

GASCO: The First Portland Harbor Early Action In Review



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What will be covered in today's GASCO presentation

- What was accomplished
- Things that worked well
- Things that didn't work so well
- What remains to be done at GASCO
- What we learned for future early actions

GASCO; Willamette River mile 6.5 on the south side



Why EPA proposed an early action

- The goal was to clean up a reasonable size area or “hot spot” as quickly as possible to reduce risk from known areas of uncontrolled contamination.
- Didn’t feel it would be responsible to wait until the Superfund Record of Decision was completed in 2008.
- Needed to find out what was under the tar mass.

What was accomplished

- **15,000 cubic yards** (500 truckloads) of highly contaminated tar was removed from the Willamette River, taken to a hazardous waste landfill, and the area capped.
- An actively eroding tar mass has been stabilized.



What was accomplished

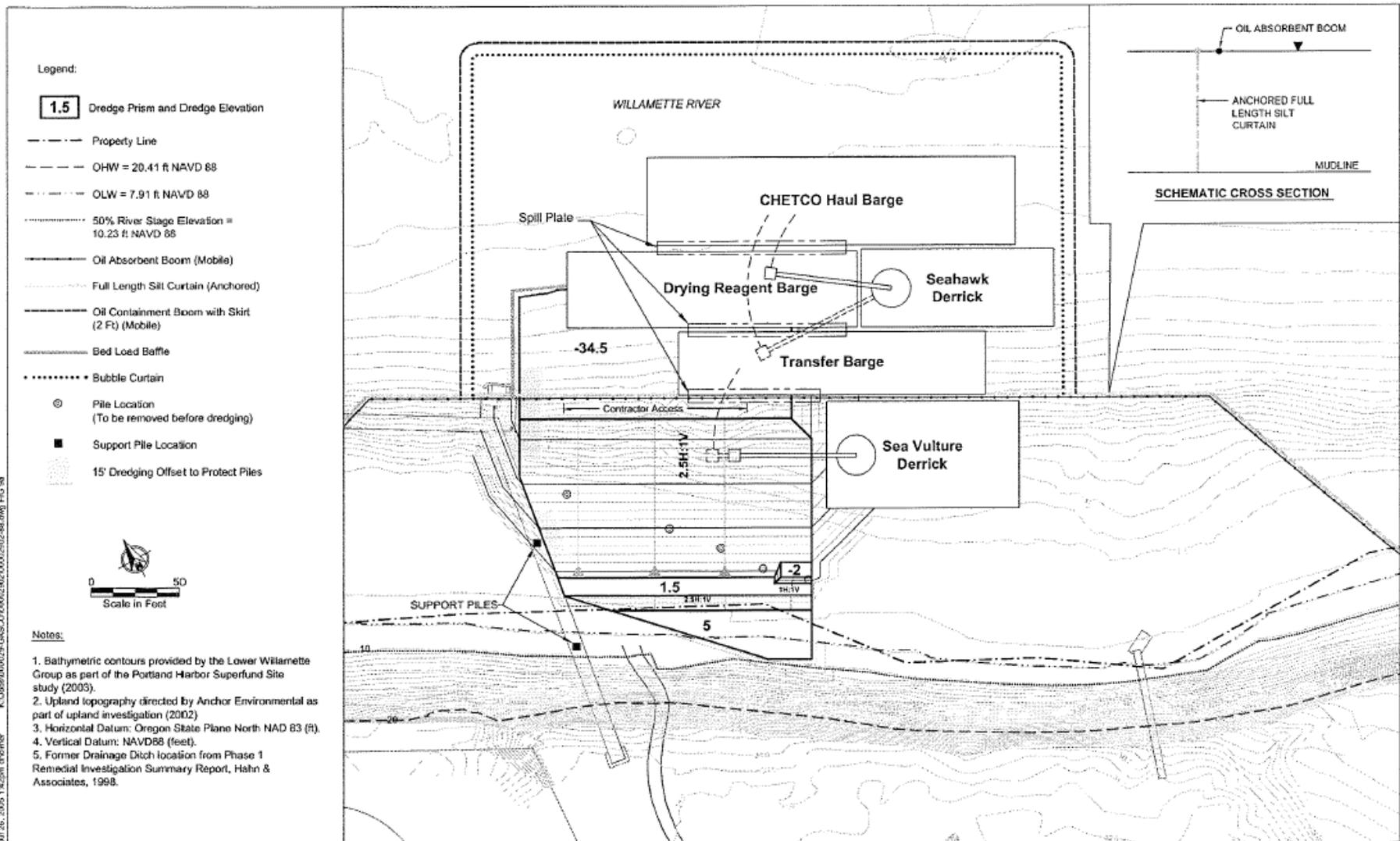
Removing the tar gave EPA new information about:

- the presence of liquid phases in the tar, which are present in the uplands as well.
- the mobility of the tar material for future work.

The pilot cap will help us understand how quickly nearby contamination and flux of contaminants will recontaminate a clean cap.

