



NOVATO SANITARY DISTRICT

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September 21, 2012

Bruce Wolfe
Executive Officer
Regional Water Quality Control Board, San Francisco Bay Region
Elihu M. Harris State Office Building
1515 Clay Street, Oakland, 94612

Subject: Proposed Settlement Agreement and Stipulation for Entry of Order in the
matter of Administrative Civil Liability Complaint No. R2-2010-0102

Dear Mr. Wolfe:

Novato Sanitary District ("NSD") submits this Summary in support of the above-referenced Settlement Agreement.

I. Introduction

In March 2007, NSD cleaned a secondary digester at its Novato wastewater treatment plant in preparation for the construction of a new primary digester. The digester cleaning impacted the operation of the plant, and an investigation by the U.S. Environmental Protection Agency ("EPA") ensued. In May 2009, the EPA executed a search warrant at NSD's Novato plant and the federal investigation became public. Since that time, NSD and its managers and staff have cooperated fully with federal, state and local environmental agencies and have sought themselves to uncover the truth about the March 2007 event. As with many environmental incidents, the answers are technical and complex, and do not lend themselves to sweeping generalizations. That said, NSD has determined that there is no credible evidence of wrongdoing or harm to the environment in connection with the March 2007 event.

In September 2010, the EPA and the U.S. Attorney's Office (San Francisco) closed their investigation and referred the matter to the State Water Resources Control Board ("SWRCB") and San Francisco Regional Water Quality Control Board ("RWQCB") for investigation. On September 15, 2010, the RWQCB issued Complaint No. R2-2010-0102 ("Complaint"), which sought to impose administrative civil liability for a variety of alleged violations occurring between September 2007 and February 2010. In May 2012, NSD and the RWQCB agreed to resolve the matters at issue in the Complaint by entering into a settlement under which NSD would pay a total of \$344,000 in administrative civil penalties. This amount includes a payment of \$3,000, plus staff costs, for the March 2007

event. This Summary is submitted in support of that resolution, and to thoroughly explain the events of March 2007 to the public.

II. Development and Organization of the Summary

The Summary presents the technical, scientific and legal basis for the proposed Settlement Agreement negotiated with the RWQCB.¹ It was prepared with the assistance of NSD's outside technical consultants, Dr. David Jenkins and Dr. Denny Parker, whom NSD retained to independently analyze the March 2007 event.

Dr. Jenkins is a Professor Emeritus at the University of California, Berkeley in the Department of Civil and Environmental Engineering. He has over forty years of experience in research and international professional practice relating to water, wastewater chemistry and wastewater treatment. He was elected to the National Academy of Engineering in 2001, and has received numerous awards for his research from the Water Environment Federation and the International Water Association.

Dr. Parker is a Senior Vice President at Brown and Caldwell and the firm's Director of Technology. He is a registered Professional Engineer, with a B.S. in Civil Engineering, a M.S. in Environmental Engineering, and a Ph.D. in Engineering, all from the University of California, Berkeley. He has over forty years of experience in wastewater planning and process design. Dr. Parker has received multiple national awards for his wastewater process engineering work, and was elected to the National Academy of Engineering in 2004.

Dr. Jenkins and Dr. Parker have each prepared technical letters to present their engineering and technical opinions, which in turn support the information presented in this Summary. See Exhibit 1 (Dr. Jenkins' Technical Letter) and Exhibit 2 (Dr. Parker's Technical Letter).

Finally, this Summary responds to comments received by the RWQCB from James Lynch dated June 21, 2012 regarding the proposed Settlement Agreement.

III. The March 2007 Digester Event

A. The Secondary Digester Cleaning Process

From September 2001 through July 2012, NSD was engaged in the design, permitting and construction of a new, state-of-the-art wastewater treatment plant at the site of NSD's existing Novato treatment plant. The effort involved major design and construction activities which interfaced with existing plant operations.

