

Commentor #5

(29) *On page 7 the Health Consultation states "... It is unlikely that...nor is it an attractive play area for children," This is an unrestricted residential area and children can and do play in these areas.*

Response: ATSDR agrees that children have played in the area south of Centredale Manor. This was explicitly stated in the health consultation. However, ATSDR does not believe that a child would access this area every day over a period of many years, as could occur in a child's backyard. As stated in the consultation, direct contact with the soil would be limited by the heavy groundcover of leaves and vegetation. It is also unlikely that young children (who might engage in hand-to-mouth activity) would frequently access the area. Children who access this area would most likely be older children (6 years or older) who are not likely to engage in frequent hand-to-mouth activity.

The area has now been fenced and posted by the EPA, so future exposures of residents to contamination in this area are unlikely to occur.

(30) *"...Centredale manor is the major source of dioxin contamination..." No source has been documented to date.*

Response: See response to comment 17.

(31) *Conclusion (6), "if land use changes..." Currently these areas are unrestricted residential properties. How would the land use have to change to be a concern?*

Response: EPA testing has documented the presence of dioxin contamination in soil and sediment in the wetlands and flood plains area around Centredale Manor property. Land use changes in this area that result in increased opportunities for people to come into contact with this contamination would be of concern. An example of this would be if the property along the river were to be converted to a public greenway with unlimited public access. Any change in land use would warrant a re-evaluation of possible exposure scenarios.

(32) *Recommendation (5). How has ATSDR determined that a clean up standard of 1 ppb is an appropriate?*

Response: See response to comment 2.

Commentor #6

(33) *The data collected to date do not support Conclusion #1 that "...the Centredale Manor property is the major source of dioxin contamination in the Woonasquatucket River." The recommendation section needs to be expanded to include a recommendation for conducting studies to better characterize the source. Although the Centredale Manor site has always been suspected as a source of dioxin leading to fish contamination, the actual source has not been identified. The existence of multiple sources on either side of the River are consistent with the available data. During the public meetings, Management*

Committee members have testified that the source(s) still have not been conclusively identified. In addition, Management Committee members have agreed that the second phase of sampling needs to incorporate a plan for identifying the source(s) of dioxin. Conclusion #1 in the Health Consultation is a significant departure from this position.

Response: See response to comment 15.

(34) The draft Health Consultation does not address some of the major health concerns associated with dioxin: the word "cancer" is not used; no information is provided which would allow the reader to put the exposures from the Woonasquatucket River into the context of likely exposures from other sources; and the document does not address concerns about the public health implications of "background" levels of dioxins and how these exposures related to the Conclusions of the consult.

Response: See responses to comments 3 and 4.

(35) The RI Department of Health recommends that the ATSDR qualify Conclusions 4 and 5 about which exposures are not a public health hazard. The ATSDR makes no implications about exposure in these two conclusions. In addition, these conclusions run counter to RI DOH advice to the public that microbiological contamination of soils and sediments along the Woonasquatucket can present a public health hazard.

Refer to Conclusions 3 and 6 for examples of how exposures need to be qualified. With respect to the issue of soils and sediments, the ATSDR has overlooked the public health hazards caused by pathogens.

Response: Conclusions 4 and 5 address dioxin and other *chemical* contaminants in sediment and surface soil from the Lee Romano Ballfield. These statements were not qualified since the concentrations of chemicals in these areas are not considered to be of public health concern for plausible exposure scenarios. ATSDR did not evaluate the risk of microbiological contamination in soil and sediment along the Woonasquatucket River.

(36) The document focuses appropriately on dioxin contamination in fish, soil and sediment. However, no mention is made of data on other contaminants in fish (available from EPA or in sediment (available from DEM). Public concerns extend beyond dioxin.

The ATSDR has an opportunity to provide a comprehensive overview of the public health consequences of activities along the river. While dioxin has received the most media attention, other chemical/microbiological agents may pose greater acute or chronic health hazards. Such an overview would be of great assistance to groups like the Woonasquatucket Greenway project which are faced with many difficult questions about the appropriate and safe development of urban resources.

Response: Most of the data provided to ATSDR was for dioxin contamination. Other contaminants were also detected in fish, but the dioxin contamination, by itself, warrants the fishing advisory. Microbiological contamination, while briefly addressed in the consult, is generally outside the purview of ATSDR.

(37) The RI DEM has data on the levels of bacteria, metals and other contaminants in the Woonasquatucket River and data on contaminants in River sediment. These data could be used to support Conclusion #3 and expand upon the contaminants included in the Health Consultation.

