

CHAPTER IV TABLES

Table IV-1. Proposed Changes to the Performance Standards

Proposed Change to Standard	Proposed Numerical Criteria	Rationale	Impact on Other Standards
Resuspension			
<p>Adjust the far-field net PCB load standard; adjust the seasonal load and corresponding daily evaluation and control level loads upwards.</p> <p>[EPA will propose specific control and evaluation levels for net load after completing ongoing analyses.]</p>	<p>Total load due to the project: 2000 kg Total PCBs</p>	<p>Based on preliminary findings, a total project net PCB load of 2000 kg Total PCBs +/- 25% is not expected to significantly impact the Lower Hudson. The best-estimate break-even point with MNA occurs within 25 years. Additional evaluation is underway. The daily load criteria will be set in consideration of the proposed flexibility in the Productivity Standard's schedule and the constraints of the Resuspension Standard's water quality criteria.</p>	<p>Maintain productivity while protecting the Lower Hudson River.</p>
<p>Revise the station of compliance for load to be Waterford, exclusively.</p>	<p>N/A</p>	<p>Waterborne PCB concentrations decrease with distance from dredging. The focus of the analysis of load in the 2004 Resuspension Standard documents was loads that would be released to the Lower Hudson; such loads are best measured at Waterford. Thus, this change is consistent with the intent of the performance standard.</p>	<p>No impacts are expected.</p>
<p>Reduce the near- field net suspended solids (TSS) levels for Phase 2.</p>	<p>Net increase of 50 mg/L TSS above ambient (upstream) conditions at a location:</p> <ul style="list-style-type: none"> • 300 m downstream of the dredging operation, or 	<p>Conditions during Phase 1 showed that current suspended solids criteria are too high to be useful and lower criteria are achievable and needed to monitor solids transport and releases. Proposed levels are consistent with observations of suspended solids</p>	<p>No impacts are expected.</p>

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	<ul style="list-style-type: none"> • 150 m downstream from any TSS control measure. Sustained TSS of 100 mg/L above ambient (upstream) conditions at near-field stations located: <ul style="list-style-type: none"> • to the side of dredging operations, or • 100 m downstream of dredging operations. 	during Phase 1 and should not result in the need for more stringent practices than applied in Phase 1 with respect to suspended solids control.	
Use the 500 ng/L threshold at Thompson Island as a trigger to require operational changes, but not necessarily an operational shutdown, at EPA’s discretion.	N/A	Phase 1 showed more than a factor of 2 reduction in water column concentrations from Thompson Island Dam to Waterford. Operational changes should be made, as needed, in response to changes in water column sample composition (<i>e.g.</i> , congener pattern, oil phase, dissolved vs. suspended contamination, etc.). Split sample precision should be considered when selecting operational changes. This proposed change will not impact water supplies because Waterford and Halfmoon have an alternate connection to Troy, and Stillwater (which draws its water from an aquifer adjacent to the river) has treatment.	Avoid unnecessary operational shutdowns and improve productivity.
Maintain the water column Control Level of 350 ng/L for discretionary use by EPA to	N/A	During Phase 1, few operational changes were made prior to exceeding the 500 ng/L threshold. Exceeding the	Provide early action to avoid operational shutdowns and maintain productivity.

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require (as opposed to merely recommend) appropriate operational changes.		500 ng/L threshold may be avoided by proactive adjustments to the operation.	
Residuals			
Reduce the number of cases from 8 to 4 primary response categories.	The four maintained cases are: 1. The standard is met or almost met 2. Residuals are present 3. Inventory is present 4. Recalcitrant residuals or inventory is present	The intention is to simplify and streamline the standard based on Phase 1 results. Four of the cases included in the Residuals Standard were not encountered during Phase 1 and are not likely to be encountered during Phase 2.	This may have some benefit to resuspension and productivity by shortening the time for CU closure.
Remove the 20-acre averaging option and backfill testing requirement.	N/A	The conditions where the 20-acre averaging could be applied did not occur during Phase 1 and are unlikely to occur in Phase 2.	This will have some benefit to resuspension and productivity by avoiding longer times for CU closure.
Eliminate use of the 99% UCL (6 mg/kg criterion) as a basis to decide CU sampling requirements.	N/A	Rather than use 6 mg/kg criterion to trigger sampling at depth, full penetration and analysis of all 6-inch core segments in a minimum 24-inch core (unless bedrock or dense clay is encountered) will be required for all post-dredging cores due to Phase 1 experiences with missed inventory and underestimated DoC.	This will improve productivity by eliminating multiple, unnecessary re-dredging passes and sampling rounds to address missed inventory.
Permit capping without formal petition to EPA only after completion of the first pass and at least 1 additional dredging pass targeting only the top 6 inches of material. In other	No numerical criteria are changed for this revision. This applies only to Case 4 – Recalcitrant Residuals or Inventory Present	The Residuals Standard contemplated limited capping as a contingency to address residuals in the presence of difficult bottom conditions. The option for capping is not meant to compensate for any deficiency in	When underestimates of DoC have been remedied, re-dredging to capture inventory will be reduced, improving productivity and reducing resuspension. The targets