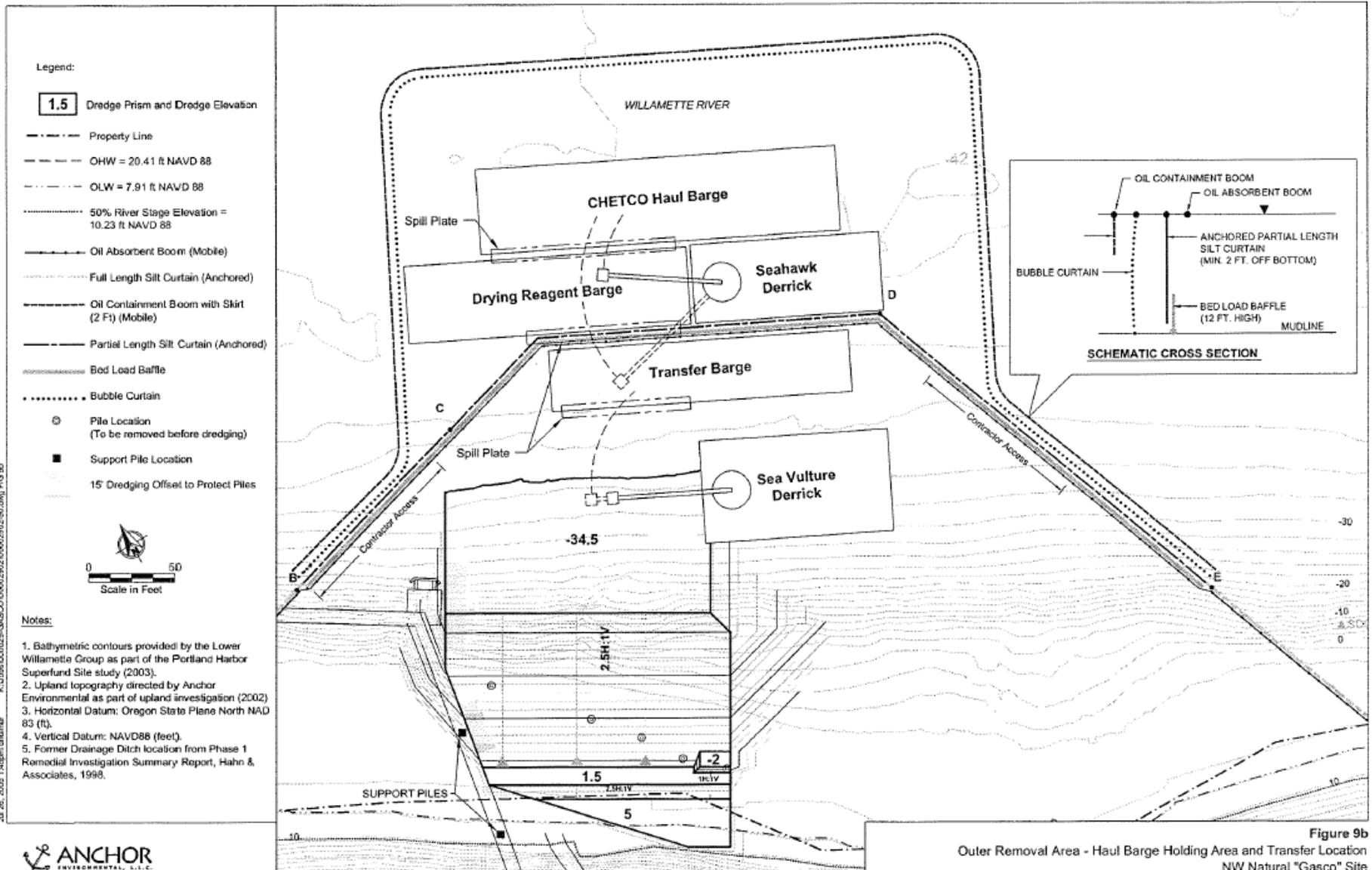


How was the Removal accomplished? Inner Containment Area



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How was the Removal accomplished? Outer Containment Area



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What worked well

- Project oversight
 - Who: EPA, Parametrix (EPA contractor), NW Natural Gas (NWN), Anchor Environmental (NWN contractor), DEQ, NOAA-NMFS, 6 tribes, operators
- Continuous improvement process -- When problems were identified the operation was to be shut down until consultations were finished and needed changes were made. (Adaptation during construction)
- Cleanup sequencing. “Worst first”

What worked well

- NWN's construction contractor was diligent and cooperative.
- Lack of fish kills. Fish kills inside containment would have occurred even with a sheet pile wall (they had nothing to do with off site impacts).
- Monitoring. More dissolved constituent monitoring took place at GASCO than at any other Superfund dredging project in Region 10



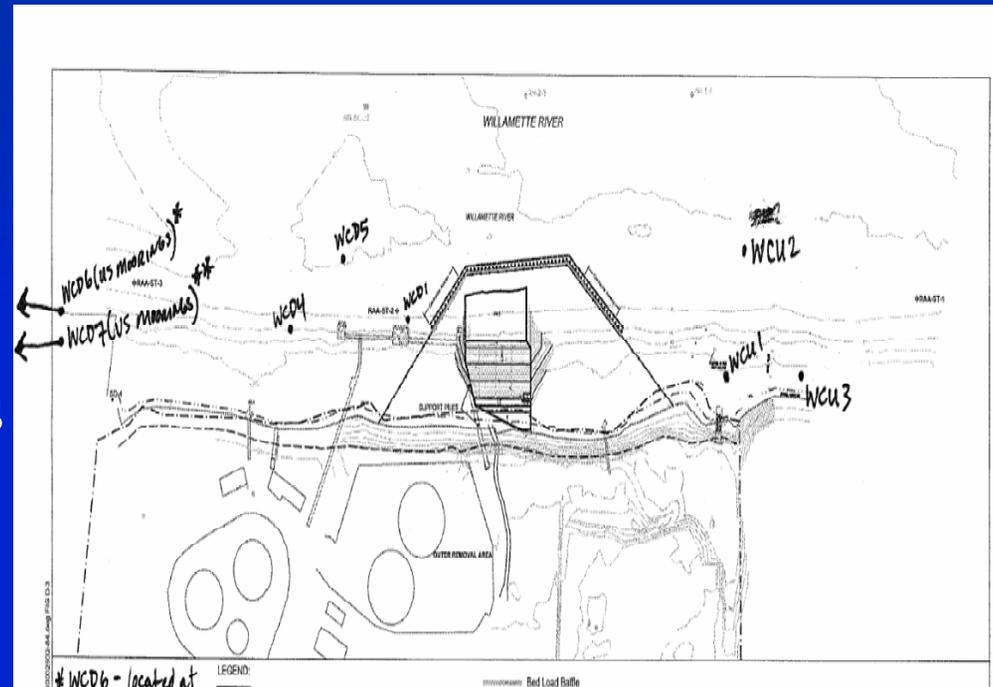
Our view on GASCO and fish

- Work was planned during a “fish window” -- the time of year when few migratory fish are in river
- All fish mortality was **within the containment** area, so the silt curtain did it's job
- Fish were seined (netted) from the containment area prior to the start of work, not possible to get 100% (175 fish were safely removed).
- NMFS biological opinion said expected loss was up to **five** adult and **50** juvenile threatened or endangered (TE) fish species.
- The total TE fish kill was **one** Coho salmon and **8** juveniles (1-2”) within the containment area .
- Other fish kill included: 1 bluegill, 1 crappie, 1 sunfish (all 4-7”).

