

Minutes
Oct. 2, 2015

The Wastewater Advisory Committee to the MWRA met at the MAPC conference room, 60 Temple Place

Attendees/Contributors:

WAC: Taber Keally (chair), , Beth Miller (vice-chair), Mary Adelstein, Wayne Chinouard, Zhanna Davidowitz, Karen Golmer, Karen Lachmayr, Martin Pillsbury, Stephen Greene Dan Winograd

Guests: Denise Breiteneicher, Carl Pawlowski, Maret Smolow, David Wu (MWRA), Alison Field-Juma (OARS), Dolores Randolph (BWSC), Ned Beecher (NEBRA)

Staff: Andreae Downs (WAC)

FUTURE MEETING DATES/TOPICS

NEXT: Friday, Nov. 6, DC Water vs Deer Island

EXECUTIVE DIRECTOR'S REPORTS:

WAC minutes reveal that Stephen Greene has been WAC Chairman for about 20 years (minutes aren't complete for this period). He took over from Polaroid's John Shea, who was chairman at WAC's inception in 1990, and of FPCAC (the facilities planning citizens advisory committee, predecessor to WAC). There had been a 1 year interim chair from VHB.

Announcements: **HUBweek** (Oct. 3-10).

DEP listening session Oct. 1: of interest to WAC: Mo limits in biosolids for land application (may be raised, making MWRA pellets more marketable year-round) and Title 5 septage regulations, which may take away the incentive for larger developments on MWRA's borders to pay for connections to its system by increasing the residential limit (from 10Kgal/day to 15Kgal/day) before sewage treatment is required (but with better monitoring of contaminants & escrow accounts) and lowering DEP estimates of average residential flows.

Water Pitch Session: NEWIN and BeCause Water had an app pitch night AD attended, with several interesting processes highlighted for wastewater, and AD may have them in to WAC to talk about their products. K Golmer: were surprised at high attendance.

EPA draft rules on pharmaceuticals that impact wastewater;

VOTES:

After discussion (below), WAC decided to comment on Mo limits and the EPA rules. Draft letters will be available for approval at the next meeting.

PRESENTATIONS & DISCUSSION:

Denise Breitneicher: What's In It? Pollutant Limits and Contaminants of Concern:

EPA customizes local limits for the type of receiving water (in MWRA's case, Boston Harbor and the Nashua River). TRAC regulates 220 contaminants—organics, metals, solids... Permits (NPDES—National Pollutant Discharge Elimination System) incorporates Federal standards and customizes them for each receiving water. Local limits can be lower than Federal, but can't be higher. NPDES permits are supposed to be issued every 5 years. EPA hasn't revisited MWRA's since 2001.

The standards need to be defensible—they need to be based on science and what is technically possible. For contaminants that might later be regulated, EPA asks local treatment plants to start sampling and collecting data well ahead of any new limit.

Then EPA sets limits on headworks (MAHL-Maximum Allowable Headworks Loadings). Under this system, the assumption EPA made is that non-industrial sources were not controllable (ie stormwater, residential uses, commercial uses), and so sets amounts for POTWs (publically owned treatment works) accordingly.

Concentrations of limited substances in sludge are a large part of what drives the overall limits.

MWRA sets limits low and conservative, but change them when the plant starts hitting the set limit. They are allowed to raise their limits if they do not exceed the EPA limits.

TRAC uses a hybrid approach to setting limits for sewer connections—for commercial and residential sources, MWRA does education and outreach, including workshops. For industrial sources, MWRA issues permits and levies fines if limits are exceeded. They use 230 parameters.

For instance, for Molybdenum, MWRA limited industries, but also reached out to suppliers of cooling tower systems, and those institutions with large cooling towers (over 5,500 in the system). They also held workshops for the suppliers and larger building owners, trade groups, explained the alternatives and the benefits of switching.

