Long-term Impacts of Recent Regulatory Developments

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May 20, 2010

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Solutions for Progress

Recent Developments

- 2009 Basin Plan Amendments for pH and Turbidity
- Antidegradation Analyses – What's expected
- Cyanide – EPA's proposed analytical method changes
- State Water Board's Recycled Water Policy – Chemicals of Emerging Concern (CECs)

pH and Turbidity Basin Plan Amendments

pH and Turbidity

- Challenges of operating compliant plants
- Challenge is compounded if standard is unnecessarily stringent, and that is cause for non-compliance
- First addressed for Deer Creek
- Sound science that was developed allowed processing Basin-wide
- CVCWA-led effort

pH and Turbidity

- Original Turbidity Objective
  - Where natural turbidity is between 0 and 5 NTUs, increases shall not exceed 1 NTU
- Turbidity Amendment
  - Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2 NTU
  - Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU

pH and Turbidity

- Turbidity Amendment – Long-term Impacts
  - Addressed regulatory issue described through refinement of the objective
  - Protective of aquatic life and recreational uses

pH and Turbidity

- pH Amendment
  - The pH shall not be depressed below 6.5 nor raised above 8.5
  - Eliminated: "*Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters…..*"

pH and Turbidity

- pH Amendment – Long-term Impacts
  - Addressed issue of WWTPs “chasing” receiving water pH through chemical addition
    - No benefit to aquatic life uses
    - Loaded additional salts
    - Costly
    - Didn’t always achieve compliance
  - Improved EDW POTW compliance
  - Protective of aquatic life
- Congrats to all involved!

Antidegradation Analyses

Antidegradation Analyses

- Water Quality Standards (Clean Water Act)
  - Beneficial uses
  - Criteria/objectives necessary to protect uses
  - Antidegradation policy to maintain and protect water quality
    - Compliance with criteria/objectives is a key tool used to assess the acceptability of the discharge
    - The other key tool provided by WQ standards is the Antideg. Policy
    - New discharges and expansion of permitted capacity

Antidegradation Analyses

- Antidegradation Policies
  - **Tier II:** high quality – some degradation may be allowed

Federal	State
Support important economic or social development	Achieve highest water quality consistent with the maximum benefit to the people of the State
Fully protect existing uses	Will not unreasonably affect present and anticipated uses
Meet highest statutory/ regulatory requirements for point source dischargers (cost-effective/reasonable BMPs for nonpoint)	Activities meet best practicable treatment or control

- Recent Developments
  - Requirement of detailed, quantitative analyses
  - Recycled Water Policy require antidegradation analyses

Antidegradation Analyses

- Water Quality Baseline – (Long-term impacts):
  - To evaluate water quality changes, a permanent baseline water quality condition must be established
  - Regulations – upon adoption of state and federal antidegradation policies (i.e., 1968 and 1975)
  - Practice – first time a quantitative antidegradation is performed
  - Impact – Antidegradation analyses will evaluate incremental and cumulative effects
    - Effects measured through use of available assimilative capacity (i.e., how close to standard)

Antidegradation Analyses

- Water Quality Baseline – (Long-term impacts):
  - Example discharger:
    - 2008: 3.0 to 4.0 mgd – incremental degradation
    - 2020: 4.0 to 5.0 mgd – incremental degradation
    - 2020: 3.0 to 5.0 mgd – cumulative degradation

Antidegradation Analyses

- Socio-Economic Analysis Thresholds – (Long-term impacts):
  - 10% or greater use of available assimilative capacity triggers a detailed socio-economic analysis of the cost of alternatives that could reduce water quality impacts.
  - Cumulative trigger is 20% or greater use of available assimilative capacity.
  - Both triggers have been incorporated into the Recycled Water Policy

Cyanide

Cyanide

- Often problematic compliance for dischargers without dilution credit
  - 4.1 ug/L AMEL w/o dilution
- Approved EPA test methods experience numerous interferences
  - Most typically EPA 335.2, 335.4, Standard Methods 4500-CN (total cyanide by acid distillation)
  - Both matrix and preservation related interferences
- Cyanide effluent violations may in fact be erroneous analytical measurements

