Tables

BLASLAND, BOUCK & LEE, INC.
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Table 2-1 – Remedial Design Schedule

Activity	Deadline
General	
1. RD Work Plan	Completed and approved prior to effective date of RD AOC.
2. *Baseline Monitoring Program Scoping Document* (for surface water and fish)	Completed and approved prior to effective date of RD AOC and attached to RD Work Plan.
3. HDA Work Plan	Completed and approved prior to effective date of RD AOC and attached to RD Work Plan.
4. CARA Work Plan	Completed and approved prior to effective date of RD AOC and attached to RD Work Plan.
5. Revised CHASP to cover RD data gathering efforts	Completed and approved in June 2003 and appended to the RD AOC (Appendix 2).
6. Revised HASP to cover RD data gathering efforts	Completed.
7. Baseline Monitoring QAPP	Submitted.
Design Support Activities	
8. Performance of Year 1 sediment sampling and side-scan sonar	Completed.
9. Performance of sub-bottom profiling field test	Per schedule in Sub-bottom Profiling Test Work Plan (as approved or modified by USEPA).
10. Commencement of baseline monitoring program for water column and fish	30 days after USEPA approval of Baseline Monitoring QAPP.
11. Submission of *Data Summary Report* for Year 1 to USEPA	Submitted.
12. Commencement of habitat delineation and assessment activities	Commenced.
13. Commencement of cultural and archaeological resources assessment	Commenced.
14. Submission of Supplemental FSP and associated QAPP Addendum for Year 2 to USEPA	Submitted.
15. Submission of *Supplemental Engineering Data Collection Work Plan* for Year 2 and associated QAPP, as well as HASP and CHASP Addenda (as needed) to USEPA	Submitted.
16. Performance of sediment sampling, bathymetric surveys, and sub-bottom profiling (if necessary) for Year 2	Completed, except for bathymetric survey in River Section 3, which could not be completed in 2003 due to low water levels between Locks 3 and 4 – to be completed in 2004.
17. Performance of engineering data collection for Year 2	Per schedule in *Supplemental Engineering Data Collection Work Plan* for Year 2 (as approved or modified by USEPA).
18. Submission of *Supplemental Data Summary Report* for candidate Phase 1 areas to USEPA	December 26, 2003.
19. Submission of *Phase 1 Dredge Area Delineation Report* (covering candidate Phase 1 areas) to USEPA	January 16, 2004.

Table 2-1 – Remedial Design Schedule

Activity	Deadline
20. Submission of *Phase 1 Target Area Identification Report* to USEPA	January 16, 2004.
21. Submission of *Archaeological Resources Assessment Report* for candidate Phase 1 areas to USEPA	30 days after USEPA approval of *Phase 1 Dredge Area Delineation Report.*
22. Submission of *Habitat Delineation Report* and *Habitat Assessment Report* for candidate Phase 1 areas to USEPA	April 19, 2004.
23. Submission of *Data Summary Report* for Year 2 to USEPA	Per schedule in Sediment Sampling AOC.
24. Submission of *Year 2 Dredge Area Delineation Report* to USEPA	30 days after USEPA approval of *Data Summary Report* for Year 2.
25. Submission of *Supplemental Engineering Data Collection Summary Report* for Year 2 to USEPA	Per schedule in *Supplemental Engineering Data Collection Work Plan* for Year 2 (as approved or modified by USEPA).
26. Submission of *Supplemental Engineering Data Collection Work Plan* for Year 3 and QAPP, HASP, and CHASP addenda (as needed) to USEPA	30 days after USEPA approval of *Year 2 Dredge Area Delineation Report*.
27. Submission of *Archaeological Resources Assessment Report* for Year 2 (covering areas covered by *Year 2 Dredge Area Delineation Report*) to USEPA	90 days after USEPA approval of *Year 2 Dredge Area Delineation Report*.
28. Performance of engineering data collection for Year 3	Per schedule in *Supplemental Engineering Data Collection Work Plan* for Year 3 (as approved or modified by USEPA).
29. Submission of *Supplemental Engineering Data Collection Summary Report* for Year 3 to USEPA	Per schedule in *Supplemental Engineering Data Collection Work Plan* for Year 3 (as approved or modified by USEPA).
30. Submission of *Habitat Assessment Report* for Year 2 (covering areas covered by *Year 2 Dredge Area Delineation Report*) to USEPA	Same as deadline for *Supplemental Engineering Data Collection Report* for Year 3.
31. Submission of BA to USEPA	Submitted (with some missing information due to delayed or absence of receipt of certain necessary information from governmental agencies).
32. Submission of supplemental *Dredge Area Delineation Report*, *Archaeological Resources Assessment Report*, and/or *Habitat Assessment Report* for Phase 2 dredge areas (if necessary to complete these activities for Phase 2 areas)	If necessary, per schedule in *Year 2 Dredge Area Delineation Report* or *Supplemental Engineering Data Collection Work Plan* for Year 3 (as approved or modified by USEPA).
33. Submission of *Treatability Studies Work Plan* (and associated QAPP, HASP, and CHASP addenda if necessary) to USEPA	Submitted.
34. Commencement of treatability studies	Per schedule in *Treatability Studies Work Plan* (as approved or modified by USEPA).
35. Completion of treatability studies	Per schedule in *Treatability Studies Work Plan* (as approved or modified by USEPA).
36. Performance and reporting of supplemental treatability studies (if necessary)	Per schedule relating to treatability studies in relevant *Intermediate Design Report* (as approved or modified by USEPA).
37. Submission of *Baseline Monitoring Data Summary Reports* to USEPA	Annually, by April 1 of each calendar year following baseline monitoring activities.

Table 2-1 – Remedial Design Schedule

Activity	Deadline
Engineering Design	
38. Submission of *Preliminary Design Report* to USEPA	Submitted.
39. Commencement of Phase 1 Intermediate Design	Upon receipt of USEPA's *Draft Facility Siting Report* or USEPA approval of *Preliminary Design Report*, whichever is later.
40. Submission of *Phase 1 Intermediate Design Report*, including results of Value Engineering Study, to USEPA	The latest of: EITHER: 180 days after the latest of: • USEPA approval of *Phase 1 Target Area Identification Report*; • Establishment of finalized Engineering Performance Standards and Quality of Life Performance Standards; • Final determination of any limitations or requirements applicable to releases of constituents not subject to performance standards; • USEPA approval of *Phase 1 Dredge Area Delineation Report*; and • USEPA approval of *Preliminary Design Report*. OR: 90 days after the later of: • USEPA selection of sediment processing/transfer facility sites(s) for Phase 1; or • Completion of treatability studies.
41. Submission of *Phase 1 Final Design Report* to USEPA	The latest of: EITHER: 120 days after the latest of: • USEPA approval of *Phase 1 Intermediate Design Report*; • USEPA approval of *Archaeological Resources Assessment Report* for candidate Phase 1 areas; • USEPA approval of the *Supplemental Engineering Data Collection Summary Report* for Year 2, as it relates to candidate Phase 1 areas; and • USEPA approval of *Habitat Assessment Report* for candidate Phase 1 areas. OR: 90 days following receipt of assurance from USEPA that USEPA intends to acquire a property interest in the selected sediment processing/transfer facility site(s) for Phase 1. OR: 60 days after the latest of: • Receipt of final BOs or written concurrence by USFWS and NMFS with a "not likely to adversely affect" determination in the BA and a determination by USEPA, if necessary, as to related measures necessary to be incorporated into the design; • USEPA approval of *Year 2 Dredge Area Delineation Report*; and • Completion of any supplemental treatability studies proposed in *Phase 1 Intermediate Design Report.*
42. Submission of RA CHASP and *Environmental Monitoring Plan* for Phase 1 to USEPA	Simultaneously with *Phase 1 Final Design Report*.
43. Commencement of Phase 2 Intermediate Design	Upon receipt of USEPA approval of *Year 2 Dredge Area Delineation Report*.

