Great Lakes Fleet Fuel Facility Spill

04 January – 26 January 2011

Background Information:

The Canadian National (CN) dock in Two Harbors, Minnesota consists of two types of waterfront facilities.

The first, operated under the CN name, is a dry bulk loading facility handling taconite.

The second, operated under the Great Lakes Fleet name (a subsidiary of CN), is a bulk oil transfer facility consisting of two Marine Transportation Related transfer sites on Pier 2 and a Non-Marine Related tank farm.

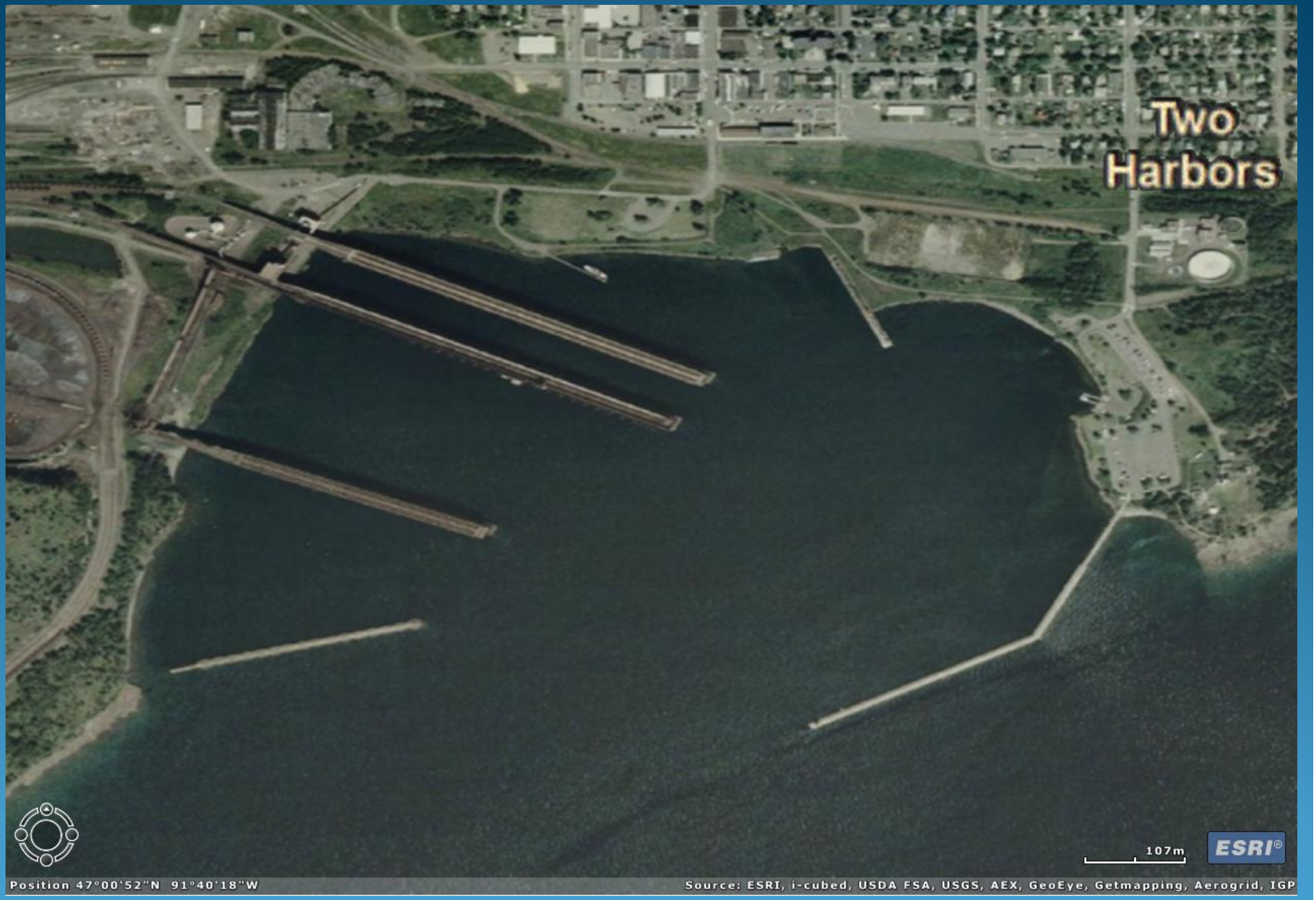
Background Information:

Pier 2 at the CN dock is approx. 1200 feet in length.

