

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name **NYANZA CHEMICAL WASTE DUMP** **ProjectID:** 01-03

Last Updated: 01/14/04

City: Ashland

County: Middlesex

State: MA

Country: USA

Bodies of Water: Eastern Wetland; Trolley Brook; Outfall Creek; Sudbury River

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Active

Date On NPL: 1983

ROD/ESD Date: 1993 (OU-3)

Operable Unit: OU-3 (source control); OU-4 (river)

Areas of Concern (length or acres): 5.5 acres of wetlands (Eastern Wetland); 1,200 feet of brook/creek (Trolley Brook, Outfall Creek); 26 miles of river (Sudbury River).

Other Characteristics of Water Body: There are several impoundments, including Mill Pond near the Nyanza site and the Saxonville Dam Impoundment roughly 6 river miles downstream, which are behind intact or partially collapsed dams built for milling operations during the early 1900s. Below the Saxonville Dam, the river is primarily depositional and meanders through an extensive floodplain. Figures 1B through 1E in Reference M-44 detail the pathway of the Sudbury River from its inception near Cedar Swamp to its confluence with the Assabet River to form the Concord River. These figures also illustrate the various dams and bays associated with the Sudbury River.

As described in Reference C-813):

“From its headwaters at Cedar Swamp Pond in Westborough, Massachusetts, the Sudbury River flows about 13 km (8.1 miles) eastward and then about 40 km (24.9 miles) northward until it joins the Assabet River to form the Concord River (McAdow 1990; NUS Corporation 1992). Impoundments on the river include Reservoir 2, Reservoir 1, and the Saxonville Impoundment. The floodplain along about 10 km (6.2 miles) of the northern reach of the river lies within the 12-km² Great Meadows National Wildlife Refuge, which contains extensive wetlands that are generally classified as palustrine wetlands with scrub-shrub and persistent, emergent herbaceous plants (Harris 1996). The northern reach of the river also contains a natural riverine lake, Fairhaven Bay.”

“The elevation of the river drops 47 m (154 ft.) from its headwaters to the confluence with the Assabet River, with an average gradient of 90-100 cm/km. The gradient of the downstream reach of the river is considerably less, however, averaging only 1.5 cm/km (National Park Service 1996). Most of the contaminated reach is characterized by slow current velocity and depositional environments, with velocities approaching 0 cm/s during summer months in the downstream reach of the river. Water samples taken during two water years, 1994 (1 October 1993 to 30 September 1994) and 1995 (1 October 1994 to 30 September 1995), had annual mean (values for one or both years) pH of 6.9-7.0, alkalinity of 18 mg/L (as CaCO₃), hardness of 38 mg/L (as CaCO₃), total suspended solids of 10.5 mg/L in 1994 and 5.5 mg/L in 1995, dissolved organic carbon of 5-6 mg/L, sulfate of 10.7 mg/L (as SO₄), and specific conductance of about 290 µS/cm (J.A. Colman, U.S. Geological Survey, Northborough, Mass., personal communication).”

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"The river receives flow from a number of tributaries draining its 425-km² basin. At Reservoir 1, flow enters from the Sudbury Reservoir and Reservoir 3. The river also receives water from the Whitehall, Hopkinton, and Ashland reservoirs. The estimated average annual discharge is 8.44 m³/s (298 cfs) at the mouth of the Sudbury River, where it meets the Assabet River (Socolow et al. 1995). The primary land use in the watershed is suburban residential, and the terrain is rolling and hilly (NUS Corporation 1992)."

"The Sudbury River provides habitat for many warm water fishes, including largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), white perch (*Morone americana*), yellow perch (*Perca flavescens*), and bullheads (*Ameiurus spp.*) (NUS Corporation 1992; National Park Service 1996). The river and adjoining areas also provide habitat for a number of aquatic mammals, including raccoon (*Procyon lotor*), muskrat (*Ondatra zibethicus*), and river otter (*Lutra canadensis*). Nesting birds include osprey (*Pandion haliaetus*), great blue heron (*Ardea herodias*), mallard (*Anas platyrhynchos*), and other waterfowl (McAdow 1990)."

