Comments on
The Ward Transformer Superfund Site
Operable Unit 1
Superfund Proposed Plan
By
Environmental Stewardship Concepts
Richmond, VA
On Behalf of
The Upper Neuse Riverkeeper
Neuse River Foundation
October 4, 2007

Document Summary

The Proposed Plan is a simplified document for public consumption outlining cleanup actions to be taken in the waterways downstream of the Ward Transformer Superfund site in Raleigh, NC. This contamination is the result of Polychlorinated Biphenyls (PCBs) being released during the reconditioning of old electrical transformers on the Ward property. Over time, these highly persistent and toxic compounds have been transported down tributaries leading to the Brier Creek Reservoir, Crabtree Lake, Crabtree Creek and likely the Neuse River. The Plan evaluates five alternatives for dealing with is contamination in Operable Unit 1 (OU1), or the water bodies downstream from the Ward Transformer Site, referred to as Operable Unit 0 (OU0). These options are:

1) No Action- This alternative is required and is for comparative purposes
2) Institutional Controls- Continuing current fish consumption advisories and increasing educational outreach programs
3) Monitored Natural Recovery (MNR) and Institutional Controls- Same as above but with additional monitoring of sediments and aquatic wildlife
4) Removal of sediments in the unnamed tributary to Brier Creek and Brier Creek proper, Monitored Natural Recovery (MNR) and Institutional Controls in Brier Creek Reservoir, Crabtree Lake and Crabtree Creek.
5) Removal of sediments in the unnamed tributary to Brier Creek, Brier Creek, Brier Creek Reservoir, Crabtree Lake, and Monitored Natural Recovery (MNR) with Institutional controls in Crabtree Creek

These options were developed based on a Remedial Investigation (RI) and a Feasibility Study (FS) released as separate, large documents. We have included comments relevant to the RI and FS because the Proposed Plan depends on them and the Technical Assistance Grant was finalized after the release of the RI/FS. The options were evaluated by EPA and compared to assess the ability of each alternative to protect human health, meet legal requirements, the potential for the public to accept the remedy, performance in the short and long term, the ability to reduce the toxicity of contaminants, and cost. Based on these criteria, EPA selected Alternative #4: the removal of sediments in the unnamed tributary to Brier Creek and Brier Creek proper; Monitored Natural Recovery (MNR) and Institutional Controls in Brier Creek Reservoir, Crabtree Lake and Crabtree Creek.

Issues and Recommendations

- **Crabtree Lake was created as a recreational facility, and Brier Creek Reservoir supports recreational uses, meaning these two water bodies must be cleaned to protect these human uses**
- **The Proposed Plan and the Feasibility Study are based on incomplete data and assumptions of reduced risks that are the result of an inadequate Remedial Investigation**
- **The Feasibility Study incorrectly classifies lower PCB concentrations downstream from the Ward Transformer site as "recovery"**
- **Monitored Natural Recovery does nothing to address the contamination most directly affecting human health and the environment**
- **The focus on human health in the Feasibility Study has resulted in the development of alternatives that do not adequately protect wildlife**
- **The Remedial Investigation did not account for new information on the toxicity of PCBs and local waters to clams**
- **None of the alternatives discussed in the Plan address contamination in floodplain soils around Brier Creek**
- **EPA and Ward Transformer should expand the removal actions proposed for Reaches B, C, and D to include floodplain soils**
- **Alternatives for Brier Creek Reservoir, Crabtree Lake, and Crabtree Creek should be reevaluated and include increased sampling to identify and remove "hot spots"**
- **Alternative remediation technologies like biomremedation should be considered as well as limited dredging**

Comments on the Proposed Plan

The Proposed Plan inevitably shares many of the same weaknesses as the Remedial Investigation (RI) and Feasibility Study (FS). Sampling associated with the Remedial Investigation (RI) did not adequately characterize deeper sediments or floodplain soils in upper Brier Creek. Inadequate sampling has failed to accurately describe the linkage between PCB contamination in sediments in Brier Creek Reservoir and Crabtree Creek to the levels recorded in fish tissues. "Hotspots" of contamination are likely the source of PCB's, but sediment sampling has been cursory and has not been complete enough to locate any hot spots. The strength of the Plan's proposed alternatives suffered as a result of the underestimation of risks in the Remedial Investigation. The Plan's focus on alternatives involving Monitored Natural Recovery (MNR) is primarily the result of a combination of flawed assumptions in the Feasibility Study.

