

**DETAILED PROJECT REPORT
WITH ENVIRONMENTAL ASSESSMENT**

SECTION 205 FLOOD DAMAGE REDUCTION STUDY

**MAD CREEK
MUSCATINE, MUSCATINE COUNTY, IOWA**

**APPENDIX E
HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE (HTRW) ASSESSMENT**

Executive Summary

The Corps of Engineers' Engineering Regulation (ER) providing guidance for the conduct of Civil Works Planning Studies is contained in ER 1105-2-100. The policies and authorities outlined in ER 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects, and ER 405-1-12, Real Estate Handbook, were developed to facilitate the early identification and appropriate consideration of HTRW issues in all of the various phases of a water resources study or project. American Society for Testing and Materials (ASTM) Standards E1527-00 and E1528-00 provide a comprehensive guide for conducting Phase I Environmental Site Assessments (ESAs). When the Phase I ESA identifies potential environmental concerns, a Phase II ESA is initiated in which sampling of the project area is performed to determine the presence of any HTRW contamination. Phase II Sampling is completed in accordance with the U.S. Army Corps of Engineers Engineering Manual EM 200-1-3, *Environmental Quality – Requirements for the Preparation of Sampling and Analysis Plan* (CEMP-RT/CECW-E, February 1, 2001). The policy of the U.S. Army Corps of Engineers is to avoid construction of Civil Works projects when HTRW is located within project boundaries or may affect or be affected by such projects.

Several Phase I and Phase II ESAs were performed for this project as the scope was modified. These reports include the following:

- U.S. Army Corps of Engineers, *Mad Creek Flood Damage Reduction Project Hazardous, Toxic, and Radioactive Waste Documentation Report Addendum*, June 2002.
- U.S. Army Corps of Engineers, *Mad Creek Flood Damage Reduction Project Hazardous, Toxic, and Radioactive Waste Documentation Report Addendum*, August 2001.
- U.S. Army Corps of Engineers, *Mad Creek Flood Damage Reduction Project Hazardous, Toxic, and Radioactive Waste Documentation Report*, December 2000.
- Daily & Associates Engineers, Inc., *Preliminary Phase IIA Environmental Site Assessment, Mad Creek Flood Damage Reduction Project*, June 2001.
- Missman Stanley & Associates, P.C., *Preliminary Phase IIA Environmental Site Assessment, Mad Creek Flood Reduction Project*, Muscatine, Iowa, December 2001.

These Phase I and Phase II ESAs covered the following areas:

- Right descending bank of Mad Creek from Isett to the confluence with the Mississippi River;
- Left descending bank of Mad Creek near 2nd Street;
- Right descending bank of the Mississippi River from the confluence with Mad Creek to Mulberry Street;
- Geneva Creek Retention Area;
- Mad Creek Retention Area;
- Mad Creek Borrow Site; and
- Geneva Creek Borrow Site.

On the right descending bank of Mad Creek from 5th Street to the Mississippi River, only the arsenic concentration exceeded the Iowa Land Recycling Plan (LRP) statewide standard. However, the concentrations were below the ingestion and inhalation standards for construction workers under the Illinois Tiered Approach to Corrective Action Objectives (TACO) standards. This would indicate that short-term exposure during construction of improvements would be well under published guidelines. These contaminants appear to be at or near natural background levels and do not appear to be associated with a specific source of contamination or a spill. No institutional controls are recommended with the conditions as known at the end of the Phase II-A ESA. The results of the sampling indicate that the properties adjacent to the right descending bank of Mad Creek may have contributed some contamination to the existing levee and banks. Contaminants found were at levels below the Iowa LRP statewide. Therefore, contamination by human activities may have occurred, but the contamination is minimal and requires no cleanup action and restricted use of the site.

On the left descending bank of Mad Creek, just upstream of 2nd Street, one Volatile Organic Carbon (VOC) constituent and several polynuclear aromatic hydrocarbon (PNA) constituents were detected on the site. Toluene, the detected VOC constituent, was detected at a concentration less than the statewide standard for soil published by the Iowa DNR. It is recommended that the remediation of toluene is not warranted. One PNA compound was detected at a concentration that exceeded statewide standards for soil. Under a different laboratory procedure that is more precise, this PNA was less than the statewide standard. For this reason, it is recommended that further assessment or remediation of PNAs is not warranted.