What needed to be done differently

Water quality criteria adjacent to the dredging operation may not be the best judge of acceptable short term impact, especially when the site exceeds chronic standards every day **ABSENT** any action.

DRET testing/subsequent modeling did not accurately predict water column impacts.

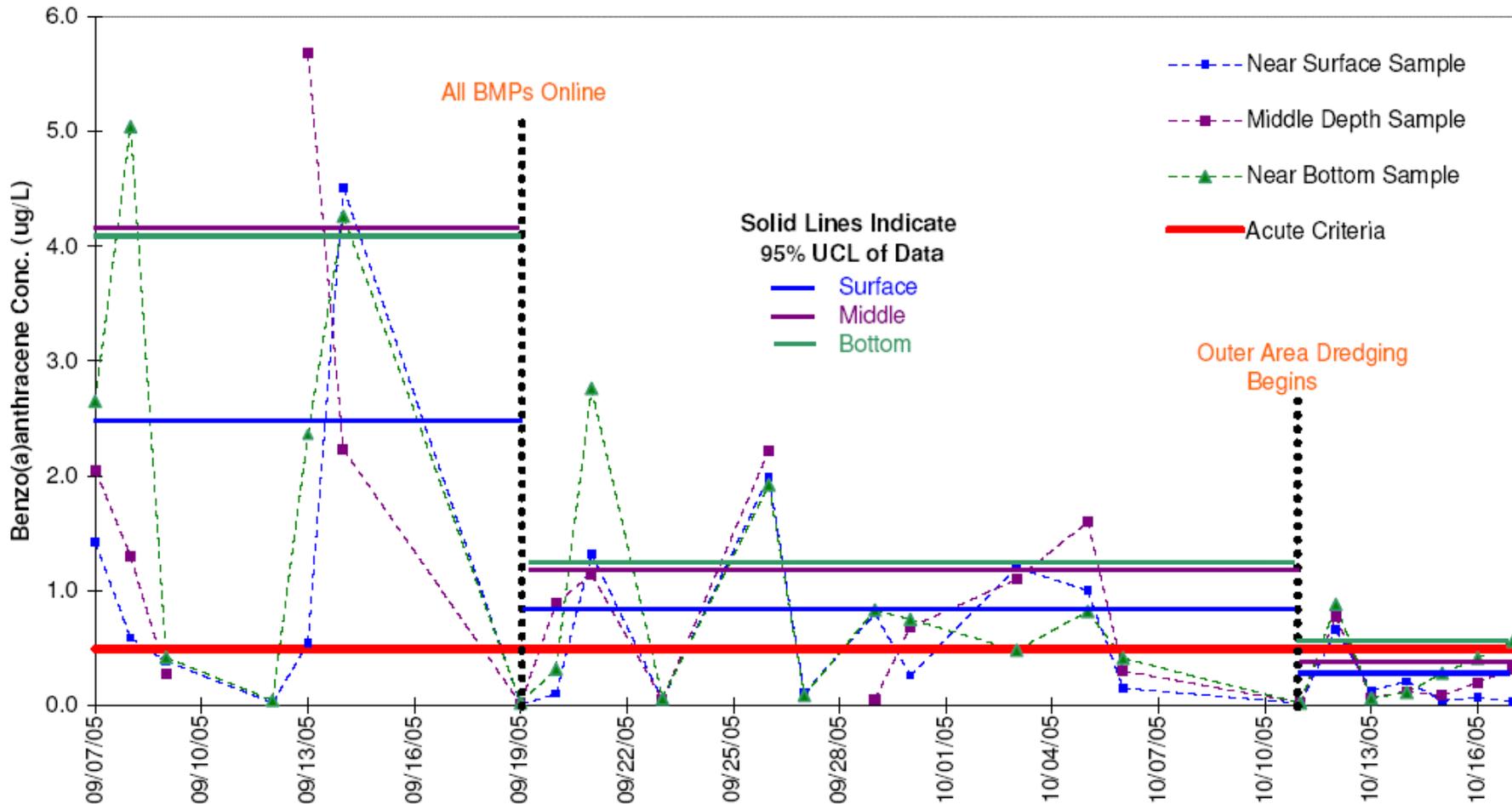


What needed to be done differently

- Silt curtain and clamshell dredging did not control dissolved contaminant migration to our expectations.
- Sediment trap data will tell us more about how well containment limited movement of contaminated particles.

