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DEQ MERCURY STRATEGIC PLAN

September 8. 2006

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Overview

Mercury (Hg) is a naturally occurring metal found in air, water and soil. It exists in several forms: elemental or metallic mercury, inorganic mercury compounds, and organic mercury compounds. Elemental or metallic mercury is a shiny, silver-white metal. It is a liquid at room temperature, combines easily with other metals and expands and contracts evenly with temperature changes. Because of these properties, mercury has been used in many household, medical and industrial products. Although mercury performs many useful functions in our workplaces and homes, it is toxic and can impair our health. Mercury is a potent neurotoxin, meaning that it interferes with the way nerve cells function. Mercury poisoning causes a decreased ability to see, hear, talk and walk. It can cause personality changes, depression, irritability, nervousness, and the inability to concentrate. It can also cause damage to the brain, kidneys, and lungs. Mercury is a particularly serious problem for pregnant women and children. Fetuses and young children suffer the greatest risk because their nervous systems are still developing. They are four to five times more sensitive to mercury than adults.

Mercury can be released in the environment from natural sources, such as volcanic and geothermal activity, marine environments or forest fires, or it can be released from anthropogenic (man-made) sources like coal-fired power plants and other industrial activities. Recent studies suggest that human activity contributes 50-70% of the mercury in the environment globally. Once mercury enters the environment, it circulates in and out of the atmosphere until it ends up in the bottoms of lakes and oceans. Mercury is among a group of pollutants called persistent bioaccumulative toxins or PBTs. These pollutants "persist" in the environment, meaning that they do not break down or go away. Mercury cannot be destroyed, it cannot be combusted, and it does not degrade. Mercury also "bioacccumulates" in the environment, meaning it builds up in the food chain over time.

When mercury is deposited in waterways, bacteria convert it to methylmercury. Methylmercury builds up in the tissue of fish, which may then be eaten by wildlife (e.g., eagles, osprey, common loons, river otters, minks) and by people. Although human exposure to mercury occurs most frequently through eating contaminated fish, other human exposures to mercury can occur. People have been exposed to mercury from inhaling mercury vapors from broken fluorescent lamps, gas regulators, or even home fever thermometers.

To protect human health, in 2005 the State of Utah issued its first fish consumption advisories due to elevated levels of mercury in fish tissue at Gunlock Reservoir, Mill Creek, and Green River in Desolation Canyon. Also in 2005, Utah also issued a duck consumption advisory due to elevated mercury levels – the first ever in the nation. DEQ has a number of regulatory programs affecting releases of mercury to the environment.

The Utah Department of Environmental Quality has assembled a DEQ core group with representatives from key DEQ Divisions to address mercury issues in a coordinated manner. This group is comprised of representatives from the Divisions of Solid and Hazardous Waste, Air Quality, Environmental Response & Remediation, Water Quality and the Office of Planning and Public Affairs. This draft strategic plan was developed by the DEQ Mercury Core Group to insure coordination of all activities DEQ undertakes with respect to mercury in order to protect human health and the environment.

Hg

Activities

What does DEQ plan to do about Mercury and by when does DEQ plan to do it?

Priorities occurring now that have been addressed or being addressed (July 1, 2006 – September 1, 2006)

- 2006 fish samples were collected with Division of Wildlife Resources (DWR) this spring (fish in the freezer pending analysis).
- Additional 2006 samples being collected by DWQ and with DWR this fall (2006).
- 2006 sampling strategy is focusing on the "water" being fished and species being eaten.
- Efforts underway to secure monies for "mercury" studies from all sources.
- Need to develop work plan to study the Great Salt Lake.
- Continue to work with the State of Nevada to reduce emissions at gold mines
- Continue and expand voluntary collection programs for mercury such as the Hospitals for a Healthy Environment, School Chemical Clean Out Pilot project, and Local Health Departments/DEQ "Get the Mercury Out" Campaign
- Reporting of mercury releases continues via the Toxic Release Inventory (TRI) and mercury spills in Utah are being reported and cleaned up
- Need to develop a "source" assessment plan for impacted water bodies. Is there an obvious source of mercury? Develop the plan and pilot it at an already impacted water body (such as Gunlock Reservoir).
- Resources needed to fund a contractor to come up with the criteria ($50,000 - $100,000). The staff will research what other states are doing in terms of assessments. The bottom line: Is it possible in every case to do something regarding the mercury contamination, the answer is probably "no" but there may be opportunity for fixes.

Priorities to be addressed September 1, 2006 – March 1, 2007

- 2005 and spring 2006 fish tissue results will be completed by end of October 2006. 600 results to be plotted that may result in more "hot spots" and fish tissue consumption advisories.
- QA/QC data analysis of 2005 and spring 2006 fish tissue results to be completed by October 2006 with resulting advisories and updated maps on DEQ website...
- Fish tissue consumption advisories likely as a result of 2005 data (October 2006).
- Additional fish tissue analysis to be scheduled and completed.
- Participate in Lake Powell workgroup (includes Arizona DEQ, Utah DEQ and DNR, Nevada, Bureau of Reclamation, EPA Regions 8 & 9, National Park Service) – annual meeting will have "mercury in fish tissue" as a topic.
- Mercury Work Group, hosted by Utah DEQ, quarterly meeting scheduled next for September 28th, 9:00 a.m., DEQ conference room 101.

