

**South River Science Team Meeting
October 8-9, 2002. Harrisonburg, Va.**

Agenda

Tuesday, October 8, 2002

During the morning of October 8, DEQ and DuPont will provide the members of our expert panel a tour the South River in the Waynesboro – Grottoes area. Those involved in the tour have been notified and will meet at the DEQ Harrisonburg Office at 9:00 a.m.

All other Science Team members should plan to arrive at DEQ, Harrisonburg at 1:00 p.m.

<u>Time</u>	<u>Issue</u>	<u>Responsible</u>
1:00	Welcome	Brad Chewning DEQ Regional Director
1:10	Introductions, housekeeping	Don Kain, DEQ
1:30	New RFI Results	Mike Liberati, DuPont
2:00	Previous floodplain work	Dean Cocking, JMU
2:30	Fish tissue statistics update	John Green, DuPont
3:00	Break	
3:15	Virginia Tech dietary study results	Greg Murphy / Don Orth (Va. Tech)
4:15	Mud mapping / floodplain results	Dick Jensen, DuPont Annette Guiseppi-Elie, DuPont
4:45	Adjourn	
6:00	Group dinner, L'Italia, Harrisonburg	contact Don Kain if interested.

Wednesday, October 9, 2002

8:30	Intensive water sampling results	Ted Turner, DEQ
9:30	Waynesboro landfill proposed work	Mike Sherrier
1000	Break	
1015	Coring proposal	Dick Jensen / Erin Mack, DuPont
1100	Corbicula study proposal	Tom Benzing, JMU Doug Graber-Neufeld, EMU
1130	Conceptual site model	Ralph Stahl, DuPont
1200	Lunch	
1230	Working hypotheses	Ralph
1300	What have we missed?	Ralph / Don
1330	Wrap up / Adjourn	Ralph / Don

Tuesday, October 8, 2002

Tour of South River and Sampling Sites. During the morning of October 8, expert panel members and hosts participated in an on-site tour of the South River area, with a focus on sampling sites for fish, sediment, and water surveys.

Welcome. Brad Chewning, Director of DEQ's Harrisonburg's regional office, welcomed the meeting attendees and recognized the Science team's effectiveness as a collaborative team.

Introductions and Housekeeping. Don Kain outlined housekeeping and the agenda for the meeting. Self-introductions were made. Attendees are listed on Attachment 1.

New RFI Results. Mike Liberati presented recent information regarding contaminated soils at the DuPont plant site in Waynesboro (refer to Presentation folder). Since there are areas where mercury contaminated soils have been left in place on the DuPont site, practices are in place to minimize the potential for mercury to leave the site. DuPont's practice has been to containerize contaminated soils from the site whenever excavation activities occur. Stormwater sampling at the plant has yielded "non-detects" for mercury, but newer, more sensitive, clean metals procedures have not been used. Future sampling will use the clean metals techniques.

Mike Sherrier presented results of the Phase I RCRA Facility Investigation (RFI) for the DuPont site. The RFI is designed to characterize the site geology, hydrogeology, and groundwater migration pathways; characterize site-wide soil and groundwater quality; and evaluate current releases and potential for future releases to the South River. Soils data indicate that mercury levels are generally in the low ppm range on the site, with known "hot" areas having several hundred ppm. Elemental mercury has been observed in isolated locations (incineration area burning pit) in the interior area of the property. Mass flux calculations indicate negligible introductions of mercury from the plant property to the South River. Areas needing further study include a portion of the plant site (northeast corner) underlain by a karst formation, confirmation of the extent of soil and groundwater impacts, and more aggressive stormwater sampling. These items will be addressed in Phase II of the RFI.

Previous floodplain work. Dean Cocking of James Madison University presented findings from several projects he has been involved with dealing with floodplain issues (Presentation folder). Data from several soils and plant studies were shared. Some of this work was previously published and some is from unpublished graduate and undergraduate studies conducted over the last 15 years. The studies documented the presence of mercury, both in floodplain soils and in animal and plant tissue, downstream of the DuPont property. In general, shallow soils yielded higher mercury levels than deeper soils. Vascular plants did not appear to be effective vehicles for carrying mercury up the food chain. In published and additional unpublished studies of earthworms, mercury levels in earthworms and soils showed good correlation. Dean expressed interest in conducting further floodplain mercury studies to support objectives of the Science Team, particularly in the area of plant uptake from floodplain soils. Dean's request for input regarding this issue can be found in Attachment 3 below.

Fish tissue statistics update. John Green, DuPont, presented a statistical review of fish tissue results from South River and the South Fork Shenandoah River (Presentation folder). Efforts have focused over the years on smallmouth bass (predator), sunfish (forager), and suckers (bottom feeder). Data were normalized for fish length and compared all years and all sample sites. Mercury concentrations were consistently highest at the Doods, Crimora, and Grottoes sites.

Mercury levels from fish collected during 1996 were higher than those from samples taken in other years for most species and most sites.

Virginia Tech fish dietary study results. Greg Murphy provided a project status report and preliminary results from the fish dietary study (Presentation folder). The study is proceeding on schedule. Fish target species overlap with those most heavily sampled by DEQ for tissue analyses: smallmouth bass, redbreast sunfish, white sucker, and channel catfish. The Phase I objective of the study is to identify diet composition for these fish species. Greg presented preliminary diet composition results for each fish species, by fish size and food type. Fish collections and subsequent diet analysis will continue through 2002. During 2003, phase II of the project will occur, and will include field collections of representative prey items from the study areas, followed by mercury analyses of these items.

Wednesday, October 9, 2002

Waynesboro landfill proposed work. An investigation of the former Waynesboro landfill has been proposed by DuPont to determine whether high levels of mercury are present on the site and, if so, to evaluate the potential for off-site impacts. This work is expected to proceed after site access issues are resolved between DuPont and the City of Waynesboro.

Intensive water sampling results. Ted Turner, DEQ, presented the results of an intensive water column survey of a 1.5-mile reach of the South River in Waynesboro (see Presentation folder). The study area bracketed began several hundred yards upstream of the Second Street bridge and extended downstream to a point several hundred yards below the Hopeman Parkway bridge. At 0.10-mile intervals, total and dissolved mercury samples were collected, using clean metals protocols. Samples were collected approximately 25% out from each bank, and work proceeded upstream to prevent disturbance of areas not yet sampled. The sampling crew waded upstream, and recorded pH, DO, conductivity, and temperature at 30-second intervals in an effort to identify inputs from springs or other "tributaries" not evident from visual observations. These readings were recorded electronically with a time stamp, which was coordinated with GPS lat/long and time stamp recordings. The survey also incorporated Passive Integrative Mercury Samplers (PIMS) at several sites. These devices, developed by Dr. Jim Petty of USGS, Columbia, MO, integrate mercury from the water column over time (30-days used for this study), and may be particularly useful where mercury levels may be difficult to measure using conventional methods.

Results of this "snapshot" survey did not yield conclusive results. A relatively high spike of total mercury was noted on river left several hundred yards downstream of the Hopeman Parkway bridge. The cause was unknown. pH, temperature, conductivity, and DO data did not identify notable inputs to the river beyond those that were expected (ex., Waynesboro STP). The PIMS devices appeared to be sensitive and to effectively measure mercury levels in the stream reach, but did not allow conclusions to be drawn beyond those from the conventional sampling. Mercury uptake appeared to be linear during the period, based on values from PIMS retrieved after 2-week and 4-week periods. Follow-up recommendations are solicited from the Science Team. Mike Newman suggested that flow data be incorporated into clean metals water column work, along with an expanded list of water quality constituents (ions were specifically recommended).

Mud mapping / floodplain results. Dick Jensen, DuPont, presented an updated HTML-based South River interactive map (Presentation folder). This is an expansion of an earlier mud-mapping project, with new photos, comments, and data for floodplain features, based on recent onsite land-use survey efforts. CD copies will be provided to Science Team members upon completion.

Annette Guiseppe-Elie presented additional details of the recent floodplain survey that will be incorporated in the report. Elements of the survey included groundproofing, which involved checking the maps, followed by onsite observations and documentation. Field efforts included identification of key potential sites subject to flooding, such as play areas, private gardens, and parklands, along with a limited survey of rural areas, including homes, fields, and other residential buildings. Additional information from residents will allow the mapping of flooded areas to be more finely tuned. Annette will develop a proposal for a floodplain study, dealing with soils and plant uptake, at the December meeting of the Science Team. An initial, "pre-proposal" is included as Attachment 2.

Corbicula study proposal. Tom Benzing, James Madison University (JMU), presented a preliminary proposal to collect and analyze the Asiatic clam, *Corbicula*, from a number of sites on the South River, followed by analysis of whole body tissue for mercury (see Presentation folder). In an earlier, abbreviated study conducted by Doug Graber-Neufeld (Eastern Mennonite University), *Corbicula* tissue mercury concentrations were highly correlated with those found in DEQ's fish tissue studies. Doug presented an overview of those results. The current proposal will examine multiple sites and will include a higher number of samples. DuPont will provide funding and will arrange for analytical services for this project. DEQ and DGIF staff will provide field and laboratory sample processing assistance. Sample collections are scheduled for November 2002. Tom will develop a final proposal within the next couple of weeks and will present an update to the Science Team at the December meeting.

Sediment Coring proposal. Erin Mack, DuPont presented a proposal to conduct a sediment coring effort in South River. Two sites were proposed: The pool upstream of the Doooms dam, and a wetland/tributary area about one mile downstream of the Doooms bridge. The assumption is that stable river sediments will provide a historic record of mercury inputs to the river. If distinct mercury horizons are found within the cores, DuPont proposes to have the sections dated in an effort to determine the time periods when higher concentrations of mercury were laid down. Field work will begin this fall. Preliminary results will be presented at the December Science Team meeting.

Working hypotheses. Ralph Stahl provided a recap of the Science Team's working hypotheses and specific concepts or actions taken to date to address them. Input was requested regarding preliminary conclusions and additional actions needed. Details of the hypotheses and actions can be found in the Presentation folder.

Where to next - 2003? Ralph led a discussion, which identified completed tasks, ongoing efforts, and areas where further study is needed (Presentation folder). In particular, input is needed on future work. He also emphasized the need to expand our communication efforts by publishing the results of our work. His speaking points are outlined below.

1. DuPont's Vision
Mercury levels decline in the South River and South Fork Shenandoah River, and DuPont is viewed positively by the public, regulators, customers, shareholders and employees for having met its commitments to the Commonwealth of Virginia.
2. Where We've Been
 - Began Collaboration 11/00
 - Implemented Science Team 2/01
 - Analyzed Fish Tissue Data... once, twice...
 - Analyzed Sediment Data

South River Science Team Meeting

October 8-9, 2002

Page 5 of 9

- Debriefed Original PI – Guy Apicella 9/11/01
 - Established Expert Panel and Met 10/01 & 10/02
 - Implemented Fish Diet Study 1/02
 - Conducted & Finished Mud Mapping
 - Conducted Trust Fund Monitoring for 2002
 - Conducted Intensive Water Column Sampling
 - Developed Newsletter – released in 5/02 & 9/02
3. Parallel Efforts
- Waynesboro site RFI
 - South River TMDL Sampling
 - Friends of the Shenandoah Sampling
4. Filling Data Gaps
- Investigate 2nd St. Landfill
 - Sediment Sampling and Coring
 - Corbicula Studies
 - Sampling Periphyton / Aquatic Vegetation
 - Round 2 - Intensive Water Column Sampling
 - Water Column Sampling (ions, etc.)
 - DuPont Site Stormwater Investigation
 - Investigate Floodplain / Vegetation / Biota
 - Non Trust-fund Fish Sampling
 - Atmospheric Deposition Studies
 - Develop Basic Mass Balance, etc.
 - Publications (need some common definitions)

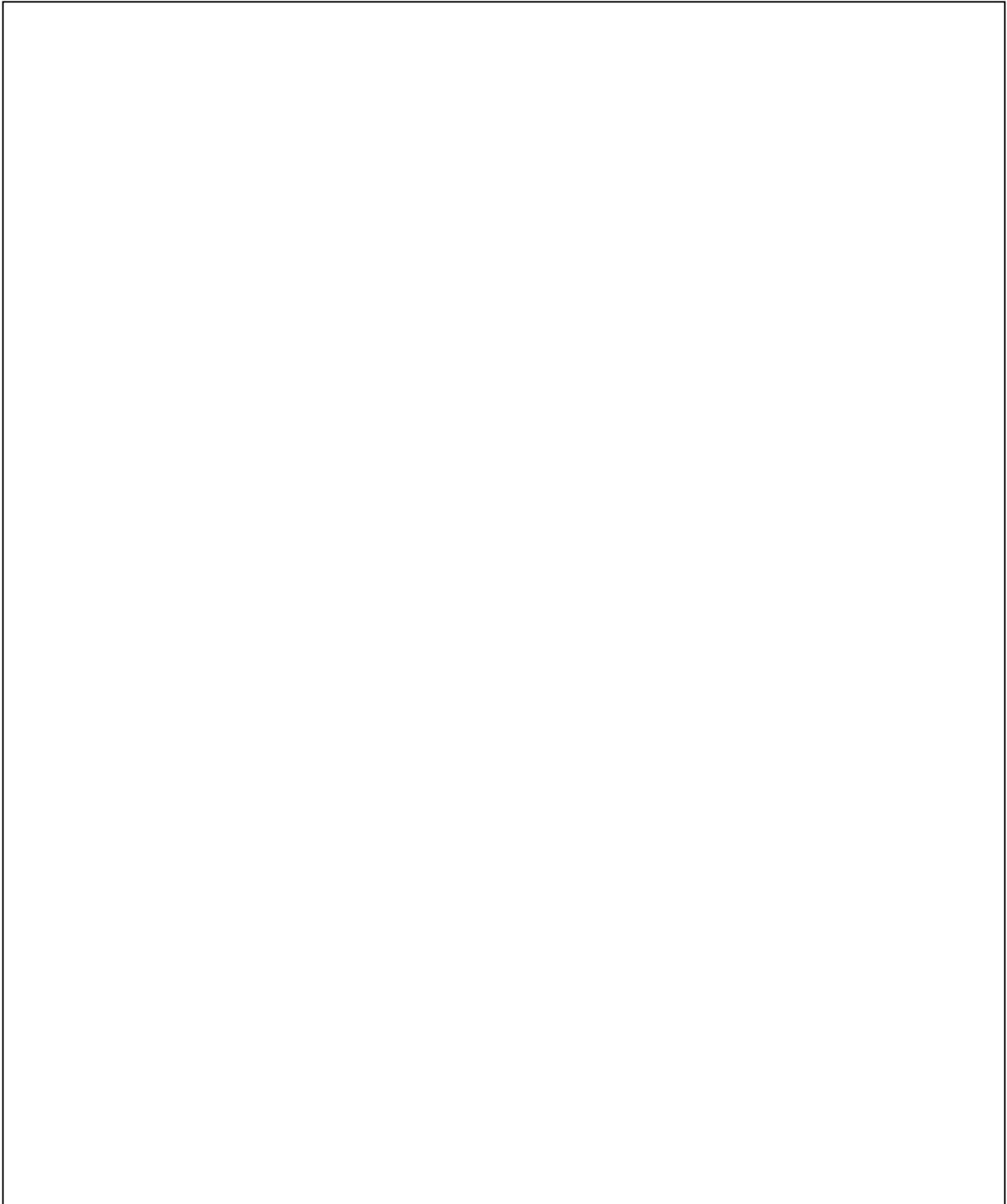
Wrap –up. Action items, assignments, and recommendations (from items above) were reviewed.

Next Meeting. Scheduled for 9:00 am, December 10 at DEQ, Harrisonburg. Later rescheduled for December 11.

Attachment 1. South River Science Meeting Attendees

Name	Organization	Phone	E-mail Address
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Attachment 2. Floodplain Proposal (Annette Guiseppi-Elie)



Attachment 3. Request for Input, Dean Cocking

Exploratory Effort to Evaluate Plant Uptake of Mercury from Floodplain Soils

Hypothesis:

Mercury in floodplain soils is not available for uptake by crops in sufficient levels to be a health risk.

Background:

Much of the mercury in the South River system is assumed to be bound up in the floodplain soils and is unavailable for plant uptake (LMS, 1981, 1982). Background information from additional sources (e.g., EPA Biosolids Rule, 1995, NAS, 1997, Mercury Report to Congress, 1997) support this assumption. However, the public may be skeptical without empirical data. The current landuse survey suggests some backyard gardening and farming does occur in the floodplain. Various tasks to obtain empirical data to address concerns that may be raised by the public are proposed below to start this discussion.

Goal:

To collect sufficient empirical data to support hypothesis that mercury in floodplain soils are not available.

Proposed Tasks:

- Develop and execute a sampling plan to tests soils for Hg and MeHg at the forestry station. Sampling should be sufficient to quantify a statistical difference. Samples should be taken on the surface and at depth to characterize vertical profile/differences.
- If there is sufficient difference between the floodplain and upland area, plant relevant crops in the floodplain area (single or multiple growing seasons). Crops should include ones that allow for distinction between windblown dust and actual uptake from the soils.
- Harvest these crops and determine, mercury content in various components, e.g., surface, roots, leaves.
- Collect samples from wayside stands and local "factory" and perform similar analyses.

Timing:

Summer of 2003

Resources:

DuPont

Request for Input:

Is it reasonable to try to test this hypothesis?
Are the proposed tasks appropriate?
What other tasks should be considered?

References:

Mercury contamination of the South, South Fork Shenandoah and Shenandoah Rivers. State Water Control Board, Basic Data Bulletin 47, March 1980.

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Cooking, et al, 1991. Water, Air, and Soil Pollution 57-58: 159-170

USEPA (1995) Guide to the Biosolids Risk Assessments for the EPA Part 503 Rule, EPA/832-B-93-005

NAS (1996) Use of Reclaimed Water and Sludge in Food Production

Hg Study Report to Congress, Volume III:Fate and Transport of Mercury in the Environment EPA-452/R-97-005 (12/97)

U.S. Department of Energy (1998) Empirical Models for the Uptake of Inorganic Chemicals from Soil by Plants