Contaminants of Concern: mercury; other heavy metals and organics

Source of Contamination: Uncontrolled sludge and wastewater disposal occurred from onsite dye and polymer manufacturing, including discharges directly to the wetlands, to an unsecured onsite landfill, and to a concrete collection/setting vault which discharged via Trolley Brook, Outfall Creek, and drainageways to the Sudbury River. The Nyanza Chemical Waste Dump Site is the former location of several textile dye production companies near the Sudbury River in Ashland, Massachusetts west of Boston. Mercury and chromium were used as catalysts in the production of textile dyes from 1917 to 1978. Approximately 2.3 metric tons of mercury were used per year from 1940 to 1970 with approximately 45 to 57 metric tons of mercury released to the Sudbury River during this period. From 1970 until the facility closed in 1978, wastes were treated onsite and wastewater was discharged to Ashland's town sewer system. These changes in waste management practices reduced the amounts of mercury released to the Sudbury River to between 23 and 30 kg per year. Since dye production stopped in 1978, the property has been leased to various light industries and commercial companies (Reference M-44).

Contaminated Area
Physical Characteristics: In the brooks, creeks, and wetlands at the Nyanza site, the highest concentrations of mercury in sediments occurred in the Eastern Wetland (962 ppm max.). The highest concentrations were in the upper two feet and decreased with depth down to about five to six feet below the ground surface. As sediments were transported downstream through Trolley Brook, Outfall Creek, and the Lower Raceway, mercury concentrations decreased. Max. level in Trolley Brook was 126 ppm. Mercury concentrations increased where these drainageways discharged to the Sudbury River. Mercury was also detected in surface water samples at levels above the Ambient Water Quality Criteria in the Eastern Wetland, Outfall Creek, and Trolley Brook.

Type of Regulatory Action: Superfund. Final.

Overall Status Summary: The Nyanza Chemical Waste Dump Site (Nyanza) is the former location of several textile dye production companies near the Sudbury River in Ashland, Massachusetts west of Boston. Mercury and chromium were used as catalysts in the production of textile dyes from 1917 to 1978. Approximately 2.3 metric tons of mercury were used per year from 1940 to 1970 with approximately 45 to 57 metric tons of mercury released to the Sudbury River during this period. From 1970 until the facility closed in 1978, wastes were treated on site and wastewater was discharged to Ashland's town sewer system. These changes in waste management practices reduced the amounts of mercury released to the Sudbury River to between 23 and 30 kg per year. Since dye production stopped in 1978, the property has been leased to various light industries and commercial companies (Reference M-44). The site was placed on the NPL in 1983.

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Design of OU-3 was by the Corps of Engineers, and targeted removal of an estimated 17,330 cy of sediment from source areas comprising 6.8 acres of onsite wetlands and drainageways. The 17,330 cy would be dewatered and then consolidated under the onsite cap installed for OU-1. Target level is 1 ppm of mercury in sediments. Construction started in March 1999.

The wetland excavation part of the OU-3 remedy was accomplished in June through October 1999. A portion of the targeted drainageways were excavated in October and November 1999. Construction activities for OU-3 were put on standby in December 1999 and resumed in April 2000. OU-3 work done in 2000 included completing excavations in drainageways, Outfall Creek, and the Lower Raceway, permanent landfill closure, and starting restoration activities. Restoration activities were completed in 2001. About 19,000 cy were removed in 1999 and 26,500 cy in 2000 for a total of 45,500 cy. Total cost was \$12 million.

Characterization, risk assessment, and modeling of the river is in-progress, and has been in progress for several years. This risk assessment process is complicated in that the 26 mile length of river has been divided into ten reaches, and the EPA initially was attempting to develop ecological risk assessments applicable for each specific reach. Several prior studies (References C-818, C-819, and C-820) performed by various governmental agencies are also being evaluated and the results are being incorporated in the risk assessment as appropriate. Currently, it appears that up to four ecological risk assessments may be developed, potentially focusing on the reservoirs, the flowing river sections, and Reach 8 (the Great Meadows National Wildlife Refuge).

Work on the FS for the river won't start until the risk assessments are completed -- 2004 at earliest. No Proposed Plan for OU-4, which involves the 26 miles of contaminated river sediments, is expected until 2005 (earliest).