- Working on mercury air modeling analysis along with Region 10
- EPA has offered to provide a wet deposition mercury monitor which the state will accept and install.
- Need resources to establish a dry deposition mercury monitoring site in the State: First year costs: $69,300, Annual costs $27,300
- Clean Air Mercury Rule (CAMR). Utah will cap its mercury emissions but participate in a trading program nationally (public comment anticipated September 2006).
- Deadline for EPA CAMR Rule is November 2006
- Need resources for ongoing fish tissue testing for mercury. Estimated 450 samples per year, $58 per sample with projected annual costs of $26,100
- Need resources to characterize the nature and extent of mercury in the Great Salt Lake. Cost estimate approximately $1.5 million (water, sediments, biota); initial work in conjunction with current selenium study of the Lake is $340,000. An interagency approach is recommended.

Priorities to be addressed March 1, 2007 – December 31, 2007

- Implement the mercury switch bounty program for scrap vehicles which was a result of passage of HB138 during 2006 Legislative Session

Hg → Air Quality

Air Quality Strategic Goal
Current information indicates that mercury air emissions are decreasing in most categories within the state of Utah. Ensure that mercury emissions continue to decrease in Utah by conducting a periodic review every 5 years to measure progress and refine emission reduction goals.

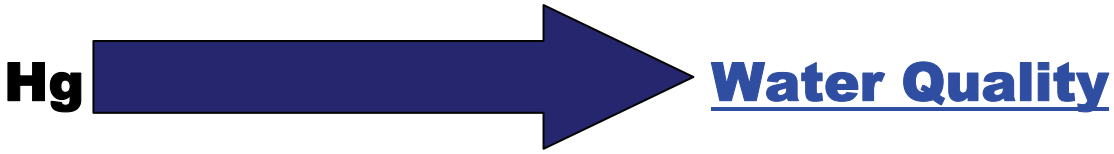
Regulatory strategies:

- Continue regulating sources emitting mercury 2002 Emissions (lbs/yr Hg)
    - Coal fired electric generating units 829.04
    - Industrial boilers 79
    - Electric arc furnaces 138.7
    - Cement plants 103.3
    - Incinerators 302.13
    - Landfills 18.4
    - Lime plants 9.06
    - Other 7.28
- Reduce mercury air emissions from Nevada gold mines – Nevada is instituting Maximum Achievable Control Technology (MACT) for gold mines, Utah is working closely with Nevada and Idaho on air quality control strategies.
- Institute a CAMR Trading Rule – Utah is proposing rulemaking in 2006 that will reduce mercury emissions
- Recognize Area Source and Global mercury emissions as contributors
    - Fire
    - Geothermal
    - Volcanic

Beyond ongoing regulatory strategies, what else do we plan to do?

- Seek funding to establish one or more National Atmospheric Deposition Program (NADP) sites in Utah to measure wet deposition of mercury - $23,050 cost estimate
- Shift existing resources or seek funding to establish an ambient mercury monitoring site in Utah to measure total gaseous mercury - $120,000 cost estimate
- Evaluate the feasibility of dry deposition research studies

Contact:
Cheryl Heying, Utah Division of Air Quality
801-536-4015
cheying@utah.gov



Water Quality Strategic Goal
Conduct selected fish tissue sampling events to identify lakes, rivers, and streams that may be impacted by mercury. Issue health advisories, in concert with other state agencies, on impacted water bodies.

Regulatory strategies:

- Regulate dischargers of mercury through existing permitting authorities (Utah Discharge permit (UPDES) and Groundwater Discharge permit (GWDP)
- Lead the Utah Mercury workgroup
- Continue an ongoing program to collect and analyze samples of fish tissue in species involving strategic lakes, rivers, and streams within the State of Utah during FY06.
- Evaluate data from fish tissue sampling, including appropriate quality assurance and control reviews, and coordinate issuance of health advisories where appropriate

Beyond ongoing regulatory strategies, what else do we plan to do?

- Define work plans and develop funding for a mercury characterization of the Great Salt Lake to compliment the ongoing selenium study.
- Establish funding for ongoing fish tissue testing
- Look beyond "mercury", is there a need for a broader "toxics" approach to sampling of fish tissue and health advisories. PCB in carp in Utah Lake provided notice that this is not just a "mercury" issue

Contact:
John Whitehead, Utah Division of Water Quality
801-538-6053
jwhitehead@utah.gov

Hg → Solid & Hazardous Waste

Solid and Hazardous Waste Strategic Goal
Ensure the proper management by recycling or disposal of mercury.