Cyanide

- Numerous matrix-related chemical interferences have been documented
  - Aldehydes, carbonates, nitrite, nitrate, oxidants, sulfide, sulfites, thiocyanate
- Standard sample preservation and stabilization techniques may cause interference
  - Chlorine quenching agents
  - Sodium hydroxide preservative

Cyanide

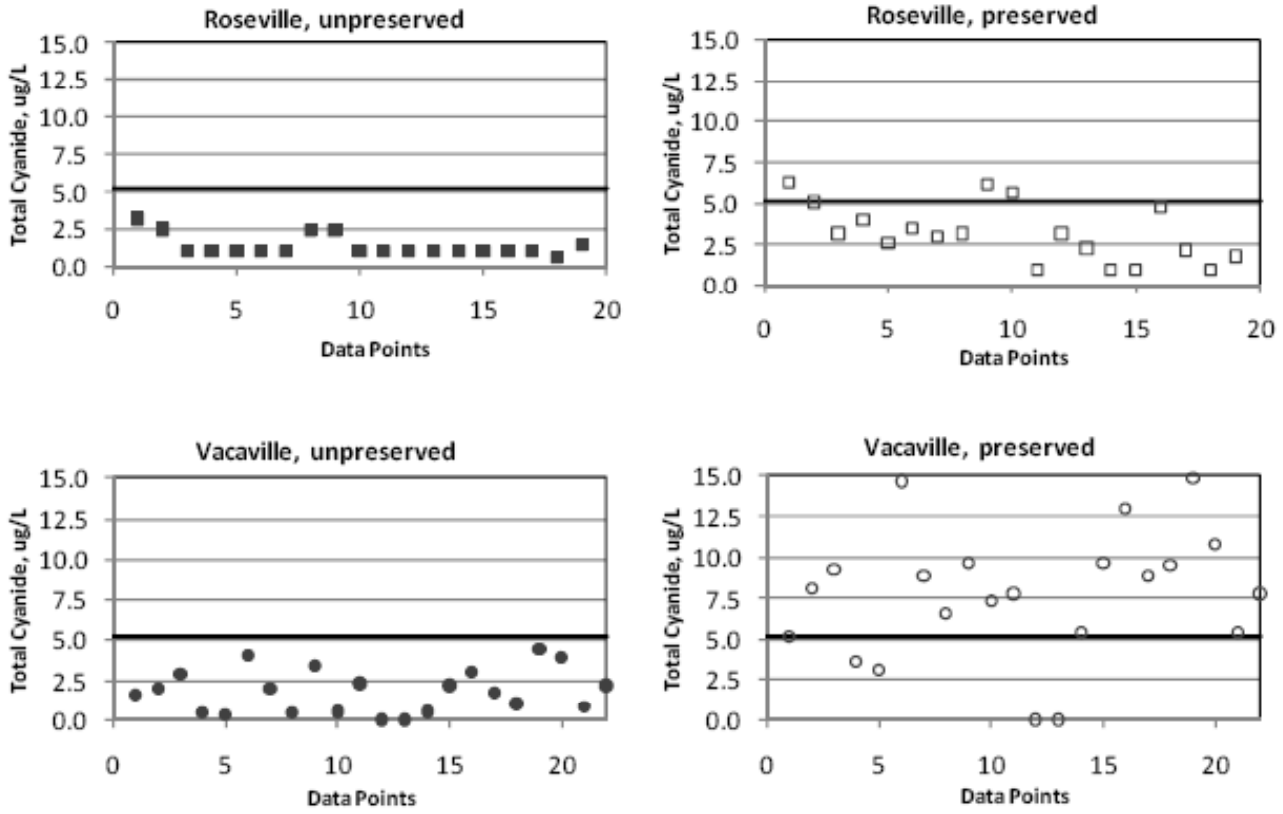

Figure 2. Total cyanide results for side-by-side analyses of split samples, one preserved with sodium hydroxide (NaOH) and the other unpreserved, from the City of Roseville's Pleasant Grove and Dry Creek Wastewater Treatment Plants (hold-time is 1 to 2 hours) (City of Roseville 2009) and the City of Vacaville's Easterly Wastewater Treatment Plant (hold-time is less than 15 minutes) (City of Vacaville 2008). The x-axis is an arbitrary labeling of data points.

Cyanide

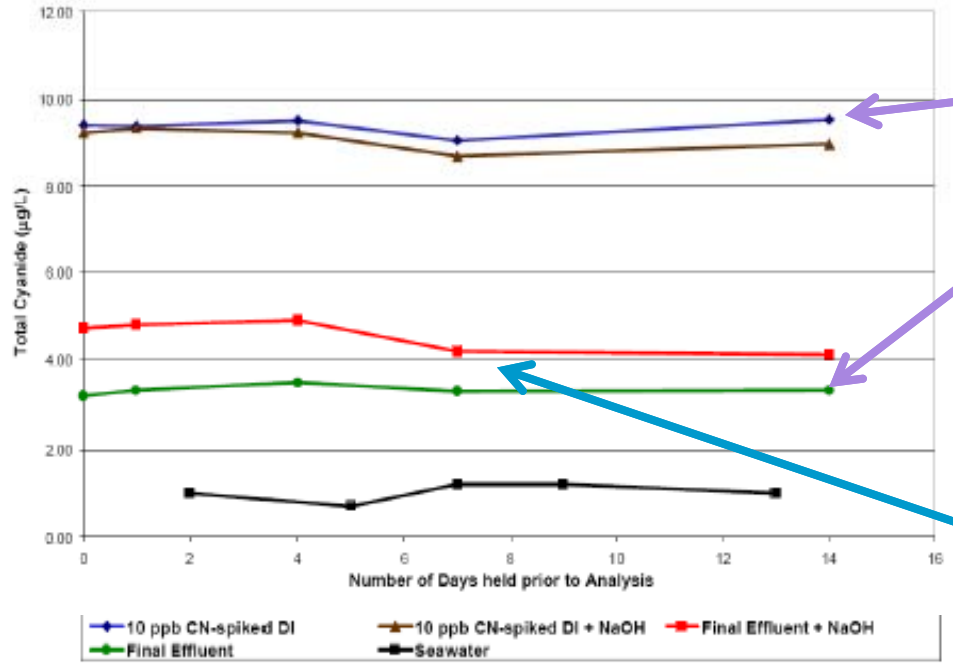

Figure 3. Hold-time study using de-ionized (DI) water, ambient seawater, and San Jose/Santa Clara Water Pollution Control Plant effluent with and without NaOH Preservation (reproduced from City of San Jose 2004).

Cyanide stability without sodium hydroxide preservative

Wastewater matrix and/or preservative effect

Cyanide

- EPA acknowledges analytical challenges
  - Proposal to adopt into 40 CFR 136 new analytical methods less prone to interference
  - Proposal to adopt into 40 CFR 136 revised sample preservation and stabilization procedures (ASTM 7365-09a)
    - Conduct matrix-specific cyanide hold-time study if analytical interference is suspected

Cyanide

- CVCWA proposes a group hold-time study
  - Discontinued use of sodium hydroxide as a preservative
  - Pool resources as was done for BPAs
  - Hold time study necessary to evaluate viability of potential solution
- Long-term Impacts:
  - May resolve cyanide compliance issues for many WWTPs

Chemicals of Emerging Concern (CECs)

CECs

State Water Board Recycled Water Policy (2009)

- Addresses chemicals of emerging concern (CECs) that may be present in recycled water
  - pharmaceuticals, personal care products, current use pesticides, industrial chemicals
- "Blue ribbon" Advisory Panel
  - Indirect potable reuse via surface spreading or groundwater recharge
  - Urban landscape irrigation

CECs

The Panel charge:

- What are appropriate constituents to be monitored?
- What are the possible indicators (i.e., surrogates) that represent a suite of CECs?
- What levels of CECs should trigger enhanced monitoring in recycled, ground, or surface waters?

CECs

Products:

- Application of the framework to identify a list of chemicals that should be monitored presently
  - Groundwater recharge priority CECs: 17beta-estradiol, caffeine, triclosan
  - Urban landscape irrigation: no priority CECs identified
- A sampling design and approach for interpreting results from CEC monitoring programs
- Priorities for future improvements in monitoring and interpreting of CEC data

Questions