Document	EPA Response to Comments from Scenic Hudson on Engineering Performance Standards – Public Review Copy Hudson River PCBs Superfund Site
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Reviewer	#	Comment	Topic	Response
Scenic Hudson	1	In general we continue to be concerned that standards are potentially conflicting, namely resuspension and productivity. Every effort should be made to keep the removal on schedule; however, protection of public health and the environment must be the foremost goal. We urge the EPA to take a more preventative and precautionary approach to controlling resuspension. Measures should be taken to prevent potential problems. The tiered action levels appear to allow significant degradation before control measures are taken. It also appears that less degradation could occur if control measures are employed earlier than what is prescribed in the proposed tiered action levels. We anticipate that dredging techniques and containment methods, such as sheet pilings, silt screens or silt curtains will be employed that attempt to keep resuspension to very low levels. Such protective engineering methods should be deployed prior to a problem being detected especially in areas with high potential for resuspension. If problems occur with such measures in place additional evaluation and controls may need to be deployed. Waiting until levels of PCBs in the water column reach 350 ppt or 70% of the Safe Drinking Water standard before any engineering	**Resuspension** More preventative approach	Protection of human health and the environment is USEPA's overriding concern. USEPA will ensure that the project is implemented and monitored to ensure that public health and the river ecosystem are protected. In doing so, USEPA ensure that the dredging project is on schedule. The Resuspension Standard and action levels have been developed with a framework that provides incentive to keep resuspension within an acceptable range. USEPA has performed analyses to demonstrate that the Resuspension Standard is protective of the downstream water supplies and fish body burdens. By these measures, compliance with the standard will ensure that the dredging operations are protective. In preparing the engineering design documents, General Electric Company will evaluate the use of appropriate engineering controls and contingencies. USEPA will review the GE design, which is subject to USEPA approval pursuant to the Agency's Administrative Order on Consent for

		controls are employed is not protective and is insufficient.		Remedial Design. The Resuspension Standard and action levels have been formulated to ensure that resuspension is within an acceptable range and is protective of the downstream water supplies and fish body burdens. By these measures, compliance with the standard will ensure that human health and the environment are protected. The Resuspension Standard did not make any assumptions regarding the use of containment methods. Therefore, the standard and action levels were developed assuming no benefits from any engineering contingencies. Modeling efforts were performed for the tiered action levels, specifically for the Control Level (350 ng/L Total PCB) and Concern Level (600 g/day Total PCB). The model predictions showed that at these action levels, the impacts from resuspension are minimal or low. The use of containment methods such as sheet pilings, silt screens or silt curtains will be considered during the Remedial Design, and may further reduce resuspension. However, USEPA recognizes the deployment of such containment methods must be balanced with the need to complete the project quickly and to minimize impacts to river use and recreation. In addition, there may be engineering issues that preclude the deployment of physical containment barriers in certain areas.

Scenic Hudson	2	A critical element of this Peer Review was its independence. We are concerned that GE has increasing influence over the peer review process. While we appreciate the opportunity to provide the EPA with potential candidates for peer review we are concerned that this review will become less independent. It is our understanding that the EPA will be using the Eastern Research Group, an EPA contractor, to administer the peer review. According to the EPA Peer Review Handbook, when a contract mechanism is used "the contractor will have its own pool of scientific and technical experts for peer review. With contractors, EPA can provide information on potential sources of peer reviewers for conducting a peer review is such a listing is prepared in alphabetical order." (page 57, Section 3.4.2) Will ERG be using its own pool as well as those supplied by EPA? Will EPA be adding names to the list, or will this list be a names generated only from external sources? As the handbook indicates, in Section 3.4.2, page 56, we urge the EPA, if it has not done so already, to reach out to other external groups for peer review names, such as colleges and universities, the National Research Council and other Federal agencies. As the handbook states, "Objective technical expertise and lack of conflict of interest are critical in selecting peer reviewers." (Section 3.4.4, pg. 57) Because the EPA is generating names from external groups, it is imperative that names that are submitted be carefully screened and selected. In this case it will be important to adhere to the "general rule" stated in the handbook- "experts who have made public pronouncements on an	**General** Peer Review	The peer review of EPA's Engineering Performance Standards will proceed in line with EPA's Peer Review Handbook. The purpose of the peer review is to ensure that the engineering performance standards are technically adequate, competently performed/monitored, properly documented, and satisfy established quality requirements. Consistent with its Peer Review Handbook, EPA solicited names of potential peer reviewers from the public. After performing an initial screening of candidates nominated by EPA and the public, EPA forwarded to ERG for consideration an alphabetical list of candidates for which EPA did not identify a conflict of interest. EPA did not identify to ERG which entity nominated each candidate on the alphabetical list, nor did EPA recommend that ERG select or not select any candidates on the list. ERG also performed its own conflict of interest and qualifications review of those candidates. EPA previously provided Scenic Hudson with the names of proposed peer review candidates that were nominated by the public. In addition, ERG conducted its own search for peer reviewers and is ultimately responsible for selecting the independent experts for the peer review panel. ERG screened potential candidates for conflicts of interest as part of its own selection process. It is EPA's understanding that each of the peer reviewers is free of any conflict of

		issue (e.g. those who have clearly "taken sides") may have difficulty being objective and should be avoided." This panel should be set up independent of GE and its consultants.		interest with General Electric Company.
Scenic Hudson	3	In addition, we anticipate that these and other comments will be made available to the peer reviewers and that there will be an opportunity to make a statement to the peer review panel similar to the peer review process used during the RI/FS.	**General** Peer Review	The commenter is correct. USEPA is making all public comments on the Engineering Performance Standards, as well as its responses, available to the peer reviewers. In addition, there will be an opportunity for commenters to address the panel at the briefing meeting in October 2003.
Scenic Hudson	5	We would like to take this opportunity to reiterate that the EPA should consider having GE fund an independent peer review, perhaps through ERG, of the remedial design work plans as well as an independent peer review of the information generated from theses work plans similar to the peer review of the performance standards. It is puzzling as to why the EPA's technical work is being subject to peer review yet GE's is not. At the very least the EPA should have a scientific and technical panel of experts set up to review all of GE's remedial design work. Such a peer review should be built into the project schedule to keep it on track so as to begin this project in 2006.	**General** GE technical team	General Electric Company will be submitting engineering design documents pursuant to the USEPA Administrative Order on Consent for Remedial Design. These documents are subject to USEPA review and approval.
Scenic Hudson	26	We recognize that the development of Performance Standards to achieve these goals is a unique challenge. In particular, there are potential conflicts between the Resuspension and Residual Standards on the one hand and Schedule/Productivity goals on the other. For this reason, we are recommending that EPA include as part	**General** Productivity vs. Resuspension	Most projects require some balance between schedule and other project elements, and the remediation of the Upper Hudson River is no exception. The design is expected to meet all performance standards and complete the project on time.

