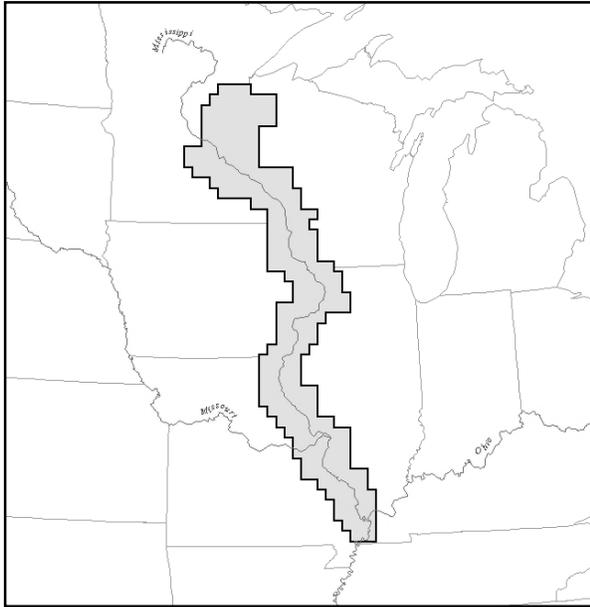


Upper Mississippi River Spill Response Plan and Resource Manual



- Illinois Environmental Protection Agency
- Iowa Department of Natural Resources
- Minnesota Pollution Control Agency
- Missouri Department of Natural Resources
- Wisconsin Department of Natural Resources
- U.S. Coast Guard
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers

Coordinated By:
Upper Mississippi River Basin Association

NOVEMBER 1997
(Updated July 1998)
(Updated December 2001)
(Updated January 2003)
(Updated February 2004)
(Updated **AUGUST 2006**)

Restricted Distribution Version

DISTRIBUTION RESTRICTED

SPECIAL NOTICE

This is the **Restricted Distribution Version** of the Upper Mississippi River Spill Response Plan and Resource Manual. Due to security concerns, distribution is limited to public and private sector personnel responsible for hazardous spills planning and response on the Upper Mississippi River. A public access version of the document, which includes the entire Response Plan but omits certain portions of the Resource Manual, is available for unrestricted distribution at www.umrba.org/hazspills/umrplan.pdf. Questions should be directed to the Upper Mississippi River Basin Association at 651-224-2880 or dhokanson@umrba.org.

PREAMBLE

Preparation and maintenance of the Upper Mississippi River Spill Response Plan and Resource Manual, originally published in 1991, is a collaborative effort among five states and four federal agencies under the auspices of the Upper Mississippi River Basin Association. The plan is not intended to supplant any other local, state, regional, or national response or contingency plans that may be in effect. Rather, it was designed to address some of the unique circumstances that may arise in coordinating spill response on the Mississippi River. It is intended to be a tool and information source for first responders.

It is the intent of those who formulated the Upper Mississippi River Spill Response Plan and Resource Manual to update portions of the plan and the information it includes on a periodic basis to insure that those who routinely use the document have the most current data. A comprehensive review and update will be undertaken every three years. Routine updates will be done every six months as inaccuracies and needed changes are identified. The public access version of the plan is available on the Association's web site at www.umnba.org/hazspills/umrplan.pdf or by contacting the Association at the phone number or address listed below. Should users of this document discover any errors or outdated information, they are asked to notify the Upper Mississippi River Basin Association, using the corrections and updates form provided in the plan.

Upper Mississippi River Basin Association
415 Hamm Building
408 St. Peter Street
St. Paul, Minnesota 55102
Phone: (651) 224-2880
Fax: (651) 223-5815
dhokanson@umnba.org

MEMORANDUM OF AGREEMENT
for Spill Response on the Upper Mississippi River

WHEREAS, the Upper Mississippi River is a valuable resource supporting a multitude of uses, and

WHEREAS, the river is a shared resource forming the borders of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, and

WHEREAS, the river is a federally navigable waterway and a federal fish and wildlife refuge, and

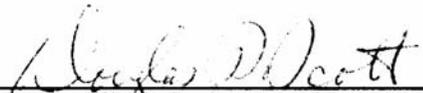
WHEREAS, a spill of oil or hazardous materials into the river could adversely affect the multiple uses of the river, and

WHEREAS, spills must be prevented and environmental damage and public health risks from spills must be minimized, and

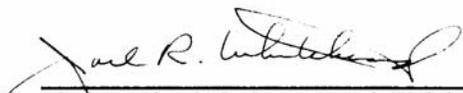
WHEREAS, this Upper Mississippi River Spill Response Plan is compatible with the Regional and Area Contingency Plans in Regions V and VII and is consistent with the requirements of the National Contingency Plan, the National Response Plan, and the National Incident Management System,

NOW, THEREFORE, BE IT RESOLVED, that the undersigned hereby agree to coordinate their spill response activities utilizing the protocols outlined in this Upper Mississippi River Spill Response Plan and Resource Manual.

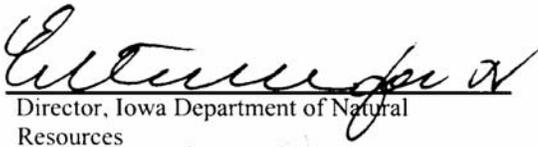
BE IT FURTHER RESOLVED, that the undersigned will update the Upper Mississippi River Spill Response Plan and Resource Manual as needed to reflect revisions to the above-referenced regional and national plans and changes in spill response methodology.



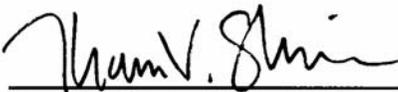
Director, Illinois Environmental Protection Agency



Commander, U.S. Coast Guard, Eighth District



Director, Iowa Department of Natural Resources



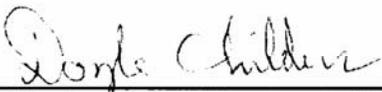
Regional Administrator, U.S. Environmental Protection Agency, Region V



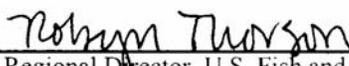
Commissioner, Minnesota Pollution Control Agency



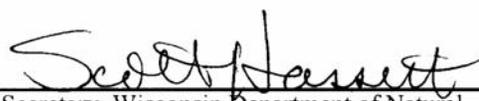
Regional Administrator, U.S. Environmental Protection Agency, Region VII



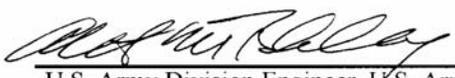
Director, Missouri Department of Natural Resources



Regional Director, U.S. Fish and Wildlife Service, Region 3



Secretary, Wisconsin Department of Natural Resources



U.S. Army Division Engineer, U.S. Army Corps of Engineers, Mississippi Valley

**UPPER MISSISSIPPI RIVER
SPILL RESPONSE PLAN AND RESOURCE MANUAL**

Corrections and Updates

Information contained in The Upper Mississippi River Response Plan and Resource Manual reflects currently available information that has been verified when possible. Because information contained within the Plan and Manual will change over time, the document will be updated periodically to reflect these changes. If you are aware of changes or errors, or if you can provide additional information, please take the opportunity to inform us. Your information will be incorporated into the next version of the Response Plan and Resource Manual. Thank you for your assistance.

Correction Additional Information *(Please check one)*

Section of Plan or Manual _____

Page # (s) _____

Correction / Information _____

Please use additional pages, if necessary.

Name _____

Telephone # _____ Date Information Provided _____

Please return to:
Upper Mississippi River Basin Association
415 Hamm Building
408 St. Peter Street
St. Paul, MN 55102
Phone: 651-224-2880
Fax: 651-223-5815
dhokanson@umrba.org

**UPPER MISSISSIPPI RIVER SPILL RESPONSE PLAN
AND RESOURCE MANUAL**

RESTRICTED DISTRIBUTION VERSION

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INTRODUCTION

The Mississippi River flows past ten states on its journey from the headwaters in northern Minnesota to the Gulf of Mexico. Activities on the river upstream can affect the quantity and quality of the river downstream. Likewise, activities by a state on one side affect the river uses of a state on the other side.

The same holds true for spills of oil or hazardous substances. Since the river is constantly flowing, any river segment adjacent to or downstream from a spill could be affected by that spill. The river is thus a shared resource, requiring dependable stewardship and coordination by the bordering states. The coordination of quick notification and response by all parties is essential to minimize the damage from hazardous substance spills.

In order to prevent and/or adequately respond to spills on the Upper Mississippi River, the five states bordering the Upper Mississippi River (Illinois, Iowa, Minnesota, Missouri, and Wisconsin) and four federal agencies (U.S. Environmental Protection Agency, U.S. Coast Guard, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers) meet periodically to discuss common problems, propose solutions, reach agreements, and coordinate activities to respond to spills on the river. While prevention of spills is the primary goal of the state and federal agencies on the river, effective response to spills is an equally important and necessary goal. Realizing the importance of rapid notification and a coordinated response to spills on the Upper Mississippi River, the spill response agencies have jointly produced this Upper Mississippi River Spill Response Plan and Resource Manual.

The Response Plan and Resource Manual is designed to provide the first responder and the on-scene coordinator with the information necessary to make informed decisions. The Response Plan sets out the procedures for notification and response by state and federal agencies in conjunction with existing plans. The Resource Manual provides reference information about the river, spill containment equipment, sensitive human and wildlife resources, and potential sources of spills. This document has been designed to function as a working contingency plan that should be used as a supplement to the appropriate state emergency response plans, Regional Contingency Plans, Area Contingency Plans, and the National Oil and Hazardous Substances Pollution Contingency Plan. As such, the Upper Mississippi River Spill Response Plan and Resource Manual is consistent with the Regional Contingency Plans and Area Contingency Plans of Regions V and VII and is in compliance with all requirements of the National Contingency Plan, the National Response Plan, and the National Incident Management System.

Knowing the stakeholders on the river and their abilities and limits, and having information about the containment equipment and other response resources that are potentially available, can provide for more effective response to a spill. Continued cooperation of these agencies and other interested parties and periodic updating of the Response Plan and Resource Manual should reduce the possibility of severe environmental damage and health hazards from a spill to the Upper Mississippi River.

SPILL RESPONSE PLAN

ROLE OF PRIVATE AND PUBLIC ORGANIZATIONS IN SPILL RESPONSE

Prevention and response preplanning

The responsibility for preventing spills and preplanning response to a spill generally lies with the party storing, transporting, or using the material. Local, state, and federal entities have responsibility for writing and implementing effective regulations covering storage, transport, use, and spill prevention and response plans. Some of the programs require permits or specify in detail the preventive measures and preplanning which is required of users, transporters, and storers. Some of these governmental programs include inspections to verify adequacy of preventive measures. In the most extreme circumstances, the governmental agencies are authorized to intervene to prevent a spill from occurring.

Most of the preventive actions and response preplanning required by governmental programs focus on protection of the public's safety and on response to the site of a potential spill. Actions relating to preventing and preplanning environmental protection and off-site impacts are also required of major facilities.

Response to public safety and property threats caused by spills

When a spill poses public safety and property threats via potential fires, explosions, toxic clouds, or other means, local officials are usually in command of the incident. The party responsible for the incident is required to cooperate with and aid the local police and fire agencies but typically does not direct or implement the firefighting, evacuation, or other first responses to the spill. The actions typically are taken minutes to hours from the onset of the spill. If highly specialized activities such as off-loading tank cars or repackaging hazardous chemicals are required, the responsible party may implement the actions under the general direction of the local public safety incident commander.

In most states, the role of state agencies in public safety response during the early stages of an incident is to advise local incident commanders to the extent possible. During major incidents state and federal authorities may be able to provide additional assistance to the incident commander at the spill scene by conducting sampling and analysis of chemicals, providing specialized contractors or equipment, providing detailed advice, or serving other support functions. Seldom will state or federal authorities assume command from a local incident commander for short term on-site public safety related issues.

Response to environmental and health threats caused by spills

A number of state and federal statutes and regulations require responsible parties to investigate and remedy environmental and health threats caused by their spills. Often these actions take place off site of the spill. They usually begin somewhat later than does the public safety protection response, but they can go on for a much longer period of time. The actions can include things like placing containment and recovery booms and pads; sampling runoff and rivers; excavating soil; doing hydrogeological investigations; air sampling; retrieving, cleaning, and rehabilitating affected wildlife; closing drinking water intakes; and providing an alternate water supply.

Generally in a major incident the environmental and health protection actions that are conducted by the responsible party are overseen by state or federal authorities, not the local commander. Local police and fire personnel are, however, often asked to assist.

Sometimes a responsible party is unable or unwilling to adequately or quickly undertake the environmental and health protection actions required by state or federal authorities. In those cases state or federal authorities can assume a more direct role. Typically, this is done by using agency personnel or hiring cleanup contractors to stop the release and/or clean up the oil/hazardous substances. These tasks are accomplished using governmental funds, such as state or federal superfunds or the federal Oil Spill Liability Trust Fund. The costs of these direct government actions and damage to natural resources will usually be recovered later from the responsible party. The decision to assume governmental control of environmental and health follow-up to an incident usually hinges on the severity of the incident, the cost and duration of required actions, and the resources available to the involved state.

INTERSTATE NOTIFICATION PROTOCOL FOR SPILLS TO THE UPPER MISSISSIPPI RIVER

1. INITIAL NOTIFICATION

It is the responsibility of the state which first becomes aware of a spill to the Upper Mississippi River to notify other potentially affected states and appropriate federal response and natural resource agencies. A state is to consider itself as first-aware if it has not previously been notified of the spill according to this protocol.

a. All spills are to be reported.

i. Notification of spills likely to impact adjoining states is to be made by voice immediately. The notification is made to the *coordinating agency* via the 24-hour number listed in the notification call roster in this manual.

ii. Notification of incidental spills or spills that are far upstream of the notification recipient should be made during first available working hours by FAX or by voice. The first-aware state should use its best judgment as to what is an incidental spill. Some factors that may affect this decision are 1) the location of the spill relative to water intakes, sensitive/critical fish and wildlife habitat, and major cities or 2) the type of material involved. In addition, news interest/coverage may make an otherwise environmentally insignificant spill into one of which other states and federal agencies should be made aware. If there is any doubt as to the significance of the spill, notification should be made.

b. Each state is responsible for its own intrastate notifications.

c. Should a federal agency become first-aware of a spill, it will notify the state where the spill occurred (if known) or the state being impacted. That state will then be responsible for notifications according to this protocol.

d. FAX notifications and notification supplements should be sent on the emergency transmittal cover sheet (from this manual) followed by the originating agency's incident/release/spill report form. Additional information, maps, etc. should be included as necessary and available. The FAX numbers of the state and federal agencies are listed in the notification call roster.

2. UPDATES

Informal daily updates will be made to adjacent and downstream states by the *designated coordinating state* if the response is state-lead or by the *federal on-scene coordinator* (FOSC) if the response is federalized. It is suggested that daily updates be FAXed at **1330** hours to meet agency management and public information needs, although urgent information should be sent immediately.

a. When a spill originates within a state, that state will be the *designated coordinating state* unless another state agrees to take over that responsibility (perhaps because of the greater involvement by the second state in the spill response).

b. When the spill occurs in or affects the river at a boundary between two states, these states will decide during initial notification as to which state will be the *designated coordinating state*.

- c. The *designated coordinating state* or *federal OSC* is responsible for an incident termination notice when spill response and monitoring efforts cease.
- d. A state or federal agency which responds in any way to a spill is to update the *designated coordinating state* or *federal OSC* on its activity and findings daily so that this information can be disseminated. It is suggested that these reports be FAXed prior to **1200** hours daily. The reports should contain a summary of all activity by that state/agency since its last report, including lab analyses and maps if appropriate. The reports should also list what future actions that state or agency plans to undertake.
- e. A *federal OSC* may negotiate with a state to provide daily updates if the *federal OSC* maintains close communications and provides the necessary information to that *designated coordinating state*.

3. APPLICABILITY

This spill notification protocol applies to those agencies which have signed the implementing memorandum of agreement at the beginning of this manual.

- a. Each state will be represented by only one contact or coordinating agency who will represent and assume the "state" role for purposes of this protocol. It is assumed that this agency will be one which is responsible for environmental emergency response to a spill on the Upper Mississippi River. The coordinating agencies are listed in the spill notification call roster.
- b. Each federal agency will be represented by only one contact point per federal region for purposes of receiving notifications and updates. The contact points are listed in the spill notification call roster.

EMERGENCY FAX

Deliver Immediately

Environmental Emergency

Deliver to:

Name _____

Agency (Division, Office, or Branch) _____

FAX Number _____

Number of pages, including this page: _____

From: _____

Voice Phone: _____

FAX Phone: _____

Message: _____

Spill Notification Call Roster

The call roster is a list of telephone numbers for notification and status report purposes. The list contains primary contacts, which include the five Upper Mississippi River basin states, the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Coast Guard, and U.S. Fish and Wildlife Service, and additional contacts, including miscellaneous federal agencies and offices. The primary contacts are those agencies that should receive first notice of a spill to the river.

The call roster includes a business hour number for the primary response/coordinating agency, a 24-hour number for the agency that accepts the initial spill reports, and a FAX number for the primary coordinating agency or office. The telephone number for the primary coordinating agency will be used for interstate or interagency coordination during business hours. The 24-hour number will be used for initial spill reporting for spills which may affect interstate waters. The FAX number will be used for notification or updates to state or federal agencies.

Primary Contacts

Illinois

Coordinating Agency	Illinois Environmental Protection Agency Emergency Operations Unit	217-782-3637
24-hour	Illinois Emergency Management Agency	217-782-7860
FAX	Illinois Environmental Protection Agency Emergency Operations Unit	217-524-4036

Iowa

Coordinating Agency	Iowa Department of Natural Resources	515-281-8694
24-hour	Iowa Department of Natural Resources	515-281-8694
FAX	Iowa Department of Natural Resources	515-725-0218

Minnesota

Coordinating Agency	Minnesota Pollution Control Agency	651-757-2160
24-hour	Division of Emergency Management	1-800-422-0798 or 651-649-5451
FAX	Minnesota Pollution Control Agency	651-297-8321

Missouri

Coordinating Agency	Missouri Department of Natural Resources	573-526-3315
24-hour	Missouri Department of Natural Resources	573-634-2436
FAX	Missouri Department of Natural Resources	573-526-5101

Wisconsin

Coordinating Agency	Wisconsin Department of Natural Resources	800-943-0003
24-hour	Wisconsin Emergency Management	800-943-0003
FAX	Wisconsin Department of Natural Resources	608-261-4380

National Response Center - Washington, D.C.

Business Hours	National Response Center	1-800-424-8802
24-hour	National Response Center	1-800-424-8802
FAX	National Response Center	202-267-2165

U.S. Department of the Army, Army Corps of Engineers - Vicksburg, MS

Business Hours	Mississippi Valley Division	601-634-5821
24-hour	Jim Hannon (cell)	601-831-2383
FAX	Mississippi Valley Division	601-634-5816

(See pp. A-5 to A-6 for Army Corps of Engineers' district and lock and dam contacts.)

U.S. Environmental Protection Agency - Region V, Chicago

Coordinating Office	Emergency and Enforcement Response Branch	312-353-2318
24-hour	Emergency and Enforcement Response Branch	312-353-2318
FAX	Emergency and Enforcement Response Branch	312-353-9176

U.S. Environmental Protection Agency - Region VII, Kansas City

Coordinating Office	Emergency Response Program	913-551-7756
24-hour	Emergency Response Program	913-281-0991
FAX	Emergency Response Program	913-551-7948

U.S. Coast Guard – Sector UMR - St. Louis, MO

Business Hours	Sector UMR	314-269-2500
24-hour	Sector UMR	1-866-360-3386 or 314-269-2332
FAX	Sector UMR	314-263-1246

U.S. Fish and Wildlife Service - Twin Cities Regional Office

[Note: The Fish and Wildlife Service contact numbers listed below should be used only to report, or consult on, a spill that has already been reported to the National Response Center hotline (800-424-8802). Discussions with Fish and Wildlife Service personnel will under no circumstances constitute Natural Resource Trustee notification under OPA, CERCLA, or the NCP.]

Coordinating Office	None — use 24-hour number below in all instances	
24-hour	DOI Regional Environmental Officer for Region V (includes IL, MN, and WI)	215-266-5155
	DOI Regional Environmental Officer for Region VII (includes IA and MO)	303-478-3373
FAX	Division of Environmental Contaminants	612-713-5292

Additional Contacts

National Pollution Funds Center – Washington, D.C.

Business Hours	National Pollution Funds Center	202-493-6700
24-hour	National Pollution Funds Center or Command Duty Officer (CDO) Pager No.	202-493-6780 or 1-800-759-7243, PIN 2073906
	Team 1 (includes Iowa and Missouri)	202-493-6745
	Team 4 (includes Illinois, Minnesota, and Wisconsin)	202-493-6732
FAX	National Pollution Funds Center	202-493-6896

Arkansas

Business Hours	Department of Emergency Management	1-800-322-4012
24-hour	Department of Emergency Management	1-800-322-4012

Kentucky

Business Hours	Department for Environmental Protection	502-564-2380
24-hour	Department for Environmental Protection	1-800-928-2380

Tennessee

Business Hours	Emergency Management Agency	1-800-258-3300
24-hour	Emergency Management Agency	1-800-258-3300

U.S. Coast Guard - Eighth District, New Orleans

Coordinating Office	Eighth District Operations Center	504-589-6225
24-hour	Eighth District Operations Center	504-589-6225
FAX	Eighth District Operations Center	504-589-2148

U.S. Coast Guard - St. Paul, MN

Business Hours	Marine Safety Detachment	612-725-1871
24-hour	Sector UMR	1-866-360-3386 or 314-269-2332
FAX	Marine Safety Detachment	612-725-1875

U.S. Coast Guard - Quad Cities

Business Hours	Marine Safety Detachment	309-782-0627
24-hour	Sector UMR	1-866-360-3386 or 314-269-2332
FAX	Marine Safety Detachment	309-782-0604

U.S. Coast Guard - Memphis, TN

Business Hours	Sector Lower Mississippi River	1-866-777-2784
24-hour	Sector Lower Mississippi River	1-866-777-2784
FAX	Sector Lower Mississippi River	901-576-8132 or 901-544-3886

U.S. Coast Guard - Paducah, KY

Business Hours	Marine Safety Unit	270-442-1621
24-hour	Sector Ohio Valley	1-800-253-7465
FAX	Marine Safety Unit	270-442-1633

U.S. Coast Guard - Louisville, KY

Business Hours	Sector Ohio Valley	502-779-5422
24-hour	Sector Ohio Valley	1-800-253-7465
FAX	Sector Ohio Valley	502-779-5402

U.S. Coast Guard, Atlantic Strike Team - Fort Dix, NJ

Business Hours	Atlantic Strike Team	609-724-0008
24-hour	Atlantic Strike Team	609-724-0008
FAX	Atlantic Strike Team	609-724-0232

U.S. Coast Guard, National Strike Force - Elizabeth City, NC

Business Hours	National Strike Force	252-331-6000
24-hour	National Strike Force	252-331-6000
FAX	National Strike Force	252-331-6012

U.S. Department of the Interior - Philadelphia, PA (Regional Environmental Officer for Region V)

Business Hours	Office of Environmental Policy & Compliance	215-597-5378
24-hour	Office of Environmental Policy & Compliance	215-266-5155
FAX	Office of Environmental Policy & Compliance	215-597-9845

U.S. Department of the Interior - Denver, CO (Regional Environmental Officer for Region VII)

Business Hours	Office of Environmental Policy & Compliance	303-445-2500
24-hour	Office of Environmental Policy & Compliance	303-478-3373
FAX	Office of Environmental Policy & Compliance	303-445-6320

(See pp. C-13 to C-15 for Fish and Wildlife Service field-level contacts.)

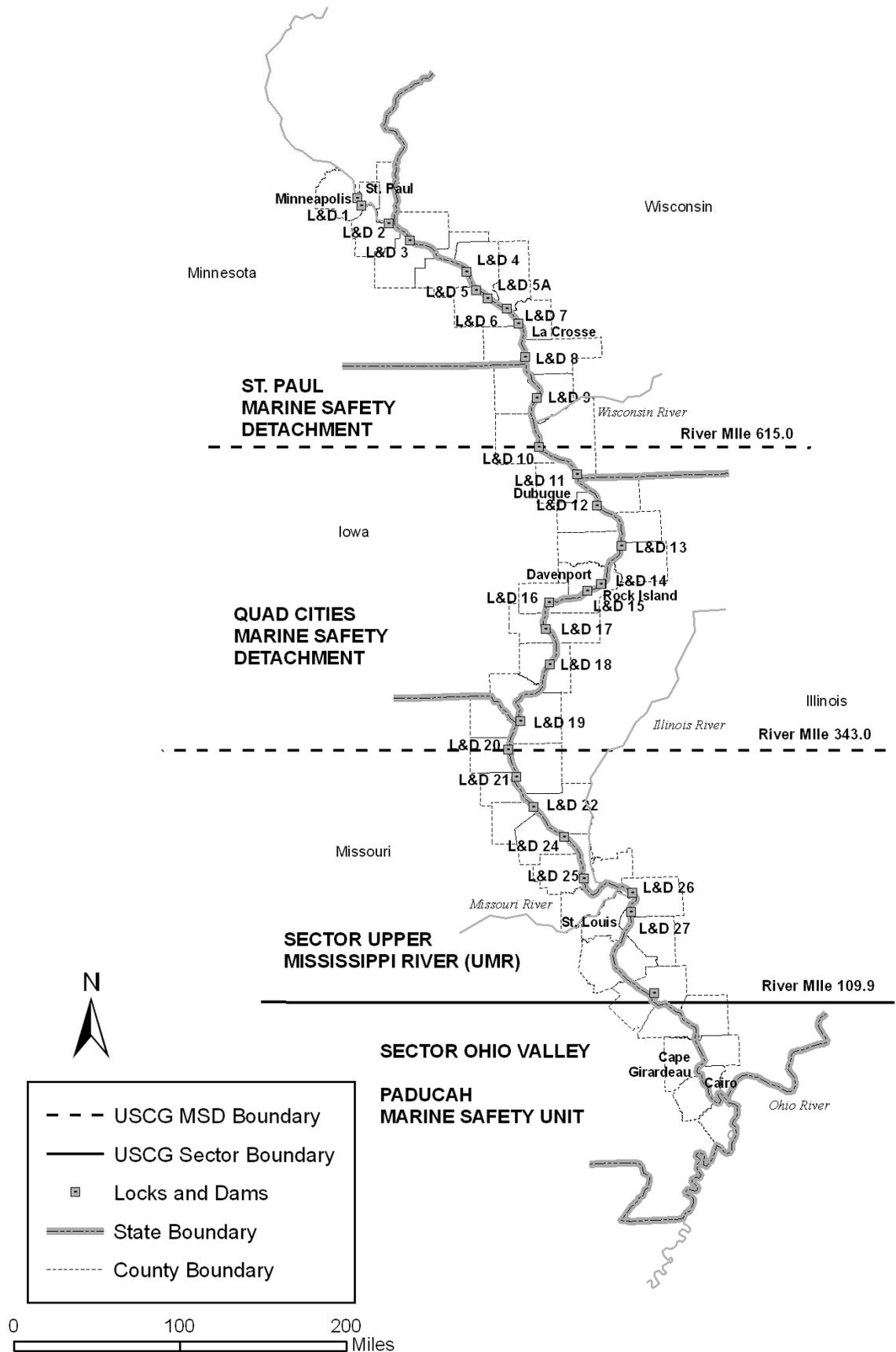
U.S. Department of Commerce, National Oceanic and Atmospheric Administration - Cleveland, OH

Business Hours	Scientific Support Coordinator	216-522-7760
24-hour	NOAA Hazmat Duty Officer (Seattle)	206-526-6317
FAX	Scientific Support Coordinator	216-522-7759

U.S. Department of Commerce, National Weather Service

Business Hours	Regional Warning & Prep Meteorologist, Kansas City	816-426-3239
24-hour	National Weather Service Forecast Offices (unlisted numbers)	
	Minneapolis, Minnesota	612-361-6671
	Milwaukee, Wisconsin	414-965-5063
	Davenport, Iowa	563-386-4110
	Des Moines, Iowa	515-270-4501
	Chicago, Illinois	815-834-0651
	St. Louis, Missouri	314-447-1887
24-hour	River Forecast Center (Minneapolis)	612-361-6660 612-361-6664
FAX	Regional Warning & Prep Meteorologist, Kansas City	816-426-3270

U.S. COAST GUARD EIGHTH DISTRICT MARINE SAFETY DETACHMENT AND SECTOR BOUNDARIES



RESPONSE PROTOCOL FOR SPILLS TO THE UPPER MISSISSIPPI RIVER

All spill incidents are unique in that the type of spill, location of the spill, time of the spill, and other environmental and human factors will vary for each spill. Since response procedures cannot be developed for every spill scenario, this plan outlines the basic procedures that are to be used by state and federal spill responders.

The predesignated federal on-scene coordinator (FOSC) for a spill in the river is the U.S. Environmental Protection Agency except for incidents involving commercial vessels or marine transportation related facilities, where the U.S. Coast Guard has this duty. However, another federal or state agency may be the incident-specific on-scene coordinator (OSC) or first federal official on-scene. Due to the remoteness of most areas of the river, this protocol outlines the coordination which is deemed desirable by all in order to mitigate the effects of a spill.

Initial Investigation

The initial spill report may be received by the local police or fire department, state or federal agencies, and/or the National Response Center. Regardless of which agency receives the first call, the state agency in the state where the spill occurs will be responsible for assuring an investigation is initiated. The investigation may be led by either of the neighboring states, the U.S. EPA, or the U.S. Coast Guard depending upon which agency is readily available or has the necessary resources. When a spill of unknown source is discovered on the river, neighboring states will confer and agree on which state will assure an investigation is conducted.

Determination of Necessary Spill Response Activities

The investigating state/federal agency will determine the extent of the spill and whether further response is necessary. This determination may be done by sending staff to the incident site or by receiving information via telephone reports from local police, fire, health, or environmental officials. The investigating agency will determine to the best of its ability the source of the spill, size of the spill, type of material spilled, the area affected, and the movement of the spill. The investigating agency will determine the necessary initial response and will expeditiously inform the designated coordinating state agency of its findings and actions to that point.

When a response justifies a continuing on-scene presence by a state or federal agency, an incident command system shall be established and the incident commander shall confer with the appropriate state and federal on-scene coordinators. The incident command systems established pursuant to this plan shall recognize that the predesignated federal on-scene coordinators have ultimate authority and responsibility. (See Incident Command System Policy, p. 16, for further details.)

In general, oversight and emergency response to a spill will be encouraged at the most local level of government which has the necessary resources available. A spiller or other responsible party is expected to provide for all resources to effect a response and cleanup. If responsible parties are not apparent or if the scope of the needed response is beyond their ability or if the responsible party's response is insufficient, then the use of government funds to respond should be implemented by the incident commander and on-scene coordinators, depending upon their funding authority in a specific instance. Requests for federal assistance should be made through the states, or Native American tribes, unless the incident commander is the federal on-scene coordinator or his/her representative.

Factors to be considered in determining the appropriate level of effort of a response are:

- size of the spill
- type of material that is spilled
- location of the spill
- exposure/damage potential of vulnerable populations (human and environmental) and property
- willingness and ability of the spiller to respond
- cost of spill clean-up and containment compared to the effectiveness expected and the damage reduction anticipated
- availability of responding agencies capabilities
- media/political interest

If a spill warrants it, the state or federal on-scene coordinator may request activation of the Regional Response Team(s). The degree of involvement and specific activities of the Regional Response Team(s) will be decided by the respective co-chairs.

Federal OSC Jurisdiction

U.S. EPA and the Coast Guard share the responsibility as predesignated federal on-scene coordinators for the Upper Mississippi River. Per EPA/Coast Guard memorandums of understanding, the Coast Guard will serve as the FOSC for all commercial vessel incidents and marine transportation related facilities (MTR) regardless of location.

In all other federal responses, as per the National Contingency Plan, the EPA shall serve as the FOSC. This responsibility is divided between Regions VII and V as follows. Region VII will provide FOSCs for spills on the mainstem of the Upper Mississippi River when either Missouri or Iowa are the principal first responding state. Region V will provide an FOSC for spills totally within the State of Minnesota and where Minnesota, Wisconsin, or Illinois are the first principal responding state.

Resources permitting, the Coast Guard will investigate/respond as first federal official on-scene to all reported spills along the Upper Mississippi River.

Notification

Spill notification and updates will be given to neighboring and downstream states and to federal agencies in accordance with the procedures outlined in the preceding Spill Notification Protocol. (See Interstate Notification Protocol, p. 3, for further details.)

Spill Mitigation, Containment, and Clean-up

The incident commander or on-scene coordinator will oversee spill mitigation efforts underway when he/she arrives at the scene or will initiate mitigation efforts using readily available resources. Many terminals on the river have small amounts of spill containment equipment that can be used for immediate spill containment. In addition, there are cooperation agreements among industries on several portions of the river that can provide individual facilities with access to larger quantities of spill containment and clean-up equipment. With the exception of the U.S. Coast Guard, most state and federal agencies working on the Mississippi River have no spill containment or clean-up equipment other than the

equipment of contractors under their control. (See the list of available spill containment equipment on pp. B-1 to B-13 of the Resource Manual.)

If the responsible party has assumed liability for the spill, the on-scene coordinator will work with the responsible party to mitigate the spill. If the responsible party is not known or is not willing or able to clean up the spill, the on-scene coordinator will pursue the options available to use government funds to hire a clean-up contractor. The on-scene coordinator will then direct the contractor in mitigation and clean up efforts. If the spill is beyond the resources of the responsible party's contractor and the local contractors, the federal on-scene coordinator may call in the Coast Guard's National Strike Force. The Strike Force consists of teams that can provide communications support, advice, and assistance for oil and hazardous materials removal. The teams have expertise in ship salvage, damage control, diving, and removal techniques and methodology. They are equipped with specialized containment and removal equipment and have rapid transportation available. The Gulf Strike Team, based in Mobile, Alabama, and the Atlantic Strike Team, based in Fort Dix, New Jersey, are the most likely Strike Force resources to be mobilized in response to a spill on the Upper Mississippi River.

The spill mitigation will be conducted so as to minimize the risk to public safety and the environment. Evacuation of communities, closure of water intakes, and other public safety measures will be implemented by the appropriate local, state, or federal agency in accordance with appropriate emergency response plans. In consultation with the designated on-scene U.S. Fish and Wildlife Service or state biologist, the on-scene coordinator will attempt to protect critical fish and wildlife habitat of the river. (See pp. C-13 to C-15 of the Resource Manual for a list of Fish and Wildlife Service contacts for each pool of the river.)

Press Releases

Spill updates will be given to the media at intervals determined by the incident commander. Press releases will be coordinated with the affected local communities, states, and federal on-scene coordinator. To facilitate dialogue with the media, the incident commander may appoint a public relations officer or designate a media center.

Incident Closure

Once the incident is over the on-scene coordinator for the lead agency will send an incident closure notice to all appropriate state and federal agencies. The on-scene coordinator may request incident reports from other agencies to provide a complete picture of the incident. When appropriate, enforcement action will be taken against the responsible party if known. If local, state, or federal agencies incurred costs due to the spill, cost recovery action will be considered. Any agency intending to initiate a cost recovery action should notify all other agencies on the notification roster as to their intent. Interested agencies can then coordinate their activities.

Critique

OSHA regulation 1910.120 provides for including a critique of a response and follow-up in an organization's emergency response plan. A critique can be a valuable tool in assessing how well a plan met the needs of responding agencies during an actual incident and can provide the basis for making important modifications and improvements to the plan.

Following an incident that results in the implementation of the Upper Mississippi River Spill Response Plan, any responding agency can request that the lead state or federal agency for the incident arrange for a critique. The lead agency will then consult with the other organizations that responded to

the incident, and if the majority agree to participate, will proceed to make arrangements for a critique. If local agencies were involved in the response, they will also be asked to participate in the critique.

The incident commander for the particular response, whether from a local, state, or federal agency, should chair the critique. If a unified command was used for the incident, the lead officials from each level of government will decide among themselves who should chair the critique. The lead agency for the response should provide a summary of the critique to the Upper Mississippi River Hazardous Spills Coordination Group for the evaluation of changes and improvements in the Upper Mississippi River Spill Response Plan and Resource Manual.

Incident Command System Implementation Protocol Addressing State and Federal Responders

Current federal law requires implementation of a site-specific incident command system at all emergencies involving hazardous substances by the senior emergency response official responding (29 CFR 1910.120 and 40 CFR 311). The specific regulatory language suggests a seniority hierarchy increasing from local, to state, to federal. Yet, often it makes more sense for senior local or state officials to command because they have committed, effectively command, and are most familiar with the resources immediately available. Flexibility was the basis of past practice and has worked well. To maintain that flexibility and comply with current law, contingency plans must reflect this in writing. At the same time it must be recognized that federal and state responders are charged by law with specific authorities and responsibilities in certain emergency situations that cannot be subsumed. The following is suggested language for Regional and Area Contingency Plans; interregional contingency plans such as the Upper Mississippi River Spill Response Plan; state contingency plans; and, potentially, for local plans that, if incorporated, would allow for more flexibility in compliance with 29 CFR 1910.120 (q)(3) than if this issue is not specifically addressed in such documents. This protocol does not commit any parties adopting it to do anything not already required by federal law.

AN INCIDENT COMMAND SYSTEM (ICS) SHALL BE ESTABLISHED AT ALL INCIDENTS INVOLVING HAZARDOUS SUBSTANCES BY THE SENIOR ON-SCENE OFFICIAL OF THE FIRST RESPONSE ORGANIZATION TO ARRIVE AT AN INCIDENT. The ICS should be based on the organization, terminology, and procedures recommended by the National Fire Academy¹ and applied in a broad sense to include all hazard control and mitigation response organizations including responsible parties; private responders; and local, state, and federal agencies. All such entities participating in a response are required by federal law to implement an intra-organizational ICS and integrate it with the overall ICS (29 CFR 1910.120 or 40 CFR 311).

The ICS established will have as the Incident Commander (IC) the most senior on-scene official with the expertise, capability, and determination to be the commander. The IC can be from a local unit of government or from a county, state, or federal agency, as long as he/she has the expertise, capability, determination, and authority. This protocol recognizes that typically, but not necessarily, the IC will change as the incident progresses from being primarily a public safety problem, with the local fire chief as IC, to an environmental incident, with a state or federal person as the IC. The following procedures specify a determinate yet flexible means of establishing the role of federal and state responders in an ICS.

I. SINGLE JURISDICTIONAL AREA AFFECTED

When the incident involves and affects only a single local geographical jurisdiction, the organizational structure of the ICS will be determined by the established local contingency plan. This may involve single or multiple agency involvement. In all situations, one person shall act as either an Incident Commander in sole charge or, when functioning as an Operations Chief, will implement the action plan of a Unified Command.

1 One set of common terminology and procedures is vital to the efficient functioning of an ICS in an emergency. While no widely accepted ICS is specifically designed for hazardous materials response, the National Fire Academy (NFA) system is workable, widely accepted, and recommended by the Federal Emergency Management Agency. The NFA ICS is being designated as the preferred ICS for purposes of this protocol until a more widely accepted system is available.

In such instances, responding state and federal officials, who might otherwise be considered the senior competent emergency response official at the site, shall either:

1. Identify themselves to the Incident Commander and integrate themselves into the established ICS per the Incident Commander's direction, usually as a technical specialist to an operations group supervisor or as an operations group supervisor; or
2. Join an existing Unified Command or request the Incident Commander to establish a Unified Command; or
3. Assume the Incident Command role when required by federal or state law, or when an existing Incident Commander agrees to such a transition, or when no ICS has been established.

The ICS transfer of command or initial assumption of command protocols shall be used.

II. MULTIPLE JURISDICTIONAL AREAS AFFECTED

When the incident involves and affects multiple local geographical jurisdictions or areas not covered by local emergency response organizations, the state or federal competent senior official at the site shall either:

1. Preferably join an existing Incident Command or Unified Command as in I above; or
2. Establish a Unified Command for an encompassing ICS if none exists; or
3. Assume Incident Command and establish an ICS incorporating existing local efforts as operations section branches or otherwise as appropriate.

III. LOCAL, STATE, FEDERAL INTERACTION

When not specifically prescribed, a Unified Command consisting of local, state, and federal senior competent emergency response officials at the site shall be the preferred approach to integrating several levels of government into an ICS. Where state law specifies incident command assignment, it shall take precedence over this protocol with respect to those state and local organizations to which it applies. Federal jurisdiction specified in CERCLA, OPA, or the RCP² shall take precedence over this protocol.

IV. SENIORITY

Seniority, as discussed in 29 CFR 1910.120 (q)(3)(i)³, is ranked according to competency and breadth of responsibility for purposes of this plan.

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- 2 CERCLA is the Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as Superfund; OPA is the Oil Pollution Act of 1990; and the RCP is the Regional Contingency Plan adopted pursuant to 40 CFR 300.210.
 - 3 29 CFR 1910.120 (q)(3)(i) "The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer.

Competency will be determined by meeting the requirements of 29 CFR 1910.120 (q)(6)(v).⁴ All officials meeting the competency criteria are senior to those who do not, unless specifically charged with overriding authority applicable to the specific incident situation by state or federal law.

Breadth of responsibility will be considered to increase from most local to state to federal. However, this protocol encourages the establishment of the ICS at the most local level practicable to assure the earliest implementation of a unified response strategy.

V. POST EMERGENCY OPERATIONS

This protocol is intended only to apply during the emergency phase of a response to which 29 CFR 1910.120 (q) applies. However, use of an incident command system throughout a response and cleanup is encouraged.

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- 4 29 CFR 1910.120 (q)(6)(v) "On scene incident commander. Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, shall receive at least 24 hours of training equal to the first responder awareness level and in addition have competency in the following areas and the employer shall so certify:
- (A) Know and be able to implement the employer's incident command system.
 - (B) Know how to implement the employer's emergency response plan.
 - (C) Know and understand the hazards and risks associated with employees working in chemical protective clothing.
 - (D) Know how to implement the local emergency response plan.
 - (E) Know of the state emergency response plan and of the Federal Regional Response Team.
 - (F) Know and understand the importance of decontamination procedures

Policy on In Situ Burning and Chemical Oil Spill Treating Agents

This policy is applicable to the commercially navigable waters of the Upper Mississippi River, including backwaters, except for those areas that are covered by a Sub-Area Contingency Plan (SACP). Sub-Area Planning Committees may develop specific policies for in situ burning and other countermeasures, as long as they are consistent with local, state, and federal regulations.

