The Sunshine State

Pretreatment Communicator

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THE COMMUNICATOR...

"The Communicator" is a quarterly publication of the Pretreatment Program for the Florida Department of Environmental Protection. The Communicator encourages participation from its readership and any other individuals interested in pretreatment in the State of Florida. Individuals wishing to contribute letters, information, or articles should submit them to:

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Inside This Issue:

Florida Department of Environmental Protection
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Robert Heilman, P.E.
Pretreatment Coordinator

Gary Millington
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John Coates, P.E.
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Technical Assistance

by Gary Millington

Back in June I attended a 2-day workshop in Fort Walton Beach for the North Florida Manufacturing Technology Center. It was a very interesting workshop and made me aware of some activities that can be useful to pretreatment programs.

(Please see **Assistance, page 2**)

Adoption Hearing Set for Revisions to Chapter 62-640, F.A.C.

by Lee Smith, P.E.

The Department will present its proposed revisions to the domestic wastewater residuals rule to the Environmental Regulation Commission (ERC) at the August meeting of the Commission. The meeting is scheduled for 9:00 a.m. on August 28 at the Orlando City Hall building.

Earlier this year, a public workshop and an additional (seventh) meeting of the Residuals Technical Advisory Committee (TAC) were held. At the public workshop in Orlando, about 85 persons attended, and comments were received on a variety of topics. The TAC discussed workshop comments at its April meeting, and the proposed rule revisions were subsequently finalized. A hearing draft was prepared for the upcoming ERC meeting and published in the Florida Administrative Weekly on July 25.

The proposed revisions will clarify and refine the current rule, and will improve consistency between the state rule and the federal rule, 40 CFR Part 503. The most

(Please see **Residuals, page 3**)

Regulatory Updates:

- On July 17,1997 EPA published a final rule to streamline the procedures for approving modifications to pretreatment programs under 40 CFR 403. According to the final rule, only modifications that relax legal authority or local limits will be considered to be substantial modifications. This and other changes reduce the number of required public notices during the formal approval process.
- EPA will soon be issuing proposed rules for three of the effluent guidelines on which it has been working. EPA's current plans anticipate issuing the proposed effluent guidelines for industrial laundries around September 1997. Guidelines for landfills and industrial incinerators are expected in November. Based on EPA's information, effluent from municipal landfills is not expected to become categorical for the purposes of pretreatment.

Assistance

(Continued from page 1)

This is the first of a series of articles I would like to write about the availability and usefulness of technical assistance. There are many sources of technical assistance for industrial users and pretreatment programs. The assistance can come from a public or a private organization. It can be free of charge or may require paying a fee.

Until recently, environmental issues have primarily been dealt with through rules and regulations. Regulatory control can lead to good environmental solutions. However, technical assistance can also be an important tool in the quest for environmental solutions, and can add the benefit of improving the economy by making businesses more efficient. I know it seems off the main track of pretreatment program work, but I believe this approach to our work can be fruitful.

Federal and state governments are using technical assistance as another tool to provide environmental results. This can be seen in the Common Sense Initiative and Ecosystem Management, as well as other programs. Every state in the nation has formed organizations to provide technical assistance to small manufacturing companies to help them become more competitive, and waste reduction is one result.

The Florida Manufacturing Extension Partnership (FMEP), Inc., was created about two years ago to help small to medium sized manufacturing companies improve the way they do business. The FMEP operates something like the agricultural extension service.

One way they help small businesses is to show them how to use raw materials more efficiently. This results in less waste. For example, powder coating can be a vast improvement over conventional spray painting, reducing air emissions and wastewater generation. Several very interesting case studies were presented at the workshop in Ft. Walton Beach.

Many aspects of the work of the FMEP - human resource development, product quality control , and research and development - seem, on the surface, to have no relationship to pretreatment. But a little thought reveals that much of this work impacts our activities. Untrained employees can cause spills and other problems. Poor product quality usually results in rework or scrap. Research and development can lead to better manufacturing processes or the use of more environmentally "friendly" materials.