Table 2-1 – Remedial Design Schedule

Activity	Deadline
44. Submission of *Phase 2 Intermediate Design Report,* including results of Value Engineering Study, to USEPA	The latest of: EITHER: 180 days after the later of: • USEPA approval of *Phase 1 Intermediate Design Report*; and • USEPA approval of all *Dredge Area Delineation Reports* for Phase 2 dredge areas. OR: 90 days after USEPA selection of sediment processing/transfer site(s) for Phase 2.
45. Submission of *Phase 2 Final Design Report* to USEPA	The latest of : EITHER: 120 days after the latest of: • USEPA approval of *Phase 2 Intermediate Design Report*; • USEPA approval of all *Archaeological Resources Assessment Reports* for Phase 2 dredge areas; • USEPA approval of all *Supplemental Engineering Data Collection Summary Reports* for Phase 2 dredge areas; and • USEPA approval of all *Habitat Assessment Reports* for Phase 2 dredge areas. OR: 90 days following receipt of assurance from USEPA that USEPA intends to acquire a property interest in the selected sediment processing/transfer facility site(s) for Phase 2. OR: 60 days after completion of any supplemental treatability studies proposed in *Phase 2 Intermediate Design Report*.
46. Submission of RA CHASP and *Environmental Monitoring Plan* for Phase 2 to USEPA	Simultaneously with *Phase 2 Final Design Report*.

Notes:

1. Acronyms:

AOC = Administrative Order on Consent
BA = *Biological Assessment*
BO = *Biological Opinion*
CARA Work Plan = *Cultural and Archaeological Resources Assessment Work Plan* (URS, 2003)
CHASP = *Community Health and Safety Plan*
HASP = *Health and Safety Plan*
HDA Work Plan = *Habitat Delineation and Assessment Work Plan* (BBL, 2003c)
NMFS = National Marine Fisheries Service
QAPP = *Quality Assurance Project Plan* (QEA and ESI, 2002)
RA CHASP = *Remedial Action Community Health and Safety Plan*
RD = Remedial Design
RD Work Plan = *Remedial Design Work Plan*
Revised CHASP = *Revised Community Health and Safety Plan* (BBL, 2003f)
Revised HASP = *Revised Health and Safety Plan* (BBL, 2003e)
Supplemental FSP = *Supplemental Field Sampling Plan*
USEPA = United States Environmental Protection Agency
USFWS = United States Fish and Wildlife Service

Table 2-1 – Remedial Design Schedule

2. Assumes USEPA approval includes any public review and comment that the USEPA deems necessary.
3. For purposes of this schedule, USEPA approval of a deliverable means approval of that entire deliverable except as provided in Para. 54 of the RD AOC.
4. All deadlines may be extended upon approval of USEPA.

Table 5-1 - Dredging Equipment Alternatives vs. Key Process Variables

	Dredging Equipment Alternatives	Production Rate	Sediment Type and Consistency	Solids Percent by Weight	Horizontal Accuracy	Vertical Accuracy	Maximum Dredging Depth	Minimum Dredging Depth	Sediment Resuspension	Dredging Residuals	Barge Transport	Pipeline Transport	Positioning Control	Maneuverability	Portability	Availability	Debris/Loose Rock	Flexibility for Varying Conditions	Thin Lift/Residual Removal	Hardpan/Bedrock	Shoreline/In-Water Structures	Surface Water Flow Characteristics	Presence and type of vegetation
Mechanical Dredges	Dipper	L	H	M	L	L	H	L	L	L	H	NA	L	L	L	H	M	L	NA	M	L	M	NA
	Bucket	L	H	M	L	L	H	L	L	L	H	NA	L	L	L	H	M	L	NA	H	L	M	NA
	Ladder	L	H	M	L	L	H	L	L	L	M	NA	L	L	L	H	M	L	NA	M	L	M	NA
	Traditional clamshell	H	H	M	M	M	H	M	L	L	H	M	L	M	M	H	H	M	L	M	L	L	H
	Watertight clamshell (e.g., Cable-	M	L	H	M	M	H	M	M	M	H	M	M	M	M	H	L	L	L	L	L	L	M
	Articulated mechanical (e.g., HPG) operated using a backhoe	M	M	H	H	H	M	M	M	M	H	M	M	M	M	M	M	H	M	L	M	M	M
	Dry Dredge	L	?	H	M	M	M	M	M	M	H	M	M	M	M	L	L	M	M	L	M	M	M
	Seaway operated using cables	L	?	H	M	M	H	M	M	M	H	M	M	M	M	L	L	M	M	L	L	L	M
	Seaway operated using a backhoe	L	?	H	H	H	M	M	M	M	H	M	M	M	M	L	L	M	M	L	M	M	M
	Amphibious (e.g., Amphibex)	L	M	M	M	M	M	H	?	?	H	M	M	H	H	L	L	M	M	L	H	M	M
Hydraulic Dredges	Cutterhead	M	H	L	M	M	M	M	M	M	NA	H	M	H	M	H	L	H	M	L	L	M	L
	Plain suction	L	M	L	L	L	M	L	M	M	NA	H	M	M	L	M	L	L	M	L	L	M	L
	Hopper	L	M	L	L	L	M	L	L	L	NA	M	M	L	L	M	L	L	L	L	L	M	L
	Horizontal auger	M	M	L	M	H	M	M	L	M	NA	H	L	L	M	H	L	M	M	L	L	M	L
	Silt wing excavator	L	?	L	M	M	M	L	M	M	NA	H	M	L	L	L	L	L	M	L	L	M	L
	Underwater Archimedean screw	L	L	L	M	M	M	M	M	M	NA	M	M	M	M	L	L	L	M	L	L	M	L
	Dust pan	L	M	L	L	M	M	L	M	M	NA	H	M	L	L	L	L	L	M	L	L	M	L
	Match box	L	M	L	M	M	M	M	M	M	NA	H	M	M	M	L	L	M	M	L	L	M	L
	Diver assisted suction	L	M	L	H	H	H	H	H	H	NA	H	H	H	H	H	L	M	H	L	H	L	L
	Environmental disk cutter	L	M	L	M	M	M	L	M	M	NA	H	M	L	L	L	L	L	H	L	L	M	L
Pneumatic / Submersible Pumps	Airlift	L	L	H	M	?	H	L	?	?	L	H	M	M	M	L	L	L	L	L	L	L	L
	Pneuma dredge	L	L	H	M	?	H	L	?	?	L	H	M	M	M	L	L	L	L	L	L	L	L
	Oozer	L	L	H	M	?	L	M	?	?	L	H	M	M	M	L	L	L	L	L	L	L	L
	Toyo	L	M	H	M	?	H	L	?	?	L	H	M	M	M	H	L	L	L	L	L	L	L
	Eddy pump	L	L	H	M	?	H	L	?	?	L	H	M	M	M	L	L	L	L	L	L	L	L
	Tornado	L	L	H	M	?	H	L	?	?	L	H	M	M	M	M	L	L	L	L	L	L	L

Notes:

1. This table is a preliminary analysis and results may be reviewed and changed based on new data and information in the Intermediate
2. H = High - Indicates that this dredge ranks high in suitability compared to other dredges for addressing a given KPV (e.g., sediment resuspension).
   M = Medium - Indicates that this dredge ranks medium in suitability compared to other dredges for addressing a given KPV (e.g., sediment resuspension).
   L = Low - Indicates that this dredge ranks low in suitability compared to other dredges for addressing a given KPV (e.g., sediment resuspension).
   ? - Indicates that limited data are available to evaluate the relative suitability of this dredge for a given KPV (e.g., sediment resuspension).
3. Acronyms:
   NA = Not applicable
   HPG = Horizontal Profiling Grab
   KPV = key process variable

Table 5-2 – Capabilities and Limitations of Dredges

Process Option	Sub-process option	Capabilities	Limitations
Mechanical	Conventional Clamshell Dredge	– Bulk sediment removal. – Debris removal.	– High level of sediment resuspension. – Results in overdredging. – Sediment leakage.
	Environmental Clamshell/Wire Supported Dredge	– Includes features to reduce resuspension and leakage. – Available with some lead time. – Level bottom cut to minimize over-dredging. – Can be supported by both barge and hydraulic pipeline transport methods.	– Extended dredge cycle-time and low production rates. – Weather-related impacts (e.g., wind) on accuracy. – Debris can prevent jaws from sealing. – Additional water entrained during dredging requires treatment. – Reduced digging capabilities in coarse-grained sediment. – Resuspension and residuals are still a concern.
	Articulated Mechanical Dredge	– Can be supported by both barge and hydraulic pipeline transport methods. – Level bottom cut to minimize over-dredging. – Fixed bucket reduces weather delays. – Potential to be operated from a backhoe increases flexibility, especially working in shoreline areas. – Includes features to reduce resuspension and leakage. – Increased digging ability compared to other environmental buckets.	– Low production rates. – Resuspension and residuals still a concern. – Overlap between dredge cuts required to minimize residuals. – Additional water entrained during dredging requires treatment. – Less availability as compared to other environmental buckets. – Limited data for resuspension and residuals for full-scale environmental dredging projects.
	Amphibious Dredge	– Can work in shallow water depths, mudflats, and shoreline areas. – Can be equipped with a mechanical bucket or a hydraulic dredge head.	– Low production rates. – Limited operating history to establish a track record for residuals or resuspension. – Similar limitations to other mechanical (and hydraulic) dredges, as this dredge platform can use either type of removal equipment. – Availability in the U.S. could be limited.
Hydraulic	Plain Suction Dredge (diver-assisted)	– Relatively high degree of accuracy. – A lower resuspension potential as compared to larger hydraulic dredges.	– Increased accident risk with divers working underwater in dredge areas. – Low solids content associated with the dredge material

Table 5-2 – Capabilities and Limitations of Dredges

Process Option	Sub-process option	Capabilities	Limitations
		– Applicability to conduct focused re-dredging pass operations. – Generally available.	slurry and the large volumes of water requiring treatment. – High cost per cubic yard of sediment removed. – Low production rates.
	Cutterhead Dredge	– Readily available. – Ability to pump dredged material slurry relatively long distances. – Potential to minimize sediment resuspension by drawing in large volumes of water. – Continuous operation.	– Large volume of water generated during dredging. – Relatively low production rates. – Level of effort to reposition the dredge and associated resuspension impacts. – Windrows left by action of the dredge. – Resuspension and residuals still a concern. – Clogging of the dredge line due to debris.
	Horizontal Auger Dredge	– Ability to take a horizontal cut. – Readily available. – Ability to operate in shallow water. – Ability to pump dredged material slurry relatively long distances.	– Large volume of water generated during dredging that requires treatment. – In-river supports and cables needed to propel the dredge and their impact on navigation. – Relatively low production rates. – Relatively high level of resuspended sediment as compared to other hydraulic dredges, such as the cutterhead. – Residuals still a concern. – Clogging of the dredge line due to debris.
Pneumatic	Pneumatic Dredges/High Solids Pumps	– Potential for high solids concentrations dredge slurry. – Some pump technologies (Toyo, Tornado, and Pneuma) require a relatively small amount of barge space and can be deployed from shallow draft barges.	– Inefficient if used with barge transport. – Presence of debris lowers dredge efficiency by increasing the water content of the dredged material slurry. – Limited knowledge of the technology's ability to meet resuspension and residual performance standards. – Limited ability to remove a thin layer of sediment. – Availability of some pumps (Pneuma) may be somewhat limited in the U.S.

Table 6-1 – Past Performance of Resuspension Control Process Options

Site (Date)	Dredging Method	Control Process Option	River Velocity	Average Water Depth	Sediment Type	Action Levels	Comments
Grasse River Study Area Alcoa, Inc. Massena, NY (1995)	Hydraulic (horizontal auger)	Three lines of silt curtains & an oil boom	0.11 fps	10 to 25 ft	River bottom different than expected - gravel, sand, silt, and boulders	Turbidity action level of 30 NTUs above background (established 10 days into dredging program), TSS action level of 25 mg/l above background (i.e., upstream), and PCB action level of 2 ug/L, 2,300 ft downstream of containment area.	A good correlation between TSS and turbidity was difficult to establish. Turbidity exceedances resulted in TSS and PCB sample collection and testing. TSS and PCB exceedances required corrective action procedures. Ideal conditions existed during dredging (e.g., low flow). Corrective action procedures were only required once for a TSS exceedance. After turbidity action levels were established, only one turbidity exceedance was reported, but the TSS and PCB concentrations were less than action levels.
Christina River Newport, DE (2000)	Mechanical (open bucket clamshell)	Sheetpile wall	0.13 fps (based on a normal daily flow of 275 cfs and a river width of 350 ft)	6 ft	Clay	Not defined in literature reviewed.	The ROD indicated that hydraulic dredging with silt curtain containment would be used; however, because the site is in a tidal zone, sheetpile was selected during the Design Phase to control turbidity. Since a sheetpile containment system was being implemented, the design team selected mechanical dredging over hydraulic to reduce the size of the wastewater treatment plant. No information is provided on the qualitative or quantitative efficiency of the resuspension control process option.
Cumberland Bay Lake Champlain Plattsburgh, NY (1999-2000)	Hydraulic (horizontal auger)	Sheetpile wall and perimeter silt curtains	Not applicable	10 to 20 ft	Sludge (low density silt, clay, and wood fiber)	No turbidity based action level. TSS action level of 25 mg/L above background.	The action level was not based on turbidity because a good correlation did not exist between turbidity and TSS. Available literature indicates that the resuspension control process options were efficient, though no quantitative information is provided.
Fox River N Deposit Kimberly, Wisconsin (Phase I – 1998 Phase II – 1999)	Hydraulic (swinging ladder)	1998 - Turbidity barrier (80-mil HDPE) and silt curtains 1999 - Silt curtains only	0.5 fps	8 ft	Silty clay and sandy loam	Not defined in literature reviewed.	No correlation between PCB water column concentrations and TSS/turbidity data could be established based on measurements during dredging. Quantitative information indicates that during Phase I, the upstream and downstream turbidities were very similar. During Phase II, the downstream turbidity was slightly higher (2-4 NTU).