Oil spill responders have a limited number of techniques available to them that will minimize environmental impacts and facilitate effective cleanup. These include mechanical methods, the use of certain chemical oil spill treating agents, and in situ burning. All five states, the local authorities, and the federal agencies with jurisdiction over the Upper Mississippi River advocate the use of mechanical containment and cleanup as primary spill response methods. These methods include the use of absorbent pads, containment boom, skimmers, and similar equipment. In general, the use of dispersants is not promoted within the boundaries of the Region 5 or Region 7 Regional Response Teams (RRTs).

General Policy

The Federal On-scene Coordinator (FOSC) has the authority to utilize, or approve, any actions necessary to prevent, or substantially reduce, the threat to human life. This includes, but is not limited to, the use of Chemical and Oil Spill Treating Agents (COSTAs) and in situ burning (ISB) (see 40 CFR 300.910(d)). The FOSC will inform the affected RRTs as well as the RRT representatives of any affected states of these actions. Other interested parties such as natural resource trustees should be informed as appropriate.

When there is no longer an immediate threat to human health and welfare, the use of COSTAs and/or ISB will be evaluated on a case by case basis, and is to be conducted in accordance with the remainder of this policy.

1. COSTA Procedure

For COSTAs the approving authority is the Federal On-Scene Coordinator (FOSC) when the FOSC has obtained the concurrence of both the Regional Response Team EPA co-chair and the affected State representative, and, to the maximum extent practicable, consulted with the federal natural resource trustees' representatives on the RRT (40 CFR 300.305(e)).

2. ISB Procedure

In situ burning, for the purposes of this guidance, is defined as the ignition of spilled oil that will burn due to its intrinsic properties, and does not include the adding of a separate burning agent to initiate or sustain the burn. The addition of burning agents requires the COSTA procedure approval because such agents are considered to be in the same category as COSTAs. In situ burning can be performed on the open water and near or on shore.

The use of in situ burning in these guidelines is not for disposal purposes; rather, it is a response technique to be employed when a oil slick has the potential to spread and contaminate additional areas. It is also considered as a cleanup technique for oiled shoreline habitats such as wetlands, where it is used in conjunction with other cleanup methods.

For in situ burns (ISB) on the Upper Mississippi River, the approving authority designated by this policy is the local Incident Commander (or Unified Command as applicable) and the State On-Scene Coordinator (SOSC) (who may need to obtain internal permission).

- A. If the proposed burn is on a local, state, tribal, or federally owned or managed natural resource area, the concurrence of the land owner/manager must be obtained.
- B. Because state or federally listed threatened or endangered species, migratory birds, managed natural resource areas, or other natural resources could be affected, all responders and trustees share interest in timely and effective removal of spilled oil in ways that protect natural resources and the public's safety. Local incident commanders and state and federal on-scene coordinators shall consider the size, nature, and location of a spill, and the type and proximity of resources, and shall, to the maximum extent practicable, consult with state and federal, and, as appropriate, tribal, trustees before deciding to conduct in situ burning. It is the expectation of the members of the Region 5 and Region 7 RRTs that, except in extraordinary cases, a local incident commander or state or federal on-scene coordinator shall contact appropriate trustees and allow at least three hours for trustees to advise before proceeding with any proposed in situ burn.

In addition, whenever the time available permits, the views of the FOSC should be sought and considered.

Because the time frame for making decisions regarding ISB is often very short, guidelines are included on pp. F-1 to F-4 of the Resource Manual to assure that the most significant issues are considered. This decision-making methodology for burning is approved by the Upper Mississippi River Hazardous Spills Coordination Group, Region 5 Regional Response Team, and Region 7 Regional Response Team.

Special Policy for FOSC Directed Burns

In situ burns overseen by a Region 5 FOSC follow the COSTA procedure (General Policy, item 1.) as a matter of RRT policy. The Region 5 RRT has established ISB Guidelines to facilitate the approval process. Region 5 federal burns are governed by the Region 5 ISB Guidelines, the NCP, and state and local regulations. Burns overseen by an SOSC or other parties in Region 5 must be in compliance with state and local regulations.

[Note: The Region 5 ISB Guidelines do not grant pre-approval to conduct an in situ burn. Rather, they are intended to provide consistent guidance throughout the region to facilitate decision-making on whether or not to conduct a burn during a spill incident].

Region 7 burns are governed by the NCP and state and local regulations. Region 7 does not currently have guidelines on the use of ISB.

It is the Upper Mississippi River policy that all burns on the Upper Mississippi River must comply with local, state, and federal regulations.

The FOSC is authorized to use any countermeasure without requesting permission if he or she believes its use is necessary to prevent or substantially reduce a hazard to human life (40 CFR 300.910 (d)). SOSCs may have similar authority under applicable state laws and regulations.

Policy on Bioremediation¹

Because the Upper Mississippi River Spill Response Plan and Resource Manual is designed to provide the first responder and on-scene coordinator with information necessary to make informed decisions, bioremediation guidelines are not included in this plan. Bioremediation takes extended periods of time to reduce contaminant mass. It is usually applied to terrestrial environments, including, potentially, riverine shoreline. It is unlikely that oversight of such a project would involve a first responder or on-scene coordinator during the first phase of a response. In the unlikely event that a first responder, on-scene coordinator, or responsible party proposes to use bioremediation measures on or in the navigable waters of the Mississippi River, the National Contingency Plan, subpart J, and state officials should be consulted for authorities, restrictions, and approvals.

Policy on Vessel Detainment

In the course of investigating and responding to spills of oil or hazardous substances, it may be necessary to detain vessels. Federal authority to detain vessels for pollution response investigations in ports subject to the jurisdiction of the United States and on the navigable waters of the United States rests with the U.S. Coast Guard Captain of the Port (COTP).

The COTP is authorized to:

- a. order a vessel to operate or anchor in a particular manner if the COTP has reasonable cause to believe that the vessel does not comply with any regulation or applicable law (33 USC 1223, Ports and Waterways Safety Act);
- b. investigate any incident which affects or may affect the safety or environmental quality of the ports, harbors, or navigable waters of the United States (33 USC 1227, Ports and Waterways Safety Act); and
- c. board and inspect any vessel, except public vessels, to enforce the oil and hazardous substance liability provisions of the Federal Water Pollution Control Act (33 USC 1321, Oil Pollution Act).

Known or suspected violations of federal pollution prevention requirements by vessels should be reported to the appropriate COTP. For incidents on the Upper Mississippi River from mile 0.0 to mile 109.9, notify the Sector Ohio Valley in Louisville, Kentucky. For incidents on the Upper Mississippi River from mile 109.9 to mile 857.6, notify the Sector Upper Mississippi River in St. Louis, Missouri. (See Spill Notification Call Roster, p. 7.)

¹ “Aerobic bioremediation is the mineralization or breakdown of organic compounds to carbon dioxide, water, inorganic compounds and cell protein. Depending upon the compound, this may be a stepwise process involving many enzymes and species of organisms.” (Sims, Judith L., R.C. Sims, J.E Mathews. 1990. “Approach to Bioremediation of Contaminated Soil.” *Hazardous Waste and Hazardous Materials*. Volume 7, No. 2: 117-149.)

State Hazardous Materials Disposal Requirements

	Non-RCRA Regulated Debris and Soil (See also following pages for additional disposal regulations/options)	RCRA Hazardous Debris and Soil	List of Emergency Response Contractors
Illinois	<ul style="list-style-type: none"> - Debris and soil above cleanup objectives are special waste and must go to special waste landfill (permit, manifesting, and licensed waste hauler required) - Clean debris and soil can go to sanitary landfill - Permits expedited through IEPA Emergency Response 	<ul style="list-style-type: none"> - Illinois has one RCRA landfill, several incinerators and other RCRA treatment facilities - Permits expedited through IEPA Emergency Response 	<ul style="list-style-type: none"> - Available verbally from IEPA
Iowa	<ul style="list-style-type: none"> - Must go to permitted sanitary landfill - IDNR prior approval required 	<ul style="list-style-type: none"> - Iowa does not have a RCRA program - No RCRA disposal facilities in Iowa 	<ul style="list-style-type: none"> - Available from IDNR
Minnesota	<ul style="list-style-type: none"> - Expedite through MPCA spills and emergency response team 	<ul style="list-style-type: none"> - Expedite through MPCA spills and emergency response team 	<ul style="list-style-type: none"> - Available from MPCA
Missouri	<ul style="list-style-type: none"> - Go to sanitary landfill - Special waste permits required - On site treatment on a site-specific basis 	<ul style="list-style-type: none"> - Must go to RCRA facility - Spiller must determine if RCRA hazardous 	<ul style="list-style-type: none"> - Duty officer will assist on request
Wisconsin	<ul style="list-style-type: none"> - May go to engineered solid waste landfill - On site containment may be considered 	<ul style="list-style-type: none"> - In state treatment or disposal preferred - No RCRA disposal site - RCRA treatment, storage available 	<ul style="list-style-type: none"> - Available from WDNR

IDNR Iowa Department of Natural Resources
 IEPA Illinois Environmental Protection Agency
 MPCA Minnesota Pollution Control Agency
 NPDES National Pollution Discharge Elimination System

POTW Publicly Owned Treatment Works
 RCRA Resource Conservation and Recovery Act
 WDNR Wisconsin Department of Natural Resources

State Hazardous Materials Disposal Requirements

	Petroleum Contaminated Water	Land Farming	Pesticides and Fertilizers
Illinois	<ul style="list-style-type: none"> - NPDES permit required for all direct discharges including storm sewers - Local approval required for discharge to sanitary sewer 	<ul style="list-style-type: none"> - Possible, demonstration permit necessary, significant containment and monitoring required 	<ul style="list-style-type: none"> - Recovered liquids and solids may be applied to agricultural land according to label application rates. Permission needed of IEPA or IL Dept. of Agriculture
Iowa	<ul style="list-style-type: none"> - Can discharge to storm or sanitary sewer with approval from IDNR and POTW 	<ul style="list-style-type: none"> - Allowed if IDNR criteria followed 	<ul style="list-style-type: none"> - Recovered liquids and solids may be applied to agricultural land at normal rates, with approval by IDNR
Minnesota	<ul style="list-style-type: none"> - MPCA spills staff may authorize emergency discharges, may require treatment before discharge 	<ul style="list-style-type: none"> - Guidance available for petroleum contaminated soil - Permit needed for more than 10 cubic yards 	<ul style="list-style-type: none"> - Regulated by MN Dept. of Agriculture
Missouri	<ul style="list-style-type: none"> - Emergency discharge authorization may be granted for decanting, may go to POTW with their approval 	<ul style="list-style-type: none"> - Various remedial technologies considered on a site-specific basis - NPDES permit required - Contact the Water Pollution Control Program at 573-751-1300 	<ul style="list-style-type: none"> - Recovered materials may be used as product in accord with MO Department of Agriculture - Waste disposed as a RCRA or special waste - Contact the Hazardous Waste Program at 573-751-3176
Wisconsin	<ul style="list-style-type: none"> - WPDES permit probably required - Emergency discharge may be authorized to prevent an emergency condition threatening public health, safety, or welfare 	<ul style="list-style-type: none"> - Guidance available for petroleum contaminated soil 	<ul style="list-style-type: none"> - Recovered materials may be applied to agricultural lands per label instructions. Guidance available from WI Dept. of Agriculture

IDNR Iowa Department of Natural Resources
 IEPA Illinois Environmental Protection Agency
 MPCA Minnesota Pollution Control Agency
 NPDES National Pollution Discharge Elimination System

POTW Publicly Owned Treatment Works
 RCRA Resource Conservation and Recovery Act
 WDNR Wisconsin Department of Natural Resources

State Hazardous Materials Disposal Requirements

	Petroleum Contaminated Soils	Open Burning
Illinois	<ul style="list-style-type: none"> - Generic permits available at some landfills - See debris and soil and land farming discussions 	<ul style="list-style-type: none"> - Allowed with permission for oil production spill residues when weather threatens environmental damage - Considerations are proximity to residences, visibility on roads, and atmospheric dispersion conditions
Iowa	<ul style="list-style-type: none"> - Excavated soil may be incinerated at an approved incinerator, land-applied at a permitted sanitary landfill, or land-farmed on property with the approval of the owner as long as IDNR criteria are followed 	<ul style="list-style-type: none"> - Generally prohibited - Variance possible through IDNR
Minnesota	<ul style="list-style-type: none"> - May be incinerated at approved incinerator - May be land-farmed following guidelines and permit rules 	MPCA spills and emergency response team authorized to approve oil spill burning after consultation with local officials and DNR approval.
Missouri	<ul style="list-style-type: none"> - Virgin material spill debris can go to sanitary landfill if not RCRA waste - May be treated by alternate technologies on a site-specific basis - NPDES permits and generic permits available - Debris must not contain any free liquids - Contact the Solid Waste Management Program at 573-751-5401 	<ul style="list-style-type: none"> - Permission of Air Pollution Control Program (573-751-4817) and local fire officials required - Considerations are proximity to populated areas and ozone exclusion zones - Overseen by SOSOC
Wisconsin	Guidance available for spills, see RCRA hazardous waste. Land farming, bio piles, and asphalt incorporation are options.	<ul style="list-style-type: none"> - Generally prohibited - Variance/exemption includes: burning of explosive or dangerous material with no other safe means of disposal, burning at rural or isolated solid waste disposal sites outside the SE Wisconsin Intrastate AQCR which may have a written exemption under s. NR 506, burning of special waste where permits are obtained from WDNR, burning of gaseous or liquid waste in a manner approved by WDNR. Must comply with all local and state fire protection regulations.

IDNR Iowa Department of Natural Resources
 IEPA Illinois Environmental Protection Agency
 MPCA Minnesota Pollution Control Agency
 NPDES National Pollution Discharge Elimination System

POTW Publicly Owned Treatment Works
 RCRA Resource Conservation and Recovery Act
 WDNR Wisconsin Department of Natural Resources

Policy on Coordination with the U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers has a wide range of responsibilities on the Upper Mississippi River, including operation and maintenance of the commercial navigation system, management of Corps-owned lands, and flood damage reduction and flood response. Given its diverse river-related missions, the Corps has a variety of resources, capabilities, and expertise that could facilitate spill response on the Upper Mississippi River. This policy outlines the types of assistance that may be available from the Corps and the appropriate procedures for requesting that assistance.

The Corps administers its Upper Mississippi River projects and programs through the St. Paul, Rock Island, and St. Louis Districts, all of which are under the command of the Mississippi Valley Division in Vicksburg, Mississippi. (See p. A-7 for a map showing boundaries among the three districts.) In letters dated between November 2001 and February 2002, the Commanders of the three UMR districts each indicated that the Corps “stands ready to respond and assist the federally designated on-scene incident commander” in the event of a major spill on the Upper Mississippi River.¹ However, that assistance is limited by the Corps’ resources and capabilities and must not conflict with the Corps’ responsibilities under applicable laws or regulations.

The precise nature and extent of the Corps’ assistance will, of course, be determined by the specifics of a particular incident. In general, the Corps’ capabilities include reporting and monitoring spills, providing information about river conditions, logistics support (including communications and other site resources), and contracting and technical support. In addition, under certain circumstances, Corps personnel may be able to facilitate control and containment of spills through its river operations, such as emergency dredging or manipulation of river flows. However, spill responders should be aware of the following limitations:

- The Corps’ ability to modify river flows to facilitate spill response is generally quite limited. For example, there is very little storage capacity in the UMR pools; thus, the Corps cannot typically hold water behind the navigation dams.
- All assistance rendered by the Corps must not conflict with the Corps’ responsibilities under applicable laws or regulations. Top priorities include the protection of public health and safety and public infrastructure.
- Corps personnel are trained only to the level necessary to respond to a spill from a Corps facility and thus do not have the training needed to respond directly to a major spill event.
- If the Corps provides assistance in response to the request of a federally designated on-scene incident commander, the Corps will compile all costs of providing that assistance and will seek reimbursement from the responsible party.

Corps Coordination Contacts

- **Contact the appropriate lockmaster (p. A-5) for:**
 - **site-specific assistance and information.**
- **Contact the appropriate District Hydraulics Branch (p. A-6) for:**
 - **requests for changes to dam gate settings, and**
 - **river level and flow projections.**

¹ The Rock Island and St. Louis District Commanders included personnel from the U.S. Environmental Protection Agency, U.S. Coast Guard, state response agencies, and local fire departments within their definition of federally designated on-scene incident commanders.

RESOURCE MANUAL

RESOURCE MANUAL

The Resource Manual contains reference information on the river and information on spill response and clean-up resources, sensitive human and wildlife resources, potential sources of spills, and public hazardous materials teams. Where possible, information in the manual is referenced by river mile. River mile 0 of the Upper Mississippi River is located at the confluence of the Ohio and Mississippi Rivers. River miles increase upstream to Minneapolis, Minnesota where the commercially navigable portion of the river ends at river mile 856. References to right and left bank are from the descending perspective. Some portions of the Resource Manual also refer to river pools. Pools are named for the lock and dam at their downstream end. Thus, for example, Pool 2 is the impounded area immediately above Lock and Dam 2. Information in the Resource Manual is generally presented in geographic order, beginning at the head of navigation in Minneapolis, Minnesota and ending at the confluence with the Ohio River in Cairo, Illinois.

River mile locations for facilities in this manual were derived from a multitude of sources. Some of the river miles are accurate to within a tenth of a mile. Other river miles are accurate to within one or two miles depending on the source. The river mile locations are provided so that the spill responders can get an idea of the facilities and resources in their area. This manual is not meant to be the definitive source of facility location information on the river.

RESOURCE MANUAL

Section A: River Information and Locational References

DESCRIPTION OF UPPER MISSISSIPPI RIVER RESOURCES

The Mississippi River flows 2,348 miles from the headwaters at Lake Itasca in northern Minnesota to the mouth at the Gulf of Mexico in Louisiana. The Mississippi River and its tributaries drain approximately 40 percent of the conterminous United States. The average discharge of the Mississippi River to the Gulf of Mexico is 420 billion gallons per day.

The Mississippi River is divided into two general hydrologic regions — the Upper Mississippi Region and the Lower Mississippi Region. The Upper Mississippi Region includes the northern 1300 miles of the river in the states of Minnesota, Wisconsin, Iowa, Illinois, and Missouri. The Lower Mississippi Region includes the 1000 miles of river that flow between Missouri, Kentucky, Arkansas, Tennessee, Mississippi, and Louisiana. The boundary between the two regions is the Ohio River confluence at Cairo, Illinois.

The average discharge of the Upper Mississippi River at Cairo, Illinois is about 121 billion gallons per day. This is approximately 30 percent of the total discharge of the Mississippi River into the Gulf of Mexico. The tributary contributing the greatest flow to the Upper Mississippi River is the Missouri River, with an average discharge of 48 billion gallons per day. Other major tributaries to the Upper Mississippi River include the Minnesota, St. Croix, Wisconsin, Illinois, and Kaskaskia Rivers.

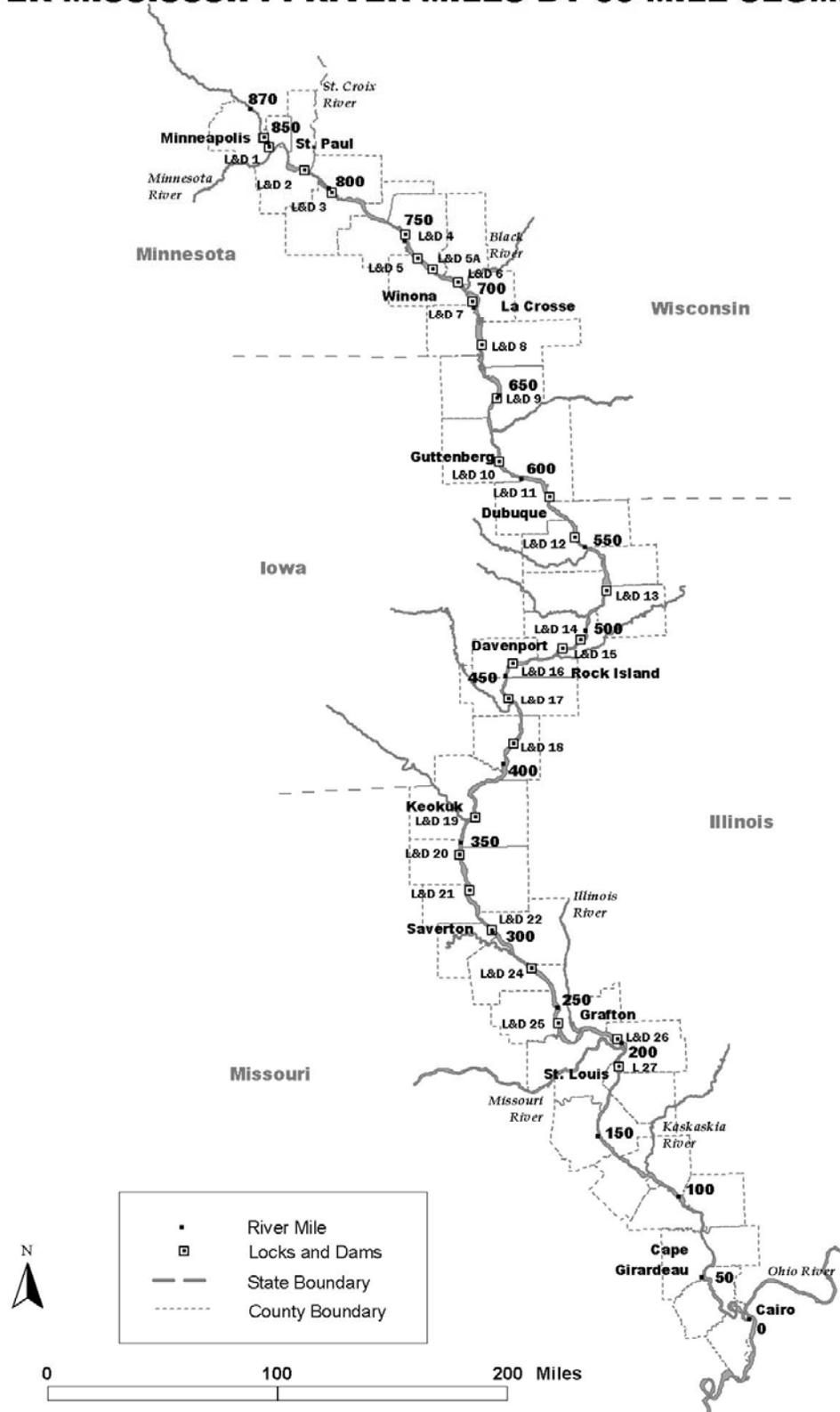
The commercially navigable portion of the Upper Mississippi River extends from Minneapolis, Minnesota to the Ohio River confluence — a total of approximately 856 miles. This portion of the Upper Mississippi River is a major transportation artery linking the Midwest to U.S. and foreign markets. Industrial and agricultural commodities are shipped by barge on the waterway through a series of 29 locks and dams that maintain a 9-foot deep channel in the river. In recent years, approximately 70 to 85 million tons of commodities have been shipped annually on the Upper Mississippi River between Minneapolis, Minnesota and the mouth of the Missouri River.

Besides being a commercial transportation corridor, the Upper Mississippi River is a major wildlife and recreational resource. In fact, the Upper Mississippi River is the only inland river in the United States serving under federal law as both a federal commercial navigation project and a major national wildlife refuge complex. There are four national wildlife refuges along the Upper Mississippi River comprising a total of 265,000 acres of wooded islands, water, and marsh. The Upper Mississippi River is a migratory corridor for 28 waterfowl species. Over 20 percent of North America's migratory waterfowl use the river system for feeding and resting during migration.

The Upper Mississippi River is also a recreational resource. Indeed, recreational activity on the Upper Mississippi River System, which includes the Illinois River and other navigable tributaries, has been estimated to involve direct and indirect expenditures of more than \$1.2 billion annually. Water-based recreational opportunities abound on the river and its backwaters. On the Upper Mississippi River alone there are over 380 boat harbors, access points, and marinas.

The Upper Mississippi River is also an important water supply. A total of 72 facilities including municipalities, industries, hydropower plants, and fish and wildlife refuges take water from the river.

UPPER MISSISSIPPI RIVER MILES BY 50-MILE SEGMENTS



UPPER MISSISSIPPI RIVER MILE POINTS OF COUNTY LINES

River Mile*	State	County/County
857.9 LDB	MN	Anoka/Hennepin
850.5 LDB	MN	Hennepin/Ramsey
845.3 RDB	MN	Hennepin/Dakota
841.9 RDB	MN	Dakota/Ramsey
835.7 RDB	MN	Ramsey/Dakota
833.1 LDB	MN	Ramsey/Washington
811.6 LDB	MN/WI	Washington/Pierce
807.1 RDB	MN	Dakota/Goodhue
779.3 LDB	WI	Pierce/Pepin
773.2 RDB	MN	Goodhue/Wabasha
763.4 LDB	WI	Pepin/Buffalo
741.9 RDB	MN	Wabasha/Winona
721.8 LDB	WI	Buffalo/Trempealeau
713.0 LDB	WI	Trempealeau/La Crosse
701.0 RDB	MN	Winona/Houston
691.3 LDB	WI	La Crosse/Vernon
673.8 RDB	MN/IA	Houston/Allamakee
667.6 LDB	WI	Vernon/Crawford
637.3 RDB	IA	Allamakee/Clayton
630.7 LDB	WI	Crawford/Grant
600.6 RDB	IA	Clayton/Dubuque
580.6 LDB	WI/IL	Grant/Jo Daviess
567.0 RDB	IA	Dubuque/Jackson
548.9 LDB	IL	Jo Daviess/Carroll
532.8 RDB	IA	Jackson/Clinton
524.7 LDB	IL	Carroll/Whiteside
511.5 LDB	IL	Whiteside/Rock Island
506.6 RDB	IA	Clinton/Scott
469.5 RDB	IA	Scott/Muscatine
448.8 RDB	IA	Muscatine/Louisa
448.8 LDB	IL	Rock Island/Mercer
425.6 RDB	IA	Louisa/Des Moines
425.5 LDB	IL	Mercer/Henderson
395.9 RDB	IA	Des Moines/Lee
390.6 LDB	IL	Henderson/Hancock
361.5 RDB	IA/MO	Lee/Clark
351.0 RDB	MO	Clark/Lewis
347.3 LDB	IL	Hancock/Adams
328.5 RDB	MO	Lewis/Marion
312.4 LDB	IL	Adams/Pike
306.1 RDB	MO	Marion/Ralls
297.4 RDB	MO	Ralls/Pike
275.4 LDB	IL	Pike/Calhoun

UPPER MISSISSIPPI RIVER MILE POINTS OF COUNTY LINES
(Continued)

River Mile*	State	County/County
258.1 RDB	MO	Pike/Lincoln
236.4 RDB	MO	Lincoln/St. Charles
217.9 LDB	IL	Calhoun/Jersey
208.5 LDB	IL	Jersey/Madison
195.5 RDB	MO	St. Charles/St. Louis
182.3 LDB	IL	Madison/St. Clair
171.2 LDB	IL	St. Clair/Monroe
79.4 LDB	IL	Jackson/Union
75.2 RDB	MO	Perry/Cape Girardeau
55.4 LDB	IL	Union/Alexander
47.8 RDB	MO	Cape Girardeau/Scott
25.9 RDB	MO	Mississippi/Scott

* LDB = Left Descending Bank
RDB = Right Descending Bank

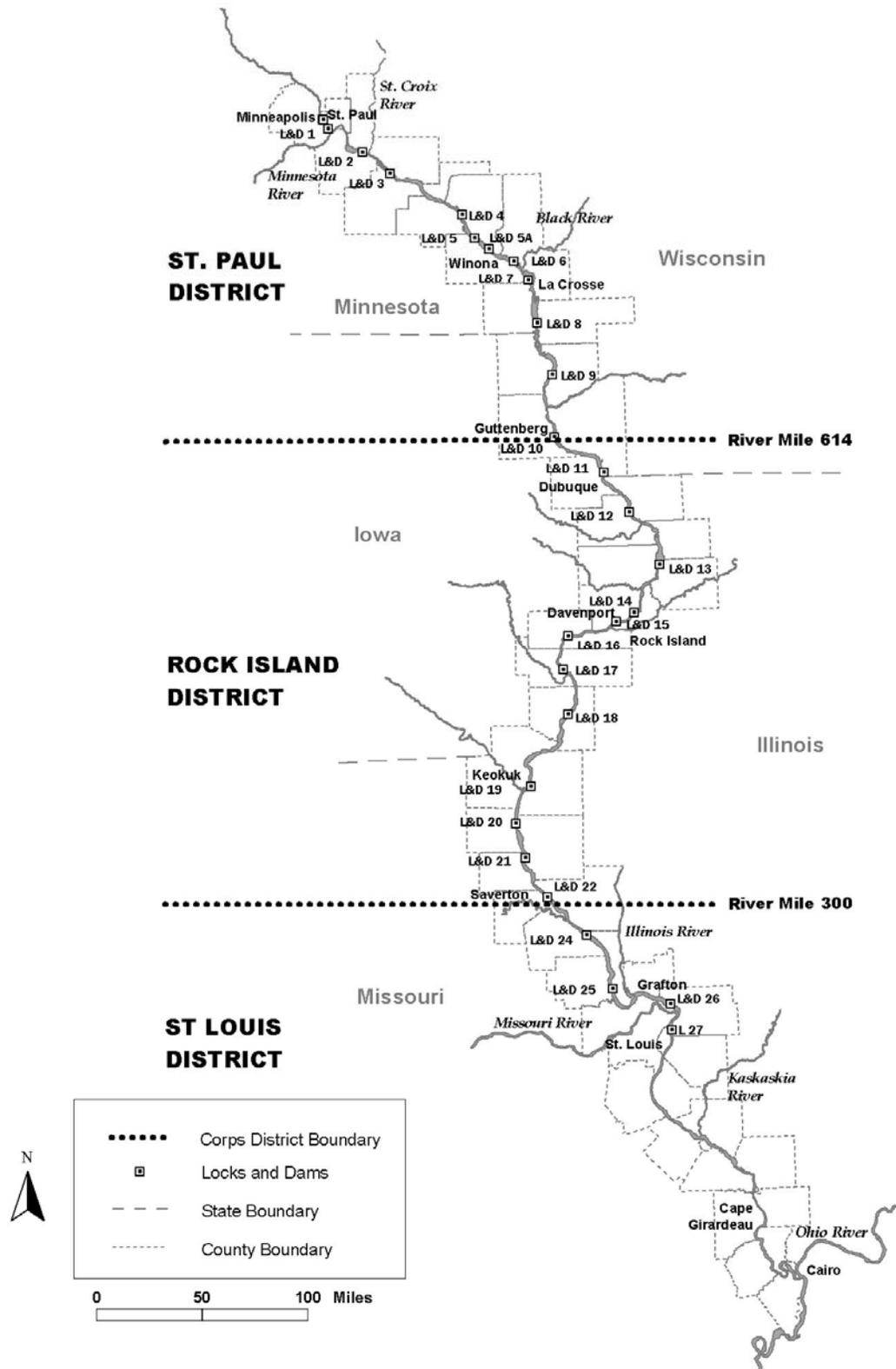
UPPER MISSISSIPPI RIVER LOCKS AND DAMS
(Operated by the U.S. Army Corps of Engineers)

Lock and Dam	River Mile	Telephone Number
Upper St. Anthony	853.7	612-333-5336
Lower St. Anthony	853.4	612-332-3660
No. 1	847.6	612-724-2971
No. 2	815.2	651-437-3150
No. 3	796.9	651-388-5794
No. 4	752.8	608-685-4421
No. 5	738.1	507-689-2101
No. 5A	728.5	507-452-2789
No. 6	714.3	608-534-6424
No. 7	702.5	507-895-2170
No. 8	679.2	608-689-2625
No. 9	647.9	608-874-4311
No. 10	615.1	563-252-1261
No. 11	583.0	563-582-1204
No. 12	556.7	563-872-3314
No. 13	522.5	815-589-3313
No. 14	493.3	563-332-0907
No. 15	482.9	309-794-5266
No. 16	457.2	309-537-3191
No. 17	437.1	309-587-8125
No. 18	410.5	309-873-2246
No. 19	364.2	319-524-2631
No. 20	343.2	573-288-3320
No. 21	324.9	217-222-0918
No. 22	301.2	573-221-0294
No. 24	273.4	573-242-3524
No. 25	241.4	636-566-8120
No. 26	200.8	636-899-1543
No. 27	185.0	618-452-7107

U.S. ARMY CORPS OF ENGINEERS DISTRICT CONTACTS

District	Telephone Number
St. Paul District (Headwaters to river mile 614) Hydraulics Branch – Water Control Section	(651) 290-5624 (24-hours)
Rock Island District (river mile 614 to 300) Hydraulics Branch	(309) 794-5849 (business hours) (309) 912-0272 (24-hour pager)
St. Louis District (river mile 300 to 0) Hydraulics Branch – Water Control Management Unit	(800) 432-1208 (business hours 7 days a week)

U.S. ARMY CORPS OF ENGINEERS DISTRICT BOUNDARIES



RESOURCE MANUAL

Section B: Spill Response and Clean-up Resources

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Note: This equipment inventory is based on information supplied by the facilities listed. Inclusion in the list does not guarantee that all of the equipment listed will be on-hand at any given point in time nor that it will be made available to a responding party upon request.)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
N/A	West Central Environmental 7871 Hickory St., N.E. Fridley, MN 55432 (763) 571-4944	X	X					X	X
N/A	Determan Brownie 1241 72nd Ave. N.E. Minneapolis, MN 55432 (612) 571-8110		X		X	X			
857.1 RDB	Flint Hills Resources 3750 Washington Ave. N. Minneapolis, MN 55412 (612) 529-4658	X	X			X	X		
853.9	U.S. Army Corps of Engineers Upper St. Anthony Lock and Dam Minneapolis, MN 55401 (612) 333-5336		X						
853.3	U.S. Army Corps of Engineers Lower St. Anthony Lock and Dam Minneapolis, MN 55401 (612) 332-3660		X						
847.6	U.S. Army Corps of Engineers Locks and Dam 1 Minneapolis, MN 55406 (612) 724-2971		X						

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
N/A	Bay West 5 Empire Drive St. Paul, MN 55103 (651) 291-0456 Note: equipment also available at other locations	X	X	X	X	X	X	X	X
N/A	Schlomka Services, Inc. 8190 Military Rd. Woodbury, MN 55129 (651) 459-3718		X		X	X			
N/A	Service Response and Remediation 2200 University Ave. W. St. Paul, MN 55114 (800) 401-0121	X	X				X		X
841.0 LDB	The Uno-Ven Co. 747 Shepard Road St. Paul, MN 55102 (651) 224-5779 Note: member Miss-Ota-Croix Oil Coop.	X	X			X	X		X
838.7 RDB	Upper River Services (Mobile Facility) 40 State Street St. Paul, MN 55107 (651) 292-9293 Note: member Miss-Ota-Croix Oil Coop.	X	X				X		X
838.7 RDB	Miss-Ota-Croix Oil Coop. (Equipment stored at Upper River Services Facility) (651) 292-9293	X	X	X		X	X		

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
836.8 LDB	Flint Hills Resources 2209 Childs Road St. Paul, MN 55106 (651) 774-9763 Note: member Miss-Ota-Croix Oil Coop.	X	X			X	X		X
836.9 LDB	Westway Trading Corp. 2225 Childs Road St. Paul, MN 55106 (651) 774-6600 Note: member Miss-Ota-Croix Oil Coop.	X	X	X		X		X	X
834.8 LDB	Commercial Asphalt Co./ Barton Enterprises, Inc. 1359 Red Rock Road Newport, MN 55055 (651) 739-4675	X	X			X	X		
833.5 LDB	Dakota Barge Service 1030 Red Rock Road St. Paul, MN 55119 (651) 731-6399	X	X	X		X	X		
832.2 LDB	Erickson Petroleum 50 21st Street Newport, MN 55055 (651) 459-5588 Note: member Miss-Ota-Croix Oil Coop.	X	X				X		X
830.0 LDB	Marathon Ashland Oil, Inc. 100 W. Third Ave. St. Paul Park, MN 55071 (651) 459-9771 Note: member Miss-Ota-Croix Oil Coop.	X	X		X	X	X	X	X

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
824.2 RDB	Flint Hills Resources 12555 US Highway 52 Rosemount, MN 55068 (651) 437-0700 Note: member Miss-Ota-Croix Oil Coop.; equipment also available at other locations	X	X	X	X	X	X	X	X
815.2	U.S. Army Corps of Engineers Lock and Dam 2 Hastings, MN 55033 (651) 437-3150		X						
815.2	U.S. Coast Guard Lock and Dam 2 Hastings, MN 55033 (314) 539-3823 Note: Coast Guard equipment pre-positioned at Corps facility. Contact Coast Guard at number listed.	X							X
796.9 RDB	U.S. Army Corps of Engineers Lock and Dam 3 4330 County Road 18 Red Wing, MN 55066 (651) 388-5794		X						
N/A	Wilson Oil Co. (Mobile Facility) 2355 W. Main St., Box 162 Red Wing, MN 55066 (651) 388-5783	X	X	X			X		
790.7 RDB	Archer Daniels Midland Co. 118 Main St. Red Wing, MN 55066 (651) 388-7111	X	X				X		

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
752.8 LDB	Lock and Dam 4 Alma, WI 54610 (608) 685-4421		X						
738.1 RDB	U.S. Army Corps of Engineers Lock and Dam 5 Minnesota City, MN 55959 (507) 689-2101	X	X						
733.0 LDB	US Army Corps of Engineers Base 431 N Shore Drive Fountain City, WI 54629 (608) 687-9241	X	X			X	X		
728.5	U.S. Army Corps of Engineers Lock and Dam 5A Goodview, MN (507) 452-2789		X						
726.2 RDB	Neumann Gas and Oil Co. (Equipment located at Artco Fleeting) 1150 E Broadway Winona, MN 55987 (507) 452-4249	X	X						
714.3	U.S. Army Corps of Engineers Lock and Dam 6 Trempealeau, WI (608) 534-6424		X						
702.5	U.S. Army Corps of Engineers Lock and Dam 7 La Crescent, MN 55947 (507) 895-2170		X						

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
N/A	La Crosse Fire Department La Crosse, WI 54603 (608) 789-7260	X	X			X			
698.2 LDB, 1.8 LDB Black River	Westway Terminal Co. (Equipment stored at Brennan Marine and Midwest Industrial Fuel) 411 S. Bainbridge St. La Crosse, WI 54603 (608)-784-7590 Note: member La Crosse Oil Spill Association								X
698.2 LDB, 1.2 LDB Black River	Midwest Industrial Fuel, Inc. 615 Sumner St. La Crosse, WI 54602 (608) 782-3308 Note: member La Crosse Oil Spill Association	X	X	X	X	X	X	X	X
698.2 LDB, 0.7 RDB Black River	Northern States Power Co. French Island Generating Plant (Boat stored at Brennan Marine) 200 S. Bainbridge St. La Crosse, WI 54603 (800) 838-3161						X		X
697.0	La Crosse Oil Spill Association (Equipment stored at Brennan Marine) 820 Bainbridge Street La Crosse, WI 54603 (608) 782-3670	X	X	X			X		
679.2	U.S. Army Corps of Engineers Lock and Dam 8 Genoa, WI 54632 (608) 689-2625		X						

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
679.2	U.S. Coast Guard Lock and Dam 8 Genoa, WI 54632 (314) 539-3823 Note: Coast Guard equipment pre-positioned at Corps facility. Contact Coast Guard at number listed.	X							X
678.2 LDB	Dairyland Power Coop. Genoa Station Genoa, WI 54632 (608) 787-1393 Note: member La Crosse Oil Spill Association		X			X			X
647.9	U.S. Army Corps of Engineers Lock and Dam 9 RR 1 Box 119 Eastman, WI 54626 (608) 874-4311		X						
N/A	Prairie Du Chien Fire Department / Crawford Co. Emergency Government Prairie Du Chien, WI 53821 (608) 326-0266, (608) 326-8414	X		X		X			
615.1	U.S. Army Corps of Engineers Lock and Dam 10 Guttenberg, IA 52052 (563) 252-1261		X						

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
580.2	Flint Hills Resources, Phillips Petroleum, Amoco Oil Co., and Parker Distribution Co. Co-op (Located at Flint Hills Dubuque Facility) 1550 Koch Court Dubuque, IA 52001 (563) 556-1304 Note: equipment also available at other locations	X		X					X
515.5	Archer Daniels Midland Co. 1251 Beaver Channel Parkway Clinton, IA 52732 (563) 242-1121	X							
487.7	Flint Hills Resources, Phillips Petroleum, Amoco Oil Co., and Parker Distribution Co. Co-op (Located at Flint Hills Bettendorf Facility) 4100 Elm St. Bettendorf, IA 52722 (563) 359-1304 Note: equipment also available at other locations	X	X			X	X		X
483.0	U.S. Coast Guard Rock Island Arsenal Rock Island, IL (314) 539-3823 Note: Coast Guard equipment pre-positioned at Corps facility. Contact Coast Guard at number listed.	X							X

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
475.4	Flint Hills Resources, Phillips Petroleum, Amoco Oil Co., and Parker Distribution Co. Co-op (Located at Flint Hills Davenport Facility) 601 East Front St. Davenport, IA 52804 (563) 359-1304 Note: equipment also available at other locations	X	X						X
471.0	Cargill Inc. 1657 West Front St. Buffalo, IA 52728 (563) 381-2210	X	X				X		X
342.6 RDB	Ayers Oil Co. 4th and Grant St. Canton, MO 63435 (573) 288-4464	X	X	X		X	X	X	
325.8 LDB	Quincy Soybean Co. 1900 Gardner Expressway Quincy, IL 62306 (217) 224-1800	X	X	X			X		
N/A	International Technologies, Inc. 42 North Central Drive O'Fallon, MO 63366 (314) 272-3303 Note: equipment also available at other locations	X	X	X	X	X	X	X	X
197.8 LDB	Redco Marine Inc. 109 S. Velma South Roxana, IL 62087 (618) 254-6042	X				X	X		

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
197.4 LDB	Shell Oil Co. Route 111/Madison Ave. Wood River, IL 62095 (618) 255-3375	X	X	X		X	X		X
197.2 LDB	Premcor Refining Group 201 E. Hawthorne St. Hartford, IL 62048 (618) 254-2623	X	X				X		
196.5 LDB	Marathon Pipeline Co. Wood River Station Hartford, IL 62048 (618) 254-1112	X	X				X		
196.0 LDB	Marathon Pipeline Co. Barge Dock Hartford, IL 62048 (618) 254-3323	X		X					
195.6 LDB	National Maintenance & Repair Foot of Hawthorne Hartford, IL (618) 254-7451	X	X			X	X		
195.2 LDB	Koch Pipeline Co. 480 Robbins Road Hartford, IL 62048 (618) 251-5850	X	X	X		X			X
194.9 LDB	Conoco Pipeline Co. S. Delmar Street Hartford, IL 62048 (618) 254-0154	X	X	X		X	X		X

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
187.0 LDB	Petroleum Fuel & Terminal Co. 2801 Rock Road Granite City, IL 62040 (618) 452-4195	X				X			
185.0 LDB	Melvin Price Support Center Granite City, IL (314) 539-3823 Note: Coast Guard equipment pre-positioned at facility. Contact Coast Guard at number listed. Includes Vessel of Opportunity Skimming System	X							X
182.1 RDB	Kiesel Marine Service 4801 Fyler St. St. Louis, MO 63116 (314) 920-0300	X		X	X		X	X	X
180.0 RDB	Petroleum Fuel and Terminals/ Apex Oil Foot of Mullanphy Street St. Louis, MO 63102 (314) 621-0522 Note: member Metro St. Louis Oil Control Coop.	X					X		X
179.8 RDB	Metro St. Louis Oils Spill Co-op Barge St. Louis, MO (314) 752-0144	X	X	X		X			
176.4 RDB	Valvoline, Inc. 3536 S. 1st Street St. Louis, MO 63118 (314) 771-8200 Note: member Metro St. Louis Oil Control Coop.	X	X						X

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipmen
176.1 LDB	Mobil Oil Corp. 2000 S. 20th Street Sauget, IL 62207 (618) 271-3155 Note: member Metro St. Louis Oil Control Coop.		X						X
176.1 RDB	J.D. Street Co. 3800 S. 1st Street St. Louis, MO 63118 (314) 351-6100 Note: member Metro St. Louis Oil Control Coop.	X	X			X			X
175.6 RDB	Premcor Refining Group 4070 S. 1st Street St. Louis, MO 63118 (314) 752-0144 Note: member Metro St. Louis Oil Control Coop.	X	X	X		X	X		X
174.0	Reidy Terminal Inc. / American River Transportation Co. (Artco) 4528 S. Broadway St. Louis, MO 63111 (314) 481-8828 Note: member Metro St. Louis Oil Control Coop.	X	X	X		X	X		X
173.6	Chemtech Industries, Inc. 139 E. Soper St. St. Louis, MO 63111 (314) 832-5010	X	X			X		X	X

**LOCATION AND TYPE OF SPILL CONTAINMENT EQUIPMENT
ON THE UPPER MISSISSIPPI RIVER**

(Continued)

River Mile	Name Location Telephone	Boom	Sorbents	Skimmer	Vacuum	Pump	Boat	Collection Truck	Other Equipment
168.5	Kerr-McGee Refining Co. 4000 Koch Road St. Louis, MO 63129 Note: member Metro St. Louis Oil Control Coop.	X	X	X					X
127.6	Luhr Brothers Inc. White Sand Road Ste. Genevieve, MO 63670 (573) 883-7260	X	X				X		
109.8	Chester Public Works Chester, IL (314) 539-3823 Note: Coast Guard equipment pre- positioned at Chester facility. Contact Coast Guard at number listed.	X							

SOURCES: Environmental Information LTD, "EI Directory of Spill Response & Cleanup Firms,"
Minneapolis, Minnesota, 1994-95.
U.S. Coast Guard Response Resources Inventory, Electronic Bulletin Board, December 1996.
Information was also provided by individual facilities.

