

Presentation by Lincoln Loehr in Victoria, February 22, 2008

Topic: Beyond the science: public interest and legal considerations around the need or imperative for treatment.

Interesting topic. How to approach it? Well, I'm from south of the border, and feel somewhat constrained to talk about what I know, which is how we regulate waste water discharges in the U.S. and in Washington State in particular. So, that is what I will talk about, including how we manage now, how we got to where we are, and how matters of public interest, political and other legal considerations have influenced matters.

How do we regulate wastewater discharges?

Wastewater discharges are regulated under the National Pollutant Discharge Elimination System (NPDES for short). Discharge permits are written for five years, after which they are subject to renewal. Most states, including Washington, have received delegation from the US EPA to administer the permitting program. EPA writes the permits for dischargers in undelegated states, which includes Alaska and Idaho.

The permits include fact sheets describing the basis for the various permit requirements and decisions. The Fact Sheets and drafts of the permit are made available for public review and comment, after which the agency provides a response to comments and issues a final permit. Permits can be appealed. In Washington, most are not, but some are. Permit requirements are subject to enforcement by the permitting agency, and there are also provisions that allow for citizen suits to enforce where a permitting agency may not have done so.

The permits carry a technology based requirement. For municipal wastewater discharges, the federal technology based requirement is secondary treatment, which is defined by concentration based limits and percent removal requirements for two parameters, TSS and BOD, and by a pH range of 6 to 9. Washington also includes a fecal coliform bacteria standard in its technology based requirements.

Washington law also requires the application of all known available and reasonable methods of treatment (AKART) which the Department of Ecology considers to be secondary treatment for municipal discharges.

After considering the technology based requirements, the permitting process then provides a water quality based overlay, in which monitoring data are used to determine if there is a reasonable potential to exceed a water quality standard in the receiving water. If chlorine is used for disinfection, there will be a water quality based effluent limit for residual chlorine. The water quality based analysis includes consideration of dilution in the receiving water. EPA and all states allow for dilution zones as a means for implementing water quality standards in permits. Water quality standards apply to receiving waters, and not effluents. In addition to concentrations, water quality standards include considerations of duration of exposure and frequency of exposure. The dilution considerations include consideration of the background concentrations, and if the background exceeded a water quality standard, then the water quality standard may be applied directly to the effluent.

The permit will use existing data on whole effluent toxicity measurements to determine whether or not a limit is needed for toxicity. If data do not exist, or if there has been a significant change in the effluent, then the permit requires whole effluent toxicity testing to characterize the effluent after which the permit leads down a decision path that either imposes a limit, or determines one is not needed. In Washington state, limits for whole effluent toxicity are based on no observable acute effects at the dilution that occurs at the edge of an acute mixing zone, and no observable chronic effects at the dilution that occurs at the edge of a chronic mixing zone.

Generally speaking, the permits do not require environmental monitoring. However, larger Permittees have had to evaluate sediments near their discharges, comparing the results to our state's sediment management standards. Our state is the only state in the nation to have adopted sediment standards. Our sediment management standards include numeric values for specific pollutants, but also include biological tests and assessments that can override the chemistry result. The override can work either way. A sediment may fail chemistry and pass the biology, and the sediment is OK. A sediment may pass chemistry and fail biology, and the sediment is deemed to violate the standards. Significantly, the standards based on sediment chemistry values are not stand-alone values.

The permit will include monitoring requirements both for specific parameters with technology based, or water quality based limits, and for other parameters that the agency is interested in gathering more data on.

Such monitoring data can lead to additional permit requirements in the next permit, or the need for further monitoring may go away.

Our Department of Ecology has a very detailed guidance document called the Permit Writer's Manual, and it is always evolving in response to new issues that come up. EPA developed their own Permit Writer's Manual after Washington State did. EPA's manual does not evolve, has no mechanism for changes or updates, and consequently forfeits the ability to share new information among permit writers with how to address new issues that arise. Washington State's manual is the superior guidance in my humble opinion. (full disclosure. I was on the advisory panel that helped develop the first edition, and have contributed information used in subsequent revisions.)

So, how is it that we got to where we are today?

Before I go into this, I have some thoughts about Risk to share.

It has been my experience that public interest and legal considerations can result in a mixed bag of environmental results, some effective, and some not. In my own experience, I have seen that public interest and legal considerations often trump science and drive treatment decisions. The provider of wastewater management services and elected officials are both confronted with the following risk management concern:

$$\text{Risk} = \text{Hazard} + \text{Outrage}$$

The equation comes from Peter Sandman, who is a specialist in risk communication.

In an ideal world, a well informed world, with a reasonably scientific inquisitive and literate public, the outrage would be in proportion to the hazard. Unfortunately, we really do not have a scientifically literate public, so these two components of the equation sometimes do not track well.

There can be high hazard and no outrage, and then there are problems with getting support to manage a real risk because nobody is concerned.

There can be no hazard and high outrage, a situation in which management requirements can sometimes be quickly imposed.

It is easier to generate outrage than to explain that a hazard might be minimal. The public mindset and much of the media are inclined to follow the sound byte and not the reason.

Now, for the history in how we got to the secondary treatment requirement for marine discharges in Washington State.

- In 1950's and early 1960's, the University of Washington documented significant changes in Lake Washington that were the result of the nutrient loading from numerous small secondary treatment plants around the lake. The science was used to inform the public, and eventually the public created a governmental entity called METRO with the assignment to clean up the lake.
- METRO's solution was implemented in 1966. The numerous small secondary treatment plants ceased discharging to Lake Washington and pumped their wastes to a site at West Point on Puget Sound. At West Point, the wastewater received primary treatment before being discharged through a deep marine outfall with a diffuser, discharging at about 200 foot depth. METRO also built a second regional treatment plant that provided secondary treatment and discharged to the Duwamish River. METRO's work is famous for achieving a cleanup of the Lake Washington. What is little known is that as the lake recovered, it also became less productive.
- In 1969, the Cuyahoga River, in Ohio, caught fire. To say that it was highly polluted would be an understatement. That incident caught the public's attention.
- In 1972, Congress passed the Federal Water Pollution Control Act, now known as the Clean Water Act. That act established secondary treatment as the national standard for all municipal wastewater. Congress knew that this would be very expensive and they set out to fund 75% of the cost. Congress understood that this would take time.
- METRO, having just cleaned up Lake Washington, and having carefully considered the siting of the West Point plant, the currents, and the water quality needs, and having selected primary treatment for the site, had some concerns with the secondary treatment requirement. METRO was an unusual agency, founded on science and directed

towards achieving environmental results. They thought their new discharge at West Point was not harmful, and they thought that there were other regional water quality problems that were more important and needed to be addressed. Beginning in 1973, they funded about \$1,000,000 US worth of research, much by the University of Washington, to evaluate the effects of their discharges. I was involved in those studies. Those studies were used by METRO to lobby congress to change the Clean Water Act. A number of other large coastal cities joined that effort.

- In 1977, Congress amended the Clean Water Act adding section 301(h) to allow waivers of the secondary treatment requirements for municipal discharges to marine or estuarine waters.
- EPA had to develop the regulations to implement the waiver provision. The regulations came out in 1979 and allowed dischargers only 90 days to gather a years worth of scientific data and submit their applications. EPA was not very supportive of section 301(h). I attended an EPA presentation describing the requirements where small community representatives asked how they could meet the application requirements and they were simply told, “you can’t.”
- In 1980, Congress investigated EPA’s implementation of the waiver program and the committee investigation report was subtitled “A case study of lawmaking by rulemakers.” They strongly chastised EPA, they emphasized that waivers were not a one-time thing, but were renewable, and they made EPA revise the implementing regulations, which they did in 1981.
- In Washington, 31 communities applied for the waivers. To get a waiver required review and approval by both the state Department of Ecology and the EPA. Ecology was working at reviewing and tentatively approving some and denying some, and then they found a glitch in the state law.
- Washington state has a large Water Pollution Control Act, with many sections and it has been amended and built on over the years. Washington also has a small, separate Pollution Disclosure Act which was passed in 1971, a year before the federal Clean Water Act. That act said simply that if you had a discharge, you had to file an annual

report. But, seeing where the federal CWA was going, the legislature added a paragraph that required all known available and reasonable methods of treatment (AKART) be applied, regardless of any water quality standards and regardless of any receiving water quality considerations. Ecology asked the state Attorney General's office what that meant. The result was that it was up to Ecology to determine what was reasonable with the waiver applicants, but they could not use any of the science. With that, the federally allowed mechanism for making science based case-by-case decisions on treatment needs for municipal discharges to marine waters was rendered null and void.

- I attended a meeting of the METRO Water Quality committee when they were trying to decide whether to appeal the denial. At that meeting, staff presented the results of another \$8,000,000 worth of research they had conducted. Staff identified numerous different water quality issues including areas with contaminated sediments and problems from stormwater discharges and combined sewer overflows. Staff organized the results of the study in a simple matrix, much like used in the magazine Consumer Report. They identified things they could do, and how those things would solve, help solve, or not help solve specific problems. This allowed them to sort the actions from most beneficial to least. Secondary treatment was far down the list and was identified as solving only one problem, that being, it would comply with the law. At the same meeting, the regional director of EPA explained that the CWA only allowed waivers for 5 years after which they had to go to secondary treatment, and that Congress only intended waivers for open ocean dischargers and Puget Sound was not open ocean. METRO decided to not appeal, to get on with planning for secondary treatment, and, as a result, to delay addressing the other issues they had learned of. Later, several federal agencies would sue METRO for natural resource damages because of the impacts they had identified from stormwater and CSOs. They were not sued for natural resource damages for not being at secondary treatment.
- In this same time frame, a number of marine scientists put together a statement to the legislature where we questioned the blanket requirement of secondary treatment and suggested that science could be used to make better use of resources to address many very real problems that existed in Puget Sound. 30 marine scientists signed on

in a 6 hour effort to gather signatures. 7 of us went to Olympia to testify. We had no effect on the legislature. We were naïve. We were clueless on the political arts of lobbying and legislation, and we failed to make any efforts to engage the media. Several grey whales came into Puget Sound and died. They do things like that every now and then. The science indicated it was a natural event. The press ran pictures on the front page and quoted a veterinarian who said a toxic Puget Sound killed them. The regional director of EPA testified to the legislature about the waiver program and made the same factually incorrect statements she had made to the METRO committee.

- I attended the hearings where three Washington cities (Lynnwood, Bellingham and Port Angeles) appealed the denial of their waivers. They all lost, but the chair of the state's Pollution Control Hearings Board refused to sign the decision. Instead, he noted that the state law had tied their hands, and had they been allowed to consider the science that was presented at the hearings, none of the cities should have had to go to secondary treatment. The chair was very critical of the state law and the outcome it imposed.
- By 1995, the West Point facility was at secondary treatment, as were most all the other municipal discharges to Puget Sound. Significantly, the 75% matching funds that Congress originally proposed, had dwindled over the years to much a much lower contribution. METRO convinced the legislature to add a tax to cigarettes to help fund the treatment upgrades. The federal funding had been prioritized in its distribution to helping the communities with discharges to inland, fresh waters, first. These were the ones with the greatest water quality need to upgrade. The marine dischargers could not get funding when it was available at 75%. Consequently, the uniform secondary treatment requirement was anything but even in its application. Those who had screwed up the water the most, paid the least out of pocket expense to go to secondary, while those who had the least impact on the receiving water, had to pay the most out of pocket expense to upgrade.

So, how have the secondary treatment waivers fared elsewhere?

- Some communities still have waivers, some had the initial waiver applications killed by local government without consideration of merit, some have succumbed to political pressures to give them up in later years, and one achieved a scientific reprieve to get back into the waiver after they had given it up.
- In Kailua, Hawaii the mayor killed the initial application simply because he assumed that greater treatment was needed. An article I read long ago described this and was subtitled, “A case study of a failure of risk communication.” How true.
- San Diego. In the late 1980’s, the mayor dropped the waiver renewal saying it would save the bay. The discharge wasn’t to the bay. This got turned around. Scientists got heavily involved and the press provided competent coverage of the science. A judge determined that it was not in the public interest to go to secondary. In addition to holding several month’s of scientific hearings, the judge was also influenced by a three year study published in 1993 by the National Research Council in response to a request from Congress, to look at issues of managing wastewater discharges to coastal waters. The NRC is the research arm of the National Academy of Sciences. The NRC said that TSS and BOD were the pollutants of lowest concern in the marine environment. Remember that secondary treatment is specifically directed at reductions in TSS and BOD. The NRC said that toxicants were best addressed by source controls, not end of pipe treatment. The NRC said that we need to move away from the technology based approach and instead use a water and sediment quality based approach because we now have the tools to be able to do so. The NRC said that for many marine discharges, advanced primary such as used by San Diego’s Point Loma facility, was a very suitable level of treatment for marine discharge. San Diego’s permit is up for renewal again now. At this time, San Diego has a smart mayor who is listening to and relying on science as he is resisting activists pressures who want the waiver discontinued. I note that you can’t always count on having smart politicians in positions to make wise decisions. Politicians strive to get elected and re-elected. If public perception demands secondary, it’s easier for them to follow the public will than to explain the science. Politicians often respond to outrage, or self esteem demands.

So, where do I come down on Victoria?

To manage risk, I think Victoria should go to treatment, but the risk being managed is largely the risk of outrage. Answering outrage in this case is mostly a self esteem issue, and I note that the SETAC panel paid a lot of attention to the economic value of self esteem. On the hazard side of the risk equation, I think that treatment may produce some changes in the marine environment near the outfalls, but that the benefits may be small and that the impacts of the existing approach could be acceptable if an analysis could accept some impact. However, because of the outrage side of the risk equation, history tells me that outrage stirrers will always demand that there be no impact (on the water side). So, a shift in risks will occur. Building and operating a treatment facility has impacts on the land side, and typically people will not want a facility in their back yard. These are trade-offs. Costs imposed impact people, and incrementally reduce the ability of society to address other issues. These too are trade-offs. Is providing treatment better overall? If so, how much treatment is “optimal”? A treated discharge will provide less organic matter to the marine ecosystem. That “improvement” may be good or bad. The marine system, like it or not, thinks of the organic loading as food. Marine ecosystems recycle almost all of their organic wastes and all of their biomass all the time. I don’t believe that the marine ecosystem off of Victoria is overwhelmed by the supply of food now.

To manage risk, I think that advanced primary is the treatment that should be selected. An advanced primary plant can generate sufficient methane to provide for its own energy needs. A secondary treatment plant on the other hand would be an energy hog, and would also be a significant CO₂ emitter. An advanced primary plant could also have a smaller footprint on the land than a secondary plant. Don’t embrace the uniform technology based approach from the US. Also, don’t simply judge communities based on what level of wastewater treatment they provide, without putting the discharges into context, and by that I mean that the amount and rate of dilution and the receiving environment are important considerations.