Commodity-Grade Mercury Stakeholder Meeting
Meeting #3

US EPA Region 8 Office
Denver, Colorado
July 24 - 25, 2007

The Environmental Protection Agency (EPA) held its third Commodity-Grade Mercury Stakeholder Meeting on July 24-25, 2007, at the EPA Region 8 Office in Denver, Colorado. The two-day meeting marked the third in a series of Mercury Stakeholder sessions.

DAY 1

Wendy Cleland-Hamnett, USEPA Office of Pollution Prevention and Toxics, opened the meeting shortly after 9:00am and welcomed the meeting participants. After thanking her Region 8 colleagues, Ms. Cleland-Hamnett explained that the purpose of the stakeholder meetings was to provide information to the federal government on options for managing commodity-grade mercury. Following her opening remarks, Ms. Cleland Hamnett introduced Sheila Canavan who served as the meeting facilitator.

Ms. Canavan welcomed the meeting participants to Denver and informed them that the final meeting minutes would be made available to them via the web. She then asked the stakeholders to introduce themselves to the public audience. Each stakeholder stated his/her name, title, and provided a brief description of his/her work. Next, Federal experts introduced themselves, followed by introductions from the meeting coordinators and members of the audience. Prior to reviewing the day's agenda, Ms. Canavan encouraged the stakeholders to freely express their individual opinions, noting that a group consensus was not required, as the meeting was not intended to follow a FACA process. She next outlined the following meeting objectives:

- How should the various non Federal stocks of mercury be managed both in the short-term and long-term?
- How do current and future supply and demand affect the determination for each of the various stocks?

Ms. Canavan informed the public audience that a Public Comment session was planned as part of the following day's afternoon agenda, which also included a discussion of the next meeting (tentatively scheduled for September 20, 2007, in Washington, DC). Finally, Ms. Canavan reminded the meeting attendees that the press was present at the meeting and therefore their remarks could be cited in the local newspaper.

Federal Mercury Storage Part 2 (Hawthorne, NV Facility, Community Reaction, and Other Options Considered by DOD Besides Consolidated Storage)

Dennis Lynch, Department of Defense, Defense Logistics Agency

Mr. Lynch's presentation described how mercury will be stored at the Defense National Stockpile Center (DNSC) in Hawthorne, Nevada. The mercury, currently stored in various locations, is scheduled to be shipped to the Nevada site in 2007. Prior to shipment, Mr. Lynch explained, a 2-phased strategy was developed to inspect and clean flasks and drums, and overpack the flasks for transport. A total of 128,662 flasks were inspected and 8 flasks were identified for having external contamination, he said. During his presentation, Mr. Lynch discussed upgrades that had been performed at the Hawthorne site, security measures, and other safety initiatives. He also indicated that DNSC supported the Nevada Division of Environmental Protection's (NDEP's) inclusion of elemental mercury under Nevada's Chemical Accident Prevention Program (CAPP). At the conclusion of his presentation, Mr. Lynch distributed flasks that had been retorted with the sides cut away so the interior could be viewed. He also presented a storage drum for the stakeholders to inspect. During and following Mr. Lynch's presentation, the following questions were noted.

Note: Throughout these minutes, questions are denoted by a "Q," answers are denoted by an "A," and comments are denoted by a "C."

Q: (*Participant from a non-governmental organization*) What was done with the $7.8 million in upgrades?
A: (*Participant from DLA*) The $7.8 million were spent on upgrading the 14 warehouses.

Q: (*Participant from industry*) What other upgrades will be done?
A: (*Participant from DLA*) The fire suppression system has not been done yet.

Q: (*Participant from academia*) What are the measuring requirements inside and outside the facility?
A: (*Participant from DLA*) Anything less than 25,000 nanograms of mercury vapor per cubic meter of air.

Q: (*Participant from academia*) When is stored mercury measured?
A: (*Participant from DLA*) A "normal" inspection level is defined as one inspection per month. A "reduced" inspection will be one inspection each six months. A "tightened" inspection is defined as one inspection per week. Normal inspection to reduced inspection will occur when four consecutive normal inspection cycles do not detect any visible mercury or mercury vapors at or above the DNSC action level of 25,000 nanograms per cubic meter. Tightened inspection will occur when one inspection detects visible mercury or mercury vapors in excess of 25, nanograms per cubic meter of air and will continue until any visible mercury is cleaned and mercury vapors are reduced to less than 12,500 nanograms per cubic meter of air. Normal inspection frequency will resume when two tightened inspection cycles do not detect visible mercury or mercury vapors in excess of 12,500 nanograms per cubic meter of air.

Q: (*Participant from industry*) What about outside?

A: (Unknown) We haven't done any monitoring outside. Dr. Graney will cover inside and outside monitoring during his presentation, before and after overpacking.

Q: (*Participant from a non-governmental organization*) I would like to have improved cost information and liability insurance information.
A: (*Facilitator*) Tomorrow afternoon we will address the cost of storage.

Q: (*Participant from industry*) Are the storage areas ventilated?
A: (*Participant from DLA*) Yes, there are mechanical vents on the roofs.

Q: (*Participant from industry*) What is the volume of airflow?
A: (*Participant from DLA*) I don't have that information.

Q: (*Participant from industry*) Is the ventilation running all of the time?
A: (*Participant from DLA*): It's a mechanical vent up in the ceiling.

Q: (*Participant from a state organization*) You mentioned that 8 flasks had external contamination. Was that mercury contamination?
A: (*Participant from DLA*) Yes.

Q: (*Participant from a state organization*) Do you have any idea how that occurred?
A: (*Participant from DLA*) We think it was through the stoppers.

Q: (*Participant from industry*) How much mercury will be stored in Hawthorne and what are the capabilities for expanding the site?
A: (*Participant from DLA*) All of DNSC's mercury will be there. I cannot respond to how much space is available there.

Q: (*Participant from academia*) Is there continuous monitoring for emissions?
A: (*Participant from DLA*) We haven't looked at continuous monitoring as of yet. In phase 2 we will be working with the Oak Ridge National Laboratory.
A: (*Participant from academia*) During my presentation I will talk about passive ventilation systems and ventilation rates. In my perspective we are more concerned with concentrations inside that warehouse.

Q: (*Participant from a non-governmental organization*) How many truckloads will there be and are you informing law enforcement agencies that you are coming through their state(s)? What process have you set up to ensure the public the transport will be safe?
A: (*Participant from DLA*) We've estimated 308 truckloads. We are not going to coordinate with states. We are acquiring our transportation through a military organization and we didn't want to reveal routes or scheduling.

Q: (*Participant from industry*) If we fast-forward the clock to 2047, have you given any thought to what happens then?

A: (*Participant from DLA*) Yes, we've identified our actions in our mercury management environmental impact statement and we've agreed to look at every flask and we have a projection that 120 flasks will need to be replaced.

Q: (*Participant from industry*) Will you continue storage at the same site?
A: (*Participant from DLA*) That's forty years down the road. There is a requirement to review our decision; we know we have to look at this. In the event that there are treatment technologies, that might be another option.

Real-Time Monitoring to Assess Mercury Emissions from Storage Activities
Dr. Joseph Graney, Binghamton University

Dr. Graney's presentation focused on results from an independent assessment of DOD's mercury storage at two facilities, the New Haven Depot in Indiana and the Warren Depot in Ohio. The assessment goals, he indicated, were to 1) monitor changes in vapor phase mercury concentrations following changes in storage practices, e.g., before and after transport and overpacking; and 2) design monitoring methods that could be implemented by inspectors in the future. Built in 1940, the Binghamton Depot used to have part of the Defense National Stockpile. It has subsequently been moved to various sites in other states. The main reason for the movement of the mercury from Binghamton Depot, he said, dealt with health concerns from two other industries in the area. Photographs of warehouse interiors showed pallets containing mercury flasks, overpacking procedures, and storage layouts/designs. He also reminded the stakeholders that there are natural and anthropogenic sources of mercury vapor and there is a global mercury vapor background regardless of where you reside—therefore, everyone is exposed to mercury vapor on a daily basis. Dr. Graney explained the different types of mercury species with their associated toxicities and he noted that elemental mercury vapor is the "easiest" to measure and is likely to be the most common form in the air inside the DOD warehouses. After discussing mercury vapor exposure guidelines inside the warehouses and offsite (residential exposure), Dr. Graney discussed possible ventilation through the roof and sidewalls of the warehouses. He described various monitoring methods, including the use of Tekran and Lumex instruments and made a distinction between short-term and real-time monitoring. Finally, Dr. Graney shared results from various mercury sites. Among the concluding results were that the highest mercury concentrations were associated with overpacking operations; the highest residual concentrations were located at floor level associated with containment areas and forklift traffic; mercury movement and concentrations within warehouses reflected changes in meteorological conditions; and residual concentrations were lowered through increased natural ventilation rates as well as floor cleaning activities. Finally, Dr. Graney noted that Tekran instrumentation is ideal for monitoring low level concentrations outside of warehouses, but requires about 1 month of training, while Lumex instrumentation is ideal for real-time measurements inside warehouses and requires only a half hour of training for monitoring.

In response to Dr. Graney's presentation, the following questions/answers/comments were noted.

Q: (*Participant from industry*) Was there a special cleaning material used when the floors were cleaned?
A: (*Participant from academia*) It was a wet scrubbing system with a contained water source.
A: (*Participant from DLA*) The floor at Warren was first cleaned using Mercon-X and the scarified. The loose material was collected in 55-gallon drums, characterized and sent to the appropriate landfill.

Q: (*Participant from industry*) Is that a sulfur based product?
A: (*Participant from DLA*) I don't know if it is or not.

Q: (*Participant from academia*) What about the aluminum surfaces? They usually absorb mercury.
A: (*Participant from academia*) Most of the surfaces are steel, concrete posts and aluminum. I don't think we found much with aluminum.

Q: (*Participant from industry*) You said S48 was where overpacking was done, correct? Why are other areas showing elevated levels?
A: (*Participant from academia*) I think that is along the wall and where the forklift traffic was.

Q: (*Participant from industry*) After the cleaning the solution was collected, how was that managed?
A: (*Participant from DLA*) It was collected and sampled.

C: (*Participant from industry*) I think you have done a good job of showing mercury can be stored safely. But as for emissions, what is the amount of mercury being emitted each day? Is this one gram per day or 50 grams per day, or less than a gram per day? It is probably low, but it would be nice to quantify this.

