Coastkeeper/NRDC’s Presentation on Feasibility of Numeric Effluent Limits for Stormwater Permits
—
September 14, 2005

INTRODUCTION

Daniel Cooper
Determining Compliance with the General Permit as drafted is Resource Intensive and often Judgment Based

• “A determination of a violation of the Receiving Water Limitations will be site specific and may be based on various factors, including indicator monitoring results, visual observations of the site, discharges, and the receiving water, and a review of BMPs.” —Fact Sheet p. 15

Benchmark Levels Do Not Determine Compliance

• “…these benchmarks are not numeric storm water effluent limits, are not related or necessarily protective of any specific receiving water, and exceedances of these benchmarks are not automatically considered permit violations.” —Fact Sheet p.14
The “Many Factored”
Judgment Based Compliance Standard
Leaves Permittees in Uncertainty
and Complicates Enforcement

- Dischargers Will Never Know How the RWQCB Will Apply the “Various Factors” and Thus Cannot Be Certain of Compliance
- The Lack of an Objective Standard for Determining Compliance Makes Evaluating Enforcement (and thus defending it in the Courts) Complicated and Resource Intensive

The Permit is Complicated and Requires Significant Documentation and Reporting by Permittees

- The Permittees must develop and implement BMPs that both meet the BAT/BCT standard and prevent violations of Water Quality standards
- The Permit Provides Little Guidance on BAT/BCT, and No Guidance on Meeting Water Quality Standards
- The Permittee Must Generate a SWPPP, a Monitoring Program, Inspection Reports, and an Annual Report. Failure to Properly Prepare These Reports is a Violation of the Permit and the CWA
Percent of Samples Exceeding CTR (Continuous Criteria)
Region 4, 2001-2002

The percentages represented are estimates because the continuous criterion values are close to laboratory detection limits for these elements.
Construction Permit Implementation Survey

- February 2004—December 2004
- 30 Construction Sites in Northern California
- Conducted by Ecological Rights Foundation for the Rose Foundation

Conclusions

- 24 of 30 (80%) sites had grossly deficient BMPs to control stormwater pollution
- 11 samples collected at 7 non-complying sites for TSS ranged between 240 mg/L and 7000 mg/L
Developing Numeric Effluent Limits is not Infeasible, and Will Result in Significant Savings of Resources in Oversight and Enforcement of the Permit

• An Initial Investment of State Board PYs in Developing the Limits Will Save Tremendous Resources at the RWQCB Level Over the Life of the Permit.
• Enforcement Will Be Efficient, Certain and Fair If Based on Objective, Numeric Effluent Limits

FEASIBLE DISCHARGE LIMITS FOR CONSTRUCTION PERMITTEES BASED ON BEST AVAILABLE TECHNOLOGY (BATs)

Dr. Richard Horner
Components

- Identification of potential pollutants
- General monitoring considerations
- Proposed discharge limits
- Background and rationale
- Remediation considerations

Identification of Potential Pollutants

- Category 1: Sediments from areas subject to clearing and grading
- Categories 2-4: Materials used, stored, or with spill potential during construction
- Categories 5-9: Materials used, stored, spilled, applied, or released during past land use*
- Category 10: Materials with polluting potential incidentally present in soils*

* Analysis of past land use activities and soil sampling and analysis required
General Monitoring Considerations

- Discharge sampling within the first hour of runoff and then every 3 hours
- Discharge limit a water quality standard or benchmark, unless options available:
  - Pre-construction baseline monitoring study
  - Reference flow sampling (if true reference, with no or minimal upstream human influence)
  - Mixing zone identification (if not 303(d) listed)

Optional Discharge Limits

- Baseline monitoring: Lowest concentration in baseline study (above standard or benchmark)
- Reference sampling: Reference sample concentration
- Mixing zone: Sample concentration estimated at mixing zone boundary by mass balance calculation
Monitoring to Establish Mixing Zone

- Discharge flow rate or volume and pollutant concentration(s)
- Flow rate or volume and pollutant concentration(s) of any flow joining discharge
- Receiving water flow rate or volume and pollutant concentration(s) outside mixing zone
- Receiving water flow rate or volume and pollutant concentration(s) inside mixing zone

Feasible Category 1 Discharge Limits

- If 303(d) listed with water quality standard, sample as in Guidance Document (GD), use standard as limit
- If no standard or can’t sample as in GD, sample discharge, analyze turbidity (field) and TSS (lab)—
  - Turbidity instant indication of possible violation (begin remediation), confirmation if standard exists
  - TSS confirms if violation (full remediation)
Category 1 Limits (cont’d)

Feasible limits if no standards:
• Turbidity—25 NTU mean, 75 NTU max.
• TSS—50 mg/L mean, 260 mg/L max.
(or concentration established through optional baseline, reference, or mixing zone study)

Rational for Category 1 Limits

• Tests of effectiveness of mat and mulch products relative to soil loss from bare slopes
• Bare soil TSS ranged 80-39510 mg/L (mean 7255 mg/L), turbidity 63 to >1000 NTU
• Wood fiber mulch, bonding agent, seeding—TSS mean 50, max. 256 mg/L; turbidity mean 21, max. 73 NTU
Feasible Discharge Limits for Categories 2-4

- If 303(d) listed as impaired for the identified pollutant(s), use water quality standard as limit
- If not 303(d) listed, use benchmark as limit (or concentration established through optional baseline, reference, or mixing zone study)

Feasible Discharge Limits for Categories 5-10

- Use field turbidity with limits given earlier as instant indication of possible violation (begin remediation)
- If 303(d) listed as impaired for the identified pollutant(s), use water quality standard as limit
- If not 303(d) listed, use benchmark as limit (or concentration established through optional baseline, reference, or mixing zone study)
Remediation Considerations

• Full remediation within 2 weeks, unless laboratory results confirm no violation
• If 0.25” rain with 40% probability within 2-week period, complete full remediation or apply short-term measure
• If violation, independent inspection until end of construction

FEASIBLE NUMERIC EFFLUENT LIMITS FOR INDUSTRIAL/MUNICIPAL STORMWATER

Richard Rollins
BMP Database website

The project, which is in its final phase, was developed as a cooperative agreement between the American Society of Civil Engineers (ASCE) and the U.S. Environmental Protection Agency (EPA). The project will develop a comprehensive database of best management practices (BMPs) for stormwater management. The database will include information on BMP design, installation, maintenance, and effectiveness, as well as links to additional resources on BMPs.

EPA’s Distribution

Figure 10-1: Modified Delta—Lognormal Distribution

The figure shows the probability density function of a modified delta-lognormal distribution. The distribution is defined by parameters that control the shape and scale of the distribution. The figure includes a legend that explains the different symbols and lines representing different distributions.
Log Transformed Data

Figure 4: Distribution of ln(Na) from the 1996-1997 group monitoring data. The curve represents a normal distribution and the lines are drawn approximately at the EPA and Basin Peak levels.

LogNormal Plot of Region 8 Copper Levels

Number of Samples at Each Level of CuS Analyses

Total Copper in µg/L

150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350

Actual
Lognormal
EPA’s Approach

Technical Development Document for the Final Effluent Limitations Guidelines and Standards for the Meat and Poultry Products Point Source Category

U.S. EPA Office of Water Engineering and Analysis Division

July 2004
14.6.2 Selection of Percentiles

EPA calculates limitations based upon percentiles chosen, on one hand, to be high enough to accommodate reasonably anticipated variability within control of the facility and, on the other hand, to be low enough to reflect a level of performance consistent with the Clean Water Act requirement that these effluent limitations be based on the “best” technologies. The daily maximum limitation is an estimate of the 99th percentile of the distribution of the daily measurements. The monthly average limitation is an estimate of the 95th percentile of the distribution of the monthly averages of the daily measurements.

Meat and Poultry Products Technical Support Document 14.6.2

Legal Validation

Chemical Manufacturers Association v. U.S. Environmental Protection Agency, 870 F.2d 177, 230 (5th Cir. 1989). The Court determined that:

EPA reasonably concluded that the data points exceeding the 99th and 95th percentiles represent either quality-control problems or upsets because there can be no other explanation for these isolated and extremely high discharges. If these data points result from quality-control problems, the exceedances they represent are within the control of the plant. If, however, the data points represent exceedances beyond the control of the industry, the upset defense is available. Id. at 230.

Meat and Poultry Products Tech Support Doc. Section 14.6.2
Legal Validation

This approach for the monthly average limitation was upheld in *National Wildlife Federation, et al v. Environmental Protection Agency*, 286 F.3d 554 (D.C. Cir. 2002). The Court determined that:

EPA rejected Industry Petitioners' claim that facilities are expected to operate processes and treatment systems so as to violate the limitations at some pre-set rate... These limitations were never intended to have the rigid probabilistic interpretation that Industry Petitioners have adopted. Therefore, we reject Industry Petitioners' challenge to the effluent limitations.

Meat and Poultry Products Tech Support Doc. Section 14.6.2

Maximum Flow Restriction

Above 50-year 24-hour rain event, numeric limit would be relaxed.

As that Court recognized, EPA's allowance for reasonably anticipated variability in its effluent limitations, coupled with the availability of the upset defense, reasonably accommodates acceptable excursions.

Meat and Poultry Products Tech Support Doc. Section 14.6.2
**Historical Precedents**

This percentile approach has been used by EPA over the last 2 decades in other Effluent Guidelines including:

- Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF, 40 CFR Part 414)
- Pulp and Paper Category (40 CFR Part 430)
- Landfills Point Source (40 CFR Part 445)
- Centralized Waste Treatment 40 CFR 437

**Proposed BAT Method**

- The IBMPDB provides analytical results from over 1600 systems treating urban runoff that have been collected under a specified protocol and validated by the IBMPDB sponsors.
- Systems evaluated include hydrodynamic devices, biofilters, detention basins, media filters, wetland basins, grassy swales, as well as others not listed here.
- The average was used to provide a preliminary BAT level instead of some lower percentile level because the lower percentiles were felt to be too difficult to meet for an initial regulatory effort.
GISWP Proposed BAT Limits