The FMEP also provides services specific to waste reduction and pollution prevention. They look at a business from the "front end" first. In other words, they look at the company's buying habits to see if there are obvious problems in the amount and types of materials the company is purchasing. This method usually makes it easier for companies to see the need to change their operation because it deals with operating costs. Financial incentives will always receive top priority.

For those interested in a broader approach to environmental control, this can be an interesting way to solve problems. It requires more effort up front, I think, but can be very rewarding and will improve relations with industrial users. These principles can be incorporated into a pretreatment program by just providing information and contacts to industrial users. Some programs could go as far as performing facility audits to identify areas of potential improvement.

The FMEP is supported by four regional Florida Manufacturing Technology Centers (MTC). You can get more information about this subject by contacting the people listed below, or go to the National Institute of Standards and Technology (NIST) Internet website http://www.mep.nist.gov/

Headquarters: Orlando
Rick Korchak, Executive Director
Florida Manufacturing Extension Partnership, Inc.
(407) 425-5313
rkorchak@enterprise.state.fl.us

Region 1: North Florida MTC

Mr. Dean Wallis, Director
OWCC/UWF Joint Campus
1170 Martin Luther King Jr. Blvd., Bldg 7, Rm 702
Ft. Walton beach, Florida 32547
(850) 651-7720

Region 2: Central Florida MTC
Mr. Ted Fluchradt, Director
1801 Lee Road, Suite 115
Winter Park, Florida 32789
(407) 599-4100

Region 3: South Florida MTC
Mr. Ray Zentis, Director
1000 West McNab Rd, Suite 112
Pompano Beach, Florida 33069
(954) 941-0115

Region 4: Suncoast MTC
Mr. Arny Bereson, Director
7431 114th Avenue North, Ste. 101
Largo, Florida 34643
(813) 544-0727

Next time I will go into more detail about how the FMEP operates and how it can compliment your pretreatment efforts. I will also discuss other sources of technical assistance, both for your industrial users and for your pretreatment program. ☻

Residuals

(Continued from page 1)

significant changes to the rule are incorporation of treatment standards and pollutant limits from 40 CFR Part 503, implementation of watershed-based phosphorus controls, provisions for residuals and septage management facilities, and consolidation of monitoring, record keeping and reporting requirements in one section for ease of reference. The revisions also address some miscellaneous issues and clarifications that are not covered by the current rule or the Department's program guidance memoranda.

Based on the current adoption schedule, the anticipated effective date of the revised rule is December 1.

Next stop - Orlando.... ☻

Florida Residuals…
Spread the Wealth!

Joey..
.
Where did you get the new high tech record system?

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Development of Technically Defensible Local Limits - Example Extraordinaire!

by John Coates, P.E.

In the previous two issues of the **Communicator**, we discussed "the basics" and "the meat" that form the foundation for most local limit calculations. As promised, we would like to share some example calculations to illustrate the derivation of a local limit. Rather than doing a complete local limit evaluation for all of the usual pollutants of concern, this article will provide examples of recurring challenges that we see in a number of your recent local limit evaluations. Therefore, we will return to the land of "Concreteopolis." (Remember from earlier 1995 and 1996 articles in the **Pretreatment Communicator**.) It is a typical Monday in Concreteopolis...

As the coordinator for the City of Concreteopolis, you have been assisting the wastewater plant director as she prepares an application for renewal of your facility's wastewater permit. Since you have been reading the state's pretreatment newsletter, you remembered that you were supposed to reevaluate your local limits and include a copy of the evaluation with the permit renewal application.

Unfortunately, as you told your boss, you have not had any extra time to start this effort. You also explained that it would take at least a month or more to complete the task since you need to collect additional samples from the collection system and, possibly,

from the wastewater plant. Only then could you do any meaningful calculations.

As you walk away from the meeting with your boss, you wonder why she was so upset. After all, you were only going to delay the permit application process by a month or more! Since your priorities have now changed, you have decided that you had better not ask for the rest of the week off.