Response: ATSDR based its evaluation on the data and information provided by March 1, 1999. Upon request, ATSDR will assess other environmental chemical contamination data for its impact on public health.

(38) Anecdotal information exists about consumption of turtles from the River. Recommendations about not eating fish could be expanded to other aquatic animals.

Response: Levels of dioxin in turtles are not known. Turtle consumption patterns along the Woonasquatucket also are not known. However, ATSDR agrees that the fish advisory would reasonably extend to other aquatic life along the river such as turtles.

(39) On page 8, the second paragraph in the Drinking Water Wells section is a better description of the results than that presented on the next page under Conclusion #7.

Response: The wording of the conclusion was revised.

Commentor #7

(40) The report may have been more helpful had a map been included for reference to specific sites.

Response: ATSDR agrees. A map with geographical reference points will be included in the health consultation.

(41) The References are actually footnotes, and no listing of in-depth reviews of literature on human exposure to dioxins. The latest journal article referenced is dates 1992, with one dating to 1981. In addition, the ATSDR's own recent (Dec. 1998) Toxicological Profile for Chlorinated Dibenzo-p-dioxins (update) is not included.

Response: See response to comment 3

(42) The report lacks sufficient conclusions on the health implications, cancerous and non-cancerous, of exposures with concentrations of fish and in soil/sediment documented thus far in the EPA investigation of this site.

Response: ATSDR's health consultation indicates whether exposure to dioxin contamination in fish, sediment, and soil poses a public health hazard (Conclusions 1, 3, 4, and 5). It is not possible to predict whether cancer or non-cancer health outcomes will occur in individuals or populations that are exposed to dioxin contamination in the environment.

(43) The conclusions are not well documented from the data presented. Only one source is cited for

dermal exposure and that one study is a lab rat study (cf pg. 5, Draft Document). The details of the study as to its providing an analog to possible exposure scenarios in the Woonasquatucket case are unclear, for example, what was the particular size and moisture content of the dioxin contaminated soil? Was the conclusion of absorption probability based directly on the rat outcome or was it extrapolated to human conditions of pore size, circulation rate, body temperature, etc.?

Response: For experimental details of the referenced study, please see the original article. The study was done with rats; other studies have shown that rat skin is 10 times more permeable than human skin to a variety of drugs and pesticides. Collectively, these studies provide scientific documentation that dioxin is not well absorbed through intact human skin.

(44) The conclusions are based on preliminary data, and the draft health consultation does not note that more samples have been taken but not reported at the date of the Draft and that these represent only samples from 0-3 inches from the surface, and not necessarily soil or sediment that may be exposed by flooding flow rates.

Response: This health consultation is based on data available to ATSDR in February of 1999. Upon request, ATSDR will evaluate additional data and information as they become available.

(45) The lack of a map with specific references for the sites and the assertions related to those sites is troubling. The draft health consultation uses the words "upper" and "lower" portions of the Woonasquatucket with multiple meanings. On page 1, paragraph 3, "lower portion" means below Lonigan Dam in Providence. On page 2, last paragraph, "lower" means below Route 44 in North Providence (a separate municipality from Providence). On page 4, paragraph 2, the use of upper and lower creates a mis-statement of fact. In fact one sample of the fish was taken in the river adjacent to, but perhaps slightly (feet) upstream from the concentration of contamination at, the Centredale Manor-Brookfield Village complex.

Response: ATSDR agrees. The health consultation was revised for clarification.

(46) Possible Sources of dioxin: One possible source, based on surficial soil sampling, may be the chemical company formerly located in the area of Brookfield Village/Centreville Manor. Little effort was extended for this report to identify the products of this company which may provide further corroboration of evidence for locating source of dioxin contamination. In addition, more than one source may be implicated, as for example the barrel-washing operation also operated on the Brookfield Village-Centredale Manor site, or an as-yet unsurveyed part of the river.

A report dated February 24, 1998, from Ann-Marie Burke, Toxicologist, U.S. EPA Region I, in Appendix A-4, shows a higher concentration in sediments of 2,3,7,8-TCDD at Lymansville Dam (5,970 pg/g dry weight) than at Allendale Dam (4,170 pg/g dry weight). Although this result may indicate sediments washed downstream when the Allendale Dam breached approximately 7 years ago.