On the radar screen:

- Personal care products,
- Pharmaceuticals (two groups—unused medications as well as what the human body excretes)
- Plastic Microbeads may be contained with voluntary reformulations, or by state bans.
- And other emerging contaminants, particularly endocrine disrupters.
- In a 2007 study, MWRA tested for 31 emerging contaminants in the wastewater coming into Deer Island, and also in the effluent after treatment. 8 of the contaminants were not detected. 23 were. About half of that were substantially removed as part of the current treatment process, including triclosan (the antibacterial agent used in soaps, etc., a hormone-mimic), and Prozac, acetaminophen, etc. Other utilities are also looking at it.

K. Lachmayer: what about genetic pollution/antibiotic resistant genes? Particularly with biotech?

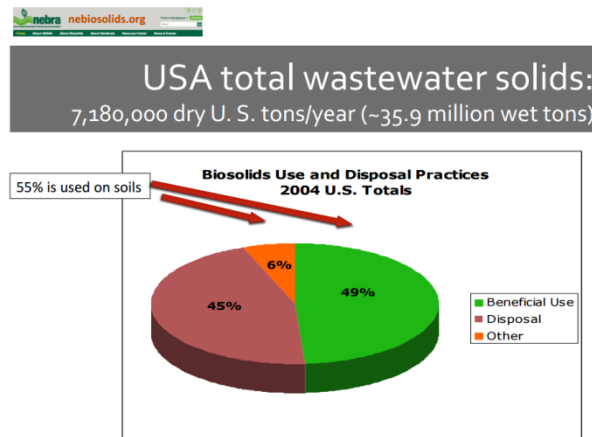
DB—MWRA has not studied/it's not much discussed. For a lot of these contaminants, the answer may be green chemistry, redesigning things so you have fewer or none of the contaminants of concern. When you have thousands of gallons of water coming in every day, it's very hard to deal with these in terms of treatment.

M Pillsbury—The process of setting limits seems to me to be analogous to the TMDL (total maximum daily load) process. There are equity issues if you there are multiple sectors contributing. How do you handle that?

DB—MWRA applies limits across the board. It may be a flaw in our process, but we may be too big

Ned Beecher: Biosolids and Soil

55%-60% of the USA's 7 million dry tons of biosolids are applied to soils.



They are a valuable soil amendment and source of nutrients.

The primary use is in agriculture, followed by Forestry and Turf (class A)

Demand is growing as customers recognize how much better plants grow in biosolids-amended soils.

They are also used to re-vegetate gravel pits, strip mines and Superfund sites—and are more successful than other soils in reclaiming such sites.

Biosolids tie up heavy carbon.



metals and sequester



Pennsylvania mine before

Same Pennsylvania mine after

Photos courtesy Bill Toffey, MABA

Microconstituents/Chemicals in biosolids

30+ years of research on how chemicals behave in biosolids. Over time, the quality of biosolids has improved as regulations have tightened.

Some chemicals have been in biosolids all along, but now we can measure very tiny concentrations.

But because of the nature of biosolids, few leach into water.

(<http://www.nebiosolids.org/resources/#/microconstituents/0>)

K Lachmayer: But in soils you have complex interactions. There are always things you can't measure.

NB: a lot of the bad rap for biosolids is the result of pure sludge applications on farm fields in the 1970s with huge levels of cadmium, which we now classify as a hazardous waste. USDA got involved and it got eliminated.

Now, however, the chemical concentrations of micro constituents are much smaller and the comparative risk is also much, much smaller. Not saying we shouldn't study and improve continually, but risks are much smaller.

KL: But there are a lot of risks that we didn't know to think about before, such as estrogens and fish feminization. We didn't know about mutated genes entering the environment.

NB: Yes, if they had been as significant as cadmium or cholera, we would have known about them. Now our science can deal with these finer issues, but they aren't the same huge risks we were dealing with now.

? How can you know on the long term risks, when some of these are newer contaminants?

NB: fair point.