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words, in order for capping to be permitted, the inventory must have been removed as confirmed by post-dredging coring and an additional pass targeting just 6 inches (residuals) must have been performed.		dredging design. However, during Phase 1, capping was sometimes employed primarily to isolate inventory and this should be avoided in Phase 2.	within the Productivity Standard are designed to accommodate some re-dredging.
Confirm DoC in post-dredging cores.	Two contiguous segments less than 1.0 mg/kg Total PCBs are required to confirm that DoC is known.	During Phase 1, there were situations where sediment cores were observed to reach a value of less than 1.0 mg/kg in a single 0 to 6-inch segment only to see concentrations rise again deeper in the profile.	This is an important component of defining DoC, thereby minimizing the number of dredging passes in order to maintain productivity targets and minimize resuspension.
Simplify identification of non-compliant nodes for reviewing dredging pass results.	Target average value of 1.0 mg/kg Tri+ PCB, using only the ranked, measured nodal values in a simple accumulating average.	As implemented in Phase 1, locations that appeared to be compliant with the standard on one pass caused the mean to exceed the Residuals Standard threshold after later passes, requiring re-dredging (or capping) in the previously compliant location. This problem is eliminated by this simplified process.	This will make the second dredging pass laterally more extensive, capturing inventory more quickly, leading to faster closure of CUs to maintain productivity and minimize resuspension.
Simplify identification of re-dredging or capping boundaries.	The area associated with non-compliant nodes extends to the periphery of compliant nodes or to the edge of the CU. Where a compliant node is	In Phase 1, a sophisticated algorithm was a source of much discussion and often resulted in unusual dredging geometries. A more conservative approach is needed in light of poor spatial correlation and DoC	Simplified geometry will shorten the design and decision period between dredging passes leading to faster closure of CUs to maintain productivity and

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	<p>surrounded by non-compliant nodes, the area associated with the compliant node is dredged to the average depth of the surrounding non-compliant nodes. Generally, 3 compliant nodes are required to define an area that does not require re-dredging.</p>	<p>uncertainty.</p>	<p>minimize resuspension.</p>
<p>Identify nodes with high probability of exceeding the Residuals Standard threshold early in the CU dredging process to mitigate uncertainty in DoC estimation.</p>	<p>Target concentration of 1.0 mg/kg Tri+PCB, permitting only a mean of 1.49 after the last pass.</p>	<p>As implemented in Phase 1, locations that appeared to be compliant with the standard on one pass later caused the mean to exceed the Residuals Standard threshold after later passes, requiring re-dredging (or capping) in the previously compliant location. Areas identified in this manner will meet the true threshold of 1 mg/kg, regardless of the outcome of subsequent re-dredging attempts at the non-compliant locations.</p>	<p>This will make the second dredging pass laterally more extensive, capturing inventory more quickly, leading to faster closure of CUs to maintain productivity and minimize resuspension.</p>
<p>Avoid capping in the navigation channel whenever possible. If it is necessary, however, design and implement such that the top of cap allows for a minimum of 14 feet of draft to allow for future maintenance dredging by</p>	<p>Caps must allow 14 feet of draft in navigation channels.</p>	<p>Capping was not expected in the navigation channel. However, during Phase 1 the installation of a subaqueous cap was required in and around Rogers Island. The caps in the navigation channel were placed such that the navigation depth of 12 feet</p>	<p>Because sediments deposited in the established navigation channel historically dredged to a depth of 14 feet are expected to be softer and readily dredged, except possibly where debris exists,</p>