The properties sampled are owned by the City of Muscatine and were owned by the City prior to initiation of this feasibility study. Under Iowa's Voluntary Land Recycling Program, the City of Muscatine may request that the Iowa DNR review the results of the Phase I and Phase II-A ESAs and issue a letter of no further action. The Iowa DNR will determine a background standard for the site pursuant to IAC 567-137.4(455H). They would also identify any special handling requirements, if required, of excavated materials if they are proposed to be removed from the site. Any removal of contaminated material or documentation to the Iowa DNR is beyond the scope of this flood protection project.

Recommendations. The HTRW due diligence process did not reveal any evidence of significant concentrations of hazardous substances, HTRW, or other regulated contaminants in connection with the Mad Creek Flood Damage Reduction Study areas. Therefore, the Mad Creek Flood Damage Reduction Project may proceed without implementing any limitations or special construction techniques commonly associated with HTRW contamination.

Disclaimer. No ESA can wholly eliminate uncertainty regarding the existence for recognized environmental conditions concerning a property. The HTRW due diligence process intends to reduce, but not eliminate, uncertainty regarding the existence of recognized environmental conditions in connection with a property within reasonable limits of time and cost. Continuing the HTRW due diligence process beyond the Phase IIA ESA may not necessarily reduce uncertainty, nor reveal unidentified environmental liabilities. If any previously unaddressed recognized environmental condition should arise, this HTRW due diligence process will be revisited and amended.

CONTENTS

Subject	Page
1. Phase I Investigation.....	E-1
2. Phase II-A Environmental Site Assessment (ESA) – Spring 2001	E-1
a. Background.....	E-1
b. Maximum Contamination Levels (MCLs)	E-2
c. Sample Results.....	E-3
d. Initial Phase II-A Conclusions.....	E-5
3. Phase II-A Environmental Site Assessment – Fall 2001	E-5
a. Background.....	E-5
b. Arsenic.....	E-6
c. Toluene	E-6
d. Polynuclear Aromatic Hydrocarbons	E-6
e. Conclusions	E-6
4. June 2002 Phase I Environmental Site Assessment	E-7
5. Wastewater Treatment	E-7
6. HTRW References and Abstracts.....	E-7

Tables

No.	Title	Page
E-1	HTRW sample locations.....	E-2
E-2	HTRW sample results.....	E-4

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1. PHASE I INVESTIGATION

A Hazardous Toxic and Radioactive Waste (HTRW) Documentation Report was completed in December of 2001 and documents the Phase I HTRW Environmental Site Assessment (ESA) for the Mad Creek Flood Damage Reduction Project Plan in accordance with Engineering Regulation (ER) 1165-2-132, HTRW Guidance for Civil Works Projects, and ER 405-1-12, Real Estate Handbook. The Phase I Environmental Site Assessment was performed in general conformance with the scope and limitations of the American Society for Testing and Materials Standards E 1527-00 and E 1528-00. The information was obtained through site reconnaissance, informal interviews, a review of maps and aerial photographs, U.S. Army Corps of Engineers records, and a search of Federal and State environmental databases. These screening methods were selected based on the particular nature of the flood damage reduction project.

A review of the environmental databases for areas surrounding the project sites discovered several facilities with various HTRW type permits within the downtown Muscatine area. Upon further review, it was determined that none of these permitted areas would adversely impact the project area. The detention areas and the borrow sites were in areas either on or near agricultural fields. It is assumed that pesticides and herbicides were applied in order to control pests and weeds in a manner consistent with normal agricultural activities. No pesticide or herbicide mixing or cleaning platforms were observed at these sites. Pesticides and herbicides applied to lands during the course of normal agricultural activities are exempt from the CERCLA or RCRA regulations, and are not considered to be an HTRW concern.

The site reconnaissance revealed that there was some evidence of recognized environmental conditions concerning the chosen properties, including unidentified substance containers, storage tanks, and indications of solid waste disposal along the current Mad Creek levee. It was recommended that further investigation be conducted along the right descending bank in four locations to determine any presence of HTRW. Photographs and maps indicating these four areas are included in the HTRW Documentation Report on the following pages.