But, for context, there are tiny amounts of the antibacterial agent triclosan in biosolids, common in biosolids. In over-the-counter toothpaste, the amounts 3,000 mg/kg—and exposure much more direct. In biosolids, the measured amounts are .1 mg/kg, and the pathways are much less direct.

(Ned went into the details of how scientists study contaminants and their effects on the environment, and some well-designed studies of biosolid applications and possible exposures.)

Biosolids have been studied for more than 30 years, and samples have been saved & frozen from each year, so scientists can go back and measure contaminants that they may not have had the tools to measure before.

Treatment plant processes eliminate or break down a number of compounds.

KL—but some of the breakdown products are more toxic than the originals

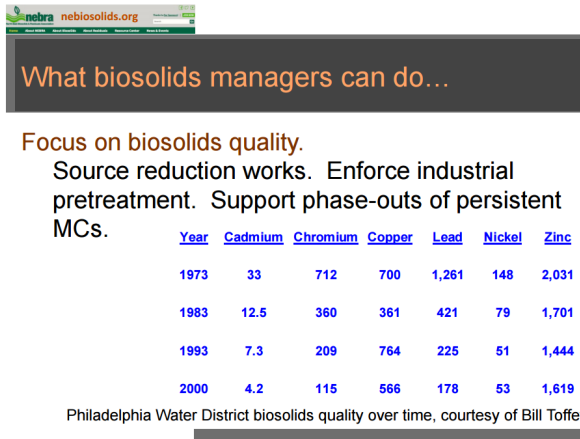
NB: that's right and they are controlled for.

In effect the chemicals in wastewater are either dissolved in the effluent, or strongly attached to the solids. So those trace contaminants of concern therefore are not very bioavailable.

When they are made available, they are often broken down in soils and consumed by bacteria in the soil.

Much of what remains in biosolids are nutrients that are harmful in water, but good for soils. That's what wastewater treatment is about, to put contaminants that will harm water into soil that can re-use them as nutrients.

But keep out the harmful chemicals:



Concern that state Department of Agriculture (DAR) is limiting applications of phosphorus-containing soil amendments, which could apply to biosolids like the MWRA pellets and restrict marketing them just as the DEP is encouraging recycling of food wastes via composting and co-digestion.

Carl P: Our tests show the pellets are slow releasers of phosphorus. MWRA legal department believe Bay State Fertilizer not covered by the new regulations because they are an “organic” fertilizer. The phosphorus is bound to iron, it is not available except to plants. But we will have to keep an eye on.

Cooling towers and Molybdenum (WAC fact sheet—in attachments)

Phosphorus containing anti-corrosives for cooling towers are more work for the operators.

But Mo (Molybdenum) is more expensive. Many companies have dropped it.

Because MWRA pellets aren't reliably below the Mo threshold year-round, only about 5% of pellets are sold in-state.

In MA, the Mo limit for biosolids is 25mg/kg for land application, but just 10mg/kg for pasture.

NB—and there's huge demand in the state for them.

Milorganite contains up to 28mg/kg Mo.

CP: Believes the limits were set by DEP on the assumption that farmers would feed cattle just the one, Mo-heavy plant (clover? Turf?), and as a result, they set a lower limit than really

needed. But we know that farmers feed cattle a variety of plants, hay, etc., and also copper-containing supplements if they are in an area with a lot of background Mo.

VOTE—to draft a letter to DEP supporting raising the state’s Mo limits, but taking a holistic approach—not just the limits, but asking for clarity of the phosphorus rules, for approval at next meeting.

EPA DRAFT Rule Controlling Pharmaceutical Disposal, particularly in wastewater

Andreae Downs: explained the handout/summary (in attachments), and highlighted that the deadline was Nov. 24.

Rules would apply to ease take-back of pharma—two kinds of operations:

- Manufacturer take-back of unopened pharmaceuticals they produce
- Community or pharmacy take-back programs for all kinds of pharmaceuticals (incinerated)

DB: working on getting more pharmacies to have lock-box take-back. But complicated because of involvement of EPA, DEP and DEA.

M Adelstein: WAC & MWRA have always encouraged not flushing pharmaceuticals

T Keally: take-back is the tough part. It needs a lot of education. Would be best if pharmacies were required to do take-back and put up informational signs at the counter where drugs are dispensed. Households are big generators (the rule applies to hospitals, veterinarians, assisted living, etc.)

DB: In our service area, the hospitals are pretty good. It’s the nursing homes, hospice and assisted living that have the high levels.

S Greene: WAC should comment, and ask EPA to add BMPs for better compliance

DEP would have to enforce

Is incineration always the best method for disposal? (some compounds are broken down in WWTPs)

****** ATTACHMENTS ******

Fact-Sheet on Molybdenum in Biosolids

Produced for the Wastewater Advisory Committee, October, 2015

By Andreae Downs, Executive Director

On Molybdenum (abbreviated Mo) generally (Wikipedia):

Molybdenum is an essential trace element for animals.

Although human toxicity data is unavailable, animal studies have shown that chronic ingestion of more than 10 mg/day of molybdenum can cause diarrhea, growth retardation, [infertility](#), low birth weight and [gout](#); it can also affect the lungs, kidneys and liver.^{[74][76]}

Dietary [molybdenum deficiency](#) from low soil concentration of molybdenum has been associated with increased rates of [esophageal cancer](#) in a geographical band from [northern China](#) to Iran.^{[77][78]}

(Scientific papers brought to the May 2015 MWRA Advisory Board workshop on Mo): Molybdenum is restricted in biosolids because of its effect on cows (sheep are less affected & wild ruminants apparently not appreciably). If cows get too much of it, they can weaken & fall over.

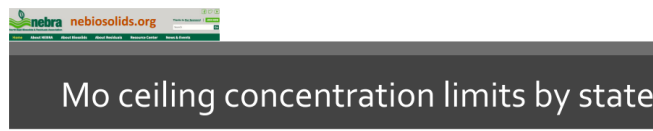
A mineral supplement (such as copper) can counteract Molybdenosis in cows.

Molybdenum applied in biosolids to soils at **40 mg/kg** (the NY limit) will leach out before reaching dangerous concentrations that could be taken up in plants and into cows.

(details here: <http://www.nebiosolids.org/nebra-publications>)

At the May workshop, Deer Island Director David Duest and MWRA Residuals Manager Carl Pawloski covered the importance of the beneficial reuse of biosolids. Manuel Irugo, VP of Operations at NEFCo recommended reevaluating the state's Molybdenum Standard.

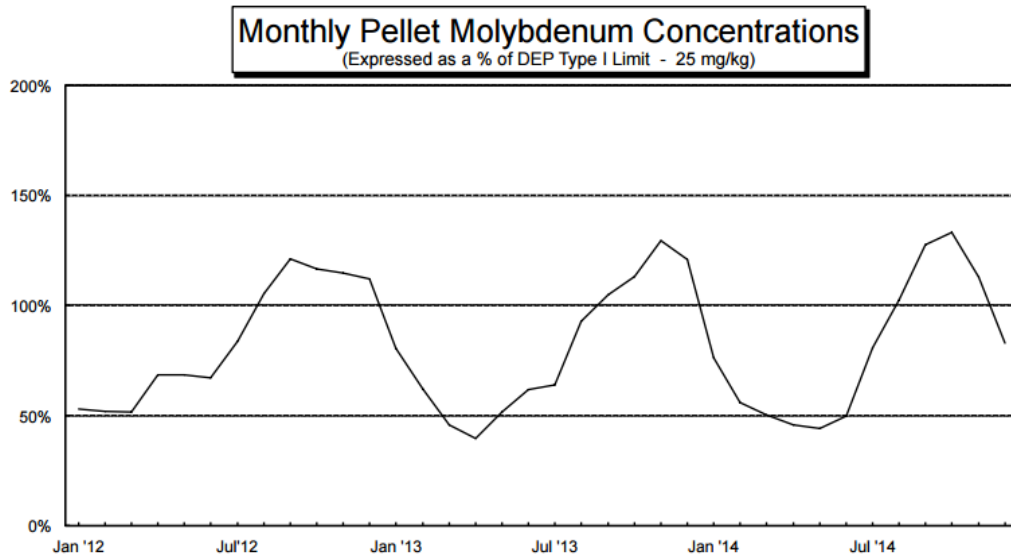
MA has one of the lowest limits for Mo in biosolids:



The image shows a screenshot of the nebiosolids.org website. The header of the page reads "nebra nebiosolids.org". Below the header, there is a dark grey banner with the text "Mo ceiling concentration limits by state". Underneath the banner is a table with two columns: "State /U. S. EPA" and "Regulatory ceiling limit".

State /U. S. EPA	Regulatory ceiling limit
U. S. EPA, AL, AK, CA, CO, FL, GA, IA, IN, KY, MD, OH, OR, PA, SC, TN, VA, WI, etc.	75
CT, ME, RI, VT	75
NY	40
NH	35
HI	25
MA	25 (10 for ruminant crops)

As a result, the bulk of the fertilizer pellets produced by NEFCo from MWRA biosolids are sold out of state for much of the year.



Mo comes into the system primarily when commercial cooling systems that use it to prevent corrosion flush it out (usually in the cooler months).

In 2014, about 5% of pellets were sold in state.

The bulk of the remainder were sold in CT (22%), NY (18%) and Indiana (10%), followed by Maine, Rhode Island, Florida & Virginia (5%).

The Advisory Board estimates that if the limit were raised enough to allow pellets to be sold year-round in-state, and NEFCo's assertion that they could sell 30% of pellets in MA annually, it would save about 13,000 gallons of diesel fuel.

One alternative to raising the Mo limit for fertilizer pellets would be to reduce the amount of Mo used in cooling systems that drain to Deer Island through TRAC or a voluntary program.

Alternatives to Mo for cooling systems include phosphates (which are cheaper), hydroxyethylidene diphosphonate (HEDP), zinc-based products and traceable polymers. (Tucson WWTP)

MWRA sells the pellets as Bay State Fertilizer—they are free to MWRA member communities.

Summary: EPA proposed rule Management Standards for Hazardous Waste Pharmaceuticals

[<http://yosemite.epa.gov/opa/admpress.nsf/a7b2ee8e45551c138525735900404444/4e6484bba71fe54985257eb20060fffb!opendocument>]

Produced for the Wastewater Advisory Committee, October, 2015

By Andreae Downs, Executive Director

Purpose: Reduce the amount of pharmaceuticals flushed into wastewater treatment systems that can't remove them.

Why: According to EPA research and regulations, flushing drugs down the drain is currently a **common, allowable** disposal method—often routine in long-term-care facilities. EPA estimates **36,000 tons** of healthcare haz waste is generated annually in the US. WWTP processes in plants such as Deer Island cannot remove these from the effluent or residuals.¹

Controlled substances such as Oxycodone, are most likely to be flushed, as separation & incineration is expensive under current regs.

Target: Largest non-manufacturing generators (>100kg of hazardous waste/mo or >1kg of **acute** hazardous waste/mo)

(i.e. nursing homes, veterinarians, pharmacies, hospitals, dentist's offices, **coroners** and those who re-purpose, recycle or manage & dispose of hazardous pharmaceuticals)

Status: **Published 9/25/15**. 60 days to comment deadline is approx. **11/24/15**. Several requests for extension, but no decision yet.

