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May 25, 2011

BY ELECTRONIC MAIL AND FEDERAL EXPRESS

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Re: Centredale Manor Restoration Project Superfund Site: Comments of Emhart Industries, Inc. on the Interim Final Feasibility Study Report Dated April 30, 2010

Dear Eve and Anna:

Please find enclosed the comments of Emhart Industries, Inc. ("Emhart") on the Interim Final Feasibility Study issued by the United States Environmental Protection Agency ("EPA") concerning the Centredale Manor Restoration Project Superfund Site ("Site").

For your ease of review, you will receive with your paper copy of the comments a DVD that includes all of the cited sources in the comments. The documents on the DVD are listed in the order in which they appear in the comments.

Please place a set of the comments and the documents on the provided DVD in the Administrative Record for the Site.

Emhart reserves its right to file further comments upon EPA's release of the final Feasibility Study and Proposed Remedial Action Plan for the Site.

SDMS DocID 486500

If you have any questions or would like to discuss Emhart's comments, please contact Jerry or me.

Sincerely,

Jerome C. Muys, Jr.
Jeffrey M. Karp
Direct line: 202 370 3921
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Enclosures (with paper copy)

FOR PLACEMENT IN THE ADMINISTRATIVE RECORD

Centredale Manor Restoration Project Superfund Site

Comments of Emhart Industries, Inc. on the Interim Final Feasibility Study Report (April 30, 2010)

Submitted by Sullivan & Worcester LLP
1666 K Street, N.W., Suite 700
Washington, D.C. 20006

May 25, 2011

Centredale Manor Restoration Project Superfund Site - Comments of Emhart Industries, Inc. on EPA's Interim Final Feasibility Study Report (April 30, 2010)

Executive Summary

Introduction

The United States Environmental Protection Agency ("EPA") released an Interim Final Feasibility Study Report ("FS Report") for the Centredale Manor Restoration Project Superfund Site (the "Site") on April 30, 2010. EPA has provided interested stakeholders the opportunity to comment on the FS Report prior to the Agency's anticipated issuance of the Feasibility Study Report together with a Proposed Remedial Action Plan for the Site in the summer of 2011. Since being notified of its status as a potentially responsible party ("PRP") at the Site, Emhart Industries, Inc. ("Emhart") has commenced litigation and established evidence demonstrating that the Site contamination resulted from the drum reconditioning operation run by New England Container Company ("NECC") on the Site, and not from the operations of Emhart's alleged predecessor, Metro-Atlantic, Inc. *Emhart Indus., Inc. v. NECC*, C.A. 06-0218-S (D.R.I. 2009). This evidence, which is summarized in Appendix A and incorporated herein by reference, not only negates Emhart's responsibility for Site clean-up and disproves EPA's conceptual site model, it also puts at issue the validity of EPA's entire analysis of the proposed remedial alternatives by invalidating the F020 waste code listing that EPA proposes to apply under the Resource Conservation and Recovery Act ("RCRA") to dioxin-contaminated soil and sediment at the Site.

EPA's arbitrary and capricious failure to conform its outdated conceptual site model to the current evidentiary record has resulted in a flawed analysis of the remedial alternatives under consideration. EPA's flawed reliance on its outdated conceptual site model has led it, in turn, to

incorrectly deem contaminated environmental media at the Site to be a RCRA-listed F020 waste. This faulty designation, as well as its unsupported assertions that certain soils on the Site constitute principal threat waste ("PTW"), has led EPA to further incorporate into its evaluation of the remedial alternatives mistaken assumptions regarding the requirements for and costs of addressing contaminated environmental media at the Site. This erroneous analytical framework, together with other deficiencies in EPA's evaluation of the remedial alternatives discussed below, has led EPA to reject feasible, protective, and cost-effective remedial alternatives, in favor of unsupportable alternatives that are infeasible, unnecessary, and/or exorbitant in their cost, and inconsistent with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA" or "Superfund") and the National Contingency Plan ("NCP").

In the FS Report, EPA identifies remedial alternatives for each of five "action areas" deemed by EPA to require some level of cleanup. The five action areas at the Site are denominated by EPA as the: (1) Allendale and Lyman Mill Reach Sediment action area; (2) Allendale Reach Floodplain Soil action area; (3) Lyman Mill Reach Stream Sediment and Floodplain Soil action area (the "Oxbow Area"); (4) Source Area Soil action area; and (5) Source Area Groundwater action area.[1] Emhart has identified significant flaws in EPA's evaluation of the remedial alternatives presented in the FS Report for each of these action areas. In the event of judicial review, EPA's remedy selection process will be evaluated based on the information in the administrative record. The comments provided here include abundant factual and legal support from the administrative record for a judicial finding that EPA's favored

[1] Please note that throughout this document, defined terms are designated by capitalization. For example, Source Area Groundwater and Source Area Soil are EPA defined terms and are capitalized when referring to the particular action area. However, when a term such as "source area soil" is not capitalized, it refers to the soil that is present in the Source Area Soil action area or also may be present in the Source Area Groundwater action area.

remedies as set forth in the FS Report, if selected for implementation at the Site, are "arbitrary and capricious or otherwise not in accordance with law," the standard of review under Section 113(j)(2) of CERCLA.

The significant flaws in the analysis underlying EPA's remedy selection process have resulted in a Feasibility Study ("FS") that favors remedial alternatives that are contrary to CERCLA and its implementing regulations. For example, with respect to the Allendale and Lyman Mill Reach Sediment action area, the FS Report reflects an apparent preference for excavation of potentially enormous quantities of sediment and disposal at an off-Site location, contrary to both legal requirements under CERCLA and significant considerations regarding technical impracticability. The preferred remedies for both the Allendale Reach Floodplain Soil action area and the Lyman Mill Reach Stream Sediment and Floodplain Soil action area pose the same concerns.

With respect to the Source Area Soil action area, EPA has expressed a clear preference in the FS Report for a capping remedy that meets or exceeds the requirements for closure of a hazardous waste landfill under Subtitle C of RCRA. However, the impacted soils at issue are not considered to be a waste at all under EPA's own regulations and guidance documents, and therefore are not subject to the unduly stringent (and costly) RCRA Subtitle C closure requirements that EPA would seek to impose.

Finally, with respect to Source Area Groundwater action area, EPA neglected even to mention in the FS Report that a fully protective remedy already has been implemented by Emhart as part of the recent performance of an EPA-approved time critical removal action ("TCRA"). This failure to acknowledge the previously-completed remediation of this area is flatly contrary to the NCP, which requires that EPA fully consider the "no-action" alternative for

an area where, as here, a removal or remedial action already has occurred and such action has been shown to be protective of human health and the environment.

Accordingly, the FS Report must be revised to take account of the current administrative record and to reflect a complete, accurate, fair and reasoned assessment of the remedial alternatives.

Site Background

The Site consists of two parcels located at 2072 and 2074 Smith Street ("the peninsula") in North Providence, Rhode Island, and downstream areas that EPA alleges have been impacted by activities conducted historically on the two parcels. Currently, there are two high-rise apartment buildings known as Brook Village and Centredale Manor on the parcels. On the eastern portion of the Site there is a drainage swale or "tail race" that empties into a wooded wetland to the south. The Woonasquatucket River (the "River") flows along the western portion of the Site. Hazardous substances, including volatile organic compounds ("VOCs"), dioxins, polychlorinated biphenyls ("PCBs"), metals, pesticides, and herbicides, have been identified in soil, sediment, and groundwater samples collected at various areas of the Site.

EPA alleges that historic drum reconditioning and chemical manufacturing contributed to contamination on the Site. Between approximately 1952 and 1972, NECC operated a steel drum reconditioning business on the peninsula area of the Site, which included an incinerator to burn residue and paint from inside 55-gallon open-head steel drums, and a caustic bath process for cleaning the inside of 55-gallon closed-head drums. These NECC operations were situated near the tail race on the eastern side of the peninsula. NECC also stored drums to the south and west of the buildings in which it conducted its drum cleaning operation, extending over to the western area of the peninsula adjacent to the River. As a result of these and other activities conducted by

NECC relating to its drum reconditioning business, a number of hazardous substances were released or disposed of throughout the Site, including dioxins, PCBs, pesticides, and herbicides.

In approximately 1944, Atlantic Chemical Company ("Atlantic Chemical") began operations at the Site, producing textile chemicals including defoamers, fire retardants, dye fixatives, water repellants, resins, cotton-softeners, powdered soaps, a metal stripper, and sulfonated tallow for wool. In 1953, Atlantic Chemical changed its name to Metro-Atlantic, Inc. ("Metro-Atlantic"), and continued to operate on the Site until approximately 1968. For a period of less than one year in the mid-1960s, Metro-Atlantic manufactured hexachlorophene ("HCP") in a building separate from its main building operation, and located on the west side of the peninsula. EPA alleges that Metro-Atlantic's HCP operation resulted in the release of dioxins at the Site and, therefore, dioxin-contaminated environmental media at the Site must be handled as a RCRA-listed F020 waste. Emhart is the alleged successor to Metro-Atlantic.

Emhart's History of Cooperation with EPA

Since 2000, Emhart has worked with EPA in good faith to establish a cleanup approach for the Site that is cost-effective, implementable, and fully protective of human health and the environment, while at the same time pursuing discovery from NECC, which resulted in the establishment of a factual record which would permit EPA to update and supplement its conceptual site model. Between 2000 and 2006, Emhart and several other Potentially Responsible Parties ("PRPs") completed three removal actions at the Site. In 2000, Emhart and four other PRPs installed a temporary soil cap and implemented limited flood control measures at the Site pursuant to a Unilateral Administrative Order ("UAO"). Beginning in 2001, pursuant to a second UAO, Emhart and four other PRPs performed additional cleanup measures at the Site, including restoring Allendale Dam, sampling residential soils and shoreline sediments, and excavating such soils and sediments containing greater than one part per billion ("ppb") of

dioxin. In September 2003, Emhart and fourteen other PRPs entered into an Administrative Order on Consent with EPA, under which a third removal action was conducted to address contaminated soils and sediments in the vicinity of the tail race.

In 2007 and 2008, pursuant to an Administrative Settlement Agreement and Order on Consent ("Settlement Agreement"), Emhart performed hydrodynamic modeling of certain remedial alternatives and a comparative ecological risk assessment to assist EPA in conducting the FS. Moreover, in 2009 and 2010, pursuant to another Settlement Agreement, Emhart performed a TCRA in the Source Area Groundwater action area, which involved excavation and off-Site disposal of delineated soils and sediments, and the installation of an impermeable cap.

More recently, in June 2010, Emhart entered into a Settlement Agreement with EPA to perform a supplemental investigation of the Lyman Mill Reach Stream Sediment and Floodplain Soil action area ("Oxbow Area"). The purpose of this investigation was to collect additional data to permit EPA to: (1) properly evaluate the remedial alternatives set forth in its FS Report; (2) analyze potential risks to human health and the environment; and (3) select the proposed remedial action for the Oxbow Area of the Site based on more complete information.

Contemporaneous with its efforts outlined above to cooperate with EPA, Emhart developed and submitted extensive evidentiary material to EPA in an effort to supplement the administrative record for the Site and thus provide the factual support for EPA to update its original site conceptual model. As explained in the following sections, however, EPA failed to undertake any such update.

Summary of Applicable Laws, Regulations, and Guidance

EPA's remedy selection process for the Site must comport with applicable laws, regulations, and guidance, which include:

- The Comprehensive Environmental Response, Compensation and Liability Act, CERCLA Section 121, which sets forth the requirements for selection of remedial actions at Superfund sites, including reliability, cost-effectiveness, and protection of human health and the environment.
- The National Contingency Plan ("NCP"), which requires EPA to develop a fully informed conceptual site model consistent with the record evidence, and also outlines nine criteria that EPA must address in evaluating whether remedial alternatives meet the requirements of CERCLA Section 121. These criteria include two threshold criteria (protection of human health and the environment; and compliance with federal and state applicable or relevant and appropriate requirements); five primary balancing criteria (long-term effectiveness and permanence; reduction of contaminant toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost); and two modifying criteria (state acceptance, and community acceptance).
- Applicable or Relevant and Appropriate Requirements ("ARARs") posed by federal environmental or more stringent state laws, with which remedies selected by EPA must comply. ARARs identified for the Site include the following:
    - The Resource Conservation and Recovery Act ("RCRA"), and the Toxic Substances Control Act ("TSCA");

- Preliminary Remediation Goals ("PRGs") for dioxins and dioxin-like contaminants in soils;
- Executive Orders, which EPA requires "to be considered" consistent with CERCLA;
- Requirements promulgated by the Rhode Island Department of Environmental Management ("RIDEM") regarding the siting of waste treatment, storage and disposal facilities; control of discharges to surface waters; and prevention of further degradation of surface waters and groundwater; and

o The Information Quality Act ("IQA"), which requires that information and data disseminated by EPA meet government standards for objectivity, utility, and integrity.

Additionally, EPA must follow applicable guidance and policy, including the principles for managing contamination in sediments and Remedial Investigation/Feasibility Study ("RI/FS") guidance encompassed within EPA technical and policy documents aimed at guiding the development of the conceptual site model, the evaluation of remedial alternatives during the FS and remedy selection process, and specific risk management decision-making.

Discussion of Remedial Alternatives

EPA's evaluation of remedial alternatives presented in the FS Report suffers from major deficiencies, including the following:

o EPA's conceptual site model for the Site is static, outdated, and factually erroneous. Moreover, it is not supported by information in the administrative record.

o EPA incorrectly deems all contaminated environmental media at the Site to be a RCRA-listed F020 waste. However, the contaminants cannot be traced to a release of

waste from a single original process meeting any listing description. EPA also inconsistently classifies the contaminated environmental media and misapplies RCRA, which results in EPA favoring more costly remedial alternatives than are necessary or permissible.

- EPA fails to meet the requirements of the IQA; it omits information and data concerning changed Site conditions, including improvements resulting from the TCRA completed by Emhart in the Source Area Groundwater action area, and recent soil and sediment sampling data for the Oxbow Area.
- EPA inadequately defines the dioxin cleanup goals for the Site, referencing upstream background concentrations that are uncertain, and improperly considers speculative future changes to the PRGs for dioxins and dioxin-like contaminants in soils, rather than evaluating the remedial alternatives based on current requirements.
- EPA fails to adequately define the volume of soil and sediment to be excavated and disposed in confined disposal facilities ("CDFs"), or excavated and disposed off-Site under several of the remedial alternatives, which creates substantial uncertainty regarding the cost and feasibility of implementing such remedial alternatives.

With regard to each of the five action areas at the Site, EPA's location-specific analysis also is flawed, resulting in the "screening out" or rejection of otherwise cost-effective, protective, and implementable remedial alternatives, as discussed below:

- For the **Allendale and Lyman Mill Sediment** action areas:
  - EPA improperly applies Executive Order ("EO") 11988 to reject the nearshore CDF disposal alternative. EO 11988 is not an absolute prohibition against selecting a remedy in a floodplain; it applies only where the option under

consideration would adversely affect the floodplain. Here, hydrodynamic modeling demonstrates that the nearshore CDF disposal option would have negligible effect on the floodplain and floodplain inundation. EPA also fails to recognize that off-Site disposal of contaminated soil and sediment is infeasible due to the unpredictable -- and potentially high -- volume and cost, potential unavailability of off-Site disposal capacity, the environmental impact of transport, and other factors required to be considered.

- EPA improperly screens out, without substantive consideration, the channel-only configuration for pond remediation, based on the supposition that there would be community opposition. However, EPA cannot apply the community acceptance criteria as a basis to screen out an otherwise acceptable remedial alternatives at the FS stage; rather, EPA must first apply the two threshold and five primary balancing criteria under the NCP. In fact, EPA did not apply the community acceptance criteria to alternatives that it favors, which already are known to have community opposition, such as the upland CDF disposal option.
- With regard to the upland CDF option, EPA fails to address key uncertainties regarding: (1) the volume of contaminated soil and sediment to be excavated and disposed of; (2) the availability for purchase and the price of properties upon which to construct the upland CDFs; (3) the ability to obtain a Land Disposal Restriction ("LDR") treatability variance; (4) whether the upland CDFs would be deemed "on-Site" for purpose of CERCLA's permitting exemptions; (5) the suitability and sufficiency of space to construct upland

CDFs of requisite capacity; and (6) the practicability of conducting confirmatory sampling to establish the adequacy of the cleanup. If these uncertainties are adequately addressed, a modified approach involving the placement of upland CDFs may be implementable.

- Off-Site disposal is not a feasible option because there may not be off-Site facilities able to accept the volume of excavated material at the time that the remedy is implemented, and because this option would run afoul of EPA's extensive efforts to promote green remediation.

Emhart's recommended approach, which involves the placement of excavated soils and sediments into a nearshore CDF or isolation caps within the footprints of the ponds, is the most protective, implementable, and cost-effective disposal option for soils and sediments to be excavated at the Site.

- For the **Allendale Reach Floodplain Soil** action area, EPA's location-specific analysis is flawed for the same reasons and in the same manner as the analysis of alternatives for the Allendale and Lyman Mill Sediment action area, as discussed above.
- For the **Lyman Mill Reach Stream Sediment and Floodplain Soil** action area (the "Oxbow Area"), EPA failed to consider data from Emhart's supplemental investigation; instead, it relied on scant data to identify and evaluate remedies that, consequently, are unreliable. EPA goes so far as to even identify possible remedies in the FS Report for emergent wetland and floodplain soil at the confluence of Assapumpsett Brook and the River, and in the southeastern portion of Lyman Mill Pond, despite the absence of any analytical data whatsoever from those areas.

Specifically, analytical data produced in September and November 2010, from the additional sampling conducted by Emhart under the Settlement Agreement with EPA to further investigate the Oxbow Area, demonstrates that dioxin levels in these soils do not pose an unacceptable risk to human health or the environment. Consequently, excavation and/or thin layer capping of these areas is not warranted. Moreover, in accordance with the NCP, the analytical data collected by Emhart must be incorporated into the FS, applied in further consideration of risk to human health or the environment, and evaluated in determining the need for, and, as appropriate, the selection of, remedial alternatives for the Oxbow Area of the Site.

- For the **Source Area Soil** action area:
  - EPA incorrectly applies RCRA closure requirements to contaminated environmental, in-place media, which are not hazardous waste subject to RCRA regulation. Further, EPA concludes that soils in this action area are PTW, although there is no evidence in the administrative record to conclude that magnetic anomalies found in preliminary testing or PCBs found in soil samples are relevant for purposes of declaring the soil to be PTW.
  - Based on the misapplication of RCRA and the unsubstantiated conclusion that PTW is present at the Site, EPA arbitrarily and capriciously screens out Emhart's recommended approach, Alternative 2 – long-term monitoring and maintenance of the existing surfaces. With modification, this approach would address EPA's concern regarding contaminants present in the soil at concentrations that may trigger Rhode Island's GB leachability criteria, and also would address TSCA closure requirements. In fact, Alternative 2, if

modified, is fully protective of human health and the environment, implementable, and cost-effective.

- EPA gives no consideration to the need to relocate the residents of the Brook Village and Centredale Manor apartments, and the inherent danger, difficulty, and impracticability of such relocation activities to effectuate alternatives involving excavation of soil and/or replacement of the existing caps in this area.

- For the Source Area Groundwater action area, EPA improperly rejects the "no-action" alternative as not protective, having failed to address the work performed in the TCRA and the associated improvement in Site conditions since the Remedial Investigation ("RI") was conducted. The TCRA, by agreement with EPA, was to be subsequently evaluated with respect to its success in mitigating: (1) potential impacts to groundwater and the River, through excavation and off-Site disposal of certain identified contaminated soils and sediments, and (2) potential migration of any residual contamination through installation of an impermeable cap. However, EPA fails to consider the "no action" alternative due to the Agency's continuing – and erroneous – assumption in its conceptual site model that dioxins are migrating in groundwater via facilitated or colloidal transport mechanisms. The TCRA effectively mitigated any risk associated with such theoretical migration. Moreover, post-TCRA groundwater sampling at monitoring wells installed for that purpose has yielded results significantly lower than EPA's cleanup goals, demonstrating the efficacy of the TCRA, and the appropriateness of EPA selecting the "no-action" alternative, which is fully protective of human health and the environment.

Conclusion

In summary, in its FS analysis, EPA has disregarded key legal requirements in CERCLA, and has ignored crucial technical facts and evaluation processes contrary to the NCP, rendering the resulting alternatives analysis and EPA's favored remedial alternatives unreliable and, consequently, unsupportable under the standard of review in CERCLA Section 113 for numerous reasons, including the following:

- EPA arbitrarily, and contrary to its own regulations, rules and guidance documents, concludes that all impacted environmental media at the Site contain a RCRA F-listed waste, and that certain soils contain PTW;
- EPA fails to acknowledge the TCRA, and its mitigation of the need for further remediation of the source area groundwater;
- EPA makes improper assumptions regarding community opposition to the most cost-effective remedial alternatives for the Ponds and the River sediment (while ignoring the high probability of community opposition to the alternative that EPA champions);
- EPA misconstrues RCRA and TSCA, and misapplies the ARARs, leading to improper and unsupported conclusions regarding the scope of necessary excavation and capping;
- EPA improperly applies EO 11988 when evaluating the implementability of the nearshore CDF, and ignores the hydrodynamic modeling demonstrating that the nearshore CDF would result in no appreciable flood inundation effects on the system; and
- EPA fails to adequately assess the cost and timeliness with which an upland CDF

could be sited.

Based on the foregoing listed failures of EPA to comply with the requirements of CERCLA and its implementing regulations and guidance documents, EPA is poised to select remedial alternatives for the designated action areas at the Site that are infeasible to implement, unnecessary, and unreasonably costly, including remedies that would require excavation and off-Site disposal of large quantities of soil and sediment, and the installation of RCRA-compliant caps. Emhart's comments on the FS Report demonstrate that far more cost effective, equally protective, and readily achievable remedial alternatives (including the "no action" alternative for Source Area Groundwater) are available that would fulfill the mandates of CERCLA and the NCP. By ignoring important evidence and maintaining its sorely out-of-date conceptual site model, EPA has premised its evaluation of remedial alternatives in the FS Report on faulty and erroneous assumptions about the sources, types, and attributes of Site contaminants. Moreover, in failing to consider important facts and scientific data included in the administrative record since the Remedial Investigation was conducted, EPA has failed to give the requisite consideration to effective, implementable, cost-effective and equally protective remedial alternatives that are available.

All of the foregoing-described conduct engaged in by EPA is arbitrary and capricious, and contrary to CERCLA, the NCP, and EPA's own guidance. Accordingly, EPA must consider the information highlighted in these comments and the accompanying appendix, and rectify its fundamentally flawed feasibility study analysis by: 1) updating its conceptual site model to accurately reflect the current state of the administrative record; 2) properly applying Site ARARS, including abandoning its incorrect F020 waste code and PTW designations for in-place

contaminated environmental media; and 3) re-evaluating and modifying the remedial alternatives under consideration for the Site.

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Appendix A – Summary of Evidentiary Basis for Emhart's Comments that EPA's Conceptual Site Model and RCRA Waste Code Determinations Are Seriously Flawed

Centredale Manor Restoration Project Superfund Site
Emhart Industries, Inc.'s Comments on the Interim Final Feasibility Study Report (April 30, 2010)

I. Introduction

Emhart Industries, Inc. ("Emhart") respectfully submits these comments on the Interim Final Feasibility Study Report ("FS Report") released by the Environmental Protection Agency ("EPA") for the Centredale Manor Restoration Project Superfund Site in North Providence, Rhode Island (the "Site"), and requests that they be included in the administrative record for the Site.[2] We have included herein an overview of the Site background, including the Site history and a description of historic Site operations; a summary of the laws, regulations, and guidance applicable to EPA's remedy selection process at the Site; and a discussion of the various remedial alternatives under consideration by EPA for each of the designated "action areas" at the Site. For ease of review, we also have included an Executive Summary of our comments at the outset of this document. Moreover, we have provided in Appendix A, which is incorporated herein by reference, an evidentiary summary documenting the flaws in EPA's conceptual site model and RCRA waste code determination identified in the FS Report.

Emhart has identified herein numerous shortcomings in EPA's remedy selection process as embodied in the FS Report. In the likely event of judicial review, the validity of EPA's remedy selection process will be determined based solely on the administrative record. The comments provided herein include abundant factual and legal support that would permit a judicial finding that EPA's remedy selection process was "arbitrary and capricious or otherwise not in accordance with law," the standard of review under Section 113(j)(2) of the

[2] Emhart reserves its right to file further comments upon EPA's release of the final Feasibility Study and Proposed Remedial Action Plan for the Site.

Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA" or "Superfund").

The Site consists of two parcels located at 2072 and 2074 Smith Street (the "peninsula") in North Providence, Rhode Island, adjacent to the Woonasquatucket River ("River"), and downstream areas that allegedly have been impacted by activities on the two parcels. Substances designated as "hazardous" under CERCLA, including volatile organic compounds ("VOCs"), semivolatile organic compounds ("SVOCs"), dioxins, furans, polychlorinated biphenyls ("PCBs"), metals, herbicides, and pesticides, have been detected at the Site, including on the two parcels, along the riverbank, and in sediments in two downstream ponds – Allendale Pond and Lyman Mill Pond.

In the FS Report, EPA identifies remedial alternatives for each of five "action" areas deemed by EPA to require some level of cleanup. The five action areas at the Site are denominated as: (1) Allendale and Lyman Mill Reach Sediment, consisting of Allendale Pond, the River channel north of Allendale Pond, and Lyman Mill Pond; (2) Allendale Reach Floodplain Soil, consisting of the floodplain areas abutting the river channel north of Allendale Pond and abutting Allendale Pond itself; (3) Lyman Mill Reach Stream Sediment and Floodplain Soil (the "Oxbow Area"), consisting of the stream channel and old mill raceway connecting Allendale and Lyman Mill Ponds, as well as the forested wetland southwest of Allendale Dam and floodplain areas abutting Lyman Mill Pond; (4) Source Area Soil; and (5) Source Area Groundwater.[3]

[3] Please note that throughout this document, defined terms are designated by capitalization. For example, Source Area Groundwater and Source Area Soil are EPA defined terms and are capitalized when referring to the particular action area. However, when a term such as "source area soil" is not capitalized, it refers to the soil that is present in the Source Area Soil action area or also may be present in the Source Area Groundwater action area.

Emhart has identified herein significant flaws in EPA's remedy selection process, which have resulted in a FS Report that favors remedial alternatives that are neither implementable nor cost-effective, and, further, are contrary to CERCLA and the National Contingency Plan ("NCP"), its implementing regulations. For example, with respect to the Allendale and Lyman Mill Reach Sediment action area, the FS Report reflects an apparent preference for excavation of potentially enormous quantities of sediment and disposal at an off-Site location, contrary to both legal requirements under CERCLA and significant considerations regarding technical impracticability. The preferred remedies for both the Allendale Reach Floodplain Soil action area, and the Lyman Mill Reach Stream Sediment and Floodplain Soil action area, pose many of the same concerns.

With respect to the Source Area Soil action area, EPA has expressed a clear preference in the FS Report for a capping remedy that meets or exceeds the requirements for closure of a hazardous waste landfill under Subtitle C of the Resource Conservation and Recovery Act ("RCRA"). However, the impacted soils at issue are not considered to be a waste at all under EPA's own regulations and guidance documents, and therefore are not subject to the unduly stringent (and costly) RCRA Subtitle C closure requirements that EPA would seek to impose.

Finally, with respect to the Source Area Groundwater action area, EPA neglected to even mention in the FS Report that a fully protective remedy already has been implemented by Emhart as part of the performance of an EPA-approved time critical removal action ("TCRA"). This failure to acknowledge the previously-completed remediation of this area is flatly contrary to the NCP, which requires that EPA fully consider the "no-action" alternative for an area where, as here, a removal or remedial action has already occurred and such action has been shown to be protective of human health and the environment.

II. Background

A. Site History

In or around 1952, the New England Container Company ("NECC") began a steel drum reconditioning operation at the Site whose primary facilities were on the eastern side of the peninsula adjacent to the "tailrace." However, NECC's receiving, storage and waste disposal activities eventually encompassed much of the peninsula. As documented in Appendix A, this operation included the processing through an incinerator of residue-laden 55-gallon open-head steel drums, which thereafter were reconditioned and painted for reuse. For a period of time, NECC also reconditioned residue-laden 55-gallon closed-head drums by means of a caustic washing process. These processes and other activities conducted by NECC in connection therewith resulted in the release of a large volume of numerous CERCLA hazardous substances at the Site, including dioxins, PCBs, pesticides, and herbicides. NECC operated at the Site until 1972.

Atlantic Chemical Company began operations at the Site in 1944, as a manufacturer of textile chemicals and, for a period of time, products used in the paper industry. In 1953, Atlantic Chemical changed its name to Metro-Atlantic, Inc. ("Metro-Atlantic") and continued to operate on the Site until 1968. As further documented in Appendix A, for a period of months in the mid-1960s, Metro-Atlantic manufactured hexachlorophene ("HCP") in a building separate from its main operations. EPA wrongly alleges that Metro-Atlantic's HCP operation resulted in the release of dioxins at the Site. Emhart is the alleged successor to Metro-Atlantic.

Currently, there are two high-rise apartment buildings, known as Brook Village and Centredale Manor, on the parcels. Adjacent to the eastern side of the peninsula is a drainage swale or "tail race" that ultimately empties into Allendale Pond. The River flows along the western side of the peninsula.

B. Emhart's History of Cooperation

EPA released an Interim Final Remedial Investigation Report ("RI Report") for the Site in June 2005. The FS Report that is the subject of the comments provided herein was released in April 2010. During the preparation of the FS, Emhart cooperated with EPA to carry out extensive additional sampling and analysis necessary to complete the Site characterization process and assessment of remedial alternatives, document the efficacy of response activities to date, and confirm that contaminants are not migrating in source area groundwater, as discussed below.

As early as 2000, Emhart began working with EPA to identify a range of remedial alternatives for the Site in an effort to establish a sensible cleanup approach that is both cost-effective and fully protective of human health and the environment. Since that time, Emhart has expended in excess of $10 million in investigating and mitigating potential hazards at the Site. Initial measures, some of which were undertaken in conjunction with one or more other Potentially Responsible Parties ("PRPs"), included installation of a temporary soil cap and implementation of flood control measures on the peninsula, restoration of Allendale Dam, sampling and excavation of residential soils and shoreline sediments, and capping of soils and sediments adjacent to the eastern side of the peninsula.

In 2007 and 2008, Emhart performed a hydrodynamic analysis of the River and Allendale Pond, and a Comparative Ecological Risk Assessment, to further EPA's evaluation of remedial alternatives. This resulted in the incorporation of a "nearshore" confined disposal facility ("CDF") as an additional disposal option under consideration by EPA. Thereafter, in 2009 and 2010, Emhart excavated a large volume of soils and sediments, which were disposed off-Site, and installed an impermeable cap in fulfillment of the requirements of the aforementioned TCRA to address the Source Area Groundwater action area.

Also in 2009, Emhart commenced litigation against NECC and began pursuing discovery. The litigation resulted in a greatly expanded factual record which directly refuted the "conceptual site model" in EPA's RI Report. *Emhart Indus., Inc. v. NECC*, C.A. 06-0218-S (D.R.I. 2009).

Most recently, Emhart performed a supplemental investigation at the location designated as the "Lyman Mill Reach Stream Sediment and Floodplain Soils action area." The purpose of that investigation was to collect additional data necessary to permit EPA to evaluate properly the remedial alternatives under consideration for this area, analyze potential risks to human health and the environment posed by this area, and ultimately to select an appropriate remedial action for this area.

Notwithstanding Emhart's aforementioned record of cooperation with EPA, and its submission to EPA of extensive evidentiary material revealing gross inaccuracies in the "conceptual site model" contained in its RI Report, EPA apparently elected to disregard much of the technical input and factual record developed by Emhart, and in 2010 released its flawed FS Report.

III. Summary of Applicable Laws, Regulations, and Guidance

A. CERCLA and NCP Requirements for Remedy Selection

1. CERCLA § 121

Section 121 of CERCLA sets forth the requirements for selecting remedial actions at CERCLA sites, including the one at issue here. *See* 42 U.S.C. § 9621. CERCLA § 121 requires the selection of remedies that comply with the NCP, are highly reliable, and provide long-term protection of human health and the environment. *Id.* § 9621(a). Cost-effectiveness is an essential requirement for any remedial action selected for a CERCLA site. *Id.* § 9621(a), (b). Section 121 also requires selected remedial actions to comply with legally "applicable or

relevant and appropriate requirements" ("ARARs"), which are cleanup standards and other environmental protection standards and criteria established under federal law, and under state law if the state requirements are more stringent than federal obligations. *Id.* § 9621(d).

CERCLA § 121(e)(1) provides that "[n]o Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely onsite, where such remedial action is selected and carried out in compliance with this section." 42 U.S.C. § 9621(e)(1). The NCP defines "on-Site" as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." 40 C.F.R. § 300.400(e)(1). For an area to qualify as "on-Site," it must be (1) necessary for implementation of a response action, (2) suitable, and (3) in very close proximity to the contamination area. *United States v. General Electric Co.*, 460 F. Supp. 2d 395, 403 (N.D.N.Y. 2006). The definition of "on-Site" is broader than the related concept of "area of contamination" and, thus, provides flexibility when implementation of the response action requires activities outside the area of contamination itself and/or areas not contiguous with the site. *See* U.S. EPA, *Introduction to ARARs: Applicable or Relevant and Appropriate Requirements* (Jun. 1992), at 5.

2. NCP Requirements

a. Development of Conceptual Site Model

The NCP requires EPA to develop a "conceptual site model" at the earliest stages of the RI process. *See* 40 C.F.R. § 300.430(b)(2) (EPA "shall . . . develop a conceptual understanding of the site based on the evaluation of existing data . . ."). EPA interpretive guidance also recognizes the development of a "conceptual site model" as a critical part of the site investigative process. *See* U.S. EPA, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, OSWER Dir. 9355.3-01 (Oct. 1988) ("*RI/FS Guidelines*"), at 2-3 to 2-7. The *RI/FS Guidelines* identify the development of a conceptual site model as a specific

activity to be conducted in the project planning stage for the RI/FS. It is used to assess "both the nature and the extent of contamination and to identify potential exposure pathways and potential human health and/or environmental receptors." *Id.* at 2-3. The *RI/FS Guidelines* further identify the categories of information to be considered in developing the conceptual site model. The "conceptual site model should include known and suspected sources of contamination, types of contaminants and affected media, known and potential routes of migration, and known or potential human and environmental receptors." *Id.* at 2-7.

In applying the conceptual site model to the RI/FS process, EPA guidance clearly recognizes that the conceptual site model should be "carefully maintained and updated throughout the life of the site activities." *See* U.S. EPA, *Data Quality Objectives Process for Hazardous Waste Site Investigations*, EPA QA/G-4HW, EPA/600/R-00/007, January 2000, at 15 L (providing guidance on developing data quality objectives for environmental data collection in support of hazardous waste site investigations, including Superfund remedial investigations).

Regarding the process for developing and screening remedial action alternatives for the FS, EPA guidance states that "[s]ite characterization activities are typically continued throughout the . . . process," and that "[t]he need for additional data may be determined at any time and/or a number of times throughout the process." U.S. EPA, *The Feasibility Study: Development and Screening of Remedial Action Alternatives*, OSWER Directive 9355.3-01FS3, November 1989.

b. Remedy Selection Criteria

The NCP identifies the criteria EPA must use in evaluating remedial alternatives for cleaning up a Superfund site consistent with CERCLA § 121 cleanup standards. *See* 40 C.F.R. § 300.430. For each remedial alternative being considered in the cleanup of a Superfund site, the NCP requires EPA to conduct a detailed analysis based on nine criteria. These criteria include

two "threshold criteria," "five primary balancing criteria," and two "modifying criteria." 40 C.F.R. § 300.430(f)(1)(i)(A)-(C).

The two threshold criteria are (1) overall protection of human health and the environment; and (2) compliance with ARARs. *Id.* § 300.430(e)(9)(iii)(A)-(B). The first threshold criterion focuses on whether the proposed remedial alternative provides adequate protection to human health and the environment – assessing both long-term and short-term effectiveness. The second threshold criterion assesses whether the proposed remedial alternative is in compliance with specific federal and state environmental regulations, and includes consideration of chemical-specific, location-specific, and action-specific ARARs. If an ARAR cannot be met for any particular remedial alternative, EPA must consider whether a waiver of that particular requirement is appropriate. *See RI/FS Guidelines*, at 6-7 to 6-8.

The five primary balancing criteria are: (1) long-term effectiveness and permanence, which assesses the risk remaining at the site upon completion of a remedial action; (2) reduction of toxicity, mobility, or volume through treatment, and how such treatment will address the site's principal threats; (3) short-term effectiveness, which assesses the remedial alternative during the construction and implementation phase and considers factors such as environmental impact and protection of the community and workers during the remedial action; (4) implementability, which evaluates the technical and administrative feasibility of the remedial alternative; and (5) cost, which includes consideration of direct and indirect capital costs, annual operation and maintenance costs, and net present value of such costs. 40 C.F.R. §§ 300.430(e)(9)(iii)(C)-(G). Cost is a "central factor in all Superfund remedial selection decisions." *Id.* § 300.430(e)(9)(iii); *see also* U.S. EPA, *The Role of Cost in the Superfund Remedy Selection Process*, Pub. 9200.3-23FS (Sep. 1996), at 1.

The two modifying criteria are (1) state acceptance, including consideration of a State's key issues and concerns, as well as state ARARs and use of waivers; and (2) community acceptance – taking into consideration community support and opposition to a proposed remedial alternative. 40 C.F.R. § 300.430(e)(9)(iii)(H)-(I).

EPA must follow specific procedures in applying these nine criteria. *See* U.S. EPA, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, OSWER 9200.1-23P (Jul. 1999) ("*Guide to Preparing Superfund Proposed Plans*"), at 1-5. As explained by the U.S. Court of Appeals for the D.C. Circuit:

> While the NCP identifies nine criteria to be used in selecting a remedy, all of the criteria are not given equal weight. Instead, they are divided into three classifications: threshold criteria, primary balancing criteria, and modifying criteria. Under this structure, "[o]verall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold requirements that each alternative must meet in order to be eligible for selection." 40 C.F.R. § 300.430(f)(1)(i)(A). EPA explained in the preamble to the NCP that remedial alternatives "must be demonstrated to be protective ... in order to be eligible for consideration in the balancing process by which the remedy is selected." 55 Fed. Reg. 8726 (1990).

State of Ohio v. EPA, 997 F.2d 1520, 1531 (D.C. Cir. 1993).

Thus, a proposed remedial alternative is only eligible for consideration if it meets the two threshold criteria. 40 C.F.R. § 300.430(f)(1)(i)(A). Thereafter, EPA must use the five primary balancing criteria to evaluate each remedial alternative. *Id.* § 300.430(f)(1)(i)(B). EPA must select preferred remedial alternatives that satisfy the threshold criteria and provide the "best balance of trade-offs" with respect to the five primary balancing criteria. *Id.*

§ 300.430(f)(1)(ii)(E). The preferred remedial alternatives selected in the FS are to be based on EPA's assessment of these first seven criteria.[4]

Once the preferred remedial alternatives are selected for the site, EPA prepares and publishes a proposed plan for public and state consideration. *Id.* § 300.430(f)(2). If necessary, EPA can modify the plan based on the comments received from the State and the community, thereby applying the "state acceptance" and "community acceptance" modifying criteria. *Id.* § 300.430(f)(4). As EPA notes in its RI/FS Guidelines, "[m]odifying criteria, ... may be considered to the extent that information is available during the FS, *but can be fully considered only after public comment is received on the Proposed Plan.* In the final balancing of trade-offs between alternatives upon which the final remedy selection is based, modifying criteria are of equal importance to the balancing criteria." *See Guide to Preparing Superfund Proposed Plans*, at 3-7 (emphasis added).

3. Standard of Review

In the event of judicial review, a court will evaluate EPA's remedy selection process under the standard of judicial review set forth in CERCLA § 113(j)(1), which provides that "judicial review of any issues concerning the adequacy of any response action taken or ordered by the [EPA] shall be limited to the administrative record." 42 U.S.C. § 9613(j)(1). CERCLA § 113(j)(2) further provides that, in considering objections, the court may reject the response action selected if "the objecting party can demonstrate, on the administrative record, that the decision was arbitrary and capricious or otherwise not in accordance with law." *Id.* § 9613(j)(2).

[4] The RI is the key tool for initially collecting and characterizing the relevant site data, which can then be used to conduct a detailed analysis of proposed remedial alternatives in the FS, applying the threshold and primary balancing criteria consistent with the requirements of CERCLA and the NCP. *Id.* § 300.430(e).

In assessing whether EPA's decision-making is arbitrary and capricious under CERCLA § 113(j), courts have examined whether "[t]he agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it would not be ascribed to a difference in view or the product of agency expertise." *United States v. Burlington N.R.R. Co.*, 200 F.3d 679, 689 (10th Cir. 1999).

B. Principles for Managing Contaminated Sediments

EPA issued its *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* to provide technical and policy guidance for federal and state project managers considering remedial response actions under CERCLA. *See* U.S. EPA, *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, OSWER 9355.0-85 (Dec. 2005), Executive Summary ("*Contaminated Sediment Remediation Guidance*"). The emphasis of this guidance is on evaluating alternatives during the feasibility study and remedy selection stage. *See id.* at 1-2. As EPA points out, "many aspects of the cleanup process may be more complex at sediment sites versus sites with soil or ground water contamination alone," and a number of potentially complicating factors for addressing contaminated sediment sites are identified:

- sediment sites may have a large number of sources, some of which can be ongoing and difficult to control;
- the sediment environment is usually dynamic, and understanding the effect of natural forces and man-made (anthropogenic) events on sediment movement and stability as well as contaminant transport can be difficult;
- cleanup work in an aquatic environment is frequently difficult from an engineering perspective and may be more costly than other media;

- contamination is often diffuse and the sites are often large and diverse (*e.g.*, mixed use, numerous property owners);
- many sediment sites contain ecologically valuable resources or legislatively protected species or habitats;
- for large sites, a number of communities with differing views and opinions may be affected; and
- there may be significant injuries to trustee resources at sediment sites.

See id. at 1-3 to 1-4.

The *Contaminated Sediment Remediation Guidance* incorporates EPA's *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites*, OSWER Dir. 9285.6-08 (Feb. 2002) ("*Principles for Managing Contaminated Sediment Risks*"), issued by the Office of Solid Waste and Emergency Response. *See Contaminated Sediment Remediation Guidance*, at 1-5. *Principles for Managing Contaminated Sediment Risks* outlines a framework for making risk management decisions concerning hazardous waste sites that have contaminated sediments. It presents an iterative approach to site evaluation to ensure that the site is fully understood before remedial decisions are made. *See Principles for Managing Contaminated Sediment Risks*, at 1. Specifically, the guidance in the *Principles for Managing Contaminated Sediment Risks* presents eleven risk management principles to be considered, the following eight of which predominate:

- develop and refine a conceptual site model that considers sediment stability;
- use an iterative approach in a risk-based framework;
- carefully evaluate the assumptions and uncertainties associated with site characterization data and site models;

- select site-specific, project-specific, and sediment-specific risk management approaches that will achieve risk-based goals;
- ensure that sediment cleanup levels are clearly tied to risk management goals;
- maximize the effectiveness of institutional controls and recognize their limitations;
- design remedies to minimize short-term risks while achieving long-term protection; and
- monitor during and after sediment remediation to assess and document remedy effectiveness.

Id. at 2-9. These principles are intended to be applied within the framework of EPA's existing statutory and regulatory requirements, including the NCP's nine remedy selection criteria (40 C.F.R. § 300.430). *See id.* at 1-2.

Moreover, the *Contaminated Sediment Remediation Guidance* instructs the remedy selection teams to refer to *OSRTI Sediment Team and NRRB [National Remedy Review Board] Coordination at Large Sediment Sites*, OSWER Dir. 9285.6-11 (Mar. 2004), to help ensure that the principles are appropriately considered before making site-specific risk management decisions. *Contaminated Sediment Remediation Guidance*, at 1-5.

C. Applicable or Relevant and Appropriate Requirements ("ARARs")

CERCLA § 121(d)(2) requires that the level of control for any contaminant that will remain on-Site after completion of the remedial action must meet ARARs posed by Federal environmental or more stringent State laws. *See* 42 U.S.C. § 9621(d)(2); *see also* U.S. EPA, *CERCLA Compliance With Other Laws Manual: Interim Final* (Aug. 1988) ("*CERCLA Compliance With Other Laws Manual*"), at 1-2. EPA may obtain a waiver of an ARAR if, *inter*

alia, (1) compliance with an ARAR will result in greater risk to human health and the environment; (2) compliance with an ARAR is technically impracticable; (3) the selected remedy will attain an equivalent standard of performance; or (4) a State has not consistently applied the ARAR. *See* 42 U.S.C. § 9621(d)(4); *see also CERCLA Compliance With Other Laws Manual*, at 1-71 to 1-75.

Requirements are "applicable" if they "specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site." *See* 40 C.F.R. § 300.5. In order for a requirement to be applicable, "the remedial action or the circumstances at the site [should] satisfy *all* of the jurisdictional prerequisites of a requirement." *CERCLA Compliance With Other Laws Manual*, at 1-10 (emphasis added). Requirements that are not applicable may be "relevant and appropriate" if they "address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site." *See* 40 C.F.R. § 300.5. A determination must be made that the requirement is both relevant *and* appropriate based on the evaluation of site-specific factors. *See CERCLA Compliance With Other Laws Manual*, at 1-10.

1. Resource Conservation and Recovery Act ("RCRA")

a. Definition of Hazardous Waste and the Contained-In Policy

RCRA regulates the identification and management of hazardous waste. *See* 42 U.S.C. § 6902. RCRA is potentially applicable to remedies at sites that involve the cleanup of material identified as RCRA hazardous waste. Before a material can be identified as a RCRA hazardous waste, however, it must first be classified as a solid waste. EPA's RCRA regulations set forth the scope of what is considered solid waste, which generally includes any material that is discarded, disposed, abandoned, or recycled in a way that is inherently "waste-like." 40 C.F.R. § 261.2.

Pursuant to EPA's "contained-in policy," environmental media (including soil and sediment) are not "solid waste" and therefore, cannot themselves be hazardous waste.[5] Moreover, contaminated environmental media are not subject to regulation under RCRA unless they "contain" hazardous waste. U.S. EPA, *Management of Remediation Waste Under RCRA* (Oct. 1998), at 9. EPA guidance provides that contaminated environmental media contain hazardous waste: "(1) when they exhibit a characteristic of hazardous waste; or (2) when they are contaminated with concentrations of hazardous constituents from listed hazardous waste that are above-health-based levels." *Id.* If contaminated environmental media contain hazardous waste, they are subject to all applicable RCRA requirements until they no longer contain hazardous waste. Contaminated environmental media no longer contain hazardous waste: "(1) when they no longer exhibit a characteristic of hazardous waste; and (2) when concentrations of hazardous constituents from listed hazardous wastes are below health-based levels." *Id.* at 9-10.

b. Land Disposal Restrictions

Congress created EPA's Land Disposal Restrictions ("LDR") program under authority provided through enactment of the Hazardous and Solid Waste Amendments of 1984 ("HSWA"). The implementing regulations are found at 40 C.F.R. Part 268. The LDR program is intended to ensure that toxic constituents present in hazardous waste are properly treated before hazardous waste is land disposed.

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[5] As discussed in the LDR Phase IV Final Rule, "[u]nder the 'contained-in' policy, EPA requires that soil (and other environmental media), *although not wastes themselves*, be managed as if they were hazardous waste if they contain hazardous waste or exhibit the characteristic of hazardous waste." *See* 63 Fed. Reg. 28,556, 28,621 (May 26, 1998); *see also* Letter from U.S. EPA to Thomas C. Jorling, Commissioner, Department of Environmental Conservation, State of New York (Jun. 19, 1989) (PPC 9441.1989(30)) ("Under our regulations, *contaminated media are not considered solid waste* in the sense of being abandoned, recycled, or inherently waste-like as those terms are defined in the regulations.") (emphasis added); Letter from U.S. EPA to John E. Ely, Enforcement Director, Virginia Department of Waste Management (Mar. 26, 1991) (PPC 9441.1991(04)) ("Our federal regulations at 40 C.F.R. Part 261.3 identify hazardous wastes. Among other things, these regulations state that a solid waste mixed with a hazardous waste is a hazardous waste. However, these regulations generally do not specifically address environmental media, *which are not solid wastes*, mixed with listed hazardous waste.") (emphasis added).