Table 6-1 – Past Performance of Resuspension Control Process Options

Site (Date)	Dredging Method	Control Process Option	River Velocity	Average Water Depth	Sediment Type	Action Levels	Comments
Fox River SMU 56/57 Phase I Green Bay, WI (1999)	Hydraulic (horizontal auger)	Woven geotextile (permeable) around perimeter of dredge area	0 to 0.6 fps in dredge area; 2.5 fps in main river (flow reversal due to strong winds - seiche periods)	2 to 14 ft	High plasticity organic silts with some sand and gravel overlying low to medium consolidated clay	Not defined in literature reviewed.	Perimeter silt curtain was torn by the currents and required repair several times during dredging activities. Initially a round cutterhead dredge was used, but it was replaced with a horizontal auger dredge. Small differences in upstream and downstream turbidity and TSS; however, downstream PCB concentrations were significantly higher than upstream concentrations.
Fox River SMU 56/57 Phase II Green Bay, WI (2000)	Hydraulic (horizontal auger)	Perimeter silt curtains with additional silt curtains used to further divide up dredge area	0 to 0.6 fps in dredge area; 2.5 fps in main river (flow reversal due to strong winds - seiche periods)	2 to 14 ft	High plasticity organic silts with some sand and gravel overlying low to medium consolidated clay	Turbidity action level of 2 times greater than upstream level. Exceedances were to trigger collection of water column samples for PCB analysis.	Silt curtains were anchored to sheetpile posts at each corner and intermittently in other sections. In addition, screw anchors and chains were used to anchor them. Silt curtain configuration functioned better during Phase II than Phase I. Turbidity action level was not exceeded during dredging. The turbidity control process option is regarded effective, though no quantitative information is provided.
St. Lawrence River GM Massena (Powertrain Facility) Massena, NY (1995)	Hydraulic (horizontal auger)	Sheetpile wall	Up to 2 fps in shallow bay (where sediment removal occurred) 2.75 to 4.42 fps (3.65 fps average) in main river	Less than 5 ft up to a max of 30 ft	Fine-grained material over coarser sediments and dense glacial till	Turbidity action level of 28 NTUs above background.	Double silt curtain system failed before dredging started due to variable current speeds and directions; therefore, a sheetpile design was implemented. During dredging, the sheetpile process option was modified as necessary when exceedances occurred. Overall, the turbidity control process option is regarded effective, though the action level was exceeded in 18 of 923 samples. Exceedances occurred prior to sheetpile process option modifications.
Manistique River & Harbor Manistique, MI (1995-2000)	Hydraulic (cutterhead)	By 2000 - Silt curtains or no containment 1995 pilot study - cofferdam with silt curtains	Varied with dredge area	6.5 to 19 ft	Fine sand, wood chips, sawdust, and silt/clay (very heterogeneous)	Less than 2 times background turbidity measurements within 50 ft of dredge head.	Dredge was specifically designed to minimize resuspension through high torque blades, short pumping head (to maximize vacuum during dredging), pump seals, and dual pump design (in case of pump failure). The process option was considered effective by the USEPA, though no detailed quantitative information is available. The turbidity was observed as not more than 2 times the background turbidity at 10 ft from the dredge head.
St. Clair River Pilot Study Dredging	Hydraulic (Eddy Pump)	No silt curtains	About 6 ft/sec	From 2 to 25 ft	Mercury-contaminated fine sand over glacial till	Running trailing 1 hour average of 100 NTU.	The real-time turbidity measurement taken at every 3 seconds at 80 ft from the dredge head averaged well below the action level, with a maximum of 14.6 NTU measured. No relationship could be established between TSS and turbidity.

Table 6-1 – Past Performance of Resuspension Control Process Options

Site (Date)	Dredging Method	Control Process Option	River Velocity	Average Water Depth	Sediment Type	Action Levels	Comments
New Bedford Harbor (Hot Spots) New Bedford, MA (1994-1995)	Hydraulic (horizontal auger)	Initially silt curtains; however, since they disturbed the bottom, no containment was used	Not applicable	Varied with dredge area	Fine sandy silt with some clay	PCB action level of 1.3 mg/l based on 1989 pilot study.	High suction rate and slow auger rotation used to control resuspension. The available documentation indicates that the resuspension control process option was effective at limiting the environmental effects on New Bedford Harbor and Buzzards Bay.
Outboard Marine Waukegan Harbor Waukegan, IL (1991-1994)	Hydraulic (cutterhead)	Silt curtains	Not applicable	14 to 25 ft	Organic silt (muck) overlying medium dense fine to coarse sand	Turbidity action level of 50 NTUs.	Only one silt curtain was placed for harbor dredging, located at the Lower part of the Upper Harbor. Silt curtains required repairs due to high winds and currents. Nonetheless, overall the containment process option was regarded effective. Turbidity readings outside the silt curtains were less than 17 NTUs.
Saginaw River/Bay Saginaw, MI (2000-2001)	Mechanical (Cable Arm Environmental Bucket and conventional buckets)	Silt curtains	Varied with dredge area	Varied with dredge area	Sediment underlain by hard sand layer. Numerous pilings (i.e., greater than 50) were removed during dredging activities	If downstream turbidity levels exceeded background levels by 50% or more, a second sample was tested. If the second test indicated an exceedance of 50% or more above background, dredging ceased and dredging activities were re-evaluated.	It was required that turbidity requirements be met outside the silt curtain at all times during dredging operations and inside the silt curtain prior to silt curtain removal. In addition, procedures to minimize resuspension using a mechanical dredge were developed as part of the design. After the first week of dredging, PCB analyses were only required if turbidity exceedances occurred. No exceedances were reported based on once per shift measurements at 300 and 600 ft downstream.
St. Lawrence River Alcoa, Inc. Massena East Smelter Plant (Reynolds Metals) Massena, NY (2001)	Mechanical (Cable Arm Environmental Bucket)	Sheetpile wall, silt curtains, and air gates	0.5 to 1 fps (8 fps in main river channel)	10 to 27 ft, but generally less than 20 ft	Varies widely. Underwater obstructions present	Turbidity action level of 25 NTUs above background.	The action level was based on the bench scale testing that GM performed for their work at the Powertrain Facility in Massena. Outside the sheetpile, no significant turbidity was observed during dredging (non-detect to 1.5 NTU). Inside the sheetpile wall, the turbidity was typically measured less than 25 NTU and generally less than 50 NTU.

Notes:
Acronyms:
- NTUs = nephelometric turbidity units
- TSS = total suspended solids
- fps = feet per second
- cfs = cubic feet per second
- ft = feet
- HDPE = high-density polyethylene
- ROD = record of decision
- PCBs = polychlorinated biphenyls

Table 6-2 – Typical Resuspension Control Process Options vs. Key Process Variables

Resuspension Control Process Option	Bathymetry	River Velocities and Directions	Riverbed Geotechnical Characteristics	Sediment Particle Size	Sediment PCB Levels	Turbidity Generation Potential (source strength) of Dredge Equipment	Dredged Material Transport	Backfill Requirements	Navigational Requirements
No Containment	H	L	L	L	L	L	H	L	H
Silt Curtain	M	L	M	L	M	M	M	M	M
Silt Curtain with King Pile/Caisson Support	M	M	M	M	L	M	L	M	M
Sheetpile Wall	H	H	M	H	H	H	L	H	L
Caisson	M	H	M	H	H	H	L	M	L
Air Curtain	L	L	H	M	L	L	H	L	L
Portable Dams	L	L	M	H	H	M	L	L	L

Notes:

1. This table is a preliminary analysis and results may be reviewed and changed based on new data and information in the Intermediate Designs.
2. H = High - Rated high for controlling or compensating KPV as compared to other resuspension control process options.
   M = Medium - Rated moderate for controlling or compensating KPV as compared to other resuspension control process options.
   L = Low - Rated low for controlling or compensating KPV as compared to other resuspension control process options.
3. Acronyms:
   KPV = key process variable

Table 7-1 - Dredge Transport Equipment Matrix

Transport Method	Description		Key Process Variables													References
	Dimensions	Horsepower Rating (hp)	Dredge Type	Equipment Availability	Processing Facility Location	Processing Facility Size Constraints	Water Depth Requirements	Proximity to Navigational Channel	Consistency of Dredged Material (percent solids)	In-River Infrastructure/ Obstructions	Failure Risk	Transport Capacity (cy/barge or cy/day)	In-River Support	On-Land Support Requirements		
Hopper barges	L = 175 ft to 195 ft W = 26 ft to 35 ft D = 10 ft	Will require pushboat with approx. 1,000 hp	Mechanical dredging of material.	Available as needed.	Affects transport time via barge.	Facility sizing affects the quantity/rate of material that can be accepted into the processing system. Barge selection will be based on daily production rate at the processing facility.	200 ton = 2.3 ft 800 ton = 5.0 ft 1,775 ton = 9.5 ft	Barges need to be moved/positioned in a manner that will not interfere with other river traffic.	All but large cobbles/rock (will need to be removed prior to dredging). Estimated 80% solids during removal/transport.	Navigation of channel, locks, and underwater debris - difficult to maneuver; potential to run aground.	If an object is hit during maneuvering, the barge could be damaged. Potential for "swamping" exists. River hydraulics will affect the movement and handling due to forces exerted on the barges by the river currents.	1,000 cy (neat) loaded to 10 ft draft.	Tug for in-river movement, anchors required during staging if located in-river.	Weld/repair equipment as needed.		Memco Barges
Deck barges with coaming	L = 60 ft to 110 ft W = 30 ft to 35 ft	Will require pushboat with approx. 500 to 1,000 hp	Mechanical dredging with potential loading of backfill materials.	Available as needed.	Affects transport time via barge.	Facility sizing affects the quantity/rate of material that can be accepted into the processing system. Barge selection will be based on daily production rate at the processing facility.	Draft range 3 ft to 5 ft.	Barges need to be moved/positioned in a manner that will not interfere with other river traffic.	All material types (note baffling will be required for "wet materials"). Estimated 80% solids during removal/transport.	Navigation of channel, locks, and underwater debris - difficult to maneuver; potential to run aground.	If an object is hit during maneuvering, the barge could be damaged. Potential for "swamping" exists. River hydraulics will affect the movement and handling due to forces exerted on the barges by the river currents.	200 cy to 500 cy (assumes a 5 ft coaming with 3 ft of material).	Tug for in-river movement, anchors/spuds required during filling of material.	Weld/repair equipment as needed.		Memco Barges
Material barges/deck barges	L = 40 ft to 110 ft W = 10 ft to 34 ft D = 6 ft to 11 ft	Will require pushboat with approx. 500 to 1,000 hp	Mechanical dredging platform/obstruction removal/equipment transport/backfill material transport.	Available as needed (may require barges from other regions of the U.S.).	Affects transport time via barge.	Ability/rate to load backfill material onto the barge.	3 ft to 5 ft when fully loaded.	Barges need to be moved/positioned in a manner that will not interfere with other river traffic.	Rock/backfill material transport/equipment transport.	Navigation of channel, locks, and underwater debris - difficult to maneuver; potential to run aground.	If an object is hit during maneuvering, the barge could be damaged. Potential for "swamping" exists. River hydraulics will affect the movement and handling due to forces exerted on the barges by the river currents.	600 tons (approx. 800 cy of backfill sand).	Tug for in-river movement, anchors/spuds required during filling/offloading of material.	Weld/repair equipment as needed.		Smith Marine - Galesville, Maryland
Pushboat (tugboat)	L = 25 ft to 75 ft W = 10 ft to 26 ft	170 hp to 1,300 hp	Used as dredge tender for both mechanical or hydraulic or barge movement.	Available as needed (may require barges from other regions of the U.S.).	Affects transport time to and from the facility.	Loading/unloading area size requirements are dictated by the size equipment that will be used for transport of dredged material and other construction materials.	3 ft to 9 ft.	Pushboats need to be moved in a manner that will not interfere with other river traffic.	Different size pushboat required for barge movement versus pipeline movement.	Easily maneuvered; potential overhead clearance difficulties.	If an object is hit during maneuvering, the barge could be damaged. Potential for "swamping" exists. River hydraulics will affect the movement and handling due to forces exerted on the barges by the river currents.	NA	Fuel/anchors/line.	Weld/repair equipment as needed.		Waterways Equipment
Hydraulic pipeline from dredge	Various (8" to 16" most probable)	320 hp to 1,280 hp	Hydraulic material movement.	Available as needed.	Affects pumping distance/limitations Approx. 3,000 lf to 10,000 if pumping distance can be achieved using only the dredge pump (booster required for further distance).	Facility will be sized to meet the daily production rate via hydraulic pipeline transport.	Floating or submerged line not applicable to water depth.	Pipeline location needs to be routed as to not interfere with other vessel movements.	Preferred 0.5" maximum gravel size for pumping efficiency. Solids content will vary between 3 to 5%.	Shallow water will make pipe service difficult - shoreline placement will be difficult - vessel traffic may cause problems with pipe location.	Pipeline placement should avoid areas of high velocity. Forces caused by high velocity could cause the pipeline to break. Routine pipeline maintenance would be necessary.	6,600 to 18,000 cy/day (slurry).	Divers/tender tug/small deck crane for pipe movement/ possibly welding equipment.	HDPE pipe would require fusion equipment for pipe section joints; steel pipe would require welding.		Ellicott Dredge
Booster pumps	L = 6.0 ft to 75 ft W = 6.0 ft to 35 ft D = 0 ft to 3.5 ft (some booster pumps are skid mounted)	175 hp to 6,000 hp	Used for increased pumping distance for hydraulic dredging.	Available as needed.	Affects the number of boosters required to pump to the processing facility. Approx. 3,000 lf to 10,000 lf can be achieved per booster.	Facility will be sized to meet the daily production rate via hydraulic pipeline transport.	Depends on draft of barge (possibly shoreline placement).	Pumps will need to be placed in a manner that will not interfere with other vessel movements (for in river pumps).	Mud/silt/sand, not gravel/rock/boulders. Solids content will vary between 3 to 5%.	Only during mobilization/ demobilization.	Mechanical failure likely during project life which will stop dredging production during repair or during time for installing a spare pump. Placement of barges with booster pumps on them should be avoided and any areas prone to flooding during seasonal rains.	22,000 to 45,000 cy/day (slurry - water and material) - 12" to 16" discharge.	Floating barge/tender tug/deck crane for pipeline service/fuel/oil.	Weld/repair equipment as needed.		IMS Dredges

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Table 7-1 - Dredge Transport Equipment Matrix