The Feasibility Study inaccurately concluded that the decrease in PCB concentrations further away from the Ward Transformer site are the result of a natural “recovery,” when it is more a function of the persistence of PCBs and the time sediments have had to travel downstream. The final factor skewing the plan towards Monitored Natural Recovery (MNR) is the assumption used in the Feasibility Study that actions protective of human health would also protect wildlife. This assumption is not the case as the Monitored Natural Recovery (MNR) alternative leaves contamination at current levels in some areas that is high enough to affect wildlife, and institutional controls such as fish consumption advisories do nothing to lower PCB concentrations in fish. As noted in the Feasibility Study and below in our comments on the same document, Monitored Natural Recovery (MNR) has a mixed track record at best and should be dropped as an alternative for areas with PCB’s levels above 0.5 ppm. Several species of fish and mammals are known to be more sensitive to PCBs than are humans, and the cleanup needs to protect these species as well.

The plan’s failure to address floodplain soils is also a major flaw. These soils act as both sources and sinks for PCBs in aquatic systems. Severe weather and associated flash flooding actively transport contaminated sediments from flood banks downstream. Any gains made from removing contaminated sediments from within the stream itself will be lost over time as PCBs slowly migrate from floodplain soils back into stream sediments. The proposed removal actions in reaches B, C, and D (Brier Creek and its unnamed tributary) should be expanded to include contaminated floodplain soils.

It is also important to include discussions of remedial actions at the Ward Site itself (OU0) when considering contamination farther downstream. The contamination in downstream waters below the Ward Site (OU1) is the direct result of PCB runoff from the original Ward Transformer site. The effectiveness of the cleanup of the Ward Site itself will have direct implications on the success of any efforts in Brier Creek Reservoir, Crabtree Lake and other waters. This part of the cleanup represents a critical element of source control for Brier Creek Reservoir and Crabtree Lake (OU1) and cannot be ignored.

Recent publications (Lehmann 2006 and Lehmann et al., 2007) present alarming results of bioassays on clams exposed to low levels of PCB’s or to waters in the Crabtree/Brier Creek watershed system. Lehmann and co-workers performed a series of biological assays on Asiatic clams as test animals for the water quality of Brier Creek Reservoir. One series of assays involved placing clams in bags into the creeks and sampling them after 21 days. The lab phase of the work involved exposing clams to three concentrations of PCB’s in controlled conditions. In both experiments, the clams suffered damage at the cellular and molecular level. The major impact on the clams was reproductive failure because the gonads were damaged by the PCB's. Clams exposed to water without PCB's, or in the reference creek not downstream from the Ward site, showed no such responses.

The remarkable result was that the field assay gave fairly clear results in terms of damage to the clams, but little variation from upstream to downstream, as occurred in the lab experiment with increasing concentrations of PCB's. The damage caused by PCB's in the lab mimicked the results observed in the field, despite the obvious inability to control the field conditions. Additionally, estimated water concentrations in the field (0.05 – 0.18 ppt) were consistent with those measured in the Remedial Investigation (RI), but were lower than the levels to which clams were exposed in the lab (1, 10 100 ppb).

The significance of the clam bioassays is that current conditions are causing biological impairment in the downstream segments of the Brier Creek system, even where sediment and water concentrations are less than action levels. Clams, as filter feeders that live in the sediment, are exposed to both dissolved PCBs and PCBs bound to sediment that is suspended or on the immediate surface of the bottom. These waters and sediments as now sufficiently toxic to impair the reproductive system of the test clams and surely any resident clams.