Q: (*Participant from academia*) Did you measure concentrations right outside the building.
A: (*Participant from academia*) Yes. And you essentially get the J curve. You would get an exponential decrease as you move outside the door. Probably the highest I can recall was approximately 10 meters away and the reading was about 60 ng/m^3.

Q: (*Participant from industry*) Did you ever verify if there was a cold-power power plant down the way?
A: (*Participant from academia*) There definitely is.

Q: (*Participant from academia*) Do we need to look at halogenated mercury?
A: (*Participant from DLA*) No.

Q: (*Participant from a non-governmental organization*) The current plan is to do monthly measurements and if they are okay, then go to every six months. What is your assessment of the adequacy of this?
A: (*Participant from academia*) I like the idea that there will be 14 warehouses from the monitoring perspective. By using Lumex you can spot check locations and find the problem before it occurs.

Mercury Storage in Nevada (DOD Mercury at Hawthorne)
Dr. Colleen Cripps, State of Nevada Department of Conservation and Natural Resources

At the beginning of her presentation, Dr. Cripps introduced her colleague Mike Elges and indicated that he would be available to answer questions during lunch. She next described the Chemical Accident Prevention Program (CAPP) program and noted that it was designed to protect the public, workers, and the natural resources of the state. And although the program typically deals with highly hazardous materials and explosives, she said, it was modified to include mercury.

The tenets of the program, she indicated, include accident prevention, emergency response, and the public's "right-to-know." The CAPP regulations established a threshold of 200,000 pounds of mercury that would be specific to the National Defense Mercury Stockpile at Hawthorne. Providing a status of the project, Dr. Cripps indicated that the process hazard analysis had been drafted and many of the recommendations had been implemented. Furthermore, the Nevada Division of Environmental Protection is working with the Defense Logistics Agency (DLA) to address outstanding issues before the shipments commence. Among these issues include the fire suppression system, concerns over flask integrity, and the evaluation of long-term storage options. Dr. Cripps stated that prior to the shipments, an approved Process Hazard Analysis (PHA) and SOPs will be developed and in place.

Following Dr. Cripps' presentation, the following questions/answers/comments were noted.

Q: (*Participant from a non-governmental organization*) Does the enforcement authority include rights of access?
A: (*Participant from a state organization*) Yes, without limitations.

Q: (*Participant from a non-governmental organization*) Is it fair for us to think an operating permit will be issued in 2007?
A: (*Participant from a state organization*) This is the timeline we are working under.

Q: (*Participant from a non-governmental organization*) Have there been any senior-level discussions in Nevada about Hawthorne being used for other sources of mercury besides DOD?
A: (*Participant from a state organization*) No, we first became aware of your discussions yesterday. Our management will be communicating this possibility to the Governor's office.

C: (*Participant from academia*) It appears that storage of mercury in the United States is expensive and it may be difficult for developing countries to follow the U.S. lead. You may want to think about ways to handle mercury waste that would be practical in developing countries. The mercury released there makes its way back to the U.S.

Q: (*Participant from industry*) I heard you say fire concerns were noted. What are the combustible materials? It might be simpler to do away with combustibles in the building.
A: (*Participant from a state organization*) It was discussed and not an option. All materials will be on wood pallets.

Q: (*Member of the public*) If Nevada is chosen to be a long-term repository of private and government mercury, does that mean state legislation will need to change for private sector mercury to be stored because it would exceed the limits?
A: (*Participant from a state organization*) I'm not sure if that is the case—mercury stored over 200,000 pounds per unit falls under our program. If it's stored in smaller quantities, it would require regulatory change if the material were to be managed by my agency under the Chemical Accident Prevention Program. The current state regulation applies to any mercury, not just DLA's. Any mercury under this limit would not be regulated under the CAP Program.

Q: (*Participant from industry*) What is the significance of Hawthorne having an existing facility status?
A: (*Participant from a state organization*) We did not need a construction permit prior to installing flooring or emergency systems. If it was not an existing facility, the Process Hazard Analysis would be needed before construction.

Q: (Unknown) One requirement is fire and hazmat crew, is that part of Chemical Accident Prevention Program (CAPP)?
A: (*Participant from a state organization*) I think it's part of the Process Hazard Analysis (PHA).

Q: (*Participant from academia*) We should not lower U.S. standards for storing mercury so developing countries can meet them. Issues of international storage are important but I think lowering standards in the U.S. should not occur and maybe a separate effort is less expensive for geological storage options.
A: (*Participant from academia*) I didn't mean to imply you should lower your standards in the U.S., but leave the door open for other countries to have other options.

Q: (*Participant from industry*) Did you consider replacing wood pallets with steel pallets to avoid the need for the fire suppression system?
A: (*Participant from a state organization*) It was discussed and there was a decision not to do it because DLA already had the wooden pallets available.

C: (*Participant from a non-governmental organization*) There needs to be a sensitivity to cost. The Basel Convention will be writing mercury waste guidelines. They may

recommend collection and storage even if it's temporary storage with fewer safety measures. You have to weight the costs against having the mercury dispersed into the environment. The storage could be temporary, with the hope of more viable long-term solution.

C: (*Participant from a non-governmental organization*) Europeans are engaged in similar discussions and key questions in the developing world are centered around chlor-alkali plants. Eight to ten plants in India are closing by 2012, so India is a logical place to initiate discussion about sequestration of this mercury. There will be a meeting about this in India in September. Our meeting today is not intended to get at the issue of what to do with excess mercury in developing countries.

Q: (*Participant from EPA*) For the storage in Nevada, what is available via the public right-to-know? Will procedures, inspection reports and such be available? Would monitoring .results be available and would it be available on the web?
A: (*Participant from a state organization*) I'm not sure if the information will be on the web, but all documents, except trade secret documents, will be available.

Wisconsin's Experience with Chlor-Alkali Plant Mercury Storage
Suzanne Bangert, State of Wisconsin Department of Natural Resources
Peder Larson, Mercury Waste Solutions, Inc.

Ms. Bangert opened the presentation on chlor-alkali plant mercury storage in Wisconsin, noting that Wisconsin was home to one of the operating chlor-alkali plants in the U.S. She provided a brief background on the facility that stored the mercury from the HoltraChem facility as it related to the Wisconsin Department of Natural Resources and its Waste and Materials program. Mercury Waste Solutions, Inc. (MWSI) recycles mercury from mercury-containing devices and materials originating in Canada and the U.S. MWSI both processes and generates hazardous. Wisconsin is an authorized state for both solid and hazardous waste regulations under RCRA and Wisconsin licensed MWSI, Ms. Bangert said. In spring 2002, Wisconsin received notice that MWSI was a possible candidate for storing mercury from a discontinued operation of a company called HoltraChem in Maine. Analytical results demonstrated the mercury was 99.994% pure. EPA wrote an interpretation. They knew the mercury would be stored for four years. EPA said that since the mercury was a commercial chemical product stored for later recycling or sale, it was not considered discarded and therefore not subject to RCRA regulations. Ultimately Wisconsin also concluded it was not a waste to be regulated. Public interest was minimal, Ms. Bangert said, and there were not many opportunities for the public to be involved. MWSI seemed to be equipped to hold the HoltraChem waste. Wisconsin inspected the storage facility every six months. She noted that the state did not have a formal role in the subsequent sale because the material was a commodity.

Mr. Peder Larson, serving as a substitute for Mr. Brad Buscher of MWSI, shared lessons learned from having mercury on their site. Insurance concerns, homeland security issues, and environmental concerns were more significant than MWSI appreciated, he said. The MSWI facility was not built for long-term storage. He felt that, on a strategic level,

MWSI suffered from a problem of incomplete solutions. The original contract stated that MWSI would store the 84 tons for four years. The incomplete solution, he said, is that there is no place for the mercury to go after temporary storage. There is another chlor-alkali plant in Louisiana that is shutting down and they may have approximately 900,000 pounds of mercury. For private companies considering the possibility of storing mercury, he cautioned that incomplete solutions are not appropriate for this type of element. If you're going to ban export of mercury, you need to have a storage solution.

After the presentation, the following items were noted:

C: (*Participant from a non-governmental organization*) I'll give you the Maine perspective. The HoltraChem plant closed in September of 2000, and at that time, the company contracted with a trader located in Illinois. All the mercury was to be shipped to India. Some of the mercury arrived in India. The Indian government refused to take the remaining mercury. Through our Senator, the State of Maine requested that the Defense Department assume the custody of the mercury. DOD's response was that it lacked statutory authority to take it. The State of Maine was aware of what was going on regarding the storage at MWSI, and the materials were manifested to Wisconsin at our request. The contract was for a four-year period, and not intended to be a permanent solution. U.S. Senator Susan Collins introduced a bill that would have effected a Federal solution to the HoltraChem mercury. The bill did not pass, and now we are right back where we were in 2000. There are three more chlor-alkali plants closing over the next 12-24 months; the issue is not going away. There were lessons learned. It was an imperfect solution.

C: (*Participant from industry*) I don't mean to disparage anyone who was involved. At the time this was going on, we were working hard in Washington to try to figure out how to help. I think you've seen the U.S. Enrichment Corporation (model of public/private partnership) that Brad Buscher described. We support the idea that there needs to be a place for mercury to go.

Q: (*Participant from a non-governmental organization*) EPA co-sponsored a meeting in Boston around 2002 that addressed this issue. This discussion has been going on for a number of years and from my perspective the problem has been lingering for far too long. I would like clarification on insurance concerns and homeland security concerns as it might be viewed as a reason to stay clear of the issue. Can you elaborate on MWSI's homeland security and insurance concerns?
A: (*Participant from industry*) The answer is easy, we went from having five to 20 tons of mercury for short periods of time, to having 84 tons and increasing public concern that it was there. And as far as homeland security issues are concerned, it wasn't a secured facility. We weren't staffed to protect it 24/7, 365 days a year or constructed in a manner that would reliably prevent access. Our insurance company wasn't comfortable with that.

C: (*Participant from a non-governmental organization*) Laying it out in that context is helpful. You've just illustrated the problems a private company can face. The Federal Government really needs to step up to the plate here.

Q: (*Participant from academia*) For a point of clarification, what is different about this 84 tons of mercury, can it not be sold on the world market?
A: (*Participant from industry*) It has been sold on the market.

Q: (*Participant from a non-governmental organization*) What is your high figure for mercury inventory at any given time, and have you experienced similar insurance issues or homeland security issues?
A: (*Participant from industry*) We store considerably more mercury than that (84 tons) and my insurance cost is outlandish. What's important is if we are going to be involved in a business with a commodity that no longer has a market, meaning we can't sell it overseas, we must have a closure and post-closure system in place.