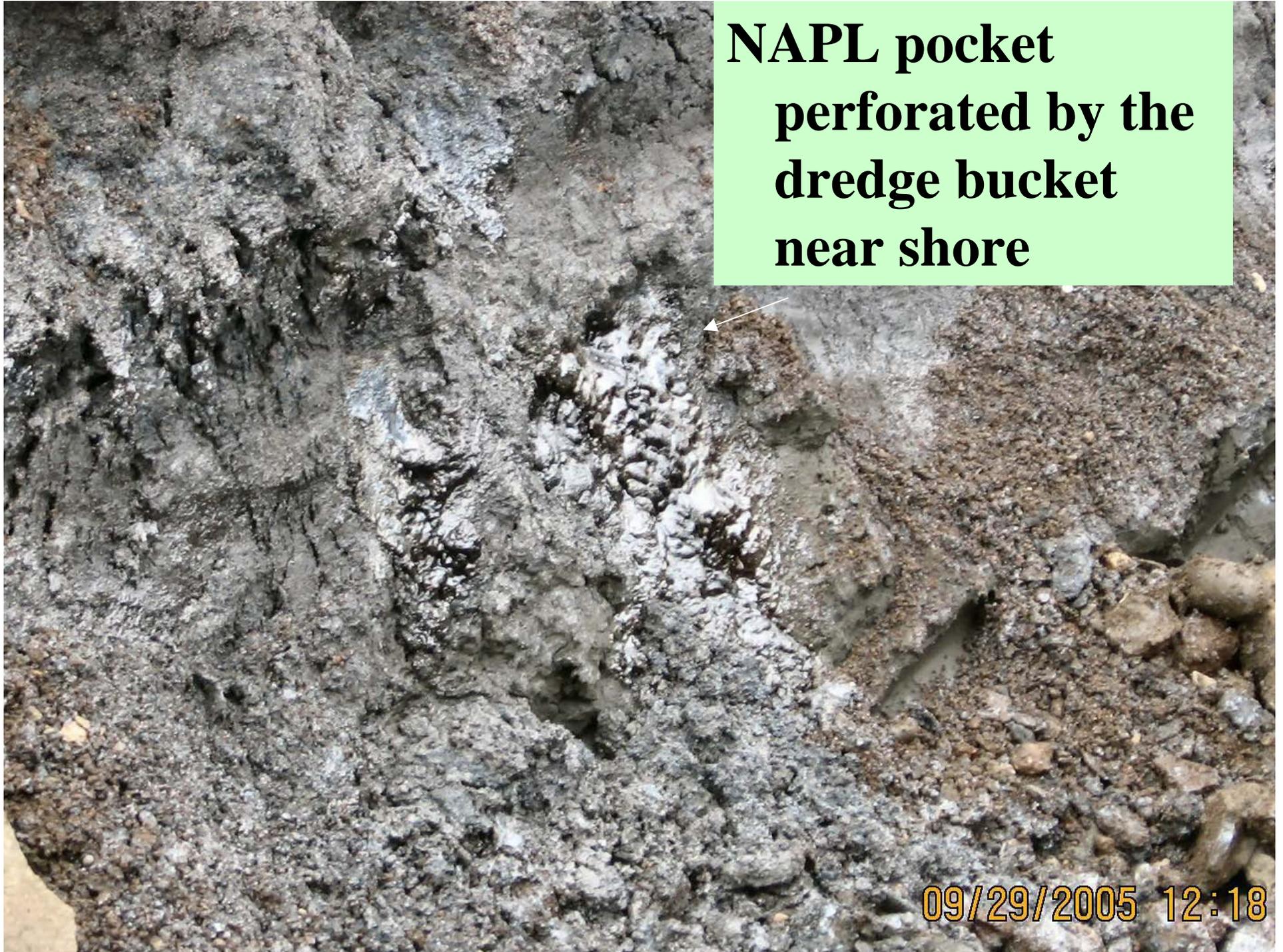


**GASCO Removal Action
Benzo(a)anthracene Concentration
Approximately 150 feet Downstream of Containment**



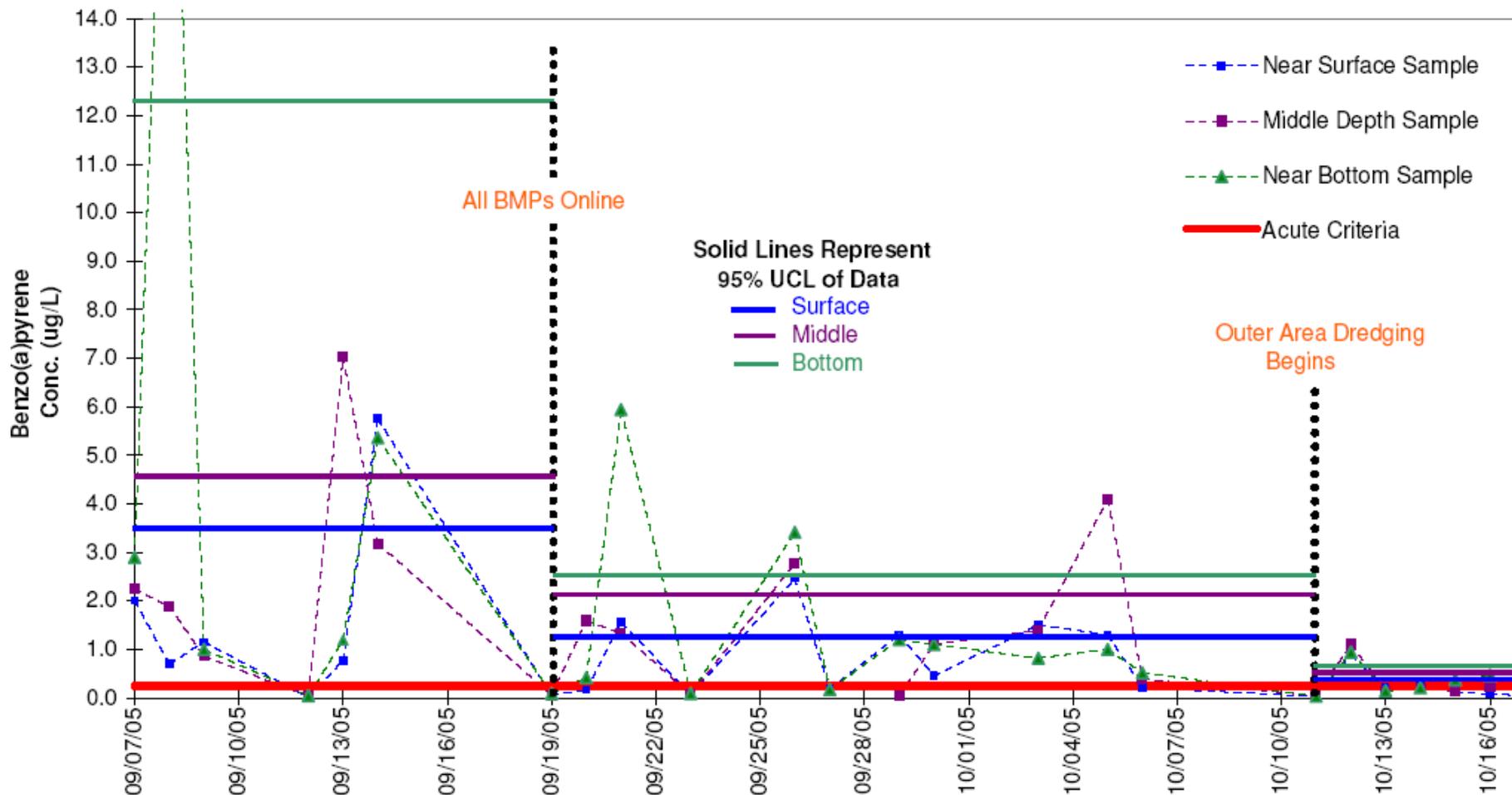
BMPs=Best Management Practices. These included slowing dredge bucket movement and treating barge dewatering water. All contingency BMPs were used due to WQ exceedances.