Remedial Action Planned: ☒

Risk Assessment: ☐

Remedial Action Implemented: ☐

Status of Dredging ☐

PRPs: ☒

Contacts: ☒

References: ☒

Modeling: ☒

Fishing Advisory: ☒

Key Conditions: dedicated landfill or CDF, extended (> 1 mile) river, habitat/streambank restoration, hydrodynamic modeling, wetlands

REMEDIAL ACTION PLANNED

Project Name	<u>NYANZA CHEMICAL WASTE DUMP</u>	ProjectID: 01-03
Last Updated:	11/30/98	
Target Sediment Cleanup Standards (TSCS):	1 ppm mercury in OU-3 source areas (wetlands, creek, brook); no target yet for river (OU-4)	
How TSCS Established:	As described in the OU-3 ROD, "The mercury cleanup level of 1 ppm was selected for the Continuing Source Areas in order to be protective of human health and the environment for a variety of exposure scenarios. This cleanup level is approximately equal to concentrations of mercury found at locations upgradient of the Site. In addition, this cleanup level reduces mercury levels approximately to the median biological effects level (ER-M) reported by NOAA in "The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program" (NCS OMA 52). This ER-M, the contaminant level above which adverse effects to ecological receptors are expected, is 1.3 ppm for mercury in sediment. A level of 1 ppm of mercury is also protective for human health through exposure via accidental ingestion and dermal contact for all exposure scenarios. Remediation to this clean-up level is expected to result in a hazard index of less than one for these exposure scenarios. This cleanup level is also expected to prevent the risks in the River from increasing by decreasing the levels of mercury migrating to the Sudbury River."	
Target Bank and Floodplain Cleanup Levels (if applicable):	See "Target Sediment Cleanup Standards (TSCS)"	
Other Target:		
Environmental Sample Data References:	<ul style="list-style-type: none">• Sediment:• Water:• Fish:	
Estimated Target Volume:	17,330 cy for OU-3 (14,500 cy at one foot depth from 5.5 acres of wetland; 530 cy from Trolley Brook; 2300 cy from Outfall Creek)	
Planned Disposal Method:	After dewatering, the 17,330 cy will be disposed onsite under an existing cap. To make room, clean fill from under a 3 acre portion of the existing 14-acre onsite cap will be removed.	
Estimated Calendar Time to Implement Remedy:	1999 (OU-3)	
Estimated Time to Implement Remedy:	One construction season (March through November) for OU-3. If more time is required, the cap will be closed for the winter and work will resume in March 2000.	
Estimated Cost to Implement Remedy:	For OU-3, \$13.1 million capital cost (1993 ROD).	
Stated Remedial Action Objectives (and Source):	Response objectives for the OU-3 source control work (from the 1993 ROD) are: "Human Health Objectives 1. Mitigate mercury contamination in sediment in areas where accidental ingestion and dermal contact with contaminated sediments may result in unacceptable human health risks." 2. "Mitigate mercury contamination in sediment in order to reduce mercury levels in fish, which may be consumed by fishermen."	

REMEDIAL ACTION PLANNED

Project Name

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3. "Mitigate mercury contamination in sediment in the Continuing Source Areas in order to prevent continued migration of contamination to the Sudbury River."

"Ecological Objectives

1. Mitigate mercury contamination in sediment to achieve an increased level of protection to environmental\ receptors in the Continuing Source Areas; one which is approximately equal to that found in background areas."

2. "Mitigate mercury contamination in sediment in Continuing Source Areas in order to prevent continued migration of contamination to the Sudbury River.

3. "Restore any wetland habitat disturbed during remediation."

**Measures of Success to
be Used:**

**Planned Monitoring and
Restoration:**

Restoration of the Eastern Wetland, planned for the year 2000.

**Agency Position on Sediment
Removal (and Source):**

POTENTIALLY RESPONSIBLE PARTIES

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: A

ReferenceID: 66

Title: *Superfund Record of Decision: Nyanza Chemical Waste Dump, MA (OU-3)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: March 30, 1993

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 146

Title: *Nyanza Chemical Waste Dump*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: January 15, 2002

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 763

Title: *Bioavailability of Sediment-Associated Mercury to Hexagenia Mayflies in a Contaminated Floodplain River (Draft Final Report)*

Location: AEM

Category: Contaminated Sediments: Investigation/Delineation

Prepared by/Author: (1) Teresa J. Naimo, (2) James G. Wiener, (3) W. Gregory Cope and (4) Nicolas S. Bloom