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Upper St. Anthony Falls Pool (river mile 857.6 to 853.4)					
857.6 RDB	Camden Park Boat Ramp (612) 348-2243	3.9 mi. upstream of Upper St. Anthony Lock & Dam Minneapolis, MN	X		
854.8 LDB	Boom Island Park Public Access (612) 348-2222	South of Plymouth Avenue Bridge Minneapolis, MN	X		
Pool 1 (river mile 853.4 to 847.6)					
Pool 2 (river mile 847.6 to 815.2)					
845.9 LDB	Hidden Falls Public Ramp (651) 292-7445	St. Paul, MN	X		
844.9 LDB	Watergate Marina (651) 292-7526	2500 Crosby Farm Rd. St. Paul, MN	X	X	F, L, R
843.1 RDB	Pool & Yacht Club, Inc. (Private) (651) 455-3900	Lilydale Rd. St. Paul, MN	X		
840.2 RDB	Public Launching Ramp (651) 488-7291	On Harriet Island St. Paul, MN	X		
839.7 RDB	St. Paul Yacht Club, Upper and Lower Harbor (651) 291-9624	On Harriet Island 100 Yacht Club Rd. St. Paul, MN	X	X	L, R
830.6 RDB	Twin City Marina/River Heights Marina, Inc. (651) 455-9110 (651) 455-4974	Behind Newport Island 4455 East 64th St. Inver Grove Heights, MN	X	X	L, R

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER

(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 2 (river mile 847.6 to 815.2) - continued					
829.5 LDB	Willie's Hidden Harbor (651) 459-2129	388 9th Ave. St. Paul Park, MN	X	X	L, R
829.4 LDB	St. Paul Park Public Ramp (651) 459-9785	7th Ave. at River Lyon Park St. Paul Park, MN	X		
826.9 RDB	River Grove Harbor, Inc. (651) 455-6273	On River Lake 3995 102nd St. E. Inver Grove Heights, MN	X	X	
822.2 LDB	Grey Cloud Park & Access (651) 458-2800	On Lower Grey Cloud Island on Grey Cloud Trail 1.5 mi. S. of 103rd St. Cottage Grove, MN	X		
820.5 RDB	Mississippi River Public Access — Spring Lake (651) 296-6157	Hilary Path, N of Hwy. 42 Dakota County, MN	X		

Pool 3 (river mile 815.2 to 796.9)

814.6 RDB	Lake Rebecca City Park (651) 437-5858	100 Sibley Street Hastings, MN	X		
813.3 RDB	Hastings Marina (651) 437-9621	1102 E. 1st St. Hastings, MN	X	X	F, L, R
812.7 LDB	King's Cove Marina (651) 437-6186	On Conley Lake 9 Hwy. 61 Hastings, MN	X	X	F, R, L
811.4 LDB	Point St. Croix Marina (715) 262-3161	101 Front St. Prescott, WI	X	X	F

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 3 (river mile 815.2 to 796.9) - continued					
811.3 LDB	Prescott Boat Access (715) 262-5544	Between RR bridge & Hwy. 10 bridge Prescott, WI	X	X	
811.1 LDB	Miss-Croix Yacht Harbor (715) 262-5202	451 S. 2nd St. Prescott, WI	X	X	F, L, R
804.5 RDB	North Lake Public Access (651) 296-1151	On North Lake Goodhue County, MN	X		
799.9 LDB	Diamond Bluff Landing	Diamond Bluff, WI	X		
799.1 RDB	Treasure Island Marina (800) 222-7077 x2376	On Sturgeon Lake 5734 Sturgeon Lake Blvd. Goodhue County, MN		X	F
798.5 RDB	Sturgeon Lake Public Access (507) 695-6341	2.1 mi. upstream of Lock & Dam 3 4330 E. County Rd. 18 Welch, MN	X		

Pool 4 (river mile 796.9 to 752.8)

794.2 LDB	Evert's Resort (715) 792-2333	1705 N. 860th St. Hager City, WI	X	X	
792.7 LDB	Wisconsin Channel Boat Launch (608) 266-1877	Hager City, WI	X		
791.5 RDB	Ole Miss Marina (651) 388-8643	In Bay Point Park 1000 Levee St. Red Wing, MN	X	X	F, L
791.2 RDB	Bay Point Municipal Park (651) 388-6796	229 N. Tyler Rd. Bay Point Park Red Wing, MN	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 4 (river mile 796.9 to 752.8) - continued					
791.2 RDB	Red Wing Marina, Inc. (651) 388-8995	890 Levee St. Red Wing, MN		X	F
791.2 RDB	Red Wing Yacht Club/ Boat House (651) 388-8643	South Bay, Bay Point Park Levee St. Red Wing, MN	X	X	
790.6 LDB	Island Campground (715) 792-2502	Directly under Hwy. 63 bridge N. 650 825th St. Hagar City, WI	X	X	
790.5 LDB	Trenton Island Yacht Club (715) 792-2035	N. 671 825th Island Rd. On channel near Harbor Bar Hagar City, WI		X	
789.2 RDB	Bill's Bay Marina (651) 388-0481	In Colville Park Hwy 292 & Hwy 61 S. Red Wing, MN		X	F, R
788.7 RDB	Colville Park Public Access (651) 388-4781	In Colville Park 1416 East Avenue Red Wing, MN	X		
788.5 RDB	Old Miss Marina (651) 388-8643	In Colville Park Red Wing, MN		X	
788.1 LDB	Goose Lake Resort (715) 792-2219	North of Red Wing Airport Goose Lake Rd. Bay City, WI		X	
786.8 LDB	Bay City Village Park (715) 594-3862	W. 6390 Main St. Bay City, WI	X	X	
780.0 RDB	Frontenac Boat Landing (651) 345-3401	At Florence Twmsp. Beach Rural Route 2 Lake City, MN	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

			FACILITIES		
River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 4 (river mile 796.9 to 752.8) - continued					
779.7 LDB	Maiden Rock Campground (715) 448-2205	Maiden Rock, WI	X		
776.4 RDB	Hansen's Harbor (651) 385-3360	35853 Hwy. 61 N. Lake City, MN	X	X	F, R, L
775.0 RDB	Hok-Si-La Park Access (651) 345-5383	Lake City, MN	X		
774.2 LDB	Stockholm Municipal Park (715) 672-5944	Stockholm, WI	X		
773.9 RDB	Waterman's (651) 345-5353	1702 N. Lakeshore Dr. Lake City, MN	X	X	
772.8 RDB	Lake City Marina & Access (651) 345-4211	Lakeshore Dr. Lake City, MN	X	X	F, L, R
772.1 RDB	Roschen Park Access (651) 345-5383	Lake City, MN	X		
770.3 LDB	Deer Island Boat Landing (715) 442-3171	Near Deer Island Pepin, WI	X		
767.1 LDB	Dan's Pepin Marina (715) 442-4900	First and Lake St. Pepin, WI	X	X	
766.9 LDB	Pepin Boat Landing (715) 442-3171	Pepin, WI	X		
765.5 RDB	Virgil Nelson Marina (651) 565-4174	Hwy. 61 Lake City, MN		X	
764.9 RDB	Camp LaCupolis Resort (651) 565-4318	Hwy. 61 Lake City, MN	X	X	F
763.5 LDB	Chippewa River Landing (608) 266-1877	RM 2.0 Chippewa River Pepin County, WI	X		
Other Services:			F = Fuel	L = Lift	R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 4 (river mile 796.9 to 752.8) - continued					
760.5 RDB	Mississippi Parkside Marina (651) 565-3809	829 W. 3rd St. Wabasha, MN	X	X	F, L, R
760.2 LDB	4 Public U.S. FWS Public Landings (507) 454-7351	On Dike Rd. Nelson, WI	X		
759.3 RDB	Wabasha Marina and Boatyard (651) 565-4747	1009 E. Main St. Wabasha, MN		X	F, L, R
755.4 RDB	Wilcox Landing Public Access (507) 285-7176	On Robinson Lake Wabasha County, MN	X		
755.0 LDB	Buffalo River Landing (507) 454-7351	Alma, WI	X		
754.7 LDB	Rieck's Lakeside Park (608) 685-3330	3.0 mi. upstream of Alma, WI	X		
754.5 RDB	Peterson Lake Landing (507) 454-7351	On Peterson Lake, 1.5 mi. N of L&D 4 Wabasha County, MN	X		
754.0 LDB	Alma Marina (608) 685-3333	125 Beach Harbor Rd. Alma, WI	X	X	F, R
752.8 RDB	Pioneer Campsite (651) 565-2242	130 Pioneer Dr. Wabasha, MN	X	X	

Pool 5 (river mile 752.8 to 738.1)

751.6 LDB	Alma WI DNR Landing (608) 266-1877	Alma, WI	X		
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Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 5 (river mile 752.8 to 738.1) - continued					
747.9 LDB	Great River Harbor (608) 248-2454	S. 2221 Hwy. 35 Alma, WI	X	X	F
747.5 RDB	US FWS Half Moon Public Access (507) 454-7351	Near West Newton Colony, MN	X		
746.9 LDB	Belvidere Slough Landing (608) 266-1877	1.0 mi. upstream of Buffalo City, WI	X		
746.8 RDB	Goose Lake Public Access (651) 296-1151	1.0 mi. upstream of Weaver, MN	X		
744.6 RDB	Weaver Landing (507) 454-7351	Weaver, MN	X		
744.3 LDB	Buffalo City Landing (608) 248-2262	Buffalo City, WI	X		
742.4 LDB	Upper Spring Lake Landing (608) 266-1877	Buffalo City, WI	X		
741.2 LDB	Lower Spring Lake Landing (608) 266-1877	1.0 mi. downstream of Buffalo City, WI	X		
738.2 LDB	Whitman Dam Wildlife Area (608) 266-1877	Upstream of Lock & Dam 5 Buffalo County, WI	X		

Pool 5A (river mile 738.1 to 728.5)

737.7 RDB	Bass Camp Resort (507) 689-9415	Hwy. 61 Minnesota City, MN	X	X	F
736.6 LDB	Indian Creek Resort (608) 687-9581	S. 2947 Indian Creek Rd. Fountain City, WI		X	F

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 5A (river mile 738.1 to 728.5) - continued					
735.3 LDB	Merrick State Park Access (608) 687-4936	S. 2954 State Rd. 35 Fountain City, WI	X		
735.0 LDB	Merrick State Park South Access (608) 687-4936	S. 2965 State Rd. 35 Fountain City, WI	X		
732.8 LDB	Fountain City Boat Dock (608) 687-7481	Fountain City, WI		X	
732.1 LDB	Fountain City Lower Landing (608) 687-7481	Fountain City, WI	X		
730.8 RDB	US FWS Bob Verchota Landing (507) 454-7351	Minnesota City, MN	X		
729.9 RDB	Minnesota City Boat Club (507) 689-2412	L&D 5A Dike Minnesota City, MN	X	X	F, R
728.7 RDB	Upper McNally Landing (507) 454-7351	L&D 5A Dike Goodview, MN	X		

Pool 6 (river mile 728.5 to 714.3)

728.2 RDB	Latsch Prairie Island Park Access	Prairie Island Rd. Goodview, MN	X		
728.0 LDB	Breezy Pt. Marina (608) 687-4774	W. 656 Breezy Pt. Ln. Fountain City, WI	X	X	
726. 2 RDB	Dick's Marine/Winona Municipal Harbor (507) 452-3809	Latsch Island Winona, MN	X	X	F, R

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 6 (river mile 728.5 to 714.3) - continued					
726.1 RDB	City Harbor Public Access (507) 457-8234	Winona, MN	X		
725.6 LDB	Latsch Island Park and Landing (507) 457-8234	Latsch Island Winona, MN	X		
725.5 LDB	Mertes Slough Landing (507) 454-7351	Hwy. 54 btwn. MN & WI	X		
724.9 RDB	Winona Yacht Club (507) 454-5590	24 Laird St. Winona, MN		X	F, L, R
724.7 RDB	St. Charles Street Access (507) 452-8550	Winona, MN	X		
723.8 RDB	East 5th Street Boat Landing (507) 452-8550	E. 5th St. Winona, MN	X		
718.1 RDB	KOA Campground Ramp (507) 454-2851	Hwy. 61, across from Trempealeau Bay Winona County, MN	X		
717.2 LDB	Perrot State Park (608) 266-1877	2.0 mi. upstream of L&D 6 Trempealeau, WI	X		
714.4 LDB	Trempealeau Marina, Inc. (608) 534-6033	Lock & Dam Rd. Trempealeau, WI	X	X	F, R
714.4 LDB	Trempealeau Public Landing (608) 534-6434	Trempealeau, WI	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 7 (river mile 714.3 to 702.5)					
714.2 LDB	Larry's Landing (608) 534-7771	Trempealeau, WI	X	X	F, R
714.0 LDB	WI DNR Trempealeau Public Landing (608) 266-1877	Trempealeau, WI	X		
713.0 LDB	3 WI DNR Boat Accesses (608) 266-1877	Downstream of Trempealeau, WI	X		
712.8 LDB	US FWS Long Lake Landing (608) 783-8405	1.9 mi. downstream of Trempealeau, WI	X		
712.8 LDB	US FWS Round Lake Landing (608) 783-8405	1.9 mi. downstream of Trempealeau, WI	X		
712.0 LDB	US FWS Lone Tree Landing (608) 783-8405	Downstream of Trempealeau, WI	X		
706.3 LDB	Cozy Corner Cottages (608) 781-3792	W. 8071 County Hwy Zb Onalaska, WI	X		
706.2 RDB	US FWS Brice Prairie Landing (507) 452-4232	Onalaska, WI	X	X	
705.1 RDB	Dresbach Park (507) 643-6327	Park Rd. Dresbach, MN	X		
705.0 LDB	Clearwater Resort (608) 781-1716	W. 7605 County Hwy. Zb Onalaska, WI		X	
704.3 LDB	Red Sails Resort (608) 781-2828	W. 7301 County Hwy. Zb Onalaska, WI	X	X	

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 7 (river mile 714.3 to 702.5) - continued					
704.0 LDB	Schafer's Boat Livery (608) 781-3100	W. 7221 North Shore Ln. Onalaska, WI			X
704.0 LDB	Mosey's Landing (507) 452-4232	Onalaska, WI	X		
703.1 LDB	La Crosse Sailing Club	North French Island La Crosse, WI			X
703.1 LDB	Fisherman's Walkdown Public Landing (608) 781-9533	Fisherman's Road French Island La Crosse, WI	X		
703.0 LDB	Nelson Park Access (608) 785-9770	La Crosse, WI	X		

Pool 8 (river mile 702.5 to 679.2)

702.1 RDB	Pool 8/Upper I-90 Access (651) 296-1151	South of Winona, MN	X		
701.9 LDB	2 Municipal Landings (608) 789-7308	Fisherman's Road La Crosse, WI	X		
701.8 LDB	US FWS Fisherman's Road Landing (608) 781-9533	Fisherman's Road La Crosse, WI	X		
701.8 LDB	Upper Dike Landing (608) 785-9770	La Crosse, WI	X		
701.8 RDB	Lower I-90 Landing (608) 783-8405	South of Winona, MN	X		
701.7 LDB	Lower Dike Landing (608) 785-9770	La Crosse, WI	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

			FACILITIES		
River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 8 (river mile 702.5 to 679.2) - continued					
701.7 LDB	Sias Isles Boat Livery (608) 783-5623	107 1st St. La Crosse, WI			F
701.7 LDB	Lower Spillway Landing (608) 789-7533	La Crosse, WI	X		
700.1 LDB	Richmond Bay Landing (608) 783-0050	La Crosse, WI	X		
700.0 LDB	Black River French Island Landing (608) 789-7308	Black River La Crosse, WI	X		
700.0 LDB	Al's Marina (608) 784-3308	RM 0.5 RDB Black River 1311 La Crescent Pl. La Crosse, WI	X	X	
700.0 LDB	Panke's Boat Livery	RM 1.3 LDB Black River La Crosse, WI		X	
700.0 LDB	Beacon Bay Marina (608) 784-8586	RM 1.4 RDB Black River 127 Marina Dr. La Crosse, WI	X	X	F, R, L
700.0 LDB	French Island Yacht Club (608) 782-9581	RM 1.5 RDB Black River 132 Marina Dr. La Crosse, WI	X	X	
700.0 LDB	Bob's Bait and Tackle (608) 782-5552	RM 1.6 RDB Black River 136 Clinton St. La Crosse, WI		X	
700.0 LDB	Copeland Boat Dock (608) 782-1325	RM 1.6 LDB Black River La Crosse, WI		X	F
700.0 LDB	Clinton Street Landings (2 ramps) (608) 789-7308	RM 1.9 LDB Black River La Crosse, WI	X		
Other Services:			F = Fuel	L = Lift	R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 8 (river mile 702.5 to 679.2) - continued					
700.0 LDB	Power House Marine (608) 784-9580	RM 2.0 LDB Black River 518 Logan St. La Crosse, WI	X	X	L
700.0 LDB	Logan Street Landing (608) 789-7308	RM 2.1 LDB Black River La Crosse, WI	X		
700.0 LDB	Best Western Midway Hotel (608) 781-7000	RM 2.3 LDB Black River 1835 Rose St. La Crosse, WI		X	
700.0 LDB	R&R Marine (608) 781-1415	RM 2.5 LDB Black River La Crosse, WI	X	X	
700.0 LDB	Black's Cove Marina (608) 781-1212	RM 2.6 LDB Black River 2003 Rose St. La Crosse, WI		X	
699.2 RDB	Hill's Boat Livery (507) 895-4781	766 Shore Acres Rd. La Crescent, MN		X	F
698.5 RDB	Sportsmen's Landing (651) 649-5451	Hwys. 61 & 14 La Crescent, MN	X		
698.0 LDB	La Crosse Holiday Inn (608) 784-9500	529 Park Plaza Dr. La Crosse, WI		X	
697.4 RDB	Bikini Yacht Club (608) 784-0556	On Barron Island La Crosse, WI		X	F, L, R
697.3 RDB	La Crosse Pettibone Boat Club (608) 784-7743	South Pettibone Island La Crosse, WI	X	X	F
696.7 LDB	La Crosse Boat Harbor, Inc. (608) 782-7077	1502 Marco Dr. La Crosse, WI	X	X	F, R

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 8 (river mile 702.5 to 679.2) - continued					
695.8 LDB	Green Island Ramp (608) 789-7308	La Crosse, WI	X		
695.3 LDB	Chut's Landing (608) 788-1588	2700 S. 15th St. La Crosse, WI	X	X	
692.8 LDB	Goose Island County Park (3 landings) (608) 785-9770	Goose Island, N. of Stoddard, WI	X		
690.6 LDB	Hunter's Point Landing (608) 785-9770	Vernon County, WI	X		
690.5 RDB	Lawrence Lake Marina (507) 482-6615	On Lawrence Lake Brownsville, MN	X	X	F
688.5 RDB	Wildcat Park Access (507) 895-6341	0.4 mi. downstream of Brownsville, MN	X		
685.7 LDB	Stoddard Park Landing (608) 457-2136	Stoddard, WI	X		
684.7 LDB	Water's Edge Dock & Motel (608) 457-2126	201 N. Pearl St. Stoddard, WI	X	X	F
679.7 LDB	Engh's Boat Livery (608) 689-2394	Genoa, WI	X	X	
679.3 LDB	Genoa Harbor (608) 689-2652 (Limited access, boats must pass under low RR bridge.)	Genoa, WI	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 9 (river mile 679.2 to 647.9)					
677.8 LDB	Dairyland Power Plant Access (608) 788-4000	Genoa, WI	X		
676.8 RDB	Millstone Landing (507) 895-6341	3.0 mi. upstream of New Albin, IA	X		
675.5 RDB	Visger's Landing (507) 452-4232	2.0 mi. upstream of New Albin, IA	X		
675.2 LDB	US COE Bad Axe Landing (507) 895-6341	Vernon County, WI	X		
673.4 RDB	IA DNR New Albin Access (515) 281-3449	New Albin, IA	X	X	
672.9 LDB	Victory Boat Landing (608) 648-2700	Victory, WI	X		
671.3 LDB	Blackhawk Park (608) 637-7330	2.0 mi. downstream of Victory, WI	X		
671.0 LDB	US COE Blackhawk Park Access (4 landings) (651) 220-0324	2.0 mi. downstream of Victory, WI	X		
669.6 LDB	Earl's Boat Landing (608) 648-3630	1 mi. north of DeSoto, WI	X	X	
666.3 LDB	DeSoto Landing (608) 648-2700	DeSoto, WI	X		
665.0 LDB	US FWS Winneshiek Slough Landing (507) 454-7351	Crawford County, WI	X		
663.8 RDB	Lansing Marina (563) 538-4474	590 N. Front Street Lansing, IA	X	X	F

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 9 (river mile 679.2 to 647.9) - continued					
663.3 LDB	US FWS Big Slough Landing (507) 454-7351	WI Side Lansing Branch Crawford County, WI	X		
662.5 RDB	S & S Houseboat Rentals (800) 728-0131	990 S. Front St. Lansing, IA		X	F, R
662.2 RDB	IA DNR Village Creek Access (515) 281-3449	At Village Creek Lansing, IA	X	X	
660.0 LDB	WI DNR Rush Creek Wayside (608) 266-7012	Crawford County, WI	X		
657.6 LDB	Ferryville Public Landing (608) 734-3624	Ferryville, WI	X		
656.0 RDB	IA DNR Heytman's Station Landing (515) 281-3449	6 mi. downstream of Lansing, IA at power plant	X	X	
653.9 LDB	US FWS Cold Springs Landing (507) 454-7351	5 mi. downstream of Ferryville, WI	X		
651.3 LDB	Lynxville Public Landing	Lynxville, WI	X		
651.0 LDB	Harris Boat Harbor (608) 874-4180	Hwy. 35 Lynxville, WI	X	X	
651.0 LDB	Withey's Campground Access (608) 874-4422	309 Spring St. Lynxville, WI	X	X	

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 10 (river mile 647.9 to 615.1)					
646.8 LDB	Gordon Bay Landing	Hwy. 35 Crawford County, WI	X		
646.0 RDB	Harpers Ferry Public Launch (515) 281-5145	Unnamed street off 1st St. Harpers Ferry, IA	X		
646.0 RDB	Babe's Boat Landing (563) 586-2261	243 N. First St. Harpers Ferry, IA	X	X	F
645.9 RDB	Delphey Brothers Marina, Inc. (563) 586-2382	113 S. First St. Harpers Ferry, IA		X	F
645.0 RDB	Lund's Landing (563) 586-2187	751 Hwy. 364 Approx. 3 mi. south of Harpers Ferry, IA	X	X	F
644.2 LDB	Sioux Coulee Wayside	Crawford County, WI	X		
643.0 LDB	Frenchman's Landing	Crawford County, WI	X		
642.0 RDB	Nobels Island (515) 281-6158	Hwy. 364 3.2 mi. downstream of Harpers Ferry, IA	X		
639.2 LDB	Ambrough Slough Landing (563) 873-3423	Hwy. K 2.2 mi upstream of Prairie du Chien, WI	X		
638.7 LDB	Greymore Lake / Ambrough Landing (608) 326-0233	2.8 mi. upstream of Prairie du Chien, WI	X		
638.6 LDB	Lakeview Marina (608) 326-2711	Hwy. K 2.7 mi. upstream of Prairie du Chien, WI	X	X	

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 10 (river mile 647.9 to 615.1) - continued					
638.2 LDB	Winneshiek Marina (608) 326-2888	Frenchtown Rd. 1.7 mi. upstream of Prairie du Chien, WI	X	X	
637.8 LDB	Marina Ramp (608) 326-6406	St. Feriole Dr. Prairie du Chien, WI	X		
637.6 RDB	Yellow River Access (515) 281-6158	Pikes Peak State Park McGregor, IA	X		
636.4 LDB	Prairie du Chien Marina (608) 326-8032	St. Feriole Dr. Prairie du Chien, WI	X	X	F, L, R
635.8 LDB	West Cedar St. Landing (608) 326-6406	Cedar St. & N. Main St. Prairie du Chien, WI	X		
635.5 LDB	N. Water St. Landing (608) 326-6406	Water St. Prairie du Chien, WI	X		
635.2 LDB	Fisher St. Access (608) 326-6406	Fisher St. Prairie du Chien, WI	X		
634.8 RDB	Marquette Municipal Landing (563) 873-3735	Marquette, IA	X		
634.5 RDB	Marquette Marina (800) 496-8238	On west channel, below Hwy. 18 bridge Marquette, IA		X	F
633.8 RDB	Boatels Marina (800) 747-2628	400 Business Hwy. 18 N. McGregor, IA	X	X	F, R
633.7 LDB	Big River Campground (608) 326-2712	On Pickerel Slough Prairie du Chien, WI	X		F
633.5 LDB	Lockwood Street Access (608) 326-6406	Lockwood Street Prairie du Chien, WI	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 10 (river mile 647.9 to 615.1) - continued					
633.5 RDB	McGregor Marina (563) 873-9613	Foot of Main Street McGregor, IA	X	X	F, R
633.4 RDB	McGregor Municipal Boat Landing (563) 873-3795	Foot of Main Street McGregor, IA	X	X	
630.0 LDB	Glen Lake Ramp (608) 996-2261	Wyalusing State Park 2 mi upstream of Wyalusing, WI	X		
627.5 LDB	Wyalusing Public Ramp (608) 723-2711	Wyalusing, WI	X		
627.0 RDB	IA DNR Sny-McGill Access (563) 873-2341	Pikes Peak State Park 6.5 mi. downstream of McGregor, IA	X	X	
624.8 RDB	Bill's Boat Landing (563) 964-2112	Clayton, IA	X	X	
624.8 RDB	Clayton Lighthouse Restaurant (563) 964-2103	100 N. Front Clayton, IA		X	
624.6 RDB	Clayton Mississippi River Access	Clayton, IA	X		
624.2 LDB	Bagley Bottoms Boat Landing (563) 873-3423	Off S. Willow Ln. Bagley, WI	X		
622.4 LDB	River of Lakes Resort (608) 996-2275	132A Packer Dr. Bagley, WI	X	X	F
622.1 LDB	Jay's Lake Landing (507) 895-6341	1.5 mi. south of Bagley, WI	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 10 (river mile 647.9 to 615.1) - continued					
619.5 RDB	Frenchtown Boat Access (563) 245-1516	On Frenchtown Lake 26254 Mississippi Rd. Elkader, IA	X		
618.5 LDB	Glen Haven Public Landing (608) 794-2640	Front Street Glen Haven, WI	X		
618.3 RDB	Island Marina (563) 252-2405	On Esmann Island 102 Riverview Rd. Guttenberg, IA	X	X	F, R
616.4 RDB	IA DNR Bussey Lake Landing	Guttenberg, IA	X	X	
616.4 RDB	Winegar Works Marina (563) 252-2050	Marina Rd. Guttenberg, IA		X	F, L, R

Pool 11 (river mile 615.1 to 583.0)

615.1 RDB	Landing 615 (563) 252-1161	911 S. River Park Drive Guttenberg, IA	X		
613.5 LDB	Schleichers Landing (608) 725-5216	7110 Closing Dam Rd. Cassville, WI	X		X
612.2 RDB	Camp Hide-A-Way Ramp (563) 252-1305	Guttenberg, IA	X		
607.8 RDB	IA DNR Turkey River Boat Landing (563) 873-2341	7 mi. downstream of Guttenberg, IA	X		
607.7 LDB	Power and Light Landing (608) 725-5112	At Nelson Dewey Generating Station 11999 County Rd. W. Cassville, WI	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 11 (river mile 615.1 to 583.0) - continued					
606.8 LDB	Cassville City Park Car Ferry (608) 725-5180	Cassville, WI	X		
606.4 LDB	Cassville Docks (608) 725-5180	Cassville, WI	X	X	
605.8 LDB	Eagle's Roost Resort (608) 725-5553	On Jack Oak Slough 1034 Jack Oak Rd. Cassville, WI	X	X	F
603.6 RDB	JD's Landing (563) 870-2004	112 Clark St. North Buena Vista, IA	X	X	F
601.6 LDB	Bertom Lake Public Access (563) 873-3423	Far Nuff Rd. 3.5 mi. SE of Cassville, WI	X		
599.9 RDB	Anthony's Resort (563) 552-1015	25613 S. Waupeton Rd. Waupeton, IA	X	X	
598.4 LDB	McCartney Landing (608) 723-2711	Grant County, WI	X		
595.9 RDB	Findley's Landing (563) 552-1571	24500 Findley's Landing Rd. Sherrill, IA	X	X	
593.7 LDB	Lynn Hollow Access (563) 873-3423	Potosi, WI	X		
592.2 LDB	Potosi Public Access (608) 763-2261	Potosi, WI	X		
590.9 LDB	Grant River Recreation Area	2 mi. downstream of Potosi, WI, in slough	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 11 (river mile 615.1 to 583.0) - continued					
589.5 RDB	Arrowhead Marina (563) 552-2303	11192 Golf Lake Rd. Upstream of Dubuque, IA	X	X	F, R
589.4 RDB	Mud Lake Park Access (563) 552-2746	Off Mud Lake Rd. 6 mi. upstream of Dubuque, IA	X		
583.0 LDB	Pool 11 Access (608) 723-2711	Grant County, WI	X		

Pool 12 (river mile 583.0 to 556.7)

582.8 LDB	O'Leary Lake Access (608) 723-2711	On O'Leary Lake Grant County, WI	X		
582.0 RDB	Hawthorne Street Municipal Boat Ramp (563) 589-4250	Lake Street Dubuque, IA	X		
582.0 RDB	Dubuque Marina (563) 582-3653	Dubuque, IA		X	F, L, R
580.7 RDB	Chaplin Schmitt Boat Ramp (563) 589-4250	Admiral Sheehy Dr. Dubuque, IA	X		
580.7 RDB	Dubuque Yacht Basin (563) 556-7708	On Schmitt Island 1630 East 6th St. Dubuque, IA		X	F, L, R
579.5 LDB	East Dubuque Municipal Ramp (815) 747-3416	North of Hwy. 20 bridge East Dubuque, IL	X		
579.0 LDB	Mid-Town Marina (815) 747-3310	285 5th St. East Dubuque, IL	X	X	F, L, R

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 12 (river mile 583.0 to 556.7) - continued					
578.0 LDB	Snyder Bent Prop Marina (815) 747-8860	780 Harbor Dr. East Dubuque, IL	X	X	
576.5 LDB	Frentress Lake Marine Center (815) 747-3155	830 West Gill Rd. East Dubuque, IL	X	X	F, L, R
573.5 RDB	Massey Marina (563) 556-9799	9400 Massey Marina Ln. Dubuque, IA	X	X	F, R
566.5 LDB	Ferry Landing (815) 777-1050	Ferry Landing Rd. Galena, IL	X	X	
561.0 LDB	Chestnut Mountain Resort (815) 777-1320	Galena, IL		X	
559.4 RDB	Spruce Creek Harbor and Marina (563) 652-3783	30711 396th Avenue Bellevue, IA	X	X	
558.3 LDB	Blanding Landing Public Use Area (563) 582-0881	5720 S. River Rd. Hanover, IA	X		

Pool 13 (river mile 556.7 to 522.5)

556.6 RDB	Bellevue Public Ramp (563) 872-5830	Riverview Dr. Bellevue, IA	X		
556.3 RDB	Bellevue Courtesy Dock (563) 872-5830	Riverview Dr. Bellevue, IA		X	
556.2 RDB	Point Pleasant Boat Landing (563) 872-4205	907 Riverview St. Bellevue, IA	X	X	F
556.0 RDB	Shady Haven Marina (563) 872-4204	911 S. Riverview St. Bellevue, IA	X	X	F

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 13 (river mile 556.7 to 522.5) - continued					
555.7 RDB	Bellevue Research Station Access (563) 872-4976	24143 Hwy. 52 Bellevue, IA	X		
553.0 RDB	Pleasant Creek Public Use Area (563) 582-0881	11995 Hwy. 52 Bellevue, IA	X		
541.0 LDB	Millers Hollow (815) 273-2731	16327 N. Rt. 84 Savanna, IL	X		
539.6 LDB	Mississippi Palisades State Park (815) 273-2731	33947 N. State Park Savanna, IL	X		
537.6 LDB	Marquette Park Municipal Landing (815) 273-4487	Wayne King Dr. Savanna, IL	X		
536.8 LDB	Savanna Marina (815) 273-2955	1 Main St. Savanna, IL	X	X	F
536.2 LDB	Esmay Slough Landing (815) 273-2732	Iowa Avenue Savanna, IL	X		
535.7 RDB	Sabula Municipal Courtesy Dock (563) 687-2772	River Rd. Sabula, IA	X	X	
535.7 RDB	North Boat Access (563) 687-2772	On Town Lake N. end of Elk St. Sabula, IA	X		
535.5 RDB	Homeport Marina (563) 687-2692	515 River St. Sabula, IA		X	F
534.8 RDB	Island City Harbor (563) 687-2825	305 South Ave. Sabula, IA	X	X	F, L, R
Other Services:		F = Fuel	L = Lift	R = Repairs	

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER

(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 13 (river mile 556.7 to 522.5) - continued					
534.2 RDB	South Sabula County Park Access (563) 652-3783	1516 South Avenue Sabula, IA	X		
533.0 LDB	Gill's Spring Lake Resort (815) 273-4595	Carroll County, IL	X		
531.4 LDB	Big Slough Access (309) 794-4524	Off Rt. 84 and Four Mile Rd. Thomson, IL	X		
530.5 LDB	Paradise Harbor (815) 273-2851	4202 N. Hwy 84 Savanna, IL	X	X	
526.0 LDB	Thompson Causeway Recreational Area (815) 259-3628	Lewis Avenue Thomson, IL	X		
525.8 RDB	Bulger's Hollow Public Use Area (815) 259-3628	Off Hwy. 67 and 170th St. Clinton, IA	X		
525.0 LDB	Mickelson's Landing (815) 273-2732	Carroll County, IL	X		
522.6 LDB	Lock & Dam 13 Public Use Area (815) 259-3628	4999 Lock Rd. Fulton, IA	X		

Pool 14 (river mile 522.5 to 493.3)

521.0 RDB	Clinton Municipal Ramps (4 ramps) (563) 242-2144	25th Ave. N., S. 5th St., 9th Ave. N., and 6th Ave. N. Clinton, IA	X		
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Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER

(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 14 (river mile 522.5 to 493.3) - continued					
519.7 LDB	Fulton Marina, Inc. (815) 589-2222	1800 4th St. Fulton, IL	X	X	F, L
519.4 RDB	Lateke Sport Center (563) 242-2973	1209 Roosevelt St. Clinton, IA		X	
518.7 RDB	Clinton Marina (563) 242-3600	20 6th Ave. N. Clinton, IA	X	X	L, R
517.7 LDB	Cattail Slough Public Use Area (815) 259-3628	Off Diamond Rd. Fulton, IL	X		
517.2 RDB	Clinton Municipal Ramp (563) 242-2144	30th Ave. N. Clinton, IA	X		
513.5 LDB	Albany Boat Access (309) 887-4308	2nd Ave. N. and Water St. Albany, IL	X		
512.2 RDB	Camanche Marina (563) 259-1514	115 4th Ave. Camanche, IA	X	X	F
512.0 RDB	Camanche Municipal Ramps (3 ramps) (563) 259-8446	5th Ave., 6th Ave., and 8th Ave. Camanche, IA	X	X	
511.0 RDB	Camanche Municipal Ramp (563) 259-8446	Swan Slough Camanche, IA	X		
508.0 RDB	Rock Creek Marina and Campground #2	Camanche, IA	X		
507.8 RDB	Rock Creek Marina and Campground (563) 847-7202	3942 291st St. Camanche, IA	X	X	F

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 14 (river mile 522.5 to 493.3) - continued					
507.5 LDB	Jim Hass Boat Landing (309) 654-2410	21808 River Rd. N. Cordova, IL	X	X	
503.5 LDB	Cordova Public Ramp #2 (309) 654-2620	Cordova, IL	X		
503.3 RDB	Princeton Public Use Area (563) 652-3132	1 mi. upstream of Princeton, IA	X		
503.2 LDB	Cordova Public Ramp #1 (309) 654-2620	Cordova, IL	X		
503.2 LDB	The Boathouse (309) 654-2515	501 Main Ave. Cordova, IL	X	X	
502.8 LDB	White's Bait (309) 794-9111	Cordova, IL	X		
502.5 RDB	Princeton Beach Marina (563) 289-5024	203 River Dr. Princeton, IA	X	X	R
502.4 RDB	Kernan's Riverview Restaurant (563) 289-5137	333 River Dr. Princeton, IA		X	
502.1 RDB	Princeton Municipal Boat Ramp (563) 289-5315	Washington St. & River Dr. Princeton, IA	X	X	
497.7 LDB	Port Byron Municipal Courtesy Dock (309) 523-3705	120 N. Main St. Port Byron, IL	X	X	
497.1 RDB	LeClaire Municipal Courtesy Dock (563) 289-4242	LeClaire, IA		X	

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 14 (river mile 522.5 to 493.3) - continued					
496.5 LDB	Shuler's Shady Grove (309) 496-2321	Rapids City, IL	X		
495.6 RDB	Captain's Quarters Drystack Marina (563) 289-5050	1211 Canal Shore Dr. SW LeClaire, IA		X	F, L, R
495.0 RDB	Green Gables (563) 289-5652	2315 Canal Shore Dr. SW LeClaire, IA	X	X	F, L, R
Pool 15 (river mile 493.3 to 482.9)					
492.9 LDB	Illinewek Public Ramp (309) 496-2620	1st Street East Moline, IL	X		
492.9 RDB	LeClaire Boat Ramp (563) 589-3229	LeClaire, IA	X		
491.7 LDB	Hampton 6th St. Ramp (309) 496-9123	Hampton, IL	X		
489.8 LDB	Island Marina (309) 755-0492	On Cambell's Slough 15806 Hwy. 84 N. East Moline, IL	X	X	L, R
489.2 LDB	East Moline Municipal Ramp (309) 752-1536	East Moline, IL	X		
488.3 LDB	Moline Municipal Ramp (East) (309) 797-0787	5500 River Dr. Moline, IL	X		
488.1 LDB	Marquis Harbor (309) 762-9372	4801 River Dr. Moline, IL		X	F
Other Services:			F = Fuel	L = Lift	R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 15 (river mile 493.3 to 482.9) - continued					
487.8 LDB	Moline Municipal Landing (309) 797-0787	4600 River Dr. Moline, IL		X	F
486.4 LDB	Moline Municipal Ramp (West) (309) 797-0787	2600 River Dr. Moline, IL	X		
485.6 RDB	Bettendorf Municipal Ramp (563) 359-1651	12th Street Bettendorf, IA	X		
484.2 RDB	Water Taxi Dock (563) 326-7766	Mound Street Davenport, IA	X		
484.1 RDB	Lindsay Park Boat Club (563) 324-1317	Mound St. Davenport, IA	X	X	F
483.5 RDB	Oneida Landing (563) 326-7766	At Oneida and E. River Dr. Davenport, IA	X	X	
483.5 RDB	Quad City Marine (563) 762-9372	935 East River Dr. Davenport, IA		X	F, L, R
482.9 LDB	Lock & Dam 15 Access	Moline, IL	X		

