

**Sediment Phthalates Work Group
Technical Committee Meeting
Source Control and Treatment
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ATTENDEES

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This meeting summary was prepared by Kate Snider. It is based on a transcription of the flip charts used during the meeting to document the discussion. Action items are identified in ***bold script***.

PURPOSE OF THE MEETING

The purpose of this meeting was to reach agreement on and document the key messages that are apparent from the material collected and reviewed regarding the source control and treatment of phthalates as it relates to sediment contamination.

AGENDA**Additional Information*****Primary Source Control***

- Bans
- Alternatives
- Reduction of off-gassing

Secondary Source Control and Treatment

- Removal from air
- Street cleaning
- Stormwater treatment and BMPs
- Chemical water treatment
- Bio water treatment
- Low impact drainage—increase permeability TSS effect

ADDITIONAL INFORMATION

- Beth provided additional information on treatment system costs.
- **Jeff to find other cost information included in stormwater manual update.**
- **Beth to pull Ecology cost information off website to see how relevant and best to present.**
- **Beth to receive additional info regarding Port of Seattle Seatac treatment system cost and expected maintenance.**

SOURCE CONTROL AND TREATMENT—KEY MESSAGES**Primary Source Control—Bans**

- A national ban on phthalates as plasticizers could potentially be effective in the long term; however, it does not seem that local bans would be effective in terms of pathways to sediments or sediment impacts over the next several decades due to the reservoir of material in the environment and its continued release of DEHP.
- Local bans don't address the significant amount of product generated nationally and internationally.
- Bans have the most potential to be effective for special products and human health pathway (e.g., medical and toys). These represent only a small volume of the plasticized PVC that contributes phthalates to sediments and thus limit the potential effectiveness of bans.
- Potential incentives could be useful in limiting the use of plasticized PVC, such as Leadership in Energy and Environmental Design (LEED) certification, Envirostars or "certified non-toxic." Plasticized PVC was recently reviewed by LEED but the decision was made to not currently address it.
- All the information considered indicates that phthalate loading to the environment is directly tied to population growth—quantity of materials will increase with more uses and more products. Future challenges will likely be bigger than those we have now.

Primary Source Control—Substitution and Coatings

- Alternative plasticizers—many present similar or worse environmental problems than phthalates.
- Phthalate alternatives are generally more expensive and not as versatile: they may be less toxic, although we do not know for sure.
- Overall, there is very little data regarding coatings that would reduce off-gassing from phthalate-plasticized PVC.
 - * Medical applications show the most focus on phthalate substitutes and minimizing direct tissue exposure. Coatings for plasticized PVCs in medical applications are not likely viable controls for phthalate paths to sediments.
- Sediment endpoint for phthalates in the environment will likely require focus on construction materials and the construction industry, which is a heavy user of plasticized PVC.

Bans and Substitutions—Motivation

- Need to understand what drives society and what directly or personally affects individuals in order to motivate change.
- Direct effect of phthalates in sediments to society appears relatively small.
- Changes required to make a difference to phthalate concentrations in sediments would need to be at the national or international level.
- There are not any good precedents for sediment quality as a driver for a ban on phthalates.
- Phthalate reductions motivated by human health direct exposure (medical apparatus, toys, cosmetics) could potentially develop and publicize information about production substitutes or increase their availability—all of which might have an impact on sediment phthalates.
- Matters of disproportion to consider:
 - * From now into the future, sediment phthalate sources and concern will increase due to population and product growth, which relate to the effort and resources available to identify and control phthalate sources.
 - * Changes to affect sediment phthalate concentrations would likely need to occur at societal scale and we expect they would have significant economic impact.
 - * More often human health (i.e., lead in gasoline) or clear obvious animal impacts (i.e., DDT effects on bald eagles) drive change at the levels needed to affect sediment phthalate concentrations.

Secondary Source Control and Treatment—Removal from Air

- Particulate removal, in general, can be used as surrogate for phthalates removal—air filters, low impact development, water treatment, etc.
- Filters to remove particulates would likely have an effect on phthalate removal (provided they do not contain phthalates themselves).

- Indoor air filters could be applied for other reasons.
- Air filters would unlikely affect outdoor air particulates and the sediment pathway.

Secondary Source Control and Treatment—Street Cleaning

- Effectiveness is dependent, in part, on the type of sweepers used; however, high-efficiency sweepers are expensive and don't work on all types of street surfaces and there are some concerns regarding effectiveness on wet streets. ***Please note—The Work Group notes that these conclusions on street cleaning were based on only a few studies and some contradictory information.***
- High-efficiency street sweepers still leave measurable percentage of small particles and phthalates that still enter drains.
- Street sweeping shows very low efficiency in removing silt and smaller sized particles, which have higher concentrations of phthalates.
- Street sweeping only affects a small percentage of an impervious watershed because the percent of total impervious surface area is limited. Limits include parking and other activities in the right-of-way, and the fact that most impervious surface (roofs, parking lots and driveways) are outside of the public right-of-way.
- Street sweeping would not likely have significant percentage removal effect on the total amount of phthalates reaching sediments; however, it is important to recognize that sweeping has additional benefits beyond phthalate removal.
- Information from Seattle sweeping pilot will be helpful.
- Sweeping may be an important element of a multi-component source control solution.
- Catch basin cleaning may also play an important role in the big picture.
- The percentage removal from catch basin cleaning versus street sweeping needs to be evaluated as data becomes available.

Secondary Source Control and Treatment—Stormwater Treatment

- Any treatment alternative that is effective for particle removal will have beneficial effect on phthalates loading.
- Most removal methods are limited effectiveness at small particle sizes—phthalates most associated with smaller particles.
- Small-scale treatments (smaller drainage areas) tend to be more effective and efficient than large scale treatments.
- Breaking large basins to smaller watersheds is useful to implement stormwater treatment, but can drive up total costs for construction and operation/maintenance. Expensive to implement many small scale systems over entire watershed—particularly in already-developed areas.
- It is difficult (if not impossible) to remove contaminants at low concentration levels (ppb) with traditional stormwater treatment methods designed to be effective at larger scales (drainage basins).

- We do not know what percentage TSS in sediment phthalate loading needs to be removed in order to prevent problems in sediments. It would be good to know what percent removal of a given particle size range would effectively control phthalates in sediments; however, this formula would be different for all locations because it is directly relates to the characteristics of the watershed and receiving environment.
- Traditional stormwater source control focuses on finding and controlling problem point sources early in their path to sediments and before the treatment happens at the basin level. The huge role of air deposition in the phthalates path to sediments is a problem because it is not a point source that can be controlled with existing technologies or regulations.
- Traditional stormwater treatment does not scale up well—requires very large storage area and land commitment.
- There are passive versus non-passive treatment alternatives—each type of treatment has implementation constraints.
- Chemical or biological waste water treatment facilities are not feasible for stormwater from large watersheds because natural flows are not steady and thus efficient to engineer treatment for. In turn, this means a lot great deal of storage (land area) is needed to provide steadier flows that could be efficiently treated. Current options are impractical.
- Chemical oxidation treatment:
 - * In queue for pilot study for treatment plant application.
 - * Concern re: potential application as a distribution system through the watershed—potential for unintended consequences.
 - * Concern regarding regulatory prohibition against introduction of chemicals into environment—cannot use environment as treatment system.
- Treatment would not necessarily eliminate phthalate recontamination and a requirement for sediment cleanup. Loading of particulates exceeding CSL is hard to prevent because of the small size particles.
- Would need to analyze watershed, receiving environment and treatment characteristics to determine possible effect on recontamination potential.
 - * Applicable treatment alternatives likely would not prevent sediment recontamination.
 - * Potentially they would defer, but not eliminate, the need for sediment cleanup.
 - * Could perform cost-benefit analysis of treatment versus cleanup if CSL enforced.
- For large urban watersheds with fairly quiescent receiving environments, unlikely that conventional stormwater treatment would prevent recontamination relative to CSL, but might delay need for additional cleanup.
- Could consider management of recontamination through thin layer capping in lieu of prevention – but the capping option brings issues too: instead of a chemical effect on the benthic infauna you have a physical effect from capping; and filling in of the waterway.

- Could compare treatment cost and size requirements to cost of cleanup, using 50-year time frame and different levels/types of treatment versus timing of cleanup.
- Evaluations of that sort would need to be presented so that reader could understand public expenditures for all alternatives and links to big picture that the funds are being expended for benthic protection.
- For treatment alternatives, could evaluate/compare the costs per acre of watershed, cost per amount of TSS removed.
- Acknowledge that treatment would need to meet several other objectives—other than only removing phthalates.
- Could design a receiving environment to treat the discharge (e.g., wetland treatment); however, having the receiving environment provide functions of treatment facility raises regulatory concerns.

Likely Practical Source Control and Treatment Alternatives

Brainstorm of likely practical alternatives given research on bans and treatment:

- Disconnect portions of watershed from outfall.
- Increase permeability of watershed to reduce discharge.
 - * City of Tacoma study at the landfill regarding low-impact drainage alternatives will be helpful. Results are about 1 year away.
 - * Other sources of data regarding low impact development would be beneficial.
- Implement periodic sediment cleanup like thin layer capping.
- Increased catch basin O&M and potential street sweeping.
 - * Consider pilot regarding aggressive catch basin cleaning or targeting most efficient balance of cleaning and sweeping.
- Implement other alternatives to reduce particulates.
- Enhance dispersion of receiving environment to reduce deposition.
- Discharge to different receiving environment.
- Acknowledge Sediment Impact Zone (SIZ; recognize regulations currently establish SIZ as “temporary measure”).

Consider potential pilot projects to improve understanding of the problems:

- Effect of aggressive maintenance sweeping and catch basin cleaning—must be done in conjunction with in-line sediment traps (before and after implementation) to measure effectiveness.
- Air monitoring to really document pathway (Puget Sound Clean Air Agency data?).
- Work to document particulate size related to air pathway.
- Particle size in stormwater and relation to phthalates—relation to maintenance.
- Particle size versus deposition in sediments.

- Focus on particular particle size of concern for phthalate air to sediment pathway and what treatment or maintenance actions would be effective.
- Reduction of key particle size in air emissions is a potential source control action.
- Bench tests?
- Recognize transformation in transport through media – air – stormwater.
- More clinical look at chemistry and emissions.
- Could this piggyback on other human health concerns for airborne particles of similar sizes?
- Low impact development—need for data regarding TSS removal.

PARKING LOT

Add to the “parking lot” regarding action items and alternatives development:

- DRCC, USEPA Innovation office could work to lobby for product substitution, etc., if we developed good message.
- Develop another illustration regarding types of plastic using phthalates.
- Consider role of tax on cars.
- Consider single-family homes regulation.
- Phthalates in indoor/outdoor air are not targeted by air quality agencies because the air exposure pathway is not a driver for human health.
- DEHP does not exceed Puget Sound Clean Air Agency’s screening levels as air toxic compound.
- Phthalate levels in our urban waterway sediments are not a concern for human health (other than tribal child subsistence) or macrofauna as far as we can tell. We have only documented benthic effects.
- The primary path of phthalates-to-sediments is from solids to air particulates followed by air deposition to impervious surfaces and stormwater. Note, however, that phthalates in air are not a concern for human health and are not regulated.
- Reduction of sediment phthalates will not apparently be driven by human health concern.

Production Bans and Use Restrictions

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***Several of the documents in this section have been excerpted: the complete documents can be found on the CD accompanying this notebook.**

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***Several of the documents in this section have been excerpted: the complete documents can be found on the CD accompanying this notebook.**

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