

## **ABSTRACT:**

### **Looking through a glass darkly, in search of Common Ground**

Breaking the Cycle Conference, Boston, Session 6A, May 2, 2002

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This presentation will discuss perplexing questions about ethical responsibilities for stewardship of commodity grade mercury. This presentation does not constitute an EPA position. Indeed, EPA and State environmental leaders are just starting to deliberate about what our national policies might become. Moreover, I am not even sure of my own views. Every one of us, even as we strive to understand the world, yet we peer through a glass darkly. Having some familiarity with the mercury commodity market and its environmental ramifications, I will share both my knowledge and my questions.

I will mention strong voluntary progress by the U.S. mercury cell-chlor-alkali sector to curtail its mercury consumption, reasons why this has been achieved, and an important step to advance further progress.

Our society may be headed toward a future day when it does not use mercury. This time is not here as yet. Beyond the United States, the world contains enormous diversity of cultural, political, and economic situations. There is strong demand for mercury in many other nations. Is export of mercury causative of this demand?

Recycling prevents new mining of mercury from virgin ores, which seems an environmental good.

If someone in a developing country uses mercury in precisely the same ways that we do in this country, is it wrong for the U.S. to export mercury to that nation? A major world use of mercury is by small-scale gold-miners. There may be two to five million people who use mercury to claw gold from the earth, because this betters their lives. Unfortunately, they burn this mercury, generating copious air emissions. Can this mining be reduced by with-holding mercury from the commodity market? This seems unlikely, since the price of gold is so vastly higher.

Each nation's unique economic and social circumstances strongly determines its use of mercury. The best way to curtail international use of mercury is a truism: it is to curtail use of mercury in other countries. The tools are education and economic growth, respect and persuasion.

International commerce in mercury is just an indicator of use, rather than causative of use. Trade bans, however alluring, would only attack the symptom of trade, rather than the cause, which is demand. Trade bans also may create local shortages and promote new mining of mercury to meet these shortages. The effective way to reduce mercury use is to spread knowledge of practices or technologies that use less mercury.

If mercury mines were to reappear in the U.S., would environmentalists advocate renewed Defense mercury sales? Implications. The relation between mercury mining and management of surplus mercury.

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*Boston seems an apt setting for this meeting. A founder of the Massachusetts Bay Colony envisioned Boston as a “City upon a hill” -- on full view, a moral inspiration for a lowly world. I am reminded, because this conference would seem an opportunity for our society to mull over perplexing questions about our responsibilities for stewardship of commodity grade mercury.*

My offerings to you do not constitute an EPA position. Indeed EPA and State environmental leaders are just kicking-off deliberations about what our national policies might become.

Yet having familiarity with the mercury commodity market plus its environmental ramifications, I feel an onus to share both my knowledge and my questions. I bear keenly in mind that every one of us, even as we strive to understand the world before our eyes, yet we peer through a glass darkly. We do not perceive all, strive as we might.

*Likewise the Irish poet, W. B. Yeats observed, “the worst are full of passionate intensity.” I do not have passionate intensity. Nor easy answers. But it seems right to think of Yeats, here in a town renowned for its Celtics.*

I plan to offer both some facts and questions. We are well served to consider facts carefully and in their fullness, while acknowledging what we do not know. I am going to try to contribute complexity, muddy things up, but I hope after my musings, you do not feel ill served.

Though I enjoy some professional association with Art Dungan, our moderator, nevertheless our relationship is not one of my reflexively cheerleading U.S. chlor-alkali companies. Yet they have accomplished a great deal, voluntarily, during the past five years and it would be unfair not to thank them. At one U.S. factory, a clever person invented an ultra-violet light that reveals mercury vapor to the human eye. This now helps workers in many factories find and plug vapor leaks. To date, U.S. factories have reduced their consumption by 75 percent on a capacity adjusted, about 125 tons per year. How have they been able to do this? They developed practical techniques to prevent fugitive air emissions, such as simply cooling down equipment before opening it for maintenance. And they have bravely

unveiled these techniques to the world via the Chlorine Institute web site (see: “[www.cl2.com/AM2001/index.html](http://www.cl2.com/AM2001/index.html)).

The President of one company, Olin, dedicated his firm to zero mercury losses, “because it is what our customers demand and communities expect.” He stepped up, set a direction.