**NAPL pocket
perforated by the
dredge bucket
near shore**



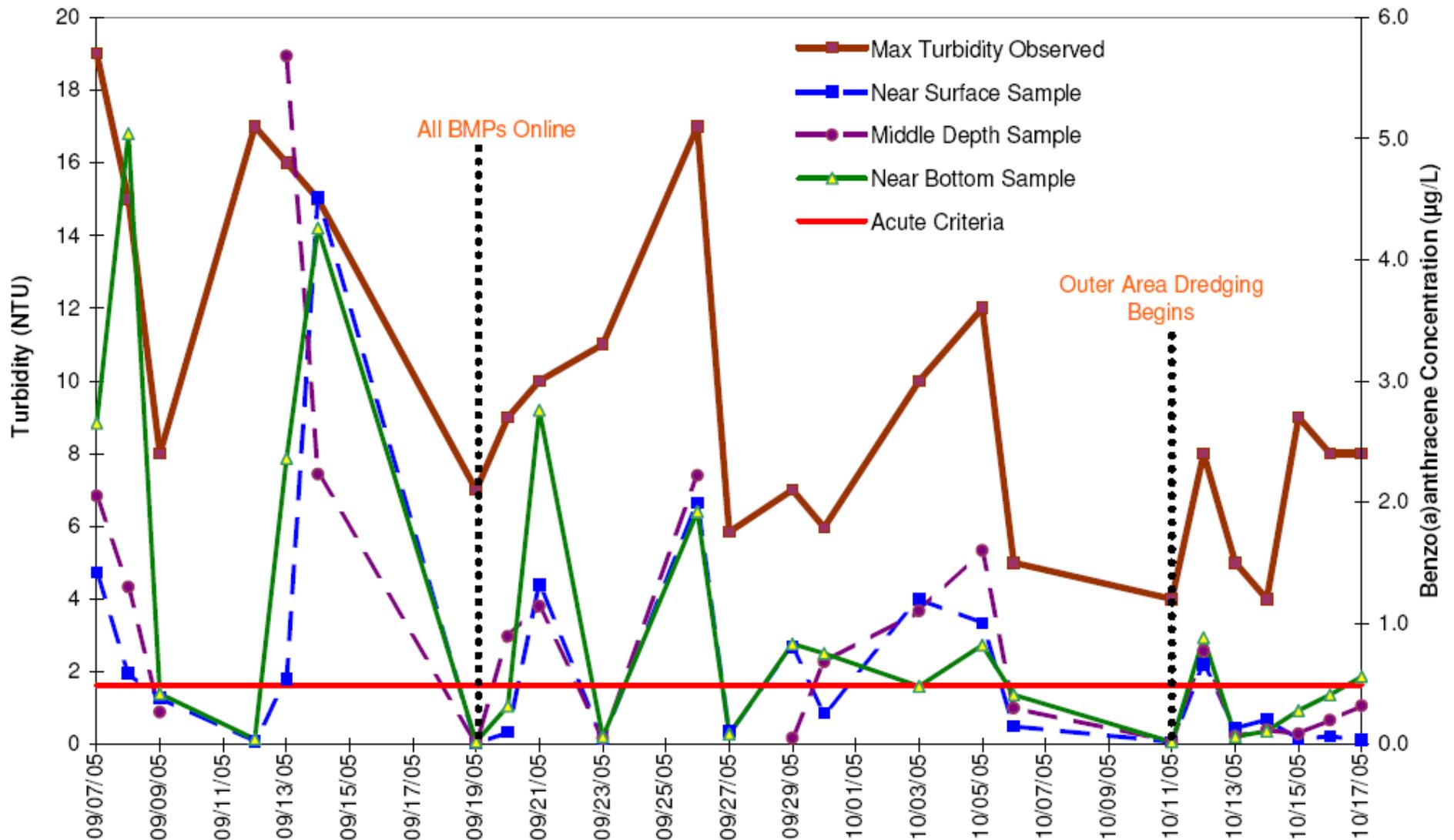
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GASCO Removal Action
Benzo(a)pyrene Concentration
 Approximately 150 feet Downstream of Containment



Note that levels dropped substantially with BMP introduction and changing from the inner to the outer containment systems.

GASCO Removal Action
Daily Maximum Turbidity and Benzo(a)anthracene Concentration
Approximately 150 feet Downstream of Containment



Turbidity tracked with dissolved contaminants, but not to the degree that it could be used as a stand alone surrogate predictive of overall WQ, contrary to the popular wisdom of most CWA 401 certifications.

