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MEMORANDUM

To: Susan Svirsky, Remedial Project Manager
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From: Susan J. Steenstrup, Project Coordinator, Special Projects
MassDEP, Bureau of Waste Site Cleanup, Springfield

Cc: Anna Symington, Deputy Regional Director (*electronic copy*)
Dean Tagliaferro, U.S. Environmental Protection Agency (*electronic copy*)
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Subject: Site No. GECD850; Housatonic River Rest of River; Comments on *Housatonic River – Rest of River – Corrective Measures Study Proposal*

Date: March 29, 2007

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed the document titled: *Housatonic River – Rest of River – Corrective Measures Study Proposal*, dated February 2007 and prepared by ARCADIS BBL on behalf of the General Electric Company (GE). MassDEP finds the document to be comprehensive, well organized and clearly written, and offers for your consideration the comments that follow.

GENERAL COMMENTS

- 1) GE has performed a fairly comprehensive, well-conceived evaluation of many remedial options for addressing sediments, riverbanks and floodplain soils and proposes a good strategy for evaluating how the various technological options will be evaluated in terms of their abilities to achieve the Interim Media Protection Goals (IMPGs). However, it is unclear how the impacts on channel flow and dynamics and flooding, relative to the use of armor stone or revetments, confined disposal facilities (CDFs), capping, and engineered barriers in the floodplain, for

- example, will be evaluated using the U.S. Environmental Protection Agency's (EPA's) PCB fate, transport, and bioaccumulation model.
- 2) MassDEP appreciates that GE chose to use conservative assumptions in making certain evaluations relative to the number of vernal pools to be evaluated, the conversion factor used to convert PCB concentrations in whole fish to those in fillets, the selection of the lowest IMPG value for floodplain areas with multiple use types, etc.
 - 3) EPA's Modified RCRA Permit for the Rest of River Site requires that GE evaluate remedial technology alternatives under the Corrective Measures Study (CMS) using a series of selection decision factors. Prior to undergoing more detailed evaluation in the CMS, the National Contingency Plan (NCP) allows remedial alternatives to be screened according to three criteria: effectiveness, implementability, and cost. In order to reduce the number of remedial alternatives that must be evaluated in detail in the CMS, GE chose to screen technologies based mainly on implementability and effectiveness and, to a lesser degree, cost. However, GE appears to have been somewhat selective and inconsistent in the manner in which it applied these criteria in screening out certain technologies and retaining others for more detailed review. For example, in evaluating effectiveness, the degree to which an alternative reduces toxicity, mobility or volume through treatment, affords long-term protection and attains applicable or relevant and appropriate requirements (ARARs) must be evaluated. These evaluations were done in a very rough sense relative to treatment of contaminated materials, but little specific information or definitive documentation was provided. Although some technologies were eliminated based on a lack of existing treatability studies, others were retained which also would require treatability evaluations. Long-term protection, particularly that afforded by disposal and capping options, was also not discussed in much detail. Furthermore, attainment of ARARs was only touched upon briefly for a few of the pertinent ARARs, and some technologies were retained despite anticipated problems in attaining ARARs. Implementability must be evaluated considering both administrative and technical feasibility and these were not evaluated consistently, or in some cases realistically, when making decisions to screen out or retain certain technologies. Finally, cost may be used to screen out technologies which provide similar implementability or effectiveness, but at greater cost. However, no detailed cost estimates were provided in the report to support such screening. Similarly, GE screened out some alternatives (such as thermal destruction) based on lack of community acceptance (one of the nine criteria required to be evaluated in detail under the CMS), yet retained others, such as local landfilling or confined disposal sites that will likely be met with strong community opposition. MassDEP believes that, due to the inconsistency in applying these criteria and the lack of detail that was provided in some cases, some technologies have been screened prematurely and merit being evaluated in more detail in the CMS. More detailed comments on the individual processes will be provided in the specific comments that follow.
 - 4) MassDEP recognizes the advantages of reducing the number of technologies that must undergo detailed evaluation and finds that GE provided information adequate to screen out certain technologies from further consideration in the CMS. This screening is justified based on the rationale that GE provided and, in some cases, on additional rationale. These screened-out technologies are: enhanced sedimentation, in-situ physical treatment of sediments and floodplain soils, in-situ chemical treatment of sediments and floodplain soils, in-situ biological treatment of sediments and floodplain soils, gabions, retaining walls, dewatering using a belt-filter press, dewatering using a centrifuge, dewatering using an evaporator, dewatering by adding a thickener,

dewatering using a settling basin, dewatering with geotubes, and ex-situ biological treatment of excavated soils and sediments.

