**STATE OF CALIFORNIA**
**REGIONAL WATER QUALITY CONTROL BOARD**
**CENTRAL COAST REGION**

**STAFF REPORT FOR REGULAR MEETING OF MARCH 21, 2008**
Prepared on February 27, 2008

**ITEM NUMBERS: 11 and 12**

**SUBJECT:** **Consideration and Discussion of Monitoring and Reporting Program No. R3-2008-0016 (Attachment E), City of Watsonville Wastewater Treatment Plant and Revised Monitoring and Reporting Program No. R3-2005-0003 (Attachment E), City of Santa Cruz Wastewater Treatment Plant, Santa Cruz County**

**KEY INFORMATION:**

| | | |
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| Treatment System Location | 401 Panabaker Lane, Watsonville | 110 California St., Santa Cruz |
| Discharge Type | Municipal wastewater | Municipal wastewater |
| Design Capacity | 12 million gallons per day (MGD) | 17.0 MGD |
| Current flowrate | 7.5 MGD | 11.8 MGD |
| Treatment: | Secondary | Secondary |
| Disposal | Ocean outfall to Monterey Bay | Ocean outfall to Monterey Bay |
| Reclamation | Beginning August 2008 | None |
| **This Action:** | **Revise MRP NO. R3-2005-0003 and Adopt MRP No. R3-2008-0016** | |

## SUMMARY

At the March 21, 2008, public meeting, the Board will consider updated waste discharge requirements for Monterey Regional Pollution Control Agency (Monterey Regional) and Carmel Area Wastewater District (CAWD). The Board will also consider the Monitoring and Reporting Programs (MRPs) proposed for the City of Watsonville and the City of Santa Cruz (Dischargers).

Staff proposes the Board consider the four MRPs at this public hearing because each discharger participates in CCLEAN's (Central Coast Long-Term Environmental Assessment Network) regional monitoring program. Therefore, the MRPs share many features, which indicates the Board should consider them together. The proposed MRPs essentially retain the monitoring requirements included in current MRP, but provide for consistent CCLEAN provisions.

## BACKGROUND

Waste Discharge Requirements (WDRs) Order No. R3-2003-0040, an NPDES permit that expires on May 16, 2008, regulates the discharge from the City of Watsonville's wastewater treatment plant. To renew the permit, staff is drafting WDRs Order No. R3-2008-0016, which staff proposes to submit for the Board's consideration at the May 9, 2008 public hearing in San Luis Obispo. When

City of Santa Cruz's permit expires, staff will submit a draft WDR Order at May 2009 public meeting for the Board to consider.

The four municipalities that now participate in the regional monitoring program discharge treated municipal wastewater into Monterey Bay. In accordance with CCLEAN's charter, the regional monitoring program employs a high-volume water sampling (HVWS) method to monitor the discharges to determine the sources of pollutants found in nearshore waters. Additionally, since May 2005, the City of Santa Cruz has sampled its effluent using a proven HVWS method, a semi-permeable membrane device, to demonstrate compliance with its permit's effluent limitations. The City of Santa Cruz combines its effluent with the City of Scotts Valley's and discharges the combined waste flows through the Santa Cruz ocean outfall. In accordance with their respective MRPs, each community separately monitors its discharge via HVWS; however, the City of Santa Cruz obtains the City of Scotts Valley's sample on their behalf.

As discussed in more detail below, HVWS allows detection of pollutants present in wastewater at low concentrations by capturing all the pollutant present in a large volume of wastewater. In particular, HVWS allows detection of persistent and bioaccumulative pollutants at concentrations below their effluent limitations, thereby allowing compliance with limitations to be determined. Grab samples or 24-hour composite samples do not provide the necessary pollutant mass or sample volume to enable analytical methods to detect these pollutants at concentrations below effluent limitations. The following section provides more detailed information on HVWS systems.

**High volume water sampling (HVWS) (integrative sampling).**
Some synthetic chlorinated hydrocarbons strongly resist bacterial degradation. Therefore, these compounds persist in the environment, some essentially forever. These persistent organic pollutants include dioxins, chlorinated pesticides, polychlorinated biphenyls (PCBs), and polybrominated biphenyl ethers (PBDEs). Persistent organic pollutants often accumulate in fatty tissues of higher aquatic organisms as they prey on lower forms, and can thereby increase to levels that cause cancer and mutations in offspring. Consequently, Congress banned the production and use of chlorinated pesticides and PCBs. However, high-temperature or highly corrosive processes, like paper bleaching, continually generate dioxins as waste byproducts. Therefore, these sources contribute dioxins to municipal wastewaters, in contrast to chlorinated pesticides and PCBs, which are neither made nor used in this country. The California Ocean Plan specifies very low water quality objectives for persistent organic pollutants because of their ability to bioaccumulate to toxic levels. For example, for dioxin (by far the lowest limit), the Ocean Plan limit is approximately 4 billionths of a millionth of a gram per liter of seawater ($3.9 \times 10^{-9}$ mg/L or $3.9 \times 10^{-15}$ g/L).

Effluent and receiving water monitoring conducted by this Region's CCLEAN has continually found persistent organic pollutants. (CCLEAN does not currently monitor dioxins, however). CCLEAN is able to detect the persistent organic pollutants by employing integrative HVWS instead of the usual 24-hour composite of 24 discrete grab samples. In CCLEAN's HVWS, for 30 days a constant-flow effluent stream split from the plant's discharge is passed, after filtration, through a column packed with beads of a specially formulated resin, which captures all the persistent organic pollutants in the split stream. Sampling is conducted over two 30-day periods, one in summer and one in winter. The mass of each persistent organic pollutant is determined by standard analysis of the extract from the resin. Knowing the volume of wastewater from which the persistent organic pollutants were obtained, the average concentration in the wastewater of each persistent organic pollutant can then be determined.

HVWS over two 30-day intervals every year provides a much more representative sample than the 24-hour composite, which comprises 24 small grab samples taken on one day. The pollutant is usually present in the HVWS extract in amounts that are detectable by standard analytical

procedures. Moreover, when the large sample volume (say 200 L) is factored in, very low concentrations can be demonstrated. CCLEAN is thereby able to report effluent persistent organic pollutants concentrations on the order of 10 pg/L ($1.0 \times 10^{-12}$ g/L).

24-hour composite effluent samples from some of this Region's plants (obtained in accordance with the Board's monitoring and reporting programs) have occasionally detected dioxins, sometimes in greater concentrations than permit limitations. These sporadic results indicate the likely presence of dioxins in municipal plant effluent. Published studies have found possible dioxin sources to be bleached paper, such as toilet tissue, and wastewater plant chlorination processes.

When analyzing the usual 24-hour composite or grab sample volume, EPA Method 1613B achieves approximately 10 pg/L as the lower limit of detection, which exceeds, for example, the City of Santa Cruz's dioxin effluent limit of 0.55 pg/L. (Effluent limits of other CCLEAN participants are similar) Therefore, HVWS provides the only means of detecting dioxins and other similar persistent organic pollutants at levels below permit limits, and at levels above permit limits but below the grab sample detection limit; i.e. from 0.001 pg/L to 10 pg/L. HVWS has detected dioxin at 0.001 pg/L in water, which is well below the effluent limitation.

## DISCUSSION

Sporadic detection of toxic dioxin in small samples of this Region's municipal discharges to fresh and marine waters emphasizes the need to extend HVWS to all such discharges to determine the extent that both regulated and unregulated toxic pollutants may threaten the beneficial uses of surface waters and groundwaters. The CCLEAN participants other than the City of Santa Cruz (City of Watsonville, Monterey Regional and CAWD) have not monitored their discharges with HVWS to demonstrate compliance with permit effluent limitations because that has not been CCLEAN's goal. Therefore, the regional monitoring program has not looked for all Ocean Plan toxic pollutants, including dioxin.

In 2007, therefore, staff initiated planning by regional monitoring program participants to investigate the feasibility of monitoring the four discharges to Monterey Bay with the same HVWS method(s) to both achieve CCLEAN's goals and to assess compliance with effluent limitations. In staff's view, this approach would be more efficient and cost-effective than using two HVWS methods, one for CCLEAN and the other to determine permit compliance.

Secondly, staff requested the CCLEAN participants develop a list of compounds of emerging concern to include in the MRPs. Currently, no State Water Quality Control Plan establishes objectives for compounds of emerging concern (CECs) although they threaten the health of humans and animals, and are often detected in ambient waters or municipal wastewaters. That is, CECs often threaten to impair beneficial uses of marine waters, and fresh surface waters and groundwaters. Staff and the CCLEAN participants agree they should monitor their discharges for these pollutants. If monitoring detects CECs, subsequent actions could include public education campaigns or other actions.

Accordingly, CCLEAN's program manager developed the Draft 2008-2013 CCLEAN Five-year Plan (Plan), which responds to staff's requests, as follows:

1. The Plan was not able to resolve differences between the current CCLEAN sampling method (resin beads), the SPMD, and the POCIS (Polar Organic Chemical Integrative Sampler) methods. As discussed below, the proposed MRPs require the CCLEAN participants to resolve these issues and recommend the appropriate HVWS method(s).

2. The Plan recommends three classes of compounds of emerging concern for effluent monitoring, as follows:
   a. Polybrominated biphenyl ethers (PBDEs) are widely used flame retardants often detected by CCLEAN monitoring. In a manner similar to PCBs, PBDEs may disrupt nervous system development.
   b. Polyfluorinated compounds (PFCs) may adversely affect wildlife and are found in high concentrations in wastewater. The CCLEAN advisor proposed a screening study for PFGCs.
   c. The Ocean Plan's Table B does not include many endocrine disrupting compounds. Evidence of adverse effects of endocrine disrupting compounds (EDCs) of aquatic life accumulates from day to day. Although a discharge may comply with the Ocean Plan's constituent-specific objectives and current whole effluent toxicity tests may find no chronic toxicity, the discharge may impair the health of aquatic life by disrupting the development of the young or by adversely altering the sex distribution. The Plan proposes the CCLEAN participants jointly employ a proven bioassay procedure to evaluate the influence of effluent EDCs on the health of marine fish.

## COMPLIANCE HISTORY

Since May 2005, Santa Cruz has sampled its effluent with a SPMD and has detected a number of pollutants not found in 24-hour composite samples, the prior sampling method. In particular, Santa Cruz found several congeners (or species) of dioxin and several of furan. No dioxin was present at a concentration that caused violation of its effluent limitation.

In addition, CCLEAN's regional monitoring program has also detected similar pollutants using its HVWS, including 46 congeners of the compounds of emerging concern PBDE, among others.

## CONCLUSION

In contrast to the results of analyzing 24-hour composite samples, monitoring with HVWS has allowed the City of Santa Cruz and the City of Scotts Valley to determine permit compliance for pollutants with low effluent limitation, including dioxin. Therefore, HVWS methods should be used to sample all municipal and industrial discharges to surface and groundwaters, including the discharges of the CCLEAN participants to Monterey Bay.

## RECOMMENDATIONS

To monitor the Discharger's effluent for the persistent and bioaccumulative toxic compounds discussed above, the proposed MRP requires annual influent HVWS monitoring for the appropriate Table B pollutants in Table E-2 and semiannual effluent HVWS monitoring for the appropriate Table B pollutants, in addition to pollutants on the federal National Priority List that are not included in Table B. The results of Table B monitoring shall serve to determine if the discharge complies with the effluent limitations in its NPDES permit.

To monitor the discharges for compounds of emerging concern, staff proposes to add requirements to section IX.A in the proposed MRP; ie, to requirements for CCLEAN. Accordingly, in Table E-8 (CCLEAN Monitoring Requirements) in section IX.A, staff proposes to include semi-annual effluent monitoring with HVWS for polybrominated diphenyl ethers and grab samples for polyfluorinated compounds. Also, to, to semiannual monitor PFCs after a screening study discussed below, and to semiannual biological monitoring of the effects of endocrine disrupting compounds, if any, after

the discharger, in concert with the other CCLEAN participants, specifies the bioassay procedure to be used. Staff proposes to add the pollutants to Table E-4.

To establish the following in accordance with the discussion above, staff proposes to modify Table E-3, Table E-4, and section IX.A CCLEAN monitoring requirements to address:

1. The HVWS method to be used by all CCLEAN participants for permit compliance,
2. The proven method to bioassay the potential effects of estrogenic EDCs on human and animal life,
3. The screening study to determine the nature of ongoing monitoring of perfluorinated compounds,

## COMMENTS

No comments were received by February 25, 2008. Staff shall include any comments received until the March 21, 2008 public meeting in a supplement to this report.

## ATTACHMENTS

1. Revised Monitoring and Reporting Program No. R3-2008-0016 for the City of Watsonville
2. Revised Monitoring and Reporting Program No. R3-2005-0003 for the City of Santa Cruz

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