2. PHASE II-A ENVIRONMENTAL SITE ASSESSMENT (ESA) – SPRING 2001

a. Background. A Phase II-A Environmental Site Assessment (ESA) was initiated to determine the presence of any actual HTRW contamination in the areas shown in Table E-1. The Phase II-A ESA was conducted by Daily & Associates, Engineers, Inc., under contract to the U.S. Army Corps of Engineers. This report is available upon request from CEMVR-ED-DN. The four areas identified below were sampled at a depth of around 5 feet, as this is the depth which

would be impacted during construction activities. In areas where surface runoff appeared to be a concern from site visits, a surface soil sample was also obtained. Samples were obtained on April 11, 2001, at the following locations and depths.

Table E-1. HTRW sample locations

Sample Number	Location	Depths
B-1	Right descending bank of Mad Creek in the vicinity of HON Industries, 600 East 2nd Street.	Samples were taken from a depth of 4 to 6 feet on the existing levee.
B-2	Right descending bank of Mad Creek downstream from 5th Street and adjacent to JUST, 1004 5th Street.	Samples were taken from a depth of 3.5 feet to 5.5 feet on the existing levee and in the vicinity of a drum storage area located on the adjacent JUST property.
B-3	Right descending bank of Mad Creek in the vicinity of a concrete slab located south of 9th Street.	Two samples were taken at a depth of 6 inches to 2 feet and one sample taken from a depth of 4.5 feet to 6.5 feet adjacent to the concrete slab.
B-4	Right descending bank of Mad Creek, north of 9th Street and adjacent to D.W. Welding.	Samples were taken at a depth of 6 inches to 2 feet and on from a depth of 4.5 feet to 6.5 feet adjacent to deteriorated steel drums.

Soil samples were collected in accordance with the instructions provided by Severn Trent Laboratories, the testing laboratory. The laboratory also provided sample containers. The samples were logged, and continuous custody was maintained by Daily & Associates, Engineers, Inc., until the samples were shipped by Federal Express to Severn Trent Laboratories. The samples were received by Severn Trent Laboratories on April 12, 2001, and were analyzed for numerous contaminants of concern. The concentrations were compared to maximum contamination levels (MCLs) specified for the Phase II-A ESA.

b. Maximum Contamination Levels (MCLs). The MCLs specified for the Phase II-A ESA were established using the Iowa Land Recycling Program (LRP) rules contained in the Iowa Administrative Code (IAC) 567-137.4(455H), referred to as Chapter 137. The Iowa LRP was enacted by the Iowa Legislature as part of the “Iowa Land Recycling Program and Remediation Standards Act” in 1997. The purpose of the Iowa LRP was to promote the wiser use of land resources by encouraging the clean up of contaminated property to prevent the unnecessary development of the farmland or open space. In late 1998, the Iowa Environmental Protection Commission adopted the Iowa Statewide Standard for Soil (Statewide Standard). The Statewide Standard is based upon incidental ingestion of soil and dust only and by definition do not establish universally safe levels of contamination. Iowa uses the Statewide Standard as a starting point for evaluation and remediation of a site. If met, a classification of no further action required, free of institutional controls, could be established for a cleanup site.

The Statewide Standard was used as the MCL for this Phase II-A. Other site-specific standards exist in the Iowa LRP but must be supported by “appropriate institutional controls” like land use restrictions. Therefore, the Statewide Standard tends to be the most stringent and is normally considered as the permissible exposure limit in the calculation of site-specific standards.

Iowa does not publish separate standards for short-term exposure limits for construction workers as part of the LRP. Illinois, as part of the Illinois regulations titled “Tiered Approach to Corrective Action Objectives (TACO)” located in Title 35 Section 742 of the Illinois Administrative Code, provides remediation objectives based on short-term exposure of construction workers via ingestion and inhalation. TACO is a risk-based procedure that takes land use and site conditions into account when establishing remediation objectives for a site. The soil sample results were compared to the to the industrial/commercial construction worker objectives from the TACO to observe any impacts during on-site construction activities.

c. Sample Results. While samples were taken at all four locations, the final results of this feasibility study determined that construction activities will only occur at sites B1 and B2, as labeled in the Phase II-A report. (This conclusion was made after the Phase I report had been completed and the Phase II-A report had been initiated). Table E-2 shows the sample results for areas B-1 and B-2 compared to the MCLs of a number of contaminants. Individual concentrations that were observed to exceed the statewide standard of the LRP are as follows:

Arsenic: All sample results exceeded the LRP statewide standard. B-3 samples had the highest concentrations, with the shallow sample having the highest concentration. Note that the Standards for Soils, Iowa Land Recycling Program, Table 2, footnotes the standard as follows: “Chemicals at these concentrations may be at or below background levels. The department may be contacted to determine the need for determining a background standards pursuant to IAC 567-137.4(455H).”

Beryllium: Selected samples exceeded the LRP statewide standard. All B-3 samples exceeded the MCL and the shallow sample at B-4 exceeded the standard. Note that the Standards for Soils, Iowa Land Recycling Program, Table 2, footnotes the standard as follows: “Chemicals at these concentrations may be at or below background levels. The department may be contacted to determine the need for determining a background standard pursuant to IAC 567-137.4(455H).”

Organic compounds and organic pesticide compounds were detected at levels below the statewide standards. PCB compounds were not detected in all samples.

Table E-2. HTRW sample results

Contaminant		Standards (MCLs)				Test Results	
Chemical Name	CAS No.	Iowa Non-Residential Standard	Illinois Industrial/Commercial Construction Worker Standard		Units	B-1	B-2
			Ingestion	Inhalation		4-6 feet	3.5-5.5 feet
Inorganics							
Arsenic	7440-38-2	1.4	61	25,000	mg/kg	4.9	3.3
Barium	7440-39-3	5,500	14,000	870,000	mg/kg	41.6	39.5
Beryllium	7440-41-7	0.48	29	44,000	mg/kg	0.43	0.45
Cadmium	7440-43-9	39	200	59,000	mg/kg	0.042	0.048
Chromium	7440-47-3		4,100	8,800	mg/kg	13.1	11.8
Cobalt	7440-48-4		12,000		mg/kg	6	6.4
Copper	7440-50-8	2900	8200		mg/kg	10.5	46.7
Lead	7439-92-1	400	400		mg/kg	7.3	8
Manganese	7439-92-1	11,000	9,600	8,700	mg/kg	293	336
Mercury	7439-97-6	23	61	52,000	mg/kg		
Nickel	7440-02-0	1,600	4,000	440,000	mg/kg	14.8	16.8
Selenium	7782-49-2	390	1,000		mg/kg	0.34	
Vanadium	7440-62-2	550	1,400		mg/kg	21.7	18.1
Zinc	7440-66-6	23,000	61,000		mg/kg	35.2	33.3
Organics							
1,1 Dichloroethane	0075-34-3	7,800	200,000	130	mg/kg		
1,1,1 Trichloroethane	0071-55-6	2,700		1,200	mg/kg		
Acetone	0067-64-1	7,800	200,000	100,000	mg/kg		
Anthracene	0120-12-7	23,000	610,000		mg/kg		
Benzo(a)anthracene	0056-55-3	3	170		mg/kg		
Benzo(b)flouranthene	0205-99-2	2.9	170		mg/kg		
Benzo(k)flouranthene	0207-08-9	29	1,700		mg/kg		
Benzo(a)pyrene	0050-32-8	0.29	17		mg/kg		
Carbon Disulfide	0075-15-0	7,800	20,000	9	mg/kg		
Chrysene	0218-01-9	290	17000		mg/kg		
Dibenzo(a,h)anthracene	0053-70-3	0.29	17		mg/kg		
Fluoranthene	0206-44-0	3,100	82,000		mg/kg		0.011
Indeno(1,2,3-cd)pyrene	0193-39-5	2.9	170		mg/kg		
Pyrene	0129-00-0	2,300	61,000		mg/kg		
Toluene	0108-88-3	16,000	410,000	42	mg/kg		
Organic Pesticides							
Aldrin	0309-00-2	0.13	6.1	9.3	mg/kg		
4,4 DDE, Solid	0072-55-9	6.3	370		mg/kg		
4,4 DDT, Solid	0050-29-3	6.3	100	2100	mg/kg		0.0016
Notes: 1. Blank spaces in test results columns are non-detects (ND) 2. Blanks spaces in the standards are where no standard is published in the reference documents. 3. Illinois Standards are referenced to TACO Tier 1 Section742, Table B. 4. Iowa Standards are referenced to ILRP, Table 2. 5. NDs are not included in this summary.							

d. Initial Phase II-A Conclusions. For areas B1 and B2, only the arsenic concentration exceeded the Iowa LRP statewide standard. However, the concentrations were below the ingestion and inhalation standards for construction workers under the Illinois TACO standards. This would indicate that short-term exposure during construction of improvements would be well under published guidelines. These contaminants (arsenic and beryllium) appear to be at or near natural background levels and do not appear to be associated with a specific source of contamination or a spill. No institutional controls are recommended with the conditions as known at the end of the Phase II-A ESA.

The results of the sampling indicate that the properties adjacent to the right descending bank of Mad Creek may have contributed some contamination to the existing levee and banks. Contaminants found were at levels below the Iowa LRP statewide standards at all four sites except as noted above. Therefore, contamination by human activities may have occurred, but the contamination is minimal and requires no cleanup action and restricted use of the site.

The properties sampled are owned by the City of Muscatine and were owned by the City prior to initiation of this feasibility study. Under Iowa's Voluntary Land Recycling Program, the City of Muscatine may request that the Iowa DNR review the results of the Phase I and Phase II-A ESAs and issue a letter of no further action. The Iowa DNR will determine a background standard for the site pursuant to IAC 567-137.4(455H). They would also identify any special handling requirements, if required, of excavated materials if they are proposed to be removed from the site. Any removal of contaminated material or documentation to the Iowa DNR is beyond the scope of this flood protection project.

Based on the findings of the Preliminary Phase II-A Environmental Site Assessment, the Mad Creek Flood Damage Reduction Project may proceed without limitations or special construction techniques, which are associated with HTRW contamination.

3. PHASE II-A ENVIRONMENTAL SITE ASSESSMENT – FALL 2001

a. Background. After the initial Phase II-A investigation was completed, it was noted that some excavation might occur on the left descending bank of Mad Creek, immediately upstream of the 2nd Street Bridge in Muscatine, Iowa. The site currently includes a parking lot associated with a residential complex and a vegetated bank line. The site once contained a warehouse and paint factory. That structure caught fire in the 1940's and burned for several days. Afterwards, the site was filled and possibly not remediated. To the north of the apartment property, there was a gas station. Underground storage tanks were supposed to have been removed after the station closed. A railroad corridor and possible sidings were also located in this general area. A second Phase II-A investigation was initiated to assess this site.

Phase II-A sampling and analysis was contracted to Missman Stanley & Associates, P.C., Bettendorf, Iowa. Their work included the advancement of two soil borings, the collection of soil samples, and a comprehensive laboratory analysis of those soil samples. The intent of the assessment was to determine if historic activities on the property have impacted the environmental quality of site soils.

Fieldwork for this project was conducted on October 25, 2001. Soil sampling, analysis, and evaluation under this project were completed in accordance with the U.S. Army Corps of Engineers Engineering Manual (EM) 200-1-3, *Environmental Quality – Requirements for the Preparation of Sampling and Analysis Plan* (CEMP-RT/CECW-E, February 1, 2001).

Sample analyses were compared to Iowa Statewide Standards for Soil (Statewide Standards) published under the Iowa Land-Recycling Program (Iowa Administrative Code 567-137.4(455H), also referred to as Chapter 137). The Statewide Standards represent concentrations of contaminants in these media at which normal exposure via ingestion is considered unlikely to pose a threat to human health.

b. Arsenic. Arsenic was detected in the upstream collected soil samples. Concentrations ranged from 2.6 to 4.2 mg/kg. The statewide standard for arsenic is 1.4 mg/kg. Arsenic is a naturally occurring substance. A published background standard for arsenic in soil does not exist in Iowa. Surrounding states, such as Illinois, do have published standards for arsenic. The Illinois EPA has published a background arsenic concentration of 11.3 mg/kg for counties outside of metropolitan areas. Although the Illinois value does not have any regulatory relevance in Iowa, this concentration is valuable from a comparative standpoint. Based on the arsenic concentrations detected at the site, it appears that these concentrations are not the result of on-site contamination, but rather the result of naturally occurring arsenic in soil.

c. Toluene. Toluene was the only volatile organic compound detected; however, each of the detected concentrations was significantly less than the statewide standard. Toluene is a petroleum-based solvent that is used in petroleum fuels and solvents.

d. Polynuclear Aromatic Hydrocarbons. Polynuclear aromatic hydrocarbon (PNA) compounds were analyzed under two methods: the 8270 method and the 8310 method. The 8310 method allows the analyst to detect PNA constituents at lower detection levels and with greater precision than the 8270 method. PNAs are a compound of over 100 different chemicals that are formed during the incomplete burning of coal, oil, gas, garbage, or other organic substances like tobacco or charbroiled meat. PNAs are usually found as a mixture containing two or more of these compounds, such as soot. Some PNAs are manufactured. These pure PNAs exist as colorless, white, or pale yellow-green solids. PNAs are found in coal tar, crude oil, diesel fuel, creosote, and roofing tar. The detected PNA constituents on the site are likely a result of the historic fire on the site in the 1940's.

Benzo(a)pyrene, a PNA compound, was detected at levels above the statewide standard using the 8270 method, but at levels below the statewide standard using the 8310 method. Several other PNAs were detected using the 8270 method, but were not detected using the 8310 method. Since the more precise procedure showed that benzo(a)pyrene was beneath the Statewide Standard, further assessment or remediation of PNA is not recommended.

e. Conclusions. As a result of the Phase IIA Assessment, one VOC constituent and several PNA constituents were detected on the site. Toluene, the detected VOC constituent, was detected at a concentration less than the statewide standard for soil published by the Iowa DNR. It is recommended that the remediation of toluene is not warranted.

One PNA compound was detected at a concentration that exceeded statewide standards for soil. Under a different laboratory procedure that is more precise, this PNA was less than the statewide standard. For this reason, it is recommended that further assessment or remediation of PNAs is not warranted.

Based on the findings of the Second Preliminary Phase II-A Environmental Site Assessment, the Mad Creek Flood Damage Reduction Project may proceed without limitations or special construction techniques, which are associated with HTRW contamination.

4. JUNE 2002 PHASE I ENVIRONMENTAL SITE ASSESSMENT

In April 2002, CEMVR-ED-DN was informed that a new project site was added to the Mad Creek Section 205 project. Specifically, the site involved extending the floodwall west along Mississippi Drive, and along Mulberry Street. The proposed work activity would include some excavation, construction of a floodwall, and the erection of temporary berms during flood conditions.

The current uses of the target property include two homes constructed over a century ago. The adjoining property includes a service station entitled Matt's Downtown Service. This service station had several Leaking Underground Storage Tanks (LUST), which were removed in the early 1990's. The LUST site had received a "No Action Required Letter" on January 11, 2000, and received a "No Action Required Certificate" on May 19, 2000, from the Iowa Department of Natural Resources.

Based on the findings of this Phase I addendum, there was no evidence of hazardous substances, HTRW, or other regulated contaminants in connection with the project study area.

5. WASTEWATER TREATMENT

Wastewater treatment lagoons are located adjacent to the proposed Mad Creek Retention Pond. The system serves Ripley's Mobile Homes (also referred to as Clear View Mobile Home Park) located at 30 Clearview Court. If these lagoons are overtopped with floodwater, there could be a release of partially treated wastewater, which, while not an HRRW concern, could be a biological pathogen concern. Impacts on sewage lagoons and future wastewater treatment activities at Ripley's Mobile Home shall be minimized. If, during the planning process, it is determined that these wastewater facilities will be impacted, appropriate mitigation efforts shall be completed. It was recommended that actions be taken during all planning and implementation phases of the Section 205 project to avoid impacts on the wastewater treatment system at Ripley's Mobile Homes.

6. HTRW REFERENCES AND ABSTRACTS

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- s. U.S. Army Corps of Engineers, Rock Island District, *Upper Mississippi River Ortho Photo, Pool 17, Sheet No. 77*, 1991.
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