As part of its implementation of the LDR program, EPA has developed mandatory technology-based treatment standards that must be met before hazardous waste is placed in a landfill. Wastes that do not meet treatment standards cannot be land disposed unless EPA has granted a variance, extension, or exclusion, or the waste is managed pursuant to an approved "no migration" petition. Solvents and dioxin-containing wastes both are subject to established treatment standards.

(i) Alternative Treatment Standards for Contaminated Soil

Remediation of hazardous waste sites will often produce contaminated soil that the generator must handle as hazardous waste because it contains a listed hazardous waste or it exhibits a characteristic of hazardous waste. These remediation wastes, due to either their large volume or unique properties, are not always amenable to the applicable treatment standards. Because of this, EPA designated soil as a unique treatability group and promulgated alternative soil-specific treatment standards in the Phase IV Final Rule (63 Fed. Reg. 28,556; May 26, 1998). As with hazardous waste, RCRA prohibits the land disposal of hazardous soil until the soil has been treated to meet LDR standards. The soil standards mandate reduction of hazardous constituents by 90 percent, capped at 10 times the universal treatment standard ("UTS").

(ii) Variance from a Treatment Standard

With the establishment of soil-specific standards, EPA promulgated an additional provision in 40 C.F.R. § 268.44 for contaminated soil. Pursuant to § 268.44(h)(3), variances from otherwise applicable LDR treatment standards may be approved if it is determined that compliance with the treatment standard would result in treatment beyond the point at which short- and long-term threats to human health and the environment are minimized. This allows a site-specific, risk-based determination to supersede the technology-based LDR treatment

standards under certain circumstances, allowing regulators to align cleanup levels and treatment levels. Alternative LDR treatment standards established through site-specific risk-based variances are required to be within the range of values the Agency generally finds acceptable for risk-based cleanup levels. Decisions to grant or deny these variances are made by EPA Regions or authorized States.

(iii) Dioxin-Containing Waste

EPA has determined that incineration is the Best Demonstrated Available Technology ("BDAT") for the treatment of dioxin-containing restricted RCRA hazardous waste. *See* 40 C.F.R. § 268.40. While any technology short of dilution is permissible for achieving the required contaminant levels, only incineration has been able to achieve them.

c. Applicability of "F" Waste Code

Solid waste is considered to be hazardous if it is a material listed by regulation under one of four waste codes (F, K, P and U), or is a material exhibiting any of the following characteristics: (1) ignitability, (2) corrosivity, (3) reactivity, or (4) Extraction Procedure ("EP") Toxicity. 40 C.F.R. § 261.11. The F code listings represent hazardous wastes from "non-specific sources," and include waste material from industrial and manufacturing processes. *See* 40 C.F.R. § 261.31. The F020 code, which is at issue at the Site, is applied to wastes "from the production or manufacturing use ... of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol.)." 40 C.F.R. § 261.31.

EPA policy states that "[s]ite managers are not required to presume that a CERCLA hazardous substance is a RCRA hazardous waste unless there is affirmative evidence to support such a finding." U.S. EPA, *Determining When Land Disposal Restrictions (LDRs) Are Applicable to CERCLA Response Actions*, Dir. 9347.3-05FS (Jul. 1989), at 2. Moreover,

"[w]here a facility owner/operator makes a good faith effort to determine if a material is a listed hazardous waste but cannot make such a determination because documentation regarding a source of contamination, contaminant, or waste is unavailable or inconclusive ... one may assume the source, contaminant or waste is not listed hazardous waste ...." *See Management of Remediation Waste Under RCRA*, at 5. Therefore, provided the material in question does not exhibit a characteristic of hazardous waste, RCRA requirements do not apply. *See id.*

EPA has discussed this approach in a number of contexts. In the preamble of the proposed NCP, EPA noted that it is often necessary to know the source of a waste to determine whether it is a RCRA listed hazardous waste and that "at many CERCLA sites no information exists on the source of the wastes." 53 Fed. Reg. 51,394, 51,444 (Dec. 21, 1988). EPA recommended that available site information, such as manifests, storage records and vouchers, be used to ascertain the sources of wastes, but when this documentation is not available or inconclusive, it may be assumed that the wastes are not listed wastes. *Id.* EPA confirmed this approach in the preamble to the final NCP. *See* 55 Fed. Reg. 8,666, 8,758 (Mar. 8, 1990); *see also Management of Remediation Waste Under RCRA*, at 4-5.

In the HWIR-Media proposed rule, 61 Fed. Reg. 18,780 (Apr. 29, 1996), EPA expanded the policy to also cover dates of waste disposal – if, after a good faith effort to determine dates of disposal, a facility owner/operator is unable to make such a determination because documentation of dates of disposal is unavailable or inconclusive, one may assume disposal occurred prior to the effective date of applicable LDRs. *Id.* at 18,805. EPA concluded that "if information is not available or inconclusive, facility owner/operators may generally assume that the material contaminating the media were not hazardous wastes." *Id.*

The LDR Phase IV Final Rule, 63 Fed. Reg. 28,556 (May 26, 1998), supports this interpretation and provides guidance on the type of assessment needed to determine the source of waste. EPA reiterated that "if information is not available or inconclusive, it is generally reasonable to assume that contaminated soils do not contain untreated hazardous waste placed after the effective dates of applicable land disposal prohibitions." *Id.* at 28,619. Further, "program implementers and facility owners/operators cannot make the determination that information on the types of waste contamination or dates or placement is unavailable or inconclusive without first making a good faith effort to uncover such information." *Id.*

d. Applicability of RCRA and the LDRs to In-Place Contaminated Soil

In-place contaminated environmental media are not subject to RCRA LDR regulations, because the LDRs do not apply to *in-situ* contaminated soil. This is consistent with the EPA policy that "[i]n order for something to be classified as a hazardous waste *it must first be a solid waste*. In-place media *does not meet the definition of solid waste*. That's where it is supposed to be. It's not discarded." U.S. EPA, Training Curriculum: Session 10, RCRA Hazardous Waste Identification: Special Regulatory Conventions (emphasis in original).

EPA explicitly states in its 1998 Phase IV LDR rulemaking that the LDRs do not apply to *in-situ* contaminated soils:

> Land disposal restrictions only attach to prohibited hazardous waste (or hazardous contaminated soil) when it is (1) generated and (2) placed in a land disposal unit [footnote omitted]. Therefore, if contaminated soil is not removed from the land (i.e., generated), LDRs cannot apply. Similarly, if contaminated soil is removed from the land (i.e., generated) yet never placed in a land disposal unit, LDRs cannot apply.[43] In other words, *LDRs do not apply to contaminated soil in situ or force excavation of contaminated soil.* If soils are excavated, however, LDRs may apply, as discussed below.

63 Fed. Reg. at 28,617 (emphasis added).

Footnote 43 in the quoted text discusses EPA's area of contamination policy:

> Note that, as discussed later in today's preamble, nothing in today's final rule affects implementation of the existing "area of contamination" policy. Therefore, soil managed within areas of contamination, even if it is "removed from the land" within such an area, would not be considered to be "generated."

Id. at 28,617 n.43.

In publishing the HWIR-Media proposed rules, EPA made clear that the contaminated media rules apply only after a decision has been reached under other rules and guidance to remove contaminated media and manage them other than *in-situ*:

> EPA wishes to emphasize that the proposed HWIR-media rules would not affect which media or wastes at a site must be cleaned up, or how much contaminated media should be excavated. Such decisions are usually made according to Federal or State cleanup laws and regulations, most of which specify certain guidelines or criteria for determining how sites are to be cleaned up. Only after those decisions are made would these HWIR-media regulations come into play.

61 Fed. Reg. at 18,789.

Capping wastes in-place does not constitute a placement/land disposal management practice for purposes of the LDRs. *See* U.S. EPA, *Superfund Management of Investigation-Derived Wastes During Site Inspections,* Dir. 9345.3-02 (May 1991). When managed *in-situ*, environmental media not removed from the area of contamination do not trigger the LDRs:

> In the area of contamination policy, EPA interprets RCRA to allow certain discrete areas of generally dispersed contamination to be considered a RCRA unit (usually a landfill). 55 FR 8758-8760 (March 8, 1999). *This interpretation allows hazardous wastes (and hazardous contaminated soils) to be consolidated, treated in situ or left in place within an area of contamination* without triggering the RCRA land disposal restrictions or minimum technology requirements – since such activities would not involve "placement into a land disposal unit," which is the statutory trigger for LDR. EPA clarifies that its interpretation of LDR applicability for contaminated soil does not, in any way, affect implementation of the area of contamination policy.

63 Fed. Reg. at 28,620 (emphasis added).

2. Toxic Substances Control Act ("TSCA")

Pursuant to TSCA, EPA has promulgated regulations to address the cleanup and disposal of PCB remediation waste. *See* 40 C.F.R. Part 761, Subpart F. "PCB remediation waste" includes "waste containing PCBs as a result of a spill, release, or other unauthorized disposal ... prior to April 18, 1978, that are currently at concentrations > 50 parts per million ("ppm") PCB, regardless of the concentrations of the original spill." 40 C.F.R. § 761.3. Bulk PCB remediation waste (*e.g.*, soils and sediments) with concentrations less than or equal to 100 ppm may remain in-place in low occupancy areas if the area is capped. *Id.* § 761.61(a)(4)(i)(B)(3). The cap must be of sufficient thickness to "prevent or minimize human exposure, infiltration of water, and erosion" and be subject to appropriate institutional controls. *Id.* § 761.61(a)(7)-(8).

3. Preliminary Remediation Goals ("PRGs") for Dioxins in Soils

The current PRG for dioxin in residential soil is 1 ug/kg. In May 2009, EPA issued a "Science Plan for Activities Related to Dioxins in the Environment" detailing a plan, with interim milestones, for completion of the Agency's reassessment of the health risks of exposure to dioxin, entitled "Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin ("TCDD") and Related Compounds" and commonly known as the "dioxin reassessment." One of the plan's interim milestones is the issuance of updated interim PRGs for dioxins and dioxin-like compounds (including certain PCBs) in soils. In late December 2009, EPA issued its draft updated interim PRGs. The draft interim PRGs proposed by EPA are more stringent than the existing ones, and would reduce the PRGs for soil in industrial and commercial areas from between 5,000 and 20,000 parts per trillion ("ppt") to 950 ppt, and the PRGs for soil in residential areas from 1,000 ppt to 72 ppt. U.S. EPA, *Public Review Draft, Draft Recommended Interim Preliminary Remediation Goals for Dioxin in Soil at CERCLA and RCRA Sites*, OSWER Dir. 9200.3-56 (Dec. 30, 2009)("*Public Review Draft*"), at 13. Notice of the draft interim PRGs

was published in the Federal Register on January 7, 2010. 75 Fed. Reg. 984 (Jan. 7, 2010), and EPA has not yet finalized the interim PRGs.

EPA's *Public Review Draft* expressly states that: "the findings and conclusions in this document are for public review and should not be construed to represent any final agency determination or policy" (document footer). Moreover, EPA states that: "[u]ntil these draft recommended interim PRGs are finalized, EPA will continue to use the 1998 recommended interim PRGs (EPA 1998)." *Id.* at pg. 2.

4. Executive Orders

EPA does not consider Executive Orders to be ARARs; instead, they are "to-be-considered" materials ("TBCs"). U.S. EPA, *Considering Wetlands at CERCLA Sites*, Pub. 9280.0-03 (May 1994), at 11-12. In its guidance, EPA states that TBCs "are meant to complement the use of ARARs, not to compete with or replace them. TBCs are not legally enforceable and therefore are not ARARs. Their identification and use are not mandatory." *Id.* at 11. EPA also states that Executive Orders "differ from other TBCs in that they are orders of the President to all Executive Branch employees, so that even though they are not ARARs under CERCLA they *should* be complied with." *Id.* at 12 (emphasis added).

5. State ARARs

On-site remedial actions must attain promulgated State environmental and facility siting requirements that are more stringent than Federal ARARs, if the State requirement is identified in a "timely" manner. *See* 42 U.S.C. § 9621(d)(2); *see also* U.S. EPA, *CERCLA Compliance With Other Laws Manual: Part II. Clean Air Act and Other Environmental Statutes and State Requirements*, OSWER Dir. 9234.1-02 (Aug. 1989) ("*CERCLA Compliance With Other Laws Manual: Part II*"), at 7-1. Potential State ARARs include requirements regarding the siting of waste treatment, storage and disposal facilities; control of discharges to surface waters; and

preventing further degradation of surface waters and groundwater. *CERCLA Compliance With Other Laws Manual: Part II*, at 7-10, 7-26 to 7-27, 7-28, 7-30. A State ARAR may be waived if the State has inconsistently applied the standard at cleanup sites within the state. *See* 42 U.S.C. § 9621(d)(4)(E).

Chemical-specific State ARARs identified by EPA for the Site include Rhode Island Department of Environmental Management ("RIDEM") Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Feb. 2004) ("Remediation Regulations"). In accordance with Rule 8.02 of the Remediation Regulations, unless otherwise specified, "soil contaminated as a result of a release of hazardous materials shall be remediated in a manner which meets the direct exposure and leachability criteria for each hazardous substance established in Rule 8.02.B (Method 1 Soil Objectives: Tables 1 and 2), Rule 8.02.C (Method 2 Soil Objectives) or Rule 8.04 (Method 3 Remedial Objectives); or the background concentration of the hazardous substance as established by Rule 8.06 (Background Concentrations for Soils)."

Soil at the Site has been determined to contain contaminants subject to the Rule 8.02.B soil objectives. In accordance with Rule 8.03 of the Remediation Regulations, "groundwater contaminated as a result of a release of hazardous materials located in a GB area shall be remediated to a concentration which meets the groundwater objective for each hazardous substance established in Rule 8.03.B.ii (Method 1 GB Groundwater Objectives) and specified in Table 4, Rule 8.03.C (Method 2 GB Groundwater Objectives) or Rule 8.04 (Method 3 Remedial Objectives); or the background concentration of the hazardous substance." Groundwater at the Site has been determined to contain contaminants subject to the Rule 8.03 GB groundwater objectives.

Action-specific State ARARs identified by EPA for the Site include RIDEM Rules and Regulations for Hazardous Waste Management (Amendment Eff. Feb. 9, 2007) ("Hazardous Waste Regulations"). Rhode Island has been delegated authority to administer the federal RCRA statute through its regulations. The standards set forth in 40 C.F.R. Part 261 are incorporated into the State requirements by reference. The Hazardous Waste Regulations set forth requirements for hazardous waste determination according to Federal (40 C.F.R. § 262.11) and State (Rule 5.08) definitions. As provided in Table 3-1 of the FS Report, "[s]olid waste generated by excavation of soils or sediments at the Site is required to undergo hazardous waste determination." EPA takes the position, as presented in Table 3-1 of the FS Report, that the RIDEM standard is "*relevant and appropriate* because wastes that may be classified as hazardous waste were disposed of prior to 1980."

D. Information Quality Act ("IQA")

The IQA, Section 515(a) of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554; H.R. 5658), was passed in 2000 as a rider to an omnibus budget package. The IQA directs the Office of Management and Budget ("OMB") to develop guidelines to "ensur[e] and maximize[e] the quality, objectivity, utility, and integrity of information" disseminated by federal agencies "in fulfillment of the purposes [of] the Paperwork Reduction Act." *Id.*

In 2002, OMB issued *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies* ("*OMB Guidelines*"). 67 Fed. Reg. 8452 (Feb. 22, 2002). Pursuant to the OMB Guidelines, EPA issued its *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency* in October 2002 ("*EPA Guidelines*").

Information and data disseminated by EPA must meet OMB and EPA standards for "objectivity," "integrity," and "utility." *EPA Guidelines*, at 3. According to the *EPA Guidelines*:

> "Objectivity" focuses on whether the disseminated information is being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance, is accurate, reliable, and unbiased. "Integrity" refers to security, such as the protection of information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification. "Utility" refers to the usefulness of the information to the intended users.

EPA Guidelines, at 15.

IV. Discussion of Remedial Alternatives

A. Site-Wide Considerations

EPA has divided the Site into five "action areas," and Emhart has provided specific comments with respect to the remedial alternatives under consideration for each of those action areas in Section IV.B. herein. However, there are a number of overarching issues and misapplications of law by EPA that have implications for the remedy selection process, either site-wide or for more than one action area. These broader considerations are discussed below.

1. EPA's Conceptual Site Model Required by the NCP is not Supported by the Administrative Record

Given the often substantial passage of time between the performance of a Remedial Investigation and the Feasibility Study that follows, the development by EPA of a conceptual site model is not a static exercise. Rather, it is to be an iterative process that evolves over time as additional information is identified or discovered and evaluated in each of the categories that comprise the elements of the conceptual site model (*see* Section III.A.2.). Here, the FS Report reflects a static, outdated, and factually erroneous conceptual site model that is not supported by the administrative record.

The Centredale Manor Site provides a prime example of the need for EPA to build upon and refine the initial conceptual site model over time to conform to the information in the

administrative record. During the five-year period that elapsed between EPA's issuance of the RI Report and its issuance of the FS Report, a great deal of additional information and data were added to the administrative record, and previously collected information was further evaluated in light of newly discovered evidence. For reasons that are not clear, EPA has declined to incorporate the significant amount of additional Site information developed over time, leaving its conceptual site model essentially unchanged from that developed over five years ago. Thus, proper site characterization, upon which the conceptual site model and, ultimately, the RI/FS must be based, is significantly impaired.

In the RI Report, EPA set forth a conceptual site model in which it identified Metro-Atlantic's HCP process as the principal source of the dioxin and hexachloroxanthene ("HCX") contamination identified in Site samples. Emhart has submitted extensive documentation to EPA for inclusion in the administrative record demonstrating that NECC's drum reconditioning operation, rather than Metro-Atlantic's HCP manufacturing process, was the likely source of the dioxin and HCX found at the Site. An objective evaluation of previously available information, coupled with the supplemental factual record developed during the past five years (as described in detail in Appendix A to these comments), leads inexorably to the conclusion that NECC and its customers were the principal, if not the sole, source of the dioxin and HCX at the Site. EPA's refusal to update and revise its conceptual site model with respect to "the known and suspected sources of contamination," or "the type of contamination" at the Site is indisputably at odds with its own guidance. *See RI/FS Guidelines*, at 2-7.

For example, EPA's conceptual site model does not consider the collocation of chemicals in soil present at depth in the "footprint" of the former HCP manufacturing building. A review of the data from soil samples collected from CMS-451 and MW-05S shows the presence of

elevated concentrations of the herbicide methylchlorophenoxy-propionic acid ("MCPP"). MCPP was detected in samples collected in the "footprint" of the former HCP manufacturing building (CMS-451) at concentrations ranging between 20 mg/kg and 68 mg/kg at depths of 5 to 10 feet below ground surface. MCPP is not known to have been utilized or otherwise associated with Metro-Atlantic's operations. Thus, its presence at these very elevated concentrations at depth in the "footprint" of the former HCP building indicates that the disposal of chemicals used by others occurred in this area. Nevertheless, EPA does not present any analysis or conclusions regarding these data and/or their impact on the conceptual site model.

Moreover, EPA's conceptual site model fails to consider the congener profile of the dioxins found in the Site samples, and no effort whatsoever has been made by EPA to identify the source(s) of the dioxins by performing a chemical analysis of the 2,3,7,8-tetrachlorodibenzo-p-dioxin ("2,3,7,8-TCDD"). As demonstrated in Appendix A, if EPA had conducted such a chemical evaluation, it would have discovered that the 2,3,7,8-TCDD identified in the Site samples did not come from the sodium 2,4,5-tricholorophenolate ("Na-2,4,5-TCP") that Metro-Atlantic received exclusively from Diamond Alkali and used in its HCP manufacturing process, and therefore must have come from a source other than Metro-Atlantic.

Further, EPA's conceptual site model is inconsistent with sworn testimony and physical evidence provided by Emhart to EPA for inclusion in the administrative record. For example, the FS Report states that chemicals were *possibly* discharged directly to the River from the HCP building. *See* FS Report, at 2-12 (emphasis added). EPA cites the testimony of Kenneth Michael Neri in support of this aspect of the conceptual site model. However, the only mention by Mr. Neri of a discharge to the River is from a pipe he recalls being located "anywhere from a hundred feet to 100 yards" downstream of the Smith Street bridge. However, in a later

examination of Mr. Neri, he placed the alleged pipe "closer to Smith Street." *See* Trial Transcript of K. Neri, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Oct. 6, 2006), at 9:17-10:4, 39:25-40:6. In fact, the northernmost corner of the HCP building was approximately 480 feet south of the Smith Street Bridge; thus, the pipe noted by Mr. Neri was not even in the immediate vicinity of the HCP plant. Further, Mr. Neri testified that he had no knowledge of what may have been discharging from the pipe. *See id.* at 11:6-8, 23:13-15.

Rather, both deposition testimony and physical evidence demonstrate that the HCP building was connected to the sanitary sewer and not a source of discharges to the River. *See* Trial Transcript of J. Buonanno, *Emhart Indus., Inc. v. NECC*, C.A. 06-218-S (D.R.I.) (Jan. 14, 2009), at 38:19-39:2; *see also* Supplemental Expert Report of Dr. James R. Kittrell (May 5, 2010), at 2. Photographic evidence collected in 2009 and provided to EPA in connection with the TCRA excavation show the HCP building footprint to be devoid of any subsurface structures, such as a dry well or leaching trenches, that could have served as a means of onsite waste disposal during or in connection with the HCP manufacturing process. *See* Addendum to Expert Report of John R. Kastrinos (Mar. 31, 2010), at 6. In fact, the referenced photographic evidence of the excavation shows utilities, including a sewer, serving the area of the HCP building, thus supporting other testimony and evidence that the plant was connected to the municipal sewer system. *See* Appendix A at p. A-15.

In its conceptual site model, EPA also ignores established expert opinion that no liquids containing dioxin would have been discharged in the HCP production process, and that even if such liquids were discharged, the volume of dioxin contained therein would have been so infinitesimal that the liquids could not possibly have accounted for the volume of dioxin present on the Site. *See* Supplemental Report of Dr. Francesco Stellacci (Dec. 24, 2009), at 3; *see also*

discussion, *infra*, at A-14 to A-16. EPA further ignores expert opinion that the activated charcoal filtration used by Metro-Atlantic would have removed from HCP process wastes any dioxin or HCX present, *see* Supplemental Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 4-5, and also ignores testimony that HCP process filters were disposed of off site. *See* Trial Transcript of J. Buonanno, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Sep. 14, 2006), at 87:3-11; Trial Transcript of J. Nadeau, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Sep. 15, 2006), at 27:23-28:8, 48:5-49:10; Trial Transcript of J. Turcone, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Sep. 18, 2006), at 5-7; *see also* discussion, *infra*, at A-11 to A-14. Finally, EPA also disregards expert opinion establishing that no activated charcoal was associated with the 2,3,7,8-TCDD found on the Site, further supporting the conclusion that HCP process filters containing 2,3,7,8-TCDD were not disposed of on Site. *See* Supplemental Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 8-9; *see also* discussion, *infra*, at A-11 to A-14.

None of the testimony cited by EPA permits the conclusion that Metro-Atlantic discharged chemicals from the HCP building directly into the River or onto the ground. The record is clear that, to the extent that there was any liquid waste whatsoever from Metro-Atlantic's HCP operation, it would only have been discharged into the sewer, not into the River nor onto the ground at the Site.

Another deficiency in EPA's conceptual site model is that it fails to explain the presence of high concentrations of HCX in the tail race, just adjacent to and downstream of NECC's drum washing and refurbishing operations. EPA has steadfastly contended that any HCX would have been associated with Metro-Atlantic's HCP process. However, samples from the tail race, including SD-30, CMS-SS-4104, CMS-SS-4111, CMS-SS-4111, CMS-SS-4109, and CMS-SS-

4106, reveal HCX concentrations ranging from 11,382 pg/g to 93,773 pg/g. In contrast, soil sample CM-SO-MW05-0406 collected from the footprint of the former HCP building were found to contain only 2,350 pg/g HCX, consistent with HCX concentrations in numerous upstream background samples (SD-33, SD-34, SD-35, and SD-37). Similarly, sediment samples collected downstream of the former HCP plant, at WRC-SD-2010 through WRC-SD-2013, did not contain HCX concentrations above those reported for upstream samples. These observations belie EPA's contention, as expressed in its conceptual site model, that the HCX at the Site was indisputably a "marker" directly associated with the HCP manufacturing process.

The validity of EPA's conceptual site model is further placed into question by data from surface and subsurface soil samples collected from the riverbank on the western shore of the River. These sampling locations, CMS-022, CMS-023, and CMS-024 are not, according to field sampling notes, in depositional areas. Rather, they are in an erosional area. *See* Trip Report: Soil Sampling, 15-19 February 1999 (Mar. 1999), at Appendix C. Nevertheless, samples collected from these locations were found to contain concentrations of 2,3,7,8-TCDD as high as 73,000 ng/kg in surface and subsurface soils. These concentrations are in sharp contrast to dioxin levels detected in soil samples elsewhere on the western side of the River, and cannot be explained by any facet of EPA's conceptual site model.

The presence of elevated levels of 2,3,7,8-TCDD in these soils located on the western bank of the River, particularly the subsurface soil, does not comport with EPA's conceptual site model depicted in the FS Report or the RI Report. In fact, neither the RI Report or the FS Report discuss these sampling locations specifically, nor do they discuss the means by which 2,3,7,8-TCDD came to be located at these locations and depths. These sampling locations and depths, the dioxin concentrations, and the described physical characteristics of the sampling locations

(*i.e.*, erosional) all are inconsistent with EPA's conceptual site model for the Site. EPA's failure to address in any fashion this anomalous data is contrary to the requirements of the NCP, and clearly demonstrates the flaws in EPA's Site model.

In sum, EPA premises its evaluation of remedial alternatives in the FS Report on faulty assumptions about the sources, types, and attributes of contamination at the Site. In failing to consider important facts and scientific data, EPA overlooks compelling evidence demonstrating that its conceptual site model and underlying site characterization are seriously flawed. By maintaining its sorely out-of-date and erroneous conceptual site model in the face of substantial conflicting evidence, EPA has engaged in arbitrary and capricious conduct and has failed to properly comply with a major aspect of the RI/FS "scoping" requirements under the NCP. *See* 40 C.F.R. § 300.430(b)(2). Furthermore, as discussed below, EPA's faulty conceptual site model has resulted in the Agency's erroneous application of the F020 waste code at the Site. Emhart respectfully submits that EPA, in accordance with the NCP and the *RI/FS Guidelines*, is required by law to update its conceptual site model to reflect current Site information, and to revise its evaluation of the remedial alternatives accordingly.

2. The F020 Waste Code Has Been Applied Improperly, Unnecessarily Limiting Remedial Options and Increasing Costs

The underlying assumption in the FS Report that all contaminated media at the Site contain a RCRA F-listed waste, namely F020, *see* FS Report, at 7-6, is plainly erroneous. That assumption – and the assessment of remedial alternatives flowing from it – must be corrected. EPA's wrongful application of the F020 waste code to impacted soil has led the Agency to favor unnecessarily costly remedial alternatives, and is at odds with both EPA guidance and with EPA's classification of contaminated environmental media at the Site during previous removal actions.

As discussed in Section III.C.1.c. above, it is not permissible to assume that all impacted media at the Site contains an F-listed waste where the presence of contamination in the media cannot be traced back to a release of waste from an original process meeting the F020 description. The administrative record and EPA's conceptual site model do not support the conclusion that all dioxins found in Site samples came from Metro-Atlantic's former HCP operation. The lack of evidence linking dioxins at the Site to a F020 waste source is overwhelming. *See, e.g.*, Letter from D. Scotti, LEA, to A. Krasko, EPA, Re: Remedial Alternative for Source-area Soil (Sep. 11, 2007). Rather, current evidence points to NECC's drum reconditioning operation as the sole or predominant source of dioxin presently found at the Site.

EPA's application of the F020 waste code to dioxin at the Site is arbitrary and capricious. The record in this proceeding is entirely devoid of any evidence whatsoever that spills, releases, dumping, or disposal of any dioxin or dioxin-containing chemicals occurred in connection with Metro-Atlantic's HCP production process. Moreover, as discussed in Appendix A, the "profile" of the dioxin found in samples in the area of Metro-Atlantic's former HCP operation, and throughout the remainder of the Site, is completely inconsistent with the byproduct contaminants that likely would have been contained in the sodium 2,4,5-trichlorophenolate ("Na-2,4,5-TCP") "starter" material that Metro-Atlantic procured as a raw material from Diamond Alkali. *See also* Expert Report of Dr. Gregory Fu (Jan. 7, 2011), at 5; and Supplemental Expert Report of Dr. James R. Kittrell (Jan. 7, 2011), at 26 ("Dioxin congener profiles of the 'source-like' samples at the Site are not consistent with Crude TCP delivered to the Site from Diamond Alkali in 1964-1965.").

In making its arbitrary and capricious determination that the source of the dioxin at the Site is a F020 listed waste, EPA completely disregards the most obvious and well-documented source of Site dioxin -- the drums received by NECC from customers of its drum reconditioning operation during the period 1952 through 1972. The administrative record documents indisputably that NECC received 55-gallon steel drums from at least 19 customers in the textile chemical industry, which contained approximately 650 different types of chemical residues. During the relevant time period, NECC also received 55-gallon steel drums from at least 10 customers in the chemical and petroleum industry, and from two military bases containing approximately 370 different types of chemical residues. *See* Expert Report of Dr. James R. Kittrell (Jan. 15, 2009), at 4-45; Expert Report of Dr. Richard Aspland (Jan. 13, 2009), at 8-68.

Many of the chemicals attributable to NECC's customers have been found as contaminants at the Site. *See* Updated Expert Report of Dr. Gregory Fu (Feb. 6, 2009), at 5. According to Dr. Fu, a professor of organic chemistry at the Massachusetts Institute of Technology, of the various chemical residues present in 55-gallon steel drums that NECC is known to have received for reconditioning, nine contained dioxins as a contaminant. *Ibid.* Moreover, of the various chemical residues present in 55-gallon steel drums that NECC received for reconditioning during the relevant time period, over 150 generated dioxins during NECC's incineration process through one of two chemical processes known as the "precursor" and "de novo" routes. *See id.* at 5, 20. Dioxins also were produced during NECC's incineration process when certain chemical residues were in the presence of certain other chemical residues, such as those containing chlorine, through either the "precursor" or "de novo" routes. *Id.*

EPA's Office of Solid Waste has taken the position that "[i]f the waste in question cannot be traced back to an original process that would generate a waste meeting any listing description,

then it is exempt from regulation providing that it does not fail a hazardous waste characteristic test." Letter from S. Lowrance, EPA, to J. Noles, Laidlaw Environmental Services (TS), Inc. (Dec. 24, 1992) (PPC 9444.1992(09)); *see also* Memorandum from J. Skinner, Director, to D. Wagoner, Director, Air and Waste Management Division, Region VII (Jan. 6, 1984) (PPC 9441.1984(01)) Re: Soils From Missouri Dioxin Sites ("If the exact origin of the toxicants is not known, the soils cannot be considered RCRA hazardous wastes unless they exhibit one or more of the characteristics of hazardous waste ...."). As noted previously, the dioxins in the soil and sediment that will need to be managed during the implementation of the Site remedy cannot be traced back to a single original process that would meet a hazardous waste code listing. Moreover, the dioxins are not characteristically hazardous waste. Thus, RCRA, and the F020 waste code, are not applicable.

Further, EPA has taken inconsistent positions regarding the application of the F020 waste code during the course of the Site investigation. For example, EPA's contractor, Battelle, disposed of investigation-derived waste as a non-listed waste when implementing an EPA-approved sampling plan, notwithstanding that Battelle was sampling in the area of the former HCP manufacturing facility that EPA contends is the source of the dioxin. *See* Battelle, *Final Work Plan, Groundwater, Semi-permeable Membrane Device (SPMD) and Sediment Collections* (Apr. 2005), at 5, 6. In addition, when the PRPs excavated soil from residential/recreational-use properties in the floodplain as part of a removal action, EPA approved the PRPs' request to dispose of the excavated soil without an F020 waste code. *See* Email from E. Vaudo, EPA, to J. Muys, Swidler & Berlin (Dec. 19, 2002). In contrast, EPA required that materials associated with the restoration of Allendale Dam, and materials removed from the footprint of and immediately proximate to the former HCP manufacturing building, be characterized as F020

waste. Now, for the first time, EPA is taking the position that *all* impacted media must be managed as containing an F-listed waste, without any indication in the administrative record or elsewhere that EPA is relying on new information.

EPA's wrongful application of the F020 waste code to the environmental media at the Site has limited the remedial options available to be considered in the FS Report, screening-out viable remedial alternatives and unnecessarily favoring more costly remedial alternatives. Without the unlawful impediment created by EPA's determination to apply the F020 waste code, excavated soil and sediment could be placed in a confined disposal facility ("CDF") not subject to RCRA closure requirements.

Furthermore, EPA has not even evaluated in the FS another implication of misapplying the F020 waste code to excavated soil, sediment or debris. There are just three incinerators within the United States that have the potential to accept F020 wastes: Clean Harbors Deer Park Incineration Facility in Deer Park, Texas; Veolia Environmental Services Facility in Port Arthur, Texas; and Clean Harbors Aragonite Incineration Facility in Grantsville, Utah. Currently, however, none of these facilities are permitted to accept F020 waste. Although one or more of these facilities could potentially accept F020 waste with a permit modification, such modifications typically take several years to obtain.

As importantly, the facilities in Texas have capacity to accept 70 tons per day, and the Utah facility has capacity to accept 50 tons per day. These daily capacities represent the total capacity to accept hazardous waste from all shippers within the United States. In the unit costs presented in Appendix J of the FS Report, EPA identifies off-Site hazardous waste disposal costs based on a quote from Clean Harbors. It is noted that the EPA has assumed a production rate for loading and off-Site disposal of hazardous waste of 260 tons per day.

So, for example, even assuming, under the excavation options considered in the FS Report, that the estimated 112,900 tons of material to be removed and disposed off-Site legally could be received by the Clean Harbors facility in Texas as a hazardous waste, which could not occur without a permit modification, under current capacity constraints, it would take approximately five years for Clean Harbors to process the total volume of waste needed to complete the project. This calculation is based on EPA's unrealistic assumption that the Clean Harbors facility would accept waste from the Site exclusively for that entire period. A more realistic estimate would be based on the assumption that the material could not be shipped to the Clean Harbors' facility at maximum capacity on a daily basis, in which case it would take decades to complete the project.

While there are incinerators in Canada, there are few facilities in Canada that can accept the waste today, resulting in a less than competitive market. Thus, the disposal costs that would be incurred in shipping the waste to Canada -- setting aside the cost and environmental impact of transport -- are very high and are set by a few facilities. These increased costs are not factored into the evaluation presented in the FS Report. Clearly, EPA has not evaluated this alternative at the level of detail mandated by the NCP.

The application of the F020 waste code, and the determination that excavated material is a hazardous waste, also would subject this otherwise non-RCRA regulated material to the State of Rhode Island Hazardous Waste Generation Fee. This fee is $46 per ton of hazardous waste manifested in Rhode Island. EPA failed, though, to include this state levy in the estimated costs presented in the FS Report. Thus, approximately $5.2 million would need to be added to the cost estimate of the project if the excavated material were to carry the F020 waste code.

To comply with the NCP and its implementing guidance, EPA must reevaluate its application of the F020 waste code and associated RCRA requirements to contaminated media at the Site, and revise its evaluation of the remedial alternatives considered in the FS Report accordingly.

3. EPA Has Not Fulfilled the Requirements of the IQA and Implementing Guidelines Because EPA Failed to Incorporate Current Site Data

As discussed in Section III.D. above, information and data disseminated by EPA must meet OMB and EPA standards for "objectivity," "utility," and "integrity." In order to meet the "objectivity" standard, the information and data must be "presented in an accurate, clear, complete, and unbiased manner" and be "accurate, reliable, and unbiased." The FS Report does not satisfy these requirements.

First, the information on which EPA bases its conceptual site model is not "accurate, reliable and unbiased." The conceptual site model does not reflect newly developed evidence regarding NECC's drum reconditioning operation and its identification as the likely source of the dioxin and HCX on the Site.

Second, EPA makes a number of inaccurate factual assertions in the FS Report regarding the Source Area Groundwater action area, and makes virtually no mention of the TCRA that Emhart conducted in this action area in 2009 and 2010. Instead, EPA describes a contamination profile in this area based on sampling results from 2000, 2005 and 2008 – before the TCRA was completed.

For example, EPA's description of the Source Area Groundwater action area in the FS Report notes that "[d]uring high-precipitation conditions, groundwater flow is apparently east-southeast and the river recharges the aquifer everywhere except in the immediate vicinity of the small groundwater mound beneath the Brook Village parking lot." FS Report, at 2-8. However,

as a result of observations made during implementation of the TCRA, EPA became aware as early as 2010 that no groundwater mound was located in this area. *See* Loureiro Engineering Associates, Inc., *Addendum No. 1, Completion of Work Report, Time-Critical Removal Action* (Apr. 2010), at A.3-3.

EPA further noted in the FS Report that "[c]ontaminated groundwater discharging to the Woonasquatucket River in the vicinity of the Brook Village parking lot is likely an ongoing source or migration pathway for 2,3,7,8-TCDD from the source area to the Woonasquatucket River." FS Report, at 2-19. EPA wholly fails to acknowledge that even if groundwater was at one time a source or migration pathway for dioxin to the River (which Emhart disputes), the TCRA has since fully remediated this area. *See* LEA, *Addendum No. 1, Completion of Work Report, Time-Critical Removal Action* (Apr. 2010), at A.5-5. Finally, the FS Report observes that "[p]rincipal threat wastes for the CMRP site also include highly-toxic soils on the west side of the Brook Village parking lot and potentially NAPL." FS Report, at 2-21. Again, there is no mention of the fact that these "highly toxic" soils were excavated and removed during implementation of the TCRA. *See* LEA, *Completion of Work Report, Time-Critical Removal Action* (Feb. 2010), at 4-3.

EPA's failure to acknowledge the TCRA in the FS Report clearly biases its evaluation of remedial alternatives for the Source Area Soil action area. For example, if the FS Report took the TCRA into consideration in identifying the required areal extent of cleanup, both the Brook Village parking lots and areas to the west near the bank of the River would be eliminated from consideration, as these areas were addressed by the TCRA. Finally, the FS Report contains no discussion whatsoever of the March 30, 2010 flood event which occurred prior to EPA's release of the Report, and resulted in record high flows (>1750 cubic feet per second ("cfs")). It is

noteworthy, but never mentioned by EPA in the FS Report, that these historically high flows resulted in no damage to the existing soil caps in the Source Area Soil action area. *See* EPA Memorandum Regarding Post-Flood Inspection of April 15, 2010 (Apr. 27, 2010). It must be assumed that disclosure of this finding in the FS Report would have engendered further support for retaining Alternative 2 (Monitor and Maintain Existing Surfaces) as the favored remedy for the Source Area Soil.

Emhart respectfully submits that EPA must update the FS Report to fully address the more recent Site data, and to account for the beneficial effect of the TCRA on the protection of human health and the environment, in its evaluation of remedial alternatives for Source Area Groundwater and Soil.

4. EPA Should Eliminate from the FS Report Reference to the Draft Recommended Interim PRGs, Which Are Inapplicable to the Evaluation of Remedial Alternatives

EPA should remove from the FS Report any analysis concerning the Draft Recommended Interim PRGs for dioxin in soil. The Draft Recommended Interim PRGs have no bearing on the development of Site cleanup goals. They are not ARARs, nor are they TBCs. In fact, EPA's *Public Review Draft of the Draft Recommended Interim Preliminary Remediation Goals for Dioxin in Soil at CERCLA and RCRA Sites* (OSWER 9200-3.56), expressly states that: "the findings and conclusions in this document are for public review and should not be construed to represent any final agency determination or policy" (document footer). Moreover, EPA states that: "[u]ntil these draft recommended interim PRGs are finalized, EPA will continue to use the 1998 recommended interim PRGs (EPA 1998)." *Id.* at pg. 2. Thus, the Draft Recommended Interim PRGs for dioxin in soil are not intended for use until finalized, are inapplicable to any evaluation of remedial alternatives at the Site, and should not be discussed in the FS.

Furthermore, the evaluation in Appendix N of the FS Report, which presents a cursory discussion of the potential effect of a revised PRG for dioxin on the implementability and cost of various remedial alternatives, should be stricken because EPA lacks a basis to delineate or include additional areas within the spatial extent of the cleanup area represented by locations with dioxin TEQ concentrations below the current PRG for dioxin in soil (1 ug/kg).

EPA recognizes the shortcoming of its analysis. It states that:

> [t]he proposed cleanup areas or remedial footprints as conveyed in [Appendix N], are conceptual. More precise cleanup footprints will be developed during the remedial design, and the removal of contaminated media will be confirmed through appropriate sampling and monitoring.

FS Report, at N-3. Presently, EPA is unable to specify the spatial extent of any such additional areas and the concomitant additional soil volumes to be remediated, or the cost implications of remediating any such additional areas under a revised PRG. Consequently, EPA's attempt to assess the costs and feasibility of the various disposal options in the FS Report, and particularly in Appendix N, with reference to hypothetical future cleanup goals is of no utility.

In lieu of speculating about remedial alternatives based on a host of unknown variables, EPA must apply the current dioxin PRG to the known facts of the Site in completing the FS Report.

5. EPA's Analysis of Remedial Alternatives Must Give Proper Weight to Remedies That Reduce Uncertainties in Cost and Implementability

As discussed in Section III.A, above, the Site cleanup goals, to which the remedial alternatives are addressed, must reflect CERCLA §121 standards. However, EPA fails to define the Site cleanup goals coherently and consistently in the FS Report, thus introducing uncertainty concerning both the spatial extent of the cleanup area and the volume of contaminated

environmental media requiring remediation. These flaws, in turn, undercut the validity of EPA's analysis of the cost and feasibility of its favored remedial alternatives.

However, EPA could eliminate the uncertainty engendered in the FS regarding the cost and feasibility of the disposal alternatives, and significantly reduce the volume of contaminated soils and sediment requiring removal, by selecting for the Allendale and Lyman Mill Reach Sediment action area a remedial alternative that incorporates as a primary component the *in-situ* capping of impacted sediment, such as Alternative 8a (*Partial Excavation, Isolation Capping and Disposal and/or Treatment).* The *in situ* remedial alternatives proposed for this action area are protective of human health and the environment, cost-effective, and feasible to implement. In addition, the selection of a remedy of this nature would fulfill the National Remedy Review Board's ("NRRB") recommendations that EPA reconsider the merits of remedial alternatives that include both excavation and capping. *See* U.S. EPA, *National Remedy Review Board Recommendations for the Centredale Manor Restoration Project Site* (Oct. 28, 2010), at 4. The FS Report must be revised to fully and fairly evaluate such alternatives.

Where EPA does calculate and apply a Site-specific cleanup goal to its analysis in the FS Report, with respect to pond sediments and floodplain soils, its calculation of the cleanup goal is fatally flawed. Pond sediments and floodplain soils comprise, by volume, most of the environmental media slated by EPA for remediation. *See* FS Report, Table 3-8. EPA's volume estimates are based on the sediment and floodplain soil cleanup goals identified in Tables 3-3 and 3-4 of the FS Report, respectively. According to these tables, the basis for the 2,3,7,8-TCDD cleanup goals is "upstream background."[6] However, EPA acknowledges that upstream

[6] Emhart does not agree with EPA that "upstream background" is the appropriate cleanup goal for pond sediments and floodplain soils at this Site. Nonetheless, Emhart believes that an accurate and fully informed calculation of

background data for sediments and floodplain soils is uncertain due to the paucity of existing data for these media.

The uncertainty in upstream background concentrations also translates to uncertainty in the removal volume estimates presented in the FS Report for Allendale and Lyman Mill Reach Sediment, Allendale Reach Floodplain Soil, and Lyman Mill Reach Stream Sediment and Floodplain Soil. This occurs because EPA is uncertain regarding how much sediment and soil would need to be removed to meet its putative cleanup goals. The absence of clarity regarding cleanup values, and the concomitant uncertainty as to removal volumes, has significant implications for CDF design and/or off-Site disposal costs.

Furthermore, in suggesting that significant delineation of impacted soil during the remedial design would be required in order to determine removal volumes, EPA recognizes that it does not know the extent of impacts to Site soils, particularly at depth. Therefore, the volume of soil required to be remediated could vary substantially from EPA's volume estimate presented in the FS Report. Consequently, Emhart submits that the soil and sediment removal volumes estimated in the FS Report likely are inaccurate (perhaps grossly so), resulting in an imprecise analysis of the remedial alternatives. This deficiency should be corrected by according proper weight to the *in situ* remedial options, which are both fully protective of human health and the environment and are not directly dependent on the final values determined for upstream background media. The use of an *in situ* remedy, such as Alternative 8 for sediments, would ensure that sediment remediation costs, volumes, and implementability do not vary significantly,

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upstream background levels would yield a higher number than that calculated by EPA, leading to the conclusion that a significantly higher cleanup value is consistent with the NCP.

even if EPA's assumptions regarding upstream background values change subsequently based on additional data that may be acquired in the future.

B. Discussion of EPA-Designated Action Areas

1. Allendale and Lyman Mill Reach Sediment

EPA is considering five alternatives for Allendale and Lyman Mill Reach Sediment:

- no action.
- full excavation with the dams remaining in place (Alternative 7), with disposal either through: placement of excavated material in an "upland" confined disposal facility (CDF) (7a); placement of excavated material in a nearshore CDF (7b); on-Site incineration (7d); or off-Site disposal (7e).
- full excavation with the dams replaced with new weir structures, with disposal through placement of excavated material in a nearshore CDF (Alternative 10b).
- partial excavation and isolation capping alternative with the dams remaining in place (Alternative 8), with disposal either through: placement of excavated material in an "upland" CDF (8a); placement of excavated material in a nearshore CDF (8b); on-Site incineration (8d); or off-Site disposal (8e).
- partial excavation, isolation capping, and on-Site consolidation alternative with the dams replaced with new weir structures (Alterative 11f) (EPA has screened-out the "channel-only" configuration for Alternative 11).

Emhart's recommended approach for Allendale and Lyman Mill Reach Sediment involves the placement of excavated sediments in a nearshore CDF or within isolation caps within the footprints of the ponds. Sediment that is not excavated would be capped *in-situ.* If EPA decides that a nearshore CDF cannot be implemented at the Site, as discussed below, the

Agency must satisfactorily address the many uncertainties inherent in the upland CDF disposal option before it can select a remedial alternative that includes an upland CDF.

a. The Nearshore CDF Disposal Option is Implementable, Protective, and Cost-Effective

In contrast to the upland CDF disposal option that EPA appears to favor, the nearshore CDF disposal option is technically feasible and readily implementable. It also is equally protective of human health and the environment, and is not burdened by the need to acquire multiple properties whose availability is unknown. The estimated remedial costs for excavation with onsite containment in a nearshore CDF are approximately $9 million less than EPA's estimated costs for an upland CDF, the real costs of which still are unknown. Nevertheless, EPA promotes the upland CDF disposal option despite its uncertain implementability and potentially exorbitant costs, in lieu of the exceedingly more implementable and cost-effective nearshore CDF option.

(i) EPA Has Inappropriately Relied on Executive Orders to Eliminate the Nearshore CDF Disposal Options from Consideration

EPA erroneously relies on Executive Order 11988 to effectively eliminate consideration of the nearshore CDF as a viable disposal option. EPA states that since "a portion of the nearshore CDF would require the permanent occupancy and modification of the floodplain," Executive Order 11988 requires a determination "that there was no other practicable alternative before selecting this option as the preferred remedy." *See, e.g.*, FS Report, at 6-17. In fact, the nearshore CDF disposal option would not have any adverse effect on the floodplain; therefore, neither the Executive Order nor EPA policy requires that EPA make the stated determination.

Executive Order 11988 states that "[i]f an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider

alternatives *to avoid adverse effects* and incompatible development in the floodplains." Executive Order 11988, § 2(a)(2) (emphasis added). EPA policy emphasizes "[i]f there is no floodplain/wetlands impact identified, the action may proceed without further consideration of the remaining procedures set forth below." *See* U.S. EPA, *Statement of Procedures on Floodplain Management and Wetlands Protection* (Jan. 5, 1979), at § 6(a)(1).