¹ The proposed Settlement Agreement addresses events and compliance issues other than the March 2007 event, but those other events and issues are not the subject of any comments from the public. Thus, this Summary focuses on the March 2007 event, for which a public comment has been received.

As part of the construction project, the secondary digester had to be cleaned prior to its demolition (which was necessary to make room for a new primary digester). The secondary digester had not received sludge feed for many years; in fact, the mixing and heating equipment for the digester was demolished in about 2003. Thus, the material inside the secondary digester in 2007 contained primarily “inert” material due to the long storage time of its contents.

The original function of the Novato secondary digester was to facilitate the separation of solids and liquids before the eventual return of the “supernatant” (the liquid) to the plant’s headworks for treatment. Return of anaerobically digested supernatant was standard practice in older plants (such as NSD’s). In fact, two secondary treatment methods, the *Hatfield Process* and the *Krauss Process*, use anaerobically digested sludge (or digested sludge supernatant) recycled to the activated sludge process. See Exhibit 1, at p. 3-4 for a more complete discussion and diagrams of these processes.

Digester cleaning can be done using a variety of methods. There is no industry standard practice for digester cleaning, nor is there is any specific guidance regarding digester cleaning in the Water Environment Federation’s Manuals of Practice. A survey of digester cleaning contractors conducted by Brown and Caldwell revealed that digester cleaning methods vary and are tailored to individual plants. See Exhibit 3; see also Exhibit 2, at p. 5, for a more complete discussion of the survey. The Brown and Caldwell survey also confirmed that although there is no standard method for digester cleaning, many of the plants did return screened digester contents to the headworks for treatment. *Id.*

NSD hired a well-respected and experienced digester cleaning company, Wastewater Solids Management (“WWSM”), to clean the secondary digester. Based on good faith engineering analysis and experience, NSD selected the following cleaning methodology:

Step 1: Fluidization of Solid Contents in Digester: The contents of the inactive secondary digester were too dry to pump out, so chlorinated secondary effluent was pumped from the chlorine contact basin using a wash water pump. The effluent was sprayed into the top of the digester to fluidize the solids and move them to the suction hose of a pump placed inside the digester. See Exhibit 4.

Step 2: Fluidized Contents Pumped and Screened: The fluidized contents of the secondary digester were then pumped through a ¾ inch screen. See Exhibit 5.

Step 3: Screenings were deposited in dumpsters and hauled to a landfill: Sixteen dumpsters of screenings were hauled to the landfill. See Exhibit 6. NSD did not have to pay for the hauling and disposal of screenings because NSD is included in the local garbage franchise; thus, there was no economic motivation to minimize the volume of the material hauled away, and no evidence that NSD did so.

Step 4: Digester Fluid Screened, and Only Diluted, Inert Contents Sent to Headworks: Treatment plant influent sampling and analysis undertaken throughout the digester cleaning process showed that only inert suspended solids were sent back to the treatment plant headworks. Influent samples show that Total Suspended Solids increased, while influent Biological Oxygen Demand loading did not change significantly during the period that the inert digester contents were being returned to the headworks. *See Exhibit 7.*

WWSM implemented this cleaning methodology on March 5, 2007. The cleaning continued to March 18, 2007, when NSD shut down the cleaning due to unanticipated impacts on the plant.

B. Impacts on the Plant

The digester cleaning caused unanticipated impacts on the plant. The plant impacts were initiated by a physical problem within the primary digester, a fixed-cover (closed) digester with mixing and supernatant draw-offs below the surface.²

At the Novato plant, digested sludge is pumped from the primary digester to offsite sludge lagoons for storage and conditioning. During the initial phases of the secondary digester cleaning, the primary digester was functioning properly. *See Exhibit 8.a.* During the cleaning process, the increased flow of solids from the thickener to the primary digester caused the thickness of the surface layer within the primary digester to increase. This, in turn, pushed “rags” from the surface layer inside the primary digester into the mixer and supernatant draw-offs. *See Exhibit 8.b.* Rags include all sorts of items that are not degradable but are put into the sewer system by NSD customers. In 2007, the Novato plant did not have a screening mechanism for rags, so rags entered the plant and were only partially ground up at the headworks. Periodically, rags had to be manually removed from clogged equipment and pumps. At the time the secondary digester cleaning was planned and conducted, NSD engineers did not know the extent of the rag accumulation inside the closed primary digester, because the digester was not open to view and it was functioning properly, as were associated pumps and lines.

