2.3 Analyzing NPDES Permits: Going beyond Effluent Limits

Looking at effluent limits in a permit is essential, but it is just the beginning. Virtually all NPDES permits also contain special conditions. Special conditions describe additional monitoring, testing or other requirements designed to ascertain the potential environmental risk of a discharge or further reduce the amount of pollution discharged.[24] These can include conditions that call for additional monitoring of pollutants not yet regulated by the permit, monitoring of toxicity and conducting ambient water quality studies and/or biological surveys. Special conditions may also describe compliance schedules or operation and maintenance requirements at the facility. This section discusses some of the most common special conditions.

Periodic Sampling for Metals and Toxic Pollutants

Dischargers will commonly screen for metals and other potentially toxic pollutants on an annual or semi-annual basis. There is a likelihood that some pollutants will be present in a discharge, but not in a quantity that warrants routine sampling or effluent limits in the permit. This occasional sampling helps determine if these pollutants are present and whether they pose a risk to the environment. If sampling later detects an elevated level of a pollutant, the agency should include an effluent limit in the next permit, or include a provision that allows them to re-open the permit and impose new effluent limits.

National Recommended Water Quality Criteria for Priority Toxic Pollutants

Priority Pollutant	Freshwater Criteria		Human Health Criteria for Consumption of:	
	Acute toxicity (μg/L)	Chronic toxicity (μg/L)	H_2O + Organism (μg/L)	Organism only (μg/L)
ARSENIC	*340*	*150*	*0.018*	*0.14*
COPPER	*13*	*9.0*	*1,300*	
LEAD	*65*	*2.5*		
MERCURY	*1.4*	*0.77*	*0.050*	*0.051*
TETRACHLOROETHYLENE			*0.8*	*8.85*
TRICHLOROETHYLENE			*2.7*	*81*

Detailed notes regarding these numbers are available at http://www.epa.gov/ost/pc/revcom.pdf.

The purpose of periodic sampling is not necessarily to regulate the discharge of these pollutants, but to make sure dangerous levels of a wider range pollutants are not present in the discharge. If high levels are present, the agency should require effluent limits and more frequent monitoring.

Does the permit specify minimum detection limits?

The minimum detection limit is the smallest quantity of the pollutant that is measurable using commonly available laboratory techniques. The permit should specify what the minimum detection limit is to ensure proper lab techniques are used when analyzing samples. Otherwise, dischargers could use techniques that are not suited for detecting contamination.

How often is the screening required?

Data should be collected at least annually, and could be required even more frequently. Over the lifetime of an NPDES permit, the discharger should be required to collect enough data to give a reliable overall picture of effluent quality. All too often a discharger is only required to conduct this type of screening once or twice over the lifetime of the permit. If these few samples show elevated levels of pollutants, the discharger or the agency might then claim they don't have enough data to impose permit limits. The obvious way to correct this problem is to require more frequent monitoring. It is not that expensive to analyze effluent samples for most common pollutants, so this will not generally place an economic burden on a discharger. (For U.S. EPA's estimated costs of conducting different types of chemical analyses, see Companion Resources for *Permitting an End to Pollution* at *www.cwn.org*).

Is the discharger required to conduct this sampling at a specific time or under representative operating conditions?

The purpose of collecting this data is to make sure potentially toxic pollutants are not being discharged. Therefore, it is important that data be collected at times when toxic conditions are most likely to occur. For instance, if a factory only operates during the day, it should not collect a sample at night when there is no activity.

Is there a problem pollutant discharged by an industrial source into the permitted wastewater treatment plant?

See page 33 for a discussion of pretreatment issues.