You go to your **Pretreatment Communicator** file and pull some old articles that were written for just such an occasion! You also go to your bookshelf of EPA guidance documents and select EPA's 1987 "Guidance Manual on the Development of Local Discharge Limitations Under the Pretreatment Program." After moments of careful consideration and planning, you have prepared your battle plan!

Next, you go to your computer and knock the dust off of three little disks you were once given – something about a computer program that would calculate local limits. You think it might have been called **LLIDS**.

Trying to be as efficient as possible, you remember your influent and effluent data which have been gathered over the years for your pretreatment annual report requirements. Perhaps this data could provide useful removal efficiencies. As you sit down to review the last several years of data, you wonder how those samples were collected. The samples were daily composites, but, the influent and effluent samples were collected over the same time period. OOPS, you think. The plant has about a ten hour detention time at the average hydraulic loading rate. So you decide not to use those results and decide that you will have to collect new sets of influent and effluent samples.

Early Tuesday morning (at 7:00 am) you start collecting a 24-hour composite sample of the influent. You beg the lead operator to start the effluent sampler at 5:00 pm that afternoon (i.e., 10 hours later). In an effort to collect a reasonable amount of data, you and the lead operator decide to collect four influent and four effluent samples over the next four 24-hour periods. (You also agree that you will come in on Saturday morning and evening to retrieve the last two samples. So much for that weekend fishing trip!)

Now that you have begun the process of getting information to calculate removal values, what about those background or nonindustrial concentrations? You sit down with Number One, your most experienced pretreatment inspector, and calmly think ... You only have one working flow proportional composite sampler that you can take into the field. So you and Number One select a liftstation downstream from one of your newer residential areas. That should be a good place to get a representative nonindustrial sample. So after careful review of your plans, you assign Number One the task of collecting four, 24-hour composite, samples from this residential liftstation.

All during the week, you and Number One continue to carefully collect and transport your samples to the city's contract laboratory (using laboratory supplied sample bottles, etc.). You also sit down to gather the rest of the information needed to calculate local limits. You sit down with the lead operator and again beg for his forgiveness and help. He kindly gathers the information and provides the following, based on a list you gave him:

- Annual average daily flow: Q_H = 8.25 MGD,
- Industrial user contribution: 6% now, but expected to increase to 9% over the next 5 years (so... Q_I = 0.75 MGD),
- Average flow to the anaerobic digester: 0.062 MGD,
- Residuals flow for disposal: 0.0484 MGD, and
- Solids concentration for disposal: 2 percent.

After thanking the operator for his help (you give him a 6-pack of his favorite diet soda!), you sit down and study EPA's local limit guidance document. While studying, you pay particular attention to the information in Tables 3-2, 3-5, and 3-10 (i.e., activated sludge inhibition thresholds, anaerobic digestion inhibition thresholds, and priority pollutant removal efficiencies through activated sludge processes, respectively). You have a hunch that this information might be very useful. You also go and get a copy of the latest DEP Chapter 62-302, F.A.C. You know this rule will contain a copy of the applicable water quality standards for your WWF's discharge to the Ol'navigable River (a Class-III fresh water body).

Having done all this, you review your battle plan and decide to update the Director (i.e. your boss!) on your progress. Well, she seemed impressed with your efforts... (She folds a curious pink piece of paper and places it thoughtfully in her desk.) You think, "I may have just avoided the ax..."

Well, it has been almost three weeks since you sent the last samples to the lab for analyses. After calling the lab, they apologize and fax you the results that have been done for over a week now.

You sit down and tabulate the influent and effluent removal results in Table 1. You also review the nonindustrial concentrations (Cni) for the residential lift station samples. You find that copper was detected in all four nonindustrial samples at an average concentration of 0.104 mg/L. Silver was not detected above the detection limit of 0.003 mg/L.

Based on this information, you decide to perform the calculations for pass through, inhibition, and residuals criteria.

Pass Through

The equation for calculating the total allowable headworks loading (TAHL) that a wastewater plant can receive, based on a discharge standard, is provided on the inset for pass through. Based on an effluent hardness of 125 mg/L as $CaCO_3$, the WWF effluent limit for copper (C_{STD}) is 0.0143 mg/L. (Of course, you had to remember to convert the calculated water quality standard from µg/L to mg/L.) Thus, for copper:

C_{STD} = 0.0143 mg/L

Q_H = 8.25 MGD, and

R_{WWF} = 0.88.

Therefore, the pass through equation indicates that the WWF can handle 8.20 lb/d of copper at the headworks. Similarly, for silver where C_{STD} = 0.00007 mg/L and R_{WWF} = 0.75, the equation indicates that the WWF can only handle 0.0193 lb/d of silver at the headworks.

Inhibition

To calculate the TAHL for inhibition, one can use the equations in the corresponding inset. The equations are provided in two different forms needed to account for pollutant loadings to a secondary treatment unit such as the activated sludge process and to either an anaerobic or aerobic digester.

Being very clever, you review EPA's tables for activated sludge and anaerobic digestion inhibition thresholds and note the following concentrations:

Inhibition Concentrations, mg/L

Process	Cu	Ag
Activated Sludge	1.0	0.25
Anaerobic Digester	40	13

Therefore, you calculated the TAHL for copper and silver in the activated sludge process as 68.8 and 17.2 lb/d, respectively. Since you did not expect significant pollutant removal prior to the activated sludge system you assumed that R_{PRIOR} was 0. Similarly, you calculated the TAHL for copper and silver in the anaerobic digester as 23.5 and 9.0 lb/d, respectively. In this case, you had to remember that the flow to the digester was 0.062 MGD and that the removal prior to the digester is assumed to be the removal for the WWF.

Pass Through:

The total allowable headworks loading (TAHL in lb/d) that a wastewater plant can receive based on a discharge standard is expressed as:

$$TAHL = \frac{8.34 \bullet C_{STD} \bullet Q_H}{(1 - R_{WWF})}$$

where;

C_{STD} = the applicable discharge standard for the WWF in mg/L,

Q_H = the average flow (in MGD) to the headworks of the WWF, and

R_{WWF} = the average removal of the pollutant through the WWF expressed as a decimal.

Residuals

Whew... you wonder... Am I done yet? Since you are not sure, you review your battle plan and remember something about residuals criteria. To calculate the TAHL for residuals, you flip through EPA's guidance document and find the equation listed in the residuals inset.

Reviewing the applicable standards

(Please see **The Example, page 7**)

Table 1. Removal Results, Concreteopolis Local Limit Evaluation

Sample/Date	Influent, mg/L	Effluent, mg/L	Percent Removal
Day 1, Cu	0.105	< 0.010	> 90%
Day 2, Cu	0.075	< 0.010	> 87%
Day 3, Cu	0.090	< 0.010	> 89%
Day 4, Cu	0.078	< 0.010	> 87%
	average = 0.087		average = 88%
Day 1, Ag	0.0145	<0.003	> 79%
Day 2, Ag	0.0090	<0.003	> 67%
Day 3, Ag	0.0120	<0.003	> 75%
Day 4, Ag	0.0142	<0.003	> 79%
	average = 0.0124		average = 75%

The Coordinator's Desk:

Another Year... Another Program

by Robert Heilman, P.E.

Well, another year has gone by. We are already into Fiscal Year 1998. My, how time flies when you are up to your elbows in pretreatment. We are now starting our third year of pretreatment program oversight!

It has been an interesting and rewarding couple of years. Some of the approved pretreatment programs in Florida have come a long way and are now where they need to be. Others only needed a "tune-up," and are crusin' along. Unfortunately, a few programs are still struggling to get their "engines" started.

This past year we continued to focus on getting approved programs to update their sewer use ordinances, reevaluate their local limits, complete enforcement response plans, and improve their filing systems. For the most part, we accomplished these goals. Overall, the pretreatment compliance inspections and audits found the majority of the approved programs to be effectively implementing their programs. Most of the sewer use/pretreatment ordinances that were outdated and in need of revision last year have been revised and formally adopted. Staff have seen improvements to the filing systems at many of the programs, and improvements to compliance tracking of industrial users. Finally, many of the approved programs are updating their local discharge limitations to ensure they are technically defensible. However, it appears that some of the programs are still not escalating their enforcement activities against persistent violators.

I would like to summarize last year's activities from a statistical perspective.

- 34 pretreatment compliance inspections (PCIs) were completed,
- 9 pretreatment program audits (PPAs) were completed,
- 18 industries were inspected during the PCIs/PPAs,
- 39 annual reports were reviewed,
- 21 categorical industrial users under direct DEP regulation were inspected,
- 9 meetings were held with public utilities that are developing pretreatment programs,
- 19 new pretreatment programs are in various stages of development,
- one pretreatment program was approved and became active,
- one pretreatment program was inactivated.

One particular accomplishment last year was the development of the Department's Local Limits Information Development System (LLIDS) by John Coates. My thanks goes out to John for developing a simple to use, effective computer program that the pretreatment programs can use. I know many of you have used this program and we appreciate your positive feedback.

This fiscal year we are again targeting 100% coverage of the approved pretreatment programs. That means we will be either inspecting or auditing each of the approved programs. Emphasis will be on continuing to have approved programs update their sewer use/ pretreatment ordinances, local limits, and compliance/ enforcement activities. We will also be doing things a little different. I already told y'all in the last **Communicator** that I was assigning pretreatment program oversight to either Gary or John, so that programs would have a single contact person. In addition to that change, we have decided to send an inspection questionnaire to the programs, prior to our inspection, so the interview process can be expedited and we can focus on issues of concern. Also, we will be looking for, and checking, your significant noncompliance (SNC) worksheets for **each** of your SIUs as part of our file review. Please be prepared to have this information on hand or you might find yourself having to enter data and calculate SNC as part of the program inspection. This is an area that has lacked attention by the approved programs in the past.

Another area we hope to make some progress in this year is the development of a Technical Assistance Manual (TAM) for either new or existing programs to use. We are waiting for a formal acceptance of a grant proposal we sent to EPA to get the ball rolling on this important task.

On behalf of the pretreatment program staff, I would like to congratulate the approved programs for all the work they have done to get their programs to where they are today. We look forward to working cooperatively with the approved pretreatment programs, as well as those pending approved programs, during the next year. We have worked well with most of you in the past and expect that to continue. If you need any assistance, have questions, or would just like to talk over a pretreatment issue, please do not hesitate to contact your program contact or me at any time.

Technical Tips:

An Information Blizzard

As many of us already know, too much information can leave you feeling as if you are caught in a blizzard (even in Florida). Having said that, the Internet is living up to its promises of being an information "Superhighway." Here are a few stops along the way that we have found to be useful. Each begins with "http://"

EPA's home page
- WWW.EPA.GOV

DEP's home page
- WWW.DEP.STATE.FL.US

PIPES (EPA's Point Source Information Provision and Exchange System)
- WWW.EPA.GOV/OWMITNET/PIPES/PIPES.HTML

Right To Know (TRI database, etc.)
- WWW.RTK.NET

Enviroene - Federal P2 network
- ES.INEL.GOV

Water Environment Federation
- WWW.WEF.ORG

Florida Water Resources Journal
- WWW.FWRJ.COM

National Technology Transfer Center
- WWW.NTTC.EDU

Florida Association of Code Enforcement
- WWW.AFN.ORG/~FACE

National Metal Finishing Resource Center
- WWW.NMFRC.ORG

Chemfinder (online information for numerous chemicals and inorganics)
- CHEMFINDER.CAMSOFT.COM

Thomas Register (index of manufacturing facilities)
- WWW.THOMASREGISTER.COM

Florida Sunshine Online (guide to legislature and Florida Statutes)
- WWW.LEG.STATE.FL.US

We are currently in the process of developing a web page for the Department that will include Florida's Pretreatment Program. If you wish to contribute ideas, please contact one of the pretreatment staff at (850) 488-4524.

The Example

in Table 3 of 40 CFR 503.13, you find that the residuals pollutant concentration for copper is 1500 mg/kg dry weight. Therefore, you calculate a TAHL for copper of 13.76 lb/d. You note that currently there is not a quality limit for silver in domestic wastewater residuals. That's nice... One less calculation you have to do!

Allowable Industrial Loadings

That seemed easy enough, but, what do I do with all those TAHL values? After reviewing EPA's guidance document, you realize that you need to determine which TAHL will limit the pollutant loading to the WWF. Wow, now you can find out how much pollutant loading you can allocate to industry!

You review all those numbers you scribbled down on several pieces of paper. (Uh OH! where did those calculations go?) You find that the limiting TAHL for copper and silver were both based on pass through criteria and were 8.20 and 0.0193 lb/d, respectively.

In order to calculate the allowable industrial loadings (AILs), you remember that you must first subtract two allowances:

- an allowance for nonindustrial pollutant loading, and
- an allowance for uncertainty.

To calculate the nonindustrial pollutant loading (Lni), you use the following relationship:

$$Lni = Cni \bullet (Q_H - Q_I) \bullet 8.34$$

Therefore, since the copper Cni = 0.107 mg/L for the four samples, you calculate a copper Lni of 6.69 lb/d. Similarly, you find that the silver Lni is 0.094 lb/d. Of course you used one-half the detection limit (i.e., 0.0015 mg/L) as the Cni since silver was not detected above

Reminders:

- The next Florida Pretreatment Coordinator's Workshop is tentatively scheduled for late October. The workshop will likely be held in central Florida. An agenda and map will be mailed approximately 4 weeks before the meeting. If you have any questions, please contact Jim Lockwood at (407) 246-2664.
- The next Florida Pretreatment Coordinator Certification course will conducted sometime around April, 1998, in Ft. Pierce. Please stay tuned for an update in the next **Pretreatment Communicator**.

Inhibition:

The total allowable headworks loading (TAHL in lb/d) that a wastewater plant can receive based on a inhibition criteria are based on the following equations:

$$TAHL_{AS} = \frac{8.34 \bullet C_{UP} \bullet Q_H}{(1 - R_{PRIOR})}$$

$$TAHL_{DIG} = \frac{8.34 \bullet C_{UP} \bullet Q_{DIG}}{(R_{PRIOR})}$$

where;

$TAHL_{AS}$ = the TAHL for an activated sludge process in lb/day,

$TAHL_{DIG}$ = the TAHL for an anaerobic digester in lb/day,

C_{up} = the applicable inhibition criteria for the biological process in mg/L,

Q_H = the average flow (in MGD) to the headworks of the WWF,

Q_{DIG} = the average flow (in MGD) to the digester, and

R_{PRIOR} = the average removal of the pollutant prior to the WWF's biological process expressed as a decimal.

0.003 mg/L.

Now, you want to subtract an allowance for uncertainty. Well, after a lengthy discussion with your boss, you finally settle on a safety factor (SF) of 20% for uncertainty. Your boss runs a good wastewater plant and wants to have at least this much loading in reserve to allow for industry upsets, exceedances, and other factors which contribute to uncertainty in the loading calculations.

This does not seem too bad. So you simply calculate that 20% of the limiting TAHLs for copper and silver are 1.64 and 0.0039 lb/d, respectively.

So finally, you feel great. You can subtract the allowances and calculate the pounds per day of copper and silver which can be allocated to industry (AIL) as follows:

AIL = TAHL - Lni - SF

For copper;

AIL = 8.20 - 6.69 - 1.64

AIL = -0.13 lb/d

For silver;

AIL = 0.0193 - 0.094 - 0.0039

AIL = -0.079 lb/d

Great! Almost Done...

But Wait! You have calculated negative allowable industrial loadings. What does this mean? After you take a closer look at the numbers, you realize that your calculations indicate that you don't have any loading available for industry. Can this be true? (You hear someone grinding an ax in the background!)

Problems Problems Problems!

You certainly did not expect this. You don't believe that your WWF is exceeding any water quality standards, but, your not sure what the problem is. Just then your boss wanders by and asks how the calculations are going. (Is that an ax in her hand?) Somewhat sheepishly you say, you are almost done, but, you think you had better recheck your calculations before telling her the results!