<table>
<thead>
<tr>
<th>Item</th>
<th>Parameter</th>
<th>Proposed BAT</th>
<th>Benchmark</th>
<th>CTR (see note 10)</th>
<th>Rationale</th>
<th>Alt. Prop. BAT</th>
<th>Alt. Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>T. Phosphorus</td>
<td>0.2 mg/L</td>
<td>2 mg/L</td>
<td>na</td>
<td>See notes 1, 2, and 11</td>
<td>0.1 mg/L Lahontan NPDES permit CAG616003</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>T. Suspended Solids</td>
<td>50 mg/L</td>
<td>100 mg/L</td>
<td>na (Lahontan Basin Plan has limits for turbidity, 20 NTU)</td>
<td>Coal Pile Runoff associated with Steam Electric Power Generating Point Source, 40 CFR 423</td>
<td>25 mg/L 30 day average, 45 mg/L 7 day average; 25 mg/L (IBMPDB, See note 6)</td>
<td>Best Practice Technology, Colorado Sand and Gravel Discharge Permit Number Cog-500000 See note 3</td>
</tr>
</tbody>
</table>

(continued)
Municipal Permit with Numeric Limits

I. DISCHARGE SPECIFICATIONS

A. Effluent Limitations:

1. All storm water/urban runoff flows generated within the Project Area which are discharged to publicly owned or maintained land treatment or infiltration systems, or to surface waters shall not contain constituent in excess of the following limits:

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Units*</th>
<th>Land Treatment/Infiltration Systems</th>
<th>Surface Waters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Nitrogen</td>
<td>mg/L as N</td>
<td>0.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Total Phosphorous</td>
<td>mg/L as P</td>
<td>0.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Total Iron</td>
<td>mg/L</td>
<td>0.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Turbidity</td>
<td>NTU</td>
<td>20.0</td>
<td>200</td>
</tr>
<tr>
<td>Grease and Oil</td>
<td>mg/L</td>
<td>2.0</td>
<td>40</td>
</tr>
</tbody>
</table>

*mg/L milligrams of substance per liter of storm water

**NTU nephelometric turbidity units

Enforcement of Numeric Limits

Table 1. Mean of Monthly Mean for the Period of 4-12-92 to 6-06-01 for Areas Affected by the Dischargers' Parking Lot Runoff

<table>
<thead>
<tr>
<th>Sampling Locations</th>
<th>Constituents</th>
<th>Turbidity NTU</th>
<th>TDS mg/l</th>
<th>TSS mg/l</th>
<th>NO3 mg/l</th>
<th>TKN mg/l</th>
<th>Total N mg/l</th>
<th>P mg/l</th>
<th>CL mg/l</th>
<th>Fe mg/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>3</td>
<td>0.02</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.02</td>
<td>3</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>SC-16</td>
<td></td>
<td>3.3</td>
<td>32.46</td>
<td>9.53</td>
<td>0.18</td>
<td>0.18</td>
<td>0.02</td>
<td>3</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>SC-18</td>
<td></td>
<td>13.15</td>
<td>81.68</td>
<td>21.51</td>
<td>0.24</td>
<td>0.24</td>
<td>0.07</td>
<td>2.41</td>
<td>0.73</td>
<td></td>
</tr>
</tbody>
</table>

* Shaded values denote violations for the above-referenced sample locations

** NS - Numerical water quality objectives not specified in the Basin Plan.
Example: TSS or Turbidity

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TSS (mg/L)</th>
<th>Turbidity (NTU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caltrans Retrofit Study</td>
<td>10</td>
<td>–</td>
</tr>
<tr>
<td>BMP Database (Mean)</td>
<td>25</td>
<td>–</td>
</tr>
<tr>
<td>Construction (Mean)</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Benchmark</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

SUMMARY AND CONCLUSION

David Beckman
Numeric Effluent Limits

Best management practices (BMPs) to control or abate the discharge of pollutants when:
(3) numeric effluent limitations are infeasible

40 CFR §122.44 (k)(3)

The Successful Development of Numeric Effluent Limitations for Stormwater Clearly Demonstrates that Such Limitations are Feasible.

Some examples in California include:

40 CFR Subchapter N following subcategories:
• Phosphate Subcategory, Fertilizer Manufacturing Point Source (limits for total phosphorus and fluoride) 40 CFR § 418.10;
• Cement Manufacturing Facility, Materials Storage Piles Runoff (limits for TSS and pH) 40 CFR § 411.30;
• Asphalt Emulsion Subcategory, Paving and Roofing Materials Point Source (limits for TSS, oil & grease, and pH) 40 CFR § 443;
• Crushed Stone, Construction Sand and Gravel, Industrial Sand (limits for TSS and pH) 40 CFR § 436;
• Coal Pile Runoff associated with Steam Electric Power Generation (limits for TSS and pH) 40 CFR § 423; and
• Coal Mining (limits for SS, Fe, and pH) 40 CFR § 434.

MS4 permit for the Tahoe Basin:
Total nitrogen, total phosphorus, total iron, turbidity, oil and grease.
End.