		of the Performance Standards a set of requirements (qualitative standards) that will enhance the likelihood that the remediation will meet the three quantitative standards, i.e. that the removal be carried out with sufficient care to achieve targets and limit resuspension in a manner that will reduce the likelihood such efforts will cause long delays.		Qualitative terms such as “with great care,” “high quality,” “high degree of accuracy,” “experienced,” and similar qualitative modifiers are, by their very nature, difficult to measure and enforce. Thus, USEPA developed quantitative performance standards rather than qualitative ones. It is anticipated that some qualitative standards will be established in the work plans and design documents developed by GE, particularly regarding the quality standards for laboratory analyses, bathymetric mapping, survey accuracy, and similar items. The dredging work, dewatering operations, and other major elements of the project will have to be of a high quality (qualitative standard) to meet the *quantitative* Performance Standards.
Scenic Hudson	27	Identify dredging areas with high potential for resuspension and require special measures. For these areas, require specific dredging procedures and mitigation (control) measures such as sheet pilings or silt curtains implemented as part of the initial design prior to exceedence of tiered action levels. Ensure that design and equipment/supplies are in place for rapid response if standards are violated by the basic dredging program.	**Resuspension** Identify areas with potential for resuspension/ equipment	These issues will be addressed in the Remedial Design. The ROD did not specify Remedial Design technologies, although such technologies must be able to meet the performance standards. Barriers likely will be required in some areas to prevent exceedences of the standards, although these were not assumed in the development of the Resuspension Standard. The Remedial Design will be required to contain sufficient details on implementing the dredging operations, including the type and area of control structures that will be used.

Scenic Hudson	28	Identify planned dredging areas with moderate potential for resuspension and require contingencies. For these areas, require either la) specific procedures and control measures (as in 1) or 1b) contingency plans that can be rapidly executed when necessary, including contracts in place for acquisition of equipment and supplies on an expedited basis.	**Resuspension** Identify areas with potential for resuspension/ equipment	The identification of target areas and the remedial techniques, equipment and contingencies will be performed as part of the Remedial Design being performed by General Electric Company pursuant to an USEPA Administrative Order of Consent.
Scenic Hudson	29	For areas with low potential for resuspension, the Performance Standard would not require a specific "upfront" plan but would require the Design to include a general contingency plan that would be implemented in the event of an exceedence requiring engineering controls. *High Potential for Resuspension* *Examples of Contingency Measures* High Flow Areas *1. Area with a reduced cross section or near channel/channel areas during with higher velocity during high flows* 1. Work in smaller work area < 5 acres *2. Fully enclose with sheet pile* *2. Other Difficult Areas* *a. Debris Areas* *1.Fully enclose work area* *2. Minimize raking* *3. Pick up specific debris items with a grapple or*	**Resuspension** **Productivity** Design issues	The identification of target areas as well as the techniques, equipment and contingencies required will be performed as part of the Remedial Design. The standard does not prescribe specific engineering controls, because there may be more than one way to accomplish the remediation and meet the requirements of the standard. A goal of the standards was to allow the designers to evaluate the relative advantages and disadvantages of different equipment and design components while requiring compliance with the three standards. USEPA has purposely avoided the inclusion in the Engineering Performance Standards specific means and methods for dredging or for meeting the Residuals and Resuspension Standards, as these are design issues. It is anticipated that the design documents will spell out the specific approaches to be used in difficult-to-dredge areas and include contingency plans as well. These documents will be reviewed by USEPA prior to acceptance of the design and contingency plans and should help minimize delays. Specifying the approaches for specific areas

		clamshell *b. Rocky Areas* *1.Fully enclose area* *2.Remove rocks first* *3. Diver assisted vacuum* *4.Excavator Dredge* *c. Shallow areas* *1.Fully enclose area* *2.Provide road access and work from land in an enclosure* *3. Weed cutter* *4.Hydraulic Dredge* *d. Near-Shore/wet/and/bank areas* *1.Fully enclose area* *2. Provide road access and work from land in an enclosure* *3. Excavate with small bucket excavator or by hand* *e. Deep cuts* *1. Use sheet pile to minimize side slopes and excess excavation* *2.For deep hot spots <Sac) work in a box within the larger 5 acre certification area.* We believe that this approach, while promoting greater certainty and less delay, is not overly prescriptive. The PRP will select - pending EPA approval - the remedial measures or contingencies designed to meet resuspension standards in different reaches and flow conditions.		in advance of design would limit the flexibility of the designers to develop their own means and methods for meeting the Performance Standards.

Scenic Hudson	30	We can reasonably expect that certain factors, e,g., high current velocities, silt, rock, and debris will increase the potential for resuspension. There is extensive information on the spatial distribution of these conditions that can be used to predict areas that are likely to require measures that minimize and control resuspension. Similarly there is ample information from other projects such as the listed case studies, to evaluate what types of controls or equipment are most effective under different conditions.	**Resuspension** Engineering controls/ equipment	A geophysical survey is being conducted during the sediment sampling program in 2002 and 2003. This information will be used during the Remedial Design. The identification of target areas as well as the remedial techniques, equipment and contingencies required will be completed as part of the Remedial Design.
Scenic Hudson	31	High Flow Conditions. High flow conditions occur seasonally in the late spring and late fall in certain Upper Hudson River stretches, which have a constricted cross-section. High flow conditions are likely to increase resuspension rate and sediment transport. These readily identifiable areas delineated for dredging that occur in these river stretches should be designated as "areas with high resuspension potential."	**Resuspension** Areas with high flow	As noted in the Resuspension Standard, resuspension of sediments also results from other natural processes (e.g., bioturbation and high-flow events) and anthropogenic processes (e.g., the movement and actions of other vessels in the river). As part of the Remedial Design, some river stretches may be designated as "'areas with high resuspension potential." However, this not part of the scope for the Performance Standards.
Scenic Hudson	32	For certain river stretches, the alternative to effective containment may be the loss of one or two entire months of dredging of the seven month dredging season. For such river stretches, the prescription at the outset of sheet piling is likely to maximize the days available for dredging. Secondly this approach avoids the delays that will occur if the decision to use sheet piling is made following weeks of exceedences with no certainty as to the availability of contractors and equipment.	**Productivity** Sheet piles to maximize dredging time	This is a design issue and will receive the scrutiny of USEPA when General Electric Company submits the design documents for Agency review. The Performance Standards, as written, leave it up to the designer to determine how best to control resuspension and meet production goals. For example, under the Productivity Standard, if a decision to install containment around an area is made after weeks of

				exceedences, and this results in a failure to meet the production target by 10 percent or more for two consecutive months, the contractor will have to submit an action plan to USEPA describing the actions taken or underway to erase the shortfall by the end of the dredging season.
Scenic Hudson	33	<u>Part 1. Performance Standard for Dredging Resuspension</u> Table 1-1 Resuspension Criteria: We suggest that EPA include a clear explanation of the meaning of "confirmed occurrence" as a footnote to the Table. It is our understanding that an exceedence for a single day would require four samples on the following day and that dredging would be stopped if the average for the second day exceeds the 500ng/L level.	**Resuspension** Clarification	Explanations on the "confirmed occurrence" will be added to the table. In fact, the average of all five samples must exceed 500 ng/L.
Scenic Hudson	34	Also we are concerned that there are no short-term (i.e. one-day) criteria based on PCB levels until there is an exceedence of the Resuspension Standard itself. We recommend setting a one-day action or control level at about 250ng/L, half the SDWA standard, or some other appropriately conservative number. This measure would require the dredging team to consider and mobilize for additional mitigation steps at levels approaching the Resuspension Standard. Such action could lower the risk of exceeding the 500ng/L standard and the need for a total shut down.	**Resuspension** Short term criteria	The action levels are designed to initiate improvements in the dredging operations, if exceedences occur. As noted in Section 1, exceedence of the action levels will warrant additional monitoring and engineering improvements up to and including temporary halting of operations. Since the causes of any excessive resuspension will be dealt with as part of the current action levels there is no need to add an additional threshold based on a single day's exceedence. Furthermore, taking into consideration the long-term nature of the load impacts and the

				likely high degree of short-term variability, the criteria should be based on longer-term conditions in order to avoid major disruptions to the operation due to short-term exceedences. It is not practical to implement such a criterion due to there considerable variations in the baseline conditions, uncertainties associated with sampling techniques and lab analyses, as well as heterogeneity within the water column. The resuspension criteria require actions based on a sufficient number of samples to be reasonably certain that substantive releases have occurred and that engineering evaluations or contingencies should be pursued to control releases. The monitoring requirements are provided in Attachment G of the Resuspension Standard.
Scenic Hudson	35	Page ES-77 – Contingencies, Engineering Contingencies and Page 7, Section 1.3.2 – The contingency actions are too vague and much time may go by discussing or negotiating the appropriate actions. Existing data on sediment types, debris areas, depth of cut, depth of water, presence of rock and other factors is sufficient to identify likely areas of problems. Further, the basic effects of different dredge types and processing approaches are well known. Therefore, the tools exist to prescribe engineering approaches that may be implemented rapidly to better address the expected problem and develop appropriate controls.	**Productivity** Engineering contingencies too vague	The Performance Standards have been designed to allow flexibility for the designers and Construction Manager to find creative and effective solutions to project challenges. The Standards are designed with tiered thresholds by which performance and success are judged. The contingency solutions proposed by the designers will be subject to review and approval by USEPA prior to implementation. This approach allows for innovative thinking in the use of proven technologies and places the responsibility for success squarely on the shoulders of the designers, while affording

				USEPA the opportunity to reject any proposed solutions that are deemed undemonstrated, unreliable or inappropriate. Because prototype designs for all anticipated contingency solutions must be approved by USEPA during the design phase, there is only a small risk that inordinate time will be spent during implementation in negotiating appropriate actions. This risk is further minimized by the existence of the Productivity Standard.
Scenic Hudson	36	Page ES-7 - Contingencies, Monitoring Contingencies and Page 5, Section 1.3.1, Monitoring Contingencies, Page 81, Near Field Monitoring and Figure 1-1 Near-Field Monitoring - Why are fewer stations required when there is no resuspension barrier versus a more controlled situation with the barrier?	**Resuspension** Number of Stations	One monitoring station is added inside the barrier to examine the concentration of solids within the containment area. The station is necessary since the addition of a barrier significantly alters the conditions around the dredge, and increases the complexity of the system. The sampling location is necessary in order to understand the dynamics of the operations including the mechanisms of release from barriers and source of residual concentrations within contained areas. It is not a more stringent requirement but simply reflects the added complexities associated with a resuspension barrier. The data for this station would be used to develop an understanding that will be valuable when considering engineering contingencies or controls. The data are not intended for use in determining compliance with the performance standard.
Scenic	37	Further, there should be provision for a non-fixed	**Resuspension**	In the implementation section, a requirement

Hudson		monitoring capability to spot check and conform that the fixed monitor is placed correctly with respect to both its downstream orientation with respect to any plume and the distance from the work.	Monitoring placement	will be added that turbidity will be measured once a day in the transect downstream from the dredge to assess the location of the downstream near-field monitoring locations.
Scenic Hudson	38	Page 10, Section 2.1.2 Definitions, Near Field Area - The 100 foot upstream and 1 mile downstream area definition seems too explicit. Although acceptable as a "rule of thumb" for average conditions, high flows, low flows or actions such as debris removal may require different spacing and more locations.	**Resuspension** Monitoring placement	The near-field monitoring locations specified for Phase 1 are approximate. The locations may be adjusted once the initial results from Phase 1 are available. No monitoring locations are designated at 1 mile downstream unless one of the far-field locations happens to be a mile away. One mile was used solely for modeling purposes and is the minimum distance downstream of any far-field station.
Scenic Hudson	39	Table 1.2 column 3, re Threshold Samples, Congener Specific PCBs has a footnote 6, which is not explained. Also, what are the other 5 footnotes below the Table referenced to?	**Resuspension** Footnote clarification	The table will be modified to reflect the footnotes.
Scenic Hudson	40	Page 9, Section 2.1.2 Definitions - Resuspension Export Rate – We have some concern that the resuspension analysis and especially the dissolved phase sensitivity analysis under estimate the importance of higher flows. Historically, 85% of the downriver PCB load occurs during 15% of the year during high flows not average flows. Tables 15, 16 and 17 of attachment D, indicate that flows exceed 4000 - 6000 cfs most of the time in the May - June and October - November.	**Resuspension** Months with high flow	As noted in response to comment #41, it is not anticipated that dredging will occur during high flows (*i.e.,* greater than 10,000 cfs at Ft Edward). Furthermore, the resuspension criteria take into account both PCB load and concentrations, indicating the significance of flow in the criteria. USEPA disagrees with the statement that historically, 85 percent of the downriver PCB load occurs during high flow. Because