The flow from the secondary digester cleaning operation mobilized the rags within the pre-existing surface layer inside the primary digester, and the rags then entered lines used for mixing and sludge draw-off. *See Exhibit 8.c.* The rags plugged lines, pumps and mixers. Eventually, the primary digester overflowed due to the clogging, and NSD became fully aware of the extent of the impacts. NSD then shut down WWSM’s cleaning activities. Nonetheless, solids appeared on the surface of the chlorine contact

² *See Exhibit 2, Dr. Parker’s Technical Letter, for a more detailed description of Dr. Parker’s forensic analysis of the plant impacts and, specifically, the impacts on the primary digester. This section of the Summary is not intended to provide the level of technical and engineering detail provided by Dr. Parker’s Technical Letter, but rather to provide a more general overview of the plant impacts for non-engineers and members of the public.*

basin. The solids seen on the surface of the chlorine contact basin did not come from the overflow of the primary digester or from the contents of the secondary digester, but instead came from “foam” that was generated in the activated sludge process. This is known because: (1) the overflows from the primary digester were sent back to the plant headworks via the plant’s storm water inlets (which all lead back to the headworks), and never breached the curb of the chlorine contact basin, and (2) the fluid from the cleaning of the secondary digester was inert and was also sent to the headworks. This conclusion is consistent with staff observations of foaming in the activated sludge units.

These impacts could not have been predicted by NSD plant managers, engineers or operators. In fact, the technical and scientific bases for the plant impacts were sufficiently complicated that even *after* the incident occurred, it took several weeks of investigation and analysis to identify and understand the impacts and what caused them. Ultimately, Dr. Parker relied on his advanced training, his extensive experience with wastewater treatment plants, and the scientific and factual information available after the incident to reach these conclusions.

C. Photographs of the Chlorine Contact Basin and Effluent Storage Pond

Photographs were taken of the chlorine contact basin and effluent storage pond during the March 2007 digester event, on March 17 or 18, 2007. *See Exhibits 9 and 10.*³ These photographs show floating solids on the surface of the chlorine contact basin and on some portions of the surface of the effluent storage pond, but not within the forebay of the effluent pumps.

These photographs have minimal value for determining the quality of the plant’s effluent on March 17 and 18, 2009. This is because the photographs only show the surface of the water in the chlorine contact basin and effluent storage pond, and both the basin and the pond have subsurface draw-offs. This means that even if solids accumulate on the surface of the basin and pond, solids will not enter the effluent because the effluent is drawn from *beneath* the surface of the water in both the basin and the pond. *See Exhibit 11.*

To demonstrate this point, NSD gathered photographs taken on other days when the plant was impacted with floating surface solids. On these other days, samples confirmed that the effluent results were compliant with applicable permit levels.

First, photographs taken on September 25, 2009 by an NSD employee at approximately 9:35 a.m. show impacts to the effluent storage pond similar to the impacts in March 2007. *See Exhibit 12.* Effluent samples were taken from the sample spigot (formerly

³ NSD has been told that the photographs were taken by former NSD operator, James Lynch.

referred to as E-002 in Board Order No. R2-2004-0093) on that same date. TSS results were 10 mg/L, well within permit limits.⁴

Second, photographs taken on October 15, 2009 by an NSD employee at approximately 5:30 p.m. show similar impacts to the chlorine contact basin. *See Exhibit 13*. Effluent samples were taken from the sample spigot on that same date. TSS results were 15 mg/L, also well within permit limits.