**Preparer/Author
Address:** (1, 2, 3) U.S. Geological Survey
(4) Frontier Geosciences, Inc.

Prepared For: US EPA Region I and US Fish and Wildlife Service, Region V

Date Published: January 27, 1997

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: A

ReferenceID: 764

Title: *Sampling for Mercury at Sub-Nanogram-per-Liter Concentrations for Load Estimation in Rivers - Draft*

Location: AEM

Category: Analytical Protocol/Issues/QAPP

Prepared by/Author: John A. Colman and Robert F. Breault

**Preparer/Author
Address:**

Prepared For: Manuscript (Draft)

Date Published: March 2, 1997

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 765

Title: *Stratigraphy and Historic Accumulation of Mercury in Recent Depositional Sediments in the Sudbury River (Draft)*

Location: AEM

Category: Contaminated Sediments: Investigation/Delineation

Prepared by/Author: (1) Bradley E. Frazier, (2) James G. Wiener, (3) Ronald G. Rada and (4) Daniel R. Engstrom

**Preparer/Author
Address:** (1, 3) U. of Wisconsin
(2) U.S. Geological Survey
(4) St Croix Watershed Research Station

Prepared For: US EPA Region I and US Fish and Wildlife Service, Region 5

Date Published: January 8, 1997

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 1032

Title: *EPA Announces Five Year Review for Nyanza Chemical Waste Dump Superfund Site*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: August 2003

**Key Words and
Phrases:**

REFERENCES

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

Reference Type: A

ReferenceID: 1070

Title: **Remedial Action Completion Report (5 CD ROM Set)**

Location: AEM

Category: Close-Out Report

Prepared by/Author: Shaw Environmental and Stone & Webster, Inc.

**Preparer/Author
Address:**

Prepared For: Department of the Army, New England District, Corps of Engineers, Concord,
MA

Date Published: April 2002

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 33

Title: **Mercury Studies in Sudbury River Near Completion**

Location: AEM

Category: Site Update

Prepared by/Author: US EPA REA-Boston

**Preparer/Author
Address:** Office of External Programs (REA)
John F. Kennedy Federal Building
Boston, MA 02203

Prepared For: General Public

Date Published: September 1996

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 103

Title: **Regional Focus Region I**

Location: AEM

Category: Site Update

Prepared by/Author: HMCRI

**Preparer/Author
Address:** Rockville, MD

Prepared For: Focus, Vol. 10 No. 4

Date Published: April 1994

**Key Words and
Phrases:**

REFERENCES

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

Reference Type: B

ReferenceID: 169

Title: ***Fact Sheet: Nyanza Chemical Waste Dump - January 1997***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:** Internet Website

Prepared For: General Public

Date Published: January 1997

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 170

Title: ***Records of Decision: -- Massachusetts***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: Undated

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 171

Title: ***Fact Sheet: Nyanza Chemical Waste Dump - September 1996***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: September 3, 1996

**Key Words and
Phrases:**

REFERENCES

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

Reference Type: B
Title: ***NPL Site Narrative at Listing (Nyanza)***
Location: AEM
Category: Site Update
Prepared by/Author: US EPA Region I
Preparer/Author Address:
Prepared For: General Public
Date Published: May 16, 1997
Key Words and Phrases:

ReferenceID: 172

Reference Type: B
Title: ***EPA Region 1 Superfund NPL Sites (Nyanza)***
Location: AEM
Category: Site Update
Prepared by/Author: US EPA Region I
Preparer/Author Address:
Prepared For: General Public
Date Published: July 22, 1996
Key Words and Phrases:

ReferenceID: 173

Reference Type: B
Title: ***New Directions Considered for Groundwater Cleanup at Nyanza Chemical Site***
Location: AEM
Category: Site Update
Prepared by/Author: US EPA Region I
Preparer/Author Address:
Prepared For: General Public
Date Published: June 1996
Key Words and Phrases:

ReferenceID: 217

REFERENCES

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

Reference Type: B

ReferenceID: 260

Title: ***Fact Sheet: June 1999 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: June 1999

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 261

Title: ***Fact Sheet: July 1999 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: July 1999

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 298

Title: ***Fact Sheet: September 1999 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: September 1999

**Key Words and
Phrases:**

REFERENCES

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

Reference Type: B

ReferenceID: 299

Title: ***Fact Sheet: October 1999 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For: General Public

Date Published: October 1999

Key Words and Phrases:

Reference Type: B

ReferenceID: 300

Title: ***Fact Sheet: November 1999 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address:

Prepared For: General Public

Date Published: November 1999

Key Words and Phrases:

Reference Type: B

ReferenceID: 323

Title: ***Nyanza Chemical Waste Dump, Massachusetts***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address: Internet Website

Prepared For: General Public

Date Published: August 20, 1998

Key Words and Phrases:

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: B

ReferenceID: 354

Title: *Superfund Update: Sediment Cleanup Begins at Nyanza*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: November 1998

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 547

Title: *Fact Sheet: April 2000 Construction Update: Nyanza Chemical
Waste Dump Superfund Site: Ashland, MA*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: April 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 548

Title: *Fact Sheet: May 2000 Construction Update: Nyanza Chemical
Waste Dump Superfund Site: Ashland, MA*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: May 2000

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: B

ReferenceID: 549

Title: *Fact Sheet: June 2000 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: June 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 550

Title: *Fact Sheet: July 2000 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: July 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 572

Title: *Update Report for Massachusetts*

Location: AEM

Category: Site Update

Prepared by/Author: USACE - New England District

**Preparer/Author
Address:** 696 Virginia Road
Concord, MA 01742-2751

Prepared For: General Public

Date Published: July 31, 2001

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: B

ReferenceID: 650

Title: *Fact Sheet: August 2000 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: August 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 651

Title: *Fact Sheet: September 2000 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: September 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 652

Title: *Fact Sheet: November 2000 Construction Update: Nyanza Chemical Waste Dump Superfund Site: Ashland, MA*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: November 2000

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: B

ReferenceID: 653

Title: *EPA Reaches \$8 Million Settlement at Nyanza Superfund Site*

Location: AEM

Category: Legal

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: Press Release

Date Published: May 21, 1998

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 654

Title: *Final Settlements Reached at Nyanza Superfund Site*

Location: AEM

Category: Legal

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: Press Release

Date Published: June 12, 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 942

Title: *Memo re: Question Re Nyanza*

Location: AEM

Category: Site Update

Prepared by/Author: Cheryl Sprague

**Preparer/Author
Address:** US EPA Region I

Prepared For: AEM, Inc.

Date Published: February 14, 2002

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: B
Title: *e-mail re: Question re Nyanza*
Location: AEM
Category: Site Update
Prepared by/Author: Cheryl Sprague
Preparer/Author Address: US EPA Region I
Prepared For: AEM, Inc.
Date Published: February 14, 2002
Key Words and Phrases:

ReferenceID: 955

Reference Type: B
Title: *e-mail re: Question re Nyanza*
Location: AEM
Category: Site Update
Prepared by/Author: Sharon Hayes
Preparer/Author Address: US EPA Region I
Prepared For: AEM, Inc.
Date Published: August 21, 2002
Key Words and Phrases:

ReferenceID: 964

Reference Type: B
Title: *e-mail re: Nyanza OU-3 Status - Reply*
Location: AEM
Category: Site Update
Prepared by/Author: Sharon Hayes
Preparer/Author Address: US EPA Region I
Prepared For: AEM, Inc.
Date Published: January 28, 2000
Key Words and Phrases:

ReferenceID: 983

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: B
Title: *e-mail re: Questions Re Nyanza*
Location: AEM
Category: Site Update
Prepared by/Author: Cheryl Sprague
Preparer/Author Address: US EPA Region I
Prepared For: AEM, Inc.
Date Published: January 9, 2004
Key Words and Phrases:

ReferenceID: 1025

Reference Type: C
Title: *EPA to put more toxics under cap*
Location: AEM
Category: Site Update
Prepared by/Author:
Preparer/Author Address:
Prepared For: Superfund Week
Date Published: January 8, 1993
Key Words and Phrases:

ReferenceID: 168

Reference Type: C
Title: *Nyanza groundwater pilot tests under way*
Location: AEM
Category: Site Update
Prepared by/Author:
Preparer/Author Address:
Prepared For: Superfund Week
Date Published: February 9, 1996
Key Words and Phrases:

ReferenceID: 212

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: C

ReferenceID: 213

Title: *Nyanza Chemical sediment cleanup to be bid*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: July 19, 1996

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 214

Title: *Nyanza bids slated for late '98*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: January 3, 1997

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 215

Title: *Nyanza sediment cleanup design due in fall*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: January 31, 1997