Were Best Management Practices (BMPs) adequate?

- When water quality (WQ) exceedences were noted, the operation was shut down until improvements could be made.
- Revised BMP's such as barge dewatering treatment and draining dredge bucket over the barge resulted in vast improvements, but not enough to bring the WQ into compliance.



Would a rigid barrier wall have been better?

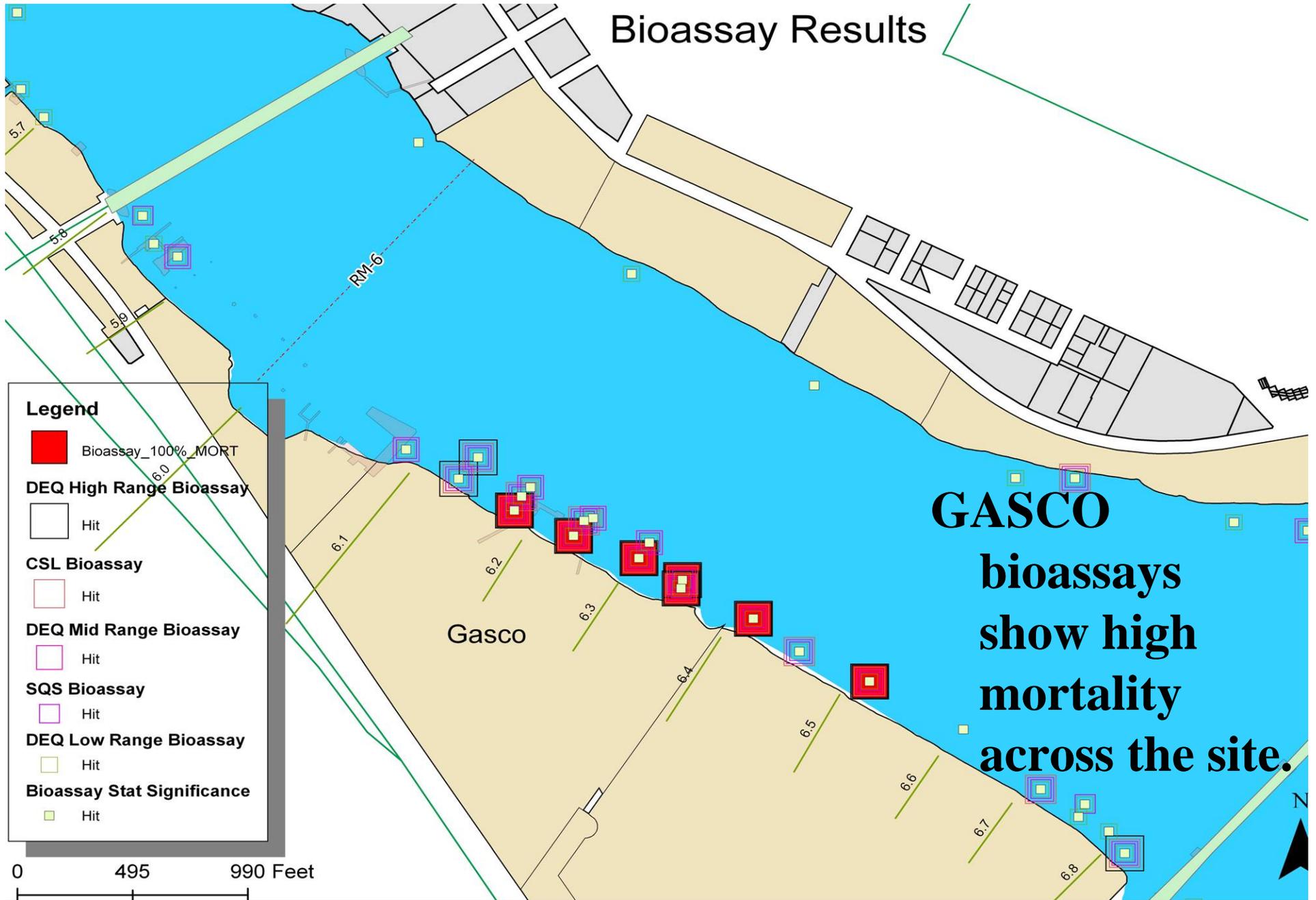
- At least 10% (1,500 cubic yards) of tar would have been left in place posing a risk to human health and the environment.
- It is highly likely that there would have been significant releases of dissolved contaminants into the water during installation and removal of the barrier wall.
- Work would have been delayed at least another year.
- There is no guarantee there would have been fewer long term impacts from this method.

What remains to be done at GASCO?

- Tar deposit removal dealt with perhaps 3-5% of the overall GASCO problem in-water.
- NAPL exists in multiple horizons down to 120 feet bgs upland.
- There are no easy answers. Cleanup will never be perfect.



Bioassay Results



GASCO
bioassays
show high
mortality
across the site.

What have we learned that will help us on future early actions?

- An onsite lab is needed for necessary turnaround times.
- GASCO waste is very soluble and difficult to remove without short term impact.
- NAPL is present in pockets throughout the shoreline area and may be connected to the uplands. Placing an anchor, movement of a diver's fin, minor prop wash produces sheen and mobilizes contaminants.
- Hydraulic dredging may be the only technology that can further limit off site impacts.
- Even with removal, amended cap material will be necessary along the GASCO shoreline to deal with underlying residuals.
- Further cleanup at GASCO will not be without short term impacts; however, these should be weighed against daily chronic WQ exceedances and bioassay mortality information absent cleanup.

In Summary.....

- The GASCO cleanup did not go as smoothly as we would have liked, but it was successful in removing and stabilizing the tar mass.
- GASCO was unlike most other dredging projects to date in Region 10.
- Dredging work accomplished early action goals, and will serve as a valuable pilot project for full-scale site cleanup.