D. Sampling Data from March 2007

NSD's regular sampling schedule for TSS involves collecting samples on Wednesday, Thursday and Friday of each week. NSD did not vary from this schedule during the digester cleaning event. TSS samples were taken on Wednesday, March 14; Thursday, March 15; and Friday, March 16; and on Wednesday, March 21; Thursday, March 22; and Friday, March 23, 2007. These samples were compliant with applicable effluent limitations. *See Exhibit 14*.

Bacteria samples taken on March 12, 13 and 15 and March 21-23 were also within permit limits. *See Exhibit 15a. and b.*

NSD normally discharges to the Bay from November 1 to April 30 (the wet season), and to its reclamation ponds from May 1 to October 31 (the dry season). *See Board Order No. R2-2004-0093 at Section III.A., and Board Order No. R2-1992-0065, respectively.*⁵ This allows NSD to reclaim the treated water during the dry season; the reclaimed water is then used for pasture irrigation. *See generally Board Order No. R2-1992-0065*. When NSD discharges its treated water to the Bay, it tests for *Enterococcus*.⁶ *See Board Order No. R2-2004-0093 at Section B.3.a.* When NSD discharges to its reclamation ponds, it tests for Total Coliform. *See Board Order No. R2-1992-0065 at Section B.4.*

On March 19, 2007, NSD switched from discharging to the Bay to discharging to its reclamation ponds, in an abundance of caution based on the observed plant impacts. NSD did not switch to the reclamation discharge earlier because the data had shown that, up to that point, the plant's discharge was in compliance with its permit limitations. On March 19, however, after taking numerous steps to respond to the impacts, NSD decided to exercise caution and discharge to its reclamation ponds. NSD had a Total Coliform violation on March 22, three days after NSD stopped discharging to San Pablo Bay and began discharging to its reclamation ponds. The Total Coliform violation of March 22 was reported in NSD's monthly self-monitoring report for March 2007.

⁴ NSD's permit sets the plant's TSS effluent limit at no greater than an average of 45 mg/L per week; a 10 or 15 mg/L effluent value would not cause a violation of this permit limit.

⁵ Permit references are to NSD permits in effect in 2007.

⁶ Under Board Order No. R2-2010-0074 (effective as of July 1, 2010), NSD tests for both *Enterococcus* and Fecal Coliform during Bay discharge.

In March 2007, NSD conducted continuous bioassay tests to measure the toxicity levels of its effluent on living organisms. The tests measured toxicity on fish (fathead minnow) and water fleas (*Ceriodaphnia dubia*). NSD has discretion regarding when to conduct this testing. It was coincidentally scheduled to be conducted during the same time as the digester cleaning, and once begun, it was not stopped, notwithstanding the observed plant impacts. Specifically, the fathead minnow samples were taken on a daily basis from Monday, March 12 through Friday, March 16. The water flea samples were taken on a daily basis from Wednesday, March 14 through Sunday, March 18. The acute toxicity testing with the fathead minnow showed 100 % survival and was compliant. The water flea test results were typical of plant effluent at other times (when no digester cleaning was being done) and were not at a level that would trigger additional concern or monitoring following permit specified procedures.

Thus, NSD's effluent sampling data from March 2007 indicate that the plant impacts from the digester cleaning did not significantly impact the quality of the plant's effluent while NSD was discharging to San Pablo Bay, in terms of solids, bacteria or toxicity.

E. Response to Plant Impacts

NSD employees and outside contractors took numerous actions to address the impacts on the plant. These response actions included:

- On March 18, 2007, NSD ordered WWSM to cease the digester cleaning operations
- On March 17-19, NSD increased the chlorine dosage in the chlorine contact basin
- NSD ordered its Collection Department to pump solids from the transfer sump at the primary digester and haul the pumped solids to the off-site sludge lagoons
- On March 17-21, NSD hired Roy's Sewage Service to pump excess solids from the Primary Clarifier and haul the pumped solids to the off-site sludge lagoons
- NSD rented a Baker Tank to store excess solids pumped from various units
- On March 19-30, NSD hired DenBeste Trucking to pump water from the Equalization Basin, which had begun to receive the fluidized contents of the secondary digester, and to haul the pumped water to the off-site sludge lagoons
- NSD used its Gravity filter (a tertiary treatment method) to further treat secondary effluent prior to its discharge into the chlorine contact basin
- NSD ordered its operators to work overtime to clean "ragged" pumps and lines and respond to other plant impacts

