

Liquid Asphalt Releases in Aquatic Environments Workshop

October 21, 2009

Case Study #1 – CSO Barge

Chicago Ship & Sanitary Canal – January, 2005

Overview: Due to undetermined causes, barge carrying 600,000+ gallons of Clarified Slurry Oil (CSO) suffers explosion and fire in heavily populated area.

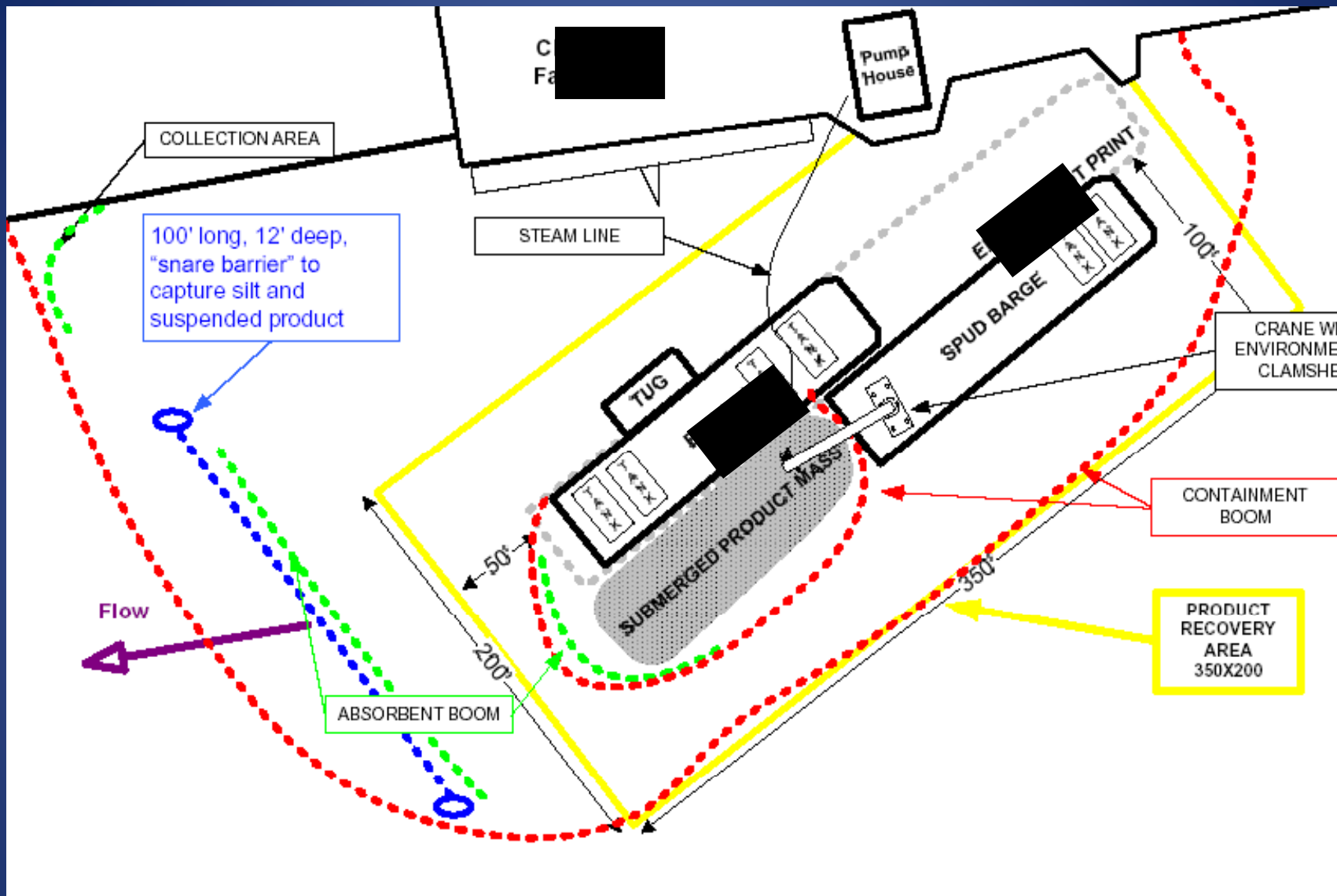
CSO is stored and transported in a heated condition to allow for pumping. When it cools, it quickly transitions from a semi-solid to a solid, “plastic” material, which cannot be pumped and which sinks in the presence of fresh water. Almost all of the oil contained in the barge when it suffered the explosion remained on the wreck and was eventually recovered by using traditional and creative heating and pumping techniques. Some oil that leaked from the barge was removed from the bottom by dredge.