Q: (*Participant from a non-governmental organization*) To follow up on the homeland security issue, have you been approached by the Department of Homeland Security and is your site secured?
A: (*Participant from industry*) No. I do all my storage indoors.

C: (*Participant from industry*) The concern I have in regards to private storage is more related to long-term solutions. Some of the conditions that occurred in Maine were because a private company went under. No one can ensure a private company will have the same stability as the U.S. Government. We don't need to worry about terrorists, but we need to worry about a private company failing.

Prior to the first stakeholder discussion, Ms. Canavan polled the stakeholders about the day's agenda to determine if there were any objections to the group hearing the presentations on the costs of storing mercury as part of the first day's agenda instead of the second day. Hearing no objections, she made the agenda change.

Stakeholder Discussion

Q: Which entities (e.g., state or private company) should be considered capable and should be allowed to store mercury; what would be the criteria for selection? What would be criteria for selecting entities that would handle the mercury prior to storage, e.g. transportation or collection? Would public/private partnerships work here? How?

A: (*Participant from a state organization*) The criteria are: a single entity to manage mercury so the standards are consistent, accountable to the public not a board of directors, and cost sharing (just because an entity manages it doesn't mean they should bear the full cost).

Q: (*Participant from industry*) Does "accountable to the public" imply public ownership?
A: (*Participant from a state organization*) Personally I would feel better with the Federal Government, but if public accountability could be achieved some other way, I am open to hearing it.

A: (*Participant from academia*) Unless a new use of mercury comes, it's going to be a burden. It has to be under the highest level of Federal agency we have and the security issue is important and although not as horrific as other hazards, elemental mercury would be difficult to clean up in a city. Having secure sites (two or three sites) is important. A Federal agency should be responsible. Climate will be important also. The climate should be dry.

A: (*Participant from a non-governmental organization*) The chlor-alkali and mining sectors are capable of managing their own mercury so I think they could establish a captive storage facility. This facility would be subject to closure and post-closure requirements. It's not the case that long-term storage is incredibly difficult and only one entity can do it. For other sources of mercury besides chlor-alkali and mining, maybe a single entity makes sense. If it is decided that certain sectors can manage the mercury themselves, they may be subject to RCRA.

Q: (*Facilitator*) Do these criteria apply to this scenario?
A: (*Participant from a non-governmental organization*) It depends on what these sectors want. The sectors have to be ready and capable of storing mercury. The important criteria of a secure facility, climate, and accountability would be assured through the permitting process.

A: (*Participant from industry*) For chlor-alkali plants, you would be changing a marginal asset with some market value into a huge liability. This may not be realistic on the balance sheets. What is the incentive for them to apply for the RCRA permit? So a disadvantage is that this is not a growing business and a new liability is a concern. There is no offset.

A: (*Participant from industry*) We don't get to set prices in the mining business because we sell a commodity. In terms of criteria, there needs to be flexibility in terms of storing mercury over the long-term and if we have one facility there will not be a competitive aspect to keep costs down.

A: (*Participant from a non-governmental organization*) I would also suggest entities that use and store mercury should have a responsibility for paying for the solution. I would target product manufacturers and entities that sell mercury within the U.S. There needs to be a surcharge. And the states want to recycle it so we need to factor into the solution the economics for the recyclers to do what we need them to do. This is in the public interest. It is a global pollutant. The Federal Government should not be expected to pick up the whole tab on this.

Q: (*Participant from academia*) Why are we only looking at the idea of handling it as elemental mercury? As the costs go up, the barriers to recycling go up, so why aren't you talking about immobilizing it or sequestering it? Or at least look at this as an option.
A: (*Facilitator*) I had a conversation on this in June. DOD has spent time and effort and said it's not feasible at this time, but it is not completely off the table.

A: (*Participant from academia*) What are the rules of the game? If it falls under RCRA then a private solution might work. If so, then recyclers can charge extra. We need to think about what incentives we are creating for the recycling industry.
A: (*Participant from industry*) It's not rocket science. A capable private party could do the storage; it would be quasi-public and properly funded. We don't want to place an extra charge on recycling mercury because then people won't recycle; they will dispose of it because it's cheaper to dispose.

A: (*Participant from industry*) From a mining perspective we are selling a commodity. We believe it poses enough of a risk that it should be dealt with, but we are taking something that generates revenue and imposing a cost to manage it. It reduces our ability to operate; we don't have the option to pass costs through. We need backstops so insurance costs can't spiral out of control. It would be like having an FDIC account -- some Federal backing should come into play. What is the effect of an export ban? Are we going to make it so cost-prohibitive that the willingness to capture mercury when there's no viable place for it to go is a problem? Some mining companies bring their byproduct mercury back into the U.S. to handle it properly. Don't make it too cost prohibitive to bring it back into the U.S.

A: (*Participant from industry*) There would be potential benefits of involving the private sector because of the efficiencies and incentives for innovation. Companies would compete and make it less costly.
Q: (*Participant from industry*) Are you suggesting a fee or tax on users of mercury on a volume basis or products sold, even though the risks are already factored into the price?
A: (*Participant from a non-governmental organization*) My main point is there is a role or responsibility that you have if you are still in the mercury business.

A: (*Participant from academia*) I wouldn't say don't charge the mines anything, but sequestration is a public benefit for so it should be a public cost. One hundred tons is about two million dollars a year that would go from a positive to a negative cost for the mines. We should have criteria and a long-term cost analysis. We need an organization that can act in perpetuity, like the Federal government.

A: (*Participant from industry*) The sooner we can sequester mercury, the better off we will be. It will take too long if we debate cost-sharing. I don't think the government should waste money, but the cost to them is miniscule (for sequestration). It is for the common good.

A: (*Participant from academia*) It's not just the direct costs, there is an indirect cost if you put private industry in the business. The liability will track backwards.

A: (*Participant from academia*) We need a set of protocols regardless of who takes over the mercury.

Q: (*Participant from a non-governmental organization*) We have an infrastructure here to collect and recycle mercury. Why would we change anything here? Even if we had the Federal Government sequester it?
A: (*Participant from a non-governmental organization*) We need to make sure the existing infrastructure and incentives continue.

Stakeholder Discussion

Q: Where should storage be allowed geographically (e.g., multiple sites or a single site, abandoned mines, warehouses, etc.)? What variables should be considered for determining the location (e.g. transport and storage costs, environmental safety, liability)?

A: (*Participant from industry*) It should be as few entities as possible. If you have a facility there are regulations in place.

A: (*Participant from academia*) It would be feasible to use old mines.

A: (*Participant from a non-governmental organization*) Until we have a long-term solution, I want it above ground where it can be tested and visually seen.

A: (*Participant from industry*) As close to the source as possible is best, to limit transportation costs.

A: (*Participant from industry*) Once standards are in place, there may be advantages to multiple sites, like lower costs for transportation.

A: (*Participant from industry*) We have to look at more than just one-time costs, but also at the 40-year, long-term costs.

Q: (*Participant from a non-governmental organization*) We need to hear from DLA. They had four facilities, what lessons did DLA learn about one versus more facilities?
A: (*Participant from DLA*) There were some economics of scale in going from four sites to one site. Congress changed the DLA mission from selling mercury to storing mercury because the stockpile was not needed for the defense of the U.S. The pending closure of sites also factored into our decision.

A: (*Participant from academia*) This is not high-powered nuclear waste, but there needs to be some thought to putting it down deep where nothing is living, like in deep mines. I think permanent retirement of mercury will prove to be cost-effective.

A: (*Participant from industry*) I would like a horizontal mine operation, above the water table.

Primary Mercury Mining: Historical and Current Trends

Tom Groeneveld, USEPA; David Lennett, Natural Resources Defense Council; and Joseph Pollara, Newmont Mining Corporation

Mr. Groeneveld began by explaining that the presentation on primary mercury mining will focus on supply and demand issues. For his portion of the presentation, Mr. Groeneveld provided a summary of historic mining activity, noting that in 1990, the last U.S. primary mine closed in Nevada and that currently primary mining is done only in Kyrgyzstan and China.

For his portion of the presentation, Mr. Lennett discussed the collaboration on mercury between the Natural Resources Defense Council and the Chinese government (SEPA) for the past three years. He presented recent data on mercury mining in China and mercury imports, including a report of zero imports to China in 2006. Mr. Lennett indicated that the ability of Kyrgyzstan and China to increase primary mining appears to be very limited due to geologic, economic, and political challenges.

The following items were noted in response to this presentation:

Q: (*Participant from EPA*) How do the international ratings of A to D for mercury reserves compare with the U.S. method?
A: (*Participant from industry*) Most bodies are graded high, medium, low.

Q: (*Participant from academia*) Do the data reflect legal mining?
A: (*Participant from a non-governmental organization*) Yes.

C: (*Participant from a non-governmental organization*) China does not have large reserves of mercury. Grade D reserves are rarely used. China does not export mercury; it has self-contained mercury use. People worry that an export ban by the U.S. could increase primary mining in other countries. This presumes demand is status quo and there is no surplus in the future. But the people in the Chinese EPA who work with NRDC say that China needs to decrease its demand for mercury, including by substitution.

Q: (*Participant from EPA*) If China produces 700 tons and doesn't import, where is the balance?
A: (*Participant from a non-governmental organization*) Catalyst recycling is not included on the general supply list.

Q: (*Participant from academia*) Where is the mass balance?
A: (*Participant from a non-governmental organization*) It could be in hydrochloric acid, we are not sure.

Q: (*Participant from academia*) How reliable is the information about zero imports?

A: (*Participant from a non-governmental organization*) Legal imports require a license, so I think that they are good data. I'm pretty confident. They have not been exporting any significant amounts for a very long time.

Beginning his portion of the presentation, Mr. Pollara asked the stakeholders if they had heard of the International Council on Mining and Metals (ICMM). In 2001, the ICMM formed to take the agenda from Mining, Minerals and Sustainable Development (MMSD) forward, he said. The ICMM vision is a viable mining, minerals and metals industry that is widely recognized as essential for modern living and a key contributor to sustainable development. The ICMM is comprised of 16 leading companies and 24 industry associations. The basis for membership, explained Mr. Pollara, is to improve performance through a sustainable development framework. Members of the ICMM, he added, agree that the dangers, risks, and hazards associated with mercury as a neurological toxin mandate that they do not open any mines designed to produce mercury as a primary product.

Following Mr. Pollara's presentation, the following questions/answers were noted:

Q: (*Participant from a non-governmental organization*) Are you going to submit information to UNEP in 2009 to help them quantify global emissions?
A: (*Participant from industry*) We haven't had any specific discussion on this. We are sorting through what we are going to do. We have talked to them about the goals that came out of the [the UNEP GC24] meeting.