- 5) MassDEP's main concern about some technologies that were retained for further consideration is that they will likely affect existing channel flow and flooding conditions and thereby have considerable difficulty attaining certain ARARs and won't likely meet the requirements for waivers. These concerns will be elaborated on further in subsequent comments about specific remedial technologies.

Some of the comments that follow will expand upon the issues raised in these general comments by providing specific examples from the proposal. Other comments will identify additional issues that MassDEP believes should be evaluated in greater detail in the CMS. MassDEP has some additional comments on certain technologies that are proposed for evaluation in the CMS, but will reserve comment on these until it reviews the CMS Study Report. The comments being provided here are intended to help guide the CMS by highlighting certain additional factors that should be considered in the evaluations and currently may not be under consideration by GE.

SPECIFIC COMMENTS

- 6) Habitat restoration alternatives for the banks, channel and floodplain should be evaluated as part of the overall cleanup options being investigated in the CMS and information on relative costs should be provided.
- 7) In evaluating the monitored natural recovery options for both sediments and the floodplain, MassDEP recommends that specific performance criteria be established for making a determination of the effectiveness of this remedial option (such as what time frame would be acceptable for reducing exposures to acceptable levels) and that contingencies be specified for addressing unacceptable exposure reduction times and factors (such as potential erosion and flooding) that may affect the remedy. In addition, monitored natural recovery which relies on natural sedimentation to bury contaminated sediments may not be a realistic option in certain locations, such as Woods Pond, that have become so shallow in many areas that future dredging may be necessary to maintain flows, prevent flooding and allow continued recreational uses.
- 8) Engineering and institutional controls (such as fences, signs and biota consumption advisories) are proposed to be evaluated in the CMS as viable remedial options, to be used in conjunction with other remedies, for reducing exposure to both sediments and floodplain soils. MassDEP considers such measures to be valuable in the short-term for limiting exposures prior to taking a more permanent remedial action, but does not consider these to be the most effective long-term solutions. These measures have been employed in the past, with limited proven long-term effectiveness relative to preventing human exposures – fishermen have admitted to ignoring biota consumption advisories, signs have been repetitively vandalized, and fences have been breached, so that access has not been restricted. Measures such as fencing may be ineffective in eliminating exposures to ecological receptors and may not even be allowed in areas of sensitive or endangered species wildlife habitat. If such measures are selected for large-scale implementation over many river miles, monitoring and maintenance activities will be very time-intensive, with no assurances that these measures will actually limit exposures. In addition, community acceptance is likely to be a significant hurdle to the implementation and maintenance of this remedial option. Recreational users of the river and floodplain will expect to be able to access many of these areas and it is unlikely that property owners along the river will agree to allow such measures to be

implemented on their properties. In evaluating the feasibility of this option in the CMS, GE should take all of these factors into consideration.