				of the large, low-flow summer time releases, high flow and low flow loads are expected to contribute roughly equally to the total annual load. Tables 15 through 17 show the average flow for the months based on the USGS data (1977 to 2002). Figures 2 through 4 show the weekly flow for Fort Edward, Thompson Island Dam, and Schuylerville, respectively, for the same data set. From these figures, it can be seen that there are some high flows in the first 3 weeks of May. However, the high flows happen for less than 50 percent of the time during those 3 weeks. During the first week of May, dredging can only be performed 50 percent of the scheduled time. During the second and third weeks of May, the probability of having high flows is even smaller. Similarly, for the month of November, the high flows occur about 50 percent of the time during the month. This will not delay the dredging schedule significantly.
Scenic Hudson	41	Page 3 of Appendix B -It states that dredging activities are not expected to occur at flow rates as high as 8001cfs. However, flows average 7,800 CFS at Thompson Island Dam in May, 8,800 at Schuylerville in May and 11,300 and 8,300 respectively in May and November at Waterford. If no dredging is to occur for 1-2 of the seven months, doesn't that affect the overall schedule?	**Resuspension Productivity** Months with high flow	The flow rate of 8,000 cfs, which corresponds to high flow, is in reference to Fort Edward. See response to comment #40. Figures 2 through 4 show the weekly flow for Fort Edward, Thompson Island Dam, and Schuylerville, respectively. From these figures, it can be seen that there are some high flows in the first 2 to 3 weeks of May. However, the high flows happen for less

				than 50 percent of the time during those 3 weeks. This means on the first week of May, dredging can only be performed 50 percent of the scheduled time. During the second and third week of May, the probability of having high flows is even smaller. Similarly, for the month of November, the high flows occur about 50 percent of the time during the week. This will not delay the dredging schedule significantly. Dredging is not expected to occur at high flows due to the linear velocities during such times. However, the upper bound of operable flow conditions is expected to be 10,000 cfs and not 8,000 cfs, as stated in the Resuspension Standard. The 8,000 cfs volumetric flow mentioned in the comment is in reference to Fort Edward. This flow rate correlates with much higher river-wide volumetric flows for downstream areas since more water is introduced into the system and the river widens. Therefore 8,000 cfs does not correspond to high linear flows at downstream locations such as Waterford and would not impede dredging operations. Attachment 1.0, Production Schedule, of the Performance Standard for Dredging Productivity at Section 1.1.8, Weather and River Flow Issues, states the following: "Based on estimated river velocities and associated water depths, it has been assumed that dredging activities can be effectively conducted at river flows up to 10,000 cfs.

				Based on flow data collected at the USGS Fort Edward gauging station from 1978 to 2000, river flows in excess of 10,000 cfs occur approximately 5 percent of the time during he proposed dredging season." The text will be revised to make it clear that the 10,000 cfs flow figure mentioned in the first sentence is as measured at Fort Edward and that the flows will be higher at gauging stations downstream. The performance standard does not prohibit dredging when flows exceed 10,000 cfs at Fort Edward. This flow rate produces a mean velocity of slightly over 1 foot per second in the River, which is acceptable for silt barriers. In some areas along the shoreline, particularly where extensive shoals exist and river velocities are generally lower than in the main channel, higher water levels may result in increased production rates as scows will be able to get closer to the shore or can be filled to a higher capacity. The example schedule included in the Productivity Standard accounted for some downtime due to high flows, at the beginning and end of each dredging season, and it is not expected that high flows will significantly impact the project's schedule.
Scenic Hudson	42	Page 21, Section 7.2.24 Resuspension Sensitivity Analysis - The dredging resuspension export rate used	**Resuspension** Release rate	The case studies were used as examples, and were not considered to provide estimates for

		in the models is based on case studies. The evaluation of those cases resulted in a range of loss percentages (from 0.13 to 2.2%) It is unclear why the rates associated with 2.2% (1,600 grams per day) were not carried through in the modeling. Is it because the maximum concentrations of 300ng/L and 350ng/L will not be exceeded?		the conditions in the Hudson River. Rather, the studies provided examples of the export rates achieved and the various conditions that could occur during dredging. In the case studies the monitoring plans, sediment concentrations/classifications, the nominal flows and weather conditions were different than those anticipated in the Hudson River. USEPA agrees that the case studies do not provide perfect templates, and therefore they were not used as such. Other case studies were also examined but either there was not enough information concerning resuspension or conditions were too dissimilar. In section 2.2.2 it is noted that there were many reasons why the field estimates for Fox River were considered overestimated. Mainly, the proximity of the monitoring locations did not allow for export to be reliably calculated. The sampling locations were located too close to the operations, and therefore export estimates from these samples did not account for settling. Despite these reservations, it should be noted that the release rate of 2.2 percent was used in the modeling analysis shown in Attachment D (Please refer to Table 31). A 2.2 percent export rate would not cause exceedences of the Resuspension Standard in any of the river sections. Furthermore according to the models, a release of 2.2 percent would not represent an exceedence of 500 ng/L Total PCBs for any River Section (at 4000 cfs) and would only

				represent a concern for the 350 ng/L Total PCB criteria in River Section **2** due to the higher sediment concentrations. However, according to the modeling this resuspension rate would represent loads greater than 600 g/day Total PCB. Nonetheless, the resuspension criteria are based on running averages and the average source strength estimates indicate that this resuspension rate should not be sustained with appropriate dredging designs and operations.
Scenic Hudson	43	Regardless, if in reality the percentages are higher, what is the impact on the productivity standard and the overall schedule of the remediation program if dredging is shut down for long periods of time?	**Productivity** Effects on dredging schedule	EPA does not expect the project to be shut down for long periods of time due to resuspension issues. Contingency plans will be available if resuspension becomes a problem, and these plans will be implemented to address the resuspension.
Scenic Hudson	44	Page 11, Section 2.1.4, Remedial Design Consideration – as noted previously, given the detailed knowledge of many of the river conditions, it seems that a more prescriptive approach to contingency measures to be described for different river reaches, is appropriate to assure rapid response to exceedences.	**Productivity Resuspension** Known river conditions	USEPA disagrees that the Performance Standard should specify the engineering contingencies. Engineering contingencies will be developed as a part of the Remedial Design. The standard provides that goals that must be achieved during the remediation without specifying the technologies to be used. It is inappropriate at this stage to dictate the details of the design. There may be more than one containment system or dredge type that would satisfy the requirements of the standards. During the design, the cost and benefit of using different technologies can be weighed to optimize the remediation while still meeting

				the requirements of the standards. Conservative assumptions about the Remedial Design were made during the development of the standards. For the Resuspension Standard, it was assumed that no barriers would be installed during the dredging. This would result in the maximum amount of PCB export. If the modeling showed that the standards could be met under these conditions, there would be no question that a well designed remediation would be in compliance with the standard. For productivity, it was assumed that silt barriers and sheet piling would be installed. Installation of the barriers puts an added burden on the productivity. During the Remedial Design, the need to control resuspension by installation of sediment barriers will be balanced against the need to meet productivity goals.
Scenic Hudson	45	Attachment A, Table 2- Estimated Baseline Levels - This Table is difficult to evaluate as it does not have any units. Is it in ppt for PCBs and ppm for TSS?	**Resuspension** Units	Units will be provided in the table.
Scenic Hudson	46	Page 27, Section 2.2.6 Far Field Modeling. We agree that the percent loss at the dredge head should be independent of flow. However, intuitively, it would seem that higher flows will cause SS to travel farther and allow for the production of more dissolved phase and high total export rates. In contrast, during low flows, the SS would settle out and wouldn't contribute	**Resuspension** Load at high flow	USEPA disagrees that the results of the model are counter-intuitive. The downstream end of the plume referred to in the comment and Section 2.2.6 is the boundary between the near-field and far-field. TSS-Chem models, and not the HUDTOX model, were used to simulate the transport of solids and

		as much to the total export. It is difficult to follow how the models support a result, which seems counter intuitive. However, it appears that the HUDTOX model assumed that "at the downstream end of the plume… most of the solids...will have settled out."		PCB partitioning up to this boundary. The TSS-Chem model indicated that 99.9 percent of the suspended coarse sediment would settle within 100 meters of the dredge. As part of the sensitivity analysis performed for the TSS-Chem model in Attachment D, the flow rate was varied between 2000 cfs and 8000 cfs. The model results (shown in Figure 17 of Attachment D) indicate that at 8000 cfs 99.9 percent of the coarse material will settle out within 30 to 60 meters. The current estimates indicate that River Section 1 sediments are about 60 percent coarse and River Sections 1 & 2 sediments combined are about 50 percent coarse. Therefore based on the CSTR-Chem and TSS-Chem results, a significant amount of solids will settle due to the coarse material alone. Although the silts are not modeled to settle as quickly as the coarse material, there is still a significant amount of settling of silty solids within the near-field. As shown in Attachment D, Table 10 for the average source strength scenarios at 4000 cfs, approximately 40 percent of the silts suspended due to dredging settle within one-mile downstream. The TSS-Chem sensitivity analysis in Attachment D also indicated that as the linear velocity was increased, the PCB flux at one-mile downstream increased, while the

				amount of partitioning decreased. The decrease in the partitioning is due to the decrease in the time it takes the particles to travel one mile, thereby limiting the time available for partitioning. Also, since this sensitivity analysis held the source strength constant, there was greater dilution (*i.e.* lower concentrations) within the water column at higher flows. Lower particulate concentrations will also contribute to less partitioning.
Scenic Hudson	47	Page 48, Section 2.3.12 Development of Primary Criteria, Delivery of Total PCBs to the Lower Hudson - Although the narrative states that the estimates of the delivery of total PCBs to the lower Hudson is less certain than those estimates for tri PCBs, it is striking that although the reported ratio of Tri+ to total PCBs is 1:3, the accumulative loads in Figure 2-4 appear to be 1:2 or a gross under estimate of total PCBs. This illustrates that the lack of data necessary to project impacts at Waterford is mentioned several times throughout the narrative. Given the concern for the water supply intake and the downstream impact on the fishery such a lack of data is surprising at this point in the program. We request that the USEPA assure that the baseline monitoring program includes the collection of more reliable flow data for the far field station at Waterford.	**Resuspension** Tri+ to Total	The Total PCB load at Waterford was estimated based on the baseline load in the water column plus the additional load due to dredging. The ratio of the Tri+ to total PCB for the baseline load in River Section 3 is 1:1.4 while the ratio of the Tri+ to total PCB due to dredging is 1:2.7. Therefore, the cumulative loads in Figure 2-4 have a ratio of approximately 1:2, representing the integration of baseline and dredging-related loads. The diagram does not present a gross underestimation of the total PCB. The lack of certainty in the Waterford estimate is not due to the Tri+ to total PCB in the water column, but rather to due to the uncertainties of the nature of the sediment that would be released during dredging and its subsequent transport. For this reason, more data (including flow) will be collected during the baseline monitoring program.

Scenic Hudson	48	Page 81, Section 3.3.4 Frequency and Parameter, Near Field Monitoring - see comment #2 above re: number of stations and use of a mobile monitoring device.	**Resuspension** Number of Stations	One monitoring station is added inside the barrier to examine the concentration of solids within the containment area. The station is necessary since the addition of a barrier significantly alters the conditions around the dredge, and increases the complexity of the system. The sampling location is necessary in order to understand the dynamics of the operations including the mechanisms of release from barriers and source of residual concentrations within contained areas. It is not a more stringent requirement but simply reflects the added complexities associated with a resuspension barrier. The data for this station would be used to develop an understanding that will be invaluable when considering engineering contingencies or controls. The data are not intended for use in determining compliance with the performance standard.
Scenic Hudson	49	Contingencies - see comments #1 and #8 above.	**Resuspension** Engineering Contingencies	The identification of target areas as well as the techniques, equipment and contingencies required will be performed as part of the Remedial Design.
Scenic Hudson	50	Page 87, Settled Contaminated Material - again, this section begins with the statement that....”a substantial amount of suspended solids will settle in the immediate vicinity of the dredge.” Is this true when the flows exceed 4000 to 6000 cfs as occurs in May, June, October, and November or 60% of the dredging season?	**Resuspension** Load at high flow	The TSS-Chem model indicated that 99.9 percent of the suspended coarse sediment would settle within 100 meters of the dredge. As part of the sensitivity analysis performed for the TSS-Chem model in Attachment D, the flow rate was varied between 2000 cfs and 8000 cfs. The model

				results (shown in Figure 17 of Attachment D) indicate that at 8000 cfs 99.9 percent of the coarse material will settle out within 30 to 60 meters. USEPA disagrees that the flow rates at Fort Edward have been consistently high throughout May, June, October and November. Figure 2 shows the weekly flow for Fort Edward based on the USGS data (1977 to 2002). From this figure, it can be seen that there are some high flows in the first 3 weeks of May. However, the high flows happen for less than 50 percent in the first week and the percentage of high flow decreases in the subsequent weeks of May (Figure 2). This means on the first week of May, dredging can only be performed approximately 50 percent of the scheduled time. During the second and third week of May, the probability of having high flows is even smaller. Similarly, for the month of November, the high flows occur about 50 percent of the time during the month. See also the response to comment #40.
Scenic Hudson	51	1. Page 2, Section 1.1 Criteria, 1. Backfill - As noted in the following comments the stipulation of a one foot backfill seems arbitrary and should be designed to accommodate several factors including dilution of residuals, armoring or stability, and habitat restoration.	**Residuals** Backfill	The decision to use one foot of clean backfill after dredging (where appropriate) is not arbitrary. One foot of backfill should be appropriate to contain residuals in the depositional areas likely to be targeted for removal. Because mixing from bioturbation is typical in the top six inches in freshwater environments, one foot of backfill should prevent exposure of the residual sediment.