Transport Method	Description		Key Process Variables												References
	Dimensions	Horsepower Rating (hp)	Dredge Type	Equipment Availability	Processing Facility Location	Processing Facility Size Constraints	Water Depth Requirements	Proximity to Navigational Channel	Consistency of Dredged Material (percent solids)	In-River Infrastructure/ Obstructions	Failure Risk	Transport Capacity (cy/barge or cy/day)	In-River Support	On-Land Support Requirements	
Positive displacement pumps (High solids Concrete Type)	Most truck/Trailer mounted L = 43 W = 13 H = 14	Varies	Mechanical to a hopper bin.	Available as needed. Dredge type positive displacement pumps are not readily available.	Affects the number of boosters required to pump to the processing facility. Could be used for transport to the processing facility from the offloading area.	Facility would have to be designed to receive high solids content from a positive displacement pump.	Depends on draft of barge (possibly shoreline placement).	Pump barges will need to be placed in a manner that will not interfere with other vessel movements (for in river pumps).	Aggregate up to 2.5 inches for concrete type pump (pipe diam. 5 to 6 in). Solids content could be up to 20%.	Only during mobilization/ demobilization.	Pipe could clog or break. Placement of barges with pumps on them should be avoided and any areas prone to flooding during seasonal rains.	75 to 200 cy/hr @ 1,300 psi.	Floating barge/tender tug/deck crane for pipeline service/fuel/oil.	Fuel, oil, etc.	Schwing, Reed, Dry Dredge
Positive displacement pumps (Bean Slurry Processing Unit or equivalent)	Size varies based on needs. Barge constructed of modular floats.	Varies	Mechanical dredging into slurry hopper.	Possibly less than five in production. Other could be manufactured if there was a demand.	Affects the number of boosters required to pump to the processing facility. Approx. 3,000 lf to 10,000 lf can be achieved per booster.	Facility will be sized to meet the daily production rate via hydraulic pipeline transport.	Barge draft range 3 ft to 5 ft.	Barge need to be moved/positioned in a manner that will not interfere with other river traffic.	Pumps material at approximately 15% solids.	Navigation of channel, locks, and underwater debris - difficult to maneuver; potential to run aground.	Mechanical failure likely during project life which will stop dredging production during repair or during time for installing a spare pump. Placement of barges with booster pumps on them should be avoided and any areas prone to flooding during seasonal rains.	Approximately 80 to 100 cy/hr.	Floating barge/tender tug/deck crane for pipeline service/fuel/oil.	Weld/repair equipment as needed. HDPE pipe would require fusion equipment for pipe section joints.	Bean Environmental
Hydraulic unloader	Varies	1,800 hp	Hydraulically unloaded from barge for transport to a processing facility.	Very limited (probably less than 10 in the Country). An 8- to 16-inch hydraulic dredge could be modified to become an unloader.	Not affected by processing facility location if this method is used. Light mat can be pumped 5,000 ft. Heavy mat pumped 3,000 ft.	Facility would have to be designed to receive high water content solids.	3.2 ft	Hydraulic unloader will need to be situated away from the navigational channel to not interfere with river traffic.	Mud/silt/sand, not gravel/rock/boulders. Solids content will vary between 15 to 20%.	Only during mobilization/ demobilization - also overhead clearance.	Mechanical failure likely during project life which will stop dredging production during repair. Unloader should not be placed in the open water or areas of high velocity.	Varies (up to 45,000 cy/day [slurry]).	Floating barge/tender tug/deck crane for service.	Weld/repair equipment as needed.	Great Lakes Dredge and Dock

Notes:
1. This table is a preliminary analysis and results may be reviewed and changed based on new data and information in the Intermediate Designs.
2. Acronyms:
   ft = feet
   cy = cubic yards
   lf = linear feet
   mm = millimeter
   L = length
   W = width
   D = depth
   NA = not applicable
   hp = horsepower
   HDPE = high-density polyethylene

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Table 8-1 - Typical Sediment and Water Processing Components vs. Key Process Variables

Sediment & Water Processing Components	Sediment Water Content	Particle Size Distribution	Sediment Solids Specific Gravity	Sediment Organic Content	Sediment PCB Content	Dredge Type - Mechanical or Hydraulic	Dredging Rate (cy/hr & hr/day)	Dredging Cut Depth	Dredge Material Transportation	Barge Unloading Method	Hydraulic Loading	Solids Mass Loading	Disposal Requirements	Use of Monofill Landfill	Processing Facility Location	Effluent Limitations	Transportation Uncertainties
On-Barge Separation/Transfer	H	M	M	M	L	H	L	M	H	H	M	M	L	L	M	L	L
Equalization/Holding	M	M	M	L	L	H	H	M	M	M	M	M	L	L	L	L	H
Pumping Facilities	H	H	L	L	L	H	H	H	H	H	H	L	L	L	M	L	L
Size Separation Technology	H	H	H	M	H	H	M	M	H	H	H	H	H	H	L	L	M
Dewatering Flocculation Facilities	H	H	M	L	M	H	H	M	M	L	H	H	M	L	L	M	L
Dewatering Technology	H	H	L	M	L	H	M	M	H	L	M	H	H	L	L	M	L
Material Staging and Testing	L	L	L	M	H	L	H	M	M	M	M	M	M	H	M	M	H
Stabilization Method	M	M	M	M	M	H	M	M	M	L	M	H	H	M	L	L	M
Water Treatment Technology	H	M	M	M	H	M	M	L	H	M	H	L	L	L	M	H	L
Effluent Holding and Discharge	M	M	L	L	M	M	H	L	H	L	H	L	L	L	M	H	L
In-River Processing	H	H	M	H	H	H	H	M	H	M	H	H	M	H	L	H	L

Notes:

1. This table is a preliminary analysis and results may be reviewed and changed based on new data and information in the Intermediate Designs.
2. H = High - Indicates that the KPVs have a high impact on the facility component.
   M = Medium - Indicates that the KPVs have a moderate impact on the facility component.
   L = Low - Indicates that the KPVs have a minor impact on the facility component.
3. Acronyms:
   PCB = polychlorinated biphenyls
   cy = cubic yard
   hr = hour
   KPV = key process variable

Table 10-1 – Summary of Disposal Facilities Responding to Request for Statements of Interest