For more photos, go to:

**[http://yosemite.epa.gov/R10/CLEANUP.
NSF/ph/gasco+photo+gallery](http://yosemite.epa.gov/R10/CLEANUP.NSF/ph/gasco+photo+gallery)**

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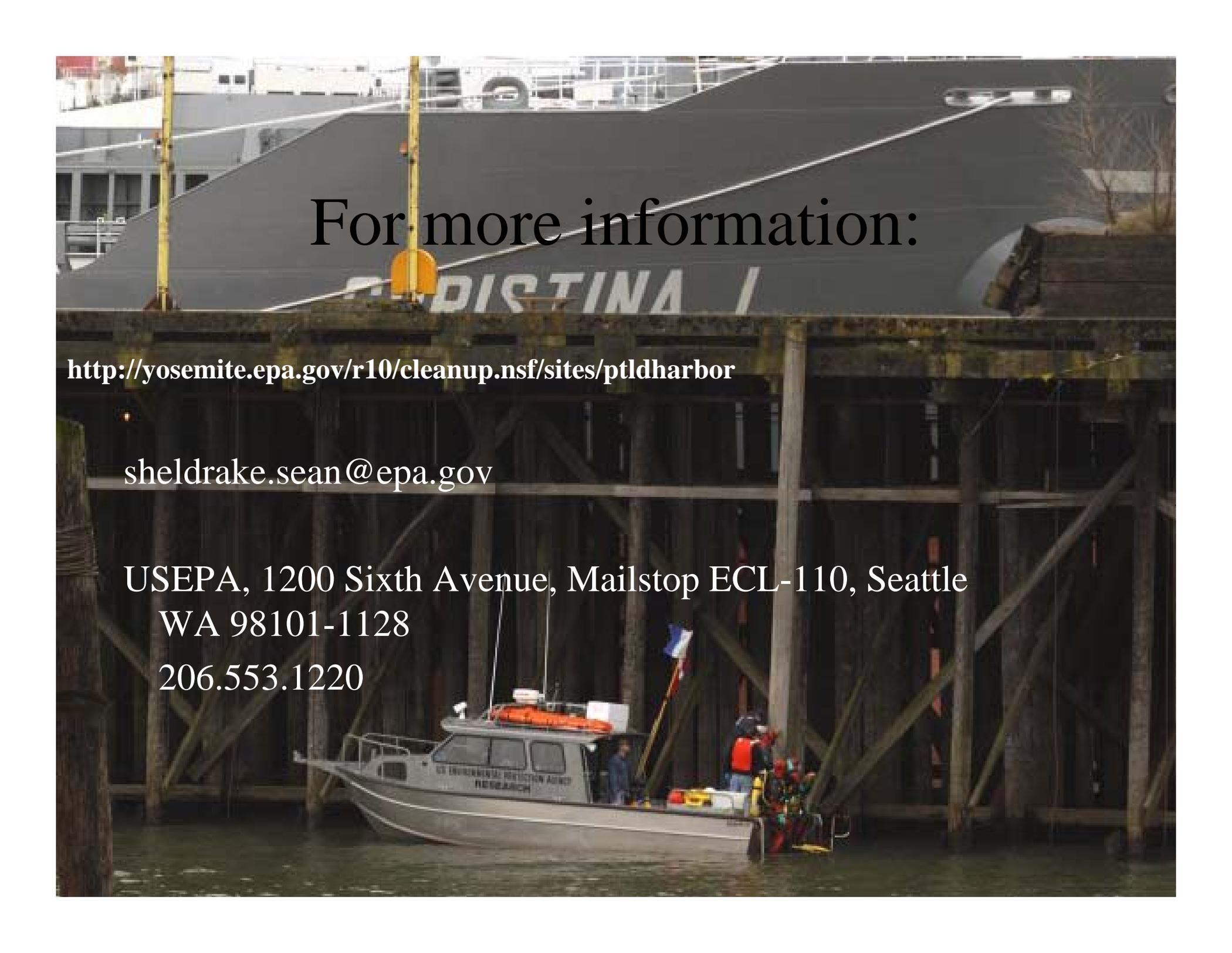


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For more information:

<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>

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WA 98101-1128
206.553.1220

Examples of BMPs/corrective actions required by EPA oversight personnel



- **8-29-05** Prior to containment being in place, divers stirred up a substantial sheen along the shore. EPA field oversight personnel directed oil sorbent boom and mats be deployed to contain and mop up sheen. Issue was a subject of next days safety/issues meeting.
- **8-30-05** Requested existing fueling terminal oil boom be deployed to contain sheens emanating from dredge prism until inner containment is in place.
- **9-7-05** EPA field oversight personnel noticed apparent billowing of silt curtain near shore. Requested divers inspect to ensure the curtain is reaching the bottom.
- **9-7-05** In response to high turbidity readings, ensured Anchor personnel notified EPA of such, and official direction obtained. Also ensured that additional (per Malek) confirmatory upstream turbidity readings were obtained whenever a turbidity “exceedance” was noted downstream.
- **9-8-05** Requested spill plate mechanism be improved by draping filter fabric material over spill plates and between edges of barge to prevent any drippings from falling between the inner containment area and the transfer barge, and between the drying and haul barges.
- **9-12-05** Noticed partial submergence of silt curtain (sloughing on bottom) in front of spill plates and requested it be corrected prior to any more dredging.
- **9-12-05** Noted means of ascertaining river flow direction was inadequate (meter “failure”) and directed Anchor to develop a more definitive means of determining river flow velocity and direction.