Later that night (after wringing your hands all day!), you awake with a start and remember something you once heard:

- **ensuring that you obtain representative samples, and**
- **obtaining low enough detection limits to get meaningful results.**

So you get up in the middle of the night and speed (figuratively, of course) to the office to review your work. You astutely look at the Cni data for copper noting that Number One gave you an average value of 0.107 mg/L for the samples he collected. Then you remember to look back at Table 1 and find that the average headworks (influent) concentration was 0.087 mg/L. You wonder... So, you quickly calculate that 0.107 mg/L times the nonindustrial flow (Q_H-Q_I) gives you about 6.69 lb/d of copper from nonindustrial sources. Then you compare that to the 0.087 mg/L times the headworks flow which gives you only about 6 lb/d of copper coming from all sources to the headworks of the WWF. You think, "Ah HA! The copper nonindustrial loading seems too high." Where is Number One? This is obviously his fault!

You call Number One and wake him from his evening rest. Saying that you've gone mad, he tells you about a second set of samples he collected from a different liftstation downstream of an established neighborhood. It seems he never agreed with your insistence on collecting nonindustrial samples from only one location.

You hang-up and rush over to his desk. Sure enough, there are the additional results. You review the results for copper from the two liftstations (see inset). Based on a closer look at the data, you find that a more representative nonindustrial concentration for copper is 0.078 mg/L. To check and see if the new value appears reasonable, you quickly calculate that 0.078 mg/L times the nonindustrial flow (Q_H-Q_I) gives you about 4.9 lb/d of copper from nonindustrial sources. This does seem more reasonable since the new value is now less than the average headworks load of 6 lb/d.

Now, you look at those detection limits. For copper, you notice that all of the effluent concentrations are below the detection limit of 0.01 mg/L. You also see that all of the effluent concentrations are below silver's detection limit of 0.003 mg/L. Well, since the sun has not risen yet, you decide to call home and let your family know that you are o.k. and that you didn't run away from home during the night.

Ah, the start of a new day. You just talked to your contract lab, Superman Analytical, Inc., who says they still have the effluent and nonindustrial samples and can have them reanalyzed this afternoon. (After all, what did you expect with a name like "Superman.") They tell you that they can detect copper down to 0.001 mg/L and silver down to 0.00004 mg/L using their new ICP/MS. "Wow!", that should help.

True to their name, the lab delivers a new set of analytical results later that afternoon. Based on the new effluent results, you prepare Table 2 and calculate revised removal rates. You are also happy to note that silver was still not detected in your nonindustrial samples even at the lower detection limit of 0.00004

mg/L. (Oh Boy!, things are looking better all the time!)

Rather than sit down and redo all those calculations by hand... You decide to install that copy of LLIDS and see what it can do. After just 15 minutes of effortless computing, you have entered everything into LLIDS and can't wait to see the results!

After picking up your preformatted, easy to read reports from the printer, you are relieved to see the results for copper and silver.

The improved nonindustrial data and detection limits for copper gave you a recalculated AIL of 5.54 lb/d (based on residuals quality this time). To calculate a uniformly allocated local limit (C_{LL}) for copper, you find as follows:

C_{LL} = AIL / (C_I • 8.34)
C_{LL} = 5.54 / (0.75 • 8.34)
C_{LL} = 0.9 mg/L (for copper)

Similarly for silver, you obtain a recalculated AIL of 0.962 lb/d (based on pass through) and find:

C_{LL} = 0.962 / (0.75 • 8.34)
C_{LL} = 0.15 mg/L (for silver)

Residuals:

The total allowable headworks loading (TAHL in lb/d) that a wastewater plant can receive based on a residuals quality standards is expressed as:

$$TAHL = \frac{8.34 \bullet C_{STD} \bullet Q_{SLDG} \bullet fs}{(R_{WWF})}$$

where;

C_{STD} = the applicable residuals standard for the WWF in mg/kg,

Q_{SLDG} = a representative flow (in MGD) for residuals being disposed,

fs = the solids concentrations in the sludge for disposal expressed as a fraction, and

R_{WWF} = the average removal of the pollutant through the WWF expressed as a decimal.