				The backfill material will be selected to provide stability and facilitate habitat replacement during the Remedial Design.
Scenic Hudson	52	2. Page 2, Section 1.1 Criteria, 2. Jointly evaluate a 20-Acre Area -what if the conditions in a specific reach are not compatible with a sub-aqueous cap? Such conditions may be where there is shallow bedrock, habitat requirements or channel depth, What are the subsequent options? Would a bentonite based cap, such as Aqua bloc be prescribed? Why not stipulate that up from for rocky high scour areas?	**Residuals** Cap designs and options	The standard does not prescribe the design of the cap. The Remedial Design will need to develop the types of caps that would be appropriate under various conditions that can be anticipated in the river. There may be areas of the river in which the residual concentrations will not comply with the standard following re-dredging attempts, but capping is not a viable solution. While this situation is expected to occur in only a limited number of areas in the river, it is not inconceivable that some areas will be abandoned after the cut lines are met and the re-dredging attempts have failed to reduce the concentrations to acceptable levels. Multi-layer cap designs may help alleviate adverse impacts to habitat.
Scenic Hudson	53	3. Page 2, Section1.1 Criteria, 3. Re-dredge or Construct Sub Aqueous Cap - same comment as in 2 above. The options for capping a rocky high scour area are very limited.	**Residuals** Cap designs and options	Please see the above response to comment #52.
Scenic Hudson	54	Page 3, Section 1.1, Criteria, 5.Contingency Areas – How much time is required to design and implement such measures? Months spent in negotiations, study and design clearly will have a serious impact on the schedule. A contingency plan should be required which	**Productivity** Contingency plan	Contingency plans will be submitted as part of the design and will be reviewed by USEPA before dredging begins.

		includes an approved design for special measures under various conditions.		
Scenic Hudson	55	Page 4, 1.2 Draft Residuals Standard Implementation - When and how will the requirement for taking samples at depths greater than 6" be made?	**Residuals** Sampling for the residuals	If the median or arithmetic average of the residual concentrations is greater than 6 ppm, the vertical extent of the contamination must be re-characterized and the cut lines revised. The dredging to meet the revised cut lines does not count as a re-dredging attempt.
Scenic Hudson	56	Page 5, Section 2.1.1, ROD Criteria -We approve of this innovative approach and believe that they are attainable in most areas either directly or by using backfill and appropriate caps. The proposed standard of 1 ppm Tri+ PCBs may be easier to attain than for other clean ups. Given the 3:1 ratio, the dredger must attain the equivalent of a 3 ppm level of total PCBs. In the Fox River, Delaware River and Sheboygan River a goal of 1PPM total PCBs was set. In the Fox River, the 1 ppm total was achieved most of the time. The 10 ppm secondary limit was always attained allowing the use of sand cover to fully achieve the prescribed goals.	**Residuals** Achieving target cleanup goals	Comment noted.
Scenic Hudson	57	Page 5, Section 2.1.1, ROD Criteria - What is the basis for assuming a reduction from l ppm to 0.25 ppm using one foot of backfill? Was this due to isolation or dilution as a result of complete mixing in the cap? Assuming the resultant backfill is well mixed with the residual, it would appear that the assumed residual layer is 3 inches thick resulting in a 5:1 dilution. If the actual contaminated residual layer is thicker, say 6 inches,	**Residuals** Achieving target cleanup goals Basis for percent reductions	The goal of the remediation to achieve 0.25 ppm in the backfilled surface sediments of the remediated areas is derived from several perspectives. In particular, the 0.25 ppm value is the steady-state surface sediment concentration derived from the long range model forecasts. This value represents the surface concentration that results from the

		would a thicker backfill say 2 feet be required?		relatively small but continued releases assumed to occur at the upriver GE facilities. This value also can be derived from a simplistic calculation involving the complete mixing of 4 inches of residual at 1 ppm with 12 inches of clean backfill. If the concentration in the top 6 inches is 1 ppm, this simple calculation yields a surface concentration of 0.33 ppm, which is not significantly different from the original calculation. However, there is little reason to believe that a 12-inch backfill layer of sediment could be readily or completely mixed with the underlying material. Hence the requirement to confirm a value of 0.25 ppm or less is required only in those instances when the residual threshold concentration for the underlying sediments is not attained. It should also be noted that typically only the top 6 inches of sediment are mixed by bioturbation in a freshwater system. Therefore, when 12 inches of backfill are placed on the residual sediments, biological mixing is not expected to cause the surface concentration to increase.
Scenic Hudson	58	Page 9, Section 2.1.2.2, Description of the Case Studies. At Marathon Battery, it is curious that this highly contaminated material wasn't removed by the overdredge along the sides of the dredging prism. Usually there are side slopes of 3:1 at the edge of the dredge cut to assure stability. Therefore, the high residuals may be more representative of inadequate characterization of the extent of the contamination. This	**Residuals** Case studies	Comment noted. The cutlines to be submitted by General Electric Company pursuant to the Agency's Administrative Order on Consent for Remedial Design are subject to USEPA approval.

		may point out the need to go beyond the apparent boundaries of contamination in the design of the dredge prism.		
Scenic Hudson	59	Page 17, Section 2.2.3, Estimate of Re-dredging area - See comment #6 above. This section mentions an assumed 6" residual layer. If the residual layer is 6", then, if uniform mixing is assumed, the dilution of 1 PPM by 1 foot of backfill will not reach the goal of 0.25 PPM.	**Residuals** Estimation of re-dredging area	The backfill is intended to isolate the residuals and case study data indicates that it is possible to place backfill in such a way that it remains uncontaminated. Recognizing that ideal conditions may not be achieved during remediation, reasonable assumptions were made regarding the potential for the backfill to mix with the residuals during placement. If as much as four (4) inches of residual sediments were completely mixed with a 1-foot thick backfill layer during placement, the backfill would reach 0.25 mg/kg Tri+ PCBs. It is important to note that the depth of the selected residuals sampling interval (0-6 inches) does not reflect the anticipated thickness of the actual residuals layer, which could range from a veneer to a disturbed layer about a foot deep, depending on the dredging equipment used. The residuals sampling depth has been selected appropriately to test the concentration in the bioavailable sediment (upper six inches), since backfill will not be placed in all locations. Following the initial placement, complete mixing of the backfill with the residual layer is unlikely to occur, because long-term mixing due to bioturbation would occur in the upper six inches of the backfill in a