Furthermore, a memo from the U.S. EPA Lab at Narragansett Rhode Island which analyzed sediments which are referenced in the paragraph above, notes "...Instead, it appears that there may be two major source types contributing to these distributions. The high molecular weight PCDD/F's (hepta- and

octochloro congeners) are probably associated with the use of pentachlorophenol. This compound has been widely used as a wood preservative and in the textile industry. Based on concentrations measured in the sediments, this compound may have entered the river at several locations. It appears that another source of PCDD/F's may have been located between the Esmond and Allendale dams. This source as highly enriched in 2,3,7,8-tetrachloro-p-dioxin which indicates a chemical manufacturing process that involved the use of 2,4,5-trichlorophenol. Well known cases of 2,3,7,8-tetrochloro-p-dioxin contamination have resulted from the production of 2,4,5-trichlorophenol for use in herbicides and from the production of hexachlorophene.

Response: ATSDR recognizes that identification of the dioxin source is an critical issue to the clean-up of the river. See response to comment 17.

(47) The report does not distinguish between acute and chronic exposures to dioxin under dermal, ingestion, and respiratory routes. While long-term exposures that may have already occurred over the duration since dioxins in above-background levels were introduced into the area under consideration cannot be changed, risk assessments for various levels of exposure from worst case to casual should be discussed. What about youngsters digging in sediments of Allendale Pond for freshwater clams for fishing bait for once a week during the April to September fishing season for 5 years? (Anecdotal conversation with an 11-year old on Manton Pond.) What about elderly walking on the grounds of Centredale Manor after flooding, tracking in dirt to apartment, and having crawling grandchild visit? (Hypothetical)

Response: ATSDR's assessments were based on plausible exposure scenarios for which environmental data are available. If additional data and information become available, assessments for alternative exposure pathways may be warranted.

(48) Acute response analysis probabilities would be useful for assessing risk to workers potentially exposed in restoration of Allendale Dam, a breached and temporarily repaired structure which is the first impoundment downstream of the identified concentrations in surficial investigations. Acute response would also be useful for risk analysis for any removal activities from the contaminated areas, as well as to address concerns and plan protective measures and risk communication for residents in the area.

Response: ATSDR recognizes that worker and resident safety during remediation are issues of paramount concern. These issues should be addressed by the appropriate agencies prior to remedial work.

(49) In addition, the long term risk of not addressing the source of the dioxin presents a problem of continuing exposure to fish and to permanent residents along Allendale Pond and other accessible, contaminated areas. While signs warning against consumption of fish are currently posted along the river, over a duration of years, there is no guarantee that budgets and personnel will be available to maintain these signs. Not controlling or removing the source will allow a continuing contamination of fish and a route of human exposure.

Response: ATSDR agrees. These issues should be addressed by corrective actions being planned by

Federal and State regulatory agencies.

(50) Although dioxins are long-lived, there is degradation of the compound over time. An analysis of exposure when the source was newer should also be factored into the analysis.

Response: Historical information on contaminant levels and on-site activity patterns are not available for this analysis.

(51) While concentrations are given for fish tissue sampled from the river and for soil/sediment samples, the risks associated with different concentrations, at different exposures through different pathways is insufficiently discussed. The threshold of 1 ppb as the action level for ATSDR does not communicate the health risks. What are the assumptions about body weight, developmental age, etc. that form the basis of the risk assessment for the various exposures?

Response: A dioxin concentration of 1 ppb in residential soil is considered to be safe for all populations. See also response to comment 2.

(52) The Draft Document discussion of dioxins triggering fish consumption advisories needs to be more detailed. The FDA acceptable levels may be different than prudent health department advisories. Such a difference exists in Mercury contamination where the FDA level is 1 ppm, but the State of Minnesota advises restricted consumption down to a level of 0.16 ppm (for pregnant women).

Response: The health consultation defines the fish consumption rates covered by the FDA advisory. The advisory levels would not apply to subsistence fish eaters who eat large quantities of fish. Because of the high dioxin concentrations detected in fish and eels, ATSDR concurs with the State that fish from the river should not be eaten by anyone.

(53) No good data exist on the ingestion behavior of residents local to the Woonasquatucket. Surveys not only of current but past consumption should be mounted. Ethnic food preferences for the local population would include consumption of eel. Foraging patterns for animals in tributaries may include some portion of life stage in contaminated areas. I have observed a large eel in a tributary near Lymansville.