Q: (*Participant from industry*) What portion of the mining industry does the group represent?
A: (*Participant from industry*) We don't have exact numbers. Mines range from mom and pop to large multinational companies. Most of the large multinationals are members. It's a fair share of the global mining market.

C: (*Participant from a state organization*) You said ICMM will work to "…reduce and eventually cease supplying mercury into the global market once policy and economically viable long-term technological solutions for the retirement of mercury are developed."
A: (*Participant from industry*) I've tried to work on the wording, it still doesn't read quite right. We want to reduce selling once we have retirement solutions.

Q: (*Participant from academia*) What about the companies that are not members? Are you fostering relationships with them, like Barrick?
A: (*Participant from industry*) Because of Barrick's merger they are a member via Placer Dome. They may become members on their own, I don't know.

Byproduct Mercury Production in Modern Precious Metals Mines in Nevada
Dr. Glenn Miller, University of Nevada-Reno

Mr. Miller's presentation addressed the production of gold and other metals in Nevada. He indicated that mercury is not used to extract gold or silver in Nevada mines; however

it is still used in developing countries. He also stated that mercury byproduct production is preferable to emissions being released into the atmosphere. He discussed various mines operating in the state, including the Jerritt Canyon mine, said to be problematic because of its release of mercury into the air. Also during his presentation, Mr. Miller discussed the role of mercury in gold ore, stating that roasting ore is the largest source of byproduct mercury. Mr. Miller stated that major gold mines are being developed in Alaska, but currently 82 to 85 percent of gold production in the U.S. is done in Nevada. Finally, Mr. Miller concluded that byproduct mercury production should be reported for all mines, and that uncertainties exist as to the total amount of mercury that can be captured from byproduct.

Following his presentation, the following questions/answers/comments were noted. Steven Hoffman from U.S. EPA's Office of Solid Waste was available via the phone to answer questions on the Bevill Amendment to RCRA.

Q: (*Participant from a non-governmental organization*) What percent of mercury byproduct production is from roasters?
A: (*Participant from academia*) 80 plus.

Q: (*Participant from a non-governmental organization*) Are there significant releases from ore roasting and autoclaving?
A: (*Participant from academia*) The operation that generated byproduct mercury is the regeneration of carbon and retorting of gold. Barrick uses a calomel process for the capture of mercury and produces tons of capture from roasting.

Q: (*Participant from academia*) The Bevill process excludes almost anything related to the process of mineral beneficiation. Any time mercury is captured it should not be Bevill-excluded, I would argue. Will EPA ever consider changing that position?
A: (*Participant from EPA*) The agency took the position that roasting and autoclaving are classified as beneficiation practices and I don't think the agency will change its position.

Q: (*Participant from a non-governmental organization*) Is there any mercury by-product processes in gold mining that are not Bevill protected?
A: (*Participant from EPA*) The residuals from air pollution control equipment. They are regulated hazardous waste. Byproduct out of retort is Bevill-protected. And all other autoclaves, cyanidization, roasting, all are Bevill-protected; the wastes are Bevill exempt.

Q: (*Participant from industry*) Define Bevill exclusion.
A: (*Participant from EPA*) Mining waste that is excluded from the RCRA hazardous waste regulations. Senator Bevill inserted language in RCRA that certain mining wastes would be excluded (i.e., not treated as hazardous waste).

Q: (*Participant from a non-governmental organization*) Except for retort operations, the material is not hazardous waste, it's Bevill exempt and it's a product. If there is an export ban (i.e., it can't be sold) is it Bevill- exempt?

A: (*Participant from EPA*) Bevill only applies to waste. If a mining company generates byproduct mercury, Bevill doesn't apply.

Q: (*Participant from a non-governmental organization*) In my example, the mercury is not a commodity. So mercury could be stored without RCRA attached to it?
A: (*Participant from EPA*) Yes, that's correct.

Q: (*Participant from a non-governmental organization*) How much byproduct material is retort generated versus other forms of generation?
A: (*Participant from EPA*) No official data, but probably 50% is from retorting. It all depends on whether companies continue to roast or move into autoclaving.
A: (*Participant from academia*) The data are not available. Most companies have the data but they are not reported. Steve Hoffman's number of 50% is probably a good number.

A: (*Participant from academia*) The calomel is the most efficient in capturing mercury and therefore most desirable, so you don't want a disincentive for the most desirable capture technology.

A: (*Participant from EPA*) They are still subject to RCRA 7003 imminent and substantive endangerment, regardless of Bevill status. EPA can require it to be handled as waste.

C: (*Participant from academia*) Large mines are doing well with capture rates, but what happens to captured mercury is the better question. Capture rates are 98-99%.

Byproduct Mercury from International Mining
Joseph Pollara, Newmont Mining Corporation

Mr. Pollara's presentation on byproduct mercury addressed the need for and importance of mercury stewardship. He wants to maintain control over the company's byproduct mercury. Is important to consider the concept of an export ban and how it will affect imports. There is a long chain of economics that needs to be considered. Mr. Pollara gave an overview of the Newmont Mining Corporation's operations of the Yanacocha Mine in Peru. Specifically, he described the smelting, retort, and gas treatment processes. In 2005, he said, shipments began to Pennsylvania. As part of the mercury handling system, he explained how the mercury is certified in Peru and in the U.S., with chemical markers to "fingerprint" the Newmont mercury. The company ensures that its mercury is sold only to qualified end users. Mr. Pollara described the security measures implemented to transport the mercury and store it in a guarded warehouse before shipment to the U.S.

Following Mr. Pollara's presentation, the following questions/answers/comments were noted:

C: (*Participant from a non-governmental organization*) I applaud you for your end user qualification. But is seems like you are simply shifting to the developing world the other U.S. exports that don't have the same qualifications. So while I applaud your desire to restrict your mercury to protective use, that is not a luxury everyone can have because we have too much in the U.S. and if it is allowed to be sold, it leaves the U.S. and is not going to a good place. The reality is you've simply sent somebody else's mercury overseas.

Q: (*Participant from EPA*) Are you importing byproduct mercury from other countries?
A: (*Participant from industry*) Peru is the only country we import from, but other companies may be importing from other countries.
C: (*Participant from industry*) We've imported mercury from Chile and Argentina and other operations in Peru.

Q: (*Participant from academia*) Any sense of levels of concentration? What is the average price of imported mercury versus exported mercury? If the intention is to pull a certain amount off the world market, the importing is less expensive than what we export.
A: (*Participant from industry*) True.

Q: (*Participant from academia*) Does the proposed export ban imply an import ban?
A: (*Participant from academia*) If there is an export ban you wouldn't have an import ban. So you are talking about an export ban and import subsidy.

C: (*Participant from academia*) That would be great.
C: (*Participant from a non-governmental organization*) I'm not sure of whether importing byproduct mercury into the U.S. for processing warrants any particular attention as a matter of policy. Either way, the byproduct mercury or its equivalent still reaches the world market. It would be different only if it's brought here to the U.S. and sequestered.

C: (*Participant from academia*) We export more because we import it for processing.
C: (*Participant from industry*) Mercury generated from byproduct production will displace virgin mercury. It doesn't matter where it comes from.
C: (*Participant from a non-governmental organization*) Kyrgyzstan is running mines for employment. China does it for internal needs. I disagree that increases in the amount the U.S. places in the global market from secondary sources will make the Kyrgyz mine produce less mercury.

Q: (*Participant from industry*) Is there not a role played by the off-market economy for this commodity? Some black market primary mining that isn't accounted for?
A: (*Participant from a non-governmental organization*) There probably is some but it has not shown up as significant. Artisanal mercury production has not been significant for quite a while. Even though the price of mercury has quadrupled, we haven't seen more primary mining.

Q: (*Participant from academia*) How good is the USGS data? Why does the Netherlands import so much from us?
A: (*Participant from USGS*) we get data from the U.S. International Trade Commission (USITC) trade and census data. I don't know what's going on in the Netherlands.
C: (Unknown) There is a huge mercury trader in the Netherlands.

Dr. Doa showed a chart prepared by Peter Maxson that illustrated the impact of DLA keeping their mercury off the market in 1994. She indicated that the data would be presented the following day in more detail.

Mercury Storage Cost Estimates (For the Y-12 National Security Complex)
Bill Fortune, DOE

Mr. Fortune's presentation addressed the cost estimate for storing mercury at the DOE Y-12 facility. He noted that this estimate was developed as a planning estimate (and not as a detailed budget-related estimate). The estimated cost for the management and long-term storage of mercury for the next 40 years was cited as $42 million. In assessments that will follow regarding the continued storage of DOE mercury at the Y-12 facility, Mr. Fortune indicated this estimate will be revisited and the specific costs evaluated in more detail. The estimate of the basic costs associated with storing the mercury included estimates for: general facility maintenance, utility costs, facility and project management, monitoring and inspections, and safety and hazard evaluations. Estimated costs related to security measures at the facility were not included in this figure. Following Mr. Fortune's presentation, the following questions/answers/comments were noted:

Q: (*Participant from industry*) How many tons do you have?
A: (*Participant from DOE*) 1206 metric tons (35,000 flasks).

Q: (*Participant from academia*) How much can be allocated on present basis versus onsite basis? Cost per ton?
A: (*Participant from DOE*) This is the best estimate we can offer at this point. On an annual basis, the basic maintenance and operation costs for storing the mercury equates to approximately $400,000 per year. A general cost per ton estimate could be obtained by dividing the $400,000 annual cost by the total quantity we have (1,206 mt).

C: (*Participant from industry*) We can't assume we can pick a government facility and the cost is free. We have to consider if we need land acquisition, facility maintenance, etc. I'm not sure they (the numbers) are realistic; they are probably way too low.

C: (*Participant from EPA*) We will provide information on private costs at the September meeting.

Q: (*Participant from industry*) This is generic operating cost, correct? Management of liability is not a factor, correct?

A: (*Participant from DOE*) Correct. An estimated cost related to liability insurance was not factored into this estimate since the mercury is stored at a federal facility.

DNSC Mercury Storage Costs
Dennis Lynch, Defense National Stockpile Center

Mr. Lynch's presentation on DNSC mercury storage costs included an overview of the one-time costs, and recurring costs at the Hawthorne site. He noted that the costs did not include for construction, nor the costs of reflasking the mercury. For his 40-year projection, Mr. Lynch indicated that he used a 4% inflation factor and he noted that the current cost of insurance ($300,000/yr) did not include coverage for mercury. Following Mr. Lynch's presentation, the following questions/answers/comments were noted:

Q: (*Participant from industry*) Does the rent cover insurance that exists now?
A: (*Participant from DLA*) It's passed through to us so it's currently in the rent, excluding insurance for mercury.