Hydrodynamic modeling performed by Anchor QEA, LLC ("QEA"), an EPA-approved contractor, has demonstrated that the remedial alternatives that use a nearshore CDF would "result in predicted flood inundation that has no appreciable effect beyond that for existing conditions for the areas adjacent to Allendale and Lyman Mill Ponds, even for 100-year flood events." *See* QEA, *Hydrodynamic Analysis of Remedial Alternatives* (Nov. 16, 2007), at ES-2. Moreover, the results of the hydrodynamic modeling analysis demonstrate that the nearshore CDF alternatives "would have a negligible effect on flood stage height and floodplain inundation during high-flow events (100-year flood) in the region downstream of Manton Dam," and, further, that such alternatives can be engineered to minimize erosion. *See id.* at ES-2 to ES-3. Therefore, fully consistent with the Executive Order and EPA's Statement of Procedures, given that no impact has been identified for the floodplain, the nearshore CDF disposal option should be considered viable.

Moreover, EPA has never interpreted Executive Order 11988 as an absolute prohibition against selecting a remedy in a floodplain. On the contrary, EPA has routinely considered and selected alternatives in a floodplain where circumstances indicate that the remedy is the least damaging and most cost-effective alternative. When such remedies are selected, as stated in Executive Order 11988, efforts must be made to "reduce the risk of flood loss, to minimize the

impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." EO 11988, at § 1.

One recent example of a floodplain remedy selection in Region 1 is the Record of Decision released on September 30, 2010 concerning the Nyanza Chemical Waste Dump Superfund Site (Operable Unit 4, Sudbury River) (Sep. 2010) ("Nyanza Chemical ROD"). In the Nyanza Chemical ROD, EPA fully acknowledges and accounts for Executive Order 11988 in considering various alternatives, yet selects a remedy involving the modification and occupancy of a floodplain. This selection does not result from a determination that all other remedies are prohibitive. Instead, EPA weighs the pros and cons of each possible alternative and concludes that the selected remedy "is the least damaging practicable alternative because this alternative impacts the smallest area among all active alternatives considered, is expected to meet cleanup goals in a short timeframe (approximately 10 years) in the most contaminated part of the river, and presents fewer impediments to successful restoration of the aquatic environment." Nyanza Chemical ROD, at 4. EPA equates "practicable" within the meaning of Executive Order 11988 to cost-effective, stating that the alternatives to the selected remedy "are not cost-effective under the conditions found at this Site, and therefore not practicable." *Id.* at 74.

The consideration of cost-effectiveness was hardly an aberration, as EPA routinely takes cost into account in its analysis of Executive Order 11988 and remedy alternatives. For example, at Pownal Tannery Superfund Site, Region 1 chose to locate a solid waste facility within a 100-year flood plain of the Hoosic River in Vermont. *See* ROD for Pownal Tannery Superfund Site, Pownal, Vermont (Sep. 2002) ("Pownal Tannery ROD"). The Pownal Tannery ROD states that off-Site disposal was investigated during the FS stage, but no solid waste facility was identified that could take the volume of dioxin-contaminated waste that would be generated. EPA further

states that the waste "could be exported to Canada for treatment and disposal, *but for an impracticably high cost.*" Pownal Tannery ROD, Executive Summary, at 2 (emphasis added). "It was determined that the selected remedy of on-Site disposal of the waste in a consolidated landfill located within the higher area of the flood plain (outside of the higher energy flood way) is the most practicable and cost-effective alternative." *Id.* The Pownal Tannery ROD states that because the selected alternative could be designed and implemented to be resistant to flood damage, and would minimize the effects on the existing floodplain, the selected remedy was "the best practicable alternative." *Id.*

Therefore, EPA should not rely on Executive Order 11988 to effectively eliminate the nearshore CDF as a viable disposal alternative. Instead, consistent with the Executive Order, EPA policy, and remedy decisions at other sites in Region 1, EPA should give adequate consideration to the nearshore CDF, which is the most practicable and cost-effective disposal alternative under evaluation.

(ii) Contrary to the NCP, EPA Has Erroneously Screened Out Effective Remedial Alternatives that Include the Nearshore CDF Disposal Option

Contrary to the NCP, EPA "screens out" the "channel-only" configuration for Alternative 11 for the Allendale and Lyman Mill Reach Sediment action area. The NCP allows EPA to remove alternatives from consideration at the screening stage if they are not effective, implementable or cost-effective. *See* 40 C.F.R. § 300.430(e)(7). However, none of these factors justifies "screening-out" the "channel-only" configuration for Alternative 11. Rather, EPA unjustifiably screens out this alternative based on its application of improper criteria and in violation of the NCP, stating that "[l]ocal residents that live along the river *might* express concerns regarding replacing the dams, especially because this would result in a reduction of open water area." FS Report, at 5-30 (emphasis added). Moreover, EPA states in the FS Report

that "[t]he channel-only configuration (Figure 5-22), however, is screened out because *it is expected* that there would be considerable public opposition due to the substantive reduction in the water area." *Id.* (emphasis added).

EPA cannot use the community acceptance criteria as the sole basis to screen out a remedial alternative at the FS stage. As discussed in Section III.A.3. above, in evaluating a remedial alternative, the NCP requires EPA to first consider the threshold criteria and then if these are met to consider the primary balancing criteria in selecting and screening out remedial alternatives for the FS. Applying any other evaluative process contravenes statutory and regulatory requirements and internal EPA guidance. In fact, EPA acknowledges in the FS Report that it may not circumvent the NCP alternatives evaluation process. *See, e.g.,* FS Report, at 6-1 ("The assessment of the modifying criteria is generally not completed until after state and public comments on the Proposed Plan are received"). The NCP specifically states that community acceptance *cannot* be assessed until comments on the proposed plan are received. *See* 40 C.F.R. § 300.430(e)(9)(iii)(I). Further, EPA guidance provides that "information available on the community acceptance criterion may be limited before the public comment period for the Proposed Plan and the RI/FS Report" and EPA "should not speculate on community acceptance of the alternatives." *See A Guide to Preparing Superfund Proposed Plans*, at 3-9 (emphasis added). Notwithstanding the requirements of the NCP and its own guidance, however, EPA screens out the channel-only configuration for Alternative 11 based on sheer conjecture regarding "expected" public opinion. This elimination of the "channel-only" alternative has occurred far in advance of the required public comment period, after which the NCP instructs that EPA shall apply the community acceptance criteria.

Notwithstanding the foregoing, in an about-face, EPA does not apply potential public opposition as a selection criterion to any other alternative, particularly the upland CDF disposal option, to which the Town of Johnston already has expressed opposition. EPA should retain the "channel-only" configuration for Alternative 11 in order that the full range of effective, implementable and cost-effective remedial alternatives will be subject to public comment, as mandated by the NCP.

b. EPA Has Failed to Address Key Uncertainties Concerning the Implementability and Cost Effectiveness of an Upland CDF

Several of the remedial alternatives contemplate disposal of excavated environmental media in one or more upland CDF(s). With respect to this disposal option, EPA states that dewatered, contaminated sediment could be contained in one or more CDF(s) constructed on properties above the 100-year flood elevation that would be acquired and deemed "on-Site" for permitting purposes.

The total volume of Site sediment requiring removal, including the over-dredge allowance, is calculated by EPA to be 155,800 cubic yards ("cy"). If the Allendale and Lyman Mill Floodplain soils are included, an additional 29,700 cy would require removal. The excavated sediment would be dewatered, reducing its estimated volume to 97,900 cy.[7] FS Report, at J-55. If the dewatered sediment and the floodplain soils are included, EPA estimates the volume of material that would be placed in the upland CDF(s) to be 127,600 cy.

As an initial matter, EPA may not consider the selection of this remedial alternative until the administrative record is supplemented to address the following threshold issues: (1) the capacity of the targeted properties to contain the excavated sediment and soil; (2) the availability

[7] EPA assumes a reduction in sediment volume of approximately 37% resulting from the dewatering. There is no support in the administrative record for this assumption, which Emhart believes to be over-stated.

of the targeted properties for purchase at fair market value; (3) the ability to obtain a waiver from the LDR requirements; (4) the qualification of the properties for "on-Site" classification; (5) the suitability of the properties to contain the proposed CDFs; and (6) the implementability of EPA's "excavate and test" approach. Each of these considerations is discussed below.

(i) Properties Targeted By EPA for Placement of Upland CDFs Are of Limited Size

The size of the properties identified by EPA as potential locations at which an upland CDF could be constructed is limited. Thus, the capacity of any upland CDFs to be constructed on these properties also is limited.

EPA has proposed an "excavate and test" iterative approach to sediment and soil removal that is intended to address the potential capacity limitations. *See, e.g.,* FS Report, at 5-18. Under EPA's proposed approach, the total volume of sediment and soil that ultimately would be excavated from the Allendale and Lyman Mill Reach areas would not be known prior to remedy implementation, but provision would be made for the placement of a thin-layer cover over impacted sediments and soils that remain in place due to limits on the capacity of the CDFs:

> Alternative 6 assumes that a thin-layer cover would be placed over residual contamination rather than conducting continuous dredging; the latter would not be practical considering the limited capacity for on-Site disposal and the high cost of off-Site disposal and/or treatment.

Id. at 5-12.

EPA also acknowledges the need to limit excavation in implementing Alternative 7 due to the likely limited capacity of the proposed upland CDF(s):

> This alternative includes a thin-layer cover as a contingency provided confirmation sampling reveals areas of deeper contamination or areas where the residual concentrations are above the cleanup goals. A thin-layer cover would be placed in order to reduce residual contaminant concentrations throughout the ponds to acceptable levels so that the RAOs could be achieved. Cost estimates assume the thin-layer cover will be required.

Id. at 5-18.

In light of the substantial uncertainties regarding EPA's implementation of the "excavate and test" approach, EPA's cost estimates for this range of alternatives must be viewed as highly suspect. *See* Letter from D. Scotti, LEA, to A. Krasko, EPA (May 16, 2008). Accordingly, in order to determine whether an upland CDF may be a viable, cost-effective remedial alternative, EPA first must develop a sound excavation approach that is based on the known areal extent and depth of sediment and soil to be excavated, and which incorporates the application of a thin layer cover as EPA contemplates in the FS Report. For example, Figure 5-6 of the FS Report shows three potential locations at Lyman Mill Reach where a CDF could be constructed above the 100-year flood elevation. Possibly, a CDF could be constructed on the two proposed northern CDF locations, assuming that the existing soil within the footprint of the proposed CDFs was removed down to the ground surface elevation at the downhill dike and was shipped off-Site for disposal at a certified facility. However, EPA has not presented any information regarding the quality of the soil at any of the proposed CDF locations. In the absence of such necessary information, EPA is unable to provide cost estimates for the disposal of any such soil, including the cost of the upland CDF disposal option.

Moreover, the FS Report indicates that, even using EPA's estimated volumes, the combined capacity of the two proposed northern CDF locations would be sufficient only to contain the excavated sediments (after mechanical dewatering), but not the floodplain soils to be excavated from Lyman Mill Reach. *See* FS Report, at 5-13. Thus, in order to realistically implement the upland CDF remedial alternative, construction of a third upland CDF with sufficient capacity for sediment and floodplain soil would be required, further south, near the head of Lyman Mill Pond, and above the 100-year flood elevation. *See* FS Report, Figure 5-6.

(ii) Property for CDFs Has Not Been Purchased and Cost of Purchase is Not Included in EPA's Cost Estimate

The construction of upland CDF(s) at the locations identified on Figure 5-6 of the FS Report is dependent on the ability to acquire and access those properties. These properties must be acquired by purchase or condemnation to effectuate the proposed remedy, and EPA has not demonstrated that their acquisition can readily be achieved.

Recent experience with several current landowners illustrates that acquisition and/or access may not be readily achieved without significant negotiation or legal recourses. For example, Integral Consulting, Inc. ("Integral"), an environmental consulting company, on behalf of Emhart, attempted to obtain access to the properties identified by the Town of Johnston on property Map 35, Lot 8 and Map 36, Lots 187, and 186 for the purpose of collecting soil and sediment samples in the Oxbow Area of the Site. Lots 8 and 187 comprise a significant portion of the central CDF pictured in Figure 5-6 of the FS Report. Although Integral attempted to gain access to these properties, as well as Lots 6, 7, 8, 9, and 18 that border lots 8 and 187 to the west, access was denied by the property owner in a July 28, 2010 letter. EPA subsequently corresponded with this property owner in an August 24, 2010 letter from Anna Krasko attempting to facilitate access to these properties. Despite EPA's written access request, which suggested a "lengthy legal process under Superfund Law" might occur if access were not granted, the property owner denied access.

Similarly, Integral requested access to another parcel, also owned by the Town of Johnston, identified on Map 36, Lot 186, in connection with another planned sampling event in the Oxbow Area. This property also would have to be accessed if sediment were transported directly from Lyman Mill Pond to the southern-most proposed CDF location shown on Figure 5-6 of the FS Report. However, an August 6, 2010 letter from the Town of Johnston's Solicitor to

Integral stated, "the Town of Johnston is not prepared to provide consent for access to its property." This letter also stated that, "[t]he Town administration has repeatedly advised all parties that it is adamant in its opposition to disposal of contaminated sediment within the Town's limits."

Further, the April 8, 2009 notes prepared by EPA technical representatives from a report by its technical consultants, Battelle, regarding a meeting with a representative of Baccala Concrete Corp. state that the current owners of the southern-most CDF location shown on Figure 5-6 of the FS Report met with EPA representatives "to discuss the potential of locating a confined disposal facility (CDF) on the property." The notes are devoid of any comment, positive or otherwise, by the Baccala Concrete representative regarding the company's willingness to allow the EPA to locate a CDF on its property.

The PRPs who may be required by EPA to perform an upland CDF remedy have no independent authority to compel the property owners to sell their land. *See, e.g., United States v. Hardage*, 58 F.3d 569 (10th Cir. 1995). EPA has authority to seek court-ordered access to a property to effectuate a response action only if (1) EPA's right of entry has been obstructed; (2) EPA has a reasonable basis to believe that there may be a release or threat of release of a hazardous substance, pollutant, or contaminant; (3) EPA has sought consent to entry; and (4) the demand for entry is not arbitrary, capricious, an abuse of discretion, or otherwise illegal. *See, e.g., United States v. W.R. Grace & Co.*, 134 F. Supp. 2d 1182, 1185-86 (D. Mont. 2001). While EPA also may obtain property by condemnation under CERCLA Section 104(j) if it is needed to conduct a remedial action, demanding possession of a parcel without adequate justification may be deemed arbitrary and capricious. *See id.* at 1189 ("If...the EPA sought access to an 'innocent' [*i.e.*, uncontaminated] tract of land in order to dump hazardous waste on it, its demand

for entry might be considered arbitrary and capricious. If other alternatives for disposal were plainly superior to the EPA's proposed actions, then its demand for entry might be an abuse of discretion."). Thus, a Rhode Island court may very well reject a demand by EPA for access to the properties upland of the Site based on a finding that the Agency's demand is arbitrary and capricious, and an abuse of EPA's discretion.

Finally, EPA does not factor the cost of acquiring such properties into its cost estimate for the upland CDF disposal option, as required by the NCP and EPA guidance for purposes of conducting the detailed analysis of alternatives. *See* 40 C.F.R. § 300.430(e)(9)(iii)(G); *see also RI/FS Guidelines*, at 6-11. Also, EPA's cost analysis does not consider that if one or more of the properties identified for the upland CDF are not available, the disposal costs would skyrocket.

(iii) Availability of a LDR Treatability Variance is Uncertain

EPA assumes, without substantiation, that it can obtain a LDR treatability variance to place dioxin-contaminated soils and sediments in upland CDFs. *See, e.g.,* FS Report, at 7-6. However, the FS Report does not contain the information required by EPA guidance to document the Agency's intent to comply with the LDRs through a treatability variance. *See* U.S. EPA, *Superfund LDR Guide #6A (2nd Edition), Obtaining a Soil and Debris Treatability Variance for Remedial Actions* (Sep. 1990), at 4. Once again, EPA's failure to follow the applicable procedural requirements for performing the FS has resulted in the Agency's expression of preference for a particular remedial alternative, absent a sufficient basis to properly evaluate its effectiveness, implementability, and cost.

(iv) It is Uncertain Whether the Upland CDFs Would Be "On-Site" as Defined by CERCLA

As discussed, the FS Report identifies three potential locations for the upland CDFs, all situated within the Lyman Mill area: "The northern CDF would be built where the current

ground surface slopes up to the northwest of Lyman Mill Pond. The second CDF could be built south of the abandoned channel where the current ground surface slopes up along the western border of the Oxbow .... The third CDF with sufficient capacity (for sediment and floodplain soil) could be constructed further south, near the head of Lyman Mill Pond and above the 100-year flood elevation." *See* FS Report, at 5-13 and Fig. 5-6. EPA acknowledges that use of these locations may result in some destruction of upland habitat and/or wetlands, and has stated that mitigation for wetland impacts would be required. Also, the proposed locations would require evaluation of their relative ecological functions and values during the remedial design. *See* FS Report, at 5-13.

For an upland CDF to qualify as "on-Site" for purposes of obtaining CERCLA permit waivers, it must be (1) necessary, (2) suitable, and (3) in very close proximity to the contamination area. *See General Electric Co.*, 460 F. Supp. 2d 395, 403 (N.D.N.Y. 2006). The proposed upland CDF locations, perhaps, may qualify as being in "very close proximity" to the Site. They are contiguous with Allendale Pond and Lyman Mill Reach and Pond, all of which comprise EPA-designated action areas requiring clean-up. The *GE* court found that a processing facility to be built within 1.4 miles of the Hudson River Site was in "very close proximity," even though the location itself was not contaminated with hazardous substances. However, given the multitude of remedial options that are under consideration for the Site, if options not requiring disposal in an upland CDF(s) meet the NCP criteria, then the upland CDF may not be "necessary." Moreover, if there are significant issues concerning the impact on the wetlands and/or habitat, or concerning whether the EPA can obtain the land necessary for the upland CDF, the upland CDF may not be "suitable" for purposes of meeting the "on-Site" criteria.

(v) Suitability of the Targeted Properties for Placement of Upland CDFs Has Not Been Determined

Prior to issuing a Proposed Plan, EPA must determine that the properties are suitable for upland CDFs, which would require that soil samples be collected and analyzed for geotechnical and chemical testing. The test results would indicate, for example, whether shallow bedrock is present that would preclude the proper construction of an upland CDF. Such testing also would indicate, for example, whether the soil at the property is contaminated, and the nature and extent of any such contamination.

Without this information, EPA cannot properly estimate the cost of the upland CDF disposal option because the cost to excavate and properly dispose of any contaminated soil that may be present at the property is not known. Moreover, if the soil is contaminated, the question arises as to where the contaminated soil removed to create the CDF would be disposed. It does not appear that EPA has considered, as part of its alternatives analysis, whether the proposed properties may have environmental issues that present significant hazards. Despite EPA's effort to estimate the cost associated with selection of upland CDFs as the preferred disposal option, EPA has failed to conduct any such testing and has not identified the locations of potential disposal facilities that could accommodate any contaminated soil that is found.

(vi) EPA's Confirmation Sampling Approach is Not Implementable

As already discussed, the "excavate and test" iterative approach to sediment removal proposed in the FS Report, *see, e.g.,* FS Report, at 5-36, does not allow for an accurate estimate of the volume of sediment to be excavated. Moreover, this approach, under which sediment samples would be collected following the excavation of impacted sediment, is infeasible to implement due to inherent time constraints in the approach. Assuming that the samples are obtained the day of excavation and are submitted for laboratory analysis that same day, the

earliest that the sample results would be known is approximately three weeks later. The results also would require validation and evaluation, which would take approximately an additional three weeks. It is assumed that, in the interim, other areas of sediment could be excavated. However, there would be limitations on the areas that could be excavated during this minimum six week time period, because the remedy would have to be conducted in an upstream to downstream manner. Thus, it is likely that remediation activities would be delayed due to the timing of receipt of the laboratory analytical results and their validation and/or evaluation.

This approach simply is not practicable or implementable during a construction project involving heavy machinery. Also, during this time, the excavated areas would be subject to impacts from precipitation events and the release of pond water from upstream reservoirs, making it very problematic to manage water within the remediation cells. One potentially implementable method to conduct this excavation remedy would be to forego the unnecessary "excavate and test" iterative approach and, instead, simply place a soil cover over areas excavated to a pre-determined depth, which already is contemplated by EPA. This latter method also would provide the requisite volume certainty in constructing the CDF.

c. Modified Approach to Implementing Upland CDF Alternative

If a favorable resolution of the foregoing issues is obtained, the upland CDF disposal option may be implementable, assuming EPA were to: 1) define the volume of soil and sediment to be placed in an upland CDF of known capacity; and 2) limit excavation to an amount of material equal to or less than the CDF capacity. In this scenario, further testing would be required to adequately determine the reduction in sediment volume that could be expected to occur through dewatering and compaction, and to identify the volume of the sediments that contain the highest concentration of contaminants to be placed in the upland CDF. EPA already contemplates the limitation of this disposal option by virtue of its assumption that a thin-layer

cover would be placed over residual contamination, rather than conducting continuous dredging/excavation, because "the latter would not be practical considering the limited capacity for on-Site disposal and the high cost of off-Site disposal and/or treatment" under Alternatives 6 and 7 (Full Excavation and Disposal and/or Treatment). FS Report, at 5-12. Instead, under a modified approach similar to the nearshore CDF option, the sediments containing the highest concentrations of contaminants could be removed from the ponds and placed in a single upland CDF. A cover could be placed over the residual contamination.

This modified approach, which would eliminate the possibility of a lack of capacity within a CDF, is protective, implementable, and cost-effective.

d. Off-Site Disposal is Not Feasible

Under the off-Site disposal and/or treatment option, excavated soil, sediment, and debris would be shipped off of the Site, and disposed either by containment in a designated facility or by thermal treatment. As provided in the FS Report, the dewatered, dredged material would be analyzed for dioxin and other contaminant concentrations to characterize the materials, and to determine which type of landfill would be required or if the materials need to be treated. Once the appropriate disposal facility were identified, the dewatered material would be loaded onto trucks and taken to a regional rail loading facility for transportation to the designated disposal facility.

Off-Site disposal is not a viable option for several reasons, including EPA's inability at this junction to determine whether there would be any off-Site facilities capable of accepting the excavated material at the time that the remedy is implemented. Facilities that are capable of accepting the requisite waste types today may not have the capacity to accept such waste at the time that the remedy would be implemented. Moreover, facilities that are operating today may not be in operation at the time that the remedy is implemented, or such facilities may not have

the capacity to accept the waste or accept the waste on a schedule that is commensurate with the remediation schedule. The few facilities that may be able to accept the waste may be able to do so only on a schedule that is extended over many years, due to capacity constraints. Lastly, there are few facilities that can accept the waste today, resulting in a less-than competitive market. Thus, the disposal costs that would be incurred are subject to very high prices that are set by these few facilities. In a market that lacks competition, this could result in costs that are not realistically factored into the evaluation presented in the FS Report. Also, there is no known regional rail loading facility for transportation; nor has one been identified in the FS Report. Thus, the costs assumed in the FS Report do not take into account alternative shipping methods.

Even if off-Site disposal were a feasible option, it is one that would run afoul of EPA's extensive efforts to promote green remediation. One of the primary objectives of EPA's *Green Remediation Guidelines* and *Superfund Green Remediation Strategy* (Sep. 2010) is the minimization of air emissions. The transport of large volumes of contaminated soil and sediment would be directly contrary to EPA's directive that "[s]ite management plans should specify procedures for minimizing worker and community exposure to emissions, and for minimizing fuel consumption or otherwise securing alternatives to petroleum-based fuel." *See* U.S. EPA, *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites* (Apr. 2008), at 14. Thus, the off-Site disposal option should be evaluated with appropriate consideration given to EPA's Green Remediation strategy.

e. Emhart's Recommended Approach for the Allendale and Lyman Mill Reach Sediment is Protective, Implementable, and Cost-Effective

To recap, Emhart's recommended approach for the Allendale and Lyman Mill Reach Sediment action areas involves the placement of excavated sediments in a nearshore CDF or within isolation caps within the footprints of the ponds. Sediments that are not excavated would

be capped *in-situ*. As discussed, this approach is described in the FS Report, in general, as Alternatives 10b (Dam Replacement, Excavation, and Disposal in a Nearshore CDF) and 11f (Dam Replacement, Partial Excavation, Isolation Capping and Consolidation). This approach is protective of human health and the environment, and is implementable and cost effective. EPA should revise its analysis of the upland CDF alternative to address the concerns raised above, and give full consideration to the nearshore CDF option.