The Home Stretch

You are really pleased with the results from all your hard work. And then you remember, all the rest of the pollutants of concern. Well, you decide that you have enough experience to understand the underlying equations and are a master of that crazy LLIDS program. Now to input the remainder of the data for the rest of the pollutants of concern.

Nonindustrial Data (Copper)

New Neighborhood Liftstation:

	Cni (mg/L)
Day 1	0.165
Day 2	0.097
Day 3	0.093
Day 4	0.074

average = 0.107 mg/L

Established Neighborhood Liftstation:

	Cni (mg/L)
Day 1	0.060
Day 2	0.074
Day 3	0.063
Day 4	0.071

Initially, you used only the average of the four daily samples from the liftstation from the newer neighborhood. After running into problems, you are told of additional data for a second liftstation.

Taking a closer look at the data, you find that the 0.165 sample result was obtained from a sample collected immediately following some industry sampling events. Suspecting contamination, you review the equipment blank for the day and find that is indeed contaminated with copper. Discarding the 0.165 mg/L result, you find that the two lift stations have average concentrations of 0.088 and 0.067 mg/L. Combined, these results give you a revised copper Cni of 0.078 mg/L.

At a **minimum**, you decide that you will evaluate all of the inorganic priority pollutants and each of the pollutants that could be limited in your WWF residuals. Of course, you include any additional pollutants of special concern to your WWF.

When inputting the data, you discover that several metals were sporadically detected in your influent; but, the values, when

Table 2. Removal Results, Revised With Lower Detection Limits

Sample/Date	Influent, mg/L	Effluent, mg/L	Percent Removal
Day 1, Cu	0.105	0.00530	95%
Day 2, Cu	0.075	0.00675	91%
Day 3, Cu	0.090	0.00540	94%
Day 4, Cu	0.078	0.00624	92%
	average = 0.087		average = 93%
Day 1, Ag	0.0145	0.00005	99.7%
Day 2, Ag	0.0090	<0.00004	>99.6%
Day 3, Ag	0.0120	0.00006	99.5%
Day 4, Ag	0.0142	0.000057	99.6%
	average = 0.0124		average = 99.6%

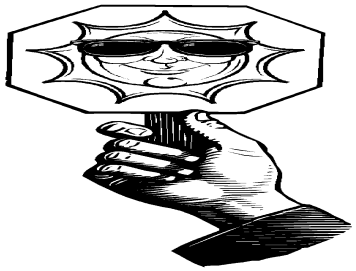
detected in your effluent, were too near or below the detection limits to provide reliable removal rates. Now what do you do?

After some momentary hand wringing, you remember table 3-10 of EPA's local limit guidance document. Maybe this table can provide some help estimating the removal rates for those pollutants where you do not have good influent or effluent data. (Of course, you realize that you may be able to use good residuals concentrations to calculate removal rates.)

You review Table 3-10 and find that it contains three columns of removal values grouped by the relative rank of the data (i.e., percentiles or deciles). You also notice that your calculated removals are similar to or greater than those in the 80th percentile column. Therefore, you select the missing removal values from this column assuming that your WWF is performing relatively "similar" to those in EPA's study. While you realize that this is an ideal assumption, you find that it has technical merit. Accordingly, you **ensure** that you have entered reasonable removal values in LLIDS and that you do **not** have any removal values for the WWF (i.e., R_{WWF}) entered as 0 or 100%.

After reviewing your results, you decide to enter additional comments into LLIDS to better document your local limit evaluation. Just as you finish, your boss comes to your office and asks for an update on the local limit evaluation. You smile and show her a table you made comparing the existing local limit with the revisions that appear to be necessary. Not bad, she comments being especially pleased with the care you have taken in documenting your work. After getting a copy to submit for the DEP's review, your boss hands you a curious piece of pink paper. It's a copy of your latest performance review and it recommends a 300% increase in your salary. As your boss leaves, she asks if you have seen her ax anywhere around the office. ☻

Special thanks are extended to Lisa Wadsworth for double checking these calculations!



Have a Good Summer!

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