These results also provide cause for concern over any rare and endangered freshwater bivalves (mussels) that may have occurred in the Brier Creek system or that may be introduced as immature mussels. Under present conditions, one can expect such mussels to die in the Brier Creek system.

Coupled with the elevated fish tissue PCB levels, the clam reproductive impairment data indicate the necessity of cleaning up the PCB sources in the Brier Creek system. If the present results are an accurate and complete characterization of the PCB contamination, then the seemingly low levels in Brier Creek Reservoir and downstream waters are far more harmful than assumed in the Remedial Investigation and Ecological Risk Assessment. On the other hand, the downstream waters may not be accurately and completely characterized, and higher levels of PCBs in sediments are yet to be identified and these sediments are the source of the toxicity to clams and PCBs in fish.

The clam bioassay investigations by Lehmann (2006) and Lehmann et al. (2007) provide compelling evidence that the Brier Creek system contains PCBs in concentrations that impair the animals living there. The source investigation and cleanup need to thoroughly delineate the PCB levels throughout Brier Creek Reservoir and Crabtree Lake and in surrounding areas.

Comments on the Remedial Investigation

General Issues

The Remedial Investigation (RI) does not give any soil sampling data for the Ward Transformer Site itself (OU0). This omission is curious because contamination in these areas have a direct effect on the contaminated tributaries and water bodies draining into the Neuse River Tributaries (OU1). The two problems are inseparable and cannot be discussed without mentioning the other. The great concern is that remedial options for each site will be developed in a vacuum.

While not directly related to OU1, the RI notes frequently in its background discussions that after 1979 only transformers with lower concentrations (< 50 ppm) were processed at the site. These transformers still contained PCBs, and plans at OU0 should be reviewed to make sure that the assumption that the reconditioning of these transformers carried no risk. Contamination from PCB oil at a level of 50 ppm can easily result in contaminated soils with PCB levels well in excess of remedial targets, and even near 50 PPM, therefore the fact that PCb's were at 45 ppm in the processed equipment is no assurance that contamination is below action levels. Indeed, 50 ppm PCB is a serious contamination problem. Please see the attachment "TEQ Methodology" for a more complete explanation of how risks from PCBs and dioxins are evaluated

Sampling

While the site has more fish tissue data than a number of other sites we have worked on, there is a dearth of data on soils, and sediment composition in Reach B (Little Brier Creek). A total of 20 soil samples were taken over the entire study area, hardly enough to characterize the entire floodplain. That is a mere 5 samples per reach, and most were focused on human health endpoints around Crabtree Lake and to identify continuing sources to the watershed. This is hardly enough to characterize contamination in floodplain soils. Obtaining more complete data on these soils is critical to controlling PCB contamination in the Neuse River. Floodplain soils act as both sources and sinks for PCB contaminated sediments in waterways. The RI contains no real discussion of major weather events and how they may affect contamination at the site, and this is reflected in the low number of samples taken from floodplain soils. Small streams like the unnamed tributaries to Brier and Crabtree Creeks as well as Brier and Crabtree Creeks themselves are prone to flash flooding. These floods can bring PCB and dioxin contaminated sediments far from established stream banks.

Stream sediments are also insufficiently characterized. Only four sample locations examined sediments greater than 24 inches beneath the surface. The highest levels of contamination in stream sediments will correspond to peak loadings, considering the delay between spill, introduction into the waters and transport down the creek. The deepest sediments are not likely to be as contaminated as those on the surface, but it is important to characterize them in order define the depth of maximum contamination, the maximum depth of contamination and to better evaluate remedial options. Even low levels of contamination at these depths could affect dredging depths or other actions.

As noted above, there are an adequate number of fish tissue samples to characterize the site. However, the RI notes that catfish had their skins removed before they were analyzed. The reason for this is not stated. Wildlife that consume catfish and many fishermen do not remove these tissues before eating the fish, so it is unacceptable to evaluate whole body concentrations for the purposes of risk assessments without them. Other fish samples appear to have been handled properly.