Built in the early 1900's, the pier was originally of wooden construction and was shorter in length. When the pier was retro-fitted, a concrete slab was poured over the existing structure and the pier was extended by creating several concrete cells which were filled with dirt and gravel and covered with a concrete slab.

Background Information:

The pipeline from the tank farm runs underground until it reaches Pier 2. From there it emerges from the ground and runs approximately eight feet above the Pier 2 deck until it reaches the pump house at the end of Pier 2, where it branches out to the north and south transfer areas at the end of the pier.


Two
Harbors
107m
ESRI
Position 47°00'52"N 91°40'18"W
Source: ESRI, i-cubed, USDA FSA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGP


34m
ESRI
Source: ESRI, i-cubed, USDA FSA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGP

Discovery:

04 January 2011; Approximately 0843

Crew of the M/V EDGAR B. SPEER discovered a sheen near the end of Pier 2 at the CN Dock.

The crew of the M/V EDGAR B. SPEER deployed absorbent boom and initiated notification procedures, including notifying the crew of the M/V AMERICAN SPIRIT, who also deployed boom and their small boat.

Initial Notification:

0945 - MSU Duluth received notification of a sheen at the CN Dock. (NRC Report 963667)

The discharge was reported by Gallagher Marine Systems on behalf of American Steamship Co.

Initial report was of a 5 ft by 10 ft sheen.

The Reporting Party believed the sheen was a result of a previous discharge from a vessel at the facility.

Initial Response:

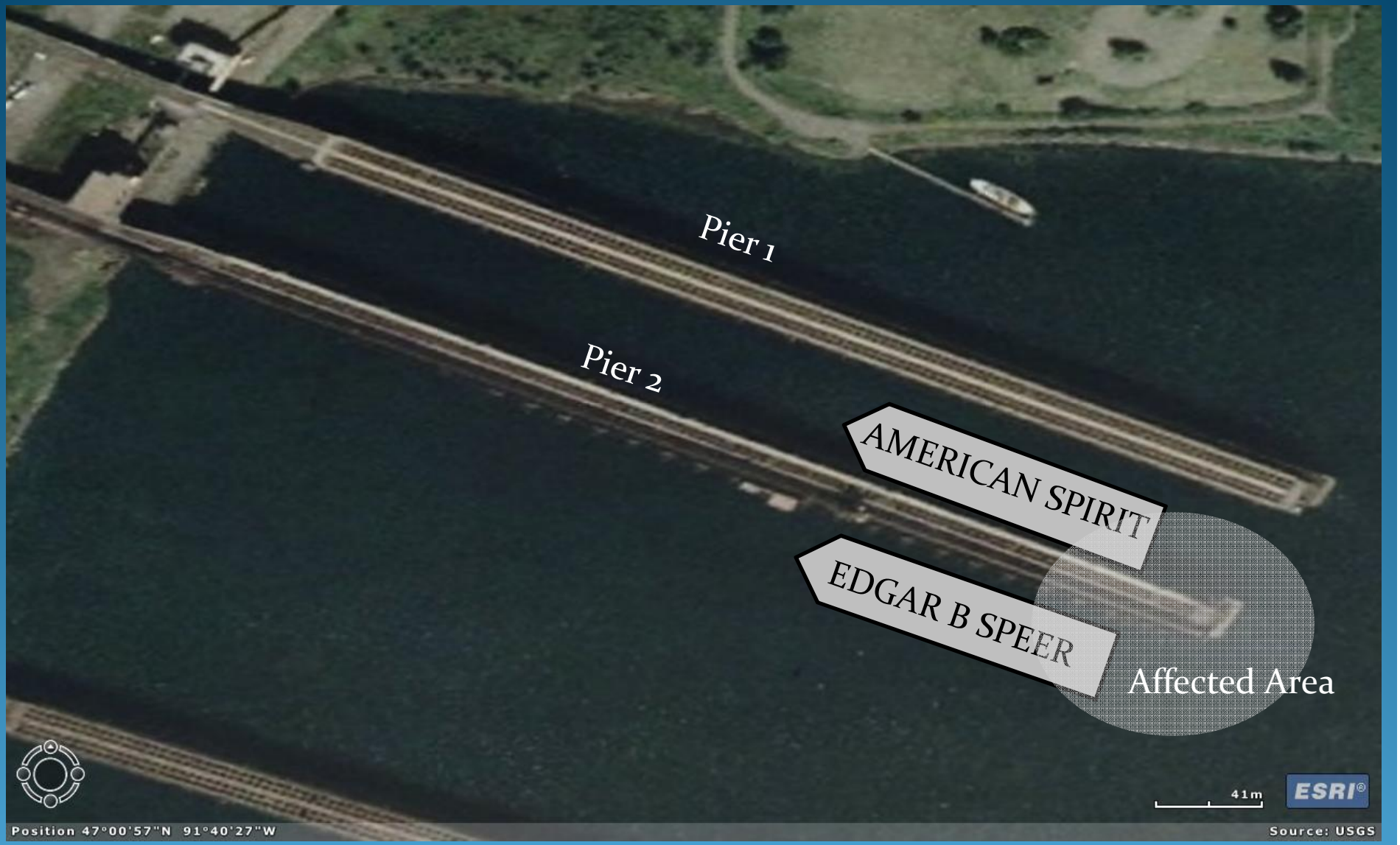
Two MSU Duluth Pollution Investigators (PI) arrived at the facility at approximately 1025.

The PIs observed sheen on the water, two vessels on scene, and both vessel's crews conducting clean up.

On Scene Weather:

Air Temperature: 1 F

Wind: 15 mph NNW


Pier 1
Pier 2
AMERICAN SPIRIT
EDGAR B SPEER
Affected Area
41m
ESRI
Position 47°00'57"N 91°40'27"W
Source: USGS

Investigation:

The PIs began the investigation on board the M/V AMERICAN SPIRIT. After interviewing the crew of the M/V AMERICAN SPIRIT no sheen was observed in the water.

The investigation continued on board the M/V EDGAR B. SPEER.

Samples were collected from both vessels and the facility for comparison analysis of oil collected from water.

Investigation:

During the course of the investigation it was learned that the facility, Great Lakes Fleet, had spilled approximately 30 gallons of heavy fuel oil onto the pier approximately one month earlier when a valve on the piping failed.

No fuel oil was observed in the water during this previous spill.

Investigation:

At approximately 1730 additional PIs and a Marine Inspector arrived on scene.

Further investigation of the fuel oil spill from the month before led to the discovery of a hole in the deck of the pier.

After removing the layer of ice covering the hole, oil was observed in the cavity below the pier.

Complications to Investigation:

While the discovery of the hole in the pier occurred early on in the investigation, the lack of appropriate pier schematics prevented the responders from knowing the extent of the cavity under the pier.

The pier's structural information arrived on scene 11 January 2011.

Recovery Operations:

05 January 2011

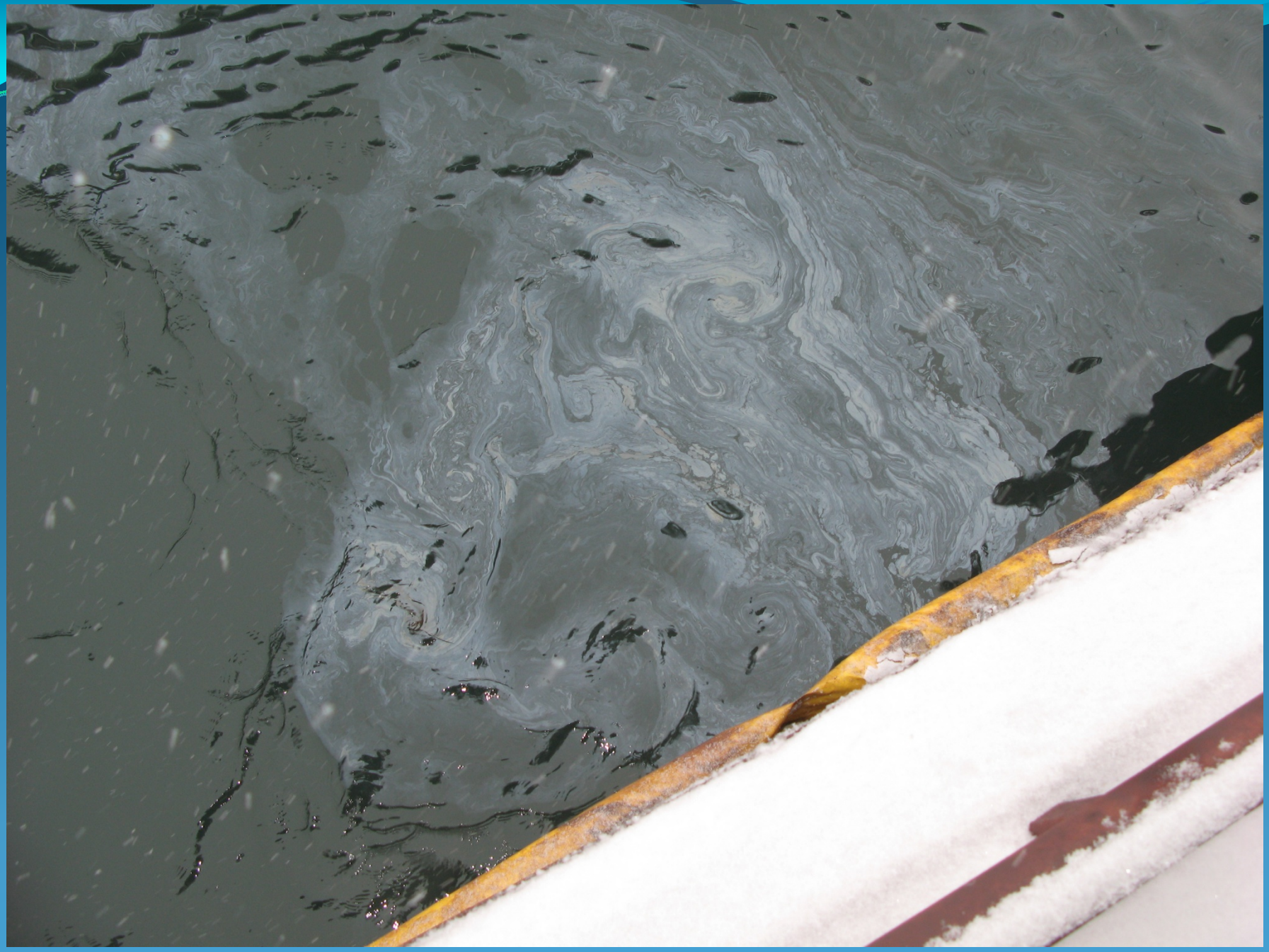
Facility personnel began cutting open the pier to gain access to the cavity below in order to conduct clean up.

However, due to the lack of proper data, the opening was not fully expanded for a week, once the engineers determined that doing so would not create structural instability of the pier.

Recovery Operations:

During the clean up small sheens and tar balls appeared sporadically, especially during and shortly after vessel movement around the piers.

It became apparent that there was a hole in the bulkhead that was allowing water to surge into and out of the cavity under the pier, carrying the oil with it.



Recovery Operations:

Clean up operations continued without any significant developments.

The facility continued to open the cavity, remove oil with sorbent pads, and remove contaminated substrate.

Recovery Operations:

11 January 2011

Divers from Indiana arrived on scene and began to deploy sediment curtain to catch tar balls as they emerged from bulkhead.

As pollution responders were departing the scene, additional oil was observed surfacing deeper in the slips after the M/V JOSEPH L. BLOCK shifted.


41m
ESRI
Position 47°00'57"N 91°40'27"W
Source: USGS

Recovery Operations:

An investigation into the source of the oil deeper in the slips was initiated.

The PIs investigated the possibility that there could have been oil saturated into the ground that was leaching into the water.

During the investigation the PIs checked all the bulkheads around the slips as well as the storm water systems and found no trace of oil.

Recovery Operations:

A meeting with CN personnel was held to discuss the potential need to drill test wells on the facility to determine if there was oil in the ground water.

CN personnel indicated that the Minnesota Pollution Control Agency had required the facility to drill test wells previously and monitor for pollution.

A review of the data from the previously drilled wells indicated that there was no oil pollution in the ground water.