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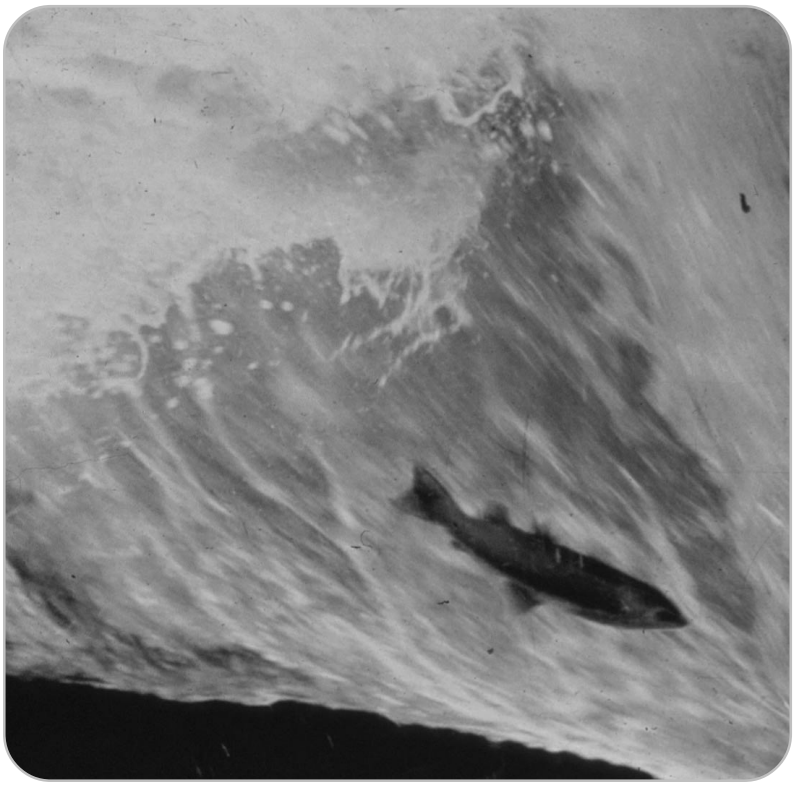
Did the discharger conduct all monitoring required under the old permit?

Another problem occurs when dischargers don't collect all the data required under the previous permit. If this monitoring was required, make sure it was done and look at the results. If the monitoring was not done, the discharger is in violation of their permit. This information should be available from the agency, and you can also check out the U.S. EPA Permit Compliance System web site to look at monitoring records of the discharger: *www.epa.gov/enviro/html/pcs/pcs_query_java.html*.

Whole Effluent Toxicity Testing



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Many permits require the discharger to conduct **Whole Effluent Toxicity** testing (also known as WET testing) — a way of measuring the chronic and acute toxicty of the effluent. Where monitoring of an individual pollutant only tells you the concentration of that specific pollutant, whole effluent toxicity testing gives you an indication of the toxicity of all pollutants *combined* in the effluent. When chemicals are mixed together and discharged, there may be reactions that create dangerous by-products undetectable by the chemical-specific sampling required in the permit. By conducting whole effluent toxicity testing, one can detect toxic conditions that may otherwise escape notice. Live organisms are actually placed in effluent samples to see if they live, die or experience sublethal effects. This gauges how toxic the effluent may be to organisms in receiving waters. For more information on WET testing, visit: *http://www.epa.gov/waterscience/WET/*.

Questions to Consider

Does the permit require the discharger to measure acute and chronic toxicity?

Acute toxicity means organisms will die soon after they are exposed. **Chronic toxicity** means organisms experience sublethal effects (such as reproductive, developmental or immunological problems) or eventually die if exposed for a long period of time. For purposes of conducting whole effluent toxicity tests, the chronic timeframe is usually assumed to be 96 hours. Insist that dischargers conduct both acute and chronic toxicity testing.

How often is WET testing conducted?

Like any kind of monitoring, the more often it is done, the more likely you are to get the right answer. U.S. EPA recommends WET testing be conducted quarterly during the first year of operation for new sources and at least annually thereafter. At a minimum, WET testing should be performed annually and more frequently in many situations.

Instream Monitoring

Sometimes dischargers are required to monitor instream impacts of their discharge. This might include any of the following:

- Taking water quality samples upstream and downstream of their outfall.
- Conducting surveys of fish, mussels, macro-invertebrates and other aquatic organisms to determine if the natural community of the stream is changing as a result of the new pollution.
- Measuring streamflow levels to determine if assumptions in the permit about critical low and high flows are correct.

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Questions to Consider

How often will such impacts be measured?

As with effluent limits, the more data collected, the better idea you have of the health of the stream and the impacts of the discharge. Always push for more, rather than less, data collection.

Will monitoring be conducted before a facility begins operation?

Usually it is wise to monitor instream conditions before the permitted discharge occurs, so you can determine baseline conditions and initial health of the receiving waters. This data provides a reference point to measure what effect the discharge may have.

Where will the results of these studies be kept on file?

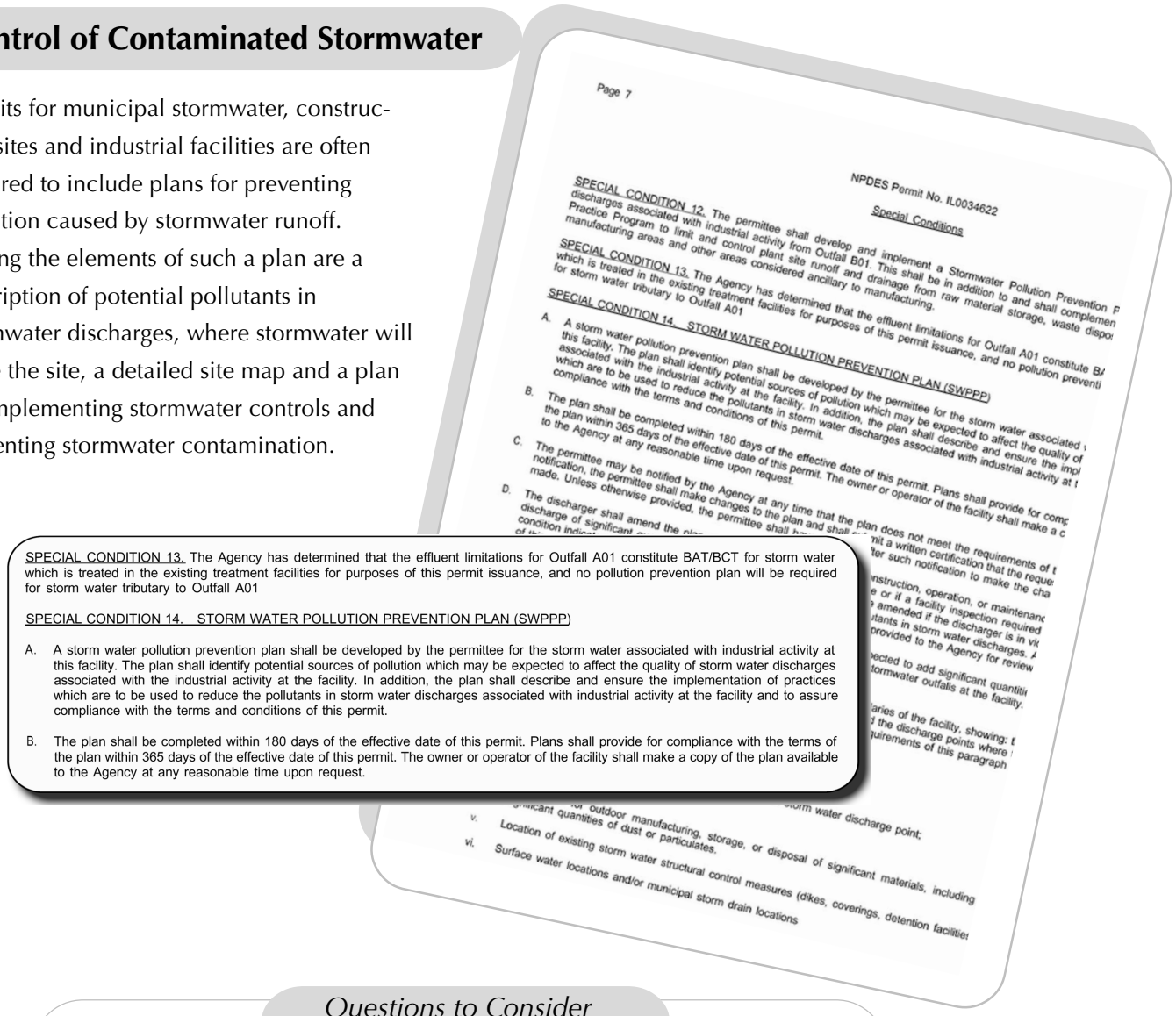
Will they be made available to the public upon request? Make sure the public is able to look at results of the monitoring.