The Mayor of Raleigh created a scientific panel to evaluate the adequacy of sampling associated with the cleanup of the Ward Transformer site. Many of the sites recommended by the panel were not included in the RI. No explanation for not taking these samples was given in the report. EPA needs to address why they did not include these in the investigation.

Human Health Risk Assessment

After reviewing the Remedial Investigation (RI) portion of the document, the most disconcerting problem was not with the document, but with changes or specific rules proposed by the regulatory agencies. In particular, the soil screening values of two toxic metals (arsenic and lead) were set dangerously high at the request of NCDENR or EPA Region 4. The residential screening value for lead was set to 400 mg/kg. This value is almost twice that used in many superfund cleanups around the country. Lead is highly toxic with no lower threshold for adverse effects, particularly in children. In other words, there is no “safe” dose of lead, and any dose will result in measurable health effects (see CDC website).

After the initial draft of the RI was released, EPA Region 4 sent out a bulletin setting a PRG based on noncancer-based endpoints. The resulting chronic reference dose for children was 20 mg/kg and 160 mg/kg for adults. The 20 mg/kg concentration can be considered dangerous to adults based on risks associated with cancer, and would be highly toxic for the stated endpoint of a child’s health. It is highly disconcerting that regulatory agencies would exert their influence to establish such unprotective screening levels, particularly since the result effectively prevents lead and arsenic from becoming COPCs in future investigations.

The Baseline Human Health Risk Assessment (BHHRA) fails to examine an important and likely scenario: intrusive operations into the soil by construction workers in the future in the area immediately downstream from the Ward Site, Reach A. This area, Reach A, is the most contaminated Reach examined by the BHHRA, and is directly adjacent to the Ward Transformer Site and the Ward stormwater treatment outfall. Given the pace and extent of residential development in the area, and the demand for open or green space in residential areas, the plan must envision residential use of all areas covered by the Proposed Plan.

The report erroneously concludes that there is no risk in many of the scenarios outlined in the BHHRA. This error occurs primarily because the BHRA uses a less protective screening value of E-04 (1 in 10,000) instead of the more appropriate E-06 (1 in 1,000,000). For many of the Chemicals of Potential Concern (COPCs), particularly PCBs and dioxins, additional health effects are routinely found at lower and lower doses. The 1 in 1,000,000 screening level was designed to provide a margin of safety for these types of pollutants. The fact that the proposed Superfund plan is based around the higher risk threshold should call into question the effectiveness of the overall plan.

Ecological Risk Assessment

The most significant problem of the Baseline Ecological Risk Assessment (BERA) is that the focus is on PCBs, while metals and other toxic compounds are completely ignored. Other compounds weren't even screened despite the sensitivity of wildlife to many of the pollutants present such as aluminum. While PCBs and dioxins are by far the most toxic compounds released by Ward Transformer, they are not the only source of risk to wildlife. The omission of these other contaminants had a profound effect on risk estimates for wildlife.

The recent results of clam bioassays by Lehmann (2006) and Lehmann et al. (2007) indicate that current conditions cause reproductive impairment to at least some aquatic species. These results were apparently not included in the ecological risk assessment, thereby omitting important toxicological information on risks to aquatic animals.

In addition, risks to wildlife are significantly underestimated based on the way that Toxicity Reference Values (TRVs) were calculated. No safety factors for increased species sensitivity were incorporated into these calculations when the species used in the laboratory were different than the target wildlife species. The report attempts to dismiss the significance of safety factors by erroneously claiming that laboratory species tend to be more sensitive than wildlife species. Such a generalization is not true, particularly for avian receptors. Bald eagles are certainly more sensitive to PCBs than pheasants or chickens. Among mammals, mink are among the most sensitive and are not often used in lab tests.

The report admittedly underestimates risks from PCBs to raccoons and mink by ignoring some pathways such as oysters and mussels. A study was originally planned to characterize mussel tissues but was cancelled. Given the amount of sediment that bivalves take up, it is likely that they are a significant pathway for PCB uptake to their predators. It is encouraging to see the RI openly admit this flaw in their design, but unfortunately these omissions simply compound the flaws noted above.