Q: (*Participant from industry*) Do you have salary, burden, permitting costs captured?
A: (*Participant from DLA*) No.

Q: (*Participant from industry*) Do you have man hours for time to manage the project?
A: (*Participant from DLA*) No, I don't have that.

Q: (*Participant from academia*) How much will it cost to store per/pound of mercury for next 40 years?
A: (*Participant from DLA*) I can tell you what DOD is being charged. It goes year by year. I inflated the base rent by 4% inflation.
C: (*Participant from academia*) Before the September meeting we will get this type of data from EPA.

Q: (*Participant from industry*) The facility was already 14 buildings that you refurbished, correct?
A: (*Participant from DLA*) Yes.

Q: (*Participant from industry*) Did you cost out new structures?
A: (*Participant from DLA*) Yes, we have it as Appendix F in the Environmental Impact Statement.
C: (*Participant from industry*) EPA, please include a new facility scenario in your numbers prior to the September meeting.

C: (*Participant from industry*) We need an annualized costs per pound over time.

C: (*Participant from academia*) There are a lot of hidden costs that we need to account for, e.g., legal, permitting, man hours, etc. Costs are probably low but we should have a really good number so we can have confidence that the costs are low.

Stakeholder Discussion

Q: What factors might affect the future quantity of mercury from mining byproduct? If mining byproduct is a long-term source, should reporting be required?

A: (*Participant from industry*) The number one factor is the price of gold. Ore bodies are unpredictable. It will come down to production. I don't think reporting is a difficult issue. It's not hard to measure on a gross basis and we are reporting now under the Nevada program and will likely incorporate it as part of our TRI process.

A: (*Participant from industry*) We should focus on supply and demand. On all products in U.S. there should be a reporting requirement.

C: (*Participant from academia*) Mines could legally decrease their byproduct quantities by putting it all into the tailings facility and nothing requires them to report what goes into tailings.

Q: (*Participant from a non-governmental organization*) Under Nevada law, air or mining regulations or other statutes, can someone take high concentrations of mercury material and dump it in a tailing pond?
A: (*Participant from a state organization*) Yes.

C: (*Participant from industry*) So if we have an export ban and storage, we need to be sure Bevill doesn't become an escape. Perhaps EPA would have to use the RCRA 7003 authority.

A: (*Participant from academia*) The price of mercury matters.

C: (*Participant from a non-governmental organization*) Unless the Bevill loophole is addressed, the ability will be there to just use the tailings. I would encourage EPA to look at the repercussion of the status quo.

C: (*Member of the public*) All of this is based on Bevill remaining the same. If Bevill is in jeopardy, the numbers will be blown away. Since 1980 some mining companies use the Bevill exclusion for a revenue stream. If anything jeopardizes the Bevill exclusion you have to revisit all these assumptions and numbers.

C: (*Participant from a non-governmental organization*) 50% of this material is now Bevill protected. I don't think people are going to take advantage of this loophole because there is too much of a risk if you put material with a questionable Bevill status into a Bevill-protected unit. Nevada should look at the issue.

C: (*Participant from academia*) I think unless the Bevill exclusion is changed, there is no incentive to recover mercury. You will capture less and put more in the tailings pond.

C: (*Participant from a state organization*) I am not convinced it is happening widely across the industry. We are looking at where material is going as part of an ongoing investigation. And we are looking at emissions at tailings ponds. But I think if changes are made in national policy we would like to be involved so we can respond as the policies are changed.

Q: (*Participant from academia*) Is Bevill the binding regulation here?
A: (*Participant from academia*) I'm not prepared to say it is or not, it requires some investigation to see if it would have a major impact. I think it would be, we need to see.

The first day of the 3rd Stakeholder Meeting adjourned at 5:00 p.m.

DAY 2

The second day of the Commodity-Grade Mercury Stakeholder Meeting began with welcoming remarks from Ms. Canavan. After reminding the group of the meeting objectives, she embarked on the day's first agenda item—addressing Stakeholder Discussion questions.

Stakeholder Discussion

Q: If there was a storage solution for excess mercury, would byproduct mercury be a preferred source to meet the U.S. demand?

A: (*Participant from a non-governmental organization*) Both byproduct and recycled products are essentially the same, since both recover mercury as a way of minimizing mercury emissions. So no, is my answer. In the U.S. the principal mercury sources will be byproduct mercury and mercury recovered from products and wastes, except for the three to five chlor-alkali plants that will remain in operation.

Q: (*Participant from EPA*) If a decision is made to sequester mercury, is recycled mercury large enough to meet the demand and should byproduct mercury be immediately sequestered? Is there a hierarchy?

A: (*Participant from a non-governmental organization*) The point is the same, do you want us to make a recommendation for a hierarchy? I don't think we are that far along. We are looking at sequestering chlor-alkali mercury and promoting the recycling of products and byproduct mercury. When we have more supply than needed for the U.S. market then a decision needs to be made about sequestering. I don't think we need to answer that right now.

A: (*Participant from academia*) The point is to keep mercury from being released. There is an economic issue. We don't want to do anything to discourage recycling. There's a fairness issue that needs to be addressed. Who's going to pay for it? I would agree, there is no priority for which type of mercury should be sequestered.

A: (*Participant from a state organization*) Start with the assumption that everything should be sequestered except the minimum amount needed to meet the U.S. demand. It's presumptuous to talk about where it's coming from. There is no preferred. We should choose based on risk, transportation, and cost.

A: (*Participant from a non-governmental organization*) The only change in our recycling infrastructure will be felt by the retorters because they won't be able to export their treated mercury.

A: (*Participant from industry*) The reality is the demand comes from people in recycling programs.

A: (*Participant from a state organization*) If we assume mercury will be sequestered, we need to promote recycling. We need to look at the recycling infrastructure because it's designed to handle mercury. If the demand is less than the supply then that's what needs to be sequestered.

Q: (*Participant from EPA*) At the first meeting we established there is a surplus. The question is what happens if there is not an export ban and we need to address the excess mercury?
A: (*Participant from a non-governmental organization*) You have to define where the mercury can legitimately go. If you are worried mercury retorters are going to store mercury for speculation purposes, then you have to cap the inventory they can maintain at any one time through the permitting process.

A: (*Participant from academia*) There is a disincentive for recyclers to take in mercury. We have to keep the disincentives out. We need to define what an excess is and who pays for the excess. I see it as a government issue. The government could purchase all the mercury and byproduct mercury so there is no mercury for export. It may be an inexpensive option. There would be a mechanism where a Federal agency would say when there was an excess and then they buy it from the market and sequester it in perpetuity. The government would allow only enough to meet domestic demand. The exports and imports basically balance each other.

A: (*Participant from academia*) There are clear implications of banning exports. We have an excess supply, not a surplus. If you have an export ban it will affect the price of mercury, so that changes demand and supply.

A: (*Participant from academia*) I think we need a major incentive to recycle as much as possible. It has to be no cost to them. That is a major market we don't have any control over.

A: (*Participant from a non-governmental organization*) There is not a free market for mercury in the U.S. With State and Federal legislation, it is virtually inconceivable that there will be a higher demand for mercury. Nobody will be proposing new uses of

mercury. The cost of storage is significantly less than $8 per pound. I think the notion of a "disincentive" is a bit overstated.

A: (*Participant from industry*) I want to sequester it no matter what and have a net zero use in the world.

A: (*Participant from industry*) Our objective is to reduce use and emission of mercury no matter what. To get the mercury sequestered as soon as possible is to have government involvement. It will be a low cost to the government. The sooner we can get it sequestered the better.

A: (*Participant from a non-governmental organization*) We want to see a minimal amount of government intervention and still accomplish the mission. The estimate is 300 tons getting into the global atmosphere a year. It's an environmental health issue. There is a public need. There is an interest in stopping the global flows of mercury. There needs to be a way to make sure recycling is still viable. There is orphan mercury in reservoirs, and producers have a responsibility. If there are other options, that would be good. Is there an economic incentive that we are not hearing about?

A: (*Participant from industry*) Producer responsibility is an easy answer. Maine has led the nation to require people to recycle mercury. Fluorescent lamps should be sent to have the mercury recovered instead of going into a landfill. The producer needs to take greater responsibility, which should be the status quo. There is no enforcement to make people recycle lamps.

C: (*Participant from academia*) Without an export ban, the payer is the taxpayer, just like what DOD and DOE are doing now. What if DOD and DOE did not store? Then there would be more mercury in the world market and the price of mercury would be lower.

C: (*Participant from EPA*) The EPA wants your advice on what the future world will look like. We want a range of advice. We'll bring your input back into the interagency process.

A: (*Participant from industry*) Producer responsibility is a logical place to go in looking at these issues. Lamps, thermostats, switches, are many parties along the chain that profit from them and user benefits from them so producers are one of the parties involved, but there are many players so focusing only on the manufacturer I don't think is the right way to look at this.

Stakeholder Discussion

Q: What other options exist for foreign-generated byproduct mercury besides shipment to the U.S. for processing?

A: (*Participant from academia*) I'm not sure what we mean by options. We have foreign influence and control. If you get rid of refining in the U.S. and make it unprofitable, we

would not want to buy it on the open market and there is no reason that foreign countries would want to sell it to us because we couldn't pay for it. So many artisanal miners may pick up the byproduct. The only reason we import is for refining. We get paid for that service. If there is no viable export market we won't import it.

A: (*Participant from a non-governmental organization*) This question presumes there is something special about imported by-product. They import for processing and someone else's mercury is being used overseas, so nothing worth special consideration is going on here.

A: (*Participant from academia*) I agree, you are just substituting one mercury for the next in the foreign market. What if everyone else wanted this privilege? The system would break down. The byproduct sector has established what they consider a legitimate market; they have created their own export ban with an Australian exception.

A: (*Participant from industry*) We should be solving the U.S. issues and then look at how to expand on a global basis.

A: (*Participant from industry*) The rationale behind importing byproduct into the U.S. is a liability issue. Mines operating overseas got into lawsuits when they sold it locally. That's why companies decided to ship it out of country and handle it in the U.S.

A: (*Participant from academia*) We don't want to create a disincentive to import byproduct mercury.

A: (*Participant from academia*) We need to make sure our recycled mercury doesn't go to artisanal mining.