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the NYS Canal Corporation (NYSCC).		was met. The 12-foot depth, however, does not account for the need to conduct maintenance dredging of sediments that become naturally deposited on top of the cap. The tops of any caps placed in the navigation channel in Phase 2 must be at least 14 feet deep in order for NYSCC to maintain adequate channel depths.	this is expected to have a minimal impact on productivity.
Eliminate the concepts of ‘inventory pass’ and ‘residuals pass’ from the Residuals Standard. Consider all passes simply as dredging passes.	N/A	Rarely in Phase 1 was subsequent dredging after the first pass exclusively done to remove inventory or residuals. The categorization of particular dredging passes, which has no impact on implementation of the Residuals Standard, became a distraction during project discussions.	No impacts are expected.
Productivity			
Add a provision to extend the time frame for Phase 2 at the discretion of EPA.	Every reasonable effort will be made to maintain the 5-year duration of Phase 2. EPA may allow 1 or 2 additional years if conditions require.	This change allows EPA to adjust the project schedule if necessary to accommodate conditions beyond the control of EPA and GE, such as extreme flows, force majeure, or the discovery of significant additional inventory to be removed; as well as possible resuspension impacts, which are the subject of ongoing analysis by EPA.	The project will still be required to meet a PCB load threshold based upon the amount of mass to be removed and protection of the Lower Hudson River.
Recalculate the annual required and target dredging volumes to reflect the revised Phase 2	<u>Required volume:</u> Yrs 1 to 4 - 475,300 CY/Yr Yr 5 - 475,300 CY*	This modification is consistent with the design intent of the standard and is based on a Phase 2 schedule of 5	The project will still be required to meet a PCB load threshold based upon the

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removal volume.	Avg. daily - 3,378 CY Avg. monthly - 86,420 CY <u>Target volume:</u> Yrs 1 to 4 - 528,100 CY/Yr Yr 5 - 264,100 CY* Avg. daily - 3,745 CY Avg. monthly - 96,020 CY *or remaining inventory	years and the current estimate of remaining inventory to be removed (~2.4 million CY).	amount of mass to be removed and protection of the Lower Hudson River.
Count sediment volumes removed during residuals dredging and when dredging missed inventory toward meeting required and target volumes listed in the Standard.	N/A	GE requested, and EPA approved, a change for Phase 1 to count missed inventory, and it should be carried forward into Phase 2, as well as residuals dredging volumes. Since there is some uncertainty in the remaining inventory to be dredged for Phase 2, since overcuts may be required to address uncertainty in the existing DoC information, and since all dredging activities will contribute to resuspension losses, these dredged volumes should be counted toward the productivity targets.	No impacts are expected.

**Table IV-2
Summary of Resuspension Standard Criteria for Phase 2**

Parameter		Evaluation Level		Control Level		Standard Level	
		Limit	Duration	Limit	Duration	Limit	Duration
Far-field PCB Concentration	Total PCBs			350 ng/L	7-day running average	500 ng/L	Confirmed occurrence
Far-Field Net PCB Load	Total PCBs	t.b.d.		2,0000 kg*	Phase 1 + Phase 2		
	Tri+ PCB	t.b.d.		700 kg*			
	Total PCBs	t.b.d.	7-day running average	t.b.d.	7-day running average		
	Tri+ PCB	t.b.d.		t.b.d.			
Far-Field Net TSS Concentration	TSS	12 mg/L	24-hr average	24 mg/L	24-hr average		
Near-Field (300m) TSS Concentration	TSS	50 mg/L	6-hr average net increase over ambient	50 mg/L	6-hr average net increase over ambient		
Near-Field (100 m and Channel-Side) Net TSS Concentration	TSS	100 mg/L	Calculated from discrete turbidity measurements made in 2 sampling events per day				

t.b.d. – To be determined, as part of the April addendum.

* - Final distribution of these loads to be supplied as part of the April addendum.

