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SRST Human Exposure Task Team Fact Sheet
For Discussion Only

A Human Exposure Task Team of the South River Science Team (SRST) was formed in 2008. The key objectives of the team's efforts are to better identify possible routes of exposure to mercury, define possible risks and uncertainties, and communicate that information to the public. One activity identified by the team is to produce a fact sheet identifying what is known, what is not known and what the SRST is doing about getting this information related to potential human exposures to mercury on the South River and its floodplain. The fact sheet is meant to be made available to the general public.

Below is a preliminary draft of the Fact Sheet, which is being circulated as a Briefing paper for the Oct 21-22 SRST expert panel meeting.

South River Mercury

The South River and South Fork of the Shenandoah River have been impacted from historic (1929-1950) mercury use at the DuPont plant in Waynesboro, and have been under VA Department of Health (VDH) advisories for fish consumption since the problem was discovered in the late 1970s. In 1984 the State Water Control Board (SWCB) and DuPont agreed to a settlement, which included a penalty and the establishment of a trust fund, to be administered by the SWCB, to support a 100-year mercury monitoring program for fish, water, and sediments. The SWCB and its successor, the VA Department of Environmental Quality (DEQ), have been implementing the mercury monitoring program since that time. Assessments of data through the 1990s concluded that mercury levels had not been declining as predicted by models run in the early 1980s. Therefore, DEQ expanded its monitoring program and entered into partnerships with VDH and Department of Game & Inland Fisheries (DGIF), DuPont, citizens groups, universities, and private researchers, with an interest in further exploring the contamination and long-term options to reduce concentrations and potential risks to the public. This group of stakeholders, called the South River Science Team (SRST), has initiated a number of monitoring, research, and communication efforts. This group meets quarterly and has developed newsletters of their activities to better inform the public. Once each year, the Science Team convenes for 2 days with an "expert panel," a group of several internationally recognized mercury experts, to share summaries of data, recent field activities, and proposals for future work. These meetings serve to refine and refocus the work of the Science Team, with the ultimate goal of identifying, managing, and reducing risks to the public from this legacy problem.

In 2008, the South River Science Team formed a human exposure task team for the purpose of better identifying possible routes of exposure to mercury, defining possible risks and uncertainties, and communicating that information to the public. Areas of focus for the group include:

- Fish Consumption. The risks associated with consuming mercury-contaminated fish have been studied extensively in many locations around the world. As a neurotoxin, mercury is particularly harmful to young children and pregnant women. In the South River, fish monitoring and associated consumption advisories have been in place for at least 30 years. These consumption advisories are based on risk assessments that assume long-term eating of fish. Fish that are higher in the food chain (top predators like smallmouth bass) and those larger in size generally contain the highest concentrations of mercury. Fish stocked in the South River, like trout, have little mercury in their flesh because of the much shorter residence time. The Virginia Department of Health's current advisory on the South River recommends that no fish except trout be consumed if caught from the South River between Waynesboro and Port Republic. Downstream, in the South Fork of the Shenandoah River, no more than 2 meals of fish should be eaten each month. Signs outlining these consumption advisories in English and Spanish are posted at all public access points along these rivers. Additional information has been made available at local health clinics.
- Recreational Use. There are no known risks or advisories associated with mercury contamination from water contact recreation in the South River. Exposure to mercury in this manner is very limited;

in fact, mercury concentrations in the river are generally lower than allowable levels (based on EPA criteria) in drinking water. The South River, along with nearly all natural waters, does pose some risk to users who wade, swim, or come in frequent contact with the water, primarily from bacteria, which are introduced to the river from natural (wildlife), domestic (pets), agricultural (livestock), and human (improperly treated human waste) sources. Generally, bacterial counts are highest during periods of runoff and high river flows. When possible, users should avoid water contact during those high flow periods. At all times, river users should use good personal hygiene practices.