*The world’s largest aluminum company, Alcoa, has dedicated itself to reducing mercury releases. The path toward a Sustainable Biosphere crucially relies on the innovatory genius of our productive industries.*

Yet, Art and I occasionally have differing outlooks. A year back, I appealed to his members to install a continuous mercury vapor analyzer above production equipment, so as to alert workers on a real-time basis to vapor leaks, which can be neither seen nor smelled by humans. (*I wonder if factories might give thought to hiring Minnesota PCA’s mercury detecting dog, Clancy, as an expert consultant?*) A real-time mercury vapor analyzer would empower workers to take prompt actions to prevent air pollution. When firms did not undertake this idea voluntarily, I recommended this measure be included in an air regulation that EPA will shortly propose.

I want to take you inside a chlor-alkali factory to show you what I am talking about. (two pictures)

There are far more factories in Europe. Yet no European nation requires continuous monitoring in the vital place -- above the production equipment. Given long-range dispersion of mercury via the atmosphere, this is unwelcome for us here in the United States. It would be terrific if European chlor-alkali factories were to step up and adopt this modern technique, on a voluntary basis, in keeping with the precepts of responsible care, so that their workers can promptly plug mercury vapor leaks.

As U.S. chlor-alkali factories have reduced mercury losses, they of course buy less mercury. I can even begin to envision a day when the U.S. economy needs no mercury whatsoever. I recently read that GE is developing “light emitting organic diodes.” Someday, perhaps, we may not use glass light bulbs containing mercury, instead we may use sheets of plastic containing these diodes. How astounding this sounds, to me anyway. In addition, dentists who offer mercury-alternatives are increasing. In addition, President Bush has given strong impetus to the promising quest for hydrogen powered cars. Imagine, cars whose tail pipes yield water droplets! By such technical and economic advances, we seem headed toward a mercury-free society.

Yet such is a future possibility, whereas our reality is still here and now. The U.S. economy today does make economic use of mercury.

In addition, let us look beyond ourselves. The world as a whole contains enormous and glorious diversity of cultural, political, and economic situations. There is strong demand for mercury in many other nations. Some assume that the export of mercury is causative of use in other nations. They assume that industrial nations are dumping unwanted poison on ones less appreciative of the risks. When I among others visited the Defense Department in July 1994 to urge that Federal sales of mercury be suspended, I was moved by a sense of moral disquietude about the effect of mercury exports. Now I wonder if I was not a bit naïve at that time, perhaps a little paternalistic.

I would like to conduct a little experiment. Mercury is a mobile substance that cycles through the Biosphere. So how many folks here think it is a good idea to promote new mining of mercury ore from the earth? There are reports of low-tech miners who extract mercury in China, Siberia, Mexico. Who would like to encourage these miners to dig more mercury out of the earth? A show of hands, please.

Next question: how many of you would like to stop shipments of mercury from the United States to developing countries? Please raise your hands.

Here is the quandry. Restrictions on recycling mercury from nations with abundance to countries with a shortage creates economic incentive for new mercury mining. Trade barriers, if effective, fracture markets and foster local shortages. So barriers to mercury trade, however well intentioned, could be looked on as having the potential to be perversely anti-environmental, in that they encourage new mercury mining in other nations. Is it logical to raise a hand for one of my questions, but not the other? They are actually the same question, just framed in two ways.

Recycling mercury prevents new mining. In 1989, Arizona's McDermott mercury mine objected to Defense sales of mercury, enlisting a learned economics professor to analyze the issue and testify before Congress. In 1965, there were 150 mercury mines across the United States. By the early 1990s, there were none. Thus past Defense sales of mercury have contributed to killing mercury mines. Many people would consider that an environmental success story.

Another question: If tomorrow McDermott or another mercury mine were to reopen in the United States, should the Defense Department resume mercury sales, to undercut this mining? Put another way, should we keep Federal mercury stocks in readily retrievable condition, so we could resume sales on environmental grounds, if such sales ward off new mercury mining?

If a mercury mine opened tomorrow in Maine, would the Maine Department of Environmental Protection then feel that it should sell its 100 tons?

What if the mercury mine were instead next door in New Hampshire?

What if the hypothetical mercury mine were in Arizona?

Would the answer change if the mercury mine was located in neighboring northern Mexico? Why?

What if instead we assume that mercury mining in Mexico serves only local demand and so is little influenced by the availability of mercury from the U.S. or Europe? This illustrates that how we understand and frame the economic context may influence our preferences.

If someone in a developing country uses mercury in precisely the same ways that we do in this country, is it wrong for the US to send mercury to that nation? Should parents in another nation be able to take the temperature of a sick child with an inexpensive mercury thermometer? What if they do not have access to a mercury free thermometer? Should people in other countries be able to disinfect their drinking water, as we do with chlorine from a chlor-alkali factory? How about fluorescent lights? Is it wrong to sell mercury for light bulbs in other nations? How about dentistry? Is it wrong to ship mercury to other countries to be used in dentistry, though it is used so in the United States?