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: C

ReferenceID: 247

Title: *Corps set to clean Nyanza soil*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: June 5, 1998

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 349

Title: *Corps starting sediment excavation next year at Nyanza Chemical*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: December 4, 1998

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 486

Title: *Section on Grants and Contracts*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: HazTECH News

Date Published: April 15 & 29, 1999

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: C

ReferenceID: 635

Title: *Contractors to Keep Checking Water At Nyanza Chemical Waste Dump Site*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: January 15, 2001

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 813

Title: *Mercury in the Sudbury River (Massachusetts, U.S.A.): pollution history and a synthesis of recent research*

Location: AEM

Category: Site Update

Prepared by/Author: (1) James G. Wiener, (2) Pamela J. Shields

**Preparer/Author
Address:** (1) U.S. Geological Survey
Biological Resources Division
Upper Midwest Environmental Sciences Center
2630 Fanta Reed Road
La Crosse, WI 54603
(2) US EPA Region I
John F. Kennedy Federal Building
Mail Code CHW
Boston, MA 02203-2211

Prepared For: Canadian Journal of Fisheries and Aquatic Sciences, Vol. 57, No. 5

Date Published: May 2000

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: C

ReferenceID: 816

Title: *Stratigraphy and historic accumulation of mercury in recent depositional sediments in the Sudbury River, Massachusetts, U.S.A.*

Location: AEM

Category: Contaminated Sediments: Investigation/Delineation

Prepared by/Author: (1) Bradley E. Frazier, (2) James G. Wiener, (3) Ronald G. Rada, (4) Daniel R. Engstrom

Preparer/Author Address: (1, 3) River Studies Center
University of Wisconsin - La Crosse
La Crosse, WI 54601
(2) U.S. Geological Survey
Biological Resources Division
Upper Midwest Environmental Sciences Center
2630 Fanta Reed Road
La Crosse, WI 54603
(4) St. Croix Watershed Research Station
Science Museum of Minnesota
Marine on St. Croix, MN 55047

Prepared For: Canadian Journal of Fisheries and Aquatic Sciences, Vol. 57, No. 5

Date Published: May 2000

Key Words and Phrases:

Reference Type: C

ReferenceID: 817

Title: *Sampling for mercury at subnanogram per litre concentrations for load estimation in rivers*

Location: AEM

Category: Contaminated Sediments: Investigation/Delineation

Prepared by/Author: John A. Coleman and Robert F. Breault

Preparer/Author Address: U.S. Geological Survey
Water Resources Division
10 Bearfoot Road
Northborough, MA 01532

Prepared For: Canadian Journal of Fisheries and Aquatic Sciences, Vol. 57, No. 5

Date Published: May 2000

Key Words and Phrases:

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: C

ReferenceID: 818

Title: *Distribution, hydrologic transport, and cycling of total mercury and methyl mercury in a contaminated river-reservoir-wetland system (Sudbury River, eastern Massachusetts)*

Location: AEM

Category: Contaminated Sediments: Characteristics/Bioavailability

Prepared by/Author: Marcus C. Waldron, John A. Colman, Robert F. Breault

Preparer/Author Address: U.S. Geological Survey
Water Resources Division
10 Bearfoot Road
Northborough, MA 01532

Prepared For: Canadian Journal of Fisheries and Aquatic Sciences, Vol. 57, No. 5

Date Published: May 2000

Key Words and Phrases:

Reference Type: C

ReferenceID: 819

Title: *Bioavailability of sediment-associated mercury to Hexagenia mayflies in a contaminated floodplain river*

Location: AEM

Category: Contaminated Sediments: Characteristics/Bioavailability

Prepared by/Author: (1) Teresa J. Naimo, (2) James G. Wiener, (3) W. Gregory Cope, (4) Nicolas S. Bloom

Preparer/Author Address: (1, 2, 3) U.S. Geological Survey
Biological Resources Division
Upper Midwest Environmental Sciences Center
2630 Fanta Reed Road
La Crosse, WI 54603
(4) Frontier Geosciences
414 Pontius Avenue North, Suite B
Seattle, WA 98109

Prepared For: Canadian Journal of Fisheries and Aquatic Sciences, Vol. 57, No. 5

Date Published: May 2000

Key Words and Phrases:

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: C

ReferenceID: 820

Title: *An in situ assessment of mercury contamination in the Sudbury River, Massachusetts, using transplanted freshwater mussels (Elliptio complanata)*