Recovery Operations:

During the investigation, areas where water flowed freely between the slips were identified under Pier 1 and Pier 2.

It was determined that tar balls were being moved around under the water by vessel movement.

Once the tar balls surfaced they immediately broke up into rainbow sheen and completely dissipated within a few minutes.

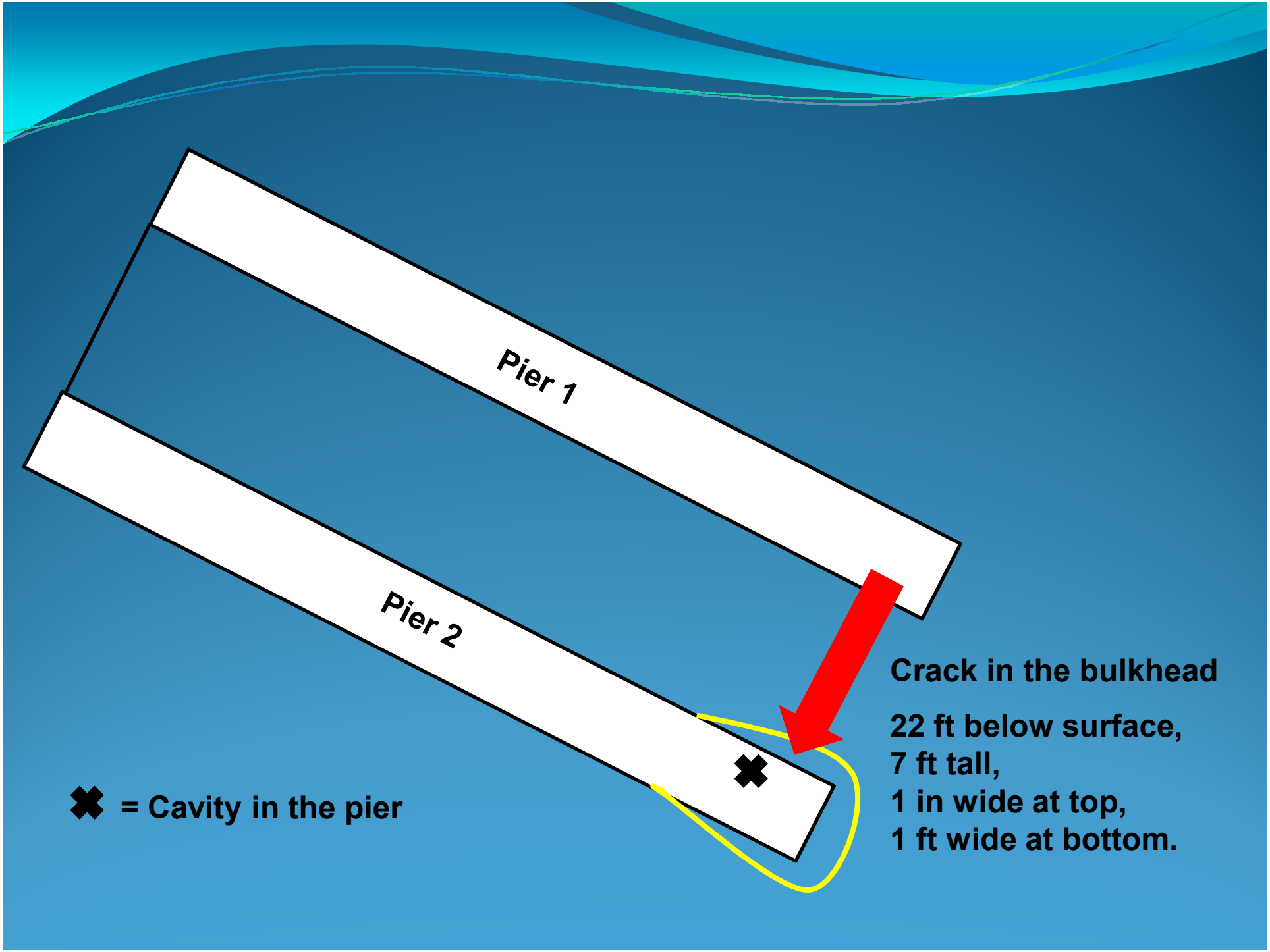
Ping Pong Ball sized tar ball just underneath the surface moving deeper into the slip after the M/V JOSEPH L. BLOCK shifted.