Perhaps the dominant world use of mercury is by artisanal, small-scale miners. There may be 2 to 5 million people around the world who rely on mercury to claw gold and silver from the earth's crust. They tend to be poor folks at the social margins of societies. They are like you or I, just born without our circumstances and blessings. Through back-breaking work, these folks better their lives by gold mining. *In turn, perhaps 15 to 20 million more people supply them or are otherwise involved in this economic activity worldwide.* Unfortunately, most gold miners burn mercury after they have used it to locate and bind with gold, so air emissions are huge. Since these people are part of an informal economy, there are few statistical clues about the magnitude of their mercury use.

Can artisanal gold-mining be reduced by with-holding mercury from the commodity market? In one sense, no, because the price of gold is so vastly higher that even if the price of mercury rose many times, it would not much curtail gold mining. Yet, a higher price would still give miners incentive to husband their mercury more carefully.

So where do I come out? Each nation's particular circumstances strongly determine its use of mercury. Thus, the best way to curtail mercury use is to do just that, to curtail mercury use. In each country,

where it occurs. How is this done? U.S. chlor-alkali factories are showing one way by reducing their consumption of mercury. For artisanal gold miners, the UN Environmental Program has started technical centers in several countries to spread better practices. While this experiment is modest, it does suggest the way forward: education and economic growth, respect and persuasion versus coercion.

My second thought is that international trade in mercury is just a symptom of use, rather than much causative of use. People mine gold because they want to do so, despite the U.S. government holding off on mercury sales these past 8 years. If mercury trade were to be impeded, it would create shortages in some places and encourage new mining of mercury ores in those places. This is environmentally unwelcome.

I much favor international knowledge-sharing about ways to curtail mercury use as opposed to interference in mercury trade. Trade barriers would attack a symptom, rather than root cause, which is use. However alluring, trade barriers would likely achieve little, while bringing more mercury up from the earth, here into the Biosphere. To my friends who may wish to ban mercury trade, I would instead faithfully propose that they spread awareness to other nations about mercury free alternatives. That seems the best way to have the effect that you want. Prevent mercury use and there will be no mercury trade.

What of U.S. Defense mercury stocks? Should these be sold? I would answer by asking: if mercury mines were to reappear in the United States, would not many environmentalists request that Defense sales resume? If so, this may imply that Defense mercury holdings remain readily retrievable, for the possibility of later sale, on environmental grounds.

Yet what of now, when there are no active mercury mines in the United States to justify sales? In this present circumstance, I can see rationale for continuing to suspend Defense mercury sales. Suspension sends an educational message to other nations of U.S. support for minimal mercury use worldwide. If the U.S. government itself were to resume sales of mercury, such might discourage other nations from their own efforts to curb use. Given long-range dispersion of mercury via the atmosphere, the U.S. has a stake in such efforts.

How do these remarks relate to a session entitled storage? I have offered rationales for not permanently throwing away Defense mercury holdings, but for maintaining them, somehow, in retrievable, marketable condition. There would seem many options as to how this might be done:

surface storage; subsurface storage as in a mine and we will hear a speaker from Sweden talk about that approach; or containment in a landfill.

If my optimism proves warranted, that the U.S. and other nations are indeed heading toward a mercury-free society, then as this becomes more apparent in due course, our society can, with more confidence, retire surplus mercury back to the earth's crust, whence it once came.

These thoughts are for your consideration. They are derived from trying to combine and balance three factors:

- respect for businesses that now rely on mercury to provide services that Americans value;
- respect for the rights of other nations to decide their own needs;
- and respect for the environment.

I will close with several advertisements for people in the frontlines of everyday environmental decisions:

I enjoy working with companies who aim to prevent air emissions of mercury. If there happen to be folks here from companies aiming to do this, it would be a pleasure to meet you.

Second, for State environmental agencies interested in building their technical capabilities to assess air emissions from a prospective source, there are modern technologies that can be harnessed to do just this. There will be a meeting in the Midwest this upcoming fall on this topic, open to anyone interested. If you let me know of your possible interest, I will let you know of this event when scheduled.

Third, right after this panel, I will offer a 10 minute briefing on fugitive mercury air emissions from a chlor-alkali factory, to anyone who cares to remain for that. (*For more information, EPA's Office of Research and Development has recently issued a report, Characteristics of Mercury Emissions at a Chlor-alkali Plant. This can be ordered from the National Technical Information Service under publication number EPA-600/R02-007a, March 2002*)

Thank you for your kind attention.