2. Allendale Reach Floodplain Soil

EPA is considering three alternatives for Allendale Reach Floodplain Soil:

(1) full excavation (Alternative 5), with a nearshore (Alternative 5b) or upland (Alternative 5a) CDF disposal option;

(2) full excavation, and on-Site thermal treatment (Alternative 5d); or

(3) full excavation and off-Site disposal and/or treatment (Alternative 5e).

Although EPA treats Allendale Reach Floodplain Soil as a separate action area, the proposed remedies for this area are subject to the same concerns and limitations as the alternatives proposed for the Allendale and Lyman Mill Reach Sediment, as discussed in Section IV.B.1. above. Thus, Emhart reiterates its objections to EPA's analysis of the remedial alternatives for Allendale Reach Floodplain Soil, and submits that Emhart's preferred alternative, namely placement of excavated sediment in a nearshore CDF or within isolation caps within the pond footprints, is implementable, cost-effective, and protective of human health and the environment, as required by the NCP.

3. Lyman Mill Reach Stream Sediment and Floodplain Soil (Oxbow Area)

EPA is considering two basic alternatives for Lyman Mill Reach Stream Sediment and Floodplain Soil:

(1) targeted excavation and enhanced natural recovery (ENR) (Alternative 3), with containment in either a nearshore (Alternative 3b) or an upland (Alternatives 3a) CDF; on-Site incineration (Alternative 3d); or off-Site disposal (Alternative 3e); or

(2) partial excavation and ENR (Alternative 5), with containment in either a nearshore (Alternative 5b) or an upland (Alternatives 5a) CDF; on-Site incineration (Alternative 5d); or off-Site disposal (Alternative 5e).

a. EPA Should Not Finalize a Remedy for this Action Area Without Considering Data from Emhart's Ongoing Supplemental Investigation

Emhart submits that the FS Report must be revised to take account of new sampling data for this action area collected by Emhart under an agreement with EPA, which indicates that the remedial alternatives presently discussed in the FS Report are overreaching. The paucity of floodplain soil and wetland sediment data for this action area hampered EPA's ability to assess remedial alternatives with any certainty. Recognizing this shortcoming and the need to obtain additional data for this action area, EPA entered into an Administrative Settlement Agreement and Order on Consent with Emhart to conduct a supplement investigation of floodplain soils and wetland sediments in Lyman Mill Pond. (CERCA Docket No. 01-2010-045) ("Order"). Since EPA's issuance of the FS Report, Emhart has completed and submitted to EPA extensive additional sampling and analytical data. Without the results of the work described in the Order, EPA cannot adequately assess the distribution and occurrence of contaminants in this area, accurately quantify the potential human health and ecological health risk, or properly assess whether the remedial alternatives under consideration for the Oxbow Area are appropriate. Consequently, it would be inconsistent with the NCP and premature for EPA to identify a favored a remedy for this action area without first obtaining and analyzing the data necessary to

adequately characterize it. As discussed below, data from Emhart's supplemental investigation suggest that the remedial alternatives under consideration in the FS Report for the Oxbow Area are not appropriate.

b. Overview of Emhart's Ongoing Supplemental Investigation

EPA relied on scant data to identify remedial alternatives for this action area, particularly for the floodplain soils and sediment in the Oxbow Area and the Lyman Mill Reach Floodplain Soil. For example, the Oxbow Area baseline risk assessment, which determines the need for remediation, was conducted based on the results of only seven sediment/floodplain soil samples. *See* Battelle, *Addendum to the BHHRA and BERA* (Aug. 2006). Additionally, remediation alternatives for floodplain soil located at the confluence of Assapumpsett Brook and the River and in the southeastern portion of Lyman Mill Pond were evaluated without any analytical data from those areas. Thus, EPA's determination of appropriate remedies for these areas, if any, could not be made with confidence based on the data available to EPA when it prepared the FS Report.

To address this paucity of data, Emhart, subsequent to issuance of the draft FS Report, agreed with EPA to collect soil and sediment samples in the area of the Oxbow and the other emergent wetland/floodplain soils within the remediation footprint as defined in the FS Report. *See* Order; *see also* Integral Consulting, Inc. *Sampling and Analysis Plan for the Supplemental Investigation of the Lyman Mill Reach Sediment and Flood Plain Soils* (Jun. 21, 2010). The Statement of Purpose in the Order provides that,

> the data collected, in the performance of the aforementioned investigation shall be considered by EPA, if available, as a factor in the 1) evaluation of the remedial alternatives set forth in the Feasibility Study; 2) analysis of potential risks to human health or the environment; and 3) selection of the proposed remedy.

See Order, at 4.

Emhart has fulfilled the requirements of the Order in good faith, performing two field events to obtain sampling data for both flood plain soils and wetland sediment. Floodplain soils were sampled in September and November 2010, and sediment samples were collected in November 2010. Additionally, in accordance with Section IX of the Order, Emhart has provided to EPA validated analytical data from all field sampling activities, as well as field notes, soil boring logs, and sampling location photographs. This data must be incorporated by EPA into the remedy selection process.

c. Summary of Preliminary Data and Implications for Remedy Selection

Emhart has evaluated the data in light of the foregoing-stated purposes for its collection. Some of the initial findings regarding that assessment were transmitted to EPA in a November 10, 2010 letter from Patrick Gwinn of Integral Consulting, Inc. to Anna Krasko of EPA.

A review of the sampling data indicates that concentrations of dioxins are most elevated in the northeastern-most portion of the Oxbow Area (in the immediate vicinity of SS_G-01 and LPX-SD-4405), while levels of dioxins detected in samples collected throughout the remainder of the upland and forested wetland portions of the Oxbow area are much lower. As discussed in Mr. Gwinn's November 10, 2010 letter, the supplemental soil data collected in 2010 have significantly altered the human health and ecological risk computed for the forested wetland portion of the Oxbow area. Given the difficulty of accessing much of the forested wetland portions of the Oxbow area, receptor exposures are very limited. Thus, this area does not pose an unacceptable risk to human health under current and foreseeable future uses. Moreover, the computed risks to terrestrial ecological receptors are essentially equivalent to the risks computed for terrestrial receptors in upstream environs at Greystone Mill. Consequently, excavation and/or

thin layer capping in upland and forested wetland portions of the Oxbow area is unwarranted, and a "no action" alternative instead must be considered, consistent with the NCP.

Surface soil sampling data from the forested and emergent wetlands located at the confluence of Assapumpsett Brook and the River, and in the southeastern portion of Lyman Mill Pond (SS_G-31 and SS_G-32), also suggest that these areas require no remediation. The sample collected from the forested wetland (SS_G-31) contained 48.7 pg/g dioxin TEQ. The emergent wetland sample (SS_G-32) contained 140 pg/g dioxin TEQ. The average TEQ concentration for these samples is 94.35 pg/g, which, if applied to the risk assessment paradigm used by EPA's contractor Battelle in the Oxbow Area BERA, would result in risk to terrestrial ecological receptors that is lower than that posed upstream at Greystone Mill to the same receptors. Furthermore, these reported dioxin TEQ concentrations would not pose a significant human health risk to potential receptors accessing this land. Based on this information, EPA must reconsider the need for excavation and/or thin layer capping remedial alternatives for this area, and, instead, consider a "no action" alternative.

Surface soil samples collected from floodplain soils located in the southeastern portion of Lyman Mill pond adjacent to Earl and Jefferson Streets (SS_G-30 and SS_G-33) had dioxin TEQ concentrations of 14.7 and 0.864 pg/g, respectively. Based on these data, it appears that this area is not being impacted by upstream contamination. Nonetheless, in the FS Report, EPA is considering excavation and/or thin layer capping of these flood plain soils. FS Report, at 5-42 to 5-45. However, the September 2010 sampling data suggest that remediation is unnecessary in this area. Therefore, EPA should reconsider a "no action" alternative for this area.

The 2010 sampling effort also included the collection of analytical and physical parameter data, such as sediment grain size distribution and total organic carbon, from the

scrub/shrub and emergent wetlands at the northern and northeastern extents of Lyman Mill Pond (i.e., south and east of the Oxbow area). Previously, no samples had been collected from this area. Thus, any remedial considerations in the FS Report for this area would have been made by extrapolation of the conditions in other areas. Now, EPA must assess the sampling data for the scrub/shrub and emergent wetlands in considering remedial alternatives for this area.

The supplemental dioxin sampling data raises questions regarding the prior risk assessment results and the remedy selection process for the Oxbow Area forested wetland and other Lyman Mill flood plain soils currently targeted by EPA for remediation. EPA agreed in the Order to conduct additional risk assessments and reassess remedial considerations when the final validated floodplain soil and wetland sediment data become available. *See* Order, at 4. The foregoing discussion illustrates the potentially significant impact of these new data on the reassessment of any remedial alternatives for these areas. In short, the analytical data upon which EPA has relied in the FS Report are inadequate to accurately assess the need for, nature, or scope of a remedy for the sediments and floodplain soils in the Oxbow area.

In accordance with the NCP, EPA must fully incorporate the supplemental sampling data into the risk assessment and remedy selection process prior to the issuance of a proposed remedial action plan. This approach also is consistent with the stated purpose of the Order, and the iterative approach to risk assessment as presented in the Principles for Managing Contaminated Sediment Risks. Moreover, it comports with comments made to the EPA by U.S. Fish and Wildlife. *See* Letter from T. Chapman, Fish & Wildlife Service, to A. Krasko, EPA (Jul. 26, 2010).

4. <u>Source Area Soil</u>

EPA is considering three alternatives for Source Area Soil:

(1) no action (Alternative 1);

(2) targeted excavation, upgrade and maintain existing surfaces, with off-Site disposal (Alternative 3); or

(3) targeted excavation, convert to RCRA caps and maintain, with off-Site disposal (Alternative 4).

Alternative 2, long-term monitoring ands maintenance of existing surfaces, including existing caps, parking lots, paved surfaces, rip rap and landscaped areas, was improperly "screened out" by EPA in the FS Report. For the reasons set forth more fully below, EPA's elimination of Alternative 2 was arbitrary and capricious, and merits reconsideration. Several removal actions already have been undertaken to remediate source area soil at the Site. In 2000, Emhart and others installed a soil cap (Cap No. 2), and flood control berm along the western extent of the Site. Moreover, in 2003, Emhart and others installed a cap (Cap No. 3) over contaminated soils and sediments within the former tailrace. Finally, during 2009 and 2010, Emhart performed the TCRA, described in Section IV.B.5.b., which involved the excavation and off-Site disposal of source area soils and sediments from both the Source Area Soil and Source Area Groundwater action areas, and the installation of an impermeable cap. All of these TCRA activities performed by Emhart were overseen by EPA, and determined by the Agency to be protective of human health and the environment.

In light of the foregoing, Emhart's recommended approach for Source Area Soil to ensure the long-term protection of human health and the environment is to monitor and maintain the existing surfaces; extend the cap areas, as discussed herein, to address certain soils not currently capped; and, as necessary, conduct limited excavation of soils in areas exceeding TSCA requirements for PCBs. The soils requiring excavation could be consolidated and covered with a RCRA/TSCA compliant cap.

a. EPA Has Improperly Applied RCRA Closure Requirements

(i) In-Place Environmental Media Are Not Waste Subject to RCRA Closure Requirements

As discussed in Section IV.A.2., EPA has concluded incorrectly that all contaminated media at the Site contain a RCRA F-listed waste. EPA not only makes an unsupportable assumption that the source area soils are a hazardous waste, it also incorrectly concludes that the RCRA cap remedial alternative for application in the Source Area Soil action area is the only alternative that would comply with all ARARs.

In fact, RCRA requirements only apply if the response activity "constitutes treatment, storage, or disposal" of a hazardous waste. *See* U.S. EPA, *CERCLA Compliance with Other Laws Manual, RCRA ARARs: Focus on Closure Requirements* (Oct. 1989), at 3. Even assuming, *arguendo*, that the contaminated media at the Site contain a hazardous waste, which Emhart disputes, disposal does not occur when wastes are consolidated within the same area of contamination or unit, treated *in situ*, or capped or left in place. *See id.* At the Site, the source area soils have been capped in place. Therefore, RCRA closure requirements are not applicable.

Because, as discussed in Sections III.C.1.a. and d., environmental media are not waste, RCRA does not apply to the Site environmental media unless and until they are removed from the land or the area of contamination. EPA has implicitly conceded this point; most notably, it recently has concluded that the source area soil is not a waste by allowing Centredale Manor Limited Partnership LLC to manage soil excavated during a recent waterline replacement project as environmental media. EPA has allowed the placement of these soils -- soils within the same source area and with the same contaminant concentrations -- to be excavated and used as backfill within the areas of excavation. By this action, EPA has acknowledged that the source area soils

are environmental media and are not subject to RCRA closure requirements. This interpretation by EPA, alone, would allow the source area soil to remain in place.

(ii) Insufficient Basis to Conclude that Principal Threat Waste is Present at the Site and Thus that RCRA Closure is Required

EPA has identified a limited area within the Source Area Soil action area under and south of the southern-most parking lot for the Centredale Manor Apartments as an area containing magnetic anomalies. *See* FS Report, at 2-2 to 2-3 and Figure 2-1. While EPA defines this area in the RI Report simply as one within which soils contain magnetic anomalies, in the FS Report EPA classifies the soils in this area as constituting principal threat waste ("PTW") under the NCP. *See* RI Report, at 1-5; FS Report, at 2-21. This classification is significant because it leads EPA to further conclude – erroneously – that RCRA closure requirements apply.

The NCP provides that EPA is expected to employ treatment technologies to address the principal threats at a site, when practicable, and engineering controls to address waste that poses a relatively low long-term threat or if treatment is impracticable. *See* 40 C.F.R. § 300.430(a)(iii)(A)-(B). These expectations reflect the fact that source materials can be safely contained and that treatment for all waste will not be appropriate or necessary to ensure protection of human health and the environment.

In general, PTW are those source materials considered to be highly toxic or highly mobile, which generally cannot be contained in a reliable manner and/or would present a significant risk to human health or the environment should exposure occur. "Principal threats" include "liquids, soils and sediments contaminated with high concentrations of toxic compounds, and highly mobile materials." *Id.* § 300.430(a)(iii)(A). Low-level threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of a release. *See* U.S. EPA, *A Guide to Principal Threat and Low-Level Threat Wastes*,

OSWER Superfund Publication: 9380.3-06FS (Nov. 1991), at 2. Low-level threats include source materials that exhibit low toxicity, low mobility in the environment, or are near health-based levels. *See id.* Wastes generally considered to be low-level threat wastes include non-mobile contaminated source material of low to moderate toxicity, surface soil containing contaminants that are relatively immobile in air or groundwater, low leachability contaminants such as low molecular weight compounds, or low toxicity source material. *See id.*

According to EPA, PTW at the Site includes: (i) buried waste material in the Source Area Soil action area that contains magnetic anomalies; and (ii) highly-toxic soils, and, potentially NAPL, in the Source Area Groundwater action area. *See* FS Report, at 2-21.[8] As demonstrated below, EPA lacks a sufficient basis to conclude that PTW is present at the Site. Thus, there is no basis for EPA's assertion that RCRA closure requirements apply.

The source area soils reported to contain magnetic anomalies do not meet the definition of PTW. Geophysical surveys performed at the Site that resulted in the identification of these anomalies are simply a preliminary investigation tool to locate possible below ground surface anomalies, including buried drums. However, they do not provide the basis or support for EPA's assertion that PTW is present in the source area soil, absent follow-up investigation that leads to the identification of drum-related hazardous substances that qualify as PTW.

In fact, more often than not, magnetic anomalies are not buried, intact drums containing hazardous material; rather, they are other relatively benign metallic debris. Thus, one would not expect to find drum-related hazardous substances in soils, including in the Source Area Soil action area under and south of the southern-most Centredale Manor Apartments' parking lot,

[8] While EPA suggests that dioxin-contaminated soils and sediments in other areas of the Site are highly toxic materials that potentially could meet the definition of PTW, the Agency further explains that Site-specific factors, nonetheless, indicate that it may be appropriate to address these materials as low-level threat waste. *See* FS Report, at 2-21.

which the FS Report states, without support, may contain buried bulk metallic materials, absent additional evidence. Accordingly, EPA has failed to provide any justification for defining soils with magnetic anomalies as PTW, and there is no evidence in the administrative record supporting EPA's conclusion that soils defined by the boundaries shown in Figures 2-1, 5-28, and 5-29 of the FS Report are PTW.

Similarly, although a few crushed drum lids were found during the TCRA in the soils within the Source Area Groundwater action area, there were no findings indicating the presence of buried, intact drums of toxic material that might constitute PTW. Performed in 2009 and 2010, the TCRA required the excavation and disposal off-Site of allegedly highly toxic soils in this area. However, as further described below in Section IV.B.4. and 5., EPA has failed to acknowledge the performance or describe the positive impact of the TCRA on current conditions in the Source Area Groundwater and Soil action areas of the Site, including the absence of PTW.

In light of the foregoing, EPA has not established that PTW is present at the Site. Rather, EPA's stated preference for remedial alternatives requiring RCRA closure is based on unsubstantiated conclusions regarding the presence of PTW. Thus, EPA's selection of a remedy requiring RCRA closure would be arbitrary and capricious and contravene the NCP. Accordingly, EPA should not select an excavation remedial alternative for the Source Area Soil action area. Instead, Emhart submits that EPA must reconsider its refusal to include Alternative 2 in the array of remedial alternatives for Source Area Soil and should select that option which entails long-term monitoring and maintenance of the existing caps and paved surfaces. The application of Remedial Alternative 2 in the Source Area Soil action area would ensure that the surfaces remain intact, thereby preventing direct contact with the underlying contaminated soils.

b. EPA Has Erred in Screening Out Remedial Alternative 2

Under Alternative 2, long-term monitoring and maintenance of the existing surfaces, including the existing caps, parking lots, paved surfaces, rip rap and landscaped areas, would be performed to prevent erosion and potential exposure of contaminated source area soil. Application of this alternative also would ensure that the surfaces remain intact, thereby preventing direct contact with the underlying contaminated soils.

The existing caps are protective of human health and the environment, and RCRA caps would be no more protective than the existing caps. *See* Letter from J. Loureiro, LEA, and J. Muys, Sullivan & Worcester, to A. Krasko, EPA (Jun. 8, 2007). The long-term protectiveness of the caps was demonstrated, although not mentioned in Section 2.3.5 of the FS Report, following the highest recorded flood event on the River, which occurred on March 30, 2010 and resulted in record high flows (>1750 cfs). Even with these historically high flows, no damage resulted to the present soil caps. *See* Letter from EPA Re: Interim Final Feasibility Study (May 7, 2010), at 2 ("The flooding caused no significant structural damage to the caps or armoring.").

According to EPA, Alternative 2 would not comply with the ARARs for GB leachability, RCRA or TSCA closure, residential direct exposure, or EPA's recommended residential level for dioxin in soil (EPA, 1998). *See* FS Report, at 5-54. EPA concludes that these requirements must be met or waived in order for Alternative 2 to meet CERCLA requirements. *See id.* However, as discussed above, RCRA closure requirements do not apply. As for residential direct exposure to contaminated soils, with just a modest extension of the protective surfaces already in place, this concern could be fully addressed. (In contrast, as discussed in Section IV.B.4. below, the relocation of residents to avoid direct exposure to contaminated soils and sediments if Alternatives 3 or 4 are chosen is highly problematic.) As set forth in Section IV.B.4.b.(i) below,

EPA has incorrectly applied the GB leachability criteria. And, TSCA is not a bar to leaving impacted media in place, as discussed below in Section IV.B.4.b.(ii).

EPA's failure to acknowledge that the existing surfaces satisfy performance standards and its misapplication of the Site ARARs has resulted in EPA screening out the most practicable alternative for the Source Area Soil action area. *See* FS Report, at 5-54 to 5-55.

(i) EPA Incorrectly Asserts that PCBs Are Present In Soil at Concentrations Above the GB Leachability Criteria

EPA asserts in the FS Report that Alternative 2 was screened-out because the existing caps would not reduce precipitation infiltration into the groundwater, nor would this alternative actively remediate the area where contaminants in the groundwater are above the Rhode Island GB groundwater criteria and where contaminants in the soil are above the GB leachability criteria. FS Report, at 5-54.

In evaluating soil data, EPA compares contaminant concentrations to the Method 1 Soil Objectives specified in Table 2 of the Rhode Island Remediation Regulations. From its evaluation, EPA concludes that the concentration of PCBs in source area soil (mass) exceeds the GB leachability criterion of 10 milligrams per kilogram (mg/kg). However, this conclusion is premature; the Remediation Regulations allow for a comparison of the soil data to an alternative criterion for PCBs, not only to the Soil Objectives specified in Table 2. The Remediation Regulations provide that:

> [w]ith respect to any hazardous substance in soil, the Director may approve a leachability criterion provided it is demonstrated to the satisfaction of the Director that the application of such leachability criterion at the contaminated-site is protective of the following:
>
> a. The actual and potential uses of the groundwater at the contaminated-site by ensuring that, at a minimum, the leachability criterion will not contribute to an exceedance of the applicable groundwater objective for the hazardous substance; and

b. Surface water at or in the vicinity of the contaminated-site from potential migration of groundwater.

Remediation Regulations, § 8.02(A)(ii)(1).

When describing Alternative 3 (Targeted Excavation, Upgrade and Maintain Existing Surfaces and Disposal and/or Treatment), EPA contemplates that if there is no potential to leach, then the soils containing PCBs that apparently exceed the GB leachability criterion can remain; thus, it is necessary to obtain an accurate assessment of whether migration of the PCBs is likely. *See* FS Report, at 5-55 n.50. EPA has not completed the evaluation of whether or not PCBs have the potential to leach from the soil. While EPA performed a Method 1 analysis in accordance with the RIDEM regulations by comparing mass results to the tabulate criteria, this is only the beginning of the necessary evaluation. *See* Remediation Regulations, § 8.02. As noted in these regulations, as quoted above, this evaluation does not end with the Method 1 analysis. EPA fails to take this into consideration in performing its evaluation; therefore, it prematurely concludes that concentrations of PCBs in soil exceed the GB leachability criterion.

Rather, the soil should have been sampled and subjected to a leachability test, such as the Synthetic Precipitation Leaching Procedure ("SPLP"), in order to complete the evaluation of whether the PCBs have the potential to leach from the soil. The SPLP test was devised to provide a realistic evaluation of leaching potential; thus, it serves as an appropriate test upon which to determine the leachability criterion as identified in the RIDEM regulations discussed above. Nonetheless, EPA did not subject soils sampled in the source area to the SPLP test, thus failing to complete the necessary leachability evaluation. Therefore, EPA's conclusion regarding the potential leachability of PCBs from soil is based on an incomplete analysis and, accordingly, is arbitrary and capricious. In fact, based on the Site groundwater data, it is likely that SPLP

testing of source area soil would demonstrate that PCBs do not have the potential to leach into groundwater.

Further support for the conclusion that surface water is not contributing to leaching of PCBs in soil to groundwater is found in EPA's statement that: "the existing interim caps and parking lots in the source area currently appear to be effective in limiting the leaching of contaminants into groundwater, except in the vicinity of Well MW-05S in the Brook Village parking lot where discharge of contaminated groundwater to the Woonasquatucket River occurs." FS Report, at 5-54. Moreover, as discussed in Section IV.B.5.b. below, the TCRA completed in the Source Area Groundwater action area successfully addresses any potential impacts from the vicinity of the Brook Village parking lot, which EPA fails to take into consideration. Therefore, EPA's conclusion that concentrations of PCBs in soil exceed the GB leachability criterion is inconsistent with current data, which do not indicate that leaching is occurring. In light of the foregoing, it is imperative that EPA conduct the requested leachability testing under the Rhode Island Remediation Regulations prior to selecting the preferred alternative for the Source Area Soil action area.

(ii) EPA Improperly Asserts that Alternative 2 Does Not Satisfy TSCA Closure Requirements

In the FS Report, EPA fails to consider that the EPA Region I PCB Coordinator has the discretionary authority, based upon a risk-based analysis, to allow source area soil impacted with PCBs to remain in-place under TSCA. EPA has failed to perform such an analysis; therefore, it is unknown whether, under TSCA, PCB-impacted soils will require removal. Thus, Alternative 2, which would allow the impacted soils to remain in place, should be carried through a detailed evaluation. Alternative 3 includes targeted excavation to remove alleged PTW and contaminated soil that exceeds the TSCA and GB leachability criteria, as well as

upgrading and maintaining the existing surfaces to prevent exposure to or migration of contaminated soil in the Source Area Soil action area. Excavated material would be shipped off-Site for disposal and/or treatment. However, as previously discussed, little or no data exist to support the assumptions regarding PTW and contaminated soil that underlie EPA's favored remedies for source area soils at the Site. For instance, just west of the Centredale Manor apartment building, the proposed excavation and soil removal remedy is not consistent with the data: there are no data that warrant the removal of soil from this area or the capping of the parking lot area. Further, EPA has failed to justify why source area soils that have not been addressed yet need to be covered with an additional 12 inches of clean soil.

Undoubtedly, such action would be unnecessary because the TSCA requirements would be satisfied if the modified Alternative 2 approach suggested by Emhart is implemented: the consolidation of the soil that would be excavated under Alternative 3 (TSCA "hot spots") into a single RCRA/TSCA cap/cell placed over the area defined by EPA as containing PTW.

With some simple modifications to address potential exposure to contaminated source area soils at several small landscaped areas, Alternative 2 would be equally protective of human health and the environment as Alternative 3 and Alternative 4 (Targeted Excavation, Convert to RCRA Caps and Maintain, and Disposal and/or Treatment). Thus, EPA's conduct would be arbitrary and capricious were it to select a remedy costing nearly $20 million (Alternatives 3 or 4), when the same outcome could be achieved for approximately $5 million (Alternative 2).

c. EPA Retains Infeasible Alternatives While Improperly Screening Out Viable Ones

Infeasible alternatives retained by EPA include Alternative 3 and 4, which involve extensive excavation of soils. EPA does not consider the short-term negative impacts that would result from the implementation of Alternatives 3 and 4, and which would not result if Alternative

2 were to be implemented. Alternatives 3 and 4 would result in unnecessary and unacceptable risks to the resident population of the Brook Village and Centredale Manor apartments from the potential exposure to fugitive, airborne contaminants generated during the extensive excavation of soils.

In evaluating these alternatives, EPA fails to address the problems inherent in relocating the residents of the Brook Village and Centredale Manor apartments, which would be necessary to implement Alternatives 3 and 4. Nor does the evaluation of Alternatives 3 and 4 consider the costs resulting from the relocation of the residents. This task would be formidable, if not impossible, given the demographics of the population residing at the Site. Under both Alternative 3 and Alternative 4, the existing surfaces (parking lot paving) would be removed up to the apartment buildings, exposing the impacted soils and sediments. Due to the risk to human health that would occur, access to the buildings over the exposed soils and sediments would be prohibited.

The human health risks associated with the short-term effectiveness of Alternatives 3 and 4 would make the implementability of either of these remedial alternatives highly questionable. In fact, the short-term risks to human health posed by implementation of Alternatives 3 and 4 would justify a waiver of applicable ARARs, if there were any, since "compliance with such requirement at the facility will result in greater risk to human health and the environment than alternative options." *See* 42 U.S.C. § 9621(d)(4)(B); *see also CERCLA Compliance With Other Laws Manual*, at 1-72 ("Meeting an ARAR could also pose greater risks to workers or residents.... If protective measures were not practicable, then use of this waiver might be appropriate.").

Furthermore, unlike Alternative 2, Alternatives 3 and 4 are at odds with EPA's green remediation guidance, insofar as it requires transportation by truck of large volumes of waste material. *See* EPA's *Green Remediation Guidelines and Superfund Green Remediation Strategy* (Sep. 2010); U.S. EPA, *Green Remediation Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites* (Apr. 2008).

As recommended by Emhart, Alternative 2 should be fully evaluated with the suggested modifications. As modified, the entire cost of implementing Alternative 2 would be approximately $5 million dollars, thus eliminating the additional estimated $15 million cost of shipping and disposing of impacted soils off-Site under Alternatives 3 or 4.

5. Source Area Groundwater

EPA is considering three alternatives for the Source Area Groundwater action area:

- excavation and dewatering (Alternative 2);
- *in-situ* treatment using chemical oxidation (Alternative 5); or
- no action (Alternative 1).

EPA's evaluation of the remedial alternatives for this area is flawed insofar as it fails completely to address the results of the TCRA. Under EPA's direction, a fully protective remedy already has been implemented in the Source Area Groundwater action area by agreement between EPA and Emhart. Thus, EPA should have fully developed the "no-action" alternative in the FS Report, rather than considering other alternatives.

a. EPA Has Improperly Concluded that the No-Action Alternative is Not Protective

The NCP specifically provides that EPA develop a range of remedial alternatives for a site or portions thereof, "which may be no further action if some removal or remedial action has already occurred at the site." 40 C.F.R. § 300.430(e)(6). Here, in contravention of the NCP,

EPA ignores the TCRA that Emhart conducted in the Source Area Groundwater action area in 2009 and 2010, instead proposing a similar excavation and dewatering remedy (Alternative 2).

EPA provides no explanation for this failure. Post-TCRA sampling data confirm that the TCRA meets the performance standards set by EPA in the Work Plan – *i.e.*, by EPA's own criteria, the TCRA has produced results that are fully protective of human health and the environment. *See* LEA, *Addendum No. 1, Completion of Work Report, Time-Critical Removal Action* (Apr. 2010). If EPA had taken the TCRA remediation and the post-TCRA sampling results into account, it would necessarily have concluded that no further action is necessary in this area, consistent with the NCP.

b. Description of Time Critical Removal Action ("TCRA")

In August 2009, Emhart voluntarily entered into an Administrative Settlement Agreement and Order on Consent ("AOC") with EPA (CERCLA Docket No. 01-2009-0086) to perform the TCRA, wherein Emhart agreed to excavate and dispose off-Site delineated dioxin-contaminated soils within the Source Area Groundwater and Source Area Soil action areas, and to install an impermeable cap, at a cost of approximately $3 million. EPA issued a Notice of Completion for the TCRA work on July 27, 2010.

The TCRA was approved by EPA in an Action Memorandum dated July 16, 2009, which described the remedial nature of the TCRA as follows:

> Impacts to the Woonasquatucket River and groundwater can be effectively reduced by excavation and disposal of contaminated soils in the area near the eastern bank of the river at the southern end of the Brook Village parking lot. The subsequent installation of an impermeable cap will prevent percolation of precipitation through underlying soils and further mitigate the migration of any residual contamination. The cap also provides a physical barrier that minimizes the possibility of direct exposure to residual levels of dioxin in soils.

Further description of the purpose of the TCRA is reflected in the May 8, 2009 correspondence from Emhart's contractor, LEA, to Ted Bazenas, EPA's On-Site Coordinator for the Site, which

stated that "[t]he proposed limited excavation and capping remedy would provide overall, long-term protection of human health and the environment," consistent with remedial goals. *Id.* "The excavation component of the remedy, which USEPA is requiring, and the capping component of the remedy would effectively mitigate the potential transport mechanisms identified in USEPA's conceptual site model in shallow groundwater in this area of the Site." *Id.*

The language of the AOC reflected EPA's expectation that no further action would be necessary in this area following completion of the TCRA: "EPA believes that, subject to post-implementation monitoring, the removal action will mitigate a potential risk to public health, welfare or the environment posed by this area of the Site." *See* AOC, at 9. *See also* EPA's September 7, 2010 Press Release entitled "Short-Term Clean-up Completed at Centredale Manor Restoration Project in N. Providence."

c. Dioxin Was Not Migrating in Groundwater

Notwithstanding the foregoing, the FS Report appears to reflect a wholly unsubstantiated assumption by EPA that dioxin transport via groundwater to the River has served as a contaminant through both pre- and post-TCRA. For example, this flawed assumption, sometimes referred to by EPA as "facilitated transport," pervasively undermines EPA's analysis of the remedial alternatives for the Source Area Groundwater action area.

Even prior to completion of the TCRA, the data simply did not confirm the occurrence of facilitated transport of dioxin. As explained in submissions dated June 8, August 15, and October 15, 2007, and incorporated in the administrative record, Emhart has shown that sampling results from the area surrounding the former HCP building do not support the assumption of facilitated transport of dioxin in groundwater. *See also* LEA, *Shallow Groundwater Data Report* (Sep. 12, 2008), at 8-1 to 8-3. EPA nonetheless asserts in the FS Report that "[t]he elevated concentrations of 2,3,7,8-TCDD in adjacent river sediment may

reflect legacy contamination from historic site activities, *continuing contributions from contaminated groundwater*, or a combination of the two." FS Report, at 2-19 (emphasis added). This is sharply at odds with post-TCRA groundwater monitoring. *See* LEA, *Addendum No. 1-Completion of Work Report, Time Critical Removal Action* (Apr. 2010), at A.5-5.

d. Even If Dioxin Previously Were Migrating in Groundwater, the TCRA is Fully Protective

Assuming, *arguendo*, that dioxin previously was migrating in source area groundwater, the TCRA more than adequately mitigated the risks associated with this potential migration pathway such that further action is unnecessary. This is confirmed by the results of groundwater samples collected on February 2, 2009, from the two monitoring wells installed as part of the TCRA to verify the efficacy of the TCRA. *See id.* Groundwater sampling results for 2,3,7,8-TCDD from these two monitoring wells were 1.7 pg/L and 6.7 pg/L; both of which are significantly lower than EPA's proposed groundwater cleanup goal of 1,768 pg/L developed in the FS Report. *See* FS Report, Appendix F.

The TCRA resulted in groundwater concentrations of dioxin up to three orders of magnitude lower than EPA's groundwater cleanup goal identified in the FS, thus demonstrating that the TCRA effectively mitigated any risk that may have been posed by groundwater transport of dioxin to surface water, if it had been occurring. Accordingly, no further action is warranted in the Source Area Groundwater action area.

V. Conclusion

In summary, during the FS process EPA has circumvented key legal requirements in CERCLA, and has ignored crucial technical facts and evaluation processes contrary to the NCP. These actions have rendered the resulting alternatives analysis and EPA's favored remedial

alternatives unreliable and, consequently, unsupportable under the standard of review in CERCLA Section 113 for numerous reasons, including the following:

- EPA arbitrarily and contrary to its own regulations, rules, and guidance documents concludes that all impacted environmental media at the Site contain a RCRA F-listed waste, and that certain soils contain PTW;
- EPA fails to acknowledge the TCRA, and its mitigation of the need for further remediation of the Source Area Groundwater;
- EPA makes improper assumptions regarding community opposition to the most cost-effective remedial alternatives for the Ponds and the River sediment (while ignoring the high probability of community opposition to the alternative that EPA champions);
- EPA misconstrues RCRA and TSCA and misapplies the ARARs, leading to improper and unsupported conclusions regarding the scope of necessary excavation and capping;
- EPA improperly applies EO 11988 when evaluating the implementability of the nearshore CDF, and ignores the hydrodynamic modeling demonstrating that the nearshore CDF would result in no appreciable flood inundation effects on the system; and
- EPA fails to adequately assess the cost and timeliness with which an upland CDF could be sited.

Based on the foregoing listed failures of EPA to comply with the requirements of CERCLA and its implementing regulations and guidance documents, EPA is poised to select remedial alternatives for the designated action areas at the Site that are infeasible to implement,

unnecessary, and unreasonably costly, including remedies that would require excavation and off-Site disposal of large quantities of soil and sediment, and the installation of RCRA-compliant caps. Emhart's comments on the FS Report demonstrate that far more cost-effective, equally protective, and readily achievable remedial alternatives (including the "no-action" alternative for Source Area Groundwater) are available that would fulfill the mandates of CERCLA Section 121 and the NCP. By ignoring important evidence, and maintaining its sorely out-of-date conceptual site model, EPA has premised its evaluation of remedial alternatives in the FS Report on faulty and erroneous assumptions about the sources, types, and attributes of Site contaminants. Moreover, in failing to consider important facts and scientific data placed in the administrative record since the RI was conducted, EPA has failed to give the requisite consideration to effective, implementable, cost-effective and equally protective alternatives that are available.

All of the foregoing-described conduct engaged in by EPA is arbitrary and capricious, and contrary to CERCLA, the NCP, and EPA's own guidance. Accordingly, EPA must rectify its fundamentally flawed feasibility study process by considering the information highlighted in these comments and the accompanying appendix, and updating its conceptual site model accordingly; properly applying Site ARARS, including abandoning its incorrect F020 waste code and PTW designations for in-place contaminated environmental media; and re-evaluating and modifying the remedial alternatives under consideration for the Site.

Respectfully submitted,

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APPENDIX A

SUMMARY OF EVIDENTIARY BASIS FOR EMHART'S COMMENTS THAT EPA'S CONCEPTUAL SITE MODEL AND RCRA WASTE CODE DETERMINATION ARE SERIOUSLY FLAWED

I. Introduction

As discussed in Emhart's comments, EPA's arbitrary and capricious disregard for important facts and scientific data in the administrative record has resulted in EPA overlooking compelling evidence demonstrating that its conceptual site model is seriously flawed. Moreover, EPA's faulty conceptual site model has resulted in the Agency's erroneous application of the RCRA F020 waste code at the Site. In turn, these deficiencies have undermined the validity of EPA's analysis of remedial alternatives in the FS Report. Consequently, Emhart submits, it is incumbent on EPA to re-evaluate the remedial alternatives, based on an accurate, comprehensive analysis of the data currently available. Following is the evidentiary basis for Emhart's position that EPA's conceptual site model and RCRA waste code determination are seriously flawed.

The full administrative record demonstrates that the 2,3,7,8-tetrachlorodibenzo-p-dioxin ("2,3,7,8-TCDD") found in Site samples resulted from NECC's refurbishing of barrels containing waste received from its customers. The higher concentration of 2,3,7,8-TCDD in comparison to other dioxin congeners in Site samples provides conclusive scientific evidence, as discussed below, that the 2,3,7,8 TCDD found in Site samples was not in the sodium 2,4,5-trichlorophenolate ("Na-2,4,5-TCP") that Metro-Atlantic received exclusively from Diamond Alkali and used in its hexachlorophene ("HCP") manufacturing process.

The administrative record further demonstrates that NECC and its customers caused the PCB contamination found in Site samples. *See* RI Report, at 4-12, 4-13; *see also* Dep. of M. Robinette, NECC Expert In *Emhart Indus., Inc. v. NECC*, C.A. No. 06-218-S (D.R.I.)

(Sep. 11, 2009), at 141:21-22 ("I think NECC customers contributed oil, VOCs, some PCBs, some metals."), 143:22-144:4 ("Of the PCBs, I think they [NECC] definitely contributed Aroclor 1254 because that was found very much coincident with the drum storage areas that they participated with."); Expert Report of Dr. James R. Kittrell (Jan. 15, 2009), at 27.

The record makes clear that any dioxin that may have been contained in the Na-2,4,5-TCP that Metro-Atlantic used in its HCP manufacturing process was not released onto the Site. It was filtered out by activated charcoal filters that were disposed of off site. There was no activated charcoal associated with the 2,3,7,8-TCDD found on the Site. If the source of the 2,3,7,8-TCDD found on the Site had been the disposal of filters from the Metro-Atlantic HCP plant, activated charcoal would have been found with the 2,3,7,8-TCDD. It was not so found.

Moreover, there was little or no dioxin in aqueous liquids in the HCP manufacturing process; whatever may have been in such liquids was disposed of through the municipal sewer systems. Nor would dioxins have been produced in the course of Metro-Atlantic's HCP manufacturing process. Metro-Atlantic did not use the Givaudan HCP manufacturing process reported to have led to dioxin releases in other geographic locations. Rather, Metro-Atlantic used a distinct patented process that could not have caused a release of 2,3,7,8-TCDD.

By contrast, the NECC drum reconditioning operation undeniably caused routine releases of raw chemicals and products of incineration from the contents of drums containing residues of countless hazardous substances, including dioxin-containing and dioxin-producing substances and PCBs. In addition, the incineration of drums containing certain types of chemical residues produced dioxins.

II. NECC's Drum Reconditioning Process Generated and Was the Source of Dioxins At the Site

NECC brought to the Site customers' drums that contained 2,4,5-trichlorophenol ("2,4,5-

TCP"), 2,3,7,8-TCDD, and other dioxin congeners, as well as chemicals that degraded to 2,4,5-TCP or, when incinerated alone or in combination with other compounds, produced polychlorinated dibenzodioxins and polychlorinated dibenzofurans ("PCDDs/PCDFs").

A. Overview of NECC's Operations at the Site

From approximately 1952 to 1971, NECC operated a drum reconditioning facility on a portion of the Site located on a peninsula bordered by U.S. Route 44, the River, and the tail race. *See* NECC Supp'l CERCLA § 104(e) Response (Feb. 8, 2002). NECC's buildings were located along the tail race, a narrow channel with an upstream section, known as the head race, that is no longer connected to the River. The head race was filled prior to 1956. The tail race enters Allendale Pond near the southern terminus of the peninsula. Historic aerial photographs indicate that NECC used other areas of the Site, including an open area west of its buildings, various areas along the River, and an access road that roughly paralleled the river, for movement, storage and staging of drums. There were spills and leaks onto the ground from the drums prior to reconditioning. *See* Dep. of R. Nadeau, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Dec. 17, 2002), at 12-13; Dep. of J. Cifelli, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Feb. 13, 2003), at 29-30. NECC also buried drums that were not reconditioned in the southern portion of the Site. *See* Aff. of E. Izzo (Oct. 28, 2000).

As part of the reconditioning process, NECC moved drums through a furnace by placing them upside down on a conveyor. *See* Dep. of R. Nadeau, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Dec. 17, 2002), at 12; Dep. of J. Cifelli, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Feb. 13, 2003), at 19. Any liquid or sludge remaining in the drums was drained into a cement pit under the conveyor or was spilled onto the ground. *See* Dep. of R. Nadeau, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Dec. 17, 2002), at 12, 32; Dep. of J. Cifelli, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A.

No. 02-053-S (D.R.I.) (Feb. 13, 2003), at 19, 22. When the pit was full, the material, including residual chemicals and ash from the furnace, was taken to an area south of the facility and dumped. *See* Dep. of R. Nadeau, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Dec. 17, 2002), at 12-13, 31-32.

NECC also had a drum washing operation in which closed head drums were washed in caustic liquid baths. *See* Dep. of R. Nadeau, *Russell-Stanley Holdings, Inc. v. Vincent J. Buonanno*, C.A. 01-cv-2818 (S.D.N.Y.) (Oct. 1, 2002), at 39:18-23, 41:18-42:4; *see also* Dep. of J. Cifelli, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Feb. 13, 2003), at 42:4-51:1. Substantial amounts of contaminated liquids were released to the Site from this operation. *See* Dep. of T. Lussier, *Emhart Indus., Inc. v. NECC*, C.A. No. 06-218-S (D.R.I.) (Apr. 30, 2009), at 29-30; s*ee also* Dep. of C. Maine, *Emhart Indus., Inc. v. NECC*, C.A. No. 06-218-S (D.R.I.) (Apr. 29, 2009), at 9:5-7, 9:18-21; 12:20-13:10, 17:18-24, 30:1-9; *see also* Dep. of C. Maine, *Emhart Indus., Inc. v. NECC*, C.A. No. 06-218-S (D.R.I.) (Apr. 29, 2009), at Exh. 2.

B. Chemicals Sent to the Site by NECC's Customers

During the relevant time period, NECC received 55-gallon steel drums from at least 10 customers in the chemical and petroleum industry, and from two military bases (*i.e.,* 4800 drums from Quonset Naval Base ("Quonset") and Otis Air Base ("Otis")) containing approximately 370 different chemical residues, including compounds likely containing 2,3,7,8-TCDD, 2,4,5-TCP precursors, and PCBs. *See* Supplemental Expert Report of Dr. James R. Kittrell (Jan. 7, 2011), at 26; *see also* Expert Report of Dr. James R. Kittrell (Jan. 15, 2009), at 27; RI Report, at 4-12 to 4-13 ("[t]he former drum reconditioning facility probably received chemical shipping and storage containers from numerous sources and may be the original source of the PCBs. The former drum reconditioning operation in the source area likely washed pesticide and PCB

residues into the source area soils."). These customers and chemical residues are identified in the expert report of Dr. James R. Kittrell (Jan. 15, 2009). Moreover, NECC received 55-gallon steel drums from at least nineteen (19) customers in the textile chemical industry during the relevant time period. These drums contained approximately 650 different chemical residues from dyes, pigments, textile auxiliary, specialty finishing chemicals, and waste products. The chemical residues included mineral acids, organic acids, alkalis and salts, and other organic chemicals (*e.g.*, chlorinated solvents, alcohols, aromatic hydrocarbons, aliphatic hydrocarbons, and other oils, fats and waxes). These customers and chemical residues are identified in the expert report of Dr. Richard Aspland (Jan. 13, 2009).

Numerous chemicals that were handled by NECC's customers in 55-gallon drums during the relevant time period have been detected as contaminants at the Site. *See* Updated Expert Report of Dr. Gregory Fu (Feb. 6, 2009). According to Dr. Fu, a professor of organic chemistry at the Massachusetts Institute of Technology ("MIT"), of the various chemical residues present in 55-gallon steel drums received by NECC for reconditioning, nine were either dioxins themselves or contained dioxins as a contaminant. *See id.* at 5. Certain compounds or formulations that were sent to the Site from Quonset and Otis, such as Silvex and 2,4,5-trichlorophenoxyacetic ("2,4,5-T"), degrade swiftly to 2,4,5-TCP and also were contaminated with 2,3,7,8-TCDD. See Supplemental Expert Report of Dr. James R. Kittrell (Jan. 7, 2011), at 29. Moreover, of the various chemical residues present in 55-gallon steel drums that NECC received for reconditioning, over 150 generated dioxins during NECC's incineration process through one of two chemical processes known as the "precursor" and "de novo" routes. *See id.* at 7-9. Dioxins and furans also were produced during NECC's incineration process when certain chemical residues were in the presence of certain other chemical residues, through either the

"precursor" or "de novo" routes. *See id.* at 9-20.

III. Metro-Atlantic's HCP Manufacturing Operations Could Not Have Caused 2,3,7,8-TCDD Contamination at the Site

A. Description of Metro-Atlantic's HCP Manufacturing Process

For a period of less than one year during the 1964-1965 time period, Metro-Atlantic manufactured HCP, which EPA has incorrectly speculated is the source of the dioxin contamination at the Site. The HCP manufacturing process used by Metro-Atlantic, unlike other HCP manufacturing processes such as the Givaudan process, does not generate still bottoms contaminated with 2,3,7,8-TCDD.[1]

Metro-Atlantic manufactured HCP using a process developed and patented by Thomas Cleary (the "Cleary process"). Mr. Cleary developed this process to avoid infringing upon the patent for the HCP manufacturing process held by Givaudan Corporation (the "Givaudan process"). Dep. of T. Cleary, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Feb. 10, 2003), at 21; *see also Cleary Statement* (Apr. 8, 2008), at 1. The Cleary process was a so-called "batch" process, in which a producer moves materials from one vessel to another, and completes a full production cycle before beginning another "batch." *See Cleary Statement* (Apr. 8, 2008), at 1; *see also* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3.

The Cleary process involved the purification of Na-2,4,5-TCP, which was used in the production of HCP. By adding and removing other liquids (which were collected for reuse in subsequent batches), and by variously heating, agitating and cooling the resulting mixtures in different reaction vessels during the production process, Metro-Atlantic facilitated a series of chemical reactions whereby the Na-2,4,5-TCP was removed from the "starter" solution, purified

[1] None of Metro-Atlantic's other manufacturing operations did or could have produced dioxin, and there is no allegation that those operations were responsible for dioxin contamination at the Site.

(*i.e.*, converted into pure Na-2,4,5-TCP), and then converted into HCP. The HCP, in turn, was extracted in two distinct "crops" of solid products, a first crop of higher purity HCP and a second crop of slightly lower purity HCP. The entire process took about 24 hours and resulted in the formation of approximately 300 pounds of dry HCP per batch of starter material. *See Cleary Statement* (Apr. 8, 2008), at 1.

Diamond Alkali Company ("Diamond Alkali") supplied Metro-Atlantic with a crude (*i.e.*, unpurified), alkaline starter solution of 30% Na-2,4,5-TCP in water, with a small percentage (less than 2%) of residual methanol remaining from the production of Na-2,4,5-TCP from 1,2,4,5-tetrachlorobenzene. The solution also contained a small percentage of 2,4,5-TCP as a function of the solubility of 2,4,5-TCP in the aqueous solutions. This crude "starter" solution was transferred from a tanker truck directly into the first reaction vessel at the HCP building. *See* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 2; *see also Cleary Statement* (Apr. 8, 2008), at 2.