What actions will the agency take if these studies show degradation of receiving waters or downstream resources?

Make sure the permit explicity states what will be done if degradation is observed. All too often a permit will require monitoring, but when this monitoring indicates that degradation has occurred, nothing happens. Even though degradation caused by a discharge is clearly a violation of water quality standards, it doesn't hurt to make sure the permit explicitly recognizes this fact and requires corrective action.

Control of Contaminated Stormwater

Permits for municipal stormwater, construction sites and industrial facilities are often required to include plans for preventing pollution caused by stormwater runoff. Among the elements of such a plan are a description of potential pollutants in stormwater discharges, where stormwater will leave the site, a detailed site map and a plan for implementing stormwater controls and preventing stormwater contamination.



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NPDES Permit No. IL0034622

Special Conditions

SPECIAL CONDITION 12. The permittee shall develop and implement a Stormwater Pollution Prevention P discharges associated with industrial activity from Outfall B01. This shall be in addition to and shall complemen Practice Program to limit and control plant site runoff and drainage from raw material storage, waste dispo manufacturing areas and other areas considered ancillary to manufacturing.

SPECIAL CONDITION 13. The Agency has determined that the effluent limitations for Outfall A01 constitute BA which is treated in the existing treatment facilities for purposes of this permit issuance, and no pollution preventi for storm water tributary to Outfall A01

SPECIAL CONDITION 14. STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

A. A storm water pollution prevention plan shall be developed by the permittee for the storm water associated this facility. The plan shall identify potential sources of pollution which may be expected to affect the quality of associated with the industrial activity at the facility. In addition, the plan shall describe and ensure the impl which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at t compliance with the terms and conditions of this permit.

B. The plan shall be completed within 180 days of the effective date of this permit. Plans shall provide for comp the plan within 365 days of the effective date of this permit. The owner or operator of the facility shall make a c to the Agency at any reasonable time upon request.

C. The permittee may be notified by the Agency at any time that the plan does not meet the requirements of t notification, the permittee shall make changes to the plan and shall mit a written certification that the reque made. Unless otherwise provided, the permittee shall ter such notification to make the cha

D. The discharger shall amend the nstruction, operation, or maintenanc discharge of significant e or if a facility inspection required condition indic e amended if the discharger is in vi

utants in storm water discharges. A provided to the Agency for review

pected to add significant quantiti tormwater outfalls at the facility.

laries of the facility, showing: t the discharge points where quirements of this paragraph

storm water discharge point;

v. significant quantities of dust or particulates. outdoor manufacturing, storage, or disposal of significant materials, including

vi. Location of existing storm water structural control measures (dikes, coverings, detention facilitie

Surface water locations and/or municipal storm drain locations

SPECIAL CONDITION 13. The Agency has determined that the effluent limitations for Outfall A01 constitute BAT/BCT for storm water which is treated in the existing treatment facilities for purposes of this permit issuance, and no pollution prevention plan will be required for storm water tributary to Outfall A01

SPECIAL CONDITION 14. STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

A. A storm water pollution prevention plan shall be developed by the permittee for the storm water associated with industrial activity at this facility. The plan shall identify potential sources of pollution which may be expected to affect the quality of storm water discharges associated with the industrial activity at the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit.

B. The plan shall be completed within 180 days of the effective date of this permit. Plans shall provide for compliance with the terms of the plan within 365 days of the effective date of this permit. The owner or operator of the facility shall make a copy of the plan available to the Agency at any reasonable time upon request.

Questions to Consider

When will the agency review the stormwater pollution prevention plan?