Despite the fact that Lake Crabtree currently has fish advisories in place based on the concentration of PCBs and dioxins found in fish tissues, the BERA found no risks to fish and crayfish at the Lowest Observed Effect Dose (LOED). Besides the obvious problem with combining toxicity data for two species of completely different phylogenic groups, this finding contradicts all available evidence. The body burdens reported in the RI could be high enough to cause reproductive problems in sensitive fish and developmental problems in fish fry (Rice et al 2003). Both of these endpoints are critical to the ongoing health and survival of fish populations, and neither appears to have been considered.

In addition to the above, there are a number of other issues with the BERA: Bald eagles were not examined in all reaches, a gap in crayfish sampling resulted in the omission of risk assessments in one reach, the use of maximum detected values when 95% upper confidence limits were exceeded, and the assumption that mink and bald eagles do not accidentally ingest soils or sediments. All of the above issues, though small in comparison to others, result in the underestimation of risks to wildlife. Any one of these issues could potentially be enough to make the difference between a target species exceeding acceptable risk levels. Serious flaws such as these and others noted above represent serious issues that should be considered when determining the acceptability of the proposed Superfund plan.

Feasibility Study

The Feasibility Study (FS) is substantially lacking compared to the Remedial Investigation (RI). Some of these shortcomings are a direct result of inaccuracies in both the ecological and human health risk assessments. However, these flaws are insignificant compared to one supremely flawed assumption in the FS regarding Reach A, just downstream from the Ward Site.

Reach A is defined as the unnamed tributary to Brier Creek directly adjacent to the Ward Transformer property. This Reach contains the highest concentrations of PCBs of any of the water bodies in Operable Unit 1 (OU1). Though this Reach was investigated under the RI for OU1, remedial options for this area will be selected and performed under the cleanup for OU0, the Ward Transformer property itself. Though odd, there is nothing wrong with this approach in practice if handled properly. However, one passage in Section 4.1.1 indicates that the cleanup of this Reach is being approached in a manner that is not consistent with the protection of downstream locations:

> "The drainage area around the Ward Transformer property is approximately 120 acres, and Reach A is a tiny tributary (2 feet wide and less than 1 foot deep) to Little Brier Creek. As a result, the contaminated sediment loading from soil and

> sediment erosion around the Ward Transformer Site is relatively small compared to the uncontaminated sediment loading from other segments of the Little Brier Creek watershed (5200 acres) and downstream watersheds (e.g., Brier Creek). The practical result of this mixing of relatively small amounts of contaminated sediments with larger amounts of uncontaminated sediments is that the PCB contamination from Ward Transformer is diluted by these "clean" sediments. This form of natural recovery is occurring, as evidenced by the drop in PCB concentrations in downstream sediments as each new stream with uncontaminated sediments empties into Little Brier Creek and Crabtree Creek."

There are a number of problems with the concept in this paragraph. The first problem is the disturbing failure to incorporate accurate scientific information regarding the nature of PCBs and their fate in the environment. Because PCBs are so persistent in the environment (they can remain for hundreds of years under some conditions), the "dilution" of these sediments with "clean" sediments downstream is irrelevant. The fact that over time the contamination in these sediments has made its way all the way down to Crabtree Lake to deposit in concentrations high enough to justify fish consumption advisories for PCBs is evidence that dilution does not play a significant role in the long term compared to other factors. The above approach addresses the contamination in an outdated "dilution is the solution to pollution" mindset, and assumes that all Reaches of OU1 were contaminated at the same time.

The concept that "dilution is the solution to pollution" has been applied in the Clean Water Act for decades and is based on the chemical, physical and biological interactions of "conventional" pollutants in water. "Conventional" pollutants are nutrients (nitrates and phosphates), bacteria, heat, acidity, sediment and organic matter (carbon material from the breakdown of plant and animal matter). In the case of these pollutants, estimates of allowable releases assume that degradation, breakdown, biological absorption and/or other natural processes cause reductions in the amount of the pollutant in the water body. In other words, these pollutants are not conserved, but are processed in a way to be removed from the system. Sediment is the exception; the assumption is that sediment is a natural part of the benthos and can be incorporated into the benthos upon settling. PCB's and other persistent organic pollutants do not have the properties that permit degradation, breakdown, transformation or other removal from the system in appreciable levels. PCB's are conserved and persist in the aquatic environment, hence the assumptions necessary to apply the "dilution" approach are simply not met.

Furthermore, the impacts of conventional pollutants are short term from a toxicological extent. These conventional pollutants cause fairly rapid impacts to the system in the area of the release. Not so with PCB's and other persistent organic pollutants. PCB's exert their effects over long periods for as long as they remain in the system and subject to uptake by biological receptors. PCB's have no short term (i.e. acute) effects at the concentrations found in aquatic systems at contaminated sites.

An examination of the basic properties of small (low order) streams completely discredits this assumption when combined with the fact that PCBs are incredibly persistent in the environment. Streams are dynamic environments with a wide variety of flow regimes both temporally and spatially. Sediments will be deposited in some areas with lower water velocities that may change depending on the current discharge rate of the stream. During periods of higher than average discharge, these deposition patterns can change significantly. Areas that at one time were depositional can be subject to water velocities that scour and move sediments downstream. Flash flood events (common in these small order streams) interact with floodplain soils, depositing or transporting soils from these areas in unpredictable fashion. The assumption that sediment loadings can be accurately estimated from drainage areas is also scientifically unsound. The statistics cited in the text apply only to *water* discharges and not sediment. Sediment transport is a factor of many variables, including water velocity, sediment particle size, and land use that are not addressed in either the RI or the FS.

Another major problem with the quoted passage is that decreasing PCB concentrations in sediments further from the site **are not** evidence of any sort of "recovery." These reductions are a function of distance from the Ward Transformer site and *the time that these contaminated sediments have had to travel downstream*. In no way, shape, or form should these lower concentrations be construed as "recovery," as the contamination in these downstream areas is likely composed of sediments originally contaminated in Reach A when Ward Transformer first began to process PCB contaminated transformers in the 1960's. Properly cleaning up the waterways downstream from Ward Transformer requires the basic understanding of these facts. Unfortunately, it appears the approach demonstrated in the quoted passage is applied to the rest of the FS as well.

Another major problem with the plan to let the downstream waters "recover naturally" is that the reservoir and the lake will have to be dredged one day to prevent sediment from filling in each water body. When the dredging is conducted, the buried PCB-laden sediments will be uncovered, resuspended and once again serve as a contaminant to the aquatic system. A more complete description of MNR and its effectiveness can be found in the attachment "Monitored Natural Recovery in Aquatic Systems.

As previously noted in comments on the RI, there is a significant dearth of data on floodplain soils around the various reaches. Perhaps related to this, there is no proposed remedy for floodplain soils within the FS. Data have shown that at least portions of these stream banks exceed the remedial goal of 1 ppm of PCBs. It is critical to clean up these areas as they serve of both sources and sinks for PCBs in and out of the waterways. A failure to act in these areas will only result in the continued addition of PCBs to sediments downstream.

The FS evaluates in a number of different alternatives using “monitored natural recovery” (MNR) as a remedial option. MNR is essentially the act of doing nothing and watching nothing happen. The Feasibility Study notes the lack of long-term data on MNR, and this observation is exactly right. Past experiences with MNR on the James River, Virginia have shown that even as overall sediment concentrations of the toxin Kepone decreased with new deposition over time, Kepone concentrations in fish have remained steady at levels high enough to warrant continued fish consumption advisories more than thirty years after the toxin was originally dumped into the watershed. The Hudson River (NY) offers another example of MNR’s poor record. After more than 25 years following the decision to do nothing, the contaminated sediments have to be removed from the river because fish tissue PCB levels remain unacceptable with insufficient decline for the foreseeable future. Newark Bay and the Passaic River in New Jersey are additional places where PCB’s, dioxins and pesticides from the 1960’s are still present and causing problems. The buried sediments from decades ago are still presenting risks to human health and the environment. This alternative is better described as “No Action with Monitoring.”