There is no evidence in the administrative record that any spills occurred during this transfer stage, or, for that matter, at any other stage of the HCP production process. Moreover, it is highly unlikely that any such spills of the starter material occurred. This material is comprised of a liquid that rapidly evaporates leaving a strong odor that would cause human discomfort. As a consequence, these chemicals are maintained and transferred in a manner that avoids their exposure to the atmosphere. *See* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 2; *see also Cleary Statement* (Apr. 8, 2008), at 2. Moreover, Metro-Atlantic had economic incentive to use all of the Na-2,4,5-TCP in its HCP manufacturing process and would not tolerate losses due to spillage. *See* Supplemental Expert Report of Dr. James Kittrell (May 5, 2010), at 3. Metro-Atlantic had a limited supply of the Na-2,4,5-TCP (not exceeding 25,000 kgs) from

Diamond Alkali, which further supports the conclusion that losses due to spillage would not be tolerated. *See* Dep. of T. Cleary, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Feb. 10, 2003), at Exh. 15.

Once in this first reaction vessel, the crude starter solution from Diamond Alkali was treated with additional 30% aqueous sodium hydroxide ("NaOH") to convert any residual 2,4,5-TCP in the solution to Na-2,4,5-TCP. During this step, the Na-2,4,5-TCP precipitated out of the solution. The precipitate was separated from the solution by filtering it in a centrifuge. The precipitate, known as "filter cake," was recovered and washed with an additional 30% aqueous solution of NaOH. The 30% aqueous NaOH solution was collected and reused in subsequent batches. Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3; *Cleary Statement* (Apr. 8, 2008), at 2. This procedure follows common and safe synthetic chemical practices and is among the most effective to achieve the starting reagent needed to produce HCP. *See* U.S. Patent 3,499,045 (Mar. 3, 1970); *see also Cleary Statement* (Apr. 8, 2008), at 1-3. The procedure further indicates that Mr. Cleary was concerned with the yields of the reaction. Although this step is not strictly necessary, it was done only to maximize the quality of the HCP produced by decreasing the by-products overall, and reasonably added cost to the final product. Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3.

Because the Na-2,4,5-TCP "filter cake" was the desired end product of this first stage of the Cleary process, Metro-Atlantic had a strong economic incentive to recover all of the filter cake. To that end, it extracted all of the filter cake into perchloroethylene ("PCE") and transferred this Na-2,4,5-TCP solution from the centrifuge into a second reaction vessel. *Id.* at 3. In the next step of the Cleary process, which took place in a second reaction vessel, the Na-2,4,5-TCP was re-protonated, that is the sodium cation was replaced with a proton (H^+) forming 2,4,5-

TCP. *Id.* The filter cake was extracted (*i.e.*, slurried) in PCE and this mixture was heated to 50°C. Sulfuric acid was added slowly to this mixture with agitation (stirring). Agitation was stopped two hours following completion of sulfuric acid addition. This process allowed the biphasic mixture to separate, and resulted in a quantitative conversion of all the Na-2,4,5-TCP to 2,4,5-TCP. The aqueous phase liquid was collected and re-used in subsequent batches. *Id.* at 3; *see also Cleary Statement* (Apr. 8, 2008), at 2. The organic phase, a solution of pure 2,4,5-TCP in PCE, was transferred to a third reaction vessel. *Id.* at 3. In the next stage of the Cleary process, which took place in the third reaction vessel, the 2,4,5-TCP in solution with PCE was heated to 75°C. Paraformaldehyde (0.5 equivalents) was added to the reaction mixture, followed by slow addition of sulfuric acid (0.5 equivalents). This reaction resulted in the formation of an intermediate compound; however, both the paraformaldehyde and sulfuric acid are limiting reagents in the reaction, and, as a result, there was only partial conversion to the intermediate. Therefore, some 2,4,5-TCP (approximately 0.5 equivalents) remained un-reacted in the reaction vessel. The products of this reaction were not isolated, but rather were taken directly into the next step of the HCP manufacturing process. Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3; *see also Cleary Statement* (Apr. 8, 2008), at 2-3.

The reaction mixture was maintained at 75°C and additional sulfuric acid (0.5 equivalents) was added slowly. The reaction mixture was agitated for two more hours after addition of the sulfuric acid. This reaction resulted in the formation of HCP in a PCE solution. The reaction was complete after two hours and an aliquot of the liquid was removed and the melting point was determined to establish complete conversion to HCP. *See* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3; *see also Cleary Statement* (Apr. 8, 2008), at 3.

The reaction mixture was maintained at 75°C. Approximately 1 pound of calcium

carbonate was added to the reaction vessel to neutralize the residual sulfuric acid globules. A fine powder form of Nuchar (10 lbs.) was added to the reaction vessel and the solution was stirred for approximately 30 minutes. Nuchar is a brand name for a form of carbon black; it is a fine particulate material made of carbon atoms similar to graphite. The solution was hot filtered to remove the Nuchar and calcium sulfate byproducts. The filter cake was then washed with additional PCE. Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3; *see also Cleary Statement* (Apr. 8, 2008), at 3. This is the only step where Nuchar was added. The Nuchar was not reused in subsequent batches. *See* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3; *see also Cleary Statement* (Apr. 8, 2008), at 3.

The HCP solution, now in a fourth reaction vessel (and now "clear" because the Nuchar removed the color), was allowed to cool to room temperature, during which time some of the HCP precipitated out of the solution. Dep. of T. Cleary, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Feb. 10, 2003), at 42. This precipitate was collected by filtration, dried, placed in 50-lbs. fiber drums, and sold as a "first crop" of pharmaceutical grade HCP to Sterling-Winthrop, Inc. *See* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3; *see also Cleary Statement* (Apr. 8, 2008), at 3. The PCE from the filter press was recycled too. U.S. EPA, *Dioxins* (EPA-600/2-80-197) (Nov. 1980), at 108.

In the final step of the Cleary process, the remaining PCE-HCP solution (filtrate) was subjected to distillation to recover the PCE for reuse. Upon cooling, the additional HCP that precipitated out of the solution was collected by filtration, dried and sent to Kalo Laboratory as a second crop of HCP product. *See* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 3; *see also Cleary Statement* (Apr. 8, 2008), at 4.

The process – from introduction of raw materials into the first reaction vessel to

production of the final product – took approximately twenty-four hours per batch. *See Cleary Statement* (Apr. 8, 2008), at 1. This process did not involve the use of steel drums. *Id.* at 3; *see also* Dep. of V. Buonanno, *Emhart Indus., Inc. v. NECC*, C.A. 06-218-S (D.R.I.) (Oct. 22, 2008), at 96:12-15.

It has been suggested that unidentified "still bottoms" may have existed at the end of the Cleary process because such wastes were reported in a 1972 report by Radian Corporation addressing the Givaudan HCP manufacturing process. However, the Givaudan process differed from the Cleary process in many respects because Thomas Cleary specifically developed the patented Cleary process to avoid infringing the patent on the competing Givaudan process. Among other things, as previously highlighted, the Givaudan process was a single-vessel "continuous" process, whereas the Cleary process was a multi-vessel "batch" process. Additionally, there is no indication in the record that the Givaudan process, like the Cleary process, resulted in multiple "crops" of HCP product or reuse of the PCE solution out of which those "crops" precipitated. *See* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009) at 3; *see also Cleary Statement* (Apr. 8, 2008), at 3-4; U.S. EPA, *Dioxins* (EPA-600/2-80-197) (Nov. 1980), at 108.

Thus, no evidence exists from which to conclude that the Cleary process generated residual "still bottoms" requiring disposal. To the contrary, the patent for the Cleary process describes a manufacturing process that did not involve "still bottoms." Supplemental Expert Report of Dr. Francesco Stellacci (Dec. 24, 2009), at 3.

B. Nuchar Would Have Removed Any Contamination Present in the Na-2,4,5-TCP Starter Material or Generated During the HCP Manufacturing Process

Although it has been suggested that some dioxin might have been present as a contaminant in the Na-2,4,5-TCP starter material supplied to Metro-Atlantic by Diamond Alkali,

any dioxin that might have been present as a contaminant was removed by the Nuchar that was added during the final step of the reaction. *See* Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 5; *see also* Expert Report of Dr. Francesco Stellacci (Jan. 10, 2011), at 1. The HCP process incorporated a decolorization step in which Nuchar was added to the reaction mixture. Nuchar has a large surface with a high affinity (*i.e.*, strongly attractive) to planar molecules such as dioxins or furans. Once a planar molecule with delocalized electrons (such as dioxin or hexachloroxanthene) binds to graphitic carbon, it does not detach. Carbon materials (when in graphitic form) are very rich in such electrons. Hence, the Nuchar would strongly attract small molecules such as dioxins that have delocalized electrons. Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 4.

Nuchar was used as a means to decolorize the final product because, in the HCP product, color was determined by the presence of small quantities of molecules with delocalized electrons. During the 30 minutes in which Nuchar was in contact with the reaction mixture (during the second to last step in the HCP production process), the Nuchar acted like a sponge, attracting and trapping all of the planar molecules (*e.g.*, dioxins/furans) that were present with delocalized electrons. Thus, Nuchar was the perfect material of choice to remove such planar molecules. *Id.* at 4. The effectiveness of the Nuchar filtration is evident in Mr. Cleary's testimony that the resulting liquid was clear, almost colorless. *See* Dep. of T. Cleary, *Emhart Indus., Inc. v. Home Ins. Co.*, C.A. No. 02-053-S (D.R.I.) (Feb. 10, 2003), at 42.

The quantity of the Nuchar used in the Metro-Atlantic HCP manufacturing process was sufficient to adsorb all of the dioxin from the solution mixture. In fact, more than 100 times the Nuchar needed to adsorb the dioxin was used in this stage of the process. In other words, 0.1 lbs. of Nuchar would have been sufficient to remove irreversibly all the dioxin from the reaction, yet

Metro-Atlantic used 10 lbs. per batch treatment. Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 5-6.

The Cleary process of manufacturing HCP did not independently produce additional dioxin or any similar molecules. Such molecules were not generated even as trace by-products. *Id.* at 4. Even if, as suggested, hexachloroxanthene ("HCX") had been present in the reaction vessel or generated in connection with the Cleary process, it too would have been adsorbed on the Nuchar. HCX, like dioxin, is a planar molecule with delocalized electrons. Hence, for the reasons described above, HCX also would have been adsorbed on the free adsorption sites of the Nuchar. *Id.* at 4.

While it has been suggested that the dioxin at the Site may have resulted from Metro-Atlantic discarding Nuchar and other filter solids on the Site, there is no such evidence in the record. In fact, Metro-Atlantic disposed of the Nuchar by having it trucked off the Site, as Metro-Atlantic did with other solid wastes in 1964 and 1965. *See* Trial Transcript of J. Buonanno, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Sep. 14, 2006), at 87:3-11; Trial Transcript of J. Nadeau, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Sep. 15, 2006), at 27:23-28:8, 48:5-49:10; Trial Transcript of J. Turcone, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Sep. 18, 2006), at 5-7.

The application of internal standard procedures used by EPA to validate its recovery procedures in extracting dioxin from Site samples further belies any suggestion that the spent Nuchar was disposed of on the ground at the Site, given the absence of activated carbon in the samples analyzed. Expert Report of Dr. Francesco Stellacci (Jan. 12, 2009), at 9. Because of the high affinity of Nuchar surfaces to chemical molecules, the efficiency of recovery during EPA's internal standards tests would have been adversely affected if Nuchar had been contained in Site

soil or sediment samples. If activated carbon was present in the samples analyzed, the internal standard recoveries for $^{13}C_{12}$ radio-labeled 2,3,7,8-TCDD would be extremely low, in the order of 1% or less. *Id.* at 9. However, the data from the Remedial Investigation (RI) reveal that the $^{13}C_{12}$ radio-labeled 2,3,7,8-TCDD was recovered in 71-103% yields. Thus, the data indicates that the analytical method was functioning correctly with minimal effect on the recovery of PCDDs/PCDFs (dioxins and furans) from the samples. *Id.* at 8. Therefore, none of the samples analyzed in the RI Report contained dioxin adsorbed on Nuchar. *Id.* at 9.

C. Any Dioxin Found in Aqueous Solutions Associated with HCP Manufacturing Would Be Infinitesimally Small and Would Have Been Discarded, Along with the Aqueous Solution, in the Sewer

While it has been suggested that 2,3,7,8-TCDD might have been present in the HCP process from an alleged aqueous (water) waste stream and then discarded, this hypothetical scenario ignores the fact that the solubility of 2,3,7,8-TCDD in water is extremely low: only 0.000317 ppm (or 0.317 ppb). Supplemental Expert Report of Dr. Francesco Stellacci (Dec. 24, 2009), at 3. Thus, any aqueous waste streams disposed of from the HCP manufacturing operation would contain very little 2,3,7,8-TCDD (*i.e.,* on the order of 5 micrograms total for the duration of the HCP manufacturing process). Moreover, this speculative argument also ignores the fact that, to the extent there was any aqueous liquid waste from the HCP process, it would have run only into the sewer system, not the River, and thereafter would not be found at the Site. *See* Town Council of North Providence, Meeting Minutes (Jul. 6, 1964), at 3 (during visit to Metro-Atlantic, "all chemical waste was deposited through the sewer system"). Trial Transcript of J. Buonanno, *Emhart Indus., Inc. v. NECC*, C.A. 06-218-S (D.R.I.) (Jan. 14, 2009), at 38-40.

The sewer connections to the Site were available by the early 1940s. *See* Easement (Jan. 4, 1941) (beginning at Smith Street and running south down Mill Street); Easement (Oct. 7, 1939) (running along tailrace south of Steere Avenue); Easement (Jan. 23, 1939) (running north

from Grover Street; parallel to tailrace); Easement (Jan. 17, 1939) (running mostly parallel to tailrace, to the north and south of Redfern Street, but cutting across the tailrace two plats north of Redfern Street); Easement (Jan. 17, 1939) (running south from Redfern Street, parallel to tailrace); Easement (Jan. 24, 1939) (running north from George Street, parallel to the tailrace); Easement (Oct. 2, 1940) (running south from George Street, parallel to the tailrace, and across Grover Street, cutting across portion of Site); Easement (Oct. 2, 1940) (running north from Stevens street along tailrace). Furthermore, in 1956, the local plumbing code enacted required that facilities be connected to the sewer system, where such connections were available. *See* Building Ordinance of the City of Providence, Article 17, Chapter 1700.0, *et al.* (1956).

Metro-Atlantic's main plant, which housed its textile operations, was connected to the sewer before the operations commenced at the HCP building. *See* Town Council of North Providence, Meeting Minutes (Oct. 1, 1956), at 1 ("Metro-Atlantic Co has tied in its domestic sewage system with the Town."). When the HCP building was constructed, it also was connected to the existing sewer system. *See* Trial Transcript of J. Buonanno, *Emhart Indus., Inc. v. NECC*, C.A. 06-218-S (D.R.I.) (Jan. 14, 2009), at 38:19-39:2. This was further confirmed when pipes connecting the HCP plant to the sewer were unearthed during the 2009 TCRA that was conducted at the Site. *See* Expert Report of Dr. James R. Kittrell (May 5, 2010), at 2; LEA-001237; LEA-002018; LEA-001283; Bennett Soil Boring Sample Tracings (Mar. 22, 2010) (showing location of pipes unearthed).

Also, Metro-Atlantic did not use a septic system to manage its waste. *See* Trial Transcript of J. Buonanno, *Emhart Indus., Inc. v. NECC*, C.A. 06-218-S (D.R.I.) (Jan. 14, 2009), at 38:22-39:4; Expert Report of Dr. James R. Kittrell (May 5, 2010), at 2; Addendum to Expert Report of John Kastrinos (Mar. 31, 2010), at 6. Nor did it use dry wells or leaching pits. *Id.* at 6.

Given that Metro-Atlantic was connected to the sewer, any alleged aqueous waste from the HCP building would have been disposed of in the sewer. *See* Town Council of North Providence, Meeting Minutes (Jul. 6, 1964), at 3 (during visit to Metro-Atlantic, "all chemical waste was deposited through the sewer system"); Expert Report of Dr. James R. Kittrell (May 5, 2010), at 2; Trial Transcript of J. Buonanno, *Emhart Indus., Inc. v. NECC*, C.A. 06-218-S (D.R.I.) (Jan. 14, 2009), at 38:15-40:5, 42:8-44:8; Trial Transcript of J. Buonanno, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Sep. 14, 2006), at 85:7-19; Dep. of D. Paterson, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-ML (D.R.I.) (Dec. 20, 2002), at 9:8-15; Trial Transcript of J. Priest, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Jan. 17, 2003), at 25:12-26:3; Dep. of J. Buonanno, *Emhart Indus., Inc. v. Home Ins., Co.*, C.A. 02-053-S (D.R.I.) (Jan. 17, 2003), at 15:3-14, 16:20-17:1, 116:6-11. Thus, no such waste material would have been disposed of into the River or onto the ground at the Site.

IV. The Dioxin Found in Site Samples Could Not Have Come From the Na-2,4,5-TCP Used in Metro-Atlantic's HCP Process

There is scientific evidence that the 2,3,7,8-TCDD identified in samples on the Site did not come from the Na-2,4,5-TCP that Metro-Atlantic used in its HCP manufacturing process. The chemical reaction that produces Na-2,4,5-TCP also produces a variety of dioxin and furan congeners, including 2,3,7,8-TCDD, that are contaminants in the Na-2,4,5-TCP product. Unless Na-2,4,5-TCP is purified, the 2,3,7,8-TCDD produced is accompanied by other dioxin and furans congeners. *See* Expert Report of Dr. Gregory Fu (Jan. 7, 2011), at 5. However, various purification techniques alter the dioxin/furan pattern of the dioxin contaminants. *See* Supplemental Expert Report of Dr. James R. Kittrell (Jan. 7, 2011), at 14. Thus, 2,3,7,8-TCDD dioxin/furan patterns constitute unique fingerprints indicating whether it results from a purified or unpurified source of 2,4,5-TCP. *Id.* at 14-15.

The Site samples contain 2,3,7,8-TCDD produced from a manufacturing source (as well as 2,3,7,8-TCDD produced from combustion). However, the dioxin/furan pattern of the 2,3,7,8-TCDD from a manufactured source found in Site samples demonstrates conclusively that it did not come from the Na-2,4,5-TCP Metro-Atlantic purchased from Diamond Alkali in the 1964-1965 time period for use in its HCP operation. The Diamond Alkali Na-2,4,5-TCP produced at that time was not purified. Therefore, it had a relatively large dioxin/furan concentration, with other dioxins and furans present with the 2,3,7,8-TCDD. However, there were little or no other dioxin or furan congeners with the non-combustion produced 2,3,7,8-TCDD found at the Site. The 2,3,7,8-TCDD found at the Site was from a purified product, *see* Expert Report of Dr. Gregory Fu (May 6, 2010), at 5, and accordingly could not have come from the 1964-1965 Diamond Alkali product used by Metro-Atlantic.

The National Institute of Occupational Safety and Health Dioxin Registry Reports ("NIOSH Reports") indicate that it was not until September 1967 that Diamond Alkali began to purify its Na-2,4,5-TCP with a charcoal cartridge filtration system. Moreover, Diamond Alkali's method lowered the concentrations of <u>all</u> dioxins and furans uniformly. Unlike other manufacturers purification processes, Diamond Alkali's did not alter the dioxin/furan profile. *See* Supplemental Expert Report of Dr. James R. Kittrell (Jan. 7, 2011), at 9. Consequently, even the post-1967 purified Diamond Alkali Na-2,4,5-TCP would have contained a whole family of dioxin and furan congeners (albeit at lower total concentrations). Therefore, the 2,3,7,8-TCDD found on the Site could not have originated from the post-1967 Diamond Alkali product either. Further, Diamond Alkali's manufacture of Na-2,4,5-TCP resulted in the formation of 2,3,7,8-tetrachlorodibenzofuran ("2,3,7,8-TCDF"). *See* Expert Report of Dr. Gregory Fu (Jan. 7, 2011), at 5. The absence of 2,3,7,8-TCDF in the Site samples is further evidence that the

2,3,7,8-TCDD found on the Site did not originate from the Diamond Alkali Na-2,4,5-TCP. *See id.*; *see also* Supplemental Expert Report of Dr. James R. Kittrell (Jan. 7, 2011), at 26 ("Dioxin congener profiles of the 'source-like' samples at the Site are not consistent with Crude TCP delivered to the Site from Diamond Alkali in 1964-1965."). Accordingly, EPA's belief that the 2,3,7,8-TCDD found on the Site came from the Metro-Atlantic HCP operation lacks a supporting foundation, and is entirely refuted by the fact record and the scientific evidence.

V. The Dioxin Found in Site Samples Compels the Conclusion that It Came From NECC's Customers

The NIOSH Reports further compel the conclusion that the 2,3,7,8-TCDD found on the Site came from NECC's customers. Manufacturers other than Diamond Alkali did use purification processes that altered the dioxin/furan congener patterns. The 2,3,7,8-TCDD profile similar to that found at the Site is from a purified Na-2,4,5-TCP with an altered congener profile. As early as 1965, manufacturers other than Diamond Alkali began purifying their Na-2,4,5-TCP in an attempt to remove the 2,3,7,8-TCDD by-products. Dow's manufacturing procedure, for example, included a TCA decantation process to remove the dioxin by-products from its Na-2,4,5-TCP. This procedure removed the higher chlorinated dioxin congeners, leaving a small amount of 2,3,7,8-TCDD, but virtually none of the other dioxin congeners. In 1967, another producer of Na-2,4,5-TCP, Occidental Chemical Company (f/k/a Hooker Chemical), purified its 2,4,5-TCP by vacuum distillation. The vacuum distillation method did not remove all 2,3,7,8-TCDD from the 2,4,5-TCP, however, but left up to 1 ppm 2,3,7,8-TCDD in the 2,4,5-TCP. *See* Supplemental Expert Report of Dr. James R. Kittrell (Jan. 7, 2011), at 21. Since the boiling points of the dioxin congeners other than 2,3,7,8-TCDD are higher than that of 2,3,7,8-TCDD, in this purification process the dioxin congeners other than 2,3,7,8-TCDD would not boil off with the purified 2,4,5-TCP. Accordingly, the 2,4,5-TCP purified by such a vacuum distillation

process would have a dioxin congener profile with 2,3,7,8-TCDD but little or no other dioxin or furan congeners. The samples from the Site have such a profile.

As discussed in Section IV above, the dioxin profile at the Site is inconsistent with the TCP produced by Diamond Alkali during the time period of interest. However, manufacturers other than Diamond Alkali did use purification processes that would have produced a dioxin congener profile similar to that found at the Site. Accordingly, the conclusion is compelled that the 2,3,7,8-TCDD found on the Site did not come from the Diamond Alkali Na-2,4,5-TCP used by Metro-Atlantic. Rather, more likely than not, the dioxin at the Site came from the materials in NECC's customers' drums. *See* Supplemental Expert Report of Dr. James R. Kittrell (Jan. 7, 2011), at 4, 26 (stating that the contamination more likely than not "originated from NECC barrels brought on Site and stored in the vicinity of the Metro-Atlantic plant and originating from herbicides leaking from those barrels").

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Document #	Document Citation
1	Interim Final Feasibility Study Report (April 30, 2010)
2	Executive Order 11988
3	Interim Final Remedial Investigation Report (June 2005)
4	*United States v. General Electric Co.*, 460 F. Supp. 2d 395 (N.D.N.Y. 2006)
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56	LEA, Addendum No. 1, Completion of Work Report, Time-Critical Removal Action (Apr. 2010)
57	LEA, Completion of Work Report, Time-Critical Removal Action (Feb. 2010)
58	U.S. EPA, *National Remedy Review Board Recommendations for the Centredale Manor Restoration Project Site* (Oct. 28, 2010)
59	U.S. EPA, *Statement of Procedures on Floodplain Management and Wetlands Protection* (Jan. 5, 1979)
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70	U.S. EPA, *Superfund LDR Guide #6A (2nd Edition), Obtaining a Soil and Debris Treatability Variance for Remedial Actions* (Sep. 1990)
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75	Integral Consulting, Inc. *Sampling and Analysis Plan for the Supplemental Investigation of the Lyman Mill Reach Sediment and Flood Plain Soils* (Jun. 21, 2010)
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77	Letter from T. Chapman, Fish & Wildlife Service, to A. Krasko, EPA (Jul. 26, 2010)
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