- On March 19, NSD directed its discharge to the reclamation ponds rather than to San Pablo Bay

These actions not only demonstrate NSD's commitment to environmental protection and regulatory compliance, but also completely belie any notion of a tendency toward secrecy or clandestine decision-making. These actions were done openly, during regular operating hours, with both employees and outside contractors present and highly engaged.

IV. NSD's Response to Specific Allegations in Letter from James Lynch

On June 21, 2012, James Lynch, a former NSD plant operator, submitted a letter in response to the proposed Settlement Agreement. He made the following four allegations about the March 2007 digester event:

- 1) "the effluent ponds [were] full of sludge" as shown by the photographs taken during the weekend of March 17-18;
- 2) "the effluent [that was discharged] to the bay was sludge, not treated wastewater;"
- 3) the effluent discharged constituted "intentional dumping;" and
- 4) NSD does not take seriously its responsibility to keep the State's waters clean.

Mr. Lynch's allegations are without merit. With respect to the first, second, and third allegations that sludge was in the effluent storage pond and was discharged or intentionally dumped, the photographs upon which Mr. Lynch bases those allegations show only the *surface* of the effluent storage pond and are not reliable to draw conclusions about the quality of the *effluent* that was discharged. See Section III. C., above, and Exhibits 1 and 2. As shown by the photographs and sampling results from September and October 2009, TSS results can be well within permit limits even when floating surface solids are present. See Exhibits 12 and 13.

Not only do Mr. Lynch's allegations lack evidentiary credibility, they are also demonstrably false. The effluent that was discharged was, in fact, "treated" in the manner that all effluent from the plant is treated. In addition, the chlorine dosage was increased and a *tertiary* treatment method was used (the Gravity filter). See Section III. E., above. The effluent was not "sludge" as shown by the sampling results. The only documented permit exceedance was a Total Coliform sample taken *after* the plant's effluent discharge was directed to NSD's reclamation ponds (not the San Pablo Bay), and all other measurements were within permit limits and typical of plant effluent at other times. See Section III. D., above.

With respect to the fourth allegation, that NSD does not take seriously its responsibility to keep the State's waters clean, nothing could be further from the truth. NSD directed its

employees and outside contractors to take numerous actions to address the impacts on the plant from the March 2007 digester event to prevent discharging effluent above permit limits. *See* Section III. E., above. Moreover, NSD's primary focus for the last several years has been the design, construction and operation of a new state-of-the-art wastewater treatment plant to serve the growing needs of northern Marin County. *See* Section V., below.

V. The New Novato Treatment Plant

The secondary digester cleaning was one small part of a ten-year, \$154 million dollar capital project to provide state-of-the-art treatment, pumping, and collection system facilities for the Novato community.⁷

On October 26, 2010, NSD officially dedicated its new Novato treatment plant. *See Exhibit 16* (photograph of new plant). The new Novato plant has many advanced features, such as ultraviolet treatment of treated water, which eliminates the need for traditional chlorination in a chlorine contact basin. The plant also has built-in redundancy, with two primary clarifiers, two thickeners, two digesters, two activated sludge basins, two secondary clarifiers and multiple UV disinfection channels. The new plant also has a screening system that removes rags from the influent, which increases reliability and reduces clogging and jamming of pumps and other mechanical equipment. Finally, the plant is designed to respond to future population growth, with space reserved for a third digester and an additional secondary clarifier, when and if needed. The compliance record of the new plant is exemplary. *See Exhibit 17.*

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⁷ It has been alleged that NSD's selection of the secondary digester cleaning methodology was done to save money, which is not accurