EPA REGION 9 DRAFT GUIDANCE FOR PERMITTING DISCHARGES INTO IMPAIRED WATERBODIES IN ABSENCE OF A TMDL

Summary of guidance:

1. A final limit referenced in the permit provisions or findings and fact sheet indicating the water quality based effluent limit (WQBEL) that would be set if Waste Load Allocation (WLA) has not been established through a TMDL:
   a. If impairment is due to bioaccumulation (fish tissue contamination) and/or persistence of pollutant (e.g., sediment contamination, concentration of pollutant in water column due to evaporation in a closed system, etc.), the only WQBEL that is certain, in the absence of a TMDL, not to cause or contribute to a violation of the narrative standard is no "net" loading. A no "net" loading requirement can be met by: I) reducing the effluent concentration below detectable levels through source control and treatment; ii) reducing loads through recycling/reclamation; and/or iii) reducing loads elsewhere in the watershed by an amount at least equivalent to the amount being discharged (in equivalent bioavailability) through an approved offset program.

   b. If impairment is due to concentrations exceeding objective(s) and pollutant is not persistent (i.e., does not concentrate in the water column), the only limit that is certain, in the absence of a TMDL, not to cause or contribute to a violation of this objective is the criterion applied end-of-pipe (no mixing zone).

2. Time-schedules may be allowed in permit to the extent allowed under State law.

3. In interim, permit provisions should require milestones that may include the following:
   a. Studies to assist in TMDL development;
   b. Identification of sources of pollutant entering treatment plant and of other sources entering watershed;
   c. Development and implementation of Pollutant Minimization Program;
   d. Examination of costs, feasibility and benefits of:
      i. reclamation/recycling;
      ii. offsets; and
      ii further treatment: and
   e. Mass limitations and concentration limits that assure no long-term increase in loadings and concentrations, and that backsliding does not occur.

Introduction:

NPDES permitting authorities and permittees in Region 9 have raised numerous questions in regards to permitting existing discharges into an impaired water body as listed under 303(d) of the Clean Water Act (CWA). Below is a chart which summarizes EPA Region 9's approach for establishing final water quality based effluent limits (WQBELs) and interim WQBELs (in terms of both mass and concentration) in the absence of a Total Maximum Daily Load (TMDL) analsysis. In the text that follows, EPA describes, in greater detail, the legal and technical bases for this guidance, as well as the authorization to use time schedules. Finally, an example of acceptable permit language is included, which should assist permit writers in setting interim limits and time schedules.

Ideally, all "interim" limits described below would eventually be replaced by the Waste Load Allocations (WLAs) determined during the TMDL process. However, if a TMDL has not been developed by the end of the compliance schedule and WLA have not been set for the permittee, the "final" WQBEL established in the table below should be required of the permittee. 40 C.F.R. §122.44(d) requires that the permit contains final water quality-based effluent limits (WQBELs) that assure the discharge will not cause or contribute to an exceedance of the State's numeric and narrative water quality standards.

EPA Region 9 recognizes that water body impairment is rarely caused by a single discharger and therefore believes strongly that TMDL development is an essential component to the establishment of fair WQBELs that do not penalize a particular discharger because of impairment caused by other point and non-point sources. However, any discharger contributing to the impairment, at whatever level, shares in the burden of bringing the water body back into attainment of beneficial uses. Effective implementation of this guidance will ensure that reasonable progress will be made towards attainment of water quality standards or, at a minimum, prevent increased of the impairment. In most scenarios, participation in the TMDL process, in a pollutant minimization program, and in mass offsets and reclamation projects should allow the discharger to comply with legally defensible NPDES permits without incurring significant expenses through end-of-pipe treatment.

Summary table:

Waterbody is an open system listed for non-bioaccumulative effects[1]	Waterbody is a closed-system and/or is listed for bioaccumulative/ biostimulatory effects, or sediment levels[2]
Concentration limit: Final: objective applied end-of pipe.[3] Interim: Performance-based (BAT)[4] Mass limit: Final: objective multiplied by design flow Interim: Current loading[5]	Concentration limit: Final: below toxic effects level Interim: Performance-based (BAT) Mass limit: Final: No net loading . [6] Interim: Current loadings[7]

[1]Only the concentration of the parameter is of concern due to its toxic effects. (Eg. Copper in water column exceeds objective in only a stretch of a river).

[2] Any loading, regardless of concentration, may contribute to impairment either because the pollutant may bioaccumulate in the fish tissue or in sediment, or because the pollutant may concentrate in the water column if the system is "closed" (i.e., water leaves the system primarily through evaporation).

[3] Mixing zone cannot be used since ambient water concentrations are exceeding the water quality objective. Appropriate averaging periods should be used in setting limits (i.e. a yearly average for Hg may be appropriate for protection of human health).

[4] In establishing these limits, the permit writer may wish to examine other similar facilities to determine what concentrations can be achieved with aggressive source control, pretreatment, P2, etc.

[5] If discharger cannot meet end-of-pipe immediately, discharge should not be allowed to increase its loading. (See footnote number 7 below.)

[6]No net loading means that loads from outfall are equal to load reductions achieved through offset program.

[7] Any increase in loading may further degrade the water body. The method of calculating mass limitations depends on the quality and the amount of existing data. Only loadings that enter the water body should be measured to determine compliance with limit. The discharger should be credited for reclamation efforts, and be allowed to provide offset reductions elsewhere in the watershed in order to achieve limit. As a means of encouraging offsets, the permitting authority may allow wish to allow for a "banking" system which would allow for immediate increases in loadings provided the necessary offsets are achieved by the end of the permit cycle.

Determining cause of impairment:

Regulations at 40 CFR Part 122.44(d) require that effluent limits be established for pollutants that cause or contribute to an exceedance of water quality standards, and prohibits the issuance of any permit "[w]hen the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected States..." If a waterbody is already impaired by a certain pollutant, the permit writer must look at the cause for impairment in determining how to calculate WQBELs that ensure that the discharge does not cause or contribute to a violation of a numeric or narrative standard. If the impairment determination is based on water column exceedances of the numeric criteria, and there is no nexus between the discharger's mass loading and the cause of impairment, criteria applied end-of-pipe should be sufficient for the reasons discussed below. However, where the impairment is based on levels of the pollutant in fish tissue and/or in sediment, or in other situations where the pollutant is persistent, the permit writer must determine whether any loading of the impairing pollutant, regardless of concentration, has the reasonable potential to cause or contribute to a violation of water quality standards. For example, if fish tissue levels indicate that the assimilative capacity of the receiving water is exceeded for a certain pollutant, any loading of that pollutant may have the reasonable potential "to cause or contribute" to an excursion of the narrative criteria. We therefore believe that determination of "reasonable potential," and the setting of effluent limits depends on the basis for the impairment.

Final limit if impairment is based only on water column exceedances of the numeric criteria:

If a waterbody is listed as impaired, and that listing is based on exceedances of water column criteria, a zone of mixing may be inappropriate. The permit writer should allow for dilution only when background concentrations are below the criteria, since no dilution would be available if the receiving water already exceeded the objective.[8] Since there is no assimilative capacity a dilution factor (i.e., a mixing zone) is clearly not appropriate, and the final WQBEL should be the numeric objective applied end-of-pipe unless a Total Maximum Daily Load (TMDL) analysis has been performed and the Wasteload Allocation (WLA) assigns an alternative limit. EPA recognizes that the TMDL development may take a number of years, and also recognizes that it may be

[8] The *1995 San Francisco Basin Plan* provides the equation for calculation of WQBELs when allowing for dilution. The equation can only be used "in cases where ambient concentrations are equal to or less than the water quality objectives." (*1995 Basin Plan*, 4-11).

appropriate to include a time schedule in the permit to give the discharger the opportunity to achieve the necessary reductions, provided such a schedule is allowed for in a state-wide or basin plan. We therefore believe that the following requirements are appropriate and should be included in the NPDES permit provisions if the compliance schedule ends before the expiration date of permit. If the schedule extends beyond the expiration date of the permit (i.e., is longer than five years), the final limits do not have to be included in the permit provisions, but must be described in the permit fact sheet and findings:

Compliance with the final WQBEL will be required within ___ years (not to exceed the maximum allowed by the State-wide or Basin Plan for time schedules). This limit will either be the numeric objective (on which the impairment determination has been based) applied end-of-pipe, or the WLA determined from an approved TMDL.

Final limit if impairment is based on fish tissue levels and/or levels in sediment:

Special considerations must be made when establishing a limit for a persistent or bioaccumulative pollutant (i.e. a pollutant that has accumulated in sediment to toxic levels or in the food chain, such as in fish tissue), because mass of these pollutants entering the waterbody is typically of greater concern than the end-of-pipe concentration of that pollutant. This is because any amount of this pollutant, regardless of concentration, has the potential of entering the food chain or building up in the sediment. The discharge, therefore, of that pollutant may have the reasonable potential to cause or contribute to a violation of the State's narrative criteria that addresses bioaccumulative substances, or that states "no toxics in toxic amounts."

EPA Region 9 believes that if the listing is based on fish tissue or sediment contamination levels, the permit writer must look beyond simple application of existing water column criteria to determine whether the narrative criteria are achieved. Use of existing numeric criteria are not always adequate to ensure that the narrative criteria are met throughout the waterbody. For example, the permittee may be discharging to a system where pollutants bioaccumulate in fish tissue at a rate that is greater than the bioconcentration rate used to calculate the national water quality criteria, which is based on a laboratory-derived bioconcentration factor (BCF). This is not unexpected because field measured bioaccumulation factors (BAFs) reflect uptake in fish through the organism's food and water, whereas laboratory BCFs measure the uptake only from the water. Though, BAFs and BCFs are calculated in the same manner ((L/kg) by dividing the pollutant concentration in the fish tissue (mg/kg) by the water column concentration (mg/L)), BAFs are typically based on empirical data reflecting uptake from both food and water, while BCFs are laboratory measured, thereby reflecting only

the water. This means that a specific waterbody can be meeting the national numeric water quality criterion but the fish tissue concentration in the waterbody is at a level that exceeds the safe fish tissue concentration because fish are exposed through their food as well as water.

Furthermore, for both bioaccumulative and persistent pollutants, the water quality criteria also do not always account for routes of exposure, for site-specific circumstances that may render the pollutant more bioavailable, for accumulation in sediment, or for concentrating effects resulting from evaporation. Such circumstances have been acknowledged in the Great Lakes Initiative, Proposed Water Quality Guidance for the Great Lakes System (58 FR 20802, April 16, 1993):

> The proposed human health and wildlife criteria may not be sufficiently protective for persistent bioaccumulative chemicals. The proposed criteria are derived using available data and assumptions regarding data gaps. Despite the inherently conservative nature of the assumptions used when data gaps occur, it is possible that in some cases the criteria may not be sufficiently stringent. Considering the conservative elements of the criteria development methodologies, the risk of criteria not being sufficiently stringent is acceptable with respect to pollutants that are not persistent in the environment, since the resulting unacceptable impacts will be relatively temporary in duration. For persistent bioaccumulative pollutants, however, the risk may not be acceptable in the Great Lakes Basin Ecosystem where recycling of pollutants in a relatively closed system may result in unacceptable impacts that are long term in duration, and make future cleanup actions more difficult, costly, and time consuming.[9]

We therefore believe it is vital that the overall loading of these pollutants to the waterbody be assessed, and that mass-based limits be established to assure that the discharge will not cause or contribute to an exceedance of water quality standards, including narrative standard. Ideally, these mass-based limits would be the result of a TMDL analysis. Such an analysis would lead to individual WLAs and load allocations set on point and non-point sources that would limit the discharges of these pollutants enough to achieve the narrative criteria. However, in the absence of these TMDLs, the only WQBEL that would assure that the discharge does not cause or contribute to an

[9] Section 118(c)(2) of the CWA required EPA to publish proposed and final Water Quality Guidance for the Great Lakes System that conforms with the treaty objectives and provisions agreed to by the United States and Canada in the Great Lakes Water Quality Agreement. This binational agreement calls for the "virtual elimination of persistent toxic chemicals" and that every reasonable effort be made to reduce loadings of such pollutants to the maximum extent practicable.

exceedance of the narrative criteria is “no net loading.” Of course, if a Site Specific Objective (SSO) is adopted for the waterbody, and this SSO is protective against bioaccumulation and buildup in sediment, compliance with the SSO should be sufficient.

EPA therefore asserts that the final WQBEL for these persistent or bioaccumulative pollutants should be “no net loading,” unless a TMDL is completed which concludes that an alternative load can be assimilated by the receiving water. Again, we recognize that TMDL development may take a number of years, and also recognize that time may be necessary for the discharger to achieve the necessary reductions either through source control, improved treatment, or offsets. We therefore suggest that the permit contain the following finding:

Compliance with the final WQBEL will be required within __ years (not to exceed the time allowed in the Basin Plan). This limit will either be the WLA determined from an approved TMDL, or will be “no net loading.” The permittee may achieve these limits through the following efforts:

1. reducing the effluent concentration below detectable levels through source control and treatment;
2. reducing loads through recycling/reclamation;
3. reducing loads elsewhere in the watershed through an approved offset program (If the limit is “no net loading”, reductions must be an amount at least equivalent to the amount being discharged (in equivalent bioavailability)); and/or
4. end-of-pipe compliance with a site-specific objective that is protective of the narrative criteria or the use being impaired.

<u>Authorization to use time schedules:</u>

The CWA allows states to use compliance schedules in permits to meet water quality based effluent limitations only when the state has adopted specific authorization in its water quality plans. Currently, two Regional Boards (2&5) have amended their Basin Plans to include such language. The State Board has recently adopted a policy that will authorize the Regional Boards to use compliance schedules not to exceed 15 years for toxic pollutants. Furthermore, the California Toxics Rule (CTR) allows the use of compliance schedules up to five years for pollutants covered under the CTR.

Unfortunately, while the CWA allows states to adopt and use compliance schedules in permits, the CWA and implementing regulations do not address the apparent disconnect between the provision that requires that final WQBELs be included in permits and the allowance for time schedules that may extend beyond the life of the

permit. Because of this dilemma, it has been argued that compliance schedules longer than 5 years are illegal. Historically, compliance schedules have generally required compliance within the term of the permit. However, in the past EPA has approved under §303 of the CWA a California provision which provided a longer time for a particular newly adopted criterion where the state made a credible showing that the types of sources likely to be subject to this particular criterion would need longer time to come into compliance.[10]

In addition, the GLI final rule provides that schedules of compliance for effluent limitations based on new GLI requirements may be up to five years, even when that extends beyond the term of the permit; that is, if a permit is modified during its term to contain a more stringent limitation, there may still be up to a five year schedule for compliance. The rationale for this is that sources for which effluent limitations are revised mid-term (e.g., based on studies exploring revisions of Anti-Degradation Tier II values) are just as much in need of time to come into compliance as sources whose permits were initially written based on a new GLI requirement. The final GLI rule provides that where a schedule extends beyond the term of the permit, an interim permit limit effective upon the expiration date shall be included in the permit and reflected in the fact sheet/statement of basis and findings shall reflect the final limit and its compliance date.

EPA Region 9 therefore believes that States that are authorized to use compliance schedules do not necessarily need to include a final WQBEL as a provision in the permit when the compliance schedule extends beyond the life of the permit. However, the findings in the permit must state that a WQBEL will be established at the end of the compliance schedule and must state what that limit would be should a TMDL not be finalized. Should an alternative WQBEL/WLA be established during the TMDL process, the permit can be either reopened and modified during the permit renewal process to include these new limits. §303(d)(4)(A) provides that a permittee may back-slide from a water quality-based effluent limitation if certain conditions are met. First, the existing permit limit being revised must be based on a TMDL or other WLA established under §303. Second, the cumulative effect of all the revised permit limits based on such a TMDL or WLA must assure attainment of the water quality standards.

[10]This approval was made as part of EPA's approval of the Inland Surface Waters Plan (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP), which have been subsequently remanded on procedural grounds. We merely cite this approval for precedential purposes.

Interim requirements:

As mentioned previously, we can be certain that the discharge is not causing or contributing to an exceedance of the numeric and narrative water quality standard only after a TMDL has been developed and the permittee is in compliance with the resulting WLA, or the alternative WQBELs described above are met. In the interim, EPA Region 9 believes that the dischargers should first be required to reduce the mass and concentration of the pollutant to the maximum extent practicable through aggressive pollution prevention efforts. The discharger may also wish to participate in effluent and ambient monitoring studies which would help support the state's/EPA's TMDL efforts. At the end of the time schedule (not to exceed the time allowed in the State-wide or Basin Plan), the discharger shall either be assigned the WLA determined from the TMDL effort, or shall meet the alternative WQBELs. As an interim measure, the discharger should submit a pollutant minimization plan that describes the actions that will be taken by the discharger to reduce discharge of these pollutants from the wastewater. Furthermore, the discharger may wish to identify other sources of the pollutants within the watershed available for offset reductions and estimate the costs and potential reductions associated with those sources. Also, the discharger may be required to submit a engineering feasibility study which would describe treatment options available to reduce effluent levels of these pollutants, the estimated reductions, and the costs.[11] Finally, the discharger may wish to examine recycling/reclamation projects that may be available as means of reducing the loading.

Furthermore, the discharger should not be permitted to increase loading of the pollutants prior to the effectiveness of the final limits, if such an increase could contribute to the impairment. Any limits (or the lack of limits) which allow water quality to be further degraded is prohibited by the CWA. [12]

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[11] See Interim Economic Guidance for Water Quality Standards–Workbook, March 1995, EPA-823-B-002

[12] Any increase in loading of a pollutant to a waterbody that is impaired because of that pollutant would presumably degrade water quality in violation of the applicable anti-degradation policy. §40 C.F.R. Part 131.12(a)(1) requires the state to adopt and implement an anti-degradation policy that will "maintain the level of water quality necessary to protect existing (in stream water) uses." State Board Resolution 68-16, *Statement of Policy With Respect to Maintaining High Quality of Waters in California,* is the policy that the State believes incorporates the federal antidegradation policy. The Water Quality Control Plans for the California Regional Water Quality Control Boards ("Basin Plans") require conformity with State Board Resolution 68-16. Therefore, any provisions in the permit that are inconsistent with the State's anti-degradation policy are inconsistent with the Regional Board's Water Quality Standards and would therefore violate §40 C.F.R. 122.4(a) which prohibits permit issuance "when the conditions of the permit do not provide for compliance of CWA, or regulations promulgated under CWA." The May 1990 Administrative Procedures Update, entitled *Antidegradation policy implementation for NPDES permitting*, APU 90-004, provides guidance for the Regional Board in implementing State Board Resolution No. 68-16, *Statement of Policy With Respect to Maintaining High Quality of Waters in California*, and

The state has flexibility in determining how this limitation on mass loading is calculated. EPA recommends at least two years of data, as well as taking effluent variability and seasonal variability into account. A limit must provide a reasonable assurance that the discharger will not cause loadings of a persistent or bioaccumulative pollutant to increase to the waterbody. The permitting authority may wish to allow for a pollutant "banking" system in which immediate increases of loadings could be permitted provided the discharger achieved the necessary reductions in loading to the watershed by the end of the permit cycle. (See "Offsets" below.) If the discharger wishes to increase mass loadings of the pollutant causing impairment, and cannot find an offset, an anti-degradation analysis must be performed consistent with state policy. The engineering feasibility study mentioned earlier is an essential component of such an analysis.

In summary, the permit should contain provisions requiring the following:

1. If the mass loading of the discharge contributes to the impairment, the permittee may not increase the mass of these pollutants in the interim, unless in compliance with a WLA or pursuant to an anti-degradation analysis. If the concentration of the effluent contributes to the impairment, the permittee may not be allowed to increase concentrations. The permittee may achieve these limits through the following efforts:
   a. reducing the effluent concentration through source control and treatment;
   b. reducing flows through recycling/reclamation; and/or
   c. reducing loads elsewhere in the watershed through an approved offset program.
2. Within the life of the permit, the permittee should conduct a reasonable amount ambient monitoring as necessary for development of the TMDL and/or site-specific objective.
3. Within one year, the permittee should develop and implement a pollutant minimization program.
4. Within the life of the permit, the permittee should identify additional treatment options, and estimate the level of reduction and costs of all treatment options.
5. Within the life of the permit, the permittee should identify other sources of pollutants entering the watershed, which are available for offsets, and estimate the costs and level of reductions of these potential offsets.

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the Federal Antidegradation Policy, as set forth in §40 C.F.R. 131.12. This document states that "[t]he Regional Boards must consider antidegradation effects and conduct an antidegradation analysis when the proposed activity results in...a substantial increase in mass emissions of a pollutant, even if there is no other indication that the receiving waters are polluted" (p.3). Furthermore, the document reads, "If baseline water quality is equal to or less than the quality as defined by the water quality objective, water quality shall be maintained or improved to a level that achieves the objectives" (p.4).

Offsets:

Depending on the cause of impairment, the permitting authority may decide that it is appropriate for the discharger to pursue offsets as a means to comply with mass limits. The term "offsets," for purposes of this guidance refers to reductions achieved through the discharger's actions in loadings of the pollutant causing impairment. Reductions must be from a source that is either not regulated under any environmental statute, or cannot be readily controlled due to significant resource constraints or inability to locate the responsible party. Furthermore, the offsets must reduce loadings into the same waterbody to which the permitted facility discharges. Offsets do not include sources that, if not controlled, would enter the facility's treatment system. These sources should already be controlled as part of the facility's pollutant minimization program. It is appropriate to allow offsets when:

1. Discharger has already implemented a pollutant minimization strategy;
2. Impairment is not a localized to the area surrounding the outfall and is not entirely due to discharger's effluent;
3. The discharger's end-of-pipe concentrations are not having acute or chronic toxic effects (i.e., not exceeding the criterion maximum concentration (CMC) or criterion chronic concentration (CCC); and
4. Offsets achieved will reduce the levels of the pollutant causing impairment.

If the permitting authority determines that offsets are appropriate, permits must assure that:

1. A ratio has been determined expressing, as accurately as possible, the relationship between the mass of the pollutant from the outfall and the mass discharged at the "offset source". This ratio should take into account the relative bioavailability, the likelihood that the pollutant will reach the waterbody if method of entry to waterbody is not direct (e.g., airborne), and a factor of safety to account for uncertainty in biological effects and in monitoring;
2. A monitoring program is implemented that accurately determines both loadings from permittee's outfall and an estimate of loading reductions from offset sources (may require base-line data to be gathered); and
3. Limits are written in the permit that clearly indicate how compliance with offset program and mass limits will be assessed. If a "banking" system is allowed, limit must indicate the amount of time for which loads can be banked.

Example of offset program (WLA and offset ratios are purely hypothetical and must be defined for each project):

Scenario:

1. Mercury is listed under 303(d) as causing impairment in waterbody due to levels

of methyl-mercury in fish tissue;

2. Point source discharger contributes to the loading of that pollutant, but is not the only contributor, and does not have concentrations at end-of-pipe that are causing localized toxic effects;
3. Discharger is estimated to be contributing 3 lbs/year to the waterbody, but will grow to 4 lbs in years 5 and 6;
4. Interim limits or WLA derived from a TMDL granted to discharger is 0.5 lbs/year; and
5. Discharger has requested to pursue offset projects in the form of abandoned mine cleanup and collection of flourescent light bulbs.

Permitting authority must:

1. Determine offset ratio. If effluent from outfall is thirty times more bioavailable than runoff from mine, offset ratio should be at least 30. Ratio may be even higher to account for uncertainty in assessing loading reductions at mine. If 50:1 is used, for example, then for every 50 pounds of mercury that the discharger has prevented from entering waterbody, one pound is subtracted from the annual loading at the outfall. For flourescent bulbs, the ratio may be lower due to the fact that the mercury contained in flourescent bulbs is in a form that is readily methylated. However, the permit writer must take into account the percentage of flourescent bulbs that break and the percentage of mercury from the broken bulbs that actually enters the waterbody. If a ratio of 5:1 is chosen, for example, then the discharger may subtract one pound of mercury from the outfall for every 5 pounds of mercury that the discharger has collected and sent for recycling.
2. Establish a monitoring program. Monitoring program must clearly lay out how discharger will determine reductions achieved through offsets. (i.e., frequency of monitoring, monitoring locations, methods, etc.);
3. Draft clear, enforceable limits based on the foregoing. Offset projects may or may not be ongoing. Furthermore, offset programs may take some time to be developed. Therefore, the permit writer may allow a “banking” system in which the discharger’s annual loadings and offsets are accounted for as debits and credits. So long as the net balance at the end of the permit is the waste load allocation for that five year period, the discharger would be determined to be in compliance with its permit limit. Furthermore, future permits could carry over a negative balance to credit the discharger for past offset reductions.

Under the scenario expressed above, and assuming that the discharger embarks on one program for collection of flourescent light bulbs (beginning year 2), under which they collect 4 lbs of mercury a year (total) and an abandoned mine cleanup program in which they prevent 200 lbs per year (total) from entering waterbody (beginning year 3),

the tabulation looks as follows:

	Allowances and Offsets	Discharge	Running Balance
Year 1	WLA= 0.5 lbs Total= 0.5 lbs	Discharge=3 lbs	2.5 lbs
Year 2	WLA= 0.5 Bulbs: 4lbs/5=0.8 lbs Total=1.3 lbs	Discharge=3 lbs	2.5+1.7= 4.2 lbs
Year 3	WLA= 0.5 lbs Bulbs: 4lbs/5 =0.8 lbs Mine: 200/50= 4 lbs Total= 5.3 lbs	Discharge=3 lbs	4.2+(-2.3)= 1.9 lbs
Year 4	WLA= 0.5 lbs Bulbs: 4lbs/5 =0.8 lbs Mine: 200lbs/50= 4 lbs Total= 5.3	Discharge=3 lbs	1.9+(-2.3)= -0.4 lbs
Year 5	WLA= 0.5 lbs Bulbs: 4lbs/5 =0.8 lbs Mine: 200lbs/50= 4 lbs Total= 5.3 lbs	Discharge=4 lbs	-0.4+(-1.3)= -1.7 lbs
Year 1 of 2nd permit	WLA= 0.5 lbs Bulbs: 4lbs/5 =0.8 lbs Mine: 200lbs/50= 4 lbs Total= 5.3 lbs	Discharge=4 lbs	-1.7+(-1.3)= -3.0 lbs

Under this example, the discharger is in compliance with the permit because the running balance at the end of the permit cycle is less than zero.

Joint Efforts:

It may be appropriate for many dischargers to work together on offset projects. Under such circumstances, the WLAs for all dischargers could be combined and offsets achieved by the group as a whole would count towards offsetting their combined net loading. So long as the combined running balance reaches zero by the end of the allotted period (typically a permit cycle), all dischargers would be in compliance with their WLAs.

New sources:

The same approach outlined herein should be used for permitting new sources, except that time schedules should not be allowed. Therefore, new sources should be required to meet criteria end-of-pipe, if end-of-pipe concentration is contributing to impairment, and offset entire loading, if loading is contributing to impairment. The discharger may be given time to develop an offset program by relying on the “banking” system for offsets.