Considerations:

1. Making rules less confusing and easier to comply with (note thousands of items used, some acutely hazardous & some not, busy professionals whose mission is not just hazmat management)
2. Making returning pharmaceuticals (unused, recyclable) easy & safe
3. Need to distinguish between controlled substances and other hazardous pharma, and easing reporting and other burdens to keep controlled substances from being flushed.

¹ EPA cites several studies of long-term care and healthcare facilities that showed drain disposal of the majority of waste pharmaceuticals.

Final Rule

1. Would be mandatory, not optional
2. Would not include household pharma waste (recommends against flushing, but no mandate), but would include long-term care facilities that are now exempt.
3. Would apply to community take-back programs or events
4. Exempts unused nicotine patches, gums and lozenges
5. Would be sector-specific in order to be more flexible than current hazmat regulations.
6. Would apply the flush ban to “conditionally exempt small quantity generators”, those smaller entities that are not covered by other aspects of this rule, such as training and reporting.²
7. Would ease EPA requirements for managing hazardous controlled substance wastes, providing they are incinerated (not autoclaved) rather than flushed.
8. Excludes materials already regulated in other ways
(i.e. sharps and medical/biohazard waste, radioactive materials, dental amalgams)
9. For pharma waste that is not classified as “hazardous waste,” **recommends &** allows incineration rather than flushing, but **does not** require it.³
(i.e. carcinogenic, endocrine disrupting compounds or vitamins/minerals with heavy metal content, and other pharma of less concern)

Possible Comments:

- **EPA has created a “Hazardous Waste Pharmaceuticals Wiki”** WAC may want to check this out and commend EPA for this tool, if it is useful.
(<http://hwpharms.wikispaces.com>)
- **Community take-back programs:** EPA wants comments on whether they should be included in this rule—ie be mandated to incinerate, rather than landfill household medical waste.
- **Changing the recommendation for “non-hazardous” pharma** to a requirement.
- **Conditionally Exempt Small Quantity Generators** EPA wants comments on whether they should be included in the flushing ban (see footnote 2), expressly whether the risks posed by medications in wastewater is outweighed by risks of diversion or worker/patient exposure

² According to the EPA narrative, this includes 94 % of dental offices and continuing care retirement communities.

³ EPA is considering adding to the list of pharma considered “hazardous” see EPA’s “*Data Collection on the Toxicity, Use and Disposal of Hazardous Drugs Report*” The Inspector General notes that EPA hasn’t kept up with the thousands of drugs developed since 1980.

- **Sending EPA information on potentially hazardous pharma:** EPA asks for comments and information (“sources and identity”) on these substances for possible inclusion in a future flushing ban.
- **Whether nicotine should be exempt** and in which concentrations. It currently is not, but this rule would make some unused smoking-cessation products exempt. Should concentrates used in e-cigarettes (vapes) be included as pharmaceutical hazardous waste?

Other methods shown to improve health/pharma wastewater quality:

- **Banning lindane** California banned this in pharmaceuticals and found it improved wastewater quality
- **New DEA regulations** ban flushing as a disposal method for controlled substances
- **State bans:** flushing pharma is already banned in Illinois, New Jersey, Washington DC, and is being considered in Connecticut

TRAC’s view: (from interview 9/30 with John Riccio and Peter Yarossi, MWRA): A good first step. Want to encourage the ban on flushing pharma. DEA Rule on controlled substances is comprehensive and will stop hospice flushing of the really bad stuff. A lot of the chemo drugs are already on the EPA banned lists. Remaining concern is the endocrine disruptors, esp. for fresh water, but this is still a very good first step.

Comment Guidelines: include “docket ID No. EPA-HQ-RCRA-2007-0932” sent to <http://www.regulations.gov>

Questions: Kristin Fitzgerald, office of resource conservation & recovery: 703-308-8286 or fitzgerald.kristin@epa.gov or Mary Jackson 8453 jackson.mary@epa.gov

Resources: FDA on pharma:

<http://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/EnsuringSafeUseofMedicine/SafeDisposalofMedicines/ucm186187.htm>