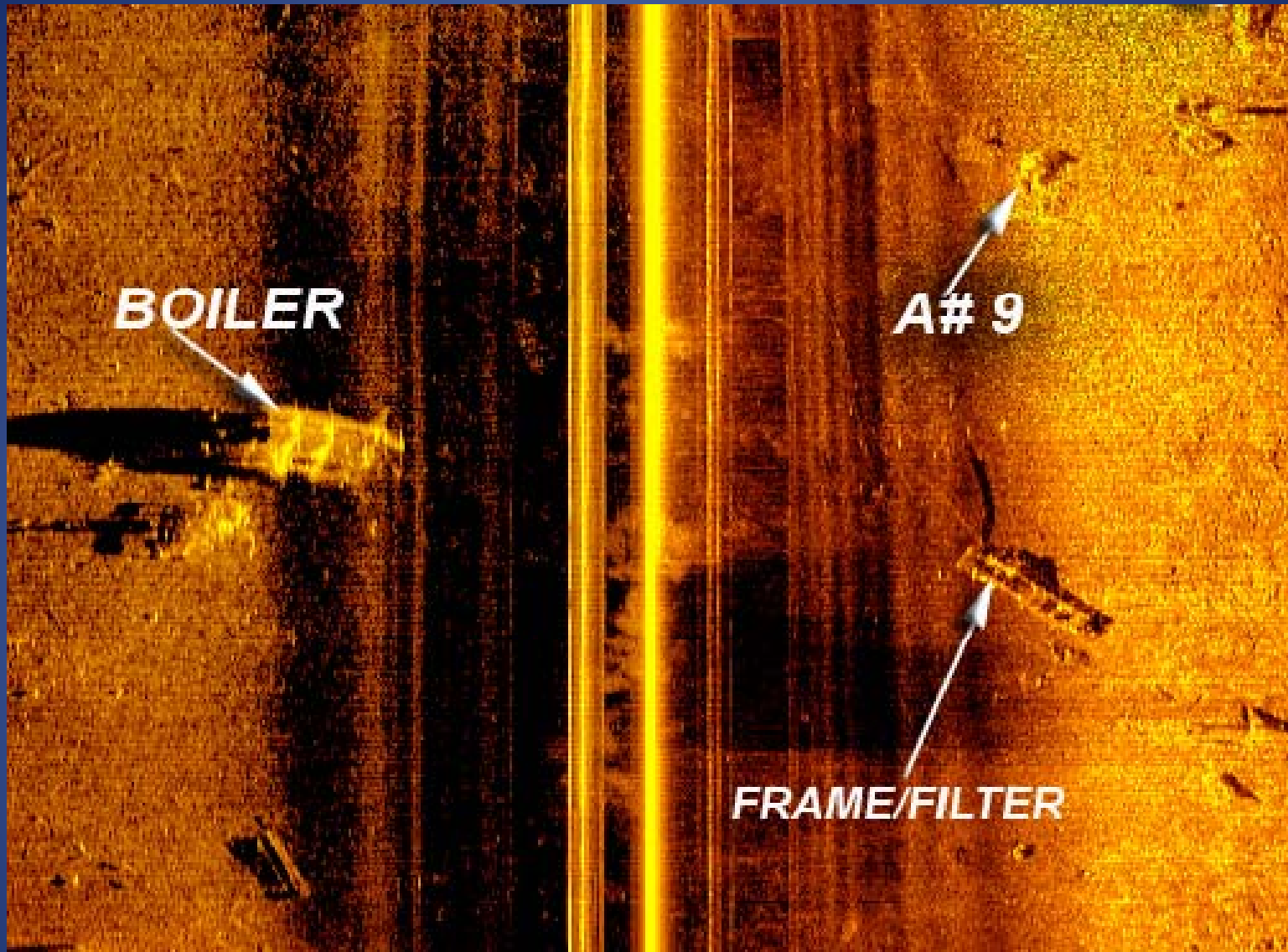
Photo taken from the exposed bow of the barge, with the stern ~295' to the rear and under ~20 feet of water. At this point, all oil is thought to remain on board.



When exposed to cold air (ambient temperatures were below 20 degrees F) the CSO immediately solidified and could not be pumped unless heated again.



During the course of the operations, divers began reporting a mass of oil located adjacent to and under the barge. It was determined that this oil had migrated from the barge through cracks or over-the-top when she sank.



Side scan sonar proved very useful for debris recovery purposes. However, the planning team did not find this technology useful for locating oil on the bottom of the canal and instead relied on divers' visual observations.



After considering a number of different approaches, this environmentally-friendly clamshell dredge unit was mobilized to the site. The dredge minimizes the amount of contaminated water runoff associated with such operations.



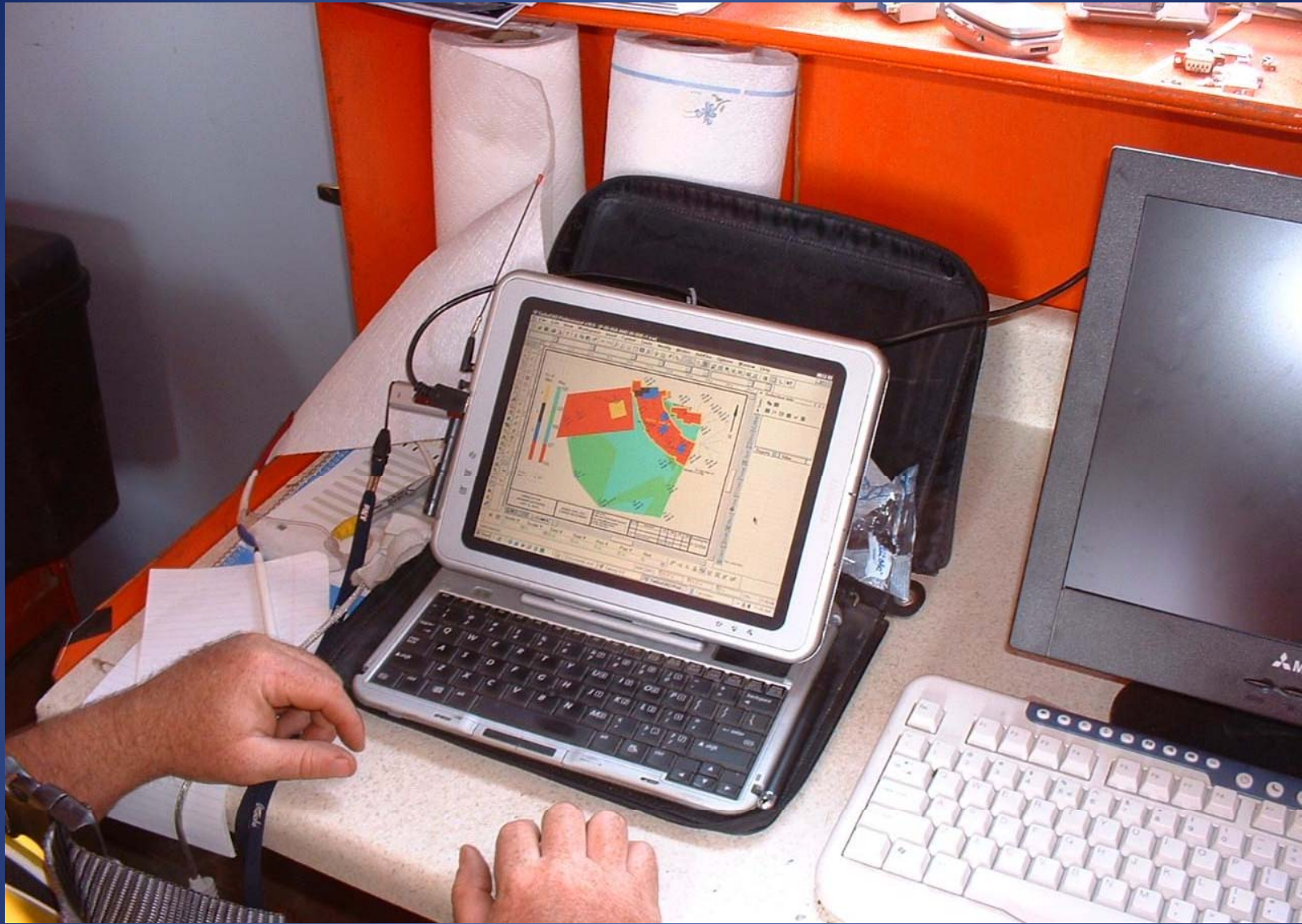
Conventional Clamshell Bucket



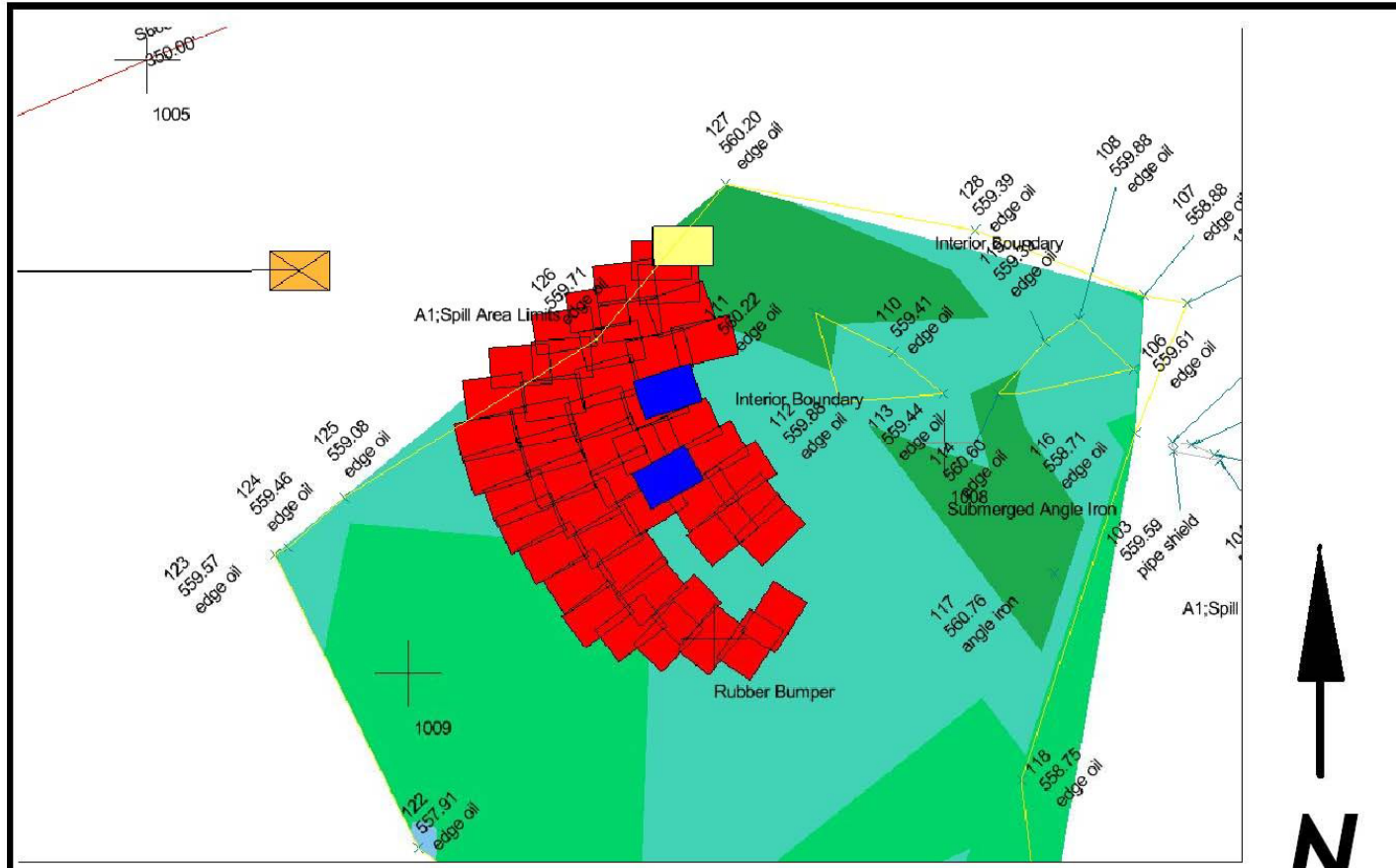
Two platform barges were sourced and obtained, one and was outfitted with a series of recovery boxes (20 cubic yard – DOT-approved). The boxes were sealed with waterproof foam at their doors.



The second barge housed the crane unit that was used to deploy the environmental clamshell bucket. The second barge also housed the GPS system analytical processing center and computers.



Each “bite” taken by the crane was recorded in an electronic format, and a map representing daily progress was submitted at the close of each day’s operations.



Approximate Scale: 1" = 20'

DAILY AMOUNT REMOVED MAY 10, 2005	BARGE EMC 423 CARGO RECOVERY	prepared by:	Rev. No.	Description	Dsr.	Date	Chk.	Date	Drawing No. P-5/10-A
		Cable Arm Professional Services 3452 West Jefferson Avenue Trenton, Michigan 48183 Ph: 734-676-6108	0	Issued to MMG	GWS	05/10/05			

Recovery Figures:

- Almost all the oil that remained in the barge (>570,000 gallons) was successfully recovered by standard heating and pumping methodologies (which hinged on the fact that the barge was refloated intact).
- ~22,450 gallons of oil (estimated) was recovered using the clamshell dredge. Over 600 yards of sediments was recovered during the process.

Lessons Learned:

- Availability of specialized equipment necessary to conduct subsurface containment/recovery operations is limited. This is especially true of remote sensing equipment capable of discerning oil below the surface.
- Oil containment proved problematic; after initial heating operations effective containment could not be maintained due to tank structures.
- Planning and Operations Groups must be PROACTIVE, continuously weighing multiple options, and must be prepared to “switch gears” when conditions change or based on unsatisfactory field results.
- It was eventually concluded that traffic on the canal had a deleterious effect on the operation, causing oil that would otherwise have remaining recoverable to migrate beyond practical recovery points.
- Clamshell operation lacked precision due to antiquated crane apparatus.

Thank You