Location: AEM

Category: Fish/Biota

Prepared by/Author: (1) Nancy Beckvar, (2) Sandra Salazar, (3) Michael Salazar, (4) Ken Finkelstein

Preparer/Author Address: (1, 4) National Oceanic and Atmospheric Administration
Office of Response and Restoration
7600 Sand Point Way NE
Seattle, WA 98115-6349
(2, 3) Applied Biomonitoring
11648 72nd Place NE
Kirkland, WA 98034

Prepared For: Canadian Journal of Fisheries and Aquatic Sciences, Vol. 57, No. 5

Date Published: May 2000

Key Words and Phrases:

Reference Type: H

ReferenceID: 19

Title: *The Nyanza site and the Sudbury River drainage basin in Middlesex County, Massachusetts (map)*

Location: AEM

Category: Miscellaneous

Prepared by/Author:

Preparer/Author Address:

Prepared For:

Date Published:

Key Words and Phrases:

REFERENCES

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

Reference Type: J **ReferenceID:** 7
Title: **US EPA Region I Web Address**
Location: AEM
Category: Miscellaneous
Prepared by/Author: US EPA Region I
Preparer/Author Address: http://www.epa.gov/region01/remed/sfsites/t_nyanza.html
Prepared For:
Date Published: July 22, 1996
Key Words and Phrases:

Reference Type: L **ReferenceID:** 11
Title: **Memo re: Nyanza Chemical Company**
Location: AEM
Category: Site Update
Prepared by/Author: AEM, Inc.
Preparer/Author Address: Malvern, PA 19355
Prepared For: Internal file
Date Published: August 13, 1997
Key Words and Phrases:

Reference Type: M **ReferenceID:** 44
Title: **An In-Situ Assessment of Mercury Contamination in the Sudbury River, Massachusetts, Using Bioaccumulation and Growth in Transplanted Freshwater Mussels (*Ellipptio complanata*); NOAA Technical Memorandum NOS ORCA 89**
Location: AEM
Category: Contaminated Sediments: Investigation/Delineation
Prepared by/Author: (1) S.M. Salazar, (2) N. Beckvar, (3) M.H. Salazar and (4) K. Finkelstein
Preparer/Author Address: (1, 2, 4) National Oceanic and Atmospheric Administration
(3) EVS Consultants
Prepared For:
Date Published: December 1996
Key Words and Phrases:

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: M

ReferenceID: 45

Title: *Report: Sudbury River Project (Final - Working Draft)*

Location: AEM

Category: Site Update

Prepared by/Author: Gregory H. Nail and David D. Abraham

Preparer/Author U.S. Army Corps of Engineers

Address: U.S. Army Engineer Waterways Experiment Station

Prepared For: US EPA Region I

Date Published: 1994

**Key Words and
Phrases:**

Reference Type: M

ReferenceID: 46

Title: *Artifact Formation of Methyl Mercury During Aqueous
Distillation and Alternative Techniques for the Extraction of
Methyl Mercury Environmental Samples*

Location: AEM

Category: Analytical Protocol/Issues/QAPP

Prepared by/Author: (1) Nicolas S. Bloom, (2) John A. Colman and (3) Lee Barber

Preparer/Author (1) Frontier Geosciences, Inc.

Address: 414 Pontius North
Seattle, WA 98109
(2) U. S. Geological Survey
28 Lord Road, Suite 280
Marlborough, MA 01752
(3) School of the Environment
Duke University
Durham, NC 27708

Prepared For: Manuscript (Draft)

Date Published:

**Key Words and
Phrases:**

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: M

ReferenceID: 48

Title: *Estimating Historical Mercury Concentrations and Assessing Fish Exposure to Mercury in a Contaminated Reservoir on the Sudbury River. East-Central Massachusetts, Using a Constant-Settling-Velocity Model and Accumulation Rates of Mercury in Sedimentary Cores (Draft)*

Location: AEM

Category: Modeling

Prepared by/Author: John A. Colman

Preparer/Author Address: U.S. Geological Survey

Prepared For: Unknown

Date Published: March 5, 1997

Key Words and Phrases:

Reference Type: M

ReferenceID: 49

Title: *Factors Affecting Food Chain Transfer of Mercury in the Vicinity of the Nyanza Site, Sudbury River, Massachusetts (Draft)*

Location: AEM

Category: Site Update

Prepared by/Author: (1) Terry A. Haines, (2) Thomas W. May, (3) R. Todd Finlayson, (4) Stephen E. Mierzykowski and (5) Michael W. Powell

Preparer/Author Address: (1 and 2) U.S. Geological Survey
(3 and 5) U. of Maine
(4) U.S. Fish and Wildlife Service

Prepared For: US EPA Region I

Date Published: 1995 circa

Key Words and Phrases:

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: M

ReferenceID: 52

Title: *Total Mercury and Methylmercury in Sediment Cores from Reservoirs and Wetlands on the Mercury-Contaminated Sudbury River, East-Central Massachusetts (Draft)*

Location: AEM

Category: Contaminated Sediments: Investigation/Delineation

Prepared by/Author: John A. Colman, Marcus C. Waldron and Robert F. Breault

Preparer/Author Address: U.S. Geological Survey

Prepared For: US EPA Region I

Date Published: April 9, 1997

Key Words and Phrases:

Reference Type: M

ReferenceID: 53

Title: *Distribution, Transport, and Cycling of Mercury in a Contaminated River / Reservoir / Wetland System (Draft)*

Location: AEM

Category: Mass Balance

Prepared by/Author: Marcus C. Waldron, John A. Colman and Robert F. Breault

Preparer/Author Address: U.S. Geological Survey

Prepared For: US EPA Region I

Date Published: March 4, 1997

Key Words and Phrases:

REFERENCES

Project Name NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Reference Type: M

ReferenceID: 211

Title: *Distribution and Transport of Total Mercury and Methylmercury in Mercury-Contaminated Sediments in Reservoirs and Wetlands of the Sudbury River, East-Central Massachusetts*

Location: AEM

Category: Contaminated Sediments: Characteristics/Bioavailability

Prepared by/Author: John A. Colman, Marcus C. Waldron, Robert F. Breault, and Robert M. Lent

Preparer/Author Address: U.S. Geological Survey
Water Resources Division
Northborough, MA

Prepared For: US EPA Region I

Date Published: 1999

Key Words and Phrases:

MODELING

Project Name: NYANZA CHEMICAL WASTE DUMP

ProjectID: 01-03

Last Updated: 08/11/98

Modeling Performed: Constant-settling-velocity reservoir model; food-chain model.

Modeling Objectives:

Modeling Description: Modeling of river in-progress. Details not identified.

**Company Performing
Modeling:**

Modeling Status:

Modeling Summary:

FISH ADVISORIES

Project Name **NYANZA CHEMICAL WASTE DUMP**

ProjectID: 01-03

<i>Advisory:</i>	Sudbury River	<i>AdvisoryID:</i> 5
<i>Extent:</i>	All towns between the dam at Myrtle Street crossing in Ashland and Concord; from Ashland to its confluence with the Assabet and Concord Rivers, including the Stern and Bracket Reservoirs in Framingham	
<i>Pollutant:</i>	mercury	
<i>Species:</i>	all fish	
<i>Population:</i>	NCGP	
<i>Population Definition:</i>	No Consumption-General Population: Advise against consumption by the general population.	
<i>Advisory Type:</i>	River	<i>Advisory Number:</i> 186
<i>Status (Active or Rescinded):</i>	Active	<i>Date Rescinded:</i>
<i>Contact Name:</i>	Elaine Krueger	<i>Contact Number:</i> 617-624-5757
<hr/>		
<i>Advisory:</i>	Sudbury River	<i>AdvisoryID:</i> 928
<i>Extent:</i>	All towns between the dam at Myrtle Street crossing in Ashland and Concord; from Ashland to its confluence with the Assabet and Concord Rivers, including the Stern and Bracket Reservoirs in Framingham	
<i>Pollutant:</i>	mercury	
<i>Species:</i>	all fish	
<i>Population:</i>	NCSP	
<i>Population Definition:</i>	No Consumption-Subpopulation(s): Advises against consumption for populations that are potentially at greater risk, e.g., pregnant or nursing women, and small children.	
<i>Advisory Type:</i>	River	<i>Advisory Number:</i> 186
<i>Status (Active or Rescinded):</i>	Active	<i>Date Rescinded:</i>
<i>Contact Name:</i>	Elaine Krueger	<i>Contact Number:</i> 617-624-5757