**Table IV-3
Revised Summary of the Performance Standard for Dredging Residuals**

Case	Description	Certification Unit Arithmetic Average (Tri+ PCBs, mg/kg)	Outlier Nodes Present		No. of Dredging Attempts Conducted	Most Recent Dredging Pass at 6 inches or less for all Nodes? (No. of Recent Dredging Passes at 6 inches or less)	All Post-dredging Cores Show DoC ≤ 6 inches	Required Action
			No. of Sample Results ≥ 15 mg/kg Tri+ PCBs AND < 27 mg/kg Tri+ PCBs	No. of Sample Results ≥ 27 mg/kg Tri+ PCBs				
A	Standard Met	avg. < 1.5	≤ 1	0	≥ 1	N/A	Y	Backfill certification unit (where appropriate); no testing of backfill required.
A1	Standard Almost Met	avg. < 1.5	≥ 2	1 or more	≥ 1	N/A	Y	If either or both of the 2 outlier node conditions are met, identify nodes contributing to avg. > 1.0, including all nodes ≥ 15 mg/kg and dredge.
B	Widespread Residuals Present	avg. ≥ 1.5	N/A	N/A	< 4	Y/N (0 or 1) [If 2 or more, go to Case D]	Y	Identify nodes contributing to avg. > 1.0, including all nodes ≥ 15 mg/kg and dredge.
B1	Isolated Residuals Present	1.5 < avg. ≤ 3	≤ 1	0	2-4	Y	Y	If 1 inventory pass and at least 1 dredging pass targeting only the top 6 inches of material at previously non-compliant nodes have been conducted, dredge as in Case B or construct a sub-aqueous cap so that arithmetic avg. of uncapped nodes is ≤ 1.0 mg/kg Tri+ PCBs and no node ≥ 15 mg/kg Tri+ PCBs. Place backfill in uncapped areas.
C	Inventory Present	avg. > 1.5 and/or DoC > 6 in	N/A	N/A	< 4	N/A	N	Identify nodes contributing to avg. > 1.0 and dredge. This must include all nodes above 15 mg/kg Tri+ PCBs and all nodes with DoC > 6 in.
D	Recalcitrant Residuals or Inventory Present	avg. > 1.5 and/or DoC > 6 in	N/A	N/A	≥ 4	N/A	N/A	Identify nodes contributing to avg. > 1.0. This must include all nodes above 15 mg/kg Tri+ PCBs and all nodes with DoC > 6 in. Petition EPA to dredge or to cap identified non-compliant nodes such that the avg. < 1.0. Place backfill in uncapped areas.

Table IV-4 – Interactions between Standards in Phase 2

	Interaction With Productivity	Interaction with Residuals	Interaction with Resuspension
Productivity			
Meeting Phase 2 productivity targets.	-	EPA does not expect that efforts to meet the productivity standard should have an effect on residuals.	In October 2009 bucket bite volumes increased to over 100% and cycle times were greatly lengthened, indicating inefficient and mis-counted bucket bites were occurring. At the same time resuspension became elevated suggesting a relationship between inefficient or incomplete bucket bites and resuspension, which will be further investigated. Dredging to a well understood DoC with efficient bucket bites should reduce resuspension while increasing productivity. The daily load criteria will be set considering the proposed flexibility in the Productivity Standard’s schedule and the constraints of the Resuspension Standard’s water quality criteria. EPA will propose specific control and evaluation levels for net load after completing ongoing analyses.

Residuals			
Implementing the CU closure process during Phase 2.	Removing uncertainty in DoC in dredging prisms for Phase 2 prior to dredging and by collecting fully penetrating cores after each dredging pass to identify missed inventory will reduce the number of dredging passes required and hence streamline the CU closure process. This, in turn, will increase productivity and allow the productivity targets to be met by reducing the number of sampling events and streamlining the CU closure process.	-	The streamlined CU closure process will reduce the time that CUs are open to the river and will assure that exposing inventory to the river is minimized by dredging more efficiently to clean sediment. Both of these aspects, less exposure time and lower surface concentrations may reduce resuspension.
Resuspension			
Maintaining resuspension below thresholds during Phase 2.	Maintaining the water column Control Level of 350 ng/L for discretionary use by EPA to require (as opposed to merely recommend) appropriate operational changes should provide early action to avoid operational shutdowns and maintain productivity. Further, if operations are not necessarily required to be halted when the 500 ng/l threshold is exceeded at Thompson Island, then unnecessary resuspension shut downs are less likely to occur. For these reasons, the potential for the	The Residuals Standard should not be affected by efforts to maintain resuspension below the standard thresholds.	-

	resuspension standard to reduce productivity will be mitigated . The daily load criteria will be set in consideration of the proposed flexibility in the Productivity Standard's schedule and the constraints of the Resuspension Standard's water quality criteria. EPA will propose specific control and evaluation levels for net load after completing ongoing analyses.		
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