

MERCURY REMEDIATION STRATEGY WORKSHOP NOTES**DATE:** August 13, 2013**ATTENDEES: (Attached)**

Franklin Hill/EPA	Fred Butterfield/DOE
Mark Whitney/DOE	Betsy Child/UCOR-RSI
Arthur Collins/EPA	Mark Janaskie/DOE
Harold Taylor/EPA	Karen Skubal/DOE
Jeff Crane/EPA	Terry Allen/DOE
Jon Richards/EPA	Jim Donnelly/NNSA
Andy Binford/TDEC	Curt Myers/TDEC
John Owsley/TDEC	James Ashworth/TechLaw
Sandra Dudley/TDEC	Mark Peterson/ORNL
Patrick Flood/TDEC	Paul Clay/UCOR-RSI
Dale Rector/TDEC	Stacey McNamara/B&W Y-12
John Michael Japp/DOE	Terry Cothron/B&W Y-12
Sue Cange/DOE	Eric Pierce/ORNL
Laura Wilkerson/DOE	Dick Ketelle/UCOR-RSI
Dave Adler/DOE	Ralph Turner
Elizabeth Phillips/DOE	Susan DePaoli/P2S
Jason Darby/DOE	Cheryl Cabbil/UCOR
John Kubarewicz/UCOR-RSI	Beth Pearson/P2S

OPENING COMMENTS/OBJECTIVES

Mark Whitney welcomed the attendees and reviewed the purpose of the workshop – to collaborate on key issues and develop a common vision for mercury remediation. Mark explained that in the current fiscal environment there is intense funding competition and that regulatory collaboration is critical to preserving funding. He mentioned that the OF 200 Mercury Treatment Facility (MTF), Environmental Management Disposal Facility and TRU Sludge Build-Out projects are all capital asset projects and subject to high levels of scrutiny. Mark asked all parties to be flexible, open to discussion and noted that technical staff are attending to answer questions.

Sue Cange also welcomed the attendees and explained the DOE critical decision process for the capital asset projects and emphasized that it is critical to develop agreements on key issues to avoid delays in funding of these projects. She mentioned that these projects are likely to become construction line projects subject to additional controls and requirements. Sue summarized that she hoped to come to agreement on the proposed sequence of mercury remediation activities and make collaborate agreements on the design approach for the OF 200 MTF. Franklin Hill said that he understood the fiscal constraints are real for all parties and that it was important to make technically sound, creditable decisions that meet requirements for protecting the environment and be accountable to the taxpayers. He recognized that there are differing viewpoints and perspectives but emphasized that the three parties can make the right decisions. Andy Binford stated that the State's goal is to protect people downstream of Y-12 from the impacts of mercury

releases and that posting is not realistic as it is often ignored. Andy identified the need to stop releases of mercury that will occur from demolition of the Y-12 mercury use facilities. He mentioned that having three TDEC Directors, himself, Pat Flood, and Sandra Dudley at one meeting was rare and appreciated their support in developing sound technical accountable solutions.

BACKGROUND ON Y-12 MERCURY CLEANUP PROGRAM

Regulatory Background

Dave Adler provided an overview of the key Y-12 CERCLA response action decisions. Per EPA request, Dave reviewed sections from the UEFPC Phase 1 and Phase 2 RODs on Principal Threat Waste (PTW) and explained that the concept of PTW was included in CERCLA as direction from Congress to identify key sources of contamination to eliminate toxicity, mobility and volume. Dave summarized that while some PTW remediation is identified in the RODs, the language recognizes that additional work needs to be done in future decisions. Jeff Crane identified non-mobile deep (below 2 feet) seated mercury sources which should not be automatically deferred to institutional controls and urged that alternatives be developed and evaluated to consider treatment of PTW. Sue questioned whether DOE is obligated to treat all materials identified as PTW. Jeff clarified there is not an obligation for treatment but an expectation to evaluate alternatives for treatment of PTW using the nine CERCLA criteria.

Past Mercury Mitigation Measures at Y-12

Terry Cothron provided a summary of historic mercury releases and mitigation measures at Y-12. Terry identified significant mercury source areas, past mitigation projects, completed recovery act mercury reduction projects, and discussed the historic mercury discharge trend to EFPC.

LEFPC Floodplain Remediation Project

Dave introduced a short video on remediation of the Lower East Fork Poplar Creek Floodplain. Dave briefly mentioned the history of the remediation, role of public involvement and the Agency for Toxic Substance Disease Registry in reaching an agreement on the remediation goal.

Current Mercury Release Pathways and Associated Environmental Impacts

Dick Ketelle presented a summary of current mercury release pathways. Dick described the complex subsurface and surface transport pathways, conceptual model, major discharges and role of storm flow in mercury transport. He highlighted the dramatic increase in particulate bound mercury during storm events due to scouring of exposed contaminated soils and sediments. Bob Alexander questioned the sources of contaminated sediments; Dick replied that both surface runoff and sediments contained in pipes that have not been remediated contribute mercury. He explained that small diameter pipes hold sediment more effectively than large diameter pipes which are more likely to flush contaminated sediments. Terry noted that opening blocked lines during the recent storm sewer remediation has allowed additional releases of contaminated sediments. Bob asked about the amount of mercury releases related to baseflow versus that related to stormflow. Ralph Turner cautioned the attendees to focus on the dissolved mercury

that impacts fish on a daily basis rather than sediment bound mercury released during storm events.

Mark Peterson provided an overview on the impact of mercury releases on the stream environment. Mark summarized Lower East Fork Poplar Creek fish studies including bioaccumulation monitoring, fish mercury uptake trends, water-fish mercury relationship, factors affecting mercury bioaccumulation and ongoing evaluations. Mark compared the linear relationship between mercury water concentrations in LEFPC and fish during the time of the Phase 1 ROD (~2000) with the post 2006 disconnect between water and fish concentrations. Mark explained that although total mercury is not currently a good predictor of mercury fish concentrations, the concentrations of methyl mercury in water are a better predictor of mercury levels in fish. Mark also mentioned that ORNL is in the first year of three years of laboratory/field studies of LEFPC, including identification of mercury source areas, mercury transport, stormflow impacts, methylation and other factors that impact bioaccumulation. Mark reported that mercury levels in fish decreased dramatically in Lake Reality (from 0.8 to below 0.2 ppm) when it was bypassed even though the sediment in Lake Reality contained significant concentrations of mercury. He concluded that isolating the sediment from water flow will likely reduce mercury levels in fish. Bob stated that every watershed is different and consideration of natural site-specific bioaccumulation factors is justified. Mark summarized that methyl mercury is generated from microbial communities but bioaccumulates in the food chain, while elemental and inorganic forms of mercury are not considered to be a significant risk via the food chain. Although there are ways to control methylation it is challenging.

CURRENT STRATEGY TO ADDRESS REMAINING Y-12 SCOPE

Laura Wilkerson presented an overview of the DOE current strategy for completing the remaining Y-12 remediation scope. Laura discussed near term plans, long term plans and funding assumptions/constraints. Franklin asked if there is flexibility in the strategy to make adjustments based on priorities and to accelerate funding. Sue explained that while there is some flexibility to juggle priorities within the baseline budget, it ultimately depends on appropriations; she mentioned that the FY2014 Senate mark included \$17M for the OF 200 MTF. Sue also said that a continuing resolution is anticipated at the start of FY2014 and the only FY2014 funding available for the OF 200 MTF is from program efficiencies.

CURRENT STRATEGY PLAN INTEGRATED INTO NNSA Y-12 PLANNING

Diane McDaniel provided an overview of the integration of mercury strategic plans into NNSA Y-12 mission planning and plant operations. Diane stressed that Y-12 is committed to continue and maintain the mercury reduction recovery projects and support/prepare for upcoming mercury remediation projects. She identified Y-12 provided funding for supporting the current and planned mercury remediation projects and described the Facilities Disposition Program which was established to demolish facilities that are not eligible for demolition by the EM program. Diane emphasized the need to integrate modernization projects such as the Uranium Processing Facility with mercury remediation planning. The group discussed the relocation of the Y-12 Perimeter Intrusion Detection Assessment System, the status of the Alpha 5 building, and potential soil characterization needs for the Uranium Processing Facility.

PROPOSED GOALS FOR MERCURY REMEDIATION AT Y-12

Dave compared the applicable mercury regulatory standards for UEFPC with the average mercury concentrations at Station 17 and observed that the current Station 17 mercury levels are above the Phase 1 ROD interim goal of 200 ppt and the 51 ppt state recreational ambient water quality criteria (AWQC). Dave stated that DOE is in agreement with the regulators that the applicable regulatory standard for UEFPC is the 51 ppt AWQC, but that time and a phased approach are needed to achieve this ultimate goal as he did not believe that the OF 200 MTF alone would achieve it. Flexibility is needed to try additional actions and evaluate their effectiveness. Franklin said that he likes the interim action phased approach as it is accountable and recognizes the challenges but has no feel for the timeline. Sue mentioned that additional interim actions such as covering UEFPC sediments need to be evaluated as part of the meeting the ultimate AWQC goal. Dave observed that if the ultimate goal is to reduce mercury levels in fish to safe consumable levels, the goal may be less than 51 ppt and may include actions in the LEFPC floodplains. Jeff asked if the 51 ppt would be the in-stream goal or Station 17 goal; Dave replied that as UEFPC is a blue line stream the standard applies to all reaches despite Station 17 having been historically used as a compliance point. Andy stated that we have had this discussion before and he recognizes time and money are needed, but wants both the ultimate AWQC goal and a timeline to achieve it. He said that his concern is a lack of urgency implied in the DOE strategy as funding is likely to be reduced in the future and the timeline extended.

Dale Rector recommended formalizing the ORNL LEFPC floodplain studies into the CERCLA process, possibly as a remedial investigation because mercury uptake in fish may be related to floodplain mercury levels rather than UEFPC releases. Mark explained that the studies were linked to the CERCLA Five Year Review process as action plans. Franklin asked about the flexibility to redirect resources if needed to LEFPC. Sue replied that there is some flexibility to shift funds but that it would require pushing out demolition of the mercury use facilities or other projects. Andy noted that based on his earlier more detailed briefings, the ORNL studies will collect much useful information to enable a better understanding of the impacts of mercury on the LEFPC ecosystem. He noted that although the mercury strategy stops at Station 17, mercury impacts go beyond that point into the City of Oak Ridge. He recommended that the strategy be more inclusive to consider impacts downstream of Station 17 and protect the public. Sue summarized that the draft strategy only addresses the Y-12 site (source areas) but is hearing that it should be more comprehensive and consider the system as a whole in identifying and sequencing actions. She stated that DOE was open to consideration of other onsite and offsite near term actions intended to follow the construction of the OF 200 MTF. Terry suggested that the mercury remediation strategy be a "living" document with periodic updates.

Dave pointed out that the three parties made the correct LEFPC floodplain protection decision and recommended not revising it unless driven to it by the need to reduce mercury levels in fish. Franklin questioned whether DOE is certain that current mercury releases are not recontaminating the LEFPC floodplain; Jason replied that the current releases are limited in scale to the massive releases that contaminated the floodplain in the 1950's. Andy stated that he is not comfortable with precluding future decisions based on updated data. Bob said that the planned studies will get answers on stream sediment sloughing and recontamination which is the primary information needed.

Dave reviewed the following key objectives for the remaining actions at Y-12:

- Achieve regulatory standards for protection of Poplar Creek (UEFPC and LEFPC)
- Preserve health of downstream riparian zones
- Mitigate any public health hazards
- Prepare for large D&D program at Y-12
- Meet objectives within realistic OREM budget and schedule constraints

DRAFT FEASIBILITY STUDY OF EFFLUENT CONTROL OPTIONS

Jason Darby provided an overview of alternative mercury mitigation strategies from the UEFPC Phase 1 ROD. Jason outlined the source control, migration control and combined source/migration control alternatives evaluated in the ROD leading to the selection of the source control alternative. He compared treatment of UEFPC at Station 17 (migration control) and Outfall 200 (combined source/migration control) alternatives and the reconsideration and selection of the OF200 MTF as part of the recovery act mercury reduction projects.

CURRENT CONCEPTUAL EFFLUENT TREATMENT PLAN DESIGN

Paul Clay presented an overview of the OF 200 MTF conceptual design project. Paul provided project background, current project status, key milestones, the conceptual design process, preferred system configuration, and major opportunities and uncertainties. Paul explained that the cost estimate at the current conceptual design phase was \$125 to \$130 M, which is in the same order-of-magnitude for construction as a similar capacity groundwater treatment system at the DOE Hanford site (\$140 M). Paul estimated that expanding the system to capture and treat a 10 M gallon one year 24 hour storm event would add \$40 M and the addition of activated carbon to treat the 1500 gpm base flow would add \$15-\$16 M while removing an additional five percent of the mercury load. Paul explained that the current concept is to discharge effluent via a pipeline to that will bypass downstream contaminated sediments. Sandra asked if membrane technology had been considered instead of multi media filtration and whether pilot studies had been performed on a slipstream containing stormflow. Paul replied that only bench scale studies have been performed. Sue explained that off the shelf technology is being utilized; Sandra mentioned that pilot studies even on a portion of the proposed treatment train could be very useful.

Franklin questioned whether flow augmentation would be continued. Bob stated that the State is recommending shutting down flow augmentation as it has been found to transport contaminated sediment. Bob questioned the recommended design since it is anticipated to remove 52 percent of the mercury load versus the 92 percent mercury removal in the comprehensive design which includes a portion of stormflow. Bob explained that in his experience all treatment facilities address stormflow. He asked whether DOE is designing a facility to capture mercury load versus a fund limited system as the comprehensive design included collection and treatment of 10 M gallons of stormflow. Andy asked about the time between the scheduled completion of the OF 200 MTF and the start of demolition of the mercury use facilities. Laura replied that operation of the OF 200 MTF is scheduled to begin in 2020 while pre-demolition activities start in 2024. Andy noted that the schedule allows four years to evaluate the system, determine needs, obtain

funding and complete construction. Sue explained that DOE is on a two year budget cycle; Laura observed that additional time will be created in the schedule as funding needs will push out the start of D&D. Bob made the point that this a good Plan B but that Plan A is to build stormflow retention now. Bob asked that the designers consider the impacts of stormflow; Dick replied that he has used data from three storms to perform an evaluation on the comprehensive system and it appeared adequate to deal with the observed stormflow. Paul explained that the comprehensive design was not selected as the preferred design based on cost and the option for diversion of clean water. Sue questioned based on a 30 year operational assumption if it was better to size the system for stormflow or evaluate options for clean water diversion. Clean water diversion may be challenging and not significant based on current conditions but may be more practicable after facility demolition. Paul added that Y-12 staff estimated that approximately 500 gpm of baseflow might be diverted allowing capacity for some stormflow. Ralph repeated his earlier comment on focusing on the mercury that impacts fish, he explained that soluble mercury is driving fish uptake and that it should be the focus not the particulate mercury associated with stormflow. Jeff said that based on the treatability studies the preferred system may achieve the 51 ppt AWQC and suggested operating the system and then determining the next step.

DISCUSSION/PATH FORWARD

Dave identified the following path forward:

- Proceed with planning design work for the OF 200 MTF
- Proceed on the assumption that the 51 ppt AWQC will be the ultimate goal, assuming flexibility in timing for achieving compliance allowing a phased approach.
- Assume the ultimate environmental objective is reduction of public health risks from uptake of mercury in fish and evaluate alternative actions
- Evaluate alternative actions in addition to the OF 200 MTF and potentially outside of Y-12 that will yield earlier reductions in mercury levels in fish.
- Capture consensus on PTW – that additional work needs to be evaluated on PTW and that alternatives to evaluate treatment to reduce toxicity, mobility or volume will be evaluated per the NCP expectation.
- Recognize that the mercury remediation strategy document is a living document and will be periodically collaboratively revised

Dave took an action to email DOE's proposed path forward to the regulators. Sue promised the Mercury Remediation Strategy document will be revised and transmitted to the regulators for review.

Franklin stated that while a Tennessee NPDES permit is not required DOE will still need to meet Tennessee substantive requirements and does not recall a water treatment facility that did not address stormflow. Sue replied that the phased approach will allow expansion of the OF 200 MTF prior to demolition of the mercury use facilities. Franklin said that at a minimum, additional discussions on options for stormflow are needed. Andy suggested that D&D activities include enhanced stormwater controls and suggested that if 500 gpm of baseflow can be diverted the additional capacity be used to capture stormwater retained from D&D activities in order to maximize mercury reduction.

CLOSEOUT

Andy thanked DOE for organizing the workshop, praised the discussions and significant progress but noted that more discussion is needed before TDEC provides comments on the Mercury Remediation Strategy. He also stated that he appreciates DOE being willing to take interim actions and use the adaptive approach. Franklin also thanked the attendees for the discussion and praised DOE for being open to interim actions and the adaptive approach. He observed that it was a good meeting but there is still a way to go. He also praised Andy's ideas on capturing stormflow during D&D activities. Franklin reminded the attendees that a lot of upfront work is needed to get to the right decision and that both meeting regulatory requirement and cost effectiveness has to be considered. Sue thanked the attendees for their time and efforts and promised to facilitate a meeting for the TDEC Water Division with DOE and the designers prior to TDEC's submittal of their comments on the Mercury Remediation Strategy.

Actions:

- DOE will email their proposed path forward from the meeting for review. (Adler)
- DOE will revise the Mercury Remediation Strategy and transmit the revised draft to the regulators for review. (Wilkerson)
- DOE will facilitate a meeting between the TDEC Water Division and the OF 200 MTF designers prior to TDEC submittal of comments on the Mercury Remediation Strategy (Wilkerson).

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