In some states the agency does not look at such plans unless it is conducting a site inspection. That is because these plans may not be submitted to the agency for review, but instead they are kept at the facility being regulated. This means that the plan has not been reviewed by the agency or the public. Sometimes this also leads to plans not being developed in a timely manner, because without review, there is little accountability. You should push your state agency to make sure these plans are developed in a timely manner, examined and made available to interested members of the public.

Compliance Schedules

If a discharger has had compliance problems in the past and must upgrade facilities in order to fix the problems, a schedule should be part of the permit. The schedule sets deadlines for construction activities, reporting dates and planned inspections, as well as specifying a date by which the discharger must be in full compliance with the NPDES permit. It may also establish new permit limits which must be achieved by a certain date.

Compliance schedules are not allowed for technology-based effluent limits. Technology-based limits represent the minimum level of performance a discharger must meet, so they should be able to comply with them at all times.[25] However, compliance schedules are sometimes used for water quality-based effluent limits. Often water quality-based limits are included in a renewed or modified permit to replace previous technology-based limits. A compliance schedule will then set deadlines for meeting the more stringent limits.

Compliance schedules are not allowed for technology-based effluent limits. Technology-based limits represent the minimum level of performance a discharger must meet, so the discharger should be able to comply with them at all times.[25]

Questions to Consider

Does the discharger take too long to come into compliance?

A compliance schedule can take years to implement. Sometimes, the discharger could comply in a much shorter amount of time. Make sure you push the agency and the discharger to comply with the permit sooner, rather than later. This is particularly true on waters that may already be violating water quality standards. Every effort should be made by the agency and the discharger to solve this problem as quickly as possible.

Was there a compliance schedule in the last permit?

It is not unusual for dischargers to violate the conditions of their previous compliance schedule, only to be given several more years to complete the work. If they did not adhere to the previous compliance schedule, they are in violation of that NPDES permit. Make sure you hold the discharger and the agency accountable.

Municipal Pretreatment

Municipal sewage treatment plants will often have special conditions in their permits that spell out how they must deal with their **pretreatment program**.[26]

A pretreatment program must be established by sewage treatment plants that discharge more than 5 million gallons per day and receive wastewater from industrial facilities. It is not unusual for local industries to send their wastewater to the local sewage treatment plant. This allows for centralized treatment of wastes in the community, but it can complicate matters if some particularly nasty industrial waste comes down the pipe.

A municipal pretreatment program must:

- ✔ grant the sewage treatment facility authority to deny permission or modify the conditions under which an industry discharges its wastewater, and
- ✔ establish a system to guarantee that the sewage treatment plant has authority to conduct necessary inspections and make dischargers meet minimum pretreatment standards.

The permit will require the municipal sewage treatment facility to submit to the agency records that show who the pretreaters are, where they are located, what pollutants are present in their wastewater and in what quantity.

Questions to Consider

Has the municipal discharger experienced problems with pollutants from industrial sources?

Sometimes you will find a discharger has had elevated levels of pollutants, such as metals or other toxic chemicals, that probably came from industrial sources . If elevated levels of industrial pollutants are showing up in the municipal discharge, it could indicate that one or more of the pretreaters is sending improperly treated wastewater to the municipal facility.

Are all industrial pretreaters identified in the permit or in the permit application?

If pollutants from pretreaters have the potential to cause problems for the municipal sewage treatment plant, it's important they be clearly identified, either in the permit or in the permit application.

Are all potential pollutants monitored?

If a pretreater might release a pollutant, it is important the sewage treatment plant at least periodically monitor for and report any concentrations of that pollutant in its effluent. Without this periodic sampling, a pretreater could send a "slug" of pollutants through, causing unforeseen consequences for the receiving waters.

2.4 Permitting Issues You Won't Find in the Permit

The information contained in the final NPDES permit is really the tip of the proverbial iceberg. The conditions described in the permit are usually the result of a great deal of analysis and a number of decisions. The details of this process are unknown to you if the only information you have is the permit. It is often useful to look at the analysis behind the permit, to see if permit conditions are based on inaccurate data or flawed assumptions. In the process of reviewing this information you will learn more of the subtle intricacies of the Clean Water Act and your state's water pollution control program.

Sometimes, it is important to investigate how and why the permit looks the way it does. To ascertain why certain decisions were made, you will probably end up answering many of the original questions you had about the permit. You will also likely end up with even more questions.

Three of the most important issues you should investigate are the past compliance history of the discharger, the possible effects of the discharge on the environment and the potential for the discharge to cause or contribute to a violation of water quality standards.

Compliance History and Past Performance

You should always look at the discharger's history. Have they complied with past permits? Have they violated repeatedly? Have they consistently done an excellent job of reducing the amount of pollution they release? Following are some sources of information you can use to check on a discharger's past compliance history.

- **DISCHARGE MONITORING REPORTS** – these reports, also known as DMRs, are typically submitted by the discharger to the agency each month. They summarize monitoring results from the past month.

  Dischargers are responsible for conducting their own monitoring and reporting, following requirements spelled out in the permit. The state may periodically inspect the facility and take their own samples, especially if they hear about a problem from a concerned citizen. It may seem odd that dischargers are responsible for collecting their own samples and reporting the amount of pollution present — why would they ever report a violation?! But they do report violations, and they do admit to mistakes. The chart below is a real example of the information provided in the DMRs. Note that the discharger reported violations for every measurement.

SAMPLE DISCHARGE MONITORING REPORT

Parameter		Quantity or Loading			Quantity or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
Solids, total suspended effluent gross value	*Sample measurement*	***983***	***2,294***	***Lbs/day***	***77***	***162***	***785***	***MG/L***	***8***	***18/31***	
	Permit Requirement	***375 Mo Avg***	***500 Wkly Avg***		***30 Mo Avg***	***40 Wkly Avg***	***45 Daily Max***			***3/week***	***Composite***

Dischargers have been also caught lying on their monitoring reports. The penalties for doing so are very strict. Citizens can help catch these types of problems by monitoring water quality downstream of a discharge. If pollution levels are high, it may be because the discharger is putting out too much pollution.

These reports are available to the public. Some agencies may supply copies, but most require a research trip to their office and a fee for copies made. DMRs may be very long and numerous, so the agency can place restrictions on how many they distribute for free. They are public records, however, so you can obtain as many as you wish in your own research.

- **PERMIT COMPLIANCE SYSTEM** – This database contains data from DMRs and can be searched from the U.S. EPA web site. It includes information on dischargers with and without violations. Not every discharger is included, but many are**.** You can also view inspection reports, compliance schedules and a host of other information. To find data on a specific permittee, simply go to *http://www.epa.gov/enviro/html/pcs/pcs_query_java.html,* type in the NPDES permit number and hit the search button.
- **TOXIC RELEASE INVENTORY** – This database contains information on a discharger's estimated annual toxic releases. It includes data on air and water pollutants and is searchable in a manner very similar to the Permit Compliance System. You can find the Toxic Release Inventory at *http://www.rtknet.org/*.

Questions to Consider

Has the discharger had violations in the past?

If the discharger had violations of their previous permit, bring this up to the agency. This is particularly true if the agency is reducing the discharger's monitoring frequency or allowing less stringent effluent limits for the pollutant in question.

Has the agency taken any action on past violations?

If violations have occurred, make sure you ask the agency how they responded. Did they initiate enforcement action? Have they administered any fines? Were these violations taken into consideration when the new/modified/reissued permit was written?

Why are dischargers allowed to do their own monitoring?

Partly, it is a reality check — there is no way an agency can do the daily or weekly monitoring required in many permits. Partly, it is a financial issue — the program gives the financial responsibility of monitoring to dischargers… which is a good thing! However, watchdogging is required for this system to work. Strong monitoring regulations, strong reporting regulations, vigilant inspections and enforcement and citizen review of records all must combine to maximize compliance!