Sediment sampling in Brier Creek Reservoir and Lake Crabtree detected low PCB concentrations, seemingly less than action levels, but PCB concentrations in aquatic biota are high enough to present risks to both human and wildlife. The PCBs have to be entering the food chain from somewhere, and the most likely place is sediments in the two water bodies. Sediment sampling in these two water bodies was relatively sparse (particularly in Brier Creek Reservoir), and did not look at deep enough sediments in many locations. “Hot spots” of contamination can have significant effects on biota, and need to be identified. Previous sampling efforts have obviously missed something, and need to be revisited. It is unclear if major depositional areas at the mouth of Brier Creek leading into the Reservoir were sampled, but these areas could be a potential source of PCBs for wildlife in the Reservoir and points downstream.

The natural recovery (MNR) alternative has been offered as the preferred remedy in Brier Creek Reservoir, Crabtree Lake, and Crabtree Creek in combination with institutional controls (fish consumption advisories) that are already in place. Again, this alternative is not a substantive change from the status quo. Fish tissues would have to continue to be monitored because of the advisory. The only change is that monitoring and review will occur more often. This action is not protective of human health because it allows for continued long-term risks related to the primary risk driver to humans over the entire site-fish consumption. This approach also does not address risks to ecological receptors. The Bald Eagles nesting near Lake Crabtree cannot not read warning signs and do not count how many meals of fish a month they have eaten from these water bodies.

Both Crabtree Lake and Brier Creek Reservoir are used recreationally by virtue of proximity to the population, even if they were originally intended for flood control. The consequence of the recreational uses is that human and ecological uses and health must be protected for the entire system, from the Ward Site proper to Crabtree Creek, below the lake. In order to maintain the lake and reservoir as open water bodies that can fulfill their role in flood control, each will have to be dredged to remove the accumulated sediment, and maintain depth. Therefore, the proposed plan must account for:

1. continued recreational use,
2. protection of stable and viable populations of indigenous plants and animals in the waters and nearby terrestrial areas, and
3. dredging to maintain the water bodies as open waters.

The Feasibility Study and the Proposed Plan does not account for these factors. In particular, the effect of the accumulation of sediment in Brier Creek Reservoir and Crabtree Lake on their ability to control flood events is overlooked. The preferred alternative would effectively bar future dredging operations indefinitely. The EPA needs to evaluate whether the minimal long-term gains provided by MNR are outweighed by the risks of degrading the two water bodies' ability to perform their original function.

One of the major flaws of the FS was the limited scope of the remedial options considered. Because of the small scale of much of the cleanup, it offers an excellent opportunity to evaluate new treatment technologies such as bioremedial techniques like the enhanced microbial decomposition that have been explored by researchers like Bedard et al (2007). The FS also only evaluates dredging the entirety of Brier Creek Reservoir and Crabtree Lake. It is possible that with increased sampling hotspots of contamination could be located, and these limited areas could be dredged at a far reduced cost. The EPA should thoroughly explore these options.

The focus on human health in the FS creates another significant problem. The document makes the assumption that if the human health endpoint in protected, then wildlife receptors will also be protected. Unfortunately, many of the assumptions used in the human health risk assessment such as limited amounts of exposure times are inappropriate for wildlife that spend their entire lives in the exposure area and consuming PCB contaminated biota. CERCLA demands that remedial actions be protective of wildlife, particularly endangered species. The focus on the human health endpoint to the exclusion of all else has resulted in "institutional controls" being a significant component of the preferred alternative. As noted above, since these controls are based on the knowledge and voluntary adherence to fish consumption advisories, they have no bearing on wildlife that cannot make rational decisions regarding diet outside their own instinctual needs. By focusing on human health, the document marginalizes the findings of the Remedial Investigation risk assessments.