				freshwater environment.
Scenic Hudson	60	Page 18, Section 2.2.3, Estimate of Re-dredging area - see comments above re: 6” residual layer.	**Residuals** Estimation of re-dredging area	See above response to comment #59.
Scenic Hudson	61	Page 20, Section 2.2.5 Achievement of 1Mg/KG Residual - The information of the goals of the remediation of Fox River SMU 56/57 does not appear to be accurate. Based on the writer’s (Henningson) recollection of the negotiations for Phase 2 of SMU56/57 in the Fox River, the goals were not based on mass removal (e.g. not 90%). Further, the clean up goal was 1PPM total PCBs, not 10 PPM. If the residuals in the cell did not meet that standard after 2 additional passes, but it was below 10 ppm total PCBs, an 18 inch cover was permitted to isolate the exposed area. The 18 inch cover was stipulated assuming that given the inaccuracies of spreading the sand, the average in place cover would be at least 12 inches	**Residuals** Achieving target cleanup goals Case studies?	The text will be revised. The goal of the Fox River SMU 56/57 was the achievement of surficial sediment concentrations of 1 mg/kg PCBs or less, where possible, and an average post-dredging surficial sediment concentration of 10 mg/kg or less. No percent concentration reduction goal was set. Notably, this mean target of 10 mg/kg for the Fox River SMU 56/57 represents a type of goal equivalent to the Residual Performance Standard goal of a mean concentration of 1 mg/kg.
Scenic Hudson	63	Page 31, Section 2.3.1 Sample Collection – The characterization of the “fluff layer” has been very controversial on several projects. Some parties have argued that even a 1~3 inch layer of fluff represents a critical “bio-available” source. The mathematical analyses were interesting but not validated by field data. Therefore, it is recommended that the "excess" water be retained and analyzed until a sufficient data base is developed to validate the	**Residuals Resuspension** Fluff layer	PCBs are tightly bound to the sediment particles. This is illustrated by the relatively high partition coefficients for these compounds. As a result, it is unlikely that the dissolved phase PCB concentration in the “excess water” would have elevated concentrations that would indicate a substantial mass of PCBs. The suspended matter in the “excess water” could markedly increase the concentration depending on the

		theoretical calculation on page 31, which states that there is only a "minor increase" in PCB levels attributable to the fluff layer.		concentration of the surface sediment, but again, this is unlikely to indicate a substantial PCB inventory. A goal of the ROD is to remove PCB inventory from the target areas. The ROD specifies a 1 ppm residual Tri+ PCB concentration limit as an indication that inventory has been removed. Typically, the thickness of the pre-design sampling intervals is six inches or greater. The sampling required by the standard is in keeping with these measurements. Sampling the sediment on a finer scale is not productive, because while the concentrations in these finer segments may be elevated over the standard, the associated inventory is not significant. Also, unless restricted by water depth or other considerations, the residual sediments will be isolated with one foot of backfill so that the surface veneer will not be bioavailable. However, as part of the Phase 1 data collection effort, the suspended fluff within a few inches of the sample core tops may be included with the sample analysis to affirm that the inventory represented by the sum of this material plus the underlying consolidated sediments still yields an acceptable residual Tri+ PCB concentration.
Scenic Hudson	64	The mathematical analyses were interesting but not validated by field data. Therefore, it is recommended	**Residuals Resuspension**	See above response to comment #63.

		that the "excess" water be retained and analyzed until a sufficient data base is developed to validate the theoretical calculation on page 31, which states that there is only a "minor increase" in PCB levels attributable to the fluff layer.	Fluff layer	
Scenic Hudson	65	Page 48-50, Engineering Contingencies – In general, we believe that sufficient data exist to allow the engineering standards for contingencies to be much more prescriptive.	**Residuals** Engineering contingencies more prescriptive	The development of engineering contingencies has been left to the remedial design. There may be multiple means by which the Residuals Standard can be successfully implemented. This will be determined by carefully weighing multiple factors including cost, effectiveness and specific river conditions (sediment type, water depth, location in the river, etc.). The performance standard provides the goals that must be achieved, but the detailed analysis will be a part of the design. USEPA will review and approve engineering contingencies proposed in the remedial design.
Scenic Hudson	66	Backfill - First, what are the assumptions based on which leads to a 0.25 PPM result after backfilling over a 1 PPM residual layer, Is complete mixing assumed?	**Residuals** Backfill	See the above response to comment #57.
Scenic Hudson	67	Second, there will be many cases along banks or for deeper cuts where one foot of backfill will not be appropriate for the conditions. How will this be determined?	**Residuals** Backfill	There will be areas of the river that cannot be backfilled in order to maintain water depth. It is unlikely that backfill will be placed in the navigational channel (water depth greater than 12 feet). Along the shoreline, some areas may not be backfilled

				so that the river can be restored to the water depths that existed prior to the removal of the former Fort Edward Dam or to foster habitat recovery. These areas will be identified through consultation with the trustees and the appropriate actions defined during the remedial design. Similarly, in areas where dredging will undermine the riverbank or riverside structures, additional backfill or other materials will be placed as appropriate. These areas and materials will also be identified as part of the remedial design.
Scenic Hudson	68	Third, the standards should require that the design report should specify the different types of backfill (sand, sand and gravel, etc.) to be used under various conditions.	**Residuals** Backfill	USEPA will review the design documents being prepared by General Electric Company, which are subject to Agency approval. Details relating to the design are generally not specified in the performance standard, however, the text will be edited to note that the type of backfill and capping material will vary to account for the river conditions and ecological setting. During the remedial design, only prototype capping designs can be prepared. The design documents will need to specify the appropriate type of backfill or capping material for different river conditions. Adjustment to the cap design may be needed during the remediation to best match the field conditions in the area to be capped. USEPA will be present in the field during the dredging project to oversee the work

				performed.
Scenic Hudson	69	Fourth, as noted previously, at the Fox River, and 18-inch cap was specified in order to increase the likelihood that on average at least 12 inches of cover would actually result.	**Residuals** Capping issues	The 2002 ROD requires "Backfill of dredged areas with approximately one foot of clean material to isolate residual PCB contamination and to expedite habitat recovery, where appropriate." If appropriate for the method of application, a thicker backfill layer may be specified to ensure that on average one foot of material is in place. Specifications for backfill will be developed during the Remedial Design.
Scenic Hudson	70	Residual Cap - The narrative states that the residual is expected to be only several centimeters thick (t inch +/-). However, in numerous previous references throughout Part 2, the residual layer is described as 6 inches thick. This makes a great difference in the presumed dilution effectiveness of the capping layer. On this page, for the first time, the residual cap is described as "greater than 1 foot" thick. How will this greater thickness be determined? Perhaps the standard should say "… Assuming well mixing with a 1 PPM residual in a six inch layer, a minimum of 18 inches of capping material will be required to achieve a dilution to 0.25 PPM." Isolation Cap - Flow will an isolation cap be effectively placed over rocky conditions? It will increase the bed elevation and be exposed to the same current velocities that scour the rock. At a minimum, such a design should be developed and reviewed by experts before any work begins that could exacerbate conditions and be	**Residuals** Backfill	The thickness of the actual residual sediments (i.e., sediments that originated above the dredging design depth but were spilled or mixed downward) is expected to vary with sediment type as well as dredge type. Thus it is not possible to specify a thickness of residual sediments that will define the actual residual material in all cases. Rather, the standard has defined a layer that will incorporate any expected residual layer along with a portion of the underlying material. Given the physical constraints of the Upper Hudson and the thickness of sediment to be removed, it is believed that any residual or disturbed layer will be less than 6 inches thick. Thus sampling a 6 inch layer can confirm that the residual material as well as the underlying layers are low in PCB concentration and below the standard threshold. This sampling

