, you should make reasonable efforts to avoid or minimize harm to the property until the significance of the discovery can be determined.

Our office should be notified of any changes in project plans, including the designation of any additional borrow areas.

Should you have any questions or if this office can be of further assistance, please contact me at the phone number listed below.

Sincerely,

Kirsten Hoffman

Kirsten Hoffman, Archeologist
Community Programs Bureau
(515) 281-4358

cc: Edward C. Brodnicki, Archeologist, Omaha COE

EXHIBIT #6

Authorization From The Iowa Department of Natural Resources
To Discharge Under The National Pollutant Discharge Elimination System

PERMITTEE

United States Army
Rural Route
Middletown, Iowa 52638

IOWA NPDES PERMIT NUMBER 29-00-9-00

DATE OF ISSUANCE JUL 14 1989

DATE OF EXPIRATION March 1, 1994

YOU ARE REQUIRED TO FILE RENEWAL OF THIS PERMIT BY September 1, 1993

IDENTITY AND LOCATION OF FACILITY

Iowa Army Ammunition Plant
Section 9, T69N, R3W, Des Moines, County

RECEIVING WATERCOURSE DESIGNATION
Brush Creek, Long Creek and an unnamed Creek, all tributaries to Skunk River.

THE DESIGNATED STREAMS ARE:

1. Brush Creek from mouth (Des Moines Co.) to Hwy. 61 (Sec. 35, T69N, R3W, Des Moines County).
2. Long Creek from mouth (Des Moines Co.) to E. line Sec. 11, T69N, R4W, Des Moines Co.
3. Skunk River from mouth to Oakland Mills Dam.

all are Classified B(w). Class "B" waters are to be protected for wildlife, fish, aquatic and semiaquatic life.

EPA NUMBER - IA0002214

This permit is issued pursuant to the authority of section 402(b) of the Clean Water Act (33 U.S.C 1342(b)), Iowa Code section 455B.174, and rule 567--64.3, Iowa Administrative Code. You are authorized to operate the disposal system and to discharge the pollutants specified in this permit in accordance with the effluent limitations, monitoring requirements and other terms set forth in this permit.

You may appeal any conditions of this permit by filing a written notice of appeal and request for administrative hearing with the director of this Department within 30 days of your receipt of this permit.

Any existing, unexpired Iowa operation permit or Iowa NPDES permit previously issued by the Department for the facility identified above is revoked by the issuance of this Iowa NPDES operation permit unless the facility is being upgraded or replaced by a new facility, then the existing permit will remain in effect until the new facility is completed and in operation.

OUTFALL SERIAL NO.	DESCRIPTION
	See Next Pages

OUTFALL SERIAL NO.	DESCRIPTION
011	This discharge, resulting from explosive loading operations in the Line 1 area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 1-70. Discharge is to Brush Creek. This facility is currently not in operation but may be required for future operations.
012	This discharge, resulting from explosive loading operations in the Line 1 area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 1-70-1. Discharge is to Brush Creek.
021	This discharge, resulting from explosive loading operations in the Line 2 area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 2-70-1. Discharge is to Brush Creek. The facility is currently not in operation but may be required for future operations.
022	This discharge, resulting from explosive loading operations in the Line 2 area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 2-70-2. Discharge is to Brush Creek.
032	This discharge, resulting from explosive operations in the Line 3 area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system, at Bldg. No. 3-70-1. Discharge is to Brush Creek.
033	This discharge, resulting from explosive loading operations in the Line 3 area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 3-70-2. Discharge is to Brush Creek.