- 9) The use of thin-layer capping or thicker capping without removal in low-velocity-flow areas is problematic. While thin-layer capping may accelerate natural recovery in the top few inches of the biologically-active zone, it is unclear how a thin-layer cap will eliminate short- or long-term exposures to both humans and biota, especially organisms that can penetrate sediments to depths of greater than a few inches. Proposed engineered capping in other areas, even shallower areas, without associated sediment removal will impact channel flow dynamics and could result in increased flooding and/or erosion in adjacent areas. Hence, attainment of certain ARARs, such as the Massachusetts Wetlands Protection Act or the Massachusetts Public Waterfront Act (Chapter 91) will be difficult and it seems unlikely that such circumstances would meet the requirements for a waiver from attaining ARARs. As already mentioned in comment 6, above, flows within Woods Pond are already considerably restricted due to the build-up of sediments behind the dam, so additional capping there may be both undesirable and infeasible. Similarly, capping in other higher-velocity flow areas in association with some sediment removal will also affect the channel cross-section and flow dynamics, particularly if armor stone is used as a cap component. In evaluating capping in the CMS, GE should take all of these factors into consideration. In applying EPA's model to evaluate the effectiveness of various remedial technologies in achieving sediment and soil cleanup goals, GE should incorporate the associated changes in flow dynamics, erosion and deposition that will result from the various capping scenarios into its model runs. The model should also evaluate the impact of the long-term PCB flux through these caps when evaluating the long-term effectiveness of these technologies in preventing human and ecological exposures.
- 10) While not having been retained for large-scale or site-wide consideration, river rechannelization has been retained for further consideration in the CMS for potential use in small sections of the river, particularly those containing meanders (i.e., future oxbows). MassDEP recognizes that the creation of meanders and oxbows is a natural process in the river, particularly in areas below the confluence. However, man-made rechannelization will accelerate this process, drastically impact flow dynamics in areas adjacent to the rechannelized portions of the channel and most likely increase erosion in other areas of the river and floodplain that are not currently subject to such intense erosion. When running EPA's model, GE should incorporate the anticipated changes in local erosion and deposition that are likely to occur in these rechannelized areas and should determine the effects of such activities on floodplain conditions and the long-term stability of remedies such as bank stabilization measures.
- 11) Two bank stabilization technologies, armor stone and revetment mats, have been retained for further analysis in the CMS. MassDEP recognizes that bank stabilization technologies may be necessary in some areas, depending upon the final mix of technologies proposed for implementation as a result of the CMS. MassDEP also recognizes that hard bank stabilization structures were used as part of the remedy in the upper 2 miles of the river adjacent to and downstream of the GE facility. However, MassDEP has a number of concerns relative to the widespread use of hard structures as bank stabilization structures in areas of the river below the confluence. The 2-mile stretch of river where these structures have been used is a relatively straight section of channel (compared the tight meanders in downstream sections) that is located in a highly urbanized area with minimal significant wildlife habitat and lower recreational and aesthetic value. By contrast, downstream river sections are undeveloped, provide significant habitat and experience significantly greater recreational use by the public. Widespread use of

hard structures in this section of the river is likely to meet with considerable community opposition. Existing wildlife habitat functions will be lost and plantings to restore lost riverine characteristics can be problematic and not all that effective. In addition, the use of hard structures along the banks of the river will affect river flow dynamics by deflecting flows to downstream sections of the channel (particularly important in areas with meanders) and banks, and may also affect channel carrying capacity and the extent of flooding. In order to remain effective in preventing exposures and recontamination, long-term monitoring and potentially frequent maintenance of these structures (as evidenced by observations in the 0.5-Mile Reach) will be required. Considering the many river miles that may be impacted, such monitoring and maintenance may be a monumental task. When evaluating the bank stabilization technologies in the CMS, GE should evaluate all of the above factors, including revising inputs into EPA's model to simulate changes to river flow, and erosion and sedimentation dynamics in the areas of the river where such stabilization measures are being proposed.

- 12) An alternative bank stabilization technology exists that was not considered for either screening or evaluation in the CMS. Bioengineering uses fast-rooting cuttings of willow, red osier dogwood, etc., and other soft structures to stabilize eroding riverbanks. This technology has several advantages: flow energy is better absorbed and diffused, rather than being strongly deflected, and banks appear more natural and provide better habitat value. For all of these positive reasons, MassDEP strongly urges EPA to request that GE evaluate bioengineering as a bank stabilization technique in the CMS.
- 13) GE proposes the use of various barriers in the floodplain to prevent contact with contaminated soils. All such barriers would require some soil removal prior to installation, in order to meet compensatory flood storage requirements, unless proper compensation could be achieved in the same reach of the river (as defined by wetlands policy and not necessarily corresponding to a reach of the river as defined in the CMS Proposal). MassDEP would not recommend the use of pavement in currently pristine areas, because of its impact on wildlife habitat, recreational use and aesthetics. Typically, large shrubs or trees cannot be planted on engineered barriers, because root structures can compromise the integrity of the barrier, so desirable habitat would be permanently lost in some such areas. Finally, the introduction of structures that minimize the infiltration of precipitation could cause increased runoff in these areas, thereby potentially enhancing localized erosion and river flows. In evaluating these technologies under the CMS, GE should take all of these factors into consideration.
- 14) For the Rest of River Site, MassDEP is not supportive of most in-situ treatment options within sediments or floodplain soils, because of potential impacts on sediment or soil structure, pH, chemistry or organic content that may adversely affect biota and be difficult to successfully ameliorate. However, once sediments or soils have been removed, treatment options become more feasible and MassDEP's Response Action Performance Standard in the Massachusetts Contingency Plan encourages the use remedial measures that minimize the long-term management of contamination at or from disposal sites, such as destruction, detoxification, and treatment options, and technologies which recycle or reuse materials. In addition, in the CMS Proposal, some of the treatment or reuse technologies were screened out without thorough analysis (such as performing treatability tests) or without providing a detailed rationale for their elimination. Because of all of the above reasons, MassDEP recommends that the following technologies be retained for further, more detailed evaluation in the CMS: particle separation, thermal destruction, and beneficial reuse. MassDEP would strongly support technologies, such as particle separation, in which treated materials could be reused in or along the river for backfilling