A: (*Participant from a non-governmental organization*) This question is outside of our purview. Maybe some issues are outside of our domain and need to be addressed by international bodies. That might be our recommendation. Newmont expects a benefit from the U.S. system to deal with out-of-country mercury. In the long run they might want to be part of a global solution outside of the U.S.

A: (*Participant from academia*) The reason Newmont exports to the U.S. is that somebody pays for the mercury. In the trade data, we have imports for consumption and total imports, and domestic exports and total exports. If you ban exports, are you banning total exports or domestic exports?

A: (*Participant from academia*) Liability, not price, is driving Newmont to import byproduct mercury. We don't want to create a disincentive to do that. Let Newmont import it and sequester it.

A: (*Participant from academia*) Newmont wants to be environmentally responsible; they balance reputation and cost.

Q: (*Participant from academia*) The price of mercury matters in my world. If we have an export ban, how much mercury do you think the U.S. will import?
A: (*Participant from industry*) Zero.

C: (Max Moya) I am a trader of Mercury in Peru. The USGS stats show that there are no exports from U.S. to Perú. However in 2004, 45 tons were exported, in 2005, 62 tons were exported, and in 2006, 54 tons were exported. This makes Peru an important player in Mercury. Therefore those statistics need to be revised. Most of this mercury enters Peru illegally, not as contraband, but underpriced to avoid import taxes. Newmont needs to get rid of the mercury produced in Yanacocha so that peruvians allow the company to continue operating and producing gold. That is the reason why Newmont brings mercury to the U.S. to be refined and sold elsewhere.

Changes in Global Demand
Tom Groeneveld, USEPA

Mr. Groeneveld's presentation illustrated the recent changes in global demand for commodity-grade mercury. During his presentation, he discussed emerging trends in supply and demand and set the stage for future conversations. Citing research from Peter Maxson, he presented current global demand at greater than 3,400 mt/yr and supply at greater than 3,600 mt/yr (with a variability of 15-20 percent). As part of his presentation, Mr. Groeneveld showed demand changes, both increases and decreases, in various devices between 2000-2005. Among the historical trends he referenced included a decline in mercury use in most product categories, except lighting; as well as a decline in mercury consumption in most process categories, except vinyl chloride monomer production and artisanal mining. Following Mr. Groeneveld's presentation, the following questions/answers/comments were noted:

C: (*Participant from a non-governmental organization*) The mining and byproduct number in 2004 is too high, I think the numbers are significantly smaller. I think you would see from the closure of the Spanish and Algerian mines additional reductions in 2004 and 2005. The other observation -- you say measuring control devices decreased over 2004-2005. At best it remained static or has gone up slightly. The SARS crises increased demand for thermometers in China.

Q: (*Participant from industry*) Where did mercury stock come from?
A: (*Participant from industry*) The former Soviet states.

C: (*Participant from industry*) When you separate supply and demand, you get a distorted picture.

Q: (*Member of the public*) If you look at the last 10-11 years, it looks pretty flat. If you agree with that, then what are we concluding here?
A: (*Participant from a non-governmental organization*) The observation is correct but we should not assume the next five years will look the same. Some changes in laws and

production processes will reduce demand, but the question is by how much? We know electronics components will go down due to the global impact of the EU RoHS Directive. In addition, the Europeans just issued a Directive on measuring devices. Whether and to what extent China reduces its mercury demand will also be important.

C: (*Participant from EPA*) Peter Maxson thinks mercury from Kyrgyzstan is going to Lambert Metals.
C: (*Participant from industry*) They have made sales to Lambert and China.
C: (*Participant from EPA*) Some to Spain and the Netherlands.

C: (*Participant from a non-governmental organization*) About the observation that the chart looks flat over 10 years…if we had a separate chart for the developed world, we'd see a decline in mercury use and in the developing world it would go up. The reality is excess supplies being generated are going to the developing world, and they are going to feed artisanal gold mining and other environmentally harmful uses.

Q: (*Participant from industry*) Did you say in 2005 and 2006 that China did not export mercury?
A: (*Participant from a non-governmental organization*) Yes.
C: (*Participant from industry*) I disagree with that.

Export Bans and Reducing Mercury Consumption in Artisanal and Small Scale Gold Mining
Dr. Kevin Telmer, University of Victoria (British Columbia; GEF/UNDP/UNIDO Global Mercury Project

Dr. Telmer opened his presentation by stating that the world emulates the EPA, so whatever it does will become a model and used as a starting place for others in the world. In the world of artisanal and small scale mining (ASM), he said, change equals dollars. And therefore, export bans, he said, can play a key role in reducing mercury consumption in ASM because they will increase the price of mercury. In large-scale mining, liability matters and the price of mercury is less important. In ASM, the price of mercury matters and miner's health is a secondary concern. One reason miners use mercury is because it gets them small amounts of gold that they can sell or barter right away for food. Dr. Telmer described three different ASM scenarios. As a consequence of poor practices, he said, between 650 and 1000 tons of mercury per year is released. Furthermore, he said, ASM is the single largest intentional-use source of mercury pollution in the world. Therefore, a goal of the Global Mercury Project (GMP) is to facilitate the elimination of whole ore amalgamation by introducing a pre-concentration step, replacing mercury with a viable alternative, e.g., cyanide, and/or introducing low-tech interventions. By doing so, mercury consumption in ASM globally could be reduced by 50 percent. Miners are sensitive to the price of mercury and they seize on opportunities to conserve. A higher price will cause more conservation. In closing, Dr. Telmer stated that an export ban on mercury trade by the U.S. would stimulate conservation at ASM operations, but cautioned that the ban would also represent a unilateral action which arguably could impoverish or further indenture the poor in developing countries. Therefore any ban

needs to be accompanied by training to teach increased efficiency of mercury use in ASM or use of viable replacement technologies. Following Dr. Telmer's presentation, the following questions/answers/comments were noted:

Q: (*Participant from academia*) If China produces 1000 tons and Kyrgyzstan 600 tons and some goes to China and we produce 200 tons, where does the mercury come from for artisanal use?
A: (*Participant from academia*) Essentially from wherever it's available. It is imported into Kenya then into the Sudan and moves by mom and pop shops. Some entry points are legal via dental amalgams. I don't think it is a fruitful effort to try to find the source.

Q: (*Participant from a non-governmental organization*) You say miners are sensitive to the price of mercury, but why do we see in your pictures that they don't always use it conservatively?
A: (*Participant from academia*) Because they need money and there is no real alternative in their setting.

Q: (*Participant from a non-governmental organization*) How is GMP going to push them away from whole ore amalgamation?
A: (*Participant from academia*) With cyanidization, it is possible. Small-scale cyanidization is something the University of British Columbia folks are working on—to use cyanide on three or four-day cycles instead of a two-month cycle.

Q: (*Member of the public*) If there is no intervention, people will be dead or impotent and the environment will be dead. They are breathing so many grams per day. What is the extent of health issues?
A: (*Participant from academia*) People have severe neurological and other problems, the health impacts are clear and dramatic. They have been doing this for 500 years and it started up again in the last 30 and it is growing.

C: (*Participant from academia*) It is clear that an export ban would help conserve use. But an export ban is an inefficient way of raising the price of mercury.

C: (*Participant from academia*) The psychological impact of an export ban is important and it would have an immediate effect on the international price of mercury.

C: (*Participant from academia*) It typically takes seven years to start a large scale gold mine.

Key Reasons for Addressing Mercury Now – Through Globally Coordinated Action
Michael Bender, Mercury Policy Project/Zero Mercury Working Group

Mr. Bender began his presentation by providing some background information on the Zero Mercury Working Group and the Mercury Policy Project. Both groups agree that mercury is a global pollutant that warrants international action. Not only does mercury cycling threaten global fish supplies, he said, it also poses acute health impacts on

artisanal and small scale gold miners and has primary exposure risk for pregnant women and children. Mr. Bender quoted the World Health Organization in 2005 as saying, "mercury may have no threshold below which some adverse health effects do not occur."

As part of his presentation, Mr. Bender provided best estimates for 2005 global mercury demands. He projected 2012 priority global mercury demand reduction in various sectors, including batteries, electronic products, measuring devices, and chlor-alkali facilities. He also noted U.S. manufacturers' commitment to produce only mercury-free button cell batteries starting in 2011 and said a goal is to get similar commitments from other manufacturers. In closing, Mr. Bender stated that without parallel supply reductions, excess quantities are likely to occur; potentially undermining prior demand reduction and the benefits of demand reduction will not be achieved if the most polluting supply sources are still utilized. Therefore, he said, closing the Kyrgyzstan mine is a top priority.

Q: (*Participant from a state organization*) How many chlor-alkali plants are outside the U.S.?
A: (*Participant from a non-governmental organization*) About 150.

Q: (*Participant from a state organization*) Is there an estimate of the cost to convert them?
A: (*Participant from a non-governmental organization*) No, because we're not sure how many would close and it may vary from country to country. India is closing the chlor-alkali plants on its own.

C: (*Participant from industry*) The World Chlorine Council has figures we could send.

C: (*Participant from academia*) There is about a 10-year supply stored that will likely go on the market in less developed countries.

C: (*Participant from industry*) There 10-15 thousand tons in Europe that will be buried in salt mines.

C: (*Participant from a non-governmental organization*) That question needs to get addressed and we will grapple with this over next few years. Next November there will be a meeting in Bangkok that will have different options for addressing this issue.

Q: (*Participant from academia*) Nevada produces 10 percent of the world's gold and yields 114 tons byproduct mercury. You can estimate there will 500-800 tons of byproduct mercury that will be produced in developing countries if air pollution control equipment is required. That is a large chunk. Better to make it a byproduct than to send it into the air.

Stakeholder Discussion

Q: For each option to manage domestic mercury supplies, what are the likely effects?

Note: Ms. Canavan indicated that the group had adequately addressed this question in previous conversations and therefore they would move to the next agenda item, a presentation by Mr. Lynch.