Recovery Operations:

12 January 2011

The sediment curtain was installed and no more oil movement in the slips was observed and all sheen and tar balls remained inside containment boom.

While inspecting the bulkhead, the divers found a crack on the north side of Pier 2.


Pier 1
Pier 2
Crack in the bulkhead
22 ft below surface,
7 ft tall,
1 in wide at top,
1 ft wide at bottom.
✖ = Cavity in the pier

Recovery Operations:

13 January 2011

The divers blew compressed air into the crack in the bulkhead which forced approximately one gallon of oil into the cavity under the pier, which was recovered with sorbent material.

This process was repeated several times per day until no more oil was entering the cavity. (16 January 2011)

Recovery Operations:

One of the divers deployed a camera into a submerged cavity to the north of the opened cavity and found approximately six pea sized tar balls and one ping pong ball sized tar ball.

Sorbent boom was stuffed into the cavity to recover this oil.


Location of alternate cavity where oil was recovered with absorbent boom
WERNER

Complications to Recovery Operations:

There were several complications to the recovery operations.

The lack of structural data mentioned earlier delayed the commencement of recovery.

The cold conditions also hampered recovery efforts. The temperatures frequently dropped below 0 F, reaching as low at -20 F and there were strong winds keeping the wind chill well below zero.

Complications to Recovery Operations:

The cold temperatures had a substantially negative impact on the dive operations.

The water temperature was near freezing, resulting in very short dive times.

Also, the dive crews were suffering from multiple equipment failures due to the cold, preventing them from conducting operations for several days.

Complications to Recovery Operations:

One of the biggest complications to the recovery operations was the fact that the shipping season was in the final weeks of operation before the vessels entered temporary lay up.

The facility was receiving multiple vessels per day in the affected area. The dive operations had to be scheduled around the vessel operations at the facility.

Additionally, every time a vessel maneuvered around Pier 2 oil and tar balls were scattered throughout the slips.

Bulkhead Repair:

26 January 2011

No oil or traces of oil have been observed in the water outside the pier for nearly one week.

The divers have made significant repairs to the bulkhead.

Coast Guard oversight of the recovery and repair operations terminated. The threat of additional discharge considered to be minimal.

Results of Coast Guard Investigation:

On the initial day of the discharge there were three obvious, potential sources:

The Great Lakes Fleet Fueling Facility

M/V AMERICAN SPIRIT

M/V EDGAR B. SPEER

Samples were taken from all three sources as well as clean water and spilled oil samples.

Results of Coast Guard Investigation:

The results of the analysis of the Coast Guard Marine Safety Laboratory determined:

M/V AMERICAN SPIRIT did not match the spilled oil,

M/V EDGAR B. SPEER fuel samples matched the spilled oil,

Great Lakes Fleet Fueling Facility sample and sample of fuel oil from the cavity in the pier matched spilled oil.

Results of Coast Guard Investigation:

It was determined that the reason that the M/V EDGAR B. SPEER matched the spilled oil sample was due to the fact that this facility is the only place the vessel receives fuel and received fuel from the facility three days before the un-reported spill at the facility.

Due to the results of the oil spill analysis report, the fact that oil was found inside the cavity under Pier 2, and that pollution investigators witnessed oil emerging from the bulkhead, the Great Lakes Fleet Fueling Facility was determined to be the Responsible Party

Lessons Learned:

(1) Investigations need to continue beyond 'obvious' sources of discharges.

(2) Plans for dock structures and other aging port infrastructure may not be readily available for examination, slowing down the investigation and capacity to initiate response activities.

(3) Potentially responsible parties are well-advised to verify cold water diving capabilities of contractors they may seek to use; likewise contingency plans should reflect this capability or lack of capability.

Lessons Learned:

(4) Continuity of pollution investigators/responders over a lengthy investigation/response promotes successful incident management.

(5) Awareness of previous site history is important.

(6) Proper personal protective equipment (PPE) is essential during extreme weather conditions, and must be funded and acquired in advance of need.

(7) Partnership efforts with other agencies, cleanup contractors and potential responsible parties creates dividends and is in the best interest of the public.

Questions?

Thank you for your time