Pool 16 (river mile 482.9 to 457.2)

482.4 RDB	LeClaire Park Public Ramp (563) 326-7766	Main St. Davenport, IA	X		
481.6 RDB	Marquette St. Public Access (563) 326-7766	Marquette St. Davenport, IA	X		
480.6 RDB	Credit Island Municipal Landing (563) 326-7766	River Dr. Davenport, IA	X		
480.2 LDB	Rock Island Boat Club (309) 786-9264	1706 Mill St. Rock Island, IL	X	X	

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 16 (river mile 482.9 to 457.2) - continued					
479.9 LDB	Sunset Park Ramps (3 ramps) (309) 788-7275	18th Ave. and Sunset Park Dr. Rock Island, IL	X	X	
479.5 LDB	Rock Island Sunset Marina (309) 793-3498	1309 Mill St. Rock Island, IL	X	X	F, L
479.3 RDB	Walter Buese Public Ramp (563) 326-7726	S. Concord St. Davenport, IA	X		
477.8 RDB	Davenport Inland Harbor (563) 326-0365	4440 S. Concord St. Davenport, IA	X	X	
475.0 RDB	Dodge Access (563) 263-4337	Scott County, IA	X		
473.1 RDB	Buffalo Municipal Ramp (563) 381-2226	Buffalo, IA	X		
473.0 LDB	Loomis Landing (309) 798-2239	On Andalusia Slough 1 Andalusia Harbor Andalusia, IL	X	X	F
471.9 RDB	Buffalo Shores Park Access (563) 381-2900	1433 West Front St. Buffalo, IA	X		
471.5 LDB	Wintergreen Harbor & Inn (309) 798-2525	On Andalusia Slough 13515 78th Ave. W. Andalusia, IL	X	X	
470.4 LDB	Andalusia Slough Public Use Area (563) 263-7913	On Andalusia Slough Hwy. 92 Andalusia, IL	X	X	
469.0 LDB	Public Use Area (309) 795-1040	Hwy. 92 East of Loud Thunder Forest Preserve Rock Island County, IL	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 16 (river mile 482.9 to 457.2) - continued					
468.3 RDB	Clark's Ferry Federal Recreation Area (563) 263-7913	Montpelier, IA	X		
468.0 RDB	Clark's Ferry Access	Montpelier, IA	X		
467.1 LDB	Loud Thunder Forest Preserve Public Ramp (2 ramps) (309) 795-1040	On Andalusia Slough Illinois City, IL	X		
464.8 RDB	Shady Creek Federal Recreation Area (563) 263-7913	Hwy. 22, 1.5 mi. upstream of Fairport, IA	X		
463.2 RDB	Fairport Landing Marina (563) 264-8660	2142 Water St. Fairport, IA	X	X	F, R
462.8 RDB	Izaak Walton League Ramp (563) 649-2288	Fairport, IA	X		
461.9 RDB	Fairport Public Use Area (563) 263-0241	Hwy. 22 Fairport, IA	X		

Pool 17 (river mile 457.2 to 437.1)

455.4 LDB	Mississippi River Gas Dock (309) 537-3119	Rock Island County, IL			F
455.3 RDB	Muscatine Public Access (563) 263-0241	Muscatine, IA	X		
449.7 LDB	Blanchard Island Public Use Area (309) 794-4523	Rock Island County, IL	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 17 (river mile 457.2 to 437.1) - continued					
446.8 LDB	Crosses Corner Public Use Area (815) 625-2968	Mercer County, IL	X		
446.8 RDB	Kilpeck Landing Public Use Area (563) 263-7913	Downstream of Louisa Generating Station and Muscatine, IA	X		
443.8 RDB	Big Timber Access Site (319) 523-6982	10728 County Rd. X61 Wapello, IA	X		
442.9 RDB	Flaming Prairie Recreation Area (319) 523-8381	Louisa County, IA	X		
441.0 RDB	Port Louisa Access (319) 523-6982	East of 120th St. and G Ave. Port Louisa, IA	X		

Pool 18 (river mile 437.1 to 410.5)

434.9 RDB	Toolesboro Access (319) 523-8319	Louisa County, IA	X		
433.6 RDB	Ferry Landing Public Use Area (319) 263-7913	At mouth of Iowa River Louisa County, IA	X		
433.0 LDB	Sturgeon Bay Park Municipal Landing (309) 587-8181	1st St. New Boston, IL	X		
432.8 LDB	New Boston Municipal Ramp (309) 587-8181	End of Hwy. 17 New Boston, IL	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 18 (river mile 437.1 to 410.5) - continued					
427.4 LDB	Keithsburg Municipal Ramp (309) 374-2311	Keithsburg, IL	X		
427.2 LDB	Keithsburg Municipal Ramp (309) 374-2311	Keithsburg, IL	X		
424.9 RDB	Fourth Pumping Station Recreational Area Access (319) 753-8260	On Slough Lake Pumping Station Rd. Des Moines County, IA	X	X	
424.2 LDB	Riverview Access (309) 374-2496	Henderson County, IL	X	X	
422.8 LDB	Big River State Forest Putney Landing (309) 374-2496	On Campbell Slough	X	X	
420.0 RDB	Hawkeye Dolbee Access (319) 753-8260	Lake Rd. 3 mi. upstream of Kingston, IA	X	X	
417.4 LDB	Delabar State Park Access (309) 374-2496	1.4 mi. above Oquawka, IL	X		
416.1 RDB	Casey Barrow Landing (319) 753-8260	End of 180th St. Des Moines County, IA	X	X	
415.8 LDB	Oquawka Municipal Ramp and Harbor (309) 867-3481	Oquawka, IL	X	X	
415.2 LDB	Pier 415 Marina (309) 867-6009	216 Marina Dr. Oquawka, IL	X	X	F

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 19 (river mile 410.5 to 364.2)					
410.1 LDB	IL DNR Henderson Creek Access (309) 374-2496	Henderson County, IL	X		
409.2 RDB	Tama Beach Public Access (319) 753-8260	Tama Rd. at 65th St. Burlington, IA	X	X	
404.6 RDB	Bluff Harbor Marina (319) 753-2590	800 N. Front St. Burlington, IA		X	F, L, R
404.1 RDB	Burlington Municipal Landing	Between Columbia and Court Sts. Burlington, IA	X		
403.9 RDB	Burlington Municipal Landing	Market St. Burlington, IA	X		
401.7 RDB	Cascade Boating Assoc. (319) 754-7144	Cascade Landing Burlington, IA	X		
400.0 LDB	Shokokon Access (309) 374-2496	On Shokokon Slough Shokokon, IL	X		
397.8 RDB	Sullivan Slough River Access (319) 753-8260	Sullivan Slough Rd. South of Burlington, IA	X		
390.5 RDB	Green Bay Access Area (319) 463-7673	2112 Green Bay Rd. Green Bay, IA	X		
390.0 LDB	Dallas City Municipal Ramp (2 ramps) (217) 852-3713	Spruce St. Dallas City, IL	X	X	
384.0 RDB	Willow Patch Municipal Ramp (319) 372-7700	10 E. Limits Fort Madison, IA	X	X	

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 19 (river mile 410.5 to 364.2) - continued					
383.6 RDB	Fort Madison Municipal Harbor (319) 372-7700	318 Riverview Dr. Fort Madison, IA	X	X	F
383.6 RDB	North Shore Marina (319) 372-6477	902 4th St. Fort Madison, IA	X	X	F
379.5 RDB	Ortho Public Ramp (319) 463-7673	Ortho Rd. Fort Madison, IA	X		
377.0 RDB	Heron Bend Conservation Area (319) 463-7673	2652 Hwy. 61 Lee County, IA	X		
376.7 LDB	Nauvoo Boat Ramp (217) 453-2587	N. Sycamore Haven Dr. Nauvoo, IL	X		
375.0 RDB	Riverview Municipal Park (319) 463-5533	Water St. at Main St. Montrose, IA	X	X	
369.3 LDB	Larry Creek Access (217) 654-2229	Hancock County, IL	X		
366.0 RDB	Keokuk Yacht Club (Private) (319) 524-9469	2029 River Rd. Keokuk, IA	X	X	F
364.9 LDB	Chaney Creek Access (217) 847-2936	Hamilton, IL	X		

Pool 20 (river mile 364.2 to 343.2)

364.2 LDB	Montebello State Park Access (217) 847-2936	Hamilton, IL	X		
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Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 20 (river mile 364.2 to 343.2) - continued					
363.1 RDB	Keokuk Municipal Ramp (319) 524-2050	Keokuk, IA	X	X	
363.0 RDB	Southside Boat Club (319) 524-7122	Railroad & Cedar St. Keokuk, IA		X	
359.4 RDB	Alexandria Ramp (660) 727-3283	Alexandria, MO	X		
359.1 LDB	Warsaw Boat Landing (217) 256-3214	Water St. Warsaw, IL	X	X	
347.7 RDB	Fenway Landing Public Use Area (217) 228-0890	Hwy. 61, 4.5 mi. north of Canton, MO	X		

Pool 21 (river mile 343.2 to 324.9)

342.5 RDB	Canton Municipal Ramp (573) 288-5581	Bland St. at Front St. Canton, MO	X		
340.8 LDB	Bear Creek Public Use Area (217) 228-0890	On Canton Chute County Rd. 2450N Adams County, IL	X		
331.6 LDB	Canton Chute Public Use Area (217) 228-0890	Opposite Deadman Island Upstream of Quincy, IL	X		
329.1 LDB	Twin Oaks Club (217) 222-0662	On Quincy Bay 2707 Bonansinga Quincy, IL	X	X	
328.7 LDB	Bob Bangert Access (217) 223-7703	On Quincy Bay North Bottom Rd. Quincy, IL	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER

(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 21 (river mile 343.2 to 324.9) - continued					
327.7 LDB	Quincy Boat Club (217) 228-2628	On Quincy Bay Front & Spring St. Quincy, IL		X	
327.7 LDB	Kesler Park Ramps (5 ramps) (217) 223-7703	Chestnut and Bonansinga Sts. Quincy, IL	X		F
327.3 LDB	Art Keller Marina (217) 228-9227	Quinsippi Island Quincy, IL	X	X	F
327.1 LDB	Clad Adams Bicentennial Park (217) 223-7703	Front St. Quincy, IL	X		
327.1 LDB	Quincy Ramp (217) 223-7703	Hampshire St. Quincy, IL	X		
326.5 LDB	South Side Boat Club (217) 222-1187	640 S. Front St. Quincy, IL	X	X	

Pool 22 (river mile 324.9 to 301.2)

324.6 LDB	Lock & Dam 21 Public Access (217) 228-0890	Quincy, IL	X		
320.0 RDB	Northeast Missouri Power Access (573) 769-2107	Marion County, MO	X		
309.2 LDB	John Hay Public Use Area (217) 228-0890	East Hannibal, IL	X		
308.8 RDB	Hannibal Boat Harbor (573) 221-9539	0.5 mi. downstream of Mark Twain hwy. bridge Hannibal, MO	X	X	F, R

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 24 (river mile 301.2 to 273.4)					
301.1 RDB	Lock & Dam 22 Public Access (573) 221-0294	Ralls County, MO	X		
296.4 LDB	Cincinnati Landing Access Area (573) 242-3724	Pike County, IL	X		
294.0 RDB	DuPont Reservation Conservation Area (573) 248-2530	Ashburn, MO	X		
288.0 LDB	Willow North Public Access (573) 242-3724	Pike County, IL	X		
284.3 LDB	Two Rivers North Access (573) 242-3724	Pike County, IL	X	X	
283.2 LDB	Two Rivers Marina (217) 437-2321	Near Hwy. 54 bridge Pike County, IL	X	X	F, L, R
283.2 LDB	Two Rivers South Public Access (573) 242-3724	Pike County, IL	X		
282.7 RDB	Louisiana River Front Park (573) 248-2530	South Carolina St. Louisiana, MO	X		
280.7 LDB	Gosline Public Access (573) 242-3724	Pike County, IL	X		
277.1 RDB	Calumet Creek Access (573) 882-9880	Hwy. 79, 4 mi. north of Clarksville, MO	X		
276.1 RDB	Silo Access Area (573) 242-3724	3 mi. north of Clarksville, MO	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 24 (river mile 301.2 to 273.4) - continued					
273.6 LDB	Pleasant Hill Access (573) 242-3724	Calhoun County, IL	X		
Pool 25 (river mile 273.4 to 241.4)					
273.3 RDB	Lock and Dam 24 Service Access (573) 242-3724	Clarksville, MO	X		
273.1 LDB	Pleasant Hill Pump Station Access (573) 242-3724	Calhoun County, IL	X		
273.1 RDB	Clarksville Boat Club (573) 242-9693	310 N. 1st St. Clarksville, MO	X	X	
271.7 RDB	Port Marmac (573) 242-3336	Pike County, MO	X		
265.3 LDB	Rip Rap Landing #1 (618) 376-3303	Off Rt. 96, north of Mozier, IL	X		
260.4 LDB	Mozier Landing Access (618) 232-1218	County Rd. 2 Calhoun County, IL	X		
258.6 LDB	Hamburg Access (618) 232-1258	Water St. Hamburg, IL	X		
258.6 RDB	Hamburg Ferry Public Access (573) 898-5905	Hwy. P Pike County, MO	X		
257.7 RDB	Timberlake Marina (573) 898-2077	Highway P Elsberry, MO	X	X	F
257.1 RDB	Prairie Slough Access (573) 898-5905	County Rd. 910 Lincoln County, MO	X		
Other Services: F = Fuel L = Lift R = Repairs					

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 25 (river mile 273.4 to 241.4) - continued					
254.2 LDB	Red Landing (618) 376-3303	3 mi. south of Hamburg, IL	X		
250.5 LDB	Gilead Public Access (573) 242-3724	On Gilead Slough Gilead, IL	X		
250.5 RDB	Hurricane Public Access (573) 242-3724	Lincoln County, MO	X		
248.8 RDB	B.K. Leach Access (573) 898-5905	Calhoun County, IL	X		
246.0 LDB	Turner Landing (618) 883-2524	Off Hwy. 2 Calhoun County, IL	X		
245.0 RDB	Foley Public Access (636) 528-6300	Parkers Landing, MO	X		
243.5 LDB	Cockrell Hollow Access Area (573) 242-3724	Calhoun County, IL	X		

Pool 26 (river mile 241.4 to 202.9)

241.3 RDB	Port of Winfield (314) 566-6573	502 Pillsbury Rd. Winfield, MO	X		
235.0 RDB	Cuivre Island Conservation Area (573) 248-2530	Dalbaw Rd. Old Monroe, MO	X		
231.5 RDB	John's Boat Harbor (636) 946-2073	2407 Hwy. C St. Charles County, MO	X	X	F, L, R
231.4 RDB	Peruque Harbor	Peruque, MO	X	X	
231.3 RDB	Two Branch Marina (636) 946-2628	2021 Hwy. C St. Charles County, MO	X	X	F, L, R

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 26 (river mile 241.4 to 202.9) - continued					
230.2 RDB	McCann Landing/Karmill Woods Harbor (636) 949-3373	Across from Two Branch Island Peruque, MO	X	X	
226.8 RDB	Riverside Harbor (636) 946-5535	600 Kampville Dr. Kampville, MO	X		
226.0 RDB	South Shore Marina (636) 250-4344	On Dardenne Slough 1011 Urna St. Charles County, MO	X	X	L, R
225.2 RDB	Yacht Club of St. Louis (Private) (636) 250-4435	On Dardenne Slough 105 Lake Village Dr. St. Charles County, MO	X	X	F, L, R
224.4 RDB	Lake Center Marina (Private) (636) 250-7500	On Dardenne Slough 498 Lake Center St. Charles County, MO		X	F, L
223.1 LDB	Royal Landing (618) 376-3303	On Squaw Island Calhoun County, IL	X		
223.0 RDB	Heartland Marina (636) 250-4480	On Dardenne Slough 800 Wilson Rd. St. Charles County, MO	X	X	
222.2 RDB	Woodland Marina (636) 250-3446	On Dardenne Slough 125 Harbor Dr. St. Charles County, MO	X	X	F, R, L
222.0 RDB	North Shore Yacht Club (636) 250-4520	On Dardenne Slough 601 N. Shore Dr. St. Charles County, MO		X	R
221.5 RDB	Polestar Harbor (636) 250-3008	6171 Hwy. V St. Charles County, MO	X	X	F, L, R

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Pool 26 (river mile 241.4 to 202.9) - continued					
221.0 RDB	The Duck Club (Private) (636) 250-4321	6257 Hwy. V St. Charles County, MO		X	
220.0 LDB	Pohlman Slough (618) 376-3303	On Pohlman Slough, north of Grafton, IL	X		
219.1 RDB	Club Sherwood Marina (636) 250-4400	29 Sherwood Harbor Rd. Portage Des Sioux, MO	X	X	F, L, R
214.0 RDB	Hideaway Harbor Park Public Access (636) 949-7535	St. Charles, MO	X		
213.0 RDB	Venetian Harbor (636) 899-0940	1 Venetian Dr. Portage des Sioux, MO	X	X	F, L, R,
212.8 RDB	Sioux Yacht Club (Private) (636) 753-9514	Portage Des Sioux, MO		X	
212.4 RDB	My River Home Boat Harbor (636) 899-0903	1545 Riverview Dr. Portage des Sioux, MO	X	X	F, L, R
212.3 RDB	Palisades Yacht Club (Private) (636) 899-1093	1670 Riverview Dr. Portage Des Sioux, MO	X	X	F, L, R
211.4 RDB	Valley Sailing Association (Private) (636) 753-9514	N. Hwy. 94 Portage Des Sioux, MO		X	
209.4 LDB	Piasa Harbor Marina (618) 466-7501	Mouth of Piasa Creek Jersey County, IL	X	X	F, L, R
209.3 LDB	Piasa Harbor (618) 466-7501	Mouth of Piasa Creek Jersey County, IL	X	X	L
209.2 LDB	Piasa Creek Access (618) 376-3303	Mouth of Piasa Creek Jersey County, IL	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

FACILITIES

River Mile*	Name	Location	Launching Area	Dock	Other Services
Pool 26 (river mile 241.4 to 202.9) - continued					
206.8 RDB	Spatterdock Lake Public Access (636) 458-2236	Alta Villa Place St. Charles County, MO	X		
206.5 RDB	Dresser Island Public Access (573) 248-2530	On Brick House Slough Hwy. 94 St. Charles County, MO	X		
205.4 RDB	Alta Villa Public Access (636) 441-4554	On Brick House Slough St. Charles County, MO	X		
204.5 RDB	Harbor Point Yacht Club (Private) (636) 899-1513	280 Jamie Circle West Alton, MO	X	X	L, R
203.0 RDB	Lincoln Shields Public Access (888) 899-2602	West Alton, MO	X		
202.9 LDB	Alton Marina (618) 462-9860	1 Henry St. Alton, IL	X	X	F, R

Lock and Dam 26 to Lock 27 (river mile 202.9 to 185.0)

200.7 LDB	Harris Park Access Area (618) 462-3580	Alton, IL	X		
195.0 LDB	Lewis and Clark State Park Access	Wood River, IL	X		
188.7 RDB	North Riverfront Park Access (314) 458-2236	Riverview Dr. St. Louis, MO	X		
188.1 LDB	Chain of Rocks Access	Madison County, IL	X		

Other Services: F = Fuel L = Lift R = Repairs

BOAT ACCESSES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile*	Name	Location	FACILITIES		
			Launching Area	Dock	Other Services
Lock 27 to Cairo, IL (river mile 185 to 0.0)					
182.6 LDB	Venice City Access (618) 877-2114	Bremmen Ave. Venice, IL	X		
181.6 LDB	East St. Louis Access	East St. Louis, IL	X		
158.5 RDB	Hoppie's Marina (636) 467-6154	Kimmswick, MO	X	X	F
140.6 RDB	Truman Access (636) 458-2236	Jefferson County, MO	X		
122.5 RDB	Marina De Gabouri (573) 883-5599	1 Marina Dr. Ste. Genevieve, MO	X	X	F
109.8 LDB	Chester Public Ramp (618) 826-5114	Chester, IL	X		
106.9 LDB	Turkey Bluffs Access (618) 826-2706	Chester, IL	X		
79.8 LDB	Grand Tower Boat Ramp (618) 565-2415	Grand Tower, IL	X		
66.6 RDB	Trail of Tears Park Boat Ramp (573) 334-1711	429 Moccasin Springs Rd. Moccasin Springs, MO	X		
44.0 LDB	Thebes Municipal Ramp (618) 661-1644	Front St. Thebes, IL	X		
0.0 LDB	Cairo Municipal Ramp (618) 734-0209	Cairo, IL	X	X	

* LDB = Left Descending Bank
RDB = Right Descending Bank

SOURCE: Upper Mississippi River Basin Association, unpublished data prepared for the U.S. Environmental Protection Agency's Region 5 Inland Sensitivity Mapping Project, December 2000.

Other Services: F = Fuel L = Lift R = Repairs

RESOURCE MANUAL

Section C: Sensitive Human and Wildlife Resources

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
863.0	City of St. Paul Water Dept. Fridley, MN (651) 489-1051 (business) (651) 489-1600 (24-hour)	X			
859.0	City of Minneapolis Water Dept. Fridley, MN (612) 661-4915 (business) (612) 661-4949 (24-hour)	X			
857.1	Xcel Energy Riverside Plant - Unit #8 Minneapolis, MN (612) 520-6840 (business) (612) 520-6997 (24-hour)			X	
856.5	Xcel Energy Riverside Plant- Unit #7 Minneapolis, MN (612) 520-6840 (business) (612) 520-6997 (24-hour)			X	
854.0	Xcel Energy Hennepin Island Hydroelectric Plant Minneapolis, MN (612) 330-5487 (business) (612) 534-6095 (24-hour)			X	
847.5	Ford Motor Co. Twin Cities Assembly Plant St. Paul, MN (651) 696-0585 (business) (651) 696-0585 (24-hour)		X		
840.8	Xcel Energy High Bridge Plant St. Paul, MN (651) 223-6729 (business) (651) 223-6750 (24-hour)			X	

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
798.2	Xcel Energy Prairie Island Nuclear Plant Welch, MN (651) 388-1121 x4722 (business) (651) 388-1121 (24-hour)			X	
789.4	Xcel Energy Red Wing Plant Red Wing, MN (651) 385-1091 (business) (651) 385-1093 (24-hour)			X	
751.1 (2 intakes)	Dairyland Power Coop., Alma Station and J.P. Madgett Station Alma, WI (608) 787-1393 (business) (608) 787-1223 (24-hour)			X	
700.0 (slough)	Xcel Energy French Island Plant La Crosse, WI (715) 839-1346 (business) (608) 782-1141 (24-hour)			X	
678.7	Dairyland Power Coop. Genoa Station Genoa, WI (608) 787-1393 (business) (608) 787-1223 (24-hour)			X	
660.0	Interstate Power Co. Lansing Station Lansing, IA (563) 582-5421 x552 (business) (563) 538-4717 (24-hour)			X	
607.7	Alliant Power Nelson Dewey Station Cassville, WI (608) 725-5112 (business) (800) 862-6222 (24-hour)			X	

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
606.2	Mid-America Power E.J. Stoneman Station Cassville, WI (608) 725-5776 (business) (608) 725-5141 (24-hour)			X	
586.0	John Deere John Deere Dubuque Works Dubuque, IA (563) 589-6332 (business) (563) 589-5921 (24-hour)		X		
580.0	Alliant Power Dubuque Power Station Dubuque, IA (563) 584-7481 (business) (800) 862-6222 (24-hour)			X	
547.4	Iowa Department of Natural Resources, Green Island Wildlife Area Miles, IA (563) 682-7392 (business) (563) 652-3132 (24-hour)				X
535.0	U.S. Fish and Wildlife Service Upper Mississippi Refuge Savanna, IL (815) 273-2732 (business) (800) 800-5923 (page 612-660-9062) (24-hour)				X
515.5 (slough) (3 intakes)	Archer Daniels Midland Co. ADM Corn Processing Clinton, IA (563) 242-1121 (business) (563) 242-1121 (24-hour)		X		
513.5 (slough)	Alliant Power M.L. Kapp Station Clinton, IA (563) 243-2611 x135 (business) (563) 264-2939 (h) (24-hour)			X	

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
506.4	Exelon Quad Cities Station Cordova, IL (309) 654-2241x2212 (business) (309) 654-2241x2202 (24-hour)			X	
505.3	Iowa Department of Natural Resources, Princeton Wildlife Area Princeton, IA (563) 682-7392 (business) (563) 652-3132 (24-hour)				X
489.8	Mid-America Energy Co. Riverside Station Davenport, IA (563) 333-8501 (business) (563) 333-8500 (24-hour)			X	
489.5	Aluminum Company of America ALCOA-Davenport Works Riverdale, IA (563) 459-1665 (business) (563) 459-2000 x 0 (24-hour)		X		
489.5	John Deere John Deere Harvester Works East Moline, IL (309) 765-6272 (business) (309) 765-6200 (24-hour)		X		
489.2	City of East Moline Water Dept. East Moline, IL (309) 752-1520 (business) (309) 752-1520 (24-hour)	X			
485.8 (Sylvan Slough)	City of Moline Water Dept. Moline, IL (309) 797-0489 (business) (309) 797-0489 (24-hour)	X			
484.2 (slough)	Rock Island Arsenal Rock Island, IL (309) 782-2120 (business) (309) 782-5148 (24-hour)	X			

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
483.8 (3 intakes)	Iowa-American Water Co. Davenport Treatment Plant Davenport, IA (563) 322-0161 (business) (563) 322-0161 (24-hour)	X			
482.9 (slough)	City of Rock Island Water Dept. Rock Island IL (309) 732-2310 (business) (309) 793-6671 (24-hour)	X			
482.8	U.S. Army Corps of Engineers L&D 15 Hydropower Plant Rock Island, IL (309) 794-5266 (business) (309) 794-5266 (24-hour)			X	
468.0	Central Iowa Power Coop. Fair Station Montpelier, IA (563) 263-6898 (business) (563) 263-6898 (24-hour)			X	
453.5	Grain Processing Corp. Muscatine, IA (563) 264-4561 (business) (563) 264-4304 (24-hour)		X		
453.0	Muscatine Power & Water Muscatine Station Muscatine, IA (563) 262-3394 (business) (563) 263-2631 (24-hour)			X	
404.5	City of Burlington Municipal Water Works Burlington, IA (319) 752-7611 (business) (319) 752-7611 (24-hour)	X			

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
399.0	Alliant Power Burlington Station Burlington, IA (319) 758-5311 (business) (319) 758-5304 (24-hour)			X	
384.0	City of Fort Madison Municipal Water Works Fort Madison, IA (319) 372-1602 (business) (319) 372-1623 (24-hour)	X			
375.8	City of Nauvoo Water Dept. Nauvoo, IL (217) 453-2411 (business) (217) 453-6686 (h) (24-hour) (217) 453-2469 (h) (24-hour)	X			
364.5	City of Keokuk Municipal Water Works Keokuk, IA (319) 524-5285 (business) (319) 524-2011 (24-hour)	X			
364.4 and 363.9 (2 intakes)	City of Hamilton Water Dept. Hamilton, IL (217) 847-3774 (business) (217) 743-5563 (h) (24-hour)	X			
364.0	Ameren UE Keokuk Plant Keokuk, IA (319) 524-2834 (business) (314) 554-2683 (24-hour)			X	
363.5	Roquette America Inc. Keokuk Plant Keokuk, IA (319) 526-3317 (business) (319) 524-5757 (24-hour)		X		

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
359.8	City of Warsaw Water Dept. Warsaw, IL (217) 256-4512 (business) (217) 256-4615 (h) (24-hour)	X			
327.0 (2 intakes)	City of Quincy Water Dept. Quincy, IL (217) 228-4590 (business) (217) 228-4590 (24-hour)	X			
311.0	Missouri Department of Conservation Bay Island Conservation Area Hannibal, MO (573) 898-5905 (business) (888) 216-7168 (24-hour)				X
308.9	City of Hannibal Public Works Hannibal, MO (573) 221-8050 (business) (573) 221-0955 (24-hour)	X			
306.0	Continental Cement Co. Hannibal, MO (573) 221-1740 (business) (573) 221-1740 (24-hour)		X		
292.3 and 290.7 (2 intakes)	Missouri Department of Conservation Ted Shanks Conservation Area Ashburn, MO (573) 754-6171 (business) (888) 216-7168 (24-hour)				X
282.8 (2 intakes)	City of Louisiana Water Dept. Louisiana, MO (573) 754-6912 (business) (573) 754-4021 (24-hour)	X			
274.3	Holcim (U.S.) Inc. Clarksville Plant Clarksville, MO (573) 242-3571 x1150 (business) (573) 242-3571 x1151 (24-hour)		X		

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER

(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
274.0	Missouri Department of Conservation Clarksville Refuge Clarksville, MO (573) 898-5905 (business) (888) 216-7168 (24-hour)				X
257.0	Missouri Department of Conservation Prairie Slough Conservation Area Elsberry, MO (573) 898-5905 (business) (888) 216-7168 (24-hour)				X
247.0	Missouri Department of Conservation B.K. Leach Conservation Area Elsberry, MO (573) 898-5905 (business) (888) 216-7168 (24-hour)				X
246.5	U.S. Fish and Wildlife Service Mark Twain Refuge Batchtown, IL (618) 883-2524 (business) (800) 800-5923 (page 612-660-9062) (24-hour)				X
209.6	Ameren UE Sioux Plant West Alton, MO (314) 992-6233 (business) (314) 554-2683 (24-hour)	X		X	
204.2	Illinois-American Water Co. Alton Treatment Plant Alton, IL (618) 465-6736 (business) (800) 422-2782 (24-hour)	X			
199.7	Dynergy Midwest Generation, Inc. Wood River Station East Alton, IL (Intake shared with Olin Corp.) (618) 462-9251 (business) (618) 344-3195 (24-hour)			X	

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
199.7	Olin Corporation East Alton Plant East Alton, IL (Intake shared with Dynegy) (618) 258-2975 (business) (618) 258-2111 (24-hour)	X	X		
192.2	Illinois-American Water Co. Choteau Island Intake/Granite City Treatment Plant Granite City, IL (618) 874-2404 (business) (800) 422-2782 (24-hour)	X			
190.4 and 190.3 (3 intakes)	City of St. Louis Water Dept. Chain of Rocks Plant St. Louis, MO (314) 868-5640 (business) (314) 868-5640 (24-hour)	X			
186.0 (Chain of Rocks Canal)	Granite City Steel Granite City, IL (618) 451-3457 (business) (618) 451-3756 (24-hour)		X		
182.5	Ameren UE Venice Plant Venice, IL (314) 992-8033 (business) (314) 554-2683 (24-hour)			X	
180.6	Illinois-American Water Co. East St. Louis Treatment Plant East St. Louis, IL (618) 874-2404 (business) (800) 422-2782 (24-hour)	X			
180.5	Trigen-St. Louis Energy Corp. Ashley Plant St. Louis, MO (314) 621-3550 (business) (314) 621-3550, ext. 136 (24 hour)		X		

WATER INTAKES ON THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility Operator, Location, and Telephone Number	Public Water Supply	Industrial Water Supply	Power Generation	Fish and Wildlife
161.8	Ameren UE Meramec Plant Arnold, MO (314) 992-7233 (business) (314) 554-2683 (24-hour)			X	
145.7	River Cement Co. Festus, MO (636) 937-7601 (business) (636) 937-7601, ext. 267 (24-hour)		X		
140.4	Ameren UE Rush Island Plant Festus, MO (314) 992-9233 (business) (314) 554-2683 (24-hour)	X		X	
109.5 (2 intakes)	City of Chester Water Dept. Chester, IL (618) 826-3315 (business) (618) 826-5454 (24-hour)	X			
80.0 (2 intakes)	Central IL Public Service Co. Grand Tower Station Grand Tower, IL (217) 523-3600 (business) (618) 565-2318 (24-hour)			X	
54.3	Alliance Water Resources, Inc. Cape Girardeau Water Plant #1 Cape Girardeau, MO (573) 334-6747 (business) (573) 335-9145 (24-hour)	X			
49.9	Lone Star Industries, Inc. Cape Girardeau, MO (573) 335-5591 (business) (573) 335-5591 (24-hour)		X		

SOURCE: Upper Mississippi River Basin Association, database prepared for the U.S. Environmental Protection Agency's Region 5 Inland Sensitivity Mapping Project, January 2001.

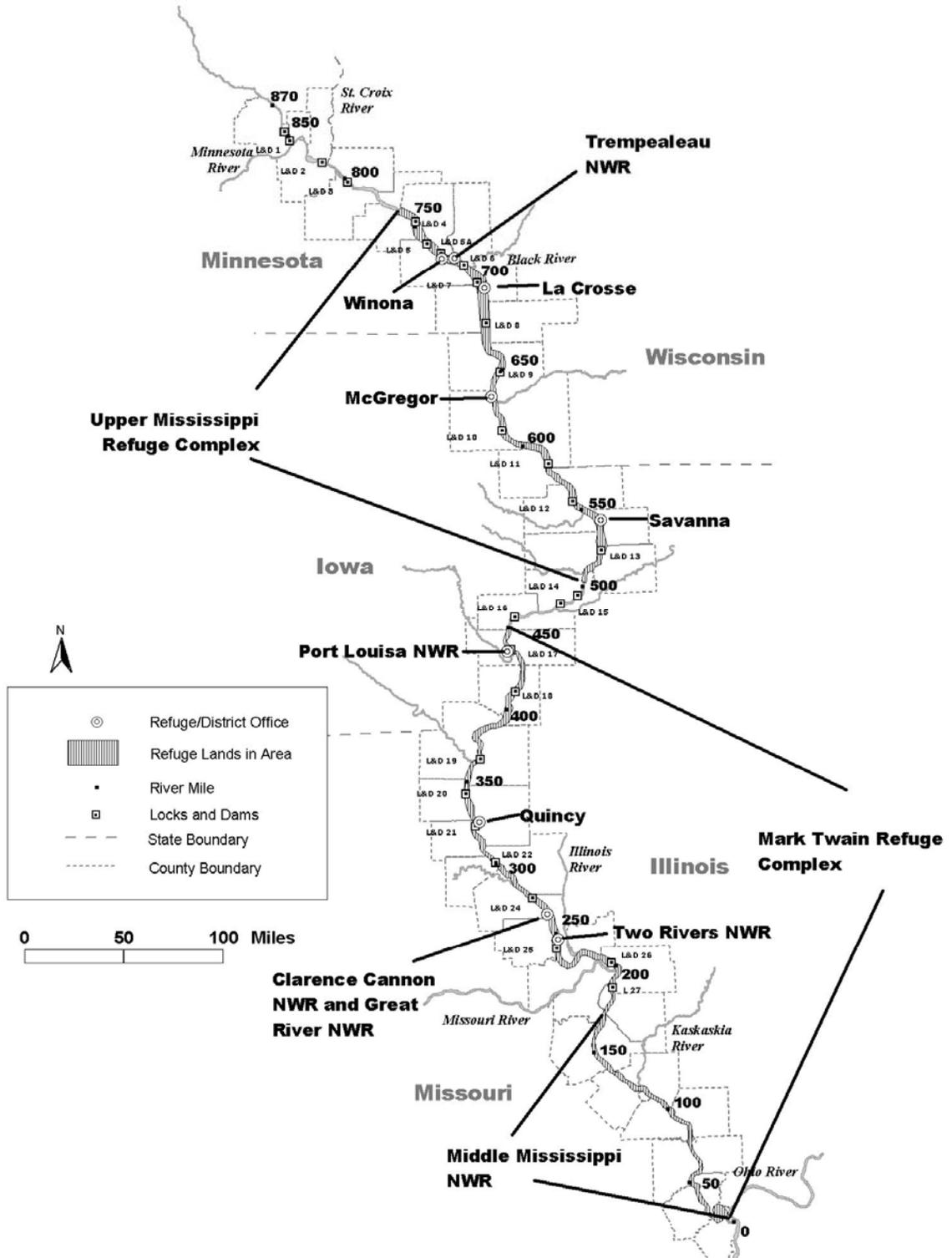
SENSITIVE/CRITICAL FISH AND WILDLIFE HABITAT OF THE UPPER MISSISSIPPI RIVER

The Upper Mississippi River and its floodplain constitute a complex, ever-changing ecosystem. An extensive network of river lakes, backwater wetlands, ponds, sloughs and floodplain forest combines with main and side channels to provide valuable habitat for fish and wildlife, including numerous state and federally listed endangered and threatened species. State and federal agencies have long recognized the unique and irreplaceable habitat the Upper Mississippi River and its floodplain provide. Many state-owned Scientific Natural Areas, Preserves, and Wildlife Management Areas are located along the river. Also bordering and encompassing portions of the river are several National Wildlife Refuges (see map on page C-12). One of these - the Upper Mississippi River National Wildlife and Fish Refuge (UMR NWFR) - consists of some 200,000 acres of aquatic, floodplain, and island habitat. The UMR NWFR's non-contiguous holdings extend from Wabasha, Minnesota to Rock Island, Illinois, a distance of more than 280 miles. The Upper Mississippi Refuge receives approximately 3.5 million visits annually, making it the most frequently visited National Wildlife Refuge in the United States.

Shallow backwater areas, which provide essential habitat for fish, furbearers, waterfowl, shorebirds, and raptors, are generally regarded as the most valuable habitat. However, the relative importance of **all** Upper Mississippi River habitat types varies seasonally or even daily due to the changing life history needs - and resulting distribution patterns - of fish and wildlife species, as well as to the variable nature of the river itself. Waterfowl and shorebirds concentrate by the tens of thousands at numerous locations along the river in spring and fall migrations, during which time they may be particularly vulnerable from a population standpoint to oil or hazardous substances spills. Eagles and other raptors forage extensively along the river year round and may themselves be adversely affected by feeding on prey which have been affected by a spilled substance. The use of deep, shallow, flowing, and calm water habitats by fish species varies with their wintering, spawning, and nursery needs. The concentrating effects of locks and dams and wing dams may put large numbers of fish at risk as spilled materials move downriver. Mussel beds, many consisting of threatened or endangered species, and other aquatic invertebrate populations are particularly vulnerable to spills due to their relative immobility and sensitivity to toxic agents. The most dramatic, readily observable spill effect - i.e., oiling and/or toxicity-related mortality to fish and wildlife - is often short-lived. However, similar, more subtle effects on aquatic invertebrate communities and emergent and submerged aquatic vegetation beds may result in the reduction of an area's habitat value and foodchain productivity for months or years following a spill event.

Both state and federal biologists and conservation officers have responsibilities for fish and wildlife management and conservation throughout the Upper Mississippi River region. Pages C-13 through C-15 list U.S. Fish and Wildlife Service personnel who can assist spill response coordinators in identifying and protecting critical fish and wildlife resources in the event of a spill on the river. Due to the continually changing nature of the Upper Mississippi and its resources, it is imperative that natural resource personnel be notified early in the spill response process in order to provide the best possible assistance.

UPPER MISSISSIPPI RIVER NATIONAL WILDLIFE REFUGES



U.S. FISH AND WILDLIFE SERVICE CONTACTS

Divisions of the U.S. Fish and Wildlife Service (Service) with natural resource responsibilities along the Upper Mississippi River include Ecological Services, Refuges and Wildlife, Fisheries Assistance, and Law Enforcement. Personnel from each of these divisions are located in a variety of field stations along the river, and are available to assist an On-Scene Coordinator in identifying and protecting fish and wildlife resources during spill response. In the event of a spill in the river, personnel from the following Service field stations have responsibility for the designated river pool(s). (See map on p. C-12 for pool locations. Pool numbers correspond to the number of the lock and dam at the downstream end of the pool. Locks and dams are identified by numbers on the p. C-12 map.)

NOTE: During business hours, U.S. Fish and Wildlife field-level contacts may be reached at the business phone numbers listed below. After hours, they may be contacted through the following 24-hour numbers for the Department of the Interior Regional Environmental Officers: 215-266-5155 for spills in Illinois, Minnesota, and Wisconsin and 303-478-3373 for spills in Iowa and Missouri.

River Pool	Primary Field Response Coordinator	Alternate
1-3	Dave Warburton Ecological Services 4101 E. 80th Street Bloomington, MN 55420 Bus: 612-725-3548 FAX: 612-725-3609	Dan Stinnett Ecological Services 4101 E. 80th Street Bloomington, MN 55420 Bus: 612-725-3548 FAX: 612-725-3609
4-6	Tony Batya Winona District Upper Mississippi River Refuge Room 203 51 East Fourth Street Winona, MN 55987 Bus: 507-454-7351	Mary Stefanski Winona District Upper Mississippi River Refuge Room 203 51 East Fourth Street Winona, MN 55987 Bus: 507-454-7351
7-8	Bill Thrune La Crosse District Upper Mississippi River Refuge 555 Lester Avenue Onalaska, WI 54650 Bus: 608-783-8405	Jim Nissen La Crosse District Upper Mississippi River Refuge 555 Lester Avenue Onalaska, WI 54650 Bus: 608-783-8405

U.S. FISH AND WILDLIFE SERVICE CONTACTS

(Continued)

River Pool	Primary Field Response Coordinator	Alternate
9-11	Cathy Henry McGregor District Upper Mississippi River Refuge P.O. Box 460 McGregor, IA 52157 Bus: 563-873-3423	Clyde Male McGregor District Upper Mississippi River Refuge P.O. Box 460 McGregor, IA 52157 Bus: 563-873-3423
12-13	Ed Britton Savanna District Upper Mississippi River Refuge Post Office Building Savanna, IL 61074 Bus: 815-273-2732	Pam Steinhaus Savanna District Upper Mississippi River Refuge Post Office Building Savanna, IL 61074 Bus: 815-273-2732
14-16	Mike Coffey Ecological Services 4469 48th Avenue Ct. Rock Island, IL 61201 Bus: 309-793-5800, ext. 206 FAX: 309-793-5804	Richard C. Nelson Ecological Services 4469 48th Avenue Ct. Rock Island, IL 61201 Bus: 309-793-5800, ext. 201 FAX: 309-793-5804
17-27	Karen Westphall Mark Twain Refuge Complex 1704 N. 24th Quincy, IL 62301 Bus: 217-224-8580	Dick Steinbach Mark Twain Refuge Complex 1704 N. 24th Quincy, IL 62301 Bus: 217-224-8580
Open River to Cairo, IL	Joyce Collins Ecological Services Rural Route 3, Box 328 Marion, IL 62959 Bus: 618-997-3344	Karen Westphall Mark Twain Refuge Complex 1704 N. 24th Quincy, IL 62301 Bus: 217-224-8580

RESOURCE MANUAL

Section D: Potential Sources of Spills

**UPPER MISSISSIPPI RIVER TERMINALS
HANDLING OIL OR CHEMICALS**

(Note: Some, but not all, facilities on major tributaries are also included and noted by river name in the first column. Terminals handling only grain or non-hazardous dry bulk products are not included in this list. Terminals handling food oils, salt, and cement have been included.)

River Mile*	Location	Owner/Phone	Products Handled
14.7 RDB Minnesota River	7000 Glendale Ave., Hwy 13 Savage, MN 55378	Cargill Inc. (952) 890-1177	Salt, Dry Bulk Fertilizer
14.4 RDB Minnesota River	12101 Yosemite Ave. Savage, MN 55378	Shiely Co. & Richards Asphalt Co. (952) 894-8000	Asphalt, Fuel Oil
13.1 RDB Minnesota River	12101 Lynn Ave. S. Savage, MN 55378	Cargill Fertilizer Inc. (952) 890-3440	Fertilizer, Salt
11.1 RDB Minnesota River	1020 Black Dog Rd. Burnsville, MN 55337	U.S. Salt, Inc. (952) 890-8448	Salt
857.0 RDB	3939 First St. N. Minneapolis, MN 55412	Holcim (U.S.) Inc. (612) 529-7704	Cement
856.9 RDB	3750 Washington Ave. N. Minneapolis, MN 55412	River Services Inc. (612) 578-6392	Fertilizer, Vegetable Oil, Asphalt, Fuel Oil, Salt, Coal
841.0 LDB	747 Shepard Rd. St. Paul, MN 55102	Uno-Ven Company (651) 890-8176	Petroleum Oils #1 & 2; Distillate Fuels, Waste Oil
838.7 RDB	50 Chester St. St. Paul, MN 55107	Farmland Industries (651) 227-8358	Fertilizer, Phosphate
837.3 LDB	1031 Childs Rd. St. Paul, MN 55106	Great Western Dock & Terminal (651) 774-5937	Fertilizer, Salt, Coal
837.1 LDB	1125 Childs Rd. St. Paul, MN 55106	Hawkins Chemical (651) 774-9604	Fatty Acids
837.1 LDB	1245 Childs Rd. St. Paul, MN 55106	LaFarge Corporation (651) 772-2497	Cement

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
836.7 LDB	2175 Childs Rd. St. Paul, MN 55106	Westway Trading Corp. (651) 435-6344	Vegetable Oil, Calcium Chloride, Caustic Soda, Sulfuric Acid, Ferric Sulfate
836.5 LDB	2209 Childs Rd. St. Paul, MN 55106	Flint Hills Resources (651) 578-6392	Asphalt, Fuel Oil, Mineral Spirits, Tall Oil
836.4 LDB	2225 Childs Rd. St. Paul, MN 55106	Westway Trading Corp. (651) 435-6344	Vegetable Oils, Fish Solubles, Glycol
836.1 RDB	701 Barge Channel Rd. St. Paul, MN 55107	Hawkins Chemical Co. (800) 424-9300	Liquid Caustic Soda, Liquid Caustic Potash, Oil Products
836.0 RDB	751 Barge Channel Rd. St. Paul, MN 55107	Alter Scrap Processing (651) 222-2751	Fertilizer, Coal, Salt
834.7 LDB	1061 Red Rock Rd. St. Paul, MN 55119	Peavy/Conagra (651) 735-5793	Fertilizer, Phosphate, Coal
833.7 LDB	1030 Red Rock Rd. St. Paul, MN 55119	Dakota Barge Service (651) 731-6399	Gasoline, Fuel Oil #2, Motor Oil
833.5 LDB	1359 Red Rock Rd. St. Paul, MN 55119	Commercial Asphalt Co., Tiller Corp. (651) 740-0932	Asphalt, Diesel Fuel, Fuel Oils #1 & #2, Heating Oil #6
833.0 LDB	1363 Red Rock Rd St. Paul, MN 55119	LaFarge Corporation (651) 739-2743	Cement
832.2 LDB	50 21st St. Newport, MN 55055	Erickson Petroleum Co. (651) 738-2623	Gasoline, Ethanol, Diesel
831.6 RDB	925 Hardman Ave. S. So. St. Paul, MN 55075	Dakota Bulk Terminal, Inc. (651) 451-1414	All Commodities
829.6 LDB	100 W. 3rd Ave. St. Paul Park, MN 55077	Ashland Petroleum Co. (651) 459-9771	Clarified Oil; Fuel Oils #1, 2, & 6; Gasoline; Crude Oil

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
824.3 RDB	12555 US Hwy. 52 Rosemont, MN 55068	Flint Hills Resources (651) 437-0760	Fuel Oil #6, Crude Oil, Lube Oil, Gasoline
823.6 RDB	13040 Pine Bend Trail Rosemont, MN 55068	CF Industries Inc. (651) 437-6366	Anhydrous Ammonia, Urea Ammonium Nitrate Solution
823.4 RDB	5300 Pine Bend Trail Rosemont, MN 55068	CF Industries Inc. (651) 437-6191	Dry Bulk Fertilizer, Ethylene Glycol, Diesel Fuel, Fuel Oils #1 & 2, Gasoline, Lube & Waste Oil
790.7 RDB	118 Main St. Red Wing, MN 55066	Archer Daniels Midland (651) 388-7111	Sunflower Oil; Linseed Oil; Fuel Oils #1, 2, 4, & 6; Gasoline
727.0 RDB	978 Riverview Dr. Winona, MN 55987	Kujak Brothers Corp. (507) 454-5421	Fertilizer, Salt, Coal
724.4 RDB	850 E. Front St. Winona, MN 55987	Modern Transport (507) 452-3918	Salt, Fertilizer
724.1 RDB	1020 E. 2nd St. Winona, MN 55987	Support Terminal Services (507) 452-2045	Liquid Fertilizer
724.0 RDB	1000 E. 3rd St. Winona, MN 55987	Winona River Rail (507) 452-9205	Dry Bulk Fertilizer
723.8 RDB	1150 E. Broadway Winona, MN 55987	Neumann Gas and Oil Co. (800) 424-9300	Fuel Oil, Diesel #2, Gasoline
1.8 RDB Black River	411 South Bainbridge St. La Crosse, WI 54603	Westway Trading Corp. (608) 857-3169	Sunflower Oil
1.3 LDB Black River	701 Sumner St. La Crosse, WI 54603	Hydrite Chemical Co. (608) 784-0024	Liquid Caustic Soda
1.2 LDB Black River	615 Sumner St. La Crosse, WI 54603	Midwest Industrial Fuels (608) 782-3308	Fuel Oil, Diesel, Asphalt

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
1.0 RDB Black River	816 S Bainbridge St. La Crosse, WI 54603	F.J. Robers Co. (608) 784-1711	Salt, Fertilizer, Cottonseed Oil
0.7 RDB Black River	200 S. Bainbridge St. La Crosse, WI 54603	Xcel Energy French Island Plant (608) 782-1141	#2 Fuel Oil
697.4 LDB	617 Cross St. La Crosse, WI 54601	Holcim (U.S.) Inc. (608) 784-0964	Cement
696.5 LDB	1700 Marco Dr. La Crosse, WI 54601	Hanke Terminals, Inc. (608) 784-6313	Salt
636.3 LDB	800 N. Villa Louis Rd. Prairie du Chien, WI 53821	Prairie Sand & Gravel Inc. (608) 326-6471	Fertilizer
634.8 LDB	990 Lane Point St. Prairie du Chien, WI 53821	Slaght Construction Inc. (608) 326-2123	Salt
623.4 RDB	Route 2 Garnaville, IA 52049	Pattison Brothers Inc. (319) 964-2651	Dry and Liquid Fertilizer
623.0 RDB	701 1st St. Garnaville, IA 52049	Ag Products Terminal Co. (319) 964-2657	Dry and Liquid Fertilizer, Salt
580.3 RDB	1550 E. 12th St. Dubuque, IA 52001	Flint Hills Resources (563) 556-1304	Light Oils, Asphalt, Asphaltic Emulsion
580.1 RDB	1050 Kerper Blvd. Dubuque, IA 52001	Continental Grain Co. (563) 556-4532	Fertilizer
580.0 RDB	505 E. 7th St. Dubuque, IA 52001	Peavy Co. (563) 556-4245	Fertilizer, Salt
579.3 RDB	20 Terminal St. Dubuque, IA 52001	Dodds River Terminals, Inc. (563) 583-9703	Bagged Salt, Cement
579.2 RDB	5 Jones Street Dubuque, IA 52001	Dubuque River Terminal Co. (563) 588-4641	Salt, Lignen Product (tree sap)
574.5 LDB	18525 Hwy. 20 W. East Dubuque, IL 61025	IEI Barge Services (815) 747-2210	Fertilizer

UPPER MISSISSIPPI RIVER TERMINALS
(Continued)

River Mile*	Location	Owner/Phone	Products Handled
574.0 LDB	16675 Hwy. 20 W. East Dubuque, IL 61025	Royster-Clark Nitrogen (815) 747-3101	Liquid Nitrogen Fertilizer, Anhydrous Ammonia
520.4 LDB	110 11th Ave. Fulton, IL 61252	Fulton River Terminal (815) 589-2448	Liquids
519.4 LDB	S. 4th St. Fulton, IL 61252	Agri Terminal Corp. (815) 589-2311	Dry Bulk Fertilizer
517.5 RDB	204 15th Ave. S. Clinton, IA 52732	Archer Daniels Midland Co. (563) 242-0962	Dry Bulk Fertilizer, Salt, Ferrous Sulphate, Crude Vegetable Oil, Fuel Ethanol
516.0 RDB	1251 Beaver Channel Pkwy. Clinton, IA 52732	Archer Daniels Midland Co. (563) 242-1121	Crude and Refined Corn Oil, Canola Oil, Diesel, Gasoline
513.7 RDB	2619 Camanche Industrial Park Dr. Camanche, IA 52730	Vertex Chemical Corp. (563) 243-2000	Caustic Soda
512.4 RDB	1425 N. Washington Blvd. Camanche, IA 52730	Determann Industries Inc. (563) 259-8311	Dry Fertilizer, Liquids
509.8 LDB	23300 River Rd. N. Cordova, IL 61242	C.F. Industries, Inc. (309) 654-2218	Anhydrous Ammonia, Dry Bulk and Liquid Fertilizer
487.8 RDB	4100 Elm St. Bettendorf, IA 52722	Flint Hills Resources (563) 359-1304	Fuel Oil, Gasoline
487.2 RDB	139 33rd St. Bettendorf, IA 52722	Phillips Pipeline Co. (563) 355-2654	Gasoline, Diesel, Kerosene
486.9 RDB	2871 Depot St. Bettendorf, IA 52722	Continental Cement (563) 359-8237	Cement

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
483.3 RDB	915 E. River Dr. Davenport, IA 52803	W.G. Block Co. (563) 884-4117	Salt
480.8 LDB	700 Mill St. Rock Island, IL 61201	Rock Island River Terminal Corp. (309) 788-7683	Liquids, Fertilizer
475.7 RDB	6603 S. Concord St. Davenport, IA 52804	Harvest States Cooperative (563) 326-3581	Salt, Fertilizer
475.4 RDB	601 E. Front St. Davenport, IA 52804	BP Amoco (563) 324-5276	Asphalt, Cutback Asphalt
475.4 RDB	601 E. Front St. Davenport, IA 52804	Flint Hills Resources (563) 523-3239	Asphalt, Cement
474.5 RDB	301 E. Front St. Davenport, IA 52804	LaFarge Corp. (563) 323-2751	Cement
469.8 RDB	1657 W. Front St. Buffalo, IA 52728	Cargill Inc. (563) 391-5290	Salt, Caustic Soda, Corn and Soybean Oils
469.5 RDB	10910 S. Utah St. Davenport, IA 52804	Blackhawk Fleet Inc. (563) 322-3510	Dry Bulk Fertilizer, Salt
453.7 RDB	1600 Oregon St. Muscatine, IA 52761	Grain Processing Co. (563) 264-4304	Alcohol, Gasoline, Diesel, Corn Oil
451.4 RDB	2579 Pettibone Ave. Muscatine, IA 52761	River Terminal Corp. (563) 263-3155	Fertilizers, Fish Solubles
451.2 RDB	2581 Pettibone Ave. Muscatine, IA 52761	K.A. Steel Chemicals Inc. (563) 263-8768	Caustic Soda
450.3 RDB	2637 Pettibone Ave. Muscatine, IA 52761	Farmland Industries (563) 264-1721	Dry Bulk and Liquid Fertilizer
449.5 RDB	2500 Wiggins Rd. Muscatine, IA 52761	Monsanto Agricultural Co. (563) 263-0093	Styrene, Gasoline, Kerosene, Diesel, Lube Oil, Fuel Oil
405.3 RDB	500 Cash St. Burlington, IA 52601	Burlington River Terminal, Inc. (319) 753-6533	Liquid Fertilizer

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
399.5 RDB	4384 Sullivan Slough Rd. Burlington, IA 52601	Flint Hills Resources (319) 752-3761	Anhydrous Ammonia
385.1 LDB	State Hwy. 9 & Apple River Rd. Niota, IL 62538	Royster-Clark Nitrogen (217) 448-4161	Anhydrous Ammonia
383.0 RDB	1618 20th St. Fort Madison, IA 52627	Hall Towing, Inc. (319) 372-3078	Fertilizer
382.6 RDB	AV1 & 15 Fort Madison, IA 52627	Jet Gas Corp. (319) 372-1962	Diesel
374.8 RDB	300 Water Street Montrose, IA 52639	Hunold Storage Inc. (319) 463-5477	Liquid Fertilizer
362.4 RDB	Commercial and K Streets Keokuk, IA 52632	Iowa Gateway Terminal (800) 524-5426	Dry Bulk Fertilizer
342.6 RDB	4th and Grant St. Canton, MO 63435	Ayers Oil Co. (800) 487-7455	Fuel Oil, Gasoline
341.7 RDB	101 S. 1st St. Canton, MO 63435	Tri-State Fertilizer Co. (573) 288-3318	Dry Bulk Fertilizer
325.8 LDB	1900 Gardner Expressway Quincy, IL 62306	ADM Quincy (217) 224-1800	Soybean Oil
320.4 RDB	2834 County Rd. 359 Palmyra, MO 63461	CF Industries Inc. (573) 769-2181	Anhydrous Ammonia
320.0 RDB	2834 County Road 359 Palmyra, MO 63461	MFA Inc. (573) 769-2181	Dry Bulk Fertilizer
319.7 RDB	Route 168 and JJ Spur Palmyra, MO 63461	BASF Corp. (573) 769-2011	Ortho Xylene, Anhydrous Ammonia
305.8 RDB	10107Hwy. 79 S. Hannibal, MO 63401	Continental Cement Co. (573) 221-1740	Cement
281.6 RDB	Hwy. 79 S. Louisiana, MO 63353	Wayne B. Smith, Inc. (573) 754-5361	Fertilizer

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
281.0 RDB	Hwy. 79 & Co. Rd. D Louisiana, MO 63353	Aqualon, Hercules Inc. (573) 754-6211	Methanol
274.3 RDB	14738 Highway 79 Clarksville, MO 63336	Holcim (U.S.) Inc. (573) 242-3571	Cement
203.9 LDB	1101 W. Broadway St. Alton, IL 62002	Archer Daniels Midland Co. (618) 782-6254	Corn Oil, Soybean Oil
198.8 LDB	3892 Berm Hwy. East Alton, IL 62024	Gulf Central Storage Co. (618) 368-6488	Anhydrous Ammonia
198.1 LDB	100 N. Amoco Cutoff Wood River, IL 62095	Miers, Inc. (618) 254-3024	Liquids
198.0 LDB	301 Evans Ave. Wood River, IL 62095	BP Amoco (800) 424-9300	Petroleum Products
197.6 LDB	109 Velma South Roxana, IL 62087	Redco Marine (618) 254-6042	Liquids
197.4 LDB	Route 111 and Madison Ave. Wood River, IL 62095	Tosco Wood River Refinery (618) 255-2652	Petroleum Products, Liquid Chemicals
197.3 LDB	201 E. Hawthorne St. Hartford, IL 62048	Premcor Dock (618) 251-2083	Petroleum Products
196.5 LDB	700 S. 6th St. Wood River, IL 62095	Marathon Pipeline Co. (618) 254-1112	Petroleum Products
195.9 LDB	480 Robbins Rd. Hartford, IL 62048	Koch Pipeline Co. (800) 688-7594	Crude Oil
195.5 LDB	S. Delmar St. Hartford, IL 62048	Conoco Inc. (618) 251-2809	Petroleum Products, Refined Base Oils
187.0 LDB	2801 Rock Rd. Granite City, IL 62040	Petroleum Fuel & Terminal Co. (618) 452-4195	#2 & 6 Oils, Asphalt, Soybean Oil, Caustic Soda
185.5 LDB	2801 Rock Rd. Granite City, IL 62040	Bulk Service Corp., Mid-Coast Terminal Co. (618) 876-0200	Fertilizer

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
182.7 RDB	1 Angelica St. St. Louis, MO 63147	Lange-Stegmann Co. (314) 241-9531	Fertilizer, Liquids
182.2 RDB	1 Branch St. St. Louis, MO 63147	Kiesel Marine Service (314) 421-0328	Diesel, Kerosene, Petroleum Products
181.6 RDB	1 N. Market St. St. Louis, MO 63102	Beelman River Terminals, Inc. (314) 241-9600	Liquid Bulk Commodities
181.4 RDB	1840 N. Wharf St. St. Louis, MO 63102	Bulk Service Tyler Street Terminal (314) 436-3096	Fertilizer
181.1 RDB	21 Brooklyn St. St. Louis, MO 63102	Continental Cement Co. (314) 231-3149	Cement
180.9 RDB	Foot of Mullanphy St. St. Louis, MO 63102	Petroleum Fuel & Terminal Co. (314) 621-0789	Diesel, Petroleum Products
180.1 LDB	25 B St. East St. Louis, IL 62201	Petroleum Fuel & Terminal Co. (314) 621-0789	Petroleum Products
179.0 LDB	Foot of Gratiot St. St. Louis, MO 63101	Fuel St. Louis, Inc. (314) 421-3962	Petroleum Products, Diesel Fuel, Lubricating Oil
178.2 LDB	2 Monsonto Ave. Sauget, IL 62201	Cahokia Marine Service, Inc. (314) 647-7529	Dry Bulk and Liquid Chemicals
177.8 RDB	2300 S. Leonor Sullivan Dr. St. Louis, MO 63104	Slay Bulk Terminal Inc. (314) 776-6629	Liquid Chemicals
177.5 LDB	10 Pitzman Ave. East St. Louis, IL 62201	Peavy/Conagra (618) 274-4306	Dry Bulk Fertilizer, Dry Chemicals
176.6 RDB	3536 S. 1st St. St. Louis, MO 63118	Valvoline Inc. (314) 771-8200	Lubricating Oil, Waste Oil
176.2 RDB	3700 S. 1st St. St. Louis, MO 63118	River Cement Co. (314) 353-3344	Bulk Cement
176.1 LDB	2000 S. 20th St. Sauget, IL 62207	Mobil Oil Corp. Sauget Terminal (618) 271-3155	Petroleum Products

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
176.0 RDB	3800 S. 1st St. St. Louis, MO 63118	J.D. Streett Co. (314) 351-6100	Petroleum Products, Automotive Fluids
175.8 RDB	3854 S. 1st St. St. Louis, MO 63118	American River Transportation Co. (314) 481-9331	Petroleum Products
175.6 RDB	4070 S. 1st St. St. Louis, MO 63118	Equilon Enterprises (314) 752-0144	Asphalt, Gasoline, Diesel, Flux Oil, Kerosene
174.9 RDB	4528 S. Broadway St. Louis, MO 63111	American River Transportation Co. (314) 481-8828	Caustic Soda, Diesel Fuel, Edible Oils
173.7 RDB	139 E. Soper St. St. Louis, MO 63111	HCI-Chemtech Industries, Inc. (314) 601-6847	Petrochemicals, Gasoline, Solvents
173.4 RDB	Foot of E. Haven Street St. Louis, MO 63109	Lone Star Industries, Inc. (314) 352-7300	Bulk Cement
170.6 RDB	1 River Rd. St. Louis, MO 63123	J.D. Streett Co. (314) 538-8264	Petroleum Products, Automotive Fluids
167.5 RDB	5000 Bussen Rd. St. Louis, MO 63129	Bussen Terminal (314) 894-8777	Dry Bulk Fertilizer, Salt
151.6 RDB	881 Main St. Herculaneum, MO 63048	The Doe Run Co. (636) 479-5311	Sulphuric Acid
145.8 RDB	3700 S. 1st St. St. Louis, MO 63118	River Cement Co. (314) 353-3344	Bulk Cement
144.8 RDB	1001 Doulin Hollow Festus, MO 63028	La Roche Industries Inc. (636) 931-8100	Liquid Fertilizer, Anhydrous Ammonia
127.4 RDB	White Sand Rd. Ste. Genevieve, MO 63670	Luhr Brothers Inc./Tower Rock Stone Co. (573) 883-7415	Diesel Fuel, Waste Oil
120.5 LDB	Chester, IL	Southern Illinois Transfer Co. (618) 826-2015	Fertilizer
107.8 LDB	1200 Swanick St. Chester, IL 62233	Southern Illinois Transfer Co. (618) 826-2015	Fertilizer

UPPER MISSISSIPPI RIVER TERMINALS

(Continued)

River Mile*	Location	Owner/Phone	Products Handled
50.4 RDB	1400 Giboney St. Cape Girardeau, MO 63703	ITAPCO Missouri Terminal, Inc. (800) 448-4931	Petroleum Products
49.9 RDB	2605 S. Spring St. Cape Girardeau, MO 63703	Biokyowa Inc. (573) 335-4725	Chemicals
49.8 RDB	2524 S. Sprigg St. Cape Girardeau, MO 63703	Lone Star Industries, Inc. (573) 335-5591	Cement
48.0 RDB	107 Rushing Rd. Scott City, MO 63780	Girardeau Stevedores Inc. (573) 264-3882	Salt, Fertilizer
44.2 RDB	10653 State Hwy. N. Scott City, MO 63780	Texas Eastern Products Pipeline Co. (573) 264-2173	Petroleum Products

* LDB = Left Descending Bank
RDB = Right Descending Bank

SOURCES: Minnesota Department of Transportation, "Minnesota's River Terminals," St. Paul, Minnesota, March 1999.

MSN Yellow Pages, on-line, January 2001

Upper Mississippi River Basin Association, unpublished data prepared for the U.S. Environmental Protection Agency's Region 5 Inland Sensitivity Mapping Project, January 2001.

U.S. Army Corps of Engineers "Port Report No. 69: Ports of Minneapolis-St. Paul and Ports on Upper Mississippi River (Miles 300 to 860 AOR)," Alexandria, Virginia, 1994.

U.S. Army Corps of Engineers "Port Report No. 70: The Port of St. Louis, Missouri and Ports on Upper Mississippi River Miles 0 to 300 AOR," Fort Belvoir, Virginia, 1992.

The Waterways Journal "Inland River Guide," St. Louis, Missouri, 1999.

Information was also provided by individual companies.

**COMMODITIES TRANSPORTED BY BARGE
ON THE UPPER MISSISSIPPI RIVER
(Commodities Transiting Individual Locks)**

Commodity Group	Upper St. Anthony	Lower St. Anthony	L&D 1	L&D 2
Coal, Lignite, & Coke	•	•	•	•
Petroleum & Petroleum Products				•
Crude Petroleum	•			•
Gasoline, Jet Fuel, Kerosene				
All Fuel Oils; Lubricating Oils & Greases				•
Pitches, Asphalt, Naptha, Solvents				•
Chemicals & Related Products	•			•
All Chemical Fertilizers	•	•	•	•
All Other Chemical Related Products		•	•	•
Crude Materials, Inedible, Except Fuels		•		•
Forest Products, Lumber, Logs, Woodchips				•
Pulp, Waste Products				•
Sand, Gravel, All Stone & Crushed Rock	•	•	•	•
Iron Ore; Iron Steel Waste & Scrap	•	•	•	•
Marine Shells, Unmanufactured				
Non-Ferrous Metallic Ores, Waste, & Scrap	•	•	•	•
Sulfur (Liquid & Dry), Clay, Salt	•	•	•	•
Slag				•
Primary Manufactured Goods	•	•	•	•
Paper & Allied Products	•	•		•
Building Cement & Concrete; Lime; Glass	•	•	•	•
Primary Iron & Steel Products	•	•	•	•
Primary Non-Ferrous & Fabricated Metal Products	•	•		•
Primary Wood Products; Veneer, Plywood			•	•
Food & Farm Products		•	•	•
Fresh Fish and Other Marine Products				
Wheat	•	•	•	•
Corn	•	•	•	•
Rye, Barley, Rice, Sorghum, & Oats	•	•	•	•
Oilseeds (Soybean, Flaxseed, & Others)	•	•	•	•
Vegetable Products				•
Animal Feed, Grain Mill & Processed Grains	•			•
Other Agricultural Products	•	•	•	•
All Manufactured Equipment & Machinery	•	•	•	•
Waste Material, Garbage, Landfill, Sewage				

**COMMODITIES TRANSPORTED BY BARGE
ON THE UPPER MISSISSIPPI RIVER
(Continued)**

Commodity Group	L&D 3	L&D 4	L&D 5	L&D 5A	L&D 6
Coal, Lignite, & Coke	•	•	•	•	•
Petroleum & Petroleum Products	•	•	•	•	•
Crude Petroleum	•	•	•	•	•
Gasoline, Jet Fuel, Kerosene					
All Fuel Oils; Lubricating Oils & Greases	•	•	•	•	•
Pitches, Asphalt, Naptha, Solvents	•	•	•	•	•
Chemicals & Related Products	•	•	•	•	•
All Chemical Fertilizers	•	•	•	•	•
All Other Chemical Related Products	•	•	•	•	•
Crude Materials, Inedible, Except Fuels	•	•	•	•	•
Forest Products, Lumber, Logs, Woodchips	•	•	•	•	•
Pulp, Waste Products	•	•	•	•	•
Sand, Gravel, All Stone & Crushed Rock	•	•	•	•	•
Iron Ore; Iron Steel Waste & Scrap	•	•	•	•	•
Marine Shells, Unmanufactured					
Non-Ferrous Metallic Ores, Waste, & Scrap	•	•	•	•	•
Sulfur (Liquid & Dry), Clay, Salt	•	•	•	•	•
Slag	•	•	•	•	•
Primary Manufactured Goods	•	•	•	•	•
Paper & Allied Products	•	•	•	•	•
Building Cement & Concrete; Lime; Glass	•	•	•	•	•
Primary Iron & Steel Products	•	•	•	•	•
Primary Non-Ferrous & Fabricated Metal Products	•	•	•	•	•
Primary Wood Products; Veneer, Plywood	•	•	•	•	•
Food & Farm Products	•	•	•	•	•
Fresh Fish and Other Marine Products					
Wheat	•	•	•	•	•
Corn	•	•	•	•	•
Rye, Barley, Rice, Sorghum, & Oats	•	•	•	•	•
Oilseeds (Soybean, Flaxseed, & Others)	•	•	•	•	•
Vegetable Products	•	•	•	•	•
Animal Feed, Grain Mill & Processed Grains	•	•	•	•	•
Other Agricultural Products	•	•	•	•	•
All Manufactured Equipment & Machinery	•	•	•	•	•
Waste Material, Garbage, Landfill, Sewage					

**COMMODITIES TRANSPORTED BY BARGE
ON THE UPPER MISSISSIPPI RIVER
(Continued)**

Commodity Group	L&D 7	L&D 8	L&D 9	L&D 10	L&D 11
Coal, Lignite, & Coke	•	•	•	•	•
Petroleum & Petroleum Products	•	•	•	•	•
Crude Petroleum	•	•	•	•	•
Gasoline, Jet Fuel, Kerosene					
All Fuel Oils; Lubricating Oils & Greases	•	•	•	•	•
Pitches, Asphalt, Naptha, Solvents	•	•	•	•	•
Chemicals & Related Products	•	•	•	•	•
All Chemical Fertilizers	•	•	•	•	•
All Other Chemical Related Products	•	•	•	•	•
Crude Materials, Inedible, Except Fuels	•	•	•	•	•
Forest Products, Lumber, Logs, Woodchips	•	•	•	•	•
Pulp, Waste Products	•	•	•	•	•
Sand, Gravel, All Stone & Crushed Rock	•	•	•	•	•
Iron Ore; Iron Steel Waste & Scrap	•	•	•	•	•
Marine Shells, Unmanufactured					
Non-Ferrous Metallic Ores, Waste, & Scrap	•	•	•	•	•
Sulfur (Liquid & Dry), Clay, Salt	•	•	•	•	•
Slag	•	•	•	•	•
Primary Manufactured Goods	•	•	•	•	•
Paper & Allied Products	•	•	•	•	•
Building Cement & Concrete; Lime; Glass	•	•	•	•	•
Primary Iron & Steel Products	•	•	•	•	•
Primary Non-Ferrous & Fabricated Metal Products	•	•	•	•	•
Primary Wood Products; Veneer, Plywood	•	•	•	•	•
Food & Farm Products	•	•	•	•	•
Fresh Fish and Other Marine Products					
Wheat	•	•	•	•	•
Corn	•	•	•	•	•
Rye, Barley, Rice, Sorghum, & Oats	•	•	•	•	•
Oilseeds (Soybean, Flaxseed, & Others)	•	•	•	•	•
Vegetable Products	•	•	•	•	•
Animal Feed, Grain Mill & Processed Grains	•	•	•	•	•
Other Agricultural Products	•	•	•	•	•
All Manufactured Equipment & Machinery	•	•	•	•	•
Waste Material, Garbage, Landfill, Sewage					•

**COMMODITIES TRANSPORTED BY BARGE
ON THE UPPER MISSISSIPPI RIVER
(Continued)**

Commodity Group	L&D 12	L&D 13	L&D 14	L&D 15	L&D 16
Coal, Lignite, & Coke	•	•	•	•	•
Petroleum & Petroleum Products	•	•	•	•	•
Crude Petroleum	•	•	•	•	•
Gasoline, Jet Fuel, Kerosene			•	•	•
All Fuel Oils; Lubricating Oils & Greases	•	•	•	•	•
Pitches, Asphalt, Naptha, Solvents	•	•	•	•	•
Chemicals & Related Products	•	•	•	•	•
All Chemical Fertilizers	•	•	•	•	•
All Other Chemical Related Products	•	•	•	•	•
Crude Materials, Inedible, Except Fuels	•	•	•	•	•
Forest Products, Lumber, Logs, Woodchips	•	•	•	•	•
Pulp, Waste Products	•	•	•	•	•
Sand, Gravel, All Stone & Crushed Rock	•	•	•	•	•
Iron Ore; Iron Steel Waste & Scrap	•	•	•	•	•
Marine Shells, Unmanufactured					
Non-Ferrous Metallic Ores, Waste, & Scrap	•	•	•	•	•
Sulfur (Liquid & Dry), Clay, Salt	•	•	•	•	•
Slag	•	•	•	•	•
Primary Manufactured Goods	•	•	•	•	•
Paper & Allied Products	•	•	•	•	•
Building Cement & Concrete; Lime; Glass	•	•	•	•	•
Primary Iron & Steel Products	•	•	•	•	•
Primary Non-Ferrous & Fabricated Metal Products	•	•	•	•	•
Primary Wood Products; Veneer, Plywood	•	•	•	•	•
Food & Farm Products	•	•	•	•	•
Fresh Fish and Other Marine Products	•	•	•	•	•
Wheat	•	•	•	•	•
Corn	•	•	•	•	•
Rye, Barley, Rice, Sorghum, & Oats	•	•	•	•	•
Oilseeds (Soybean, Flaxseed, & Others)	•	•	•	•	•
Vegetable Products	•	•	•	•	•
Animal Feed, Grain Mill & Processed Grains	•	•	•	•	•
Other Agricultural Products	•	•	•	•	•
All Manufactured Equipment & Machinery	•	•	•	•	•
Waste Material, Garbage, Landfill, Sewage					

**COMMODITIES TRANSPORTED BY BARGE
ON THE UPPER MISSISSIPPI RIVER
(Continued)**

Commodity Group	L&D 17	L&D 18	L&D 19	L&D 20	L&D 21
Coal, Lignite, & Coke	•	•	•	•	•
Petroleum & Petroleum Products	•	•	•	•	•
Crude Petroleum	•	•	•	•	•
Gasoline, Jet Fuel, Kerosene	•	•	•	•	•
All Fuel Oils; Lubricating Oils & Greases	•	•	•	•	•
Pitches, Asphalt, Naptha, Solvents	•	•	•	•	•
Chemicals & Related Products	•	•	•	•	•
All Chemical Fertilizers	•	•	•	•	•
All Other Chemical Related Products	•	•	•	•	•
Crude Materials, Inedible, Except Fuels	•	•	•	•	•
Forest Products, Lumber, Logs, Woodchips	•	•	•	•	•
Pulp, Waste Products	•	•	•	•	•
Sand, Gravel, All Stone & Crushed Rock	•	•	•	•	•
Iron Ore; Iron Steel Waste & Scrap	•	•	•	•	•
Marine Shells, Unmanufactured					
Non-Ferrous Metallic Ores, Waste, & Scrap	•	•	•	•	•
Sulfur (Liquid & Dry), Clay, Salt	•	•	•	•	•
Slag	•	•	•	•	•
Primary Manufactured Goods	•	•	•	•	•
Paper & Allied Products	•	•	•	•	•
Building Cement & Concrete; Lime; Glass	•	•	•	•	•
Primary Iron & Steel Products	•	•	•	•	•
Primary Non-Ferrous & Fabricated Metal Products	•	•	•	•	•
Primary Wood Products; Veneer, Plywood	•	•	•	•	•
Food & Farm Products	•	•	•	•	•
Fresh Fish and Other Marine Products	•	•	•	•	•
Wheat	•	•	•	•	•
Corn	•	•	•	•	•
Rye, Barley, Rice, Sorghum, & Oats	•	•	•	•	•
Oilseeds (Soybean, Flaxseed, & Others)	•	•	•	•	•
Vegetable Products	•	•	•	•	•
Animal Feed, Grain Mill & Processed Grains	•	•	•	•	•
Other Agricultural Products	•	•	•	•	•
All Manufactured Equipment & Machinery	•	•	•	•	•
Waste Material, Garbage, Landfill, Sewage					

**COMMODITIES TRANSPORTED BY BARGE
ON THE UPPER MISSISSIPPI RIVER
(Continued)**

Commodity Group	L&D 22	L&D 24	L&D 25	L&D 26	L&D 27
Coal, Lignite, & Coke	•	•	•	•	•
Petroleum & Petroleum Products	•	•	•	•	•
Crude Petroleum	•	•	•	•	•
Gasoline, Jet Fuel, Kerosene	•	•	•	•	•
All Fuel Oils; Lubricating Oils & Greases	•	•	•	•	•
Pitches, Asphalt, Naptha, Solvents	•	•	•	•	•
Chemicals & Related Products	•	•	•	•	•
All Chemical Fertilizers	•	•	•	•	•
All Other Chemical Related Products	•	•	•	•	•
Crude Materials, Inedible, Except Fuels	•	•	•	•	•
Forest Products, Lumber, Logs, Woodchips	•	•	•	•	•
Pulp, Waste Products	•	•	•	•	•
Sand, Gravel, All Stone & Crushed Rock	•	•	•	•	•
Iron Ore; Iron Steel Waste & Scrap	•	•	•	•	•
Marine Shells, Unmanufactured				•	•
Non-Ferrous Metallic Ores, Waste, & Scrap	•	•	•	•	•
Sulfur (Liquid & Dry), Clay, Salt	•	•	•	•	•
Slag	•	•	•	•	•
Primary Manufactured Goods	•	•	•	•	•
Paper & Allied Products	•	•	•	•	•
Building Cement & Concrete; Lime; Glass	•	•	•	•	•
Primary Iron & Steel Products	•	•	•	•	•
Primary Non-Ferrous & Fabricated Metal Products	•	•	•	•	•
Primary Wood Products; Veneer, Plywood	•	•	•	•	•
Food & Farm Products	•	•	•	•	•
Fresh Fish and Other Marine Products	•	•	•	•	•
Wheat	•	•	•	•	•
Corn	•	•	•	•	•
Rye, Barley, Rice, Sorghum, & Oats	•	•	•	•	•
Oilseeds (Soybean, Flaxseed, & Others)	•	•	•	•	•
Vegetable Products	•	•	•	•	•
Animal Feed, Grain Mill & Processed Grains	•	•	•	•	•
Other Agricultural Products	•	•	•	•	•
All Manufactured Equipment & Machinery	•	•	•	•	•
Waste Material, Garbage, Landfill, Sewage					•

SOURCE: U.S. Army Corps of Engineers, Rock Island District; Waterway Traffic Report (v3.5) for January 1, 1999 to December 21, 1999.

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER

River Mile	Facility*	Location
859.0	Minneapolis Water Works	Minneapolis, MN
857.1	NSP Riverside Plant	Minneapolis, MN
857.0	NSP Riverside Dredging	Minneapolis, MN
857.0	Whittaker Corp.	Minneapolis, MN
856.4	GAF Building Materials Corp.	Minneapolis, MN
855.0	Shidler Group/Firststar Bank	Minneapolis, MN
854.5	Hennepin Energy Resource Corp.	Minneapolis, MN
854.5	Hines Interests Ltd.	Minneapolis, MN
854.5	CP Rail Co., Minneapolis	Minneapolis, MN
854.0	South Sixth Street Partner	Minneapolis, MN
854.0	Nicollet Partnership	Minneapolis, MN
854.0	Dresser-Rand/Electric Machiner Co.	Minneapolis, MN
854.0	Federal Reserve Bank	Minneapolis, MN
854.0	General Mills Inc.	Minneapolis, MN
854.0	Minneapolis Grain Exchange	Minneapolis, MN
854.0	Northwestern National Life	Minneapolis, MN
854.0	NSP Fifth Street Station	Minneapolis, MN
854.0	THS Northstar Assoc. Ltd. Partners	Minneapolis, MN
853.5	Hennepin County Energy Center	Minneapolis, MN
853.5	Metal Matic, Inc.	Minneapolis, MN
853.1	University of Minnesota CME Building	Minneapolis, MN
853.0	Honeywell, Inc. Stinson/Ridgeway Facility	Minneapolis, MN
852.0	Honeywell, Inc.	Minneapolis, MN
851.5	American National Can Co.	Minneapolis, MN
851.5	Quality Park Products	St. Paul, MN
851.0	Hiawatha Metal Craft, Inc.	Minneapolis, MN
851.0	Paper, Calmenson, & Co.	St. Paul, MN
850.5	Abbott Northwestern Hospital	Minneapolis, MN
850.5	Calco of Minneapolis	Minneapolis, MN
850.5	Waldorf Corp.	St. Paul, MN
849.0	Kwong Tung Foods, Inc.	Minneapolis, MN
848.5	College of St. Catherine	St. Paul, MN
848.5	Ashland Chemical, Inc.	St. Paul, MN
848.5	Phillips 66 Co.	St. Paul, MN
847.5	United Properties, Highland Center	St. Paul, MN
846.5	U.S. Air Force 934th Tactical Airlift	Minneapolis, MN
846.5	Veterans Affairs Medical Center	Minneapolis, MN
844.5	Pearson Candy Co.	St. Paul, MN
841.5	Minnesota Brewing Co.	St. Paul, MN
841.0	3M Company, Reinforced Plastics Division	St. Paul, MN
841.0	Amoco Oil Co.	St. Paul, MN
840.8	NSP High Bridge Plant	St. Paul, MN
840.5	NSP High Bridge Dredging	St. Paul, MN
840.5	Crown Coco, Inc.	St. Paul, MN
840.5	United Hospitals, Inc.	St. Paul, MN
840.0	Archdiocese of St. Paul	St. Paul, MN
839.5	Ecolab Center	St. Paul, MN
839.5	Gross-Given Manufacturing Co.	St. Paul, MN
839.5	HFS Properties	St. Paul, MN
839.5	Ramsey County Adult Detention Center	St. Paul, MN

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility*	Location
839.5	St. Joseph's Hospital	St. Paul, MN
839.5	Shelard Group, Inc.	St. Paul, MN
839.5	St. Paul Pioneer Press	St. Paul, MN
839.5	U.S. Army Corps of Engineers River Dredging	St. Paul, MN
839.5	Zaidan Holdings	St. Paul, MN
839.0	Brookfield Trade Center	St. Paul, MN
839.0	Buckbee Mears	St. Paul, MN
839.0	Captain Ken's Foods, Inc.	St. Paul, MN
839.0	Gillette Co.	St. Paul, MN
839.0	St. Paul Port Authority	St. Paul, MN
839.0	St. Paul Ramsey Medical Center	St. Paul, MN
838.5	St. Paul Port Authority	St. Paul, MN
838.5	St. Paul Pioneer Press Rider Center	St. Paul, MN
838.5	Stroh Brewery Co.	St. Paul, MN
837.5	3M Company, St. Paul Plant	St. Paul, MN
837.5	Northern Iron Corp.	St. Paul, MN
836.0	MCES Metropolitan	St. Paul, MN
832.2	Newport Terminal Corp.	Newport, MN
830.0	Ashland Oil, Inc.	St. Paul Park, MN
826.6	JL Shiely Larson Quarry	St. Paul Park, MN
826.0	IGH Distribution Center	Inver Grove Heights, MN
824.2	Flint Hills Resources, Pine Bend Facility	Rosemount, MN
824.0	Continental Nitrogen Resource Co.	Rosemount, MN
823.6	CF Industries, Inc.	Rosemount, MN
823.5	MCES Rosemount	Rosemount, MN
819.6	MCES Cottage Grove	Cottage Grove, MN
818.5	MWCC/MC Cottage Grove	Cottage Grove, MN
818.0	3M Company, Chemolite Plant	Cottage Grove, MN
814.0	MCES Hastings	Hastings, MN
813.5	MWCC/MC Hastings	Hastings, MN
811.1	Prescott City STP	Prescott, WI
798.5	NSP Prairie Island Plant	Welsh, MN
791.0	Fleischmann-Kurth Co.	Red Wing, MN
790.5	Red Wing City STP	Red Wing, MN
789.3	NSP Red Wing Generating Plant	Red Wing, MN
788.0	Bay City STP	Bay City, WI
772.5	AE Goetze	Lake City, MN
766.6	Pepin STP	Pepin, WI
757.5	Wabasha City STP	Wabasha, MN
751.8	Alma City STP	Alma, WI
751.5	Dairyland Power Co-op	Alma, WI
732.2	Fountain City STP	Fountain City, WI
726.0	Brock Candy Co.	Winona, MN
726.0	Chicago & Northwestern Transportation Co.	Winona, MN
726.0	ICI Fiberite, Inc.	Winona, MN
725.0	RTP Co.	Winona, MN
723.5	Fusion Coatings	Winona, MN
723.5	Peerless Chain Co.	Winona, MN
723.5	Badger Foundry Co.	Winona, MN

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility*	Location
723.0	Composite Products, Inc.	Winona, MN
723.0	Winona City STP	Winona, MN
714.0	Trempealeau Village STP	Trempealeau, WI
704.0	Metallics	La Crosse, WI
702.0	U.S. Fish and Wildlife Service	La Crosse, WI
701.0	Torrance Casting, Inc.	La Crosse, WI
699.0	La Crescent City STP	La Crescent, MN
698.5	JSJ Corp./McLoone Metal Graphics	La Crosse, WI
698.5	Xcel Energy French Island Plant	La Crosse, WI
698.5	Barron Island Wastewater Treatment Facility	La Crosse, WI
698.0	Allied Signal Corp.	La Crosse, WI
698.0	La Crosse County Courthouse	La Crosse, WI
698.0	La Crosse City STP (West)	Onalaska, WI
697.5	Aquinas High School	La Crosse, WI
697.3	Wisconsin Technical College	La Crosse, WI
697.3	Century Telephone	La Crosse, WI
697.3	Metz Bakery/Sara Lee Bakery Group	La Crosse, WI
697.0	La Crosse City STP	La Crosse, WI
697.0	City Brewing Company	La Crosse, WI
697.0	Gunderson Lutheran Hospital	La Crosse, WI
695.5	Chart Heat Exchangers Limited Partnership	La Crosse, WI
695.5	Trane Co.	La Crosse, WI
695.0	Dairyland Power	La Crosse, WI
695.0	Altec International	La Crosse, WI
679.2	Genoa Village STP	Genoa, WI
678.7	Dairyland Power, Vernon County	Genoa, WI
667.3	De Soto Village STP	De Soto, WI
650.5	Valley Ridge Clean Water Commission	Lynxville, WI
636.3	Prairie Sand and Gravel Co.	Prairie Du Chein, WI
636.0	3M Company, Prairie Du Chein Plant	Prairie Du Chein, WI
633.2	Prairie du Chien City STP	Prairie du Chien, WI
633.0	McGregor City STP	McGregor, IA
613.0	Guttenberg City STP	Guttenberg, IA
606.5	Wisconsin Power and Light	Cassville, WI
605.9	Cassville Village STP	Cassville, WI
585.0	Valley Hill Trailer Park (Ty Co., Inc.)	Dubuque, IA
583.0	Sanofi Bio Industries	Dubuque, IA
583.5	Knapp Mobile Home Park	Dubuque, IA
582.5	Dubuque City Water Plant	Dubuque, IA
581.5	Rousselot, Inc.	Dubuque, IA
581.0	Dubuque City STP	Dubuque, IA
581.0	Dubuque Stamping and Manufacturing, Inc.	Dubuque, IA
580.5	Farmland Foods, Inc. Dubuque	Dubuque, IA
580.0	Interstate Power Co. Dubuque Station	Dubuque, IA
580.0	Jeld-Wen Fiber Products	Dubuque, IA
579.5	Fischer Dry Storage	Dubuque, IA
579.5	Miss. River National Education & Conference Ctr.	Dubuque, IA
578.6	A.Y. McDonald Mfg. Co.	Dubuque, IA
578.5	East Dubuque City STP	East Dubuque, IL

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility*	Location
578.5	Arctic Glacier Premium Ice	Dubuque, IA
578.0	Amoco Oil and Pipeline Co.	Dubuque, IA
578.0	Chicago-Dubuque Foundry	East Dubuque, IL
577.0	Mt. Vernon Association	East Dubuque, IL
576.0	Iowa DOT Maintenance Garage-Dubuque	Dubuque, IA
576.0	Table Mound #1 Mobile Home Park	Dubuque, IA
574.0	Northern Natural Gas Co.	East Dubuque, IL
574.0	Phoenix Chemical Co.	East Dubuque, IL
571.5	Spring Valley Mobile Park	Bellevue, IA
560.0	Chestnut Mountain Lodge	Galena, IL
556.5	Bellevue City STP	Bellevue, IA
556.5	Big D Food Center	Bellevue, IA
539.5	Mississippi Palisades State Park, Illinois Department of Conservation	Savanna, IL
537.0	Sabula City STP	Sabula, IA
536.0	Savanna City STP	Savanna, IL
528.0	Thomson-York Village STP	Thompson, IL
528.0	Andover City STP	Andover, IA
523.0	Blue Ridge Paper Products, Inc.	Clinton, IA
519.5	Fulton City STP	Fulton, IL
518.5	E.I. Dupont De Nemours & Co.	Clinton, IA
518.0	Arcadian Fertilizer, LP	Clinton, IA
515.5	ADM Corn Processing Co.	Clinton, IA
515.5	Collis, Inc.-A Subsidiary of SSW Holding Co.	Clinton, IA
515.0	Champion International Corp.	Clinton, IA
514.5	Clinton City STP	Clinton, IA
514.0	Ralston Purina	Clinton, IA
514.0	Albany City STP	Albany, IL
514.0	Bemis Clysar	Clinton, IA
513.7	Interstate Power Co., Kapp Station	Clinton, IA
513.5	National By-Products, Inc.	Clinton, IA
513.5	Sethness Products Co.	Clinton, IA
513.5	Vertex Chemical Corp.	Camanche, IA
513.0	Waukesha Engine Division	Clinton, IA
513.0	Quantum Chemical Corp.	Clinton, IA
512.0	ACC Chemical Co. and Getty Chemical	Camanche, IA
512.0	Royal Pines Village	Clinton, IA
511.0	Camanche City STP	Camanche, IA
510.5	Promotion Fulfillment Corp.	Camanche, IA
510.5	Wendling Quarries, Inc./Shaffton Quarry	Camanche, IA
510.5	IPSCO Steel, Inc.	Camanche, IA
510.3	PCS Nitrogen Fertilizer, L.P.	Clinton, IA
510.3	US Filter Operating Services-Clinton, IA	Clinton, IA
506.5	Exelon	Cordova, IL
506.0	3M Company	Cordova, IL
502.0	Cordova Village STP	Cordova, IL
502.0	Princeton City STP	Princeton, IA
501.0	Moline Consumers Co.	Cordova, IL

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER

River Mile	Facility*	Location
498.5	Port Byron Village STP	Port Byron, IL
498.2	Moline Consumers Co. LeClaire Quarry	LeClaire, IA
497.5	LeClaire City STP	LeClaire, IA
495.0	Blackhawk Junior High School	LeClaire, IA
492.0	Riverview Manor-(Private Care Facility)	Pleasant Valley, IA
491.8	Rockingham-Lunex Company	Pleasant Valley, IA
491.0	Americold	Bettendorf, IA
490.5	Aluminum Company of America/Alcoa	Bettendorf, IA
490.0	East Moline City STP	East Moline, IL
489.0	John Deere East Moline	East Moline, IL
488.5	Uno-Ven Co.	Riverdale, IA
488.0	J.I. Case Corp.	East Moline, IL
488.0	East Moline City PWS	East Moline, IL
487.2	Shell Oil Company	Bettendorf, IA
487.1	BP Amoco Oil	Bettendorf, IA
487.0	BP Amoco Oil Groundwater Remediation	Bettendorf, IA
487.0	Phillips Terminal	Bettendorf, IA
485.5	John Deere Harvester Co.	Moline, IL
483.0	Davenport City STP	Davenport, IA
483.0	Hidden Valley Addition STP	Davenport, IA
483.0	John Deere Davenport Works	Davenport, IA
483.0	Kelsey-Hayes Co.	Davenport, IA
483.0	Pavelka Mobile Home Park	Davenport, IA
482.5	Mid America Energy Co., Riverside Plant	Davenport, IA
481.5	Kraft Foods	Davenport, IA
481.0	National Metalcraft Corp.	Davenport, IA
481.0	Ty Enterprises	Davenport, IA
480.5	Rock Island STP	Rock Island, IL
480.0	Tim's Car Wash	Rock Island, IL
480.0	Blue Grass City STP	Blue Grass, IA
480.0	Rich-Spector Farms Commercial Park	Blue Grass, IA
478.5	Nichols-Homesfield, Inc.	Davenport, IA
478.5	CP Railroad	Davenport, IA
477.5	Pavelka Mobile Home Park	Davenport, IA
476.0	ESG Watts Inc.	Taylor Ridge, IL
476.0	Lakeside Manor Mobile Home Park	Davenport, IA
476.0	Blackhawk Fleet, Inc.	Davenport, IA
475.5	BP Amoco Oil	Davenport, IA
475.5	West Lake Park	Davenport, IA
475.4	Koch Refining Co.	Davenport, IA
475.2	Linwood Mining	Buffalo, IA
474.5	LaFarge Corp.	Buffalo, IA
473.0	Buffalo City STP	Buffalo, IA
473.0	PCS Phosphate	Buffalo, IA
473.0	Andalusia Village STP	Andalusia, IL
472.0	Camp Abe Lincoln	Blue Grass, IA
468.0	Central Iowa Power Coop Fair Station	Montpelier, IA
468.0	Montpelier Sanitary District	Montpelier, IA
455.5	Hon Company/Geneva Plant	Muscatine, IA
454.0	Muscatine City STP	Muscatine, IA

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER
(Continued)

River Mile	Facility*	Location
453.5	Grain Processing Corp.	Muscatine, IA
453.0	Muscatine Power and Water	Muscatine, IA
453.0	American Cryogas Industries	Muscatine, IA
451.0	Bandag, Inc.	Muscatine, IA
450.9	Central Can Company	Muscatine, IA
449.9	Monsanto Co.	Muscatine, IA
449.5	Thatcher Tubes	Muscatine, IA
447.2	Mid America Energy Co., Louisa Station	Muscatine, IA
429.0	Oakville City STP	Oakville, IA
427.5	Kiethsburg City STP	Kiethsburg, IL
416.0	Green Acres Mobile Home Park	Burlington, IA
405.0	Case Corporation	Burlington, IA
404.5	Burlington City STP	Burlington, IA
404.5	Cooper Industries, Champion Spark Plug	Burlington, IA
404.5	Diamond Vogel Paint Co., Inc.	Burlington, IA
404.5	Cook Composites and Polymers Co.	Burlington, IA
399.5	Flint Hills Resources Fertilizer Storage & Terminal	Burlington, IA
399.3	Iowa Southern Utilities	Burlington, IA
390.5	Dallas City PWS	Dallas City, IL
390.0	Dallas City STP	Dallas City, IL
387.0	Liesureland Mobile Home Park	Niota, IL
382.5	Dial Corporation	Fort Madison, IA
382.0	Atchison, Topeka, & Santa Fe Railway	Fort Madison, IA
382.0	E.I. Dupont De Nemours & Co.	Fort Madison, IA
382.0	Fort Madison City STP	Fort Madison, IA
382.0	Fort Madison City STP (Westerly)	Fort Madison, IA
382.0	Freeport-McMoran Resource Partners	Fort Madison, IA
382.0	Sheaffer-Eaton Pen Co.	Fort Madison, IA
382.0	Westside Park for Mobile Homes	Fort Madison, IA
381.7	Box USA Group, Inc.	Fort Madison, IA
381.5	Monsanto Co.	Fort Madison, IA
381.0	Scotts Co. Ortho	Fort Madison, IA
380.5	Climax Molybdenum Co.	Fort Madison, IA
379.5	Cryotech Deicing Technology	Fort Madison, IA
378.1	Lee County Correctional Facility	Fort Madison, IA
377.4	Clearview Mobile Home Park-Ripley's Inc.	Muscatine, IA
377.3	Wabash National Corporation	Fort Madison, IA
377.3	Sinclair Pipeline Co.-Blanket Permit-Iowa	Montrose, IA
376.0	Nauvoo City PWS	Nauvoo, IL
375.0	Central Lee Community Schools	Lee County, IA
375.0	Montrose City STP	Montrose, IA
375.0	Scenic View Mobile Home Park	Montrose, IA
374.0	Nauvoo City STP	Nauvoo, IL
371.0	Orba-Johnson Transshipment Co.	Keokuk, IA
369.0	Boy Scouts of America Camp Eastman	Nauvoo, IL
369.0	Skyview Mobile Home Park	Keokuk, IA
368.0	Bryant's Mobile Home Park	Keokuk, IA
366.0	Midwest Carbide Corp.	Keokuk, IA
365.5	Schlegel Corp.	Keokuk, IA

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER

(Continued)

River Mile	Facility*	Location
365.4	Metzeler Automotive Profile Systems Iowa, Inc.	Keokuk, IA
365.0	Griffin Wheel Company	Keokuk, IA
365.0	Sandusky Mobile Home Villa	Keokuk, IA
364.5	Keokuk Steel Casting	Keokuk, IA
364.5	Hamilton City PWS	Hamilton, IL
364.5	Hamilton City STP	Hamilton, IL
364.5	Ameren UE Keokuk Plant	Keokuk, IA
364.0	Country Village Mobile Home Park	Keokuk, IA
363.0	Gray Quarries Inc.	Hamilton, IL
363.0	Keokuk City STP	Keokuk, IA
362.3	Roquette America, Inc.	Keokuk, IA
361.9	Keokuk Ferro-Sil, Inc.	Keokuk, IA
359.0	Warsaw City PWS	Warsaw, IL
352.7	Logsdon & Sons, Inc.	Canton, MO
344.5	River Valley Country Club	Canton, MO
342.9	Tri-State Fertilizer Co.	Canton, MO
342.0	Canton City STP	Canton, MO
336.6	LaGrange Foundry Inc.	LaGrange, MO
336.0	LaGrange City STP	LaGrange, MO
326.0	Celotex Corp.	Quincy, IL
325.9	Quincy Soybean Co.	Quincy, IL
324.5	Quincy City STP	Quincy, IL
323.0	JM Huber Corp.	Quincy, IL
323.0	Prince Manufacturing	Quincy, IL
320.0	BASF, Northeast Plant	Palmyra, MO
319.3	BASF, Hannibal Plant	Palmyra, MO
309.7	Hannibal WTP	Hannibal, MO
309.2	Mark Twain Redi-Mix #4	Hannibal, MO
308.7	Hannibal Boat Harbor	Hannibal, MO
308.5	Hannibal City STP	Hannibal, MO
308.0	Continental Cement Co.	Hannibal, MO
282.7	Louisiana WTP	Louisiana, MO
282.5	Louisiana City STP	Louisiana, MO
281.0	Dyno Nobel Inc-Lomo Plant	Louisiana, MO
281.0	Missouri Chemical Works	Louisiana, MO
274.3	Holcim (U.S.) Inc. – Clarksville Plant	Clarksville, MO
272.0	Clarksville City STP	Clarksville, MO
257.8	Timerlake Marina	Elsberry, MO
238.0	O'Fallon City STP	O'Fallon, MO
233.2	O'Fallon Water Treatment	O'Fallon, MO
227.0	St. Charles City STP	St. Charles, MO
225.3	St. Charles County Coop	St. Charles, MO
225.3	Yacht Club of St. Louis	St. Charles, MO
224.0	Duck Yacht Club Condominium Assoc.	St. Charles, MO
218.0	Grafton City STP	Grafton, IL
214.0	McDonell Douglas Corp.	Portage Des Sioux, MO
213.5	Principia College PWS	Elsah, IL
213.0	Harbor Point Yacht Club	West Alton, MO
209.5	Lockhaven Country Club	Alton, IL

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER

(Continued)

River Mile	Facility*	Location
206.5	Godfrey Township STP	Godfrey, IL
204.6	Harbor Point-Alta Villa	West Alton, MO
204.0	Illinois-American Water Co. PWS	Alton, IL
203.0	Amerenu Sioux Plant	West Alton, MO
203.0	Lighthouse Cay Subdivision	West Alton, MO
202.0	Jefferson Smurfit Corp.	Alton, IL
201.0	Olin Corporation	East Alton, IL
201.0	Illinois Power Company	East Alton, IL
198.0	BP Amoco	Wood River, IL
198.0	Wood River City STP	Wood River, IL
197.4	Phillips 66	Wood River, IL
197.2	Premcor Refining Group	Hartford, IL
197.0	National GF Corp.	Hartford, IL
197.0	NICOR National	Hartford, IL
197.0	Center Terminal Company	Hartford, IL
197.0	Hartford City STP	Hartford, IL
196.0	Explorer Pipeline Company	Hartford, IL
196.0	Conoco, Inc.	St. Charles, MO
196.0	Gulf Central Pipeline	St. Charles, MO
195.2	Koch Pipeline Co.	Hartford, IL
194.5	Edwardsville STP	Edwardsville, IL
189.5	St. Louis, Chain Rocks WTP	St. Louis, MO
187.5	9400 Riverview LLC	St. Louis, MO
185.6	Terminal Railroad at I-70	St. Louis, MO
185.5	U.S. Coast Guard	St. Louis, MO
183.0	MSD, Bissel Point STP	St. Louis, MO
182.1	The Kiesel Company/Kiesel Marine Service	St. Louis, MO
181.6	Beelman River Terminals	St. Louis, MO
180.5	Trigen St. Louis Energy Company	St. Louis, MO
179.0	Explorer Pipeline Company	East St. Louis, IL
179.0	Illinois-American Water Co. PWS	East St. Louis, IL
179.0	Petroleum Fuel and Terminal Co.	East St. Louis, IL
179.0	East St. Louis STP	East St. Louis, IL
179.0	Breckenridge Material	St. Louis, MO
179.0	St. Louis Demolition Landfill	St. Louis, MO
178.0	Phillips Pipe Line Co.	Cahokia, IL
178.0	Sauget Village STW	Sauget, IL
178.0	Rutger Street Sand	St. Louis, MO
177.8	Slay Bulk Terminals	St. Louis, MO
176.6	Lewis & Clark Marine, Inc.	St. Louis, MO
176.4	Valvoline, Inc.	St. Louis, MO
176.1	J.D. Streett Industries	St. Louis, MO
173.6	Aventis Cropscience USA	St. Louis, MO
173.0	MSD, Lemay STP	St. Louis, MO
172.0	Dupo Village STP	Dupo, IL
172.0	Laclede Pipeline Company	St. Louis, MO
169.0	Pace Construction Co.	St. Louis, MO
168.7	Jefferson Barracks Marine	St. Louis, MO
167.5	Bussen Quarries, Inc.	St. Louis, MO

FACILITIES DISCHARGING TO THE UPPER MISSISSIPPI RIVER

(Continued)

River Mile	Facility*	Location
161.5	Amerenue Meramec Power Plant	St. Louis, MO
159.0	RCSD, Kimmswick STP	Kimmswick, MO
158.2	PACE, Jefferson Barracks	St. Louis, MO
153.7	Dow Chemical – Riverside	Pevely, MO
151.6	Doe Run Co.	Herculaneum, MO
150.1	Crystal City Sand	Crystal City, MO
148.8	Crystal City WTP	Crystal City, MO
145.0	River Cement Company	Festus, MO
140.0	Amerenue Rush Island Plant	Festus, MO
139.9	Arch Johnston Paving/Quarry	Festus, MO
135.9	APAC, Brickeys Stone LLC	Bloomsdale, MO
132.6	Holcim Lee Island Project	Bloomsdale, MO
127.6	Tower Rock Stone Co.	Ste. Genevieve, MO
127.3	Chemical Lime Company	Ste. Genevieve, MO
120.4	Bigfield Terminal	Ste. Genevieve, MO
109.0	Menard Correction Center PWS	Menard, IL
108.5	Chester City PWS	Chester, IL
108.0	Chester City STW	Chester, IL
81.5	Grand Tower STP	Grand Tower, IL
69.4	Proctor & Gamble Paper Products	Jackson, MO
52.5	Cape Girardeau City STP	Cape Girardeau, MO
50.0	East Cape Girardeau STP	East Cape Girardeau, IL
50.0	BP Amoco	Cape Girardeau, MO
49.9	Biokyowa, Inc.	Cape Girardeau, MO
49.9	Biokyowa Port Site	Cape Girardeau, MO
49.8	Lone Star Industries, Inc.	Cape Girardeau, MO
48.4	SE MO Port Authority	Scott City, MO
48.0	Girardeau Stevedores, Southeast Missouri Port Authority	Cape Girardeau, MO
48.0	Southeast Missouri Regional Port Authority	Scott City, MO
48.0	First Missouri Term Corp.	Cape Girardeau, MO
48.0	MO Fibre Corp. Chip Mill	Scott City, MO
47.0	Tower Rock Stone Co., Grays Point Quarry	Scott City, MO
46.5	West Lake Quarry & Material Co.	Jackson, MO
45.5	24 Natural Gas Trans Ln 1	Scott City, MO
44.0	Thebes Village STP	Thebes, IL

* Facility: STP = Sewage Treatment Plant
WTP = (Drinking) Water Treatment Plant

SOURCES: Illinois Environmental Protection Agency, October 1995.
Iowa Department of Natural Resources, December 1995.
Minnesota Pollution Control Agency, December 1995.
Missouri Department of Natural Resources, December 1995.
Wisconsin Department of Natural Resources, October 1995.

**RAILROAD TRACKS WITHIN ONE MILE OF
THE UPPER MISSISSIPPI RIVER**

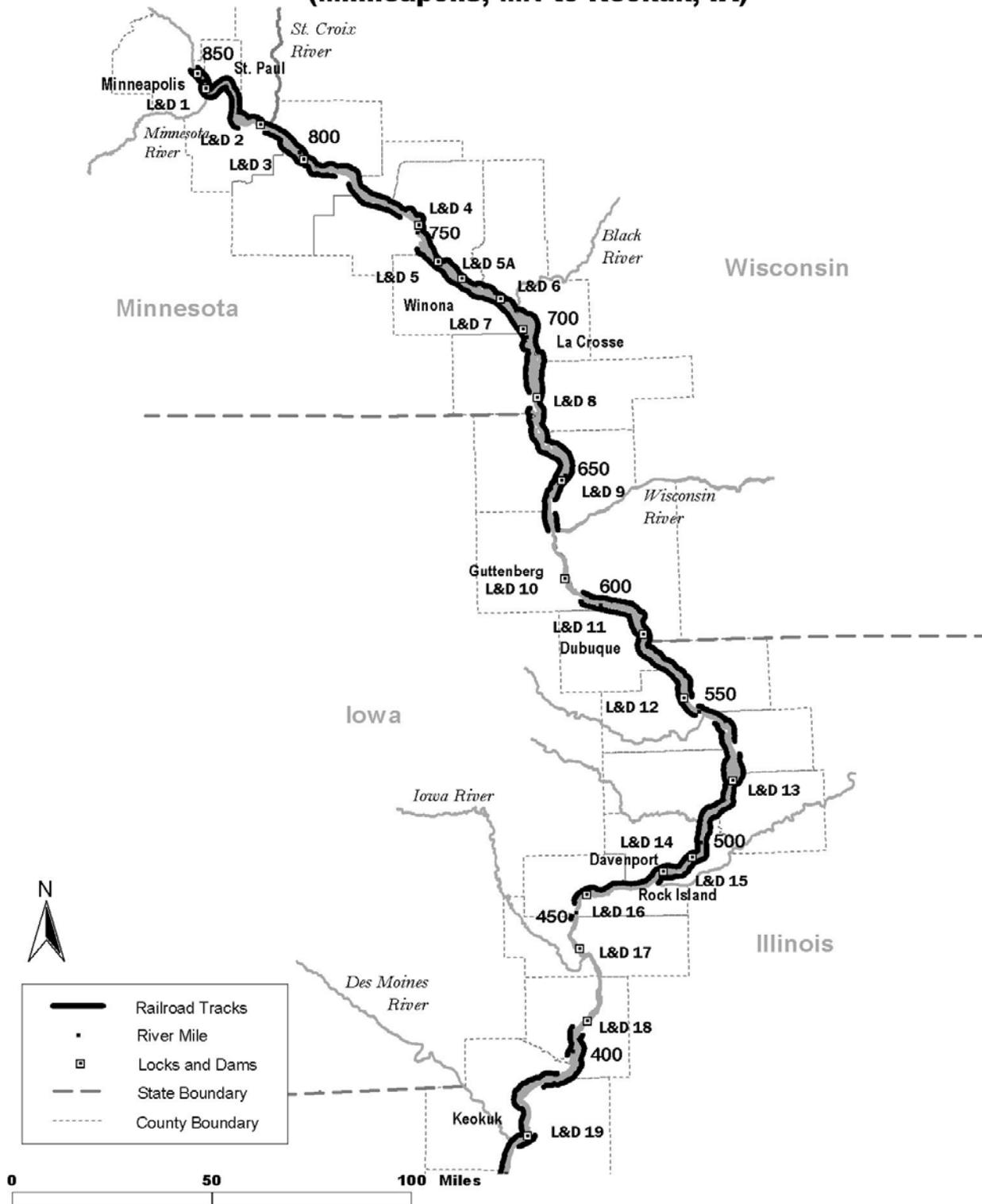
Railroads cross the Upper Mississippi River or run within one mile of the river for approximately 475 miles on the left descending bank and 625 miles on the right descending bank. Thus for the 856 mile river reach from Minneapolis, Minnesota to the Ohio River confluence, 55 percent of the left bank and 73 percent of the right bank contain railroad tracks. The river stretches that do not have nearby railroad tracks are primarily located downstream of Davenport, Iowa as shown on the accompanying maps.

Two major railroad companies — Burlington Northern and CP Rail System — own over 82 percent of the tracks near the river. Burlington Northern owns approximately 550 miles of track and CP Rail owns approximately 360 miles of track. Several other railroad companies own the remaining 18 percent of the tracks. Various products, including hazardous materials, are transported on these railroad tracks.

Both Burlington Northern Railroad and CP Rail have spill contingency plans and store spill containment equipment at many of their facilities along the river. In the event of a spill emergency, the following telephone numbers should be used to reach railroad officials:

- Burlington Northern, Command Center for Emergency Response..... 1-800-832-5452
- CP Rail Spill Response..... 1-800-766-4357

AREAS WITH RAILROAD TRACKS WITHIN ONE MILE OF THE UPPER MISSISSIPPI RIVER (Minneapolis, MN to Keokuk, IA)



**AREAS WITH RAILROAD TRACKS WITHIN
ONE MILE OF THE UPPER MISSISSIPPI RIVER
(Keokuk, IA to Cairo, IL)**



PIPELINE CROSSINGS ON THE UPPER MISSISSIPPI RIVER

Pipelines cross the Upper Mississippi River at 39 different locations as shown on the accompanying maps (see pp. D-37 and D-38). Some of the crossings contain more than one pipeline and/or spare lines not presently in use. The pipelines primarily carry liquid petroleum products such as crude oil, gasoline, and fuel oil. Several of the pipelines transport light liquefied hydrocarbons that vaporize on contact with the air. The greatest concentration of pipeline crossings is around Wood River, Illinois, where there are nine pipeline crossings over a distance of six miles. More than 15 different pipeline companies own or operate pipelines crossing the Upper Mississippi.

All the pipeline companies have an emergency response plan for spills from the pipelines, and many of the companies store containment equipment near the river that could be used in case of a spill. The accompanying table lists the pipeline crossings, the company that owns or operates the pipeline, and the products transported in the pipeline.

**PIPELINE CROSSINGS
ON THE UPPER MISSISSIPPI RIVER**

River Mile	Pipeline Company Route Name or Endpoints Telephone Number	Pipeline Size and Products Transported	Map Location
858.4	Kaneb Pipe Line Operating Partnership, L.P. Moorhead, MN to Twin Cities, MN (316) 773-9000 (business) (800) 759-0033 (24-hour)	10" line - turbine fuel, jet fuel, furnace oil, heater oil, diesel fuel, gasoline	A
831.9	Magellan Pipeline Co. Des Moines, IA to Twin Cities, MN (918) 573-2000 (business) (800) 331-4020 (24-hour)	1 - 12" line - refined petroleum products	B
825.9	Koch Pipeline Co. Minnesota Line Cottage Grove, MN to Pine Bend, MN (651) 437-0902 (business) (800) 688-7594 (24-hour)	16" line - crude oil	C
825.4	Koch Pipeline Co. Wood River Line Mason City to Cottage Grove, MN (651) 437-0902 (business) (800) 688-7594 (24-hour)	18" line - crude oil	D
824.9	Magellan Pipeline Co. Pine Bend to St. Paul Park, MN (918) 573-2000 (business) (800) 331-4020 (24-hour)	8" line - refined oils and gasoline	E
812.2	BP Pipeline North America Dubuque, IA to Twin Cities, MN (918) 660-4363 (business) (800) 548-6482 (24-hour)	10" line - turbine fuel, jet fuel, furnace oil, heater oil, diesel fuel, gasoline	F
808.6	Koch Pipeline Co. Pine Bend, MN to Junction City, MO (651) 437-0902 (business) (800) 688-7594 (24-hour)	12" line - refined petroleum products 6" line – natural gas (propane)	G

**PIPELINE CROSSINGS
ON THE UPPER MISSISSIPPI RIVER**
(Continued)

River Mile	Pipeline Company Route Name or Endpoints Telephone Number	Pipeline Size and Products Transported	Map Location
575.5	BP Pipeline North America Whiting, IN to Dubuque, IA (918) 660-4363 (business) (800) 548-6482 (24-hour)	10" line - refined petroleum products	H
574.3	Enterprise Products Operating LP (800) 546-3482 (24-hour and business)	6" line - propane	I
510	Dome Pipeline Corp. (319) 688-5304 (business) (800) 265-6000 (24-hour)	2-12" and 2-10" lines - liquefied natural gas (the 10" lines are idle)	J
510	Magellan Pipeline Co. (918) 573-2000 (business) (800) 331-4020 (24-hour)	8" & 2-10" lines - liquefied petroleum gas	K
502.9 to 502.7	Magellan Pipeline Des Moines, IA to Chicago, IL (918) 573-2000 (business) (800) 331-4020 (24-hour)	3 - 6", 8", & 12" lines - refined petroleum products (2 - 6" are auxiliary) 8" line - natural gas	L
500.3	Northern Plains Natural Gas Co. Enron Liquids Pipeline Co. (parent) Northern Border Pipeline System (402) 492-7428 (business) (888) 417-6275 (24-hour)	36" line - natural gas	M

**PIPELINE CROSSINGS
ON THE UPPER MISSISSIPPI RIVER**
(Continued)

River Mile	Pipeline Company Route Name or Endpoints Telephone Number	Pipeline Size and Products Transported	Map Location
381.8	Transmontaigne Pipeline, Inc. Chillicothe Terminal to Fort Madison, IA (219) 322-4913, ext. 14 (business) (800) 732-8140 (24-hour)	8" line- refined petroleum products	N
381.6 to 380.6	BP Pipeline North America Freeman to Manhattan No. 1 (918) 660-4363 (business) (800) 548-6482 (24-hour)	20" line - crude oil (5 other lines not in service: 3 - 8" abandoned lines, 1 - 12" and 1 - 16" idle lines)	O
379.5	Enterprise Products Operating LP (800) 546-3482 (24-hour and business)	8" line - propane	P
331.3	BP Pipeline North America Cushing, OK to Chicago, IL (918) 660-4363 (business) (800) 548-6482 (24-hour)	22" line - refined petroleum products	Q
320.2	Panhandle Eastern Pipeline Co. North Line (Quincy) (713) 989-7000 (business) (800) 225-3913 (24-hour)	8" line - natural gas	R
320.2	Panhandle Eastern Pipeline Co. Quincy to South River (713) 989-7000 (business) (800) 225-3913 (24-hour)	8" line - natural gas	S
302.1 to 301.8	Magellan Pipeline Co. Tulsa Junction, OK to Wilmington, IL (918) 573-2000 (business) (800) 331-4020 (24-hour)	3 - 12" lines - refined petroleum products (3 lines merge to double line away from river)	T

**PIPELINE CROSSINGS
ON THE UPPER MISSISSIPPI RIVER**
(Continued)

River Mile	Pipeline Company Route Name or Endpoints Telephone Number	Pipeline Size and Products Transported	Map Location
283.8	Panhandle Eastern Pipeline Co. Centralia (713) 989-7000 (business) (800) 225-3913 (24-hour)	4 - 12", 2 - 24", & 30" lines - natural gas	U
215.0	Kaneb Pipeline Operating Partnership, L.P. (A Valero L.P. Company) Former Gulf Central Line (316) 773-9000 (business) (800) 759-0033 (24-hour)	8" & 6" lines - anhydrous ammonia	V
198.9	BP Pipeline North America Madisonville, MO to Wood River, IL (918) 660-4363 (business) (800) 548-6482 (24-hour)	2 - 12" lines - refined petroleum products	W
197.6	Magellan Pipeline Co. Old Arco Line (918) 573-2000 (business) (800) 331-4020 (24-hour)	2 - 8" lines - idle (nitrogen)	X
197.2	Conoco Pipeline Co. Airport and Wood River Lines (580) 767-6236 (business) (800) 231-2551 (24-hour)	3 - 10" lines - refined petroleum products	Y
196.8 to 196.6	Equilon Pipeline Co. to Ozark 22" (918) 223-2402 (business) (800) 634-4325 (24-hour)	2 - 22" lines - crude oil (2nd line is an auxiliary at river crossing)	Z
196.4	Platte Pipeline Co. Salisbury to Wood River (307) 237-5590 (business) (888) 449-7539 (24-hour)	20" line - crude oil	AA

**PIPELINE CROSSINGS
ON THE UPPER MISSISSIPPI RIVER**
(Continued)

River Mile	Pipeline Company Route Name or Endpoints Telephone Number	Pipeline Size and Products Transported	Map Location
196.1	Explorer Pipeline Co. Glenpool to Wood River, IL to Hammond, IN (918) 493-5153 (business) (888) 876-0036 (24-hour)	24" line - refined petroleum products	BB
195.9	Koch Pipeline Co. Wood River Line (651) 437-0902 (business) (800) 688-7594 (24-hour)	20" line - crude oil	CC
193.2 to 192.9	Equilon Pipeline Co. ATF 10" Line (314) 752-0144 x225 (business) (800) 634-4325 (24-hour)	2 - 10" lines - refined petroleum products (2nd line is an auxiliary at river crossing)	DD
193.0	St. Louis Pipeline Co. St. Louis Pipeline (618) 251-4701 (business) (618) 251-4701 (24-hour)	4", 6", & 8" lines - refined petroleum products	EE
183.3	Equilon Pipeline Co. STL 6" line (314) 752-0144 x225 (business) (800) 634-4325 (24-hour)	6" line - refined petroleum products (crosses UMR on Merchants Railroad Bridge)	FF
175.8	Explorer Pipeline Co. 14" Line (918) 493-5153 (business) (888) 876-0036 (24-hour)	14" line - refined petroleum products	GG
171.4 to 171.3	Phillips Pipeline Co. Borger to Chicago, IL (618) 337-6066 (business) (800) 766-8690 (24-hour)	1 - 8" line - refined petroleum products	HH

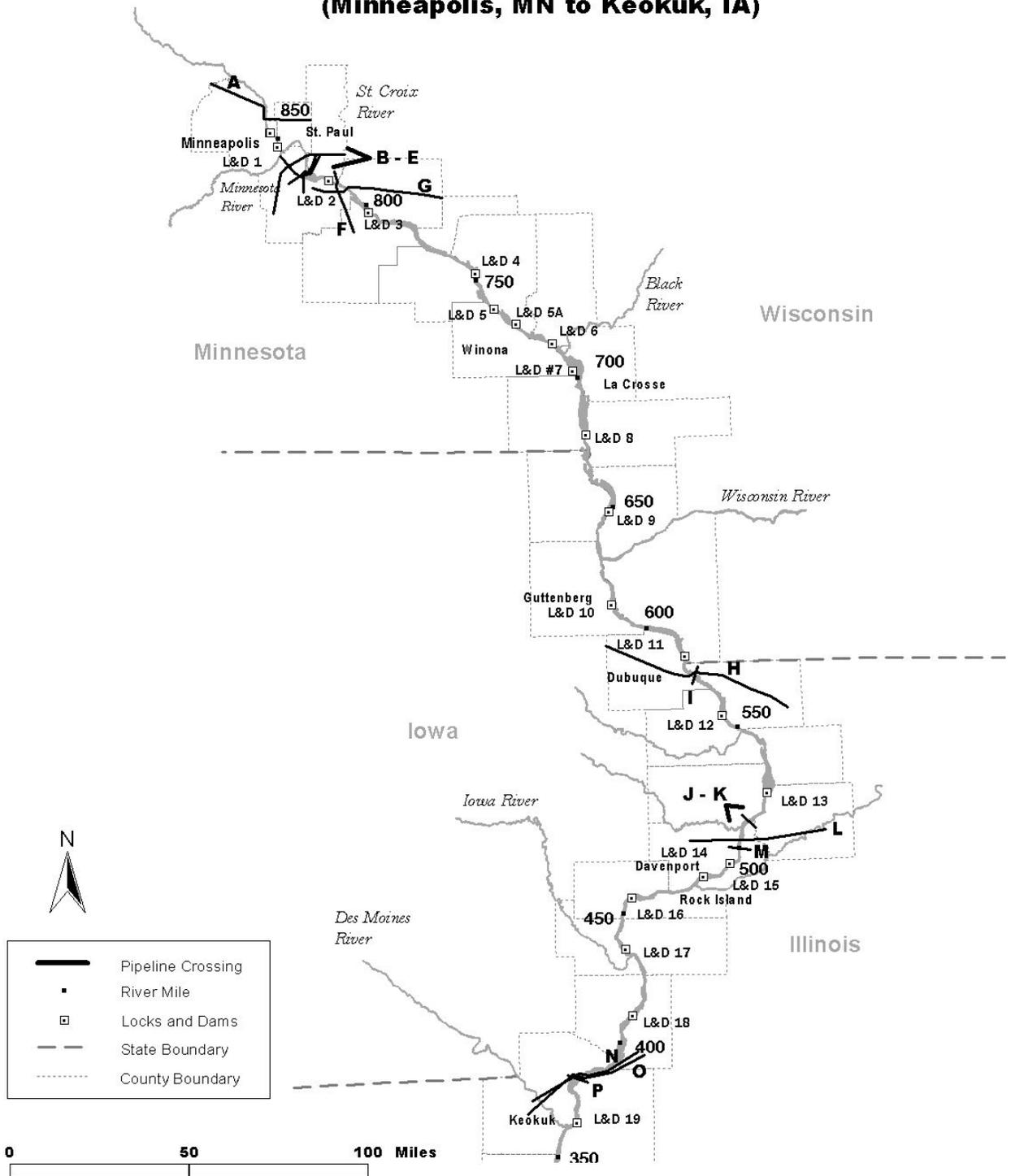
**PIPELINE CROSSINGS
ON THE UPPER MISSISSIPPI RIVER**
(Continued)

River Mile	Pipeline Company Route Name or Endpoints Telephone Number	Pipeline Size and Products Transported	Map Location
109.8 to 108.0	ExxonMobil Pipeline Co. Corsicana to Patoka (903) 654-5306 (business) (888) 337-5004 (24-hour)	2 - 20" lines - crude oil (line crossing at RM 109.8 is an alternate line for line crossing river at RM 108.0)	II
46.7	Texas Eastern Products Pipeline Co. P2 Line (713) 759-3755 (business) (800) 877-3636 (24-hour)	20" line - refined petroleum products	JJ
46.5 to 46.4	Texas Eastern Transmission Corp. Oran (713) 627-5400 (business) (800) 231-7794 (24-hour)	2 - 24" lines - natural gas	KK
44.7	Texas Eastern Products Pipeline Co. Beaumont, TX to Seymour, IN (713) 759-3755 (business) (800) 877-3636 (24-hour)	16" & 20" lines - refined petroleum products and liquefied petroleum gas	LL

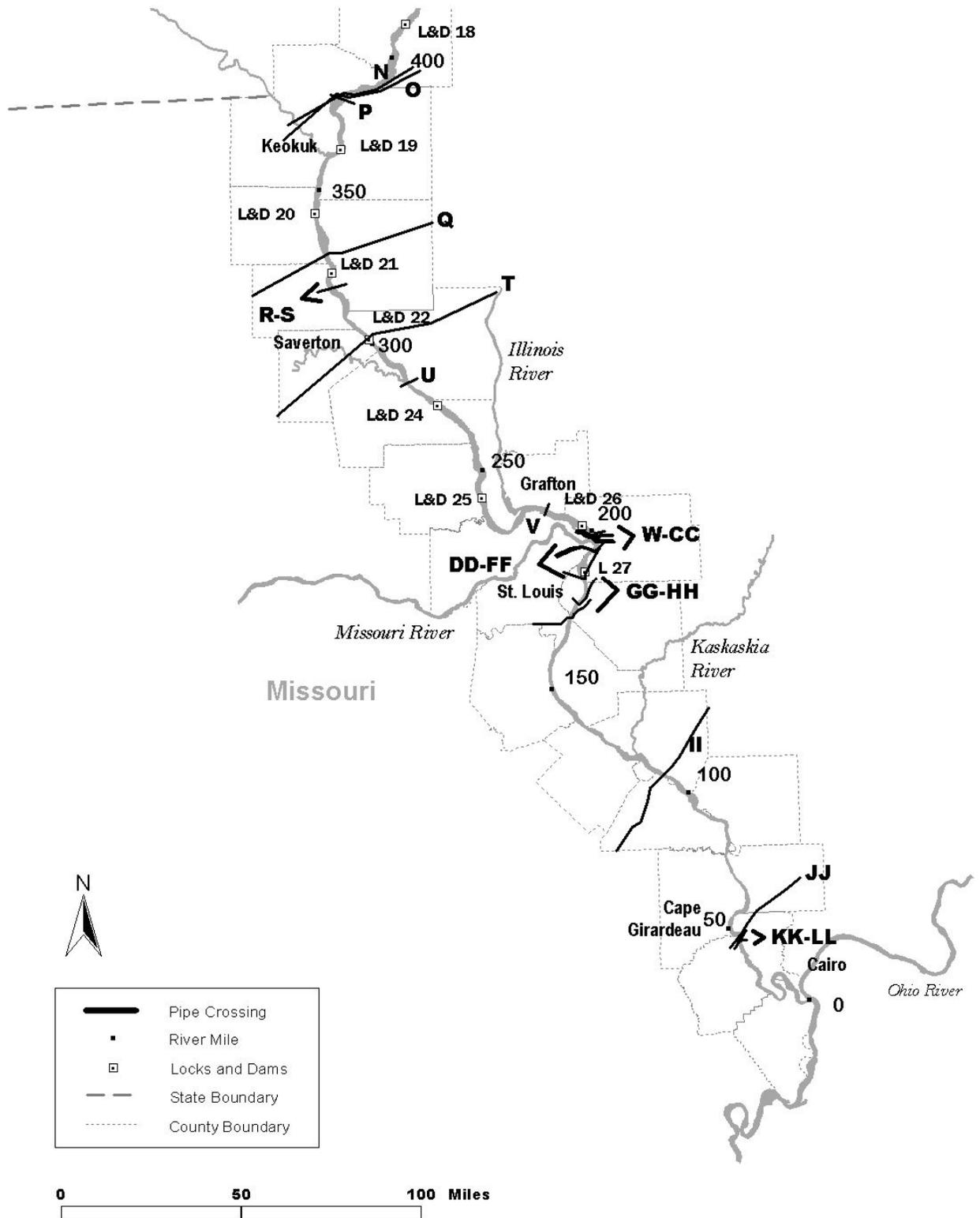
SOURCES: Upper Mississippi River Basin Association, database prepared for the U.S. Environmental Protection Agency's Region 5 Inland Sensitivity Mapping Project, January 2004.