Response: A fishing advisory is already in effect along the Woonasquatucket River. Fish and eels are included in the advisory. Dioxin testing has not been conducted on turtles or other aquatic animals in the river, but it is reasonable to expect that other species would also be impacted. ATSDR believes that community education and outreach are the best methods of ensuring compliance with the fishing advisory.

(54) Furthermore, vegetative patterns along the river have changed, and some factor should be included about exposures when grass may not have been as thick at Centredale Manor or when the wetland to the south of the manor was not vegetated with woody species.

Response: See response to comment 50.

(55) Multiple Exposures: The Draft Health Consultation does not address multiple exposures for example, digging in sediments for bait (dermal) plus eating fish, eels, or turtles (ingestion).

Response: The health consultation acknowledges that eating fish, etc. from the river poses a health concern. Additional exposures from other exposure sources would add to the concern level.

(56) Non-Cancer Risks: This Draft Health Consultation does not address various development risks that are cited in some literature, for example on pp. 239 of the Toxicological Profile for Chlorinated Dibenzo-p-dioxin (update), U.S. Department of Health and Human Services, ATSDR, December 1998.

Response: See response to comment 3

Commentor #8

(57) Has the sampling conducted to date identified the sole source of the dioxin contamination?

Response: See response to comment 15.

(58) Has it been determined if the source of dioxin is ongoing or historic?

Response: Dioxin contamination is believed to have resulted from past activities near the Centredale Manor area. A current source of dioxin contamination in this area has not been identified.

(59) What proposal has been made for continuous testing prior to containment of the contamination? What remediation measures are recommended to prevent the off-site migration of dioxin contaminated soil and sediment? How will resuspension of the contaminated sediments during flooding be prevented?

Response: Remediation of the site will be under the direction of the U.S. Environmental Protection Agency (EPA). Remediation plans for the site are currently being formulated by EPA. Remediation may include further testing and characterization of the site as well as restriction of access to the site and/or removal of contaminated soil or sediment.

(60) Based on sampling, Save the Bay is concerned that the monitoring may not accurately depict the extent of the dioxin contamination. To what depth is the contaminated soil in the wetland and riverbank found? If the soil at greater depths were found to have levels of dioxin that exceed the ATSDR Action Level, remediation of the contaminated soil could be more extensive.

Response: Soil sampling to date has focused on surface soil, because surface soil is more accessible and poses a greater potential public health hazard. However, it is possible that chemical wastes have been buried on Centredale Manor property which could result in subsurface contamination. Additional subsurface soil sampling is needed to assess the potential for subsurface contamination.

(61) The Department of Environmental Management has classified the Woonasquatucket River as Class B waters. How will the recommendations outlined in the Health Consultation help achieve the goal of a fishable swimmable river in the future?

Response: The purpose of ATSDR's Health Consultation was to examine environmental data and determine if identified chemicals pose a public health hazard. The EPA is the federal agency with the responsibility of formulating strategies to remediate environmental contamination in the river.

Commentor #9

(62) While I understand the need to address the issue of dioxins, I would like to assert the need for a more substantial emphasis on the high levels of fecal bacteria found in the Granville portion (District 4A) of the river. My Johnston constituents are deeply concerned about this issue and require additional information to avoid being harmed. Citizens frequently inquire as to where the fecal bacteria come from. I can only surmise that it enters the Woonasquatucket through the Smithfield Waste Water Treatment Facility, but I lack scientific data to support my hypothesis. I encourage your agency to investigate the origins of the fecal bacteria and make recommendations for its resolve as soon as possible.

I am pleased that the dams of the Woonasquatucket have been inspected, but I wonder if it is possible to test for increased bacteria concentrations near the Greystone Dam (Dam #13). Perhaps such testing could follow a format similar to those checking the dioxin levels in other dams.

I would like to reiterate the need for all information regarding the river be translated into terms so that nonscientists may understand. For example, the EPA recently distributed pamphlets to residents in my district with information of the do's and don'ts for the Woonasquatucket River. Citizens have repeatedly been warned against swimming in the river, and yet this pamphlet encourages recreational sports, such as canoeing, kayaking, and sailing, in which participants may often be splashed by the river water. This appears to be a contradictory message leading to confusion among my constituents. If we are to consider fecal bacteria as a pollutant, then it is imperative for people to understand precisely what extent of contact with the water might pose a health risk.

Response: Although microbiological contamination (bacteria and viruses) of the river is an important public health issue, it is not within the purview of ATSDR. ATSDR recommends that this issue be addressed by Federal and State agencies that have regulatory authority in these matters.