DNSC Mercury Technical Standards
Dennis Lynch, Department of Defense, Defense Logistics Agency

Mr. Lynch provided an overview of DNSC's experience with managing/storing mercury at its sites. His presentation included a discussion on how the technical standards were developed and other options that were considered. The National Stockpile purchase specifications for mercury were issued by the Department of Commerce, he said. At that time, in 1947, the physical and chemical requirements were not very detailed, e.g., mercury that was bright and clean, flasks of "certified quality." They developed shipping standards in compliance with applicable regulations and in 1960 developed their own storage manual and packing specifications. Among the other options considered by the DNSC during the recent decision-making, was the option to continue to store the mercury in existing sites, treatment for storage, and treatment for disposal. Mr. Lynch said the DNSC concluded that mercury can be safely stored in its elemental form and there was no commercially available technology to render large quantities of elemental mercury more stable or less toxic. Furthermore, there was a lack of an EPA-approved path for moving forward. In 1993, DNSC began selling commodities as a result of Congress' decision that over 99% of the inventory was excess to DOD needs. In 1994, DNSC voluntarily suspended sales of mercury after concerns were expressed by USEPA and members of Congress. We consulted with the Market Impact Committee to obtain a reasonable quantity of mercury sales to analyze for potential environmental impacts. Following Mr. Lynch's presentation, the following questions/answers/comments were noted:

Q: (*Participant from academia*) Did any technology come close to being preferable to storage?
A: (*Participant from DLA*) We looked at four to five technologies--zinc amalgamation, selenium, and others--and we put out an RFP and essentially there was nothing available for 4400 metric tons.

Q: (Unknown) Your policy is to not sell?
A: (*Participant from DLA*) Yes.

Q: (Unknown) How does that fit in with the Obama/Merkowski legislation that says you can't sell it? Is it gratuitous?
A: (*Participant from DLA*) I think there were other players they were looking at. We had already made our decision not to sell.

C: (*Participant from a non-governmental organization*) That decision is an Executive branch decision.

C: (*Participant from academia*) An important implication from RCRA, after 40 years they could potentially be sold, if legislation goes through, EPA will have to deal with the RCRA issue.

Q: (*Participant from industry*) Have you investigated above-ground storage?
A: (*Participant from DLA*) The way we did renovation we think will be an above-ground landfill.

Q: (*Participant from industry*) What about financial assurance requirements?
A: (*Participant from EPA*) They would not need financial assurance requirements because they are part of the Federal Government.

Stakeholder Discussion

Q: For non-federal storage, who should be responsible for initial and ongoing storage, including costs, ownership of stocks, environmental liability and security? How would stocks from state and local collection programs be handled with respect to these issues?

Q: (*Participant from academia*) Do you mean non-Federal mercury?
A: (*Facilitator*) Yes.
C: (*Participant from academia*) There has to be mercury stored in perpetuity and I don't see anybody but the Federal Government doing this.

Q: (*Participant from industry*) Is there an assumption for this question, i.e., export ban or sequestration? Why the question?
A: (*Facilitator*) There is no assumption. We are looking for options other than the Federal Government paying for storage. For example we heard landfills can be an option.

Q: (*Participant from industry*) Is there an assumption it isn't going into the market?
A: (*Facilitator*) Yes.

C: (*Participant from industry*) On ownership, we disagree if it should be Federal or non-Federal, but we all agree, I think, that it should be as few facilities as possible to handle this. If you have many, some will be well managed or better managed than a government I think DOD did a good job on some of these issues. We can take some of their good ideas and modify them. We would never put chlor-alkali mercury in 76 pound flasks.

Q: (*Participant from a state organization*) Why can't the material be located at a number of sites? The users could bear a portion of the costs, I think
A: (*Participant from industry*) For the current surplus, it's hard because you would have to assign responsibility for past uses. But for future generations, yes. I think the first years will have rigorous enforcement and then over time it will deteriorate. That is the reality.

C: (*Participant from industry*) As far as lighting goes, there are hundreds of millions of lamps and we want people to recycle them, but you don't want to increase the cost if you want people to buy them. The consumer shouldn't pay to recycle.
C: (*Participant from a state organization*) It seems the incremental costs would be minimal.
C: (*Participant from academia*) I think it's an option that needs to be considered. The mercury that is sequestered is only going to be a liability. There is an example where a company has bought the liability. And if it doesn't work it's going to fall back on the public. I don't know if agencies can do it more efficiently. Private companies may be able to do it better.

C: (*Participant from academia*) If go with the private sector it could possibly spread globally more quickly. Like the ICMM takes stewardship they could do it elsewhere. Private-government partnerships I think is a good idea. Multi-national companies could take this on and would likely act responsibly overseas.

C: (*Participant from academia*) I like the idea of private enterprise to upgrade long-term storage. The regulations we have in place could make sure everything is done at a certain level.

C: (*Participant from academia*) On the margin these things matter. We formulate public policy; we have to look at private good versus public good. The public good is sequestration of the mercury.

Q: (*Participant from a non-governmental organization*) If and when there is an export ban and the mercury market is zero and mercury is a waste, how can it be anything other than a RCRA scenario? What are the substantive differences between this waste and others?
A: (*Participant from industry*) You would be trying to say certain mercury is a hazardous waste and other mercury is not. That alone makes it odd to me. Why not create the system you want to create instead of trying to make it a RCRA waste?
C: (*Participant from a non-governmental organization*) There is a system for handling other wastes.
C: (*Participant from industry*) Mercury is a commodity, not a waste. The supply may be greater than the demand, but there are some uses that are undesirable and we want them to stop. If it weren't an issue we wouldn't be here. It needs to be regulated as a special category.

Q: (*Facilitator*) If it is not deemed a waste, what are you going to do with mercury in the short-term? What should go to sequestration and what will be used for domestic demand?
A: (*Participant from industry*) The big difference is you can't land dispose mercury, that's the law. You must recycle it. So until EPA comes up with new rules we have to live with the law.

Q: (Public Commenter) You only store for a year then it doesn't apply to RCRA?

A: (*Participant from academia*) The problem could be dealt with that a one year estimation of how much is on hand and how much will go through three to four recyclers, and then determine how much needs to be sequestered and then the government could buy that and put it in an existing facility or build a new facility. Ultimately it is a public liability, so there needs to be some backstop if someone goes out of business-- it is going to be a pubic liability.

C: (*Participant from academia*) The export ban is completely separable from the sequestration issue, if the Federal Government buys the amount we export.

Q: (*Facilitator*) What if the Federal Government doesn't manage or pay for it?
A: (*Participant from academia*) If there is a viable market for mercury then price will adjust so the surplus goes away. Buying mercury is buying a public good by doing a public good. We produce more than we consume and the remainder goes out for export. If you sequester what you export you wouldn't export it. If there is a ban, then the mercury falls under RCRA--I think that's a bad way--or the government pays someone to sequester it.

Q: (*Facilitator*) What if Congress makes policy with no money, then who pays?
A: (*Participant from industry*) It seems so simple, what are we missing? There is mercury needed and there is excess and it has a price. The government should pay for it and put it away. If that doesn't make sense the solutions must be very complicated.

Q: (*Participant from industry*) The government pays for a lot of things for the public good. If some uses are undesirable, and a few companies manage it, then good luck. Why is the government involved in recycle programs but it doesn't want to get involved in sequestering?
A: (*Participant from a state organization*) There isn't enough money to go around. They would prefer for companies with deep pockets to fund it. All environmental programs are currently being cut.

C: (*Participant from a non-governmental organization*) So we have recycling programs and they produce material called mercury and they have some left over and the government sets parameters for managing it. So you work within them. The owner of the mercury has to decide what to do with it. Materials management people step in and take care of it and manage it. How is the taxpayer involved?

C: (*Participant from industry*) When are you going to have that in place? The chlor alkali sector has 900,000 pounds of mercury ready for sale now. It is difficult to get appropriations from Congress quickly.

C: (*Participant from industry*) The Federal Government owns 5,500 tons of mercury and has over 50 years experience. I don't know who would do a better job of managing it.

Q: (*Participant from EPA*) In one "world," The Federal Government does not buy the mercury. In another "world," there is no export ban. If demand goes down what happens to incentives for recycling?
C: (*Participant from industry*) People get excited when I take mercury off their hands. I pay between $1 and $4 per pound. My customers don't like it when I say I can't take their mercury off their hands. I'm going to the grand jury soon because some kids got involved when I didn't buy mercury because of the depressed market. This is a real life example of mismanagement of material because there is no market for it.

C: (*Participant from academia*) We have to maintain recycling incentives.

C: (*Participant from academia*) You would want to buy for the public good but you still want to pay the cheapest price. In California they buy older cars because of emissions, so to say this is a radical program isn't true. I think you can get cheap sequestration.

Q: (*Participant from academia*) How do we get politicians to fund this?
A: (*Participant from academia*) It's a major challenge in public policy. An export ban has a positive effect on the environment, but it is a costly way of removing mercury from the world market.

C: (*Participant from industry*) We are not looking for a free ride, we want to share costs for the good of the public. We don't want to pay all of it and it will happen faster if the government pays some.

Stakeholder Discussion

Q: Should types of storage mimic the DOD model? If not, what technical standards should apply to storage (e.g., physical standards, such as packaging, handling, monitoring for leaks, inspections)?

A: (*Participant from a state organization*) There could be some improvements. It should be modernized. We also need to look at long-term storage aspects. DOD has managed mercury as a commodity that might be sold, not something that is going to be stored forever. Newmont uses some containers for shipping mercury that may be better than the 76-pound flasks that DOD and DOE use. That data and research is not available.

A: (*Participant from industry*) DLA has done an excellent job. The containers should be revisited. We've talked about wood pallets. They have more experience and knowledge than anyone. Maybe a private contractor could mange it.

A: (*Participant from academia*) Mercury is something we deliver in one ton containers. For new mercury there will be a new set of standards.

A: (*Participant from industry*) Look at larger, better containers, and no flammable items in the building. These issues could be resolved by experts.

Q: (*Participant from DLA*) We looked at larger containers and if it gets a hole then more mercury comes out. Nobody knows how long the containers last. We've done a good job for 50-60 years. We've had some problems, yes, but you can minimize the risks with monitoring. We've had good luck with our containers. What improvements can we make?
A: (*Participant from industry*) You have done a great job. If you want to replace containers, then you should look at something larger. To get a new supply and put them in the same 76 pound containers doesn't make sense to me.
C: (*Participant from academia*) New mercury would likely be stored in different containers.

C: (*Participant from a state organization*) We need to look at what technology improvements need to occur. I think we need a standards review of the containers. The external monitoring, passive or active vents, is also of interest. What is a more permanent sequestration? We need to examine treatment technologies to hold it in perpetuity.

C: (*Participant from industry*) I would agree with the treatment technology. If there is not an export ban none of this is applicable. If there is a ban, EPA regulations on speculative accumulation have to change, then they could codify what a sufficient treatment technology would entail. There is a 16-day pH test that we are waiting for EPA approval.

C: (*Participant from academia*) Continue to investigate alternate ways of sequestration. Put it in a form that is relatively inaccessible to use again.