- Wildlife. Much less is known about mercury concentrations in wildlife than in fish from the South River. Mercury contamination is a concern for the wildlife themselves, as well as people who may eat wild game on occasion. During the last several years the South River Science Team has been engaged in several studies to determine mercury's impact to aquatic and terrestrial wildlife. Recent and ongoing studies are examining mercury levels in songbirds, waterfowl, amphibians, reptiles, fur-bearing mammals, and even spiders and insects. These studies are beginning to tell us whether mercury is impacting reproduction, survival, and overall community health of these species. New studies will examine mercury concentrations in game species, like geese and ducks that are sometimes harvested and eaten by local sportsmen. These studies are designed to ensure that the hunting public is not at risk of excessive mercury exposure.
- Floodplain Soils. As a result of flood events, mercury has become distributed within South River floodplain soils. These soils were first sampled extensively in 1980. While it was found that the floodplain contained mercury, the levels on average were below those of concern. Since the SRST was formed, floodplain soils have been sampled several times. Major sampling events included a 2003-2004 study to evaluate the potential for mercury transfer to crops grown on the floodplain and most recently a 2008 study where more than 600 floodplain locations were sampled. The purpose of the 2008 sampling was to statistically determine the distribution of mercury on the floodplain based on different land use and flood events (i.e., the 2-yr, 5yr and 62-yr flood events). Currently, there are results for close to 2000 samples. A review of the results indicates that the majority of the sample concentrations (about 90%) are below levels of concern for people living in homes at these locations over a lifetime. Sample concentrations above these residential levels of concern generally appear to be located in industrial sites, parks and agricultural areas. Further evaluation of potential exposures in these areas is underway.
- Crops. Scientific literature has shown that mercury uptake in food crops is not expected, however, the SRST chose to test local soils and local crops to validate those findings. In 2003 and 2004 a garden study was conducted along the South River to investigate mercury uptake from soil into garden crops typically eaten by homeowners. The study covered two growing seasons and 17 different crops in both test and reference gardens. Garden crops were grown in areas that were specifically chosen to include soil concentrations above those considered safe for residential properties. Total mercury concentrations in most crop samples were very low and often mercury could not be detected. Based on the measured concentrations and several conservative assumptions (e.g., that all crops eaten were grown in soils with high mercury levels), it was determined that consumption of crops with these mercury levels is not expected to be a significant source of mercury exposure. These conclusions are consistent with other scientific studies associated with the uptake of mercury into food crops, suggesting that mercury uptake by edible crops is not a major route of exposure for people.
- Outdoor Air. Mercury can be present in air as a result of the material volatizing from soils and as emissions from burning fossil fuels. An outdoor air study was performed to determine whether concentrations of mercury were elevated over background in the vicinity of the South River and its floodplain. The target area was also the location of the study evaluating mercury uptake by garden crops. The study took place between May and November in 2005 and 2006. A single station close to the garden study was used in 2005. In 2006, a second station was added. All measured concentrations were comparable to published global background concentrations.

- Livestock. In the initial timeframe after the mercury was discovered on the floodplain, samples from the edible portions of a limited number of cattle that grazed on the floodplain were analyzed for mercury. No mercury was found. However, based on the limited number of samples, additional sampling may be necessary to confirm these findings. As an initial step a literature review is underway to evaluate what other studies have found on the potential uptake of mercury by domestic animals that are then consumed by people. The results of the literature review will be used to develop any potential sampling program.
- Other potential exposures. The team is exploring the role of a health-based survey at local health clinics to evaluate other potential exposures not covered adequately in previous or current studies. Local health clinics and private physicians along the South River have been informed about mercury contamination in fish and asked to report to VDH any signs and symptoms which could be associated with eating fish contaminated with mercury. To date, there have been no such reports.

In addition to the specific studies discussed above to address potential exposures of people to mercury on the South River, the Exposure Team is committed to disseminating the information to the general public with the goal of ensuring public safety. Opportunities include making sure that there are adequate and appropriate fish advisory signs posted, direct communication of results with homeowners as appropriate, potential formation of a community advisory group, making information available at local health clinics, and keeping local physician aware of the issue.