Examples of corrective actions required, continued (2)

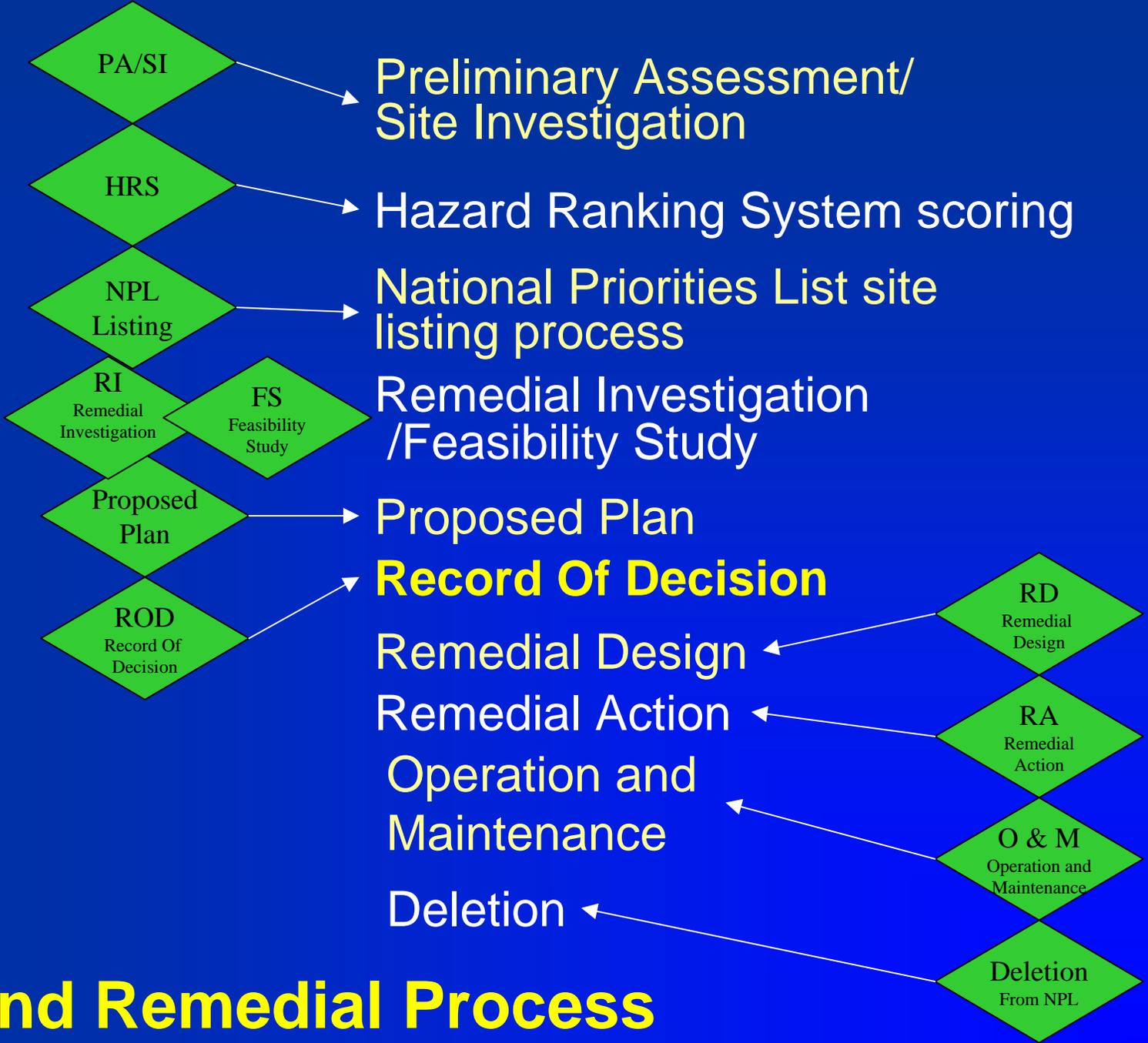


- **9-13-05** In response to dead Coho in containment area, requested contractors inspect silt curtain for any breaches (none found). Also, ensured Anchor collect additional samples whenever a fish is found (per water cert.).
- **9-14-05** Noted substantial sheen in secondary containment area, and requested additional oil boom be deployed and the sheen cleaned up/contained.
- **9-14-05** EPA field oversight personnel noticed fish surfacing within dredge prism and directed dredging to cease. Ensured appropriate samples (per water cert., DO/sulfides) were collected. Directed contractor to cease pumping barge de-water into river and initiate all BMPs.
- **9-19-05** Tear in silt curtain discovered: directed dredging to cease until repairs and/or additional silt curtain is deployed.
- **9-23-05** Noticed bubble curtain was off and directed contractor to correct.
- **9-26-05** Requested spill plate fabric be widened/improved to ensure containment of dredge bucket drippings.
- **9-26-05** EPA field oversight personnel noticed fish surfacing within dredge prism and directed dredging to cease.
- **9-26-05** Requested deployment of additional oil sorbent boom along shore in front of cut-face from where a thicker/darker sheen is emanating.

Examples of corrective action required, continued (3)



- **9-30-05** Requested additional oil sorbent boom along cut-face/shoreline.
- **10-03-05** Directed contractor to deploy additional and/or change out oil sorbent boom within inner containment area.
- **10-07-05** Directed contractor to conduct a surface skim of inner containment area to contain as much sheen as possible prior to switching over to outer containment area.
- **10-12-05** Noticed “contractors access gate” silt curtain was billowing to the surface and directed contractor to cease dredging until it can be rectified (tie/anchored in place).
- **10-14-05** Noticed dredge operator apparently “dragging” bucket along bottom looking for high spots. Directed operator to cease using this technique. EI rep onsite.
- **10-14-05** Noticed “contractors access gate” silt curtain was still billowing to the surface during reverse flow conditions and directed contractor to cease dredging until it can be further rectified (tie/anchored in place). EI rep onsite.
- **10-16-05** Requested additional oil sorbent boom be deployed along north edge of containment area.
- **10-24-05** Requested additional oil sorbent boom be deployed along north edge of containment area.
- **10-24-05** Requested additional fringe cap material be placed along the shore where previously it had been placed short of the 10-foot water mark.
- **10-29-05** Requested closure of outer containment area (access gate left open) due to frothy material from cap placement floating down river.



Superfund Remedial Process