or for habitat enhancement purposes. Thermal destruction appears to have been eliminated from further consideration mainly because other similar facilities have met with public opposition. However, thermal destruction has an advantage over thermal desorption in that organic chemicals are totally destroyed. For this reason, MassDEP recommends that EPA require GE to fully evaluate this technology as part of the CMS. In addition, GE screened out beneficial reuse as an option for managing excavated soils and sediments. However, it is not clear from the text why soils could not be treated to achieve low enough levels of PCBs or other constituents to meet reuse requirements, particularly if this technology was selectively applied to areas having lower initial concentrations of constituents. Therefore, MassDEP recommends that GE more fully evaluate this soil management option in the CMS.

- 15) As disposal options, CDFs are likely to be met with strong community opposition and property owners are unlikely to agree to the creation of such disposal sites on their land. In addition, it will be difficult to attain ARARs, because of permanent impacts to wetland areas, including habitat and navigational impacts. The impacts of the installation of such CDFs in the river should be evaluated in model runs. The CMS should also fully describe how these areas would be monitored and maintained over the long term to ensure long-term protectiveness and should explain and evaluate the nature and cost of any necessary contingency actions.
- 16) Upland disposal facilities have been retained for further evaluation in the CMS. The CMS Proposal does not discuss the fact that such facilities have run into considerable public opposition in other portions for the site (i.e., the OPCAs) or that property owners along the river are unlikely to be willing to have such facilities located on their land. The construction of such facilities near the river may well constitute fill in the 100-year floodplain, so compensatory flood storage, possibly substantial compensatory flood storage, will be required and may be difficult to obtain. Existing pristine wildlife habitat could be affected by the construction of such disposal facilities and long-term monitoring and maintenance will be a concern. The CMS should fully evaluate all of these issues.
- 17) Page 5-19 of the text of the CMS Proposal states that a Model Input Addendum will be submitted to EPA for review and approval by April 15, 2007 and will specify modifications to a number of parameters that will be used in the model. To the extent that this information would have been useful to the public's review of and comment on the CMS Proposal, it is unfortunate that this information was not included in the CMS Proposal. MassDEP anticipates that the Model Input Addendum will be available for public review once it has been released.
- 18) When evaluating remedial options for floodplain soil, GE proposes to remove only the top foot of soil. In the CMS, GE should explain in further detail why this limited removal is protective of uses by human and ecological receptors and should also evaluate if this removal will remain protective following potential erosion of floodplain soil that might occur as a result of a major, low-frequency flood event, particularly in the presence of some of the other remedial options that have been proposed (bank stabilization, river rechannelization, CDFs, etc.).
- 19) In Section 3.6 of Appendix C (*Application of EPA's Wood Frog Population Model to the CMS*), GE states that it assumes that the habitat recovery period for remediated vernal pools will be 5 years and that all larvae that hatch in the pool will not survive until habitat recovery occurs, due to a lack of available food and cover. Considering that such inputs into EPA's model will be used to evaluate the pros and cons of vernal pool remediation, MassDEP recommends that this time frame be investigated more thoroughly (through literature investigations, consultations with

wildlife biologists, etc.) to determine if this time estimate is too large. A vernal pool was recently remediated as part of the Phase 4 Floodplain work and vegetation surrounding the pool was reestablished within the same growing season, so it appears that the recovery period could be reduced to less than one year, particularly if construction were sequenced to avoid the active breeding period and the pool substrate was enhanced, if necessary.

- 20) On page D-5 of Appendix of the CMS Proposal (*Determination of Areal Extent and Volume of Floodplain Soil Remedial Alternatives*), GE states that, for agricultural product consumption assessments, only the portion of agricultural fields within the floodplain boundary will be considered for spatial averaging and a weighting factor will be applied to account for the portion of the field outside the floodplain area. MassDEP concurs with this approach for most farming scenarios, with the exception of farms growing vegetables for human consumption (both commercial and backyard farms), because such vegetables could be planted throughout the entire field, only in the portions within the floodplain, or entirely outside the floodplain. Without known use information for a particular farm, GE should make the conservative assumption that all such vegetables come from the floodplain and not apply the weighting factor to such farms.