Stakeholder Discussion

Q: Are legislative or regulatory changes needed to make some of these suggestions happen? If so, what are they?

A: (*Member of the public*) Changes regarding liability, RCRA, CERCLA, and who underwrites it. This will require policy change.

A: (*Participant from academia*) If Bevill is not amended there will be a disincentive to capture mercury. The issue of mercury in the processes of mining would have to be considered. The other issue is if new mercury becomes a liability, it would have to be separate from recycled mercury so there would need to be legislation to address this.

A: (*Participant from academia*) We need an appropriations bill with the goal of sequestration that is independent of an export ban-- not export ban policy.

A: (*Participant from academia*) It should be a mercury only policy.

A: (*Participant from a state organization*) If you sequester for perpetuity, RCRA may not be the way to manage it. We should look at standards we want and build standards around that use or need. There should also be incentives to do the sequestration.

C: (*Participant from academia*) The incentives should be in the appropriations bill.

A: (*Participant from academia*) We wouldn't need to open Bevill as an entire subject but just specify mercury issue.

A: (*Participant from a state organization*) I have concerns about timing. If the ban goes through, all of the mercury could be sold before we have time to make legislative and regulatory changes. Is there a way to get something done legislatively in one shot?
A: (*Participant from academia*) If you have a ban then you create perverse incentives in the domestic market. If you are talking about sequestration you don't create perverse incentives.

A: (*Participant from industry*) If we have a goal of doing something soon it has to be done through legislation. You need to have a complete solution if you are serious about the concern. If Congress thinks it's important enough it will introduce a bill, but will they put funding in?

Q: (*Participant from academia*) Why can't you get a foundation/donor to buy surplus mercury until something good can be done with it (asked to NGOs)? It seems like a worthy activity.
A: (*Participant from a non-governmental organization*) What would NGOs do with it?
C: (*Participant from academia*) Hold on to it.
C: (*Participant from a non-governmental organization*) Then why can't the chlor-alkali people hold on to it?

Q: (*Participant from a non-governmental organization*) If companies did want to store it until a solution was developed, what changes to RCRA would have to be made?
A: (*Participant from a state organization*) None, because it would still be a commodity. RCRA wouldn't apply.
A: (*Participant from industry*) You can store it with possible liabilities, or sell it in legitimate markets. Realistically, what would they do?

C: (*Participant from industry*) If a customer wanted met to take their mercury and I couldn't sell it, I could turn it into cinnabar and send it to Canada. To go into a U.S. landfill, the regulation would have to be changed for that.

A: (*Participant from a state organization*) If there is still a market then the length of time doesn't matter.
A: (*Participant from EPA*) As long as there is a presumption that it will go back into commerce, if that changes to no intent then RCRA would kick in because there is a storage requirement. If stored in excess of one year, for example, you have to do something with it. Then you have to dispose or sell it.

A: (*Participant from a state organization*) If they made it public, then it's not for sale, and then I think there will need to be changes to RCRA.

Q: (*Participant from a non-governmental organization*) If a group chose to sequester mercury as a solution until something regulatory was in place, would it be possible to do so under RCRA without being forced to sell it after a year?
A: (*Participant from academia*) I would be surprised if they did it.

Public Comment

- Paul Abernathy, Association of Lighting and Mercury Recyclers

My topic is the waste side of the mercury. I represent most, not all, mercury waste recyclers. There is some important hazardous waste we don't recycle. We think chlor-alkali plants have been getting part of a free ride because of the debris exemption in RCRA. We don't handle that which falls through the Bevill exclusion. So we compete with each other, 30 companies, for all other mercury waste. Of those waste streams there is a low recycling rate. There are other exemptions in Federal RCRA regulations that allow other wastes to not be recycled. About 17 years ago I started to recycle mercury waste. The price today is the same as 17 years ago. I have not seen one single mercury enforcement case in my life. There are so many barriers to do recycling that any impact on our ability to get rid of the mercury will have significant negative impact to recyclers. We sell mercury we recover, for $1 to $3 per pound. Recycling lamps is a low-margin business. All of our industry operates TSDs. The communities where we operate love us. I wanted to share that perspective

Q: (*Participant from academia*) How much mercury does your industry recycle? Fewer than 500 tons?
A: (*Member of the public*) I don't know the number. I'm guessing about 250 tons a year. There are no tracking requirements for our industry, no reporting, as it's a universal waste. We collaborate with the National Electrical Manufacturers Association. Approximately 1 billion lamps fluorescent lamps will be sold annually over the next few years; currently we recycle less than 200 million.

C: (*Participant from academia*) I have USGS's report from 2000, it says 100 tons comes from recycling.

C: (*Participant from industry*) If you compare mercury use by the American chlor-alkali industry with other countries, our use is much lower because of the land disposal restriction rule. EPA set the policy and GAO did not find it contrary to sound policies.

- Max Moya (from Peru)

According to USGS statistics, the balance of imports, material recycled and exports do not make sense. If there is no local mine production, and if only 50 to 250 tons are

recycled, how do you explain that the U.S. exports as much as 400 tons per year? Also I question the USGS figures (i.e., calomel imports of 650 tons in 2005 and 118 tons in 2006). They seem too high. Calomel is a by product of copper mining in Chile and other mining countries. Therefore, why do the mining companies working in those countries export their calomel to be processed in the USA and create a cost contingency to the U.S. taxpayer? Also I suggest that stakeholders from other countries should be invited to attend these meetings so that they get educated on these problems. If you could invite people from China, Spain, and other countries where mercury is produced it would be good. Finally, I would request that the American recycling companies examine carefully who they sell their mercury to, so as to avoid import tax evasion by those companies. In the case of my country those importers have defaulted the Peruvian government by 2 to 3 million dollars in the last two to three years.
C: (*Participant from academia*) The imported 112 tons of calomel in 2006 is almost certainly byproduct mercury, but that number doesn't gel, that's a big data defect. I think USGS should give a presentation in September to talk about data and how it affects import/exports in the U.S.

C: (*Participant from industry*) I asked the same question of where the calomel from Chile came from.

C: (*Participant from academia*) The trade numbers might reflect brokering.

C: (*Participant from EPA*) In September maybe we can have USGS and other agencies with import data, like the Commerce Department, present the numbers.

Q: (*Participant from a non-governmental organization*) If possible at the next meeting, could we have a sense from the recyclers of the portion that comes from voluntary programs versus that done by mandatory hazardous waste programs?
A: (*Participant from industry*) Voluntary take-back is negligible.
A: (*Member of the public*) Less than 2%.

C: (*Participant from industry*) I don't know how accurate the USGS data is, but the disparity may be from chlor-alkali plants.

Q: (*Participant from academia*) Do you send out calomel?
A: (*Participant from industry*) No.

- Steve Barringer, Attorney for Barrick Gold

I am a representative form Barrick Gold and I do some work with Newmont. As a RCRA lawyer, I'd say RCRA has problems trying to accommodate a program now or in the near future, but there is more to say and we will submit written comments. There are a lot of issues that make RCRA difficult. Susan Keane of NRDC asked, the byproduct mercury is just another waste, so why can't the mines just pay for it? If mercury becomes a waste because the government bans its export, it's not a waste like any other waste. RCRA was

not designed to accommodate it. You wouldn't necessarily dispose of it right now, until there is a decision about what to do with it permanently. The Bevill exemption is for large volume, low toxicity waste and the mining industry applies tests to the wastes and in most cases it doesn't exhibit the characteristic of toxicity. So recyclers wouldn't get their hands on it even if the exemption was taken away. It hasn't been mentioned and should be considered, the idea of a Federal land management agency. If mercury became a waste under current policy it would have to be managed offsite--most mining operations are on Federal land and are subject to offsite disposition for the long-term. We are discussing a product that can be sold at a profit but has environmental effects. We are not necessarily opposed to a ban. It could be a good thing, but there have to be compromises. And we feel the industry has been responsible. TRI worked, it had a good impact. So once industry became aware that it was emitting mercury, it worked out a program. We think we are exercising good materials stewardship.

- Craig Lorick, Eagle Lights Northwest

More than half the companies that recycle lamps don't operate a retort so the value of mercury is significant.

C: (*Participant from industry*) Right now I buy mercury; I used to charge customers for it.

Q: (*Participant from industry*) What would be the cost to buy the excess?
A: (*Participant from industry*) There is a 100-ton excess.

Discussion of next meeting

The draft agenda for the September meeting was distributed and reviewed. The following items were noted:

C: (*Participant from industry*) Item 3 needs to be clear on what we look at, e.g., initial and annual operation costs and defining the size of the facility so we have an idea of the order of magnitude it costs to sequester mercury.

C: (*Participant from EPA*) We talked with DOD and wanted to present different ranges. If we can have a small group to work with, we can give a couple of scenarios.

C: (*Participant from academia*) Hidden costs might come out of the workgroup, so the idea of a group is good.

Ms. Canavan explained that the September meeting may be the last stakeholder meeting, so wrap-up on the agenda at item number 7 is for the stakeholders to present their positions on issues. The number 10 agenda item is follow-up to the stakeholders on the process.

When the stakeholders were asked for other presentations that might be needed, the following items were noted:

C: (*Participant from industry*) How much would it cost to buy enough mercury to make sure there wasn't an excess?

C: (*Participant from EPA*) What is recycled and the quantity from mining companies for purification would be needed.

C: (*Participant from academia*) For that purpose, mercury from other mines outside the U.S. should not be considered because it's a domestic issue.

C: (*Participant from industry*) It would be nice to have a reliable range because its coming into the country.
C: (*Participant from academia*) We have to be careful because commodity-grade is coming in and being refined so the export ban would affect the refiners. So does the ban cover domestic export or total export?

Q: (*Participant from EPA*) How about a picture of what is in the U.S. in a year?

C: (*Participant from academia*) There is a distinction between commodity grades. It will have different prices based on its purity.

C: (*Participant from industry*) We would be satisfied if it were a range.

C: (*Participant from industry*) My guess is that within the U.S. we produce 100 tons more than we need so what price do you want to pay for that? If Newmont and Barrick decide to sequester their mercury I will need to buy some for my customers.

C: (*Participant from academia*) We have data on the value of our exports in addition to the quantity data. It's not more than $20 million.

The September meeting will be held at the Holiday Inn Capitol in Washington, D.C. The meeting will begin at 8:30 a.m. and adjourn at 4:30 p.m. to allow participants to take same-day departing flights.

The Commodity-Grade Mercury Stakeholder Meeting adjourned shortly before 4:00 p.m.