Owner/Operator	Site Name	Location (Approx. Distance)	Type of Permit	PCB Conc. Limit (ppm)	Currently Permitted Capacity (cy)	Total Potential Capacity (cy)	Wastes Accepted via Rail? (Y/N – Facility Type – Distance)	Rail Facility Capacity (tpd)	Rail Car Types Accepted	Wastes Accepted via Barge? (Y/N – Facility Type – Distance)	Notes
TSCA Facilities											
Waste Management	CWM Arlington	Arlington, OR (2,650 mi)	TSCA Approval RCRA Subtitle C	No Limit	3,000,000	44,000,000	Yes - Direct Rail - Onsite	NR	Gondolas, Intermodals	No	WMI owns and operates the Onsite rail facility, and performs all off-loading, rail car staging, etc. Materials are transferred into high capacity, off-road trucks.
	CWM Emelle	Emelle, AL (1,250 mi)	TSCA Approval RCRA Subtitle C	No Limit	1,500,000	>10,000,000	Yes - Rail-Truck Transfer - Offsite	600 - 800 tpd	Gondolas, Intermodals	No	
	CWM Kettleman Hills B-18	Kettleman City, CA (2,445 mi)	TSCA Approval	No Limit (non-RCRA)	4,300,000	11,100,000	No	NA	NA	No	
	CWM Model City	Model City, NY (320 mi)	TSCA Approval RCRA Subtitle C	No Limit	1,300,000	>4,000,000	Not currently	NA	NA	No	
American Ecology Corporation	US Ecology Nevada	Beatty, NV (2,685 mi)	TSCA Approval RCRA Subtitle C	No Limit	5,000,000 (combined)	NR	Yes - Rail-Truck Transfer - Offsite	NR	Gondolas, Intermodals	Yes – Offsite Barge-Truck – 1,300 mi	US Ecology owns and operates its own rail transfer facilities. Wastes transported by barge would be transferred to trucks at US Ecology's Texas facility for transportation to the Nevada or Idaho landfills.
	US Ecology Idaho	Grand View, ID (2,500 mi)	TSCA Approval RCRA Subtitle C	No Limit			Yes - Rail-Truck Transfer - Offsite	NR	Gondolas, Intermodals	Yes - Offsite Barge-Truck – 1,520 mi	
Clean Harbors	Grassy Mountain Landfill	Grassy Mountain, UT (2,220 mi)	TSCA Approval RCRA Subtitle C	No Limit	950,000	16,700,000	Yes - Rail-Truck Transfer - 11 & 15 Miles	10,000-11,000 tpd combined	Gondolas, Intermodals, Hoppers	Yes - Offsite Barge-Rail – 1,830 mi	Clean Harbors owns two rail spurs at Clive, UT, approx. 11 and 15 miles from the landfill. Wastes transported by barge would be transferred to rail at Port Arthur, Texas for transportation to Clean Harbors' rail-truck facilities.
EQ (Wayne Disposal)	Wayne Disposal Landfill	Wayne, MI (650 mi)	TSCA Approval RCRA Subtitle C	No Limit	2,500,000	3,600,000	Yes - Rail-Truck Transfer - 10 Miles	1,100 tpd	Gondolas, Intermodals	Yes - Offsite Barge-Truck – 24 mi	Rail-truck transfer facility is owned by EQ. Additional transfer capability could be constructed. EQ operates a Marine Services Division in New Jersey that could coordinate a barge loading operation. Barge unloading could be accomplished at Port of Detroit, with transfer to trucks for delivery to the landfill.
Waste Control Specialists, LLC (WCS)	Waste Control Specialists	Andrews, TX (1,850 mi)	TSCA Approval RCRA Subtitle C	No Limit	11,600,000	11,600,000	Yes - Direct Rail - Onsite	1,000 tpd via gondolas	Gondolas, Intermodals	No	WCS owns the spur and operates the unloading facility, which would have to be upgraded for a project of this size.
Non-TSCA Facilities											
Waste Management	CWM Lake Charles	Lake Charles, LA	RCRA Subtitle C	<50 ppm	13,700,000	13,700,000	Yes - Rail-Truck Transfer - Offsite	200 - 400 tpd	Gondolas, Intermodals	Yes - Offsite Barge-Truck – NR	Offsite barge capability through Duvalls Barge Corporation. Barge capacity reported as 1 to 2 barges per day.
	Amelia	Amelia, VA	Subtitle D (State Permit)	<50 ppm	43,000,000	43,000,000	Yes - Direct Rail - Onsite	NR	Gondolas, Intermodals, Hoppers	No	
	Atlantic	Waverly, VA	Subtitle D (State Permit)	<50 ppm	24,800,000	114,500,000	Yes - Direct Rail - Onsite	NR	Gondolas, Intermodals, Hoppers	No	
	Evergreen	Toledo, OH	Subtitle D (State Permit)	<50 ppm	20,000,000	20,000,000	Yes - Direct Rail - Onsite	NR	Gondolas, Intermodals, Hoppers	No	
	American	Canton, OH	Subtitle D (State Permit)	<50 ppm	9,500,000	84,500,000	Yes - Rail-Truck Transfer - Offsite	NR	Intermodals	No	Landfill accepts waste only from 250-mile radius. Transfer facility accepts non-TSCA materials only.
	Harrison County	Cadiz, OH (565 mi)	Subtitle D (State Permit)	<50 ppm	NR	NR	Yes - Direct Rail - Onsite	NR	NR	No	
	Butterfield Station	Mobile, AZ	Subtitle D (State Permit)	<50 ppm	148,100,000	148,100,000	Yes - Direct Rail - Onsite	NR	Gondolas	No	WMI operates the Onsite rail facility, but the host rail must shift cars.

Table 10-1 – Summary of Disposal Facilities Responding to Request for Statements of Interest

Owner/Operator	Site Name	Location (Approx. Distance)	Type of Permit	PCB Conc. Limit (ppm)	Currently Permitted Capacity (cy)	Total Potential Capacity (cy)	Wastes Accepted via Rail? (Y/N – Facility Type – Distance)	Rail Facility Capacity (tpd)	Rail Car Types Accepted	Wastes Accepted via Barge? (Y/N – Facility Type – Distance)	Notes
	Columbia Ridge	Arlington, OR (2,650 mi)	Subtitle D (State Permit)	<50 ppm (higher per Mega Rule)	359,900,000	359,000,000	Yes - Direct Rail - Onsite	NR	Gondolas, Intermodals	No	WMI owns and operates the Onsite rail facility and performs all off-loading, rail car staging, etc. Materials are transferred into high capacity, off-road trucks.
	Five Oaks	Taylorville, IL	Subtitle D (State Permit)	<50 ppm	9,400,000	9,400,000	Yes - Direct Rail - Onsite	NR	Gondolas, Intermodals, Hoppers	No	
	High Acres	Fairport, NY (230 mi)	Subtitle D (State Permit)	<50 ppm	26,200,000	26,200,000	No	NA	NA	No	This landfill is available for Beneficial Use material (ADC) delivered by truck only.
	G.R.O.W.S.	Morrisville, PA (265 mi)	Subtitle D (State Permit)	<50 ppm	9,500,000	16,000,000	No	NA	NA	No	This landfill is available for Beneficial Use material (ADC) delivered by truck only.
	Tullytown	Morrisville, PA	Subtitle D (State Permit)	<50 ppm	790,000	10,000,000	No	NA	NA	No	This landfill is available for Beneficial Use material (ADC) delivered by truck only.
	Alliance	Morrisville, PA	Subtitle D (State Permit)	0 ppm	7,000,000	62,000,000	No	NA	NA	No	This landfill is available for Beneficial Use material (ADC) delivered by truck only. PCB concentrations in ADC materials must be ND.
	Turnkey	Rochester, NH (140 mi)	Subtitle D (State Permit)	<50 ppm	10,800,000	18,200,000	No	NA	NA	No	This landfill is available for Beneficial Use material (ADC) delivered by truck only.
	Chicopee	Chicopee, MA	Subtitle D (State Permit)	0 ppm	2,800,000	4,700,000	No	NA	NA	No	This landfill is available for Beneficial Use material (ADC) delivered by truck only. PCB concentrations in ADC materials must be ND.
	Holyoke	Holyoke, MA	Subtitle D (State Permit)	0 ppm	141,000	2,000,000	No	NA	NA	No	This landfill is available for Beneficial Use material (ADC) delivered by truck only. PCB concentrations in ADC materials must be ND.
	Charles City	Charles City, VA	Subtitle D (State Permit)	<50 ppm	45,100,000	45,100,000	No	NA	NA	Not currently	Barge capability is being planned for near future.
	Lakeview	Erie, PA	Subtitle D (State Permit)	<50 ppm	3,100,000	17,100,000	No	NA	NA	No	This landfill is available for Beneficial Use material (ADC) delivered by truck only.
American Ecology	US Ecology Texas	Robstown, TX	RCRA Subtitle C	1,000 ppm	2,700,000	13,000,000	No	NA	NA	Yes - Offsite Barge-Truck – NR	Materials can be accepted by barge near Corpus Christi, Texas, with transload to trucks for delivery to the landfill.
Clean Harbors	Sawyer Landfill	Sawyer, ND	Subtitle D (State Permit)	<50 ppm	1,700,000	Unlimited	Yes, Rail-Truck Transfer - 6 Miles	NR	Gondolas, Intemodals	No	Rail-truck transfer facility is owned by Clean Harbors.
Allied Waste Industries, Inc.	Lee County	Bishopville, SC	Subtitle D (State Permit)	<50 ppm	NR	28,000,000	Yes - Direct Rail - Onsite	4,000 tpd	Gondolas	No	
	Brunswick Landfill	Lawrenceville, VA	Subtitle D (State Permit)	<50 ppm	NR	35,500,000	Yes - Rail-Truck Transfer - 5 miles	NR	Gondolas, Intermodals	No	Use of rail/truck transfer facility would require track upgrades.
	Wyandot Landfill	Carey, OH	Subtitle D (State Permit)	<50 ppm	NR	25,000,000	Not currently	NA	NA	No	Infrastructure could be put in place for direct connection to main CSX line 1.5 miles from site.
	Taylor County Landfill	Mauk, GA	Subtitle D (State Permit)	<50 ppm	NR	42,000,000	Not currently	NA	NA	No	Rail is currently available Onsite, but no infrastructure is in place for direct rail service currently. Could be upgraded.
	Ottawa County Landfill	Port Clinton, OH	Subtitle D (State Permit)	<50 ppm	NR	NR	Yes - Direct Rail - Onsite	1,200 tpd	Gondolas, Intermodals	No	Rail facility could be upgraded to accept up to 4,500 tpd.
	Spoon Ridge Landfill	Fairview, IL	Subtitle D (State Permit)	<50 ppm	NR	43,000,000	Not currently	NA	NA	No	Landfill currently closed due to lack of market - could be reopened as necessary. Rail service would require purchase of 24 miles of track and negotiations with short line.
	ECDC Landfill	East Carbon, UT	Subtitle D (State Permit)	<50 ppm	NR	300,000,000	Yes - Direct Rail - Onsite	>5,000 tpd	Gondolas, Intermodals	No	

Table 10-1 – Summary of Disposal Facilities Responding to Request for Statements of Interest

Owner/Operator	Site Name	Location (Approx. Distance)	Type of Permit	PCB Conc. Limit (ppm)	Currently Permitted Capacity (cy)	Total Potential Capacity (cy)	Wastes Accepted via Rail? (Y/N – Facility Type – Distance)	Rail Facility Capacity (tpd)	Rail Car Types Accepted	Wastes Accepted via Barge? (Y/N – Facility Type – Distance)	Notes
Eagle Environmental	Royal Oak Landfill	Chest Township, PA (410 mi)	Subtitle D (State Permit)	<50 ppm	11,900,000	11,900,000	Not currently	NA	NA	No	This is a newly permitted, to-be-constructed landfill. Rail-to-truck transfer facility would have to be built - could be established within 5 miles of facility.

Notes:

Acronyms:
PCBs = polychlorinated biphenyls
ppm = parts per million
cy = cubic yards
RCRA = Resource Conservation Recovery Act
TSCA = Toxic Substances Control Act
NA = not applicable
NR = no response
ADC = Alternate Daily Cover
tpd = tons per day
mi = miles
Y/N = Yes/No
< = less than
> = greater than

Table 10-2 – Disposal Quantities Estimated by the USEPA

River Section	Volume with PCBs >32 ppm		Volume with PCBs <32 ppm		Total	
	Dredged Volume (cy)	Weight of Stabilized Material (tons)	Dredged Volume (cy)	Weight of Stabilized Material (tons)	Dredged Volume (cy)	Weight of Stabilized Material (tons)
1	310,000	469,000	1,250,000	1,890,000	1,560,000	2,359,000
2	430,000	650,000	150,000	227,000	580,000	877,000
3	260,000	393,000	250,000	378,000	510,000	771,000
Total	1,000,000	1,512,000	1,650,000	2,495,000	2,650,000	4,007,000

Notes:

1. Totals for greater than 32 ppm include approximately 300,000 tons from navigational channel dredging.
2. Volumes and ton/cy assumption (1.51 ton/cy) are from the *Estimate of Dredged Material Exceeding TSCA Criteria,* White Paper (MC 424851) presented in the ROD Responsiveness Summary (USEPA, 2002a) and will be revised based on new data.
3. 32 ppm criteria presented in the above table is derived from the USEPA. Actual TSCA criteria will be established during the Intermediate Design.
4. Acronyms:
   PCBs = polychlorinated biphenyls
   ppm = parts per million
   cy = cubic yards
   TSCA = Toxic Substances Control Act
   USEPA = United States Environmental Protection Agency
   > = greater than
   < = less than

Table 11-1 –Backfill/Capping Material Sources

Company Name	Location	Transportation	Quantity of Sand Material/General Notes[1]
Troy Sand & Gravel	Edison Paving Site	Barge Access	6,000,000 cy
William Larned and Son	Brickyard Associates	Barge Access	> 3,000,000 cy
Peckham Materials Corp	Catskill, NY	Rail and Barge	> 800,000 cy
William E. Daily, Inc.	Shaftsbury, VT	Rail	> 800,000 cy
Jointa Galusha	Glens Falls, NY	Rail	˜ 400,000 cy
Cranersville Sand & Gravel	South Glens Falls, NY	Possible Rail	˜ 67,000 cy
Warren W. Fane Inc.	Troy, NY	Possible Rail	> 800,000 cy
A. Colarusso & Son, Inc.	Hudson, NY	Truck	> 800,000 cy
Tracey Materials, Inc.	Greenwich, NY	Truck	˜ 400,000 cy
Valente Gravel/Callahan Industries	Schenectady, NY	Truck	
Crushing Stone Co.	Amsterdam, NY	Truck	
Pompa Brothers, Inc.	Saratoga Springs, NY	Truck	
John S. Lane, Inc.	West Stockbridge, MA	Truck	
Pittsfield Sand & Gravel, Inc.	Pittsfield, MA	Truck	
Bushika Sand & Gravel, Inc.	Cheshire, MA	Truck	
J Donovan & Sons, Inc.	MA	Truck	
Burgress Brothers	Bennington, VT	Truck	
F H Stickles & Sons, Inc.	Livingston, NY	Truck	Not a Borrow Pit
Platterkill Sand & Gravel	Gilboa, NY	Truck	
Seagalla Sand & Gravel, Inc.	Canaan, CT	Truck	
BJ Farms	Greenwich, NY	Truck	
G R Lewis Construction Co.	Burnt Hills, NY	Truck	
Wunderlich Sand & Gravel	Latham, NY	Truck	
Richard H. List, Inc.	Altamont, NY	Truck	
JR Pietropaoli	Ravena, NY	Truck	
Grimm	Green Island, NY	Truck	
Albany Asphalt & Aggregates	Albany, NY	Barge Access	Not a Borrow Pit
Tall Pines Chincilla	Petersburg, NY	Truck	
Sandy Loam Farms	Troy, NY	Truck	
Stiles Excavating and Trucking	Clifton Park, NY	Truck	
Callanan Industries	Ravena, NY	Rail	Stone Screenings
Edward Herba Jr. Sand & Gravel	Gloversville, NY	Truck	

Note:
1. [1] = Quantities represent current estimates and are not necessarily representative of future capacity.
2. Acronyms:
   ˜ = approximate
   cy = cubic yard
   > = greater than