Summary and Recommendations

The Proposed Plan is built upon a number of poor assumptions that were carried through from the RI/FS. The one with the most significance to the cleanup of OU1 is that water bodies downstream from the most contaminated areas are recovering. There is absolutely no evidence of this occurring, but this “recovery” was cited in the recommendation of the MNR alternative in Brier Creek Reservoir, Crabtree Lake, and Crabtree Creek. This assumption also allowed Ward Transformer to avoid answering difficult questions regarding the contamination in these areas. Dilution is not the solution to persistent organic pollutants. If sediment concentrations across the two major water bodies were so low, then how are PCB concentrations in fish so high as to require consumption advisories? The failure to sample these reaches more substantially is a major data gap, and additional sampling is required to establish the source of PCBs in these fish.

The assumption in the Feasibility Study that actions protective of human health would also be protective of the environment also affected the recommendations in the Proposed Plan. Dangerous levels of PCBs remain in fish that present a direct risk to endangered wildlife such as Bald Eagles, however the preferred remedial alternative of MNR will do nothing to address these risks. The selection of this alternative in points downstream of Reach D would mean that the proposed plan would not meet all Applicable or Relevant and Appropriate Requirements (ARARs), particularly regarding the protection of endangered species. Voluntary Institutional Controls like fish consumption advisories do not benefit wildlife.

Even if the Proposed Plan did not make these assumptions, it would still be unacceptable because it lacks any measure of future source control. The plan makes no mention of cleanup activities at OU0 or the need to excavate contaminated soils in the floodplain Floodplain soils act as both sources and sinks for persistent organic pollutants, and therefore must be addressed. While we understand that remedial actions have already been selected and begun to be implemented at the Ward Transformer property, they must be discussed when evaluating OU1. If the cleanup of OU0 is inadequate, it will affect the cleanup of OU1 as well. Therefore future documents regarding sites downstream of the Ward Transformer property should include discussions of the remedial actions at OU0 as well.

Based on the above problems, we recommend that the Proposed Plan be modified to provide greater and more immediate protection to wildlife in addition to eliminating all potential sources of PCBs to OU1. This would require that Monitored Natural Recory (MNR) be dropped as the preferred alternative downstream from Reach D. The wildlife in these areas does not have fifty years or (likely) more to wait for PCBs to degrade to acceptable levels. Instead, Brier

Creek Reservoir and Crabtree Lake need to be sampled more thoroughly to identify any hotspots of contamination and locate the source of the PCBs bioaccumulating in fish. The additional sampling proposed in Reaches B, C, and D should also include floodplain soils, and contaminated areas should be excavated. If these areas of contamination are not addressed, it will not matter how thorough the rest of the cleanup is because PCBs will continue to be added to the streams and lakes every time there is a major rain event as sediments are transported from the floodplain downstream.

References:

Bedard, DL, KM Ritalahti and FE Löffler. 2007. *Dehalococcoides* in a sediment free, mixed culture metabolically dechlorinate the commercial polychlorinated biphenyl mixture Aroclor 1260. Applied Environmental Microbiology. In Press.

Lehmann, D.W. 2006. *Oxidative Stress in the Aquatic Environment: Effects of Hypoxia and Polychlorinated Biphenyls in Fish and Molluscs*. Ph.D. Dissertation, North Carolina State University, Raleigh, NC.

Lehmann, D.W., J.F. Levine and J.M. Law. 2007. Polychlorinated biphenyl exposure causes gonadl atrophy and oxidative stress in *Corbicula fluminea* calms. Toxicologic Pathology 35: 356-365.

Rice, C.P, P.W. O'Keefe, and T.J. Kubiak. 2003. "Sources, Pathways, and Effects of PCBs, Dioxins, and Dibenzofurans." Handbook of Ecotoxicology: Second Edition. Ed. D.J. Hoffman, B.A. Rattner, G.A. Burton Jr., and J. Cairns Jr. Lewis Publishers, New York, NY. Pg. 501-573.