		impossible to remedy. We recommend that the standard require that the preliminary design report stipulate the type of material to be used under various conditions. For example, Aqua bloc may be the only suitable capping material in high scour rocky areas.		approach serves to confirm that the residual layer must be relatively thin, containing little PCB mass while also confirming that the underlying material is at or close to background levels. Sample concentrations in excess of the standard thresholds are anticipated if both of these conditions are not met. A second consideration in the selection of a 6-inch sampling thickness arose from biological considerations. Specifically, the bioavailable layer is taken to be 6-inches thick, thus these samples will represent the layer of bioavailable material in the event the backfill is washed away or not used in a given location. Note that the standard requires additional deeper sampling in the event that residual concentrations exceed a secondary but higher concentration threshold. Residual caps will be designed in the RD for the specific conditions at the capping area. The thickness and type of capping material may differ depending on factors including the residual concentrations and the river velocity. Also, please refer to the response to comment #59.
Scenic Hudson	71	The phased approach is good in that it will allow for refinements in Phase 2 based on actual experience. However, we are concerned that unless a more prescriptive approach is taken to deal with	**Productivity** More prescriptive contingencies	USEPA is not planning any refinement to the Productivity Standard other than that described in Section 4.0 of the standard. The six-year time frame for completing the

		contingencies the schedule for Phase 2 will be extended, perhaps significantly.		dredging project is a requirement of the 2002 ROD.
Scenic Hudson	72	Page 1 Section 1. What is the shape of the dredge prism? The 2.65 Million CY appears to be based on an in-situ box developed in the ROD. Side slopes of 3:1 could easily add 5% to the total volume. Further, since no remedial dredging project has been conducted at this scale in the US previously, (although the proposed plan for the Fox River targets approximately 7.25 million cubic yards) it is likely that unexpected delays will occur. Given this, together with the extensive and somewhat optimistic assumptions noted previously, it is likely that the volume will exceed that currently projected by more than 10%. We recommend that EPA address this problem by requiring GE to plan for excess capacity in order to avoid lengthy delays in the production schedule.	**Productivity** Production schedule	The assumed dredge prism is, indeed, an in-situ box that contains approximately 6 inches of overcut, on average. The allowance for overcut amounts to between 10 and 15 percent of the total volume of sediment to be dredged and should be adequate to cover any side slopes between prisms. Until the horizontal and vertical limits of each prism are selected during design, there is no way to adequately estimate the side slope volumes. The sampling program that is currently underway should result in a more accurate estimate of the total volume of material to be dredged, and the Productivity Standard provides guidelines for what to do if the dredging volume changes by more than 10 percent.
Scenic Hudson	73	Page 7, Section 2.1.4, Other Factors Influencing Productivity – Typically the principal bottleneck in dredging productivity is the onshore processing. Given the preliminary nature of the processing design, we recommend that all factors under consideration be increased dramatically. These include redundancy in processing trains, water treatment facilities, and excess storage for both raw and processed material, rail sidings and conveyor supplied barge loading systems for product.	**Productivity** Transportation	Comment noted. The bottleneck experienced at the on-shore processing facilities in many previous projects resulted from the fact that the scale of the project was too small to justify the cost of a large scale dewatering and transfer facility. For most of these projects, it was less expensive overall to limit dredging to a few hours per day and process the dredged material dredged over a 24 hour period than to build a system large enough to keep up with the dredge production. Since this is a multi-year project

				of large size, the on-shore facilities should be designed with adequate capacity and redundancy to maintain pace with the dredging production.
Scenic Hudson	74	Page 13, Section 2.2.1, Boulders, Cobbles and Debris - The extent of these materials will have a major impact on both productivity and resuspension. Removing debris makes a great disturbance in the river and is not related to productivity per se. However, it is likely to cause a more significant plume than dredging. This is not accounted for in the resuspension standards. The design report should stipulate how resuspension will be realistically controlled during debris removal. Although expensive and time consuming it may not be unreasonable to require that debris removal be totally enclosed and limited to low flows below 4,000 CFS in summer months.	**Productivity Resuspension** River disturbances	This is an issue that will be addressed during Remedial Design. The on-going sampling program includes some ground penetrating radar and side scan sonar work to help define the areas where debris and boulders will be encountered. Once these areas are identified and site-specific velocity measurements are taken, the designers will be able to develop plans for controlling resuspension while removing debris and boulders.
Scenic Hudson	75	None of these systems have successfully treated over 2000 CY per day on a continuous basis for months at a time. Therefore, the statement that "typically a mechanical dewatering system capable of handling 4,000 to 5,000 CY per day requires 3 acres of usable space" is misleading. It simply hasn't been done before. This lack of experience should be recognized and more conservatism should be added to the planning process.	**Productivity** Production capabilities	The three (3) acres mentioned in the Productivity Standard was arrived at by scaling up previous designs that had been proven to function in dredging projects with a reasonable amount of maintenance and downtime and adding redundant equipment for each unit process. It is anticipated that the design for the on-shore dewatering facility(s) will be customized for this project and will not be based on merely assembling readily available rental equipment, as is usually the case for a small project.

Scenic Hudson	76	Pages 18-20, Sediment Dewater, Water Treatment and Shipping - The engineering evaluations do not appear to provide for any storage of raw and processed material. Given the scale and level of uncertainty at this stage, we recommend storage facilities to accommodate at least one month of production (70,000 CY) for each of these. This would probably add 5-10 acres to the current site requirement of 15-20 acres.	**General** Storage facilities	Temporary staging of sediment is discussed in Section 2.4.5.1 of the Productivity Standard (pp. 19 and 20). The area need for staging is included in the 15 acres estimated as the total usable area needed for the site. "Raw" sediment that has not yet been dewatered would not be stockpiled, as it would tend to flow. This material would typically be held in a large basin covering perhaps an acre or more.