Effects on the Environment

To ensure new water quality problems are avoided or at least minimized, states are required by federal law to have an antidegradation policy. Such a policy is intended to keep clean waters clean. Not only should a properly implemented and enforced antidegradation policy keep waters from violating water quality standards, it should also ensure that high quality streams — those waters with excellent water quality, habitat and thriving aquatic communities — stay that way. It is one of the most powerful and under-used policy tools for water pollution prevention. See Chapter 4 for more detail on antidegradation policy.

Larry N. Olson

A properly implemented state antidegradation policy should:

- ✔ Protect all existing uses.[27]
- ✔ Minimize new or increased discharges to "high-quality waters" — those that have better quality than the minimum **water quality criteria**.
- ✔ Provide a system for designating Outstanding National Resource Waters (ONRW). Waters with this designation are of such ecological or recreational significance that no new or expanded discharges are allowed into them.

In order to determine if these issues were considered, you must request a copy of the agency's *antidegradation analysis* for each permit.

Questions to Consider

What are the existing uses of the waterbody in question?

Catalog existing uses and determine if they could be impacted by the proposed discharge. Agencies often fail to document existing uses, so it is important to always identify those you know to exist. It is especially powerful to point out where threatened and endangered species may be harmed by a discharge. In your comment letter, ask the agency to document all existing uses. If they did not bother to inventory the uses, how can they determine whether they will be impacted?

Did the agency evaluate alternatives to the discharge?

The state must investigate alternatives to the proposed discharge. If they did not, tell them the antidegradation analysis is inadequate.

Potential for a Violation of Water Quality Standards

When examining a permittee's application for an NPDES permit, the agency must determine if there is "reasonable potential" for the discharge to cause or contribute to a violation of water quality standards.[28] To make this determination, the agency must consider 1) what levels of pollution a discharger has released in the past (if the permit is modified or reissued), 2) background concentrations of the pollutants in question, 3) amount of dilution available and 4) other factors. This is known as a **reasonable potential analysis**.

A reasonable potential analysis should be conducted for all pollutants for which the discharger collected effluent quality data. This includes metals and toxic pollutant screening data required under a permit's special conditions and other data the discharger and the agency may have collected from the facility in the past.

This data is then used to determine "reasonable potential" for the pollutants in question to cause problems. If the agency finds there is such potential, they are required to include water quality-based effluent limits, rather than the often less-protective technology-based limits, in the NPDES permit.

As you read more and more permits, you will begin to notice some pollutants are added to permits on occasion, and others removed. Reasonable potential analysis results are typically the cause.

Remember that sampling conducted by a discharger is not continuous. Sampling for a specific chemical may take place only once per day, once per month, or even once per year. The level of pollution being discharged at other times is not really known. To be safe, the highest measured value should therefore be used, and then it should be multiplied by a safety factor. The safety factor is based on the total number of samples collected and the variability in effluent quality. The fewer samples available and the more variable the monitored effluent quality, the larger the safety factor should be. This is done to safeguard against underestimating pollution.

Reasonable Potential Analysis

Confused by the idea of a reasonable potential analysis? Let's use an example from daily life to illustrate the concept.

Let's say you wanted to estimate the speed of a car moving through the city. The car spends most of its time in traffic, and often comes to a complete stop. Sometimes it is able to move rapidly in excess of the speed limit, but not very often. Now let's pretend we are only allowed to measure the speed or observe the car a handful of times. Although most of the time the car is moving slowly, we would be wrong to assume the car never broke the speed limit from our limited observations. However, we could use available statistics to estimate the maximum speed of the car, if we make some assumptions about driving conditions, traffic, etc.

The concept is the same in reasonable potential analysis: to draw conclusions about the maximum amount of pollution that may be discharged, based on limited data.

The highest measured value multiplied by the safety factor is then compared to the water quality standard. If it exceeds the standard, there is a "reasonable potential" that water quality standards will be violated. If a reasonable potential exists, then water quality-based effluent limits for that pollutant should be included in the permit.

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To double check the agency's analysis, you must request a copy of their "reasonable potential to exceed water quality standards analysis."[29]