**CITY OF DANA POINT**

# OCEAN WATER QUALITY SUBCOMMITTEE

**REGULAR MEETING AGENDA**

Tuesday, March 13, 2007
3:00 – 5:00 p.m.

City Hall Offices
Admin. Conf. Room
33282 Golden Lantern
Dana Point, CA 92629

## CALL TO ORDER

**ROLL CALL** Council Member Joel Bishop, Wayne Rayfield, Michael Kelly, Dick Dietmeier, Brad Fowler,

Ex-officio: (non-voting) Mike Dunbar, South Coast Water District
Eileen Takata (Orange County Supervisor's Office)
Lou Penrose (Senator John Campbell's Office)
Emmanuel Patrascu (Senator Harmon's Office)
Lisa Zawaski (Dana Point staff)

## A. APPROVAL OF ACTION MINUTES

ITEM 1: Approval of Action Minutes of February 13, 2007.

## B. PUBLIC COMMENTS

Any person wishing to address the Subcommittee during the Public Comments section or on an Agenda item is asked to complete a "Request to Speak" form. The completed form is to be submitted to City staff prior to the Agenda item being called and discussed.

In order to conduct a timely meeting, there will be a three-minute limit per person for the Public Comments portion of the Agenda. State law prohibits the Subcommittee from taking action on a specific item unless it appears on the posted Agenda.

If anyone has handouts to distribute to the Subcommittee, please follow proper procedure and hand them to the City staff. The City staff will see that they are distributed.

## C. CONSENT CALENDAR

There are no items on the Consent Calendar.

**D. PUBLIC HEARINGS**

There are no Public Hearings.

**E. PUBLIC MEETINGS**

There are no Public Meetings.

**F. OLD BUSINESS**

There is no Old Business.

**G. NEW BUSINESS**

**ITEM 2:** **North Creek Pilot Project Presentation** – Robert Stone

**ITEM 3:** **Private Lateral Update** – Joe McDivitt (SCWD)

**ITEM 4:`** **Strategy to Address Over-Irrigation**

**H. STAFF REPORTS**

There are no staff reports.

**I. COMMENTS**

**J. ADJOURNMENT**

The *next* regular meeting of the Ocean Water Quality Subcommittee will be scheduled at this meeting.

## K. CERTIFICATION

STATE OF CALIFORNIA )
COUNTY OF ORANGE ) **AFFIDAVIT OF POSTING**
CITY OF DANA POINT )

I, Brad Fowler, Public Works & Engineering Director of the City of Dana Point, do hereby certify that on or before Friday, February 9, 2007, I caused the above notice to be posted in four (4) places in the City of Dana Point, to wit: City Hall, Capistrano Beach Post Office, Dana Point Post Office and the Dana Point Library.

_____
Brad Fowler, Director
Public Works & Engineering Department

Agendas are available on the City's website at *www.danapoint.org*.

PURSUANT TO THE AMERICANS WITH DISABILITIES ACT, PERSONS WITH A DISABILITY WHO REQUIRE A DISABILITY-RELATED MODIFICATION OR ACCOMMODATION IN ORDER TO PARTICIPATE IN A MEETING, INCLUDING AUXILIARY AIDS OR SERVICES, MAY REQUEST SUCH MODIFICATION OR ACCOMMODATION FROM THE PUBLIC WORKS ADMINISTRATIVE SECRETARY AT (949) 248-3554 (TELEPHONE) OR (949) 248-7372 (FACSIMILE). NOTIFICATION 48 HOURS PRIOR TO THE MEETING WILL ENABLE THE CITY TO MAKE REASONABLE ARRANGEMENTS TO ASSURE ACCESSIBILITY TO THE MEETING.

Investigative Order No. R9-2006-0039
WPN:10-6001.02:haasj
NWU:10:6001.02:haasj

# MONTHLY MONITORING REPORT #6
for the
# OZONE TREATMENT DEMONSTRATION PROJECT AT NORTH CREEK, DOHENY BEACH, DANA POINT, CALIFORNIA

February 9, 2007

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Lisa G. Zawaski
City of Dana Point
Senior Water Quality Engineer
33282 Golden Lantern
Dana Point, CA 92629
949-248-3584
lzawaski@danapoint.org

Any questions regarding this report should be directed to either of the persons above.

**Quarterly Monitoring Report #6: Ozone Treatment Demonstration Project at North Creek, Doheny Beach, City of Dana Point**

This quarterly report is intended to provide information in accordance with:

1. **Letter & Investigative Order from San Diego Water Quality Control Board, dated April 4, 2006, WPN:10-6001.02:haasj, Investigative Order No. R9-2006-0039.**
2. **Letter dated May 21, 2006, NWU:10:6001.02:haasj**
3. **Letter dated October 25, 2006, NWU:10:6001.02:haasj**

The complete laboratory data sheets and QA/QC reports were not included in this report, but can be provided upon request. This report and attachment was provided digitally via email. Hard copies of any and all materials can be provided upon request. Please contact Lisa Zawaski at lzawaski@danapoint.org or 949-248-3584.

**Water Quality Data & Assessment**

The raw data spreadsheet is attached in Attachment I, North Creek Ozone Pilot Project Data. A variety of water quality standards have been included at the top of the spreadsheet for assessments purposes.

Data Assessment:

**Temperature**: The temperature ranges for this period ranges from 16.1 - 21.3 degrees C (61 – 70.3 degrees F) and it has been colder with colder air temperature.
Receiving water temperatures can rise from storm water urban run off caused by the transfer of heat that impervious surfaces (pavement, asphalt, and roofs) absorb from natural day light. When freshwater reaches 18-21 degrees Celsius (C) or 70 degrees Fahrenheit (F) it can have a negative impact on some aquatic organisms including fish and plants. Warmer water temperatures lower dissolved oxygen content in water, thereby decreasing the supply of oxygen available to aquatic organisms' fish and plant roots.
Higher temperatures also influence the activity of toxic chemicals, bateria, and parasites in water. This stresses the organism, increasing the incidence of fungal infections and disease.
As noted in the "Before Treatment", influent water temperatures average of 16.1 to 21.3 Celsius (C). However once the influent water is treated with ozone, aeration and pollutants are removed, the water temperature drops an average of 1.5 Celsius (C). As the ozone further dissolves the water temperature continues to drop an average of 3 degrees Celsius by the time it reaches the 75' north creek area. This helps maintain the water temperature at average of 15 degrees Celsius, ideal for aquatic organisms, including fish and plant roots.
**pH**: the pH at all three locations meets the Ocean/Basin Plan Objective.
**Ozone Application Rate**: as The project has been designed to slowly increase ozone dosage to achieve optimum treatment. An air compressor was added during the week of 11/29/06 which doubled the air flow. The system was adjusted to be able to provide a range of treatment options to treat a range of flows. The dynamics of the system are still being evaluated and adjusted, as flow volume and contact time provide variability.
Ozone was increased 01/04/07 at the influent area of the vault to eliminate the further growth of bacteria caused by urban runoff and stagnant water within the vault.
Aeration was increased on 01/04/07 and adjusted to inject air directly into the CDS unit.
The ozone system was adjusted to inject ozone directly into the CDS unit.
Aeration was again increased on 01/17/07 at the influent to keep bacteria from increasing in the vault along with ozone treatment. Aeration was also added on 01/17/07 at the effluent part of the vault.
The constant increase in ozone and aeration is starting to show positive results in the reduction of bacteria levels, as well as some metals and having a strong positive impact down steam of North Creek specifically at the exit to North Creek and at the 75' in creek/pond area.
Despite the numerous inlet contributions that are captured in the system after the treatment point, the ozone system continues to eliminate bacteria counts after treatment. This is due to the continue conversion of ozone back to oxygen as it travels down the pipe to exit into North Creek, also decrease in temperature and increase in oxygen and bacteria food elimination.
**Ozone**: Tests for ozone are conducted on influent and effluent water on a daily basis at all testing sites in order to make aeration and ozone adjustments. These included prior to entering the CDS vault, exit to North Creek and 75' down stream. Very small levels of ozone are being detected downstream of treatment in North Creek.
**DO**: the DO is in compliance with Ocean/Basin Plan criteria at all three locations. DO general increases as the water is introduced to the aeration and ozone system. This

increase in oxygen has had a noticeable impact on new plant and animal life in North Creek. Oxygen also has a positive impact on the water temperature critical to habitat life. See photos below.

**Bromide**: Bromide is being tested as it is known that ozone treatment of waters containing bromide can potentially generate bromate or bromines, toxic byproducts of ozonation. Bromide does exist in the influent and decreases slightly downstream.

**Bromate**: A potential concern as a toxic by-product of ozone treatment of waters containing bromide, bromate is tested to ensure that toxic byproducts are not generated using this ozone technology. To date no samples have detected bromate. Bromate will continue to be tested and evaluated as the ozone dosage is increased to treat bacteria to standards.

**Bromine**: A potential concern as a toxic by-product of ozone treatment of waters containing bromide, bromine is tested to ensure that toxic byproducts are not generated using this ozone technology. AquaCheck, a pool test kit is used to test for Total Bromine. This test kit also tests for Total Hardness Caco3, Alkalinity, and pH. Some limitations for this kit are as follows Caco3 over 1,000 may compromise the test results. Bromine has not been detected to date.

**Bacteria (Total Coliform, Fecal Coliform, and Enterococcus)**: In general, all three indicator bacteria appear to decrease with treatment, although the downstream site may show an increase. This could be due the closed pond situation that exists at this time, which produces a stagnant area at testing site #4 (75' downstream). The stagnant area appears to produce a higher bacteria count and a higher oxygen demand. This area also has a lot of fish and birds. As the project continues, the ozone dosage will be adjusted and monitored so that the effectiveness can be further assessed. The goal is to treat the urban runoff to bacteria levels which meet the AB411 standards (Total Coliform: 10,000 CFU/100 ml, Fecal Coliform: 400 CFU/100ml and Enterococcus: 104 CFU/100ml).

The Vault level sampling point was placed right after treatment to evaluate the potential increase of urban run off including bacteria, metals sediments after vault exit but before the "Exit to North Creek". There are numerous inputs after ozone treatment and before Exit to North Creek. Adjustments were made to compensate for any potential after treatment runoff. So far the results are positive.

This reporting period does show promise of this technology, as we have finally begun to see bacteria levels that meet or are very close to the standards after treatment.

**Metals (nickel, copper, zinc and cadmium):** Historically, these metals are of concern in this watershed, and it is thought that metal contaminant reduction may occur as a result of ozone treatment via adsorption and settling. From the data, there appears to be a decrease of metals in the treated water. Data will continue to be collected and evaluated. Travel time is not accounted for. The source of the metals has not been determined at this time. Similar concerns are noted in other watersheds, however sources have not been identified through investigations.

Metals have shown consistent reductions via adsorption and settling. Ozone appears to be particularly effective at removing copper, as it has been repeatedly non-detect at all downstream locations (detection limit: 24_L, which is below Ocean/Basin Plan criteria). Nickel is thought to be an ozone compatible metal, so the reductions may not be as quite pronounced; however reduction does occur.

**Visual Observation of Natural Creek vegetation & Aquatic Life.** There is a

noticeable elimination of odor and an increase in vegetation growth from the exit point down to the pond area of North Creek. New plant life, including creek grass and algae, and fish life has noticeably increased. This new growth of vegetation and increase in fish life might be do to the increase of oxygen from the conversion of ozone back to oxygen and reduction of urban run off contaminants from the CDS vault to the exit point. Ducks, turtles and nesting birds have found habitat at North Creek. An increase in water clarity of North Creek has been observed. Also new plant roots are now clearly seen in the creek area where none were observed before. The increase in creek grass as well as other creek plant life will continue to draw new wild life to the area. More and more birds, ducks are being seen in the area do to the new plant life and fresh water that is available to wild life to drink. See photos below.

North Creek is becoming a favorite fresh water drinking spot to new and increasing wild life.

Several member of the public have told Robert in passing that North Creek isn't "Polio Pond" anymore.

**Turtle in North Creek**

**Ducks in North Creek**

**Before Treatment Began (March 2006) After Treatment Began (Jan/Feb 2007)**

**Before Treatment Began (March 2006) After Treatment Began (Jan/Feb 2007)**

**Before Treatment Began (March 2006) After Treatment Began (Jan/Feb 2007)**

**Project Summary:**

Per the data and the photos shown above, it appears that bacteria is beginning to be reduced to levels at or very close to Ocean Plan standards. Metals are also being reduced.

The photos above show an increase in wildlife numbers, activity and diversity, increase in plant life and water clarity.

**Notes:**

As the pilot project is designed, the ozone dosage will be continually adjusted in small increments until the data demonstrates treatment of the urban runoff of bacteria to AB411 standards, without generating any byproducts of concern, specifically bromate.

All weekly grab samples are submitted to Sierra Laboratories for laboratory analyses. Samples are collected by Robert Stone who was trained by Associated Laboratory personnel with oversight by Lisa Zawaski. Sierra Laboratories is certified by Department of Health Services (DOHS) ELAP No. 2320. In addition, Sierra is an approved industrial wastewater sampling and testing laboratory by the Los Angeles County Sanitation District, ID Number 10209, Orange County Sanitation District and South East Regional Reclamation Authority

(S.E.R.R.A.) Quantum Ozone has conducted the ozone, temperature, dissolved oxygen and
bromine tests.
All data conforms with a project Quality Assurance Project Plan.
**Copies to:** Orange County, Richard Rozelle

# ATTACHMENT I - North Creek Ozone Treatment Demonstration

**Temp (oC)**
**pH**
**Ozone**
**Application**
**Rate (g/Nms/hr)**
**Regular Air**
**(scf), air pump**
**% DO saturation**
**Total Coliform**
**Fecal Coliform**
**Enterococcus**
**Nickel**
**Copper**
**Zinc**
**Cadmium**
Criterion 1 **OC Tolerance Level (as of Oct '06) 7.2 330000 106000 55000 88 15 75 9**
Criterion 2 Ocean/Basin Plan Objective **6.5-9.0 5.0 10000 400 104 50 30 200 10**
Criterion 3 CTR Acute Criterion **1513 50 379 19**
Criterion 4 CTR Chronic Criterion **168 29 382 6**
Criterion 5 $LC_{50}$ for Toxicity Test Organism
Criterion 6 7.5-7.9
5600-
23000 190-1120 <9-4700 64-780 4-120 84-690 6.1-150
10/27/2006 21.3 7.90 10.5 90 na 6.25 70.04 4.3 na ND **77000** 2000 11000 410 200 770 93 2070 re-initiate project on 10/25/06
11/3/2006 19.5 7.50 10.0 90 na 7.10 77.1 4.3 na ND **41000** 2400 6900 750 420 2700 220 1960 Ozone reduced pending creek/pond decision
11/10/2006 20 7.14 6.2 90 na 9.7 107.0 5.5 na ND **100000** 8600 23000 910 250 2400 250 2890 First flush week
11/17/2006 21 7.30 5.5 90 na 5.0 65.0 6.2 na ND **220000** 33000 11000 820 210 1500 200 2740 Ozone reduced pending creek/pond decision
11/21/2006 20.1 7.50 5.4 90 na 8.1 87.6 6.3 na ND **14000** 600 400 740 210 1800 230 2740 Heavy urban run off or flush day
11/29/2006 20 7.12 5.0 180 na 6.5 71.5 6.0 na ND **12000** 7000 29000 690 39 760 160 4960 Aeration was increased
12/6/2006 18.5 7.40 6.0 180 na 7.8 86.5 5.6 na ND **38000** 2000 15000 530 N/D 260 14 2630 heavy urban run off, possible hydrant or pipe flushing
12/12/2006 17.5 7.40 7.0 180 na 7.2 82.1 5.1 na ND **150000** 16000 43000 520 92 700 110 2820 Rained last night, flush
12/20/2006 17.6 7.50 8.0 180 na 6.7 69.8 4.2 na ND **320000** 220000 120000 390 36 320 51 2460
12/27/2006 17.1 7.40 9.0 180 na 6.4 66.4 4.7 na ND **22000** 5000 6000 480 29 420 91 2720 Rained last night, flush.
1/4/2007 17.4 7.50 10.0 270 na 6.7 70.0 5.6 na ND **21000** 1800 32000 870 100 1100 150 2810 Aeration increased, back to pond status
1/11/2007 17.1 7.4 10.5 270 na 7.1 74.7 4.4 na ND **130000** 15000 6000 530 49 570 80 2760 Flush
1/17/2007 16.1 7.4 11.0 360 na 7.3 74.3 5.9 na ND **40000** 1300 7000 660 40 750 170 2760 Aeration increased, back to creek status
1/24/2007 16.6 7.50 11.5 360 na 6.8 70.1 na ND **38000** 1200 5700 680 100 1200 170 2480
12/6/2006 20.4 7.50 6.0 180 na 13.1 190.0 4.3 ND ND **28000** 1000 1100 430 N/D 230 68 2280 Pipes were flushed.
12/12/2006 16.8 7.50 7.0 180 na 8.7 88.1 5.0 ND ND **50000** 5000 5000 540 N/D 350 100 2650 Rained last night, flush
12/20/2006 15.5 7.40 8.0 180 na 8.6 86.3 4.6 ND ND **120000** 41000 23000 460 27 320 89 2300 Maintenance was done on CDS 12/18
12/27/2206 15.4 7.40 9.0 270 na 9.5 95.3 2.0 ND ND **35000** 13000 12000 200 N/D 230 40 2600 Rained last night, flush, air increased
1/4/2007 16.5 7.40 10.0 270 na 12.6 135.4 5.4 ND ND 3000 300 500 570 N/D 370 110 2740 Water level, aeration increased at CDS unit
1/11/2007 16.6 7.50 10.5 270 na 14.8 152.3 4.7 ND ND **20000** 3000 2000 520 N/D 320 99 2680 Flush
1/17/2007 14.7 7.60 11.0 360 na 11.8 116.2 4.7 ND ND 7000 2000 600 500 N/D 360 95 2580 Aeration was increased,creek
1/24/2007 15 7.40 11.5 360 na 15.4 154.0 ND 2000 500 1000 450 N/D 320 88 2360 Running creek status
10/27/2006 19.3 7.60 10.5 90 0.48 15.75 167 3.8 ND ND **17000** 70 2600 290 N/D 170 54 1620
11/3/2006 19.5 7.60 10.0 90 0.62 18 200.00 3.5 ND ND **13000** 1600 3100 340 N/D 200 61 1700 Increase aquatic life, 100s of fish
11/10/2006 19.6 7.24 6.2 90 0.28 17.1 186 3.9 ND ND **15000** 3300 4900 410 N/D 250 76 1550 First week flush
11/17/2006 19.7 7.40 5.5 90 1.00 10.4 119.7 4.1 ND ND **54000** 5300 3400 480 N/D 310 84 2460 Adult rat floating in exit pipe area.
11/21/2006 19.5 7.60 5.4 90 1.00 16.0 175.0 4.7 ND ND **71000** 3500 1000 470 N/D 290 89 2380 Baby rat floating in exit pipe area.
11/29/2006 19.4 7.48 5.0 180 1.00 12.7 138.1 4.8 ND ND **18000** 2500 4300 500 N/D 310 92 3270 Aeration was increased
12/6/2006 17.8 7.50 6.0 180 1.68 14.7 155.1 4.8 ND ND **16000** 600 1500 500 N/D 250 59 2190 heavy urban run off, possible hydrant or pipe flushing
12/12/2006 15.9 7.70 7.0 180 1.63 7.3 76.1 4.6 ND ND 4000 1000 3000 490 N/D 300 88 2300 Rained last night, flush
12/20/2006 15.3 7.50 8.0 180 1.65 6.7 66.2 4.2 ND ND **55000** 17000 4000 420 N/D 220 78 2160 Maintenance was done on CDS 12/18
12/27/2006 15.1 7.60 9.0 270 0.15 10.6 105.1 1.2 ND ND **46000** 12000 19000 120 N/D 150 21 2480 Rained last night, flush, air increased
1/4/2007 16.4 7.50 10.0 270 0.07 11.6 118.3 5.5 ND ND 2000 500 1000 610 N/D 320 110 2630 Note:Test site is 300' from treatment area
1/11/2007 16.2 7.50 10.5 270 0.00 14.5 147.6 4.5 ND ND **15000** 2000 700 530 N/D 310 99 2390 Note: 12 re-entry storm drains after treatment
1/17/2007 14 7.50 11.0 360 0.01 18.5 180.0 4.9 ND ND 2000 300 100 460 N/D 270 77 2520 Plant and wild life increase
1/24/2007 14.8 7.50 11.5 360 0.06 14.0 138.4 ND 600 300 180 420 N/D 260 80 2180 Increase water clarity, no odor
10/27/2006 19 7.50 10.5 90 0.10 12.1 130.2 N/D ND ND **11000** 600 400 340 N/D 180 62 1840
11/3/2006 19.4 7.60 10.0 90 0.78 13.14 148.70 3.8 ND ND **10000** 100 2400 360 N/D 210 65 1780 Turtles at 4' deep, water clear
11/10/2006 18.8 7.20 6.2 90 0.28 12.3 132.8 4.2 ND ND **19000** 700 2700 40 N/D 22 73 1800 First week flush
11/17/206 18.8 7.50 5.5 90 1.00 9.9 107.9 N/D ND ND **14000** 200 2200 390 N/D 240 66 2060 Increase aquatic life, 100s of fish
11/21/2006 18.9 7.60 5.4 90 1.00 11.6 125.0 4.2 ND ND **170000** 8800 6000 400 N/D 230 74 2220 Heavy urban run off or flush day
11/29/2006 18.7 7.39 5.0 180 0.86 8.3 94.6 4.9 ND ND **31000** 1900 3300 500 N/D 300 92 4640 Aeration was increased
12/6/2006 16.8 7.40 6.0 180 1.68 12.5 129.0 4.2 ND ND **120000** 3600 300 390 N/D 230 64 2040 heavy urban run off, possible hydrant or pipe flushing
12/12/2206 13.2 7.60 7.0 180 1.68 6.8 69.3 4.7 ND ND **21000** 3000 7000 480 N/D 280 83 2190 Rained last night, flush
12/20/2006 12.8 7.50 8.0 180 1.65 6.1 57.4 4.3 ND ND **61000** 32000 9000 430 N/D 250 79 2040 Maintenance was done on CDS 12/18
12/27/2206 13.7 7.50 9.0 270 0.12 8.9 85.6 ND ND ND **38000** 2000 23000 23 N/D 89 N/D 2380 Rained last night, flush, air increased
1/4/2007 16 7.40 10.0 270 0.11 11.9 120.3 5.2 ND ND 2000 1000 2000 550 N/D 310 100 2560 Note: test site is 375' from treatment area
1/11/2007 16.1 7.60 10.5 270 0.01 12.8 129.9 5.0 ND ND 8000 800 400 500 N/D 290 94 2280 Note: State parking lot re-entry 75' from test site
1/17/2007 13.9 7.60 11.0 360 0.02 16.5 158.4 4.8 ND ND 1000 70 700 460 N/D 270 77 2370 Plant and wild life increase.
1/24/2007 14.8 7.60 11.5 360 0.07 13.2 130.5 ND 700 60 200 410 N/D 250 77 2120 Increase water clarity, no odor
The LC50 ranged from 30 ppm bromate for Pacific oyster, Crassostrea gigas, larva to several hundred ppm for fish, shrimp and clams."9
Note that Basin Plan Objectives, EPA Criteria, and CTR criteria apply to receiving waters only.
**Notes**
**Dissolved Metals**
**Total Hardness (as**
**CaCo3) (mg/L)**
**_g/L**
**Bromide (mg/L)**
**Bromine**
**Bromate (mg/L)**
**Bacteria**
**#1a - Vault - directly after treatment**
Historical Range (12/04 - 4/05)
**Date**
**#1 - Upstream (Untreated)**
**#2 Discharge to North Creek (after treatment)**
**#3 After Treatment - 75' Downstream in Creek**
**Ozone (mg/PL)**
**DO (ppm)**