Regulatory strategies:

- Ensure proper disposal/recycling of household or industrial mercury as a hazardous waste. Explore options to expedite disposal or recycling (e.g., adoption of universal waste standards)
- Implement the mercury switch removal/recycling program
- Monitor mercury emissions relating to destruction of chemical weapons (mustard ton containers at Tooele Army Depot)

Beyond ongoing regulatory strategies, what else do we plan to do?

Contact:
Chris Bittner, Utah Division of Solid and Hazardous Waste
801 - 538-6813
cbittner@utah.gov

Hg → Environmental Response & Remediation

Environmental Response & Remediation Strategic Goal
Ensure the proper reporting and cleanup of releases of mercury.

Regulatory strategies:

- Continue to report mercury releases via US EPA's Toxic Release Inventory (TRI).
- Investigate emergency incidents including mercury spills.
    - Monitoring equipment available includes a Lumex® mercury analyzer.
- Continued programmatic responsibilities for CERCLA, Brownfield, and Voluntary Agreement when there is the presence of mercury at these sites.

Beyond ongoing regulatory strategies, what else do we plan to do?

- Collaboration with the Utah Department of Health and the Utah Poison Control Center to develop protocols dealing with mercury.

Contact:
Scott Everett, Utah Division of Environmental Response and Remediation
801 - 536-4117
severett@utah.gov

Hg → Planning and Public Affairs

Planning and Public Affairs Strategic Goal
Coordinate voluntary statewide mercury source reduction programs through the "Get the Mercury Out" Campaign, the Hospitals for a Healthy Environment (H2E) Initiative, and the School Chemical Cleanout Campaign (SC3). Represent DEQ on the national Quicksilver Caucus to assess how national initiatives can be adapted to Utah and to provide policy input. Support all outreach efforts to insure information on mercury is properly disseminated to all concerned.

Voluntary strategies:

- Maintain the Mercury Work Group Website and ListServ
- Develop outreach materials
- Serve as DEQ Liaison to the Quicksilver Caucus
- Implement Pollution Prevention Source Reduction programs in the following sectors:
    - Auto Salvage: Best Management Practices workshops and posters
    - Hospitals: Hospitals for a Healthy Environment (H2E) Initiative
    - Schools: School Chemical Cleanout Campaign (SC3)
    - Statewide mercury collections: "Get the Mercury Out" Campaign
    - Thermometer exchange with residents and schools

Contact:
Leah Ann Lamb, Director, Office of Planning and Public Affairs
801 - 536-4476
llamb@utah.gov

DRAFT
Utah Department of Environmental Quality
Mercury Source Assessment Protocol

Introduction

In August 2005 the State of Utah issued its first two fish consumption advisories for mercury in fish tissue (Gunlock Reservoir and Mill Creek). This was followed by a third advisory for mercury (Green River in Desolation Canyon) in November 2005. As sampling and analysis of many more of Utah's waterways continue, there will likely be more waterbodies where mercury advisory will be warranted.

The mercury values in fish tissue are a result of mercury that is making its way into the streams and reservoirs of Utah and moving up into the food chain. The key issue is where is the mercury coming from? What is the ultimate source of the mercury that is showing up in Utah's fish populations and presenting a human health concern? If the sources can be identified, what can be done to reduce or eliminate these sources of mercury?

This document describes the approach to be followed in Utah to assess the sources of mercury at locations where fish tissue data indicates mercury contamination is occurring in an attempt to identify and, if possible, minimize or eliminate mercury sources.

It is essential that the public with particular emphasis on local citizens and governmental authorities be involved and informed throughout all source assessment projects. An information/education plan should be developed and implemented for each source assessment undertaken. A source assessment may take months or even years to complete depending on the complexity of the site and the funding available to complete an assessment.

Utah will take a tiered approach to address the source assessment of a site as outlined below. Each step is designed to be built on the prior step with the objective to utilize limited resources in the most cost effective manner possible. This protocol describes with as much detail as possible the general approach to be taken with the understanding that site specific modifications and details will be needed for each site studied.

I. Confirmation Sampling (How widespread is the contamination?)
   a. Evaluate adjacent waterbodies for mercury in fish tissue
   b. Evaluate additional species of fish in waterbody of focus

II. Inventory Existing Site, Watershed and Regional Data (What are the possible known sources?)
   a. Anthropogenic Sources

        i. Legacy Mining
        ii. Industrial Air Emissions
        iii. Industrial discharges
        iv. Other
    b. Natural Sources
        i. Volcanic or geothermal
        ii. Geologic
        iii. Other

III. Develop Site Specific Sampling/Monitoring Programs
    a. Sediment
    b. Water (may include snow pack)
    c. Air
    d. Food Chain biota
    e. Geology

IV. Evaluate Data and Develop Recommendations/Conclusions

Appendices

1. Generic work plan for environmental monitoring
2. SOP for sediment sampling
3. SOP for water and snow pack sampling
4. SOP for air monitoring (wet and dry deposition)
5. SOP for food chain biota sampling
6. SOP for geological sampling