OUTFALL SERIAL NO.	DESCRIPTION
034	This discharge, resulting from explosive loading operations in the Line 3A area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 3A-70-1. Discharge is to an unnamed tributary of the Skunk River.
035	This discharge, resulting from explosive loading operations in the Line 3A area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 3A-70-2. Discharge is to Long Creek.
041	This discharge, to be generated by explosive loading operations at Line 4A under construction, will consist of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 4A-58-2. This facility is currently not in operation but may be required for future operations. Discharge is to a sanitary sewer to the main sewage treatment plant (outfall 013) which discharges to Brush Creek.
042	This discharge, to be generated by explosive loading operations at Line 4A under construction, will consist of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 4A-65. This facility is currently not in operation but may be required for future operations. Discharge is to a sanitary sewer to the main sewage treatment plant (outfall 013) which discharges to Brush Creek.
051	This discharge, resulting from explosive operations in the Line 5A area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system, at Bldg. No. 5A-140-3. Discharge is to Brush Creek.
052	This discharge, resulting from explosive loading operations in the Line 5B area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 5B-140-3. Discharge is to Brush Creek.

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OUTFALL SERIAL NO.	DESCRIPTION
082	This discharge, resulting from explosive loading operations in the Line 800 area, consists of explosive contaminated wastewater that has been processed through carbon filter columns. The discharge shall be sampled immediately following the carbon filter treatment system at Bldg. No. 800-70-1. Discharge is to Brush Creek. This facility is currently not in operation but may be required for future operations.
009	This discharge consists of treated effluent from the industrial waste treatment system located adjacent to the Main Heating Plant, Bldg. No. 500-139. The water requiring treatment is coal pile runoff water, boiler blowdown water and leachate from the flyash landfill. The discharge is monitored immediately following the final treatment unit and prior to entering a tributary of Long Creek. The facility is operated on an intermittent basis during the heating season. Outside of the heating season, it is not necessary to operate the industrial waste treatment equipment because natural evaporation of the coal pile runoff water and leachate water contained in the collection pond is adequate to control the water level in the pond.
013 (Main STP Outfall)	This discharge contains treated effluent consisting of facility domestic wastes, car wash rack wastes and x-ray film processing wastes, boiler blowdown from the oil-fired heating plant near Line 2 (when in use). The treatment facility consists of an imhoff tank, a trickling filter, two secondary clarifiers, a chlorine contact chamber and sludge drying beds. The discharge shall be monitored immediately following the final treatment unit at Bldg. No. 500-216-1. Discharge is to Brush Creek.
014 (3A STP Outfall)	This discharge contains treated effluent consisting of domestic wastes from the Process Line 3A and blowdown water from the steam generating plant near Line 3A (Bldg. No. 3A-02). The treatment facility consists of an imhoff tank, a trickling filter, a secondary clarifier, a chlorine contact chamber, and sludge drying beds. The discharge shall be monitored immediately following the final treatment unit at Bldg. No. 502-216-2. Discharge is to an unnamed tributary of the Skunk River.

Facility Name: Army Ammunition Plant
Iowa NPDES Permit Number: 29-00-9-00

EFFLUENT LIMITATIONS FOR CONTINUOUS DISCHARGE FACILITIES

You are prohibited from discharging pollutants more frequently or in excess of the limitations specified below:

OUTFALL SERIAL NUMBER*	WASTEWATER PARAMETER	MASS IN POUNDS PER DAY (unless otherwise specified) 30-Day Average	Maximum	CONCENTRATION IN mg/l (unless otherwise specified) 30-Day Average	Maximum
011 012 021 022 032 033 034 035 051 052 082	Flow (MGD)	---	0.093	---	---
	TSS	16	31	20	40
	TNT	0.40	0.78	0.5	1
	RDX + HMX	1.56	3.90	2	5
	pH (Range)	Minimum 6.0 - Maximum 9.0			
041 042	Flow (MGD)	---	0.0024	---	---
	TSS	0.4	0.8	20	40
	RDX	0.04	0.10	2	5
	pH (Range)	Minimum 6.0 - Maximum 9.0			
* These limits apply individually to each listed outfall					

DEFINITIONS

1. "30-day Average" means the sum of the total daily discharges by mass, volume or concentration during a calendar month, divided by the total number of days during the month that measurements were made.

2. "Maximum" means the total discharge by mass, volume or concentration which cannot be exceeded during a twenty-four hour period.

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IA0091S006
Report pink water effluent

Facility Name: Army Ammunition Plant
Iowa NPDES Permit Number: 29-00-9-00

EFFLUENT LIMITATIONS FOR CONTINUOUS DISCHARGE FACILITIES

You are prohibited from discharging pollutants more frequently or in excess of the limitations specified below:

OUTFALL SERIAL NUMBER	WASTEWATER PARAMETER	MASS IN POUNDS PER DAY (unless otherwise specified) 30-Day Average	Maximum	CONCENTRATION IN mg/l (unless otherwise specified) 30-Day Average	Maximum
009	TSS*	---	---	---	50
	Iron	---	---	1	2
	Total Phosphates	---	---	5	10
	pH (Range)	Minimum 6.0 - Maximum 9.0			
013 (Main)	Flow (MGD)	0.49	1.08	---	---
	BOD_5	122	184	30	45
	TSS	122	184	30	45
	Ammonia Nitrogen (from April 1 to October 31)	---	36	---	9
	pH (Range)	Minimum 6.0 - Maximum 9.0			
014 (3A)	Flow (MGD)	0.04	0.07	---	---
	BOD_5	10	15	30	45
	TSS	10	15	30	45
	pH (Range)	Minimum 6.0 - Maximum 9.0			

* The effluent limitations for total suspended solids shall not apply when discharge occurs as a result of a rainfall event exceeding the 10 year 24-hour rainfall event. The 24-hour event is equivalent to 4.5 inches of rainfall within a 24-hour time period.

DEFINITIONS

1. "30-day Average" means the sum of the total daily discharges by mass, volume or concentration during a calendar month, divided by the total number of days during the month that measurements were made.

2. "Maximum" means the total discharge by mass, volume or concentration which cannot be exceeded during a twenty-four hour period.

Facility Name: Army Ammunition Plant/Middletown
Iowa NPDES Permit Number: 29-00-9-00

MONITORING AND REPORTING REQUIREMENTS FOR CONTINUOUS DISCHARGE FACILITIES

(a) Samples and measurements taken shall be representative of the volume and nature of the monitored wastewater.

(b) "Standard Methods", "EPA" Methods", or "ASTM", as defined in rule 60.2, or other analytical and sampling methods as specified in Table VII of Chapter 63 of the rules, or other methods approved in writing by the Department, shall be utilized.

(c) Table V of Chapter 63 of the rules provides you with further explanation of your monitoring requirements.

(d) Bypasses shall be reported in accordance with rule 63.5.

(e) You are required to monitor your wastewater as specified below. Results of all monitoring shall be recorded on forms provided by the Department or the forms developed by Army Ammunition, and submitted to the Department by the fifteenth day following the close of the reporting period. Your reporting period is on a monthly basis, ending on the last day of each month.

WASTEWATER PARAMETER	FREQUENCY	SAMPLE TYPE	SAMPLING LOCATION
*For Outfalls 011, 012, 021, 022, 032, 033, 034, 035, 051, 052 and 082			
Flow	1/week	24-hour Total	effluent
pH	1/week	grab	effluent
TNT	1/week	grab	effluent
RDX + HMX	1/week	grab	effluent
TSS	1/week	24-hour Comp.	effluent
*For Outfalls 041 and 042			
Flow	1/week	24-hour Total	effluent
pH	1/week	grab	effluent
RDX	1/week	grab	effluent
TSS	1/week	24-hour Comp.	effluent

*Samples required only when process line is operating and outfall discharges. Monitoring reports are required to be submitted only for outfalls which discharge during the month.

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Facility Name: Army Ammunition Plant/Middletown
Iowa NPDES Permit Number: 29-00-9-00

MONITORING AND REPORTING REQUIREMENTS FOR CONTINUOUS DISCHARGE FACILITIES

(a) Samples and measurements taken shall be representative of the volume and nature of the monitored wastewater.

(b) "Standard Methods", "EPA" Methods", or "ASTM", as defined in rule 60.2, or other analytical and sampling methods as specified in Table VII of Chapter 63 of the rules, or other methods approved in writing by the Department, shall be utilized.

(c) Table V of Chapter 63 of the rules provides you with further explanation of your monitoring requirements.

(d) Bypasses shall be reported in accordance with rule 63.5.

(e) You are required to monitor your wastewater as specified below. Results of all monitoring shall be recorded on forms provided by the Department or the forms developed by Army Ammunition, and submitted to the Department by the fifteenth day following the close of the reporting period. Your reporting period is on a monthly basis, ending on the last day of each month.

WASTEWATER PARAMETER	FREQUENCY	SAMPLE TYPE	SAMPLING LOCATION
For Outfall 009			
Flow	1/week	24-hour Total	Effluent
pH	1/month	grab	Effluent
TSS	1/month	grab	Effluent
Iron	1/week	8-hour Comp.	Effluent
Total Phosphates	1/week	8-hour Comp.	Effluent
For Outfalls 013 and 014			
Flow	Daily	24-hour Total	Influent or Effluent
BOD_5	1/week	24-hour Comp.	Influent and Effluent
TSS	1/month	24-hour Comp.	Influent and Effluent
Ammonia Nitrogen	1/week	24-hour Comp.	Effluent Outfall 013 Only
pH	1/week	grab	Influent and Effluent
Temperature	1/week	grab	Influent and Effluent
Settleable Solids	2/week	grab	Effluent
Silver	1/week	24-hour Comp.	Effluent
Recirculation	2/week	Measurement	Effluent

OK

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-013-

GENERAL CONDITIONS

1. DEFINITIONS
"Maximum" means the total discharge by mass, volume or concentration which cannot be exceeded during a twenty-four hour period.
"30 day average" means the sum of the total daily discharges by mass, volume or concentration during a calendar month, divided by the total number of days during the month that measurements were made.
"7 day average" means the sum of the total daily discharges by mass, volume or concentration during a calendar week, divided by the total number of days during the week that measurements were made.
2. NOTICE OF CHANGED CONDITIONS
You are required to report any changes in existing conditions or information on which this permit is based.
(a) Facility expansions, production increases or process modifications which may result in new or increased discharges of pollutants must be reported to the director in advance. If such discharges exceed effluent limitations, your report must include a new application for NPDES permit. (See rule 64.6(5)"a".).
(b) If any modification of, addition to, or construction of a disposal system is to be made, you must first obtain a written permit from this department, in accordance with rule 64.2.
(c) If your facility is a publicly owned treatment or otherwise may accept waste for treatment from commercial or industrial contributors, see CONDITIONS, LIMITATIONS AND MONITORING REQUIREMENTS FOR CONTRIBUTING COMMERCIAL/INDUSTRIAL USERS for further notice requirements. (See rule 64.3(5)).
3. PERMIT MODIFICATION, SUSPENSION OR REVOCATION
(a) This permit may be modified, suspended or revoked for causes specified in rule 64.3(11).
(b) This permit may be modified due to changed conditions or information on which this permit is based, including any new standard this department may adopt that would change the required effluent limits.
(c) If a toxic pollutant is present in your discharge and more stringent standards for toxic pollutants are established under section 307(a) of the Clean Water Act, this permit will be modified in accordance with the new standards. (See rule 64.6(5)"g".)
4. INSPECTION OF PREMISES, RECORDS, EQUIPMENT, METHODS AND DISCHARGES
You are required to permit authorized department personnel to inspect in accordance with rule 64.6(5)"c".
5. OPERATION AND MAINTENANCE
All facilities and control systems shall be operated as efficiently as possible and maintained in good working order, in accordance with rule 64.6(5)"f", and a sufficient number of staff, adequately trained and knowledgeable in the operation of your facility shall be retained to achieve compliance with the terms of this permit.
6. NEED TO HALT OR REDUCE NOT A DEFENSE
It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
7. TRANSFER OF TITLE
If title to your facility or any part of it is transferred, the new owner shall be subject to this permit. You are required to notify the new owner of the requirements of this permit in writing prior to such transfer of title. The director shall be notified in writing of such transfer within 30 days. (See rule 64.13.)
8. SEVERABILITY
The provisions of this permit are severable, and if any provision or application of any provision to any circumstances, is found to be invalid by this department or a court of law, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected by such finding.
9. APPLICATION OF OTHER AUTHORITY
This permit does not relieve you of the responsibility to comply with all local, state and federal laws, ordinances, regulations or other legal requirements applying to the operation of your facility.
10. ADMINISTRATIVE RULES
Rules of this department which govern your facility operation in connection with this permit are published in part 567 of the Iowa Administrative Code in Chapters 60-64. Reference to the term "rule" in this permit means the designated provision of part 567 Iowa Administrative Code.
11. DUTY TO MITIGATE
The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.
12. MAINTENANCE OF RECORDS AND SIGNATORY REQUIREMENTS
You are required to maintain records of your operation in accordance with rule 63.2. Also all applications, reports, or information submitted to the Department shall be signed and certified. (See rule 63.10 & 64.3(8))
13. CHANGES IN DISCHARGES OF TOXIC SUBSTANCES
You shall notify the Director as soon as you know or have reason to believe:
a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit. (See 40 CFR 122.42(a).
b) That you have begun or expect to begin to use or manufacture as in intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

You may appeal any conditions of this permit by filling a written notice of appeal and request for administrative hearing with the director of this department within 30 days of your receipt of this permit. Contact the Iowa Department of Natural Resources for extra report forms, details on performing monitoring, or any additional information at the Wallace Building, 900 E. Grand Ave., Des Moines, Iowa 50319, or phone 515/281-8693.

FOR THE DEPARTMENT OF NATURAL RESOURCES

...rry J. Wilson, Director

By _____
Wayne Farrand, Supervisor
Wastewater Permits Section
ENVIRONMENTAL PROTECTION DIVISION

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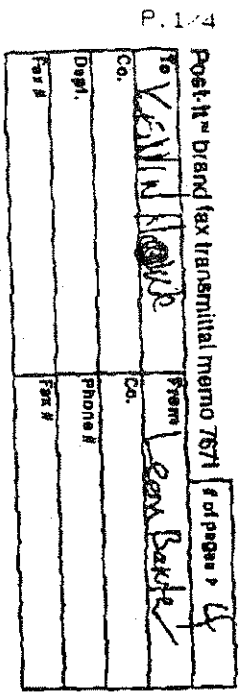
EXHIBIT #7



February 7, 1995

Plant Protection

Mr. Scott Marquess
Waste Management Division
U. S. Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Mr. Marquess:

Reference Interagency Agreement under CERCLA section 120, Administrative Docket Number: VII-F-90-0029, and conference call between Derek Romitti, U.S. Army Environmental Center (USAEC), U.S. Army Corps of Engineers, Omaha (CEMRO) and Scott Marquess, EPA conducted February 2, 1995.

This correspondence is to outline the Army's strategy for the proposed removal actions at the Former Line 1 Impoundment and the Line 800 Lagoon and Inert Landfill as discussed in reference telephone conservation.

The removals at the two sites will now be achieved in two phases. The first phase will be detailed in a Draft Engineering Evaluation/Cost Analysis (EE/CA) that will prepared by CEMRO. The details of the EE/CA are as follows:

a. Contaminated soils will be excavated from both the Former Line 1 Impoundment and the Line 800 Lagoon (Line 1 & 800 areas). Soils which are contaminated, but to a level not affecting human health and the environment, will be transported to the Inert Landfill on the IAAP (IAAP) and placed in Trench Number 6. This trench is open and unlined. In conjunction to the placement of this soil is the installation of a top and bottom liner, and a leachate collection system. This in effect will make Trench 6 a Subtitle C landfill. Trench Number 5 of the Inert landfill has been closed

under a RCRA action and EPA approved the closure with correspondence dated June 7, 1990. Trenches number 1 through 4 contain sanitary waste generated at the IAAP and were covered with nearby soil. As part of the entire removal action at the Inert landfill, Trenches 1 through 5 will be capped when the cap for Trench 6 is completed. Therefore, the entire landfill will receive a new cap."

b. Soils which are determined to affect human health and the environment from the Line 1 & 800 areas will be stockpiled at a yet to be decided location. A second EE/CA will be prepared evaluating the remedial alternatives in treating these contaminated soils to level that will not affect human health and the environment. It is currently the Army's intent to conduct a treatability study, evaluating the feasibility of the anaerobic bioslurry process. At the same time, the Waterways Experiment Station (WES) will be conducting a bench scale study of three bioremediation technologies: anaerobic bioslurry, aerobic bioslurry and composting. The data from these two studies will be evaluated to determine if the anaerobic bioslurry is working as defined. If it is effective in treating the contaminated soil, then the anaerobic bioslurry process will continue to be used in treating these remaining soils from these two sites. If it is demonstrated that the anaerobic process is not effective, then a "backup" or alternative biotreatment process will be employed, most likely composting. The Army proposes to submit the EE/CA with a contingency plan, allowing for the substitution of another biotreatment in the vent the anaerobic bioslurry is not effective. The EE/CA for this part of the project will be accomplished by one of the U.S. Environmental Center's (USAEC) contractors.

c. The areas of excavation at Line 1 & 800 and a Borrow Source area north of the line 1 Impoundment will be transformed into wetland areas once it has been determined that all contaminated soils from these sites

have been removed to the levels prescribed in agreement with EPA and Army criteria. The purpose of the wetland areas are to enhance the total environmental stewardship program at the IAAP.

In summary, due to the complexity of the removals proposed, two separate EE/CA's will be prepared. The first will discuss the execavation of soils from the Line 1 Impoundment and Line 800 Lagoon areas, transferring those soils to the Inert Landfill where they will be landfilled in newly created RCRA landfill in Trench 6, and stockpiling the more contaminated soils. The other EE/CA will address remediation alternatives of the stockpiled soils requiring remediation (the more contaminated soils). The EE/CA will include schedule and evaluation criteria to determine the effectiveness of the treatment process of the contaminated soils and allow for substitution of an alternate treatment technology if the anaerobic bioslurry is ineffective. We feel this approach will save time and money.

It is our contention that remediating the two most contaminated sites at the IAAP will eliminate approximately 90% of the contaminated soil located at the IAAP. This will eliminate future insult to the environment. The creation of wetlands in the excavated areas will exhibit to the public the firm alliance that the IAAP, EPA, and IDNR have in enhancing the environment.

The EE/CA for the removal actions at line 1 and 800 areas and Inert Landfill is scheduled to be submitted to the EPA by March 31, 1995. This submittal date is expected to allow adequate time for review and comment with the ultimate goal of a contract award no later than June 1995.

If you have any further comments please contact Mr. Leon Baxter or Mr. Rodger Allison, Plant Protection, (319) 753-7101/7130.

Sincerely,

Leon D. Baxter
Chief Engineer

Copies Furnished:

Commander, AMCCOM, ATTN: AMSMC-EQ (Mr. Tim Howard), Rock Island, IL 61299-6000
Commander, AMCCOM, ATTN: AMSMC-GCS (Mr. Joe Kang), Rock Island, IL 61299-6000
Commander, USAEC, SFIM-AEC-IRA (Mr. Derek Romitti), APG, MD 21010-5401
Commander, USACE, CEMRO-MD-MA (Mr. Kevin Howe), 215 17th Street, Omaha, NE 68102
Commander, USACEWES, (Dr. Kurt Preston), 3909 Halls Ferry Road, Vicksburg, MS 39180-6199
Director, IDNR, (Mr. John Veddder) Henry A. Wallace Building, 900 East Grand, Des Moines, IA 50319
Mason & Hanger Silas-Mason Co., Inc., IAAP

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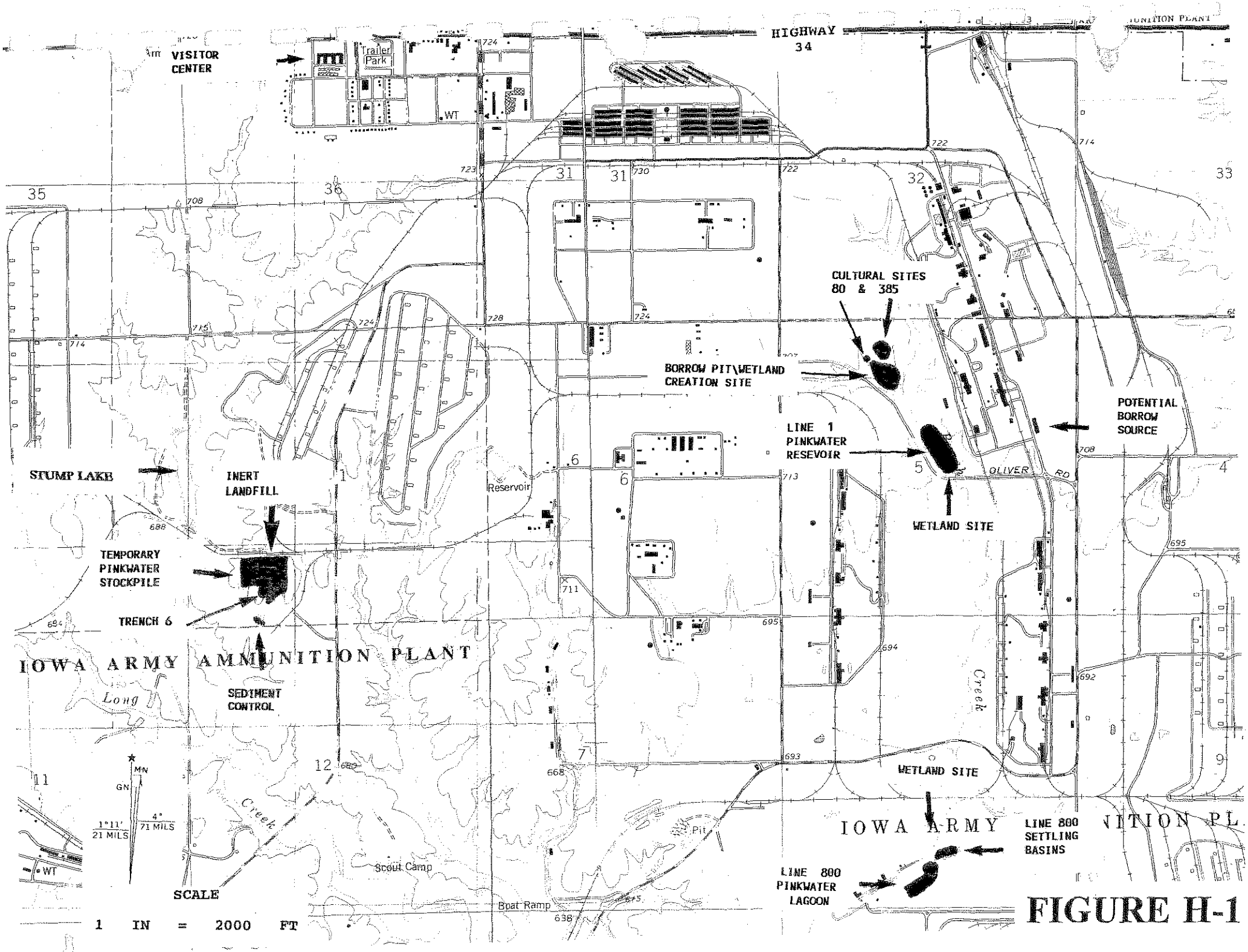
VISITOR CENTER
HIGHWAY 34
Trailer Park
WT
CULTURAL SITES 80 & 385
BORROW PIT\WETLAND CREATION SITE
POTENTIAL BORROW SOURCE
LINE 1 PINKWATER RESEVOIR
OLIVER RD
WETLAND SITE
STUMP LAKE
INERT LANDFILL
Reservoir
TEMPORARY PINKWATER STOCKPILE
TRENCH 6
IOWA ARMY AMMUNITION PLANT
SEDIMENT CONTROL
Long
Creek
Scout Camp
Boat Ramp
Pit
WETLAND SITE
IOWA ARMY
LINE 800 SETTLING BASINS
LINE 800 PINKWATER LAGOON
MN
GN
1°11' 21 MILS
4° 71 MILS
SCALE
1 IN = 2000 FT

FIGURE H-1