Information was also provided by individual pipeline companies.

PIPELINE CROSSINGS ON THE UPPER MISSISSIPPI RIVER (Minneapolis, MN to Keokuk, IA)



PIPELINE CROSSINGS ON THE UPPER MISSISSIPPI RIVER (Keokuk, IA to Cairo, IL)



HIGHWAY AND RAILROAD CROSSINGS ON THE UPPER MISSISSIPPI RIVER

There are a total of 83 highway and railroad crossings on the Upper Mississippi River. Fifty-eight of the crossings are highway crossings, 22 are railroad crossings, and 3 are a combination highway/railroad crossings. Approximately 39 percent of the crossings are located on a 50 mile reach of the river in the Minneapolis-St. Paul metro area.

River Mile	Highway Crossing	Railroad Crossing
865.1	MN State Hwy. 610/252	
860.4	Interstate 694/94	
857.7	42nd Avenue	
857.6		Canadian Pacific Rail System
856.4	Lowry Avenue	
855.8		Burlington Northern/Santa Fe RR
855.4	Broadway Avenue	
855.0	8th Avenue/Plymouth Avenue	
854.5		Burlington Northern/Santa Fe RR
854.3	Hennepin Avenue	
854.1	U.S. Hwy. 52/MN State Hwy. 65/Central Ave.	
853.7		Burlington Northern/Santa Fe RR
853.2	Interstate 35W	
853.1	19th Avenue/10th Avenue	
853.0		Burlington Northern/Santa Fe RR
852.6	Washington Avenue	
851.7	Interstate 94	
851.5	Franklin Avenue	
850.7		Canadian Pacific Rail System
849.9	Lake Street/Marshall Avenue	
847.8	Ford Parkway	
845.6	MN State Hwy. 5/W. 7th Street	
843.3	Interstate 35E	
841.4		Union Pacific RR
840.4	Smith Street (High Bridge)	
839.5	Wabasha Street	
839.3		Union Pacific RR
839.2	U.S. Hwy. 52/Robert Street	
838.8	MN State Hwy. 3/Lafayette Freeway	
835.7		Union Pacific RR
832.4	Interstate 494	
830.3	MN State Hwy. 38/66th Street East (closed)	St. Paul Park Railroad Bridge
813.9	U.S. Hwy. 61	
813.7		Canadian Pacific Rail System
790.6	U.S. Hwy. 63	
760.2	MN State Hwy. 60/WI State Hwy. 25	
725.8	MN State Hwy. 43/WI State Hwy. 54	
701.8	Interstate 90	

**HIGHWAY AND RAILROAD CROSSINGS ON
THE UPPER MISSISSIPPI RIVER**
(Continued)

River Mile	Highway Crossing	Railroad Crossing
699.8		Canadian Pacific Rail System
697.5	U.S. Hwys. 14 and 61	
663.4	WI State Hwy. 82	
634.7	U.S. Hwy. 18	
581.3	City Island Bridge/U.S. Hwys. 61 and 151	
579.9		Chicago Central & Pacific RR
579.3	Julien/Dubuque Hwy. Bridge/ U.S. Hwy. 20	
535.5	Savanna Hwy./U.S. Hwy. 52/ IA State Hwy. 64	
535.0		Canadian Pacific Rail System
520.0	North Clinton Bridge/IA State Hwy. 136/U.S. Hwy. 30A	
518.1	Clinton Hwy. Bridge/U.S. Hwy. 30	
518.0		Union Pacific RR
495.4	Interstate 80	
485.8	Interstate 74/U.S. Hwy. 6/IA-IL Memorial Bridge	
482.9	U.S. Gov't. Hwy. Bridge	U.S. Gov't. Railroad Bridge
482.1	Centennial Hwy. Bridge/IL State Hwy. 67	
481.4		Davenport, Rock Island & Northwestern RR
478.3	Interstate 280	
455.9	Muscatine Hwy. Bridge/IA-IL State Hwy. 92	
404.2	MacArthur Hwy. Bridge/U.S. Hwy. 34	
403.1		Burlington Northern/Santa Fe RR
383.9	U.S. Hwy. 61/IL State Hwy. 96	Atchison, Topeka & Sante Fe RR
363.9		Keokuk Junction RR
363.8	Keokuk Hwy. Bridge/U.S. Hwy. 136	
328.0		Burlington Northern/Santa Fe RR
327.2	New Quincy Hwy. Bridge/U.S. Hwy. 24	
327.0	Quincy Memorial Hwy. Bridge/U.S. Hwy. 24	
309.9		Norfolk & Southern RR
309.2	Mark Twain Hwy. Bridge/U.S. Hwy. 36	
283.2	Louisiana Hwy. Bridge/U.S. Hwy. 54	
282.1		Gateway Western RR Bridge
202.7	Alton Hwy. Bridge/U.S. Hwy. 67	Burlington Northern/Santa Fe RR
190.8	Interstate 270	
183.2		Merchants RR Bridge
182.5	McKinley Toll Bridge (Closed)	
180.2	Martin Luther King Memorial Bridge	
180.0		Eads Memorial Bridge (Light Rail)
179.2	Poplar Street Bridge (I-55/70/64/US40)	
179.0		Douglas MacArthur Bridge

**HIGHWAY AND RAILROAD CROSSINGS ON
THE UPPER MISSISSIPPI RIVER**
(Continued)

River Mile	Highway Crossing	Railroad Crossing
168.6	Interstate 255/U.S. Hwy. 50/ Jefferson Barracks Hwy. Bridge	
109.9	Chester Hwy. Bridge/IL State Hwy. 150/ MO State Hwy. 51	
51.6	Cape Girardeau Hwy. Bridge/ MO State Hwy. 146	
43.7		Thebes RR Bridge
7.5	Interstate 57	
1.4	Cairo-Mississippi Bridge/ U.S. Hwys. 51, 60, 62	

SOURCES: Randy McNally, *1996 Road Atlas: United States, Canada, Mexico*, Skokie, Illinois, 1996.

U.S. Army Corps of Engineers, North Central Division, *Division Bulletin No. 2 — Navigation Conditions for 1986*, Chicago, Illinois, 1996.

U.S. Army Corps of Engineers, Rock Island District, *Upper Mississippi River Navigation Charts*, Rock Island, Illinois, 1989.

U.S. Army Corps of Engineers, St. Louis District, *Missouri State Mississippi River Corridor Atlas*, St. Louis, Missouri, 1992.

SELECTED TRIBUTARIES TO THE UPPER MISSISSIPPI RIVER

Tributary Name	Enters UMR at River Mile*	Stream Length (Miles)	Drainage Area (Square Miles)
Rice Creek, MN	862.8 LDB		
Shingle Creek, MN	857.8 RDB		
Minnesota River, MN	844.0 RDB		16,550
St. Croix River, WI	811.5 LDB		7,760
Big River, WI	804.8 LDB		45
Vermillion River, MN	795.5 RDB		215
Cannon River, MN	792.9 RDB		1,440
Rush River, WI	780.8 LDB		240
Pleasant Valley Creek / Wells Creek, MN	776.9 RDB		
Chippewa River, WI	763.4 LDB		9,480
Buffalo (Beef) River, WI	755.0 LDB		465
Zumbro River, MN	750.2 RDB		1,380
Old Branch Zumbro River, MN	745.4 RDB		
Whitewater River, MN	744.0 RDB		302
Trempealeau River, WI	717.1 LDB		750
Tank Creek, WI	710.8 LDB		4.6
Shingle Creek, WI	709.7 LDB		
Black River, WI	698.3 LDB		2,250
La Crosse River, WI	698.2 LDB		480
Root River, MN	693.7 RDB		1,660
Bad Axe River, WI	675.2 LDB		170
Upper Iowa River, IA	671.1 RDB		1,600
Village Creek, IA	662.1 RDB		
Rush Creek, WI	659.4 LDB		52.5
Copper Creek, WI	655.5 LDB		27
DuCharme Creek, WI	644.5 LDB		12.4
Paint Creek, IA	640.7 RDB		42.8
Yellow River, IA	637.7 RDB		245
Wisconsin River, WI	631.7 LDB		11,700
Sny Magill Creek, IA	627.5 RDB		
Turkey River, IA	607.8 RDB		1,696
Grant River, WI	592.9 LDB		316
Platte River, WI	588.3 LDB		338
Little Maquoketa River, IA	586.5 RDB		156
Catfish Creek, IA	577.5 RDB		
Menominee River, IL	574.5 LDB	6.0	
Little Menominee River, IL	570.6 LDB	13.8	
Sinsinawa River, IL	568.9 LDB	13.8	49
Tete Du Mort Creek, IA	567.1 RDB		
Galena River, IL	564.9 LDB	13.0	203
Smallpox Creek, IL	563.2 LDB	15.8	

SELECTED TRIBUTARIES TO THE UPPER MISSISSIPPI RIVER

(Continued)

Tributary Name	Enters UMR at River Mile*	Stream Length (Miles)	Drainage Area (Square Miles)
Maquoketa River, IA	548.6 RDB		1,903
Apple River, IL	545.2 LDB	55.0	262
Plum River, IL	536.7 LDB	44.7	299
Elk River, IA	528.4 RDB		
Heldt Ditch, IA	526.7 RDB		
Johnson Creek Diversion Ditch, IL	522.1 LDB	23.1	
Otter Creek, IL	521.3 LDB	10.8	
Rock Creek, IA	507.0 RDB		
Shaff Creek, IA	507.0 RDB		
Wapsipinicon River, IA	506.7 RDB		2,563
Duck Creek, IA	487.7 RDB		
Rock River, IL	479.1 LDB	162.8	10,915
Copperas Creek, IL	452.0 LDB	28.6	
Iowa River, IA	434.0 RDB		12,640
Edwards River, IL	431.2 LDB	75.4	451
Pope Creek, IL	428.0 LDB	58.9	200
Hawkeye Dolbee Diversion, IA	422.1 RDB		
Spring Creek Diversion Ditch, IA	410.4 RDB		
Henderson River Diversion Ditch, IL	409.9 LDB	67.7	604
Flint River, IA	405.4 RDB		
Skunk River, IA	395.9 RDB		4,325
Devils Creek, IA	377.5 RDB		
Rileys Creek, IL	372.5 LDB		
Larry Creek, IL	369.2 LDB	9.5	
Chaney Creek, IL	364.8 LDB	11.6	
Des Moines River, IA/MO	361.5 RDB		14,540
Fox River, MO	353.6 RDB		
Bear Creek, IL	341.0 LDB	43.1	
Wyaconda River, MO	337.3 RDB		
Rock and Ursa Creek Diversion Ditch, IL	336.3 LDB		
Durgans Creek Diversion Ditch, MO	331.5 RDB		
Fabius River Diversion, MO	323.4 RDB		
North River, MO	321.1 RDB		
South River, MO	320.8 RDB		
Mill Creek, IL	318.2 LDB	22.8	
Handley-McCraney Diversion Channel, IL	296.7 LDB	4.5	74
Salt River, MO	284.3 RDB		2,230
Noix Creek, MO	282.2 RDB		
Buffalo Creek, MO	280.9 RDB		
Ramsey Creek, MO	265.5 RDB		
Bryants Creek Diversion Channel, MO	260.8 RDB		

SELECTED TRIBUTARIES TO THE UPPER MISSISSIPPI RIVER

(Continued)

Tributary Name	Enters UMR at River Mile*	Stream Length (Miles)	Drainage Area (Square Miles)
Bobs Creek, MO	238.2 RDB		
Peruque Creek, MO	233.6 RDB		
Dardenne Creek, MO	227.4 RDB		
Illinois River, IL	217.5 LDB	273.0	28,906
Piasa Creek, IL	209.4 LDB	25.0	121
Wood River, IL	199.3 LDB	2.4	123
Missouri River, MO	195.6 RDB		
Cahokia Creek Diversion Channel, IL	195.0 LDB	51.7	263
Chain of Rocks Canal (North), IL	194.2 LDB		
Chain of Rocks Canal (South), IL	184.1 LDB		
Harding Ditch, IL	174.0 LDB	11.1	
River Des Peres Drainage Channel, MO	171.8 RDB		
Meramec River, MO	160.6 RDB		
Fountain Creek, IL	156.4 LDB	12.1	
Joachim Creek, MO	151.5 RDB		
Kaskaskia River, IL	117.6 LDB	295.1	5,801
Marys River, IL	106.4 LDB	44.1	243
Apple Creek, MO	75.1 RDB		
Indian Creek, MO	69.0 RDB		
Little River Diversion Channel, MO	48.8 RDB		
Cache River, IL	13.0 LDB	35.9	365

* LDB = Left Descending Bank
 RDB = Right Descending Bank

RESOURCE MANUAL

Section E: Public Hazardous Materials Team

Public Hazardous Materials Teams

(Note: Listed below are Level A public sector hazardous materials teams that include some portion of the Upper Mississippi River within their response area. No Illinois-based teams are included in this list. Requests for hazmat team assistance in Illinois should be directed to the Illinois Emergency Management Agency at 217-782-7860).

Name	Location	Upper Mississippi River Response Area*	24-hour Telephone
St. Paul Fire Department	St. Paul, MN	Ramsey, Washington, and Dakota Counties, MN	651-649-5451 (Minnesota State Duty Office)
Chippewa Falls/ Eau Claire Fire Departments	Chippewa Falls and Eau Claire, WI	Pierce, Pepin, northern Buffalo, and northern Trempealeau Counties, WI	800-943-0003 (Wisconsin Emergency Management)
Winona Fire Department	Winona, MN	Winona County, MN	507-454-6100 (Winona County Sheriff's Department)
La Crosse Fire Department	La Crosse, WI	southern Buffalo, southern Trempealeau, La Crosse, Vernon, and Crawford Counties, WI; Allamakee County, IA	800-943-0003 (Wisconsin Emergency Management)
Rochester Fire Department	Rochester, MN	Goodhue, Wabasha, Winona, and Houston Counties, MN	651-649-5451 (Minnesota State Duty Office)
Madison Fire Department	Madison, WI	Grant County, WI	800-943-0003 (Wisconsin Emergency Management)
Linn County Hazmat Team	Cedar Rapids, IA	Clayton County, IA	319-398-3911
Dubuque Fire Department	Dubuque, IA	Dubuque County, IA	563-589-4415
Bettendorf Fire and Rescue	Bettendorf, IA	City of Bettendorf; portion of Scott County, IA (east of Hwy 67)	563-344-4015

(Continued)

Public Hazardous Materials Teams
(Continued)

Name	Location	Upper Mississippi River Response Area*	24-hour Telephone
Davenport Fire Department	Davenport, IA	Jackson, Clinton, and Scott Counties, IA	563-326-7979
Muscatine Fire Department	Muscatine, IA	Muscatine and Louisiana Counties, IA	563-263-9922
Burlington Fire Department	Burlington, IA	City of Burlington, IA and Des Moines County	563-753-8373
Fort Madison Fire Department	Fort Madison, IA	Lee County, IA	319-372-7700
Keokuk Fire Department	Keokuk, IA	Lee County, IA	319-524-1642
St. Charles and Warren Counties HazMat Response Teams	St. Charles, MO	St. Charles County, MO	636-928-7569
St. Louis County Hazardous Materials Team	St. Louis, MO	St. Louis County, MO	314-428-1133 North County 636-394-5442 Central County
St. Louis City Fire Department	St. Louis, MO	City of St. Louis, MO Mouth of Missouri River to Mouth of Meramec River on the UMR	314-533-3810
Jefferson County Emergency Management Agency	Hillsboro, MO	Jefferson County, MO	636-797-5381

* Includes entire city or county unless listed otherwise noted.

RESOURCE MANUAL

Section F: In Situ Burning and Chemical Oil Spill Treating Agents

IN SITU BURN CHECKLIST

The following checklist will assist OSCs at any level to ensure that reasonable decisions are made on the use of ISB on the Upper Mississippi River.

ISB Decision Tree

Step 1: Site Conditions and Desirability

- Access routes to the scene?
- Locational information to include: River mile or latitude/longitude or other precise geographical description?
- Material, amount, size, age, phase, condition of spill?
- Environmental conditions: air temperature, wind speed, lake/river current speed, wave heights, water temperature, ice conditions?
- Will the use of ISB prevent or reduce further damage by the spill?
- Is mechanical containment and recovery adequate? If so, explain why burning is being considered.
- Ecological factors such as environmentally sensitive areas? See page F-29 for Ecological Considerations.

Step 2: Feasibility

- Can worker safety be reasonably assured?
- Can the fire be contained? If not, should not burn.
- Are environmental conditions favorable? Wind speeds less than 20 knots (23 mph, 34 feet/sec), currents less than 3/4 of a knot (0.9 mph, 1.3 feet/sec), and waves less than 3 feet? If not, then probably should not conduct the burn.
- Will the smoke plume lower the visibility enough to adversely impact transportation via air, water, or land?
- Are atmospheric conditions very stable (i.e., winds are light and fog or low stratus clouds are present)? Then, the smoke plume will likely be more difficult to disperse and you might not want to burn unless there will be no human impact.
- Is the oil burnable? Recommended thicknesses are 2 to 3 mm for fresh crude oil, 3 to 5 mm for diesel and weathered crude, and 5 to 10 mm for emulsions and bunker C. Water-in-oil emulsions containing more than 30 to 50% water are difficult to ignite and support combustion. Most oils readily burn if the water content is less than 25%. Most crude oils require an evaporative loss of less than 30% to burn.
- Residues: The removal of burn residues should be considered since the potential exists for undefined levels of environmental impacts even with a successful burn. See pages F-34 and F-35 for additional information.
- Is the product ignitable without adding a burning agent? COSTA procedure approval is required for use of burning agents.

The term "burning agents" means those additives that, through physical or chemical means, improve the combustibility of the materials to which they are applied. It is recommended that, when addition of a burning agent is being evaluated, first consideration be given to the more environmentally friendly products such as kerosene or jet fuel "A" before considering the more environmentally hostile products such as gasoline or diesel.

- Is the product gasoline or other light petroleum product? If so, both mechanical techniques and ISB are still viable options. However, due to the greater risk of flammable hazard, uncontrolled sources

IN SITU BURN CHECKLIST (Continued)

of ignition should be removed from the area, only intrinsically safe equipment should be used on the site, and combustible gas indicators should be used to monitor for flammable vapors.

- Is the area forested or are conditions very dry? If so, then it may not be safe to burn.
- If in a marsh or wetlands area see pages F-14 to F-15.
- Are adequate fire boom, towboats, and igniters available?
- Is adequate helicopter/monitoring equipment available?
- Can notices to mariners, aircraft, and populations be issued in time?
- Can personnel and equipment be mobilized in time?
- Can authorization be secured in time?

See pages F-33 to F-35 for information operational considerations : open water burning, inland environment burning, ice conditions, fire boom, ignition, oil thickness, weathering, emulsification, and burn residues.

Step 3: Acceptability

- Distance between burn and human population?
- Will ambient PM-10, averaged over 1 hour, near humans, be above 150 micrograms per cubic meter? If so, evacuate or shield them, or do not conduct the burn.

Generally, burning should not be conducted if human population centers exist within 6 miles downwind of the burn or 3 miles in other directions. These distances are only a rule of thumb - they may be longer or shorter depending on the circumstances of the case. In general, a safety margin of 45 degrees of arc on either side of the wind vector should be allowed to account for wind shifts. This means that burning is not recommended if there is a human population center within 6 miles from the burn measured along the wind direction and expanded 45 degrees on either side of the wind direction. A 3 mile safety margin is recommended in other directions.

Other considerations include:

- Does the landowner concur with the decision to burn?
- Are there cultural, historical, or archaeological resources that could be affected by the burn? If so, probably should not burn.
- Does the proposed burn area contain state or federal threatened or endangered species populations or their critical habitats? If so, and the proposed burn appears likely to result in greater overall injury to those species or habitats than other response actions, including "no action", the state and federal natural resource trustees will likely object to it.

Step 4: Authorization and Conditions

- Are forecasted weather conditions favorable?
- The Site Safety Plan should be reviewed to ensure that ISB is adequately addressed.
- Unified Command authority to start, proceed, limit, or halt the burn must be recognized.
- Conduct trial burn to evaluate smoke plume drift and dispersion.
- Burn extinguishing measures are available?
- Public notification. See page F-28 for guidelines on Public Notification.
- A written description of the incident and burn plan should be provided to the OSC and other pertinent players.

IN SITU BURN CHECKLIST (Continued)

Step 5: Monitoring

The primary operational purpose in monitoring the burning of spilled oil is to determine if burning requirements and objectives are met. Although the current body of knowledge about burning is limited, each operational use provides an opportunity to gather further information. Operational monitoring should occur during a response involving the use of in situ burning and should be accompanied by a detailed monitoring plan.

Operational monitoring should include such parameters as:

- type and amount of oil spilled;
- weather and water conditions;
- trajectory of the slick and smoke plume;
- estimated volume of oil to be burned;
- estimated volume of oil actually burned and remaining;
- observation of the effectiveness of residual material collection;
- observations of adverse affects to natural resources both pre- and post-burn (e.g., number of dead organisms)
- effects on human health (see pages F-16 to F-27 for Air Monitoring Guidelines)

In an effort to gather more data about in situ burning, spill-of-opportunity research possibilities involving a broad range of physical, biological, and chemical issues, is encouraged. Research monitoring might involve:

- collection of oil sample prior to burning for analysis;
- observations of residual material behavior and fate;
- collection of residual material for analysis;
- upwind and downwind air sampling;
- number and location of sampling stations;
- determination of compounds (PAHs, particulates) to be monitored;
- species and numbers of biota (e.g., waterfowl, aquatic organisms, vegetation) in the area.

Step 6: Reports

- A lessons learned report should be submitted by the Unified Command to the FOSC (and thence to the RRT), SOSOC, state and federal natural resource trustees, and local incident commander. The feedback from these reports will help in evaluating policies and procedures and improving them as needed, especially since burning is a relatively new countermeasure on the Upper Mississippi River and these guidelines are untested.
- Post burn monitoring of the site should be considered.

ISB Reference Sources

National Contingency Plan, 40 CFR Parts 300 to 399.

API/NOAA manual "Options for Minimizing Environmental Impacts of Freshwater Spill Response, September 1994", also known as the Freshwater Manual.

Region 5 In Situ Burn Guidelines adopted in June 1996.

Alternative Response Tool Evaluation System (ARTES) adopted by RRT-5 in June 1996.

NOAA HAZMAT In Situ Burning Planning Guidelines, 11 June 1996.

Alaska Regional Response Team In Situ Burn Guidelines for Alaska, May 1994.

IN SITU BURN CHECKLIST
(Continued)

S.L. Ross Environmental Research Ltd., Alaska Clean Seas, Alaska Department of Environmental Conservation, In Situ Burning: A Valuable Tool for Oil Spill Response, April 1995
Regional Response Team 2 - In Situ Burning Decision Flow Chart, DRAFT 11/12/96.
Regional Response Team 6, In Situ Burn Decision Tree.

CHEMICAL OIL SPILL TREATING AGENTS (COSTAs)

What a Responder Needs to Know to Consider Use of a COSTA

Except for specific circumstances (i.e. to prevent or substantially reduce a hazard to human life in accordance with 40 CFR 300.910 (c)) the use of chemical oil spill treating agents (COSTAs) will be considered on a case-by-case basis. Chemical oil spill treating agents include dispersants, herding agents, emulsion treating agents, solidifiers, elasticity modifiers, shoreline cleaning agents, shoreline pre-treatment agents, oxidation agents, and bioremediation agents.

In general, the use of dispersants is not promoted within the boundaries of the Region 5 or Region 7 Regional Response Teams (RRTs).

Regarding other non-dispersant COSTA, Region 7 has no pre-approvals in place. Region 5 has a pre-approval in place for the test use of the elasticity modifier product, ELASTOL. Additionally, the use of the NOCHAR A610 solidifier product contained in booms, sock, and pillows is also approved for use in Region 5. No approval is in place for use of uncontained solidifier products. Note that both ELASTOL and NOCHAR were removed from the National Product Schedule in 1996, and, therefore, neither may be used except as provided for in the National Contingency Plan (40 CFR 300.910 9 paragraph (c)).

Consistent with the National Contingency Plan (NCP), in situations when a human hazard is not present, the federal on-scene coordinator (FOSC) must receive the concurrence of the U.S. Environmental Protection Agency (USEPA) Regional Response Team (RRT) representative(s), and the RRT representative of the affected state(s) to use any chemical product. The FOSC must also consult with the Department of Interior (DOI) and Department of Commerce (DOC) natural resource trustees, where practicable, before authorizing the use of a chemical product. Any on-scene coordinator (OSC) or responder must comply with applicable local, state, and federal regulations.

Note that the FOSC is authorized to use any chemical product without requesting permission if he or she believes its use is necessary to prevent or substantially reduce a hazard to human life (40 CFR 300.910 (c)). If a chemical product is used under these circumstances, the FOSC must notify the USEPA RRT representative and the state(s) RRT representative of its use as soon as possible. This policy should be applicable to any OSC whether local, state, or federal.

General COSTA show stoppers:

- Is the product on the National Product Schedule? If not, then it should not be used except as noted in 40 CFR 300.910 (c).
- Are all players in agreement on its use? If not, then it should not be used. These players shall include the Local Incident Commander, FOSC, SOSC, and the State and Federal natural resource trustees.
- COSTAs require RRT approval.

COSTA Decision Tree

The following information is excerpted from the API/NOAA manual "Options for Minimizing Environmental Impacts of Freshwater Spill response, 1994.

CHEMICAL OIL SPILL TREATING AGENTS (COSTAs) (Continued)

Dispersants

Objective:

To remove floating oil from the water surface and disperse it into the water column, to reduce impacts to sensitive shoreline habitats and animals that use the water surface.

Description:

Specially formulated products that contain surface-active agents are sprayed at concentrations of about 5 percent of the oil onto the slicks by aircraft or from boats. The products can be applied undiluted or mixed with water. The dispersants reduce the oil/water surficial tension and decrease the energy needed for the slick to break into small particles and mix into the water column. Some physical energy is needed to mix the dispersant into the oil and treated oil into the water.

Applicable Habitat Types:

Open water and large rivers with sufficient depth and volume for mixing.

When to Use:

When the impact of the floating oil has been determined to be greater than impacts resulting from mixing of oil into the water column.

Biological Constraints:

Not suitable in shallow water depths where the dispersed oil could affect benthic resources. The dispersed oil must not affect water intakes.

Environmental Effects:

May increase effects on water-column organisms, particularly plankton and larval fish. Dispersion will only be partially effective, so some water surface impacts will still occur.

Other Limitations:

Effective application needs enough wind, but not too much (generally less than 25 knots). Dispersants are not too effective after approximately 12 hours due to weathering of oil and increased viscosity. In general, lighter petroleum products are more dispersible than heavier products. Dispersants should not be used if water intakes are nearby. For aerial application of dispersants the visibility should be 3 miles or better, the ceiling should be 1000 feet or higher, and the wind speed should be 25 knots or lower.

Emulsion treating agents

Objective:

To break or destabilize emulsified oil into separate oil and water phases. Can also be used to prevent emulsion formation.

Description:

Emulsion treating agents are water-soluble surfactants that are applied to emulsified oil at low concentrations (0.1-2 percent). They can be injected into skimmer reservoirs to break the emulsion so that excess water can be separated from recovered oil. They also can be sprayed (similar to dispersants) directly onto slicks to break or prevent emulsions.

CHEMICAL OIL SPILL TREATING AGENTS (COSTAs)
(Continued)

Applicable Habitat Types:

On all water environments where emulsified oil is present.

When to Use:

For recovered oil, where storage capacities are very limited, to separate the oil and water so that the water can be treated and discharged. On floating slicks, when formation of emulsified oil has or could reduce skimmer efficiency.

Biological Constraints:

Unknown at this time.

Environmental Effects:

Because this is a new application approach, there are very little data available on which to evaluate environmental effects. Effective dosages are 1-2 orders of magnitude lower than dispersants. There are concerns about application to slicks on how treatment might change the physical or chemical properties of the oil, whether the oil will be more readily dispersed, and how the treated oil will behave upon contact with birds, mammals, and shorelines.

Elasticity Modifiers (visco-elastic agents, elastimers, viscosity modifying agents)

Objective:

To impart visco-elastic properties to treated oil and increase skimming rates.

Description:

Chemical agent is applied as a liquid spray or a slurry onto the oil in the proper dosage. Treated oil is rendered visco-elastic, but still fluid, gelatinous, or semisolid; there is no chemical change in the oil. The primary purpose is to increase the efficiency in removal rates by skimmers. Increases the recovery by drum skimmers, but can clog weir-type skimmers.

Applicable Habitat Types:

On all water environments where oil can be contained for recovery with skimmers. Not for use adjacent to wetlands or debris because of an increase in adhesive behavior of the treated oil.

When to Use:

When recovery efficiency of skimmers needs to be increased. Must be used in conjunction with booming or other physical containment. Not for use on heavy oils which are already highly viscous.

Biological Constraints:

Not suitable for vegetated shores or where there is extensive debris mixed in the oil. Should be avoided when birds or other wildlife that may be more adversely impacted by the treated oil can not be kept away from the treated oil.

Environmental Effects:

May enhance the smothering effect of oil on organisms. Thus, the treatment should be considered only where recovery of the treated oil is likely.

CHEMICAL OIL SPILL TREATING AGENTS (COSTAs)
(Continued)

Herding Agents

Objective:

To collect or herd oil into a smaller area and thicker slick, thus increasing recovery. Also can be used to herd oil away from sensitive areas.

Description:

Chemical agents which are insoluble surfactants and have a high spreading pressure are applied in small quantities (1-2 gallons per lineal mile) to the clean water surrounding the edge of a fresh oil slick. They contain the oil, prevent spreading, but do not hold the spill in place. Hand-held, vessel-mounted, or aircraft systems can be used. Must be applied early in spill, when oil is still fluid.

Applicable Habitat Types:

On all water environments.

When to Use:

Potential use for collection and protection. For collection, use to push slicks out from under docks and piers where it has become trapped, or in harbors, where the equipment is readily accessible for use early in the spill. For protection, in low-current areas, use to push slicks away from sensitive resources, such as wetlands. Not effective in fast currents, rough seas, or rainfall.

Biological Constraints:

Not suitable for use in very shallow water or fish spawning areas.

Environmental Effects:

Direct acute toxicity to surface layer organisms, though available products vary greatly in their aquatic toxicity.

Solidifiers

Objective:

To change the physical state of spilled oil from a liquid to a solid.

Description:

Chemical agents (polymers) are applied to oil at rates of 10-45 percent, solidifying the oil in minutes to hours. Various broadcast systems, such as leaf blowers, water cannons, or fire suppression systems, can be modified to apply the product over large areas. Can be applied to both floating and stranded oil.

Applicable Habitat Types:

All water environments, bedrock, sediments, and man-made structures.

When to Use:

When immobilization of the oil is desired, to prevent re-floating, penetration into the substrate, or further spreading. However, full solidification may not occur unless the product is mixed well with the oil, and may result in a mix of solid and untreated oil. Generally not used on spills of heavy oil because the product cannot be readily mixed into viscous oils.

CHEMICAL OIL SPILL TREATING AGENTS (COSTAs) (Continued)

Biological Constraints:

Must be able to recover all treated material.

Environmental Effects:

Available products are insoluble and have very low aquatic toxicity. Unrecovered solidified oil may have longer impacts because of slow weathering rates. Physical disturbance likely during application and recovery.

Chemical Shoreline Pre-Treatment

Objective:

To prevent oil from adhering to or penetrating the substrate.

Description:

Various types of chemicals, either solidifiers, surfactants, or film-forming agents, are applied to habitats in advance of the oil to prevent oil adhesion and penetration. Application must occur just prior to stranding of the oil, thus it is time-critical.

Applicable Habitat Types:

For solidifiers, bedrock, sand and gravel habitats, and man-made structures. For surfactant-type products and film-forming agents, sand to gravel habitats.

When to Use:

When oil is projected to impact an applicable shoreline, particularly those which have high recreational or aesthetic value. However, lack of information on the availability, effects, and effectiveness of most products greatly limits their use.

Biological Constraints:

The toxicity of currently available products vary over three orders of magnitude, thus each product should be evaluated prior to consideration for use. Solidifiers should not be applied where smothering of organisms is of concern.

Environmental Effects:

Product-specific. Solidified oil will have higher smothering effects. Products which disperse oil will affect nearshore resources. See discussion for dispersants and solidifiers.

Shoreline Cleaning Agents

Objective:

To increase the efficiency of oil removal from contaminated substrates.

Description:

Special formulations are applied to the substrate, as a presoak and/or flushing solution, to soften weathered or heavy oils to aid in the efficiency of flushing methods. The intent is to be able to lower the water temperature and pressure required to mobilize the oil from the substrate during flushing.

CHEMICAL OIL SPILL TREATING AGENTS (COSTAs) **(Continued)**

Applicable Habitat Types:

On any habitat where water flooding and flushing procedures are applicable.

When to Use:

When the oil has weathered to the point where it will not flow using warm to hot water. This approach may be most applicable where flushing decreases in effectiveness as the oil weathers.

Biological Constraints:

The released oil should be recoverable rather than dispersed into the water column. Use may be restricted where suspended sediment concentrations are high, adjacent to wetlands, and near sensitive nearshore resources.

Environmental Effects:

If more oil is dispersed into the water column, there could be more oil sorbed onto suspended sediments and transferred to nearshore habitats, particularly along sheltered shorelines.

Nutrient Enrichment

Objective:

To speed the rates of natural microbial degradation of oil by addition of nutrients (generally nitrogen and phosphorus).

Description:

Nutrients are applied to the habitat in one of several methods: soluble inorganic formulations which are dissolved in water and applied as a spray, requiring frequent applications; slow-release formulations which are applied as a solid and designed to slowly dissolve; and oleophilic formulations which adhere to the oil itself, thus they are sprayed directly on the oiled areas.

Applicable Habitat Types:

Could be used on any habitat type where safe access is allowed.

When to Use:

On moderately to heavily oiled substrates, after other techniques have been used to remove as much oil as possible; on lightly oiled shorelines where other techniques are destructive or not effective; and where nutrients are a limiting factor in natural degradation. Most effective on diesel-type and medium oils that do not have large amounts of high-molecular weight, slowly degrading components. Less effective where oil residues are thick. Not considered for gasoline spills which will be completely removed by evaporation at faster time frames than microbial degradation.

Biological Constraints:

Not suitable in shallow water or restricted waterbodies where nutrient overloading may lead to eutrophication, or where toxicity of nutrients, particularly ammonia, is of concern. Contact toxicity of oleophilic formulations may restrict areas of direct application. Toxicity tests should be evaluated carefully, as other chemicals in the product could be toxic to aquatic organisms.

CHEMICAL OIL SPILL TREATING AGENTS (COSTAs)
(Continued)

Environmental Effects:

Very little information available on effects in freshwater.

Natural Microbe Seeding

Objective:

To speed the rates of microbial degradation of oil by addition of nutrients and microbial products.

Description:

Formulations containing hydrocarbon-degrading microbes and fertilizers are added to the oiled area. The argument is made that indigenous organisms will be killed by the oil or not able to degrade the oil, so new microbial species need to be added to speed the process of biodegradation.

Applicable Habitat Types:

Could be used on any habitat type where safe access is allowed.

Biological Constraints:

Not suitable in shallow water or restricted waterbodies where nutrient overloading may lead to eutrophication, or where toxicity of nutrients, particularly ammonia, is of concern. Toxicity tests should be evaluated carefully, as other chemicals in the product could be toxic to aquatic organisms.

Environmental Effects:

Very little information available on effects in freshwater.

When to Use:

On moderately to heavily oiled substrates, after other techniques have been used to remove as much oil as possible; on lightly oiled shorelines where other techniques are destructive or not effective; and where nutrients are a limiting factor in natural degradation. Most effective on diesel-type and medium oils that do not have large amounts of high-molecular weight, slowly degrading components. Less effective where oil residues are thick. Not considered for gasoline spills which will be completely removed by evaporation at faster time frames than degradation.

POTENTIAL EFFECTIVENESS OF ISB

Although in situ burning is a relatively simple technique, its effectiveness can be limited by spill circumstances. Whether and how oil burns is the result of the interplay among a number of physical factors related to the oil itself and the extent to which the oil has been exposed to the environment. Critical factors—such as oil thickness, degree of weathering, and extent of emulsification—generally change with the passage of time, and the changes that occur make it more difficult to burn the oil. As a consequence, in situ burning is most easily and effectively implemented during the early stages of a spill.

The efficiency of in situ burning is highly dependent on a number of physical factors. Test burns and actual spill situations suggest it can be very effective in removing large quantities of oil from the water. Burn efficiencies of 50 to 90 percent can be expected making this response method more efficient than others methods. In comparison, mechanical removal (such as skimming) typically has an efficiency of 10-20 percent.

In situ burning has most often been considered and tested with crude oil spills. However, its feasibility with other types of refined oil products (e.g., diesel and Bunker C fuel oil) has been demonstrated. Difficulties with establishing and maintaining necessary slick thicknesses (in the case of lighter oils) and ignition (for heavier oils) make in situ burning a slightly less viable alternative for those materials than for crude oils.

ISB RELATIONSHIP TO OTHER COUNTERMEASURES AND POTENTIAL ENVIRONMENTAL TRADEOFFS

Relationship to Mechanical and Other Response Methods

Spill prevention is the first line of defense in spill response planning, however, acceptance of the probability that a spill can and will occur is essential to successful preparedness. Burning will be considered as a possible response option only when mechanical containment and recovery response methods are incapable of controlling the spill alone.

While physical containment and mechanical removal of spilled oil is the primary objective of any response, prudent planning dictates the consideration of alternative countermeasures.

Summary of Potential Tradeoffs Relevant to ISB

As is the case with all response methods, the environmental tradeoffs associated with in situ burning are situation dependent and cannot be considered independently from operational tradeoffs. In situ burning can offer important advantages over other response methods in specific cases, and may not be advisable in others depending on the overall mix of circumstances.

Advantages

- In certain areas where other techniques may not be possible or advisable due to the physical environment (e.g., ice conditions or wetlands) or the remoteness of the region, burning may represent one of the few viable response choices besides no action.
- In situ burning may prevent or significantly reduce the extent of shoreline impacts, including exposure of sensitive biological resources, wildlife habitats, and the oiling of high value recreational or commercial beaches.
- The magnitude of a spill may overwhelm the containment and storage equipment deployed or available for a region, necessitating the consideration of other methods in an overall response strategy.
- Burning can rapidly remove a large volume of oil from the surface of the water, reducing the magnitude of subsequent environmental impacts of stranded oil.

Disadvantages

- Large quantities of highly visible black smoke is generated that may adversely affect human and other exposed populations downwind.
- There may be the potential for mortalities and other adverse biological impacts from localized temperature elevations at the water surface. Although this would be expected to occur in a relatively small area, in specific bodies of water at specific times of the year, affected populations may be large enough or important enough to represent reasons for not considering burning as a cleanup technique. Adverse impacts from temperature elevation should be considered relative to the toxic effects of the spill if burning is not employed.
- The longer-term effects of burn residues on exposed biological populations has not been investigated. It is not known whether these materials represent a significant source of toxicity.
- In situ burning must be carefully controlled in order to maintain worker safety and to prevent unintended environmental impacts.
- There is a relatively short window of opportunity to use burning after a spill occurs prior to the oil weathering and losing its flammable characteristics.

PROPOSED GUIDELINES FOR ISB IN MARSHES

Based on the available data on effectiveness and effects of burning on oiled marshes, the following guidelines are proposed:

- Make sure that it is possible to contain and control the fire; it is not as easy to put out a fire in vegetation as it is with oil contained in a fireproof boom.
- Impacts to below ground vegetation are likely to be lower if there is a water layer between the oil and the substrate.
- A standing water layer of just a few inches may get hot enough to kill shallow roots anyway, however, little information is available regarding this effect.
- Burning of oiled woody wetland vegetation (compared to grasses and sedges) should not be considered.
- Not enough is known about seasonal effects on the ability of burned, oiled vegetation to recover, yet burning in late fall to early spring, when the vegetation is dormant and before production of new growth seems to be the best time.
- If it can be done with minimal impacts, heavy accumulations of oil should be removed using other methods, to reduce the amount of burn residues which may cause long-term impacts to both vegetation and animals returning to the habitat.
- Light fuels oils and crudes burn more efficiently and generate less residues, which should reduce the potential for long-term impacts.
- Burning of oil trapped in ice appears to have the least environmental impacts because the burn area is contained, the plants are dormant, and the above-ground vegetation is dead.
- There is some concern that burning of muddy substrates could alter their physical properties (i.e., make them hard) thus degrading their biological productivity.
- Every wetland is different in terms of the type of wetland, the species growing there, the condition (optimal or marginal for species use), and the known or estimated tolerances of that type of system to physical and chemical disturbances. Biologists or botanists should be consulted prior to the use of burning as a cleanup technique in a wetland.
- Mechanical or manual alternatives to in situ burning may compact oil into sediments, where it persists longer. Therefore, the relative damages from different response options should be weighed carefully.

ISB in Wetland Habitats

There are few studies on the relative effects of burning oiled wetlands compared to other techniques or natural recovery and most of the experience is derived from estuarine habitats. However, in situ burning in wetlands can be effective since it can remove a large quantity of oil with a minimum of physical disturbance. The type of wetland vegetation and the season of the year along with many other factors will dictate whether burning is feasible in a particular wetland.

Refuge managers have historically conducted prescribed burns of wetlands to rejuvenate wetlands that have accumulated high litter loads, generate green vegetation or open spaces to attract wildlife, release nutrients for re-cycling, and to restore habitats in areas that were historically subject to frequent wildfires to their natural conditions. The presence of oil in a wetland may have two important effects: the high BTU of the oil may increase the temperature and heat penetration of the burn, and there is often an oil residue which can cause toxicity. However, the experiences of fire ecologists and practitioners can greatly contribute to the development of guidelines for burning wetlands as a spill-response strategy.

PROPOSED GUIDELINES FOR ISB IN MARSHES
(Continued)

Guidance is being developed for specific types of wetlands such as:

- Wooded swamps
- Fresh-to-brackish impoundment marshes
- Great Lakes coastal marshes
- Upper Mississippi River marshes (lock and dam pools)
- Riparian wetlands
- Inland freshwater marshes
- Potholes

For now, based on discussions with refuge staff with fire management duties, the following general considerations for use were developed:

Pros

- Where access is limited or mechanical/manual removal has the potential to cause more damage by equipment and trampling, burning can rapidly remove oil from sensitive areas.
- It provides a response option when no others are acceptable, or where likely oil residues will be unacceptably high with other options, including natural recovery.
- It rapidly removes oil from the habitat when there is a time-critical element, such as a short-term change in the physical conditions which will likely cause loss of containment and further spreading, or a seasonal increase in wildlife use, such as arrival of large numbers of migratory waterfowl.

Cons

- Burning can cause substantial initial plant damage because the above-ground vegetation is removed.
- Burning can cause long-term impacts to vegetation, especially if the fire is so hot that the below-ground plant parts are killed.
- There is a potential for burning to increase oil penetration into the substrate, when there is no standing water.
- Any animals present and unable to escape (such as gastropods on clean vegetation above the oiled area) will be killed.

AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB

In situ burning may affect two groups of people: the workers conducting the burn (the responders), a fairly homogeneous group of young, healthy adults, and the general public, which is much more heterogeneous and includes individuals who are more susceptible to toxic agents. The basic premises and possible monitoring options for each group are discussed below.

Monitoring for Responders

The responders, i.e., the workers assigned to conduct the in situ burn, are likely to be healthy and physically fit adults. Responders' locations will vary with the nature of the burn and the stage at which it is conducted. Most of the time they are expected to be upwind of the slick and the smoke plume. However, at times they may be downwind of the evaporating slick and therefore be exposed to volatile organic compound (VOCs). Responding crews may also be downwind and near the burning oil where they can be exposed to combustion products.

Responders may be exposed to VOCs from the evaporating slick, similar to what is expected during skimming operations, and to combustion by-products from the burning oil: carbon dioxide, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulates, and other combustion products. Air concentration of those substances depends on many variables, and we can expect substantial variability. Responders may be exposed to levels of gases and particulates above the permissible occupational exposure limits, and should therefore be provided with personal protective equipment and be trained in its proper use. In reality, responders' exposure is likely to be intermittent, and will vary greatly depending on location, weather conditions, and assigned tasks. Overall exposure duration is expected to vary from minutes to several hours.

Sampling Purpose

Sampling the responders' exposure level should serve several purposes, among them:

- Characterize exposures and hazards associated with the operation to provide better protection;
- Compliance with OSHA requirements, per 29 CFR 1910.134 b.(8)¹ and 29 CFR 1910.120.q.3.(ii)²;
- Data collection for scientific purposes.

Air sampling should not substitute for workers' protection and safe work practices. Responders should be protected from overexposure regardless of monitoring and air sampling.

Exposure Limit

Exposure limits for responding personnel should be based on occupational exposure guidelines (see Table 1) such as OSHA's Permissible Exposure Limits (PEL) or applicable State standards. Exposure to the general public should not exceed the National Ambient Air Quality Standards (NAAQS).

¹ Regulations concerning respiratory protection

² Regulations concerning Hazardous Waste Operations and Emergency Response (HAZWOPER)

**AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB
(Continued)**

Table 1. Occupational Exposure Limits and the National Ambient Air Quality Standard for the Most Significant Products of ISB

COMPOUND	OSHA PEL ¹	ACGIH TLV ²	NAAQS ³
benzene (in VOC)	1 ppm (5 ppm)*	10 ppm (32 ppm)	N/A
nitrogen dioxide	(1 ppm)	3 ppm (5 ppm)	0.053 ppm annual average
sulfur dioxide	2 ppm (5 ppm)	2 ppm (5 ppm)	0.03 ppm annual average (0.14 ppm 24 hour average)
carbon monoxide	35 ppm (200 ppm)	25 ppm	9 ppm
PAHs	0.2 mg/m ³	0.2 mg/m ³	N/A
particulates PM-10	5 mg/m ³	5 mg/m ³	0.05 mg/m ³ annual average (0.15 mg/m ³ 24 hour average)

1. U.S. GPO, 1993. 29 CFR 1910.1000, Table 2.

2. American Conference of Government Industrial Hygienists, 1993. Threshold Limit Values for Chemical Substances and Physical Agents, 1993-1994. Cincinnati, OH.

3. U.S. GPO, 1993. 40 CFR 50.4 to 50.11.

* Numbers in parentheses indicate short-term exposure limits (STEL)

When To Sample

Sampling should be done as long as there is a potential for exposure .

Sampling Method

Industrial hygiene equipment and methods may be used. This may include personal sampling pumps, passive dosimeters, and real-time instruments. In general, the sampling should:

- follow sound industrial hygiene practices and procedures, including taking blank samples, proper sample packaging, etc.;
- be a combination of area samples (e.g., instruments placed on the boom towing boats), and personal sampling on the workers themselves;
- include both short-term peak exposure and time-weighted average, taken over the total length of exposure;
- be done for all substances of concern, making VOCs and particulates the top priority;
- determine background levels before and after the burn; and
- avoid erroneous readings caused by sources of smoke or fuel on the vessels, e.g., exhaust fumes, fuel vapors.

AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB (Continued)

Protection

Responders should use safe operating procedures such as staying upwind of the burn and the slick as much as possible and keeping safe distances from the fire. Responders should use respiratory protection and protective clothing as needed. It should be emphasized that safety risks such as heat and cold stress, falling overboard, or vessel collisions are just as real as chemical exposure, and more acutely dangerous. Responders should receive safety training that should include description of the hazards involved, precautions to be taken, and proper use of the safety equipment.

Monitoring for General Public

The general public usually includes people of all ages. It also includes individuals with allergies and with respiratory, cardiovascular, and other diseases. The vulnerability of these individuals to combustion by-products may be much greater than that of the responders. The distance between the general public and the burning site may vary greatly, depending on the specifics of the burn. The operational guidelines suggest six miles when the wind blows toward shore. However, burns may be conducted closer than six miles if conditions permit. Similarly, a burn may be inappropriate at six miles or a greater distance, if conditions are unfavorable.

Several miles downwind of the burn, levels of vapors evaporating from the slick and gaseous by-products from the fire are expected to be near background levels. Particulate level is the main concern. Based on data from experimental burns and from computer models, the level of particulates in the center of the plume three miles downwind of the burn is expected to be around $150 \mu\text{g}/\text{m}^3$ (McGrattan et al. 1993). If the burning is conducted according to the operational guidelines suggested above, PM-10 levels six miles away from the burn should be significantly lower than $150 \mu\text{g}/\text{m}^3$ in the center of the plume, and much lower than that at ground level. Concentrations at any one location will depend on specific atmospheric conditions at the time of the burn.

Visual Observations

Visual observations should be conducted to track plume direction and height, and to verify that the smoke behaves as predicted by the weather reports. Observations from ships and aircraft should continue as long as the burning takes place.

Monitoring Considerations

In situ burn is a relatively new response technique. There are legitimate concerns about exposure to the smoke plume by the general public and environment. In order to make decisions concerning the continuation of an in situ burn, it is advisable to collect information concerning concentrations of smoke particulates of $10 \mu\text{m}$ (PM-10) or less. Monitoring should be established when there is reason to believe that the weather conditions and/or location of the burn could produce a situation in which the general public or sensitive environments could be affected by fallout from the smoke plume. Depending on circumstances, the burn may be monitored by qualitative assessment (i.e., visual observation) and/or by quantitative methods that employ air sampling.

AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB (Continued)

Exposure Limits

Exposure limits for the general public should be based on the National Ambient Air Quality Standards, which is used by EPA for air quality control. The standard for respirable particulates 10 μm in diameter and smaller (PM-10) is shown in Table 1. To err on the side of safety, this Upper Mississippi River policy adopts an action level of a $150 \mu\text{g}/\text{m}^3$ average over one hour. Concentrations above this level should result in operational measures to control the rate of burn/smoke formation.

Sampling Limitations

In general, air sampling should not be regarded as a requirement for conducting in situ burning but as an option if the situation warrants. Sampling should not be used as the means to determine whether the public is adequately protected: the public should be protected regardless of air sampling. We believe that such protection may be achieved by adhering to operational guidelines. Sampling, however, may be valuable by providing feedback information to the OSC, by increasing the comfort level of both those conducting the burn and those potentially exposed to it, and by collecting data that may be of value for future in situ burning. Trends are more important than a single number. The readings of a real time particulate monitor may fluctuate widely, depending on nearby activity such as passing cars or smoke from fireplaces in nearby houses. A single reading may be misleading. Averaging the concentration readings over a period of time (e.g., 15 minutes) should provide an indication of the trend, that is, whether particulates concentration goes up or remains steady. Visual observations coupled with sampling that could provide the general trend of particulate concentration should be useful in ascertaining the effect of the burn on exposure of the general population to particulates.

It is also important to state clearly the limitations and shortcomings of sampling data. These data should be interpreted correctly, and the numbers should be presented with the associated uncertainty and possible interferences and inaccuracies. Otherwise, the numbers may not mean much or, worse yet, be misleading.

Sampling

Sampling may be conducted for several reasons:

1. To assess exposure levels at different points, in order to provide immediate feed back to the OSC, and to verify visual observations of plume behavior.
2. Validation of air dispersion models
3. To satisfy other scientific or historical data collection needs

Based on previous experience, the concentration of gases in the plume would drop to below the exposure limit within several hundred yards of the burn. Particulate concentration in the center of the plume may remain above the level of concern for several miles downwind. Sampling of particulates should therefore be the main effort.

When To Sample

Sampling is an option that may be exercised anytime during the burn. It may be desirable when there is a potential for exposure (even if it is expected to be below the limit). Therefore, sampling may be done

AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB (Continued)

when the plume drifts over a populated area, over natural resources, or for scientific data collection, at various locations downwind of the burning site. Since the purpose of this sampling is to monitor in situ burning effects on sensitive populations, there is no need to require it when there is no reason to believe that a sensitive population will be affected. If the smoke plume is expected to be carried away from population centers or sensitive areas, sampling should not be required.

Sampling Equipment

Sampling equipment should be:

- Portable, easily deployable, and available when needed;
- Sensitive, accurate, and precise enough to provide meaningful data;
- If possible, provide real-time readings for immediate feedback and, in addition, have the capability to log readings over several hours, to get the average concentration over an extended period of time.

Real-time particulate samplers are commercially available from several manufacturers.

In addition, sampling pumps using filter media may be deployed at various locations. Their data, which is not real time, may be used for exposure assessment, model validation, and to provide information for future in situ burning.

Recommended Air Monitoring Equipment for ISB

The primary health concern for in situ burning is the evolution of particulates from the burning of crude oil, fuel products or other hydrocarbons. Secondly, within the first several hours of the burn, the generation of volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbon's (PAHs) vapors could be additional health and safety concerns in the immediate area. Air monitoring is an important tool in communicating risks involved to the public at an emergency response. If it is determined that a burn will be conducted and there is risk of exposure to a human population center, then air monitoring should be completed (see pages 16 to 19). The Responsible Party (RP) may conduct air monitoring in conjunction with a burn, either independently or with government oversight. The air monitoring results should be immediately reviewed and assessed to determine the effectiveness of the burn and to address any public health concerns.

The U.S. EPA Region 5 and Region 7 Emergency Response Branches and their contractors, along with the U.S. EPA Environmental Response Team (ERT) and United States Coast Guard Strike Teams, are often called in emergencies to conduct perimeter and on site air monitoring. The U.S. EPA regional offices maintain a 24 hour readiness along with contractor support to provide air monitoring equipment at an emergency response. Equipment arrival time would depend on the mobilization time to the scene from the Regional Office. For a spill on the upper Mississippi this would translate to 3 to 10 hours. The Federal On-Scene Coordinator (FOSC) can mobilize additional air monitoring resources from the ERT or from the USCG Strike Teams. The State Emergency Response Coordinator, or local HAZMAT team, can also mobilize air monitoring resources during an emergency.

The ERT in Edison, New Jersey, is on call 24 hours and is equipped and specialized in supporting OSC's in conducting air monitoring. The ERT can mobilize to the site within 12 to 24 hours after being notified

**AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB
(Continued)**

by a FOSC to support air monitoring activities. The United States Coast Guard maintains the Strike Teams to provide assistance to the OSC during an emergency. The Strike Teams are equipped and trained to provide air monitoring, safety monitoring, and other assistance to the OSC as needed. The Strike Teams can mobilize to the site in 12- 24 hours to provide air monitoring assistance.

During an incident when in situ burning is being evaluated, and humans could be exposed to the smoke plume, it is recommended that the Incident Commanders plan to have air monitoring set up prior to and during the burn event. The U.S. EPA and its contractors would immediately mobilize staff and equipment to monitor for particulates using Real Time Aerosol Monitors (RAMs). In addition, carbon monoxide, carbon dioxide, and VOCs can be monitored directly at the burn location. The U.S. EPA Region 5 and 7 offices and their contractors maintain air monitoring equipment to support these operations.

It is recommended that direct reading instrumentation be used to monitor the effectiveness and potential health concerns during a burn. The data should be evaluated, assessed and communicated to the workers and to the public as soon as the results become available. The Real-Time Aerosol Monitors (RAMS), Mini Real-Time Aerosol Monitors (Mini-RAMS), or equivalents, serve as valuable tools to access the particulates in a plume which could impact humans during an in situ burn. The current guidelines for safe levels of particulates are a PM-10 (particulate matter less than 10 microns) concentration of less than 150 micrograms per cubic meter. The proposed Clean Air Act Amendments may change the PM-10 standard. The RAM and Mini-RAM instruments will directly read a measure of the total particulate in milligrams per cubic meter and give real time data for monitoring the particulates in air. The instruments can be used to screen residential areas during an in situ burn so that particulate concentrations can be monitored and the risk to the public and on-site workers may be assessed. The RAMS and Mini-RAMS have been used successfully at tire fires, train derailments involving flaring of hydrocarbons, and other chemical fires where an observable plume is seen.

In addition to the above instruments, the U.S. EPA would mobilize a photo ionization detector, explosimeter, and a portable gas chromatograph to monitor volatile emissions directly at the source of the burn. The U.S. EPA maintains portable gas chromatographs, colorimetric tubes, and fixed sampling pumps, to monitor volatile emissions, PAHs, particulates, carbon monoxide and carbon dioxide during an in situ burn.

The air monitoring equipment described in the following table can be mobilized to an emergency by calling the U.S. EPA Regional Office or the National Response Center.

U.S. EPA Region 5 (24 hour Spill line) (Minnesota, Wisconsin, Illinois)	312-353-2318
U.S. EPA Region 7 (24 hour Spill Line) (Iowa and Missouri)	913-281-0991
National Response Center (Manned by USCG can tie into USEPA regional Office or USCG Office)	800-424-8802

**AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB
(Continued)**

The State Emergency Response Section or Local HAZMAT team can also mobilize air monitoring equipment to the scene. Both can be contacted through the State Emergency Response telephone numbers found in the Notification Section of the UMR Spill Plan (see pages 6-7).

Another resource for air monitoring equipment can be vendors, such as industrial hygiene subcontractors, who rent air monitoring equipment. These vendors can make equipment available within 24 hours of an incident.

The NOAA Scientific Support Team can also provide air monitoring resources from its field office at Louisiana State University. This resource can be activated through the NOAA Scientific Support Coordinator for the Great Lakes and Inland Rivers in Cleveland, Ohio.

The purchase price of the mini-RAM is \$1,400 and the RAM is \$6,700.

Table 2 shows the current inventory of air monitoring capabilities for in situ burning in U.S. EPA Regions 5 and 7.

**AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB
(Continued)**

Table 2. USEPA Regions 5 and 7 Air-Monitoring Capabilities For ISB

EPA Regions 5 (resources located in Chicago, IL, unless otherwise noted)

INSTRUMENT OR TECHNIQUE	TARGET COMPOUND(S)	SAMPLING PERIOD OR TURNAROUND TIME	COMMENTS\ LIMITATIONS
Real-Time Aerosol Monitors	Will yield measure of total particulates, with continuous digital display, concentration ranges from mg/m ³ to mg/m ³ , with option for respirable size selection	Portable particulate monitor. Can provide immediate results once calibrated and in operation; battery operated.	3 units located in Chicago, Illinois; mobilization time determined by distance to site.
Mini Real-time Aerosol Monitors (Mini-RAMs)	Will yield measure of total particulates in milligrams per cubic meter.	Once calibrated, they will give reading 36 seconds after turned on and then a reading every 10 seconds for 500 minutes; can provide time-weighted ave.	2 Units located in Chicago, Illinois, mobilization time determined by distance to site.

EPA Region 7 (resources located in Kansas City, KS, unless otherwise noted)

Combustible Gas and Oxygen Alarm Model 261	Measures levels of oxygen and flammables	Real-time monitoring	Indicates whether it is safe to enter an area; won't measure mists of some oils.
Miniram (Total particulate Miniature Real-time Aerosol) Model PDM-3	Will yield measure of total particulates in milligrams per cubic meter.	Once calibrated, they will give reading 36 seconds after turned on and then a reading every 10 seconds for 500 minutes.	Three available at START KC office. Could be zeroed out before ignition of spill. No analysis of components of particles measured.

**AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB
(Continued)**

Table 2 continued

INSTRUMENT OR TECHNIQUE	TARGET COMPOUND(S)	SAMPLING PERIOD OR TURNAROUND TIME	COMMENTS\ LIMITATIONS
Gilian Personal Sampling Pumps HFS Air Sampling Systems	Capable of sampling for wide range of compounds, including PAHs.	Sample duration of at least 4 hours necessary, longer for some compounds.	START has access to 15 and there are 15 at EPA Region 7. A realistic startup is 48 hours after notice, because of need for charging and calibration, and purchase of unique sampling trains, which include absorbent tubes, cassettes, filters and microimpinger traps.
Draeger Tubes	Region has tubes for H ₂ S, CO, CO ₂ , TPHs, SO ₂ , benzene, toluene and xylenes. No PAH tube on market.	Real-time results that are quasi-quantitative.	Almost instantaneous results. EPA also has Sensidyne kits, which will give similar results.
OVAs	Provides concentrations of unidentified total volatiles.	Gives real-time results of total volatiles.	3 OVAs in KC START office, 2 in St. Louis; it does not provide chemical-specific results
HNu	Provides analysis of total volatiles present; some limitations in reading, compounds depending on span in photo-ionization detection (PID) lamp.	Gives real-time results of total volatiles.	3 Hnu's in KC START office, 2 in St. Louis; use limited in wet conditions; soot during burn would likely coat lamp, making it unusable. No chemical-specific results.

**AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB
(Continued)**

Table 2 continued

INSTRUMENT OR TECHNIQUE	TARGET COMPOUND(S)	SAMPLING PERIOD OR TURNAROUND TIME	COMMENTS\ LIMITATIONS
TVA-1000	Analysis of total volatiles, with both flame ionization detector and photo-ionization detector.	Gives real-time results of total volatiles. Can be set for 8-hour exposure mode.	2 Available in KC START office; lamp of PID less exposed to moisture and soot, so of a little more use than Hnu.
Monitox	Designed for confined space, rather than ambient sampling. Only H ₂ S and HCN available.	Designed to show whether threshold levels of gases exist.	2 of each in KC START office.
Polyurethane foam (PUF) samplers	Could be used to collect volatile and semivolatile samples; use on PAHs in region been very limited.	Sampling durations of several hours -- up to 3 days -- are standard.	Eight are regularly available in Kansas City, but more are available from other regions. Require power source.
PM-10 Air Samplers	Will measure particles of <10 microns.	Sampling durations of several hours are required.	Require power source; is a radioactive element involved.
Single Point Monitor from MDA Scientific	Inorganics, including ammonia, hydrogen cyanide and sulphuric acid	The SPM is designed to work with specific key, and cassette, which must be kept frozen. They are not kept on hand by START. Acquisition time would be 48 hours.	The setup time and limitation of sampling to such analytes as cyanides, acids and amines makes its use during any in situ burn response unlikely.

**AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB
(Continued)**

Table 2 continued

INSTRUMENT OR TECHNIQUE	TARGET COMPOUND(S)	SAMPLING PERIOD OR TURNAROUND TIME	COMMENTS\ LIMITATIONS
Summa Canisters	Summas can be used to collect a wide range of volatile compounds, but they do not lend themselves to collection of semi-volatiles, particularly PAHS, which stick to the inside of the canister.	Sampling periods vary from minutes to several hours. 24-hour analytical turnarounds are possible.	Real-time applications must be tied to presence of Mobile Laboratory or use of portable GC, such as Photovac. Not applicable to nonvolatiles.
Portable Gas Chromatograph, Photovac	Volatile Compounds	Estimated 2-3 hours after arrival at spill.	The Photovac has been used primarily to analyze head space samples from soil in the region. It has the potential to analyze air samples collected in Summa canisters, but it is necessary to extract samples collected from Summas. It does not lend itself to analysis of semi-VOCs.
EPA Mobile Lab	Can measure volatiles from samples collected from air, water or soil.	Will ultimately be capable of prompt turn-around of field samples collected in Summas or soil-gas bottles. The Lab is currently being retrofitted and updated.	Mobile Lab must be driven to spill site; it will require four additional hours to calibrate equipment. Some extractions will require 24-48 hours. Could be used for samples containing VOCs, semi-VOCs, PCBs and PAHs.

**AIR MONITORING GUIDELINES FOR HUMAN HEALTH IMPACTS OF ISB
(Continued)**

Sampling Location

Sampling location should be based on priority concerns, with the first priority given to population centers downwind of the burn. For scientific data collection, (e.g., model validation) we recommend that samplers be placed at different distances from the burn to collect particulate concentration data at ground level. Data collected would be extremely valuable for future burns.

If it is determined that sampling is needed, real-time particulate samplers (PM-10) should be positioned on: 1) the shoreline, at the expected centerline of the plume; 2) at the population center of concern; and 3) in several locations in the vicinity of the population downwind of the burn. PM-10 samplers which can operate for more than eight hours, can collect PM-10 reading before the burn commences, (to gather background data during the burn), during the actual burn, to assess the burn effect; and, if possible, after the burn is over, to collect post-burn readings. Sampling results should be relayed to the FOSC. If it is established that the readings exceed the level of concern, the FOSC will be so advised.

Other Sampling Considerations

1. Area background readings should be taken before and after the burn to determine baseline levels.
2. EPA and regional air monitoring stations may be able to assist by providing historical data, and by conducting air sampling during the burn itself.

PUBLIC NOTIFICATION FOR ISB

Notification of the public of an impending burn is critical to the overall success of an in situ burn effort. The notification, coordinated through the joint information center, should focus on conveying the following messages:

- Burning is a simple, well understood, and controlled practice.
- Strict health and environmental criteria are being used in deciding whether or not to burn.
- Burning is being conducted because it presents the opportunity for greater health and environmental protection than could be achieved by other spill response methods or no response.
- Health and environmental precautions will accompany burning.
- The burns will be carried out by specially trained personnel and will be closely monitored.
- The public will be notified of each burn before or as it begins.

Public notification can be initiated through radio/TV broadcasts, and broadcasts to mariners. If necessary, local government and state emergency service personnel with access to established public warning systems and authority to use them can facilitate this notification.

Materials to educate the public and media about burning, its risks, tradeoffs with other countermeasures should be developed ahead of time and available for dissemination during the burn. This material would cover the trade-offs involved in choosing response countermeasures, and relate the risks of in situ burning to better known risks (i.e. forest fires). Distribution of this information can be through the agencies' public affairs offices prior to a spill and through a joint information center established during a spill.

Suggested Public Notice for ISB

At (time) on (date), a release of oil occurred at (location). Following an evaluation of the situation, local, state, and federal officials have determined that burning the oil in place is the safest and most effective way to protect the public health and environment. The burn will be conducted under controlled conditions to ensure that the fire will not threaten the public, property, or environment.

The decision to burn was made after considering strict health and environmental criteria. Officials have determined that the burning will present an opportunity for greater health and environmental protection than can be achieved by using other spill response methods, including not responding. Health and environmental precautions will accompany the burning.

The burns will be carried out by specially trained personnel and will be closely monitored. The burn will begin at approximately (time), and the public will be advised when the burn is complete. Questions should be directed to (person or organization) at (telephone number).

ECOLOGICAL CONSIDERATIONS FOR ISB

Open Water ISB

Potential ecological impacts of open water in situ burning have not been extensively discussed or studied. Conclusions are based on documented physical effects observed in the laboratory and at limited test burns.

The surface area affected by in situ burning is likely to be small relative to the total surface area and depth of a given body of water. This does not necessarily preclude adverse ecological impacts, particularly if rare or sensitive species use the waters in question. Organisms that may be affected by in situ burning include those that use the uppermost layers of the water column, those that might come into contact with residual material, and possibly some benthic (bottom-dwelling) plants and animals.

Direct Temperature Effects

Burning oil on the surface of the water could adversely affect those organisms at or near the interface between oil and water, although the area affected would presumably be relatively small. Observations during large-scale burns using towed containment boom did not indicate a temperature impact on surface waters. Thermocouple probes known to be in the water during the Newfoundland burn showed no increase in water temperatures during the burn (NOBE Facts, January 1994). It appears that the length of time the burning layer resides over a given water surface may be too brief to change the temperature due to the fact the ambient temperature water is continually being supplied below the oil layer as the boom is towed.

Surface Microlayer

Role and importance of the surface microlayer - The surface of the water represents a unique ecological niche called the "surface microlayer," which has been the subject of many recent biological and chemical studies. Although most studies of the microlayer have been conducted in the marine environment, the results can also be applied to the freshwater environment. The microlayer, variously defined but often considered to be the upper millimeter or less of the water surface, is a habitat for many sensitive life stages of aquatic organisms, including eggs and larval stages of fish and crustaceans, and reproductive stages of other plants and animals. The microlayer also is a substrate for microorganisms and, as such, is often an area of elevated microbial population levels and metabolic activity.

Potential effects of burning on the surface microlayer - The ecological importance of the surface microlayer and the potential impacts to it from burning activities have been discussed in the different, but related, context of ocean incineration. The Office of Technology Assessment (1986) noted in an evaluation of the technique,

... given the intermittent nature of ocean incineration, the relatively small size of the affected area, and the high renewal rate of the surface microlayer resulting from new growth and replenishment from adjacent areas, the long-term net loss of biomass would probably be small or non-existent.

Despite the obvious differences between shipboard incineration of hazardous wastes and surface burning of spilled oil, the above rationale is applicable to in situ burning. Accordingly, potential impacts to the ecologically important surface microlayer are, to some extent, offset by the presumably short-lived nature of the burn and its associated residual material.

ECOLOGICAL CONSIDERATIONS FOR ISB (Continued)

Environmental Toxicological Considerations

Although many studies to define the physical and chemical characteristics that result from in situ burning have been performed, there has been little research on potential ecological effects. To address some of these information shortfalls, Environment Canada coordinated a series of studies to determine if in situ burning resulted in water column toxicity beyond that attributable to allowing the slick to remain on the surface of the water. While these studies centered on the Newfoundland in situ burn field trials conducted in August, 1993, they also included laboratory tests to investigate potential effects in a more controlled environment.

Toxic effects were evaluated using three standard marine test organisms: sand dollar, oyster, and fish. In both the laboratory and the field experiments, sensitive toxic endpoints in these organisms were studied in the three situations of no oil, no burning; oil on water, no burning; and oil on water, burned. Results from the laboratory and field studies indicated that although toxicity increased in water samples collected below burning oil on water, this increase was generally no greater than that caused by the presence of an unburned oil slick on water. Chemical analyses performed in conjunction with the biological tests reflected low hydrocarbon levels in the water samples. In addition to water column samples, the residues remaining after the laboratory and Newfoundland field burns will be subjected to aquatic toxicity testing.

Beyond the direct impacts caused by high temperatures, the by-products of in situ burning may be toxicologically significant. Although analysis of water samples collected from the upper 20 cm of the water column immediately following a burn of crude oil yielded relatively low concentrations of total petroleum hydrocarbons (1.5 ppm), compounds that have low water solubility or that associate with floatable particulate material tend to concentrate at the air-water interface (U.S. EPA 1986). Strand and Andren (1980) noted that aromatic hydrocarbons in aerosols originate from combustion associated with human activities, and that these compounds accumulate in the surface microlayer until absorption and sedimentation remove them.

Burn residues could be ingested by fish, birds, mammals, and other organisms, and may also be a source for fouling of gills, feathers, and fur. However, these impacts would be expected to be much less severe than those manifested through exposure to a large, uncontained oil spill.

Contamination is likely to be local in scale affecting certain unique populations and organisms that use surface layers of the water column at certain times to spawn or feed. In crafting an effective and protective response strategy, these effects should be weighed against effects resulting from alternative actions.

SAFETY AND HEALTH CONSIDERATIONS AND BY-PRODUCTS OF ISB

Safety of Response Personnel

The safety of personnel during both ignition and burn phases of large amounts of combustible liquids on the surface of the water presents some unique safety concerns for workers and response personnel. Many of these concerns are addressed in greater detail in operationally oriented references and include, but are not limited to the following:

Fire Hazard - Care must be taken that the burn be controlled at all times to ensure the safety of personnel and property. This precludes burning at sources such as tankers, ships, or tank farms unless means are taken to ensure that the flame cannot propagate from the burn location to the source.

Ignition Hazard - Personnel and equipment involved in ignition of the oil slick must be well coordinated. Weather and sea conditions need to be kept in mind and adequate safety distances be kept at all times. Specialized ignition equipment, unknown fire behavior and uncertain flash-points introduce safety risks.

Vessel Safety - Burning at sea may involve the use of several vessels operating in close proximity, perhaps at night or in conditions of poor visibility. These conditions are hazardous by nature and generally require training and close coordination. Maneuverability while towing boom or positioning other containment equipment will require skilled personnel.

Training - Training of personnel to operate equipment for in situ burning should be developed to minimize the risk of injury and accident. Training should meet all applicable OSHA regulations and guidelines.

Response personnel working in close proximity to the burn may be exposed to levels of gases and particulates that may require the use of personal protective equipment. Training for burn personnel should include proper use of use of personal protective equipment which may be used to minimize inhalation of, and skin contact with, combustion by-products. Exposure limits such as OSHA's PELs (Permissible Exposure Limits) are applicable to this group of typically healthy adults.

Other hazards can include the exposure of personnel to extreme heat conditions, smoke and fumes; working under time constraints or extended periods of time. Personnel involved with burning operations must be well briefed on the plan of operations, with safety stressed, and must be notified of all changes from the approved burn plan. The need for burning must be constantly evaluated and should be reconsidered if conditions (e.g., weather, operations, equipment) pose a threat or danger to human health and safety, or facilities. As more knowledge is gained from burning, it is most likely that additional safety concerns will be identified.

General Public Health Considerations

Burning oil produces a visible smoke plume containing smoke particulates, combustion gases, unburned hydrocarbons, residue left at the burn site and other products of combustion. It also results in the evaporation and release of volatile compounds from the oil. Public health concerns relate to the chemical content of the smoke plume and the downwind deposition of particulates. It should be noted that not burning an oil spill also introduces its own air quality concerns. Analysis of the physical behavior of

SAFETY AND HEALTH CONSIDERATIONS AND BY-PRODUCTS OF ISB

(Continued)

spilled oil has shown that 50 percent of a light crude oil spill can evaporate fairly readily, and it is the acutely toxic lighter fractions of a crude oil mix that quickly move into the atmosphere.

Results of recent burn tests indicate that in situ burning does not yield significant emissions above that expected for similar types of combustion such as forest fires. Many human health experts feel that the most significant human health risk resulting from in situ burning is inhalation of the fine particulate material that is a major constituent of the smoke produced. An early assessment of health concerns attributable to the Kuwaiti oil fires identified the less than 10-micron particulate matter as representing the greatest health hazard in that situation. The extent to which these particles present a health risk during an in situ burn depends on the concentration and duration of exposure. It is important to remember that particulates in these concentrations are so small that they do not settle readily. They will be carried by the prevailing wind over large distances, over which their concentrations will rapidly decline.

Polynuclear aromatic hydrocarbons (PAHs) are a group of hydrocarbons produced during in situ burning. They are found in oil and oil smoke, where their relative concentration in the latter tend to be higher than in the oil itself. Possible carcinogenicity of some members make this group a serious health concern, although it is generally long-term exposure to the higher molecular-weight PAHs that is the basis for concern. Sulfur dioxide (SO₂) and nitrogen dioxide (NO₂) are eye- and respiratory tract irritants that are produced by oil combustion. Concentrations of PAHs decline downwind as smoke from the fire is diluted by clean air. The concentrations of other by-products of burning oil (i.e., combustible gases) also decline downwind.

Burning should not be allowed if downwind human populations are at risk. The downwind extent of human risk has not been empirically determined although it is an area of very active research. There are no exposure standards for respirable particles generated by a burn that could be applied directly to determine safe downwind distances. Atmospheric dispersion models, if available for the specific area, could be utilized to help refine potential downwind exposures. If models are not available, whenever possible, a small pilot burn could be conducted before a larger burn in order to gauge the effectiveness of the ambient conditions to disperse the smoke and gasses resultant from the burned material. Because wind direction meanders under most circumstances, no population should be within a 45° arc to either side of the wind direction. Local wind and weather events (e.g., air stability class, lake breezes, and frontal passages) must be considered when determining downwind directions.

By-products

By-products of in situ burning exist because no combustion process is completely efficient in oxidizing a given source material. Besides the normal results of burning, CO₂, H₂O, and an assortment of other sulfur and nitrogen residues, a wide range of intermediate combustion products are generated. Although the exact mix of burn residues varies, by products can be categorized into three groups: unburned oil, airborne components, and combustion residues.

OPERATIONAL CONSIDERATIONS FOR CONDUCTING ISB

Open Water Burning

An open-water in situ burning technique most likely to be used would involve the use of boats towing fire resistant booms that could be used to contain the spilled oil and keep it from spreading. The boom, attached to the boats by towing lines, would be towed such that it forms a U shape. The open end of the U is maneuvered through the oil slick, and a "boomfull" of oil is collected. The boom is towed away from the main slick and the oil is ignited. During the burning the boom is pulled in such a way as to slowly advance ahead to ensure that the oil is concentrated at the back end of the boom and to maintain maximum thickness. A burn can be terminated by letting the oil layer thin out by releasing one end of the boom. After the oil is consumed the process is repeated. Other techniques may include containing the oil continuously spilling from a burning oil rig, or placing fire boom around a tanker that caught fire.

Burning in Other Inland Environments

Although it is widely held that in situ burning does take place in the inland zone, little technical information exists on techniques and impacts of burning in environments other than open water. In most cases these involve burning in ice conditions and in wetlands and the results are varied and anecdotal.

Burning in Ice/Winter Conditions - Containment is almost always required to maintain the minimum 2-3 mm thickness necessary to burn oil. Ice edges can act as natural barriers, and as long as the oil is of sufficient thickness, combustion is possible. However, wind and/or low currents may be necessary to herd the oil into sufficient thickness along the edge. Oil trapped under the ice may also accumulate in sufficient thicknesses along leads in broken ice resulting in favorable conditions for burning. Test burns in a 1986 Esso wave basin showed burning efficiencies of up to 90% where moderate winds herded the oil into long narrow leads. Burning in other lead geometries and along brash ice resulted in less efficient burns. Arctic studies have also shown it is possible to ignite and burn fresh, weathered, and emulsified oil at temperatures as low as -35°C. It is important to note that an in situ burn in broken ice is not easily extinguished once ignited

Burning oil in snow conditions is similar to burning oil on water since as the snow melts during the burn it can form a meltwater pool upon which the oil continues to burn. Certain conditions such as wind, snow properties, and concentration of the oil in the snow all can impact the success of the burn. Burn efficiencies of 90-99% have been shown during field studies and actual spills. Oil/snow mixtures of up to 75% can be ignited with a diesel or gasoline soaked rag. [This section was from *Detection of Oil in Ice and Burning Oil Spills in Winter Conditions*, PROSCARAC, Inc., March 1992]

Fire Resistant Boom

The application of in situ burning requires the physical collection and containment of oil to maximize the efficiency of the burning process and to provide a means to control the burn. Generally, this is accomplished by the use of a fire boom or some type of fire resistant containment. If fire boom or other fire containment device is not available and/or the equipment to deploy the boom is unavailable or inadequate, approval for use of in situ burning may be denied.

OPERATIONAL CONSIDERATIONS FOR CONDUCTING ISB (Continued)

Ignition

Heavy oils require longer heating times and a hotter flame to ignite compared to lighter oils. Many ignition sources can supply sufficient heat. These include pyrotechnic igniters, laser ignition systems, and aerial ignition systems. Pyrotechnic devices have been successfully used to ignite floating oil slicks under a range of environmental conditions. Disadvantages to their use are associated with safety, shelf life, availability, speed of deployment, and cost (Spiltec, 1987). Laser ignition, while a promising technique, remains experimental in nature with drawbacks associated with difficulties in beam focusing from the air, wind effects during oil preheating, energy requirements, and cost. Aerial ignition systems using gelled gasoline dropped from helicopters appear to be a more viable technique applicable in a range of environmental conditions. Whichever method is used considerations of safety and efficiency must enter into the decision process.

Oil Thickness

In general, oil slicks can be effectively burned if they are consistently 2 to 3 mm thick. This number can vary with oil viscosity and degree of weathering, with more viscous and more weathered oils requiring a considerably thicker layer of oil (estimated to be nearly 10 mm). Also, burn efficiencies increase as thickness of the slick increases. This consideration, therefore, implies that spilled oil must be contained by some means (fire resistant boom, ice, etc.) in order to prevent oil spreading and the resultant thinning of surface layers.

Effects of Weathering

Weathered oil requires a longer ignition time and higher ignition temperatures. However, igniting weathered oil is generally not a problem with most ignition sources because they have sufficient temperature and burn time to ignite most oils. Weathering, as it affects the ability to burn oil, is currently under study in laboratory and field experiments.

Effects of Emulsification

The effect of water content on oil ignition is thought to be similar to that of weathering, in that it decreases ignitability and combustibility. However, oil containing some water can be ignited and burned. The controlling factor in the combustion of emulsions is the removal of water, which is accomplished either through the boiling of the water out of the emulsion, or by breaking the emulsion thermally or chemically. The effect of emulsions on the ability to burn oil is currently under study in laboratory and field experiments.

Unburned Oil and Solid Burn Residues

Although in situ burning has the potential for removing a large proportion of the mass of an oil spill from the water surface, some of the source material will not be consumed and will remain as a concern. Similarly, combustion residues, described as stiff, taffy-like material will remain after the burn. Provisions for the removal of these materials must be made as the potential exists for undefined levels of shoreline impacts even with a successful burn.

OPERATIONAL CONSIDERATIONS FOR CONDUCTING ISB
(Continued)

Although sinking of burn residues has seldom been observed in test burns, a slight increase in density relative to the original oil has been observed. In the 1991 explosion and burning of the tanker *Haven* off Genoa, Italy, burn residues were thought to have sunk. Reliable estimates of the amount of oil actually burned were not possible, but the tanker was laden with 141,000 tons of Iranian heavy crude, and very little remained in the wreck following the accident and fire. It was reported that several surveys during 1991 confirmed that there was sunken oil offshore and along the coast. The sunken oil is now thought to have resulted from the extraordinary heating of the contained product inside the cargo holds of the vessel. This oil basically underwent a crude distillation, in which lighter components were driven off and a denser—and in this case, heavier than sea water—material remained.

It should be emphasized that the circumstances specific to this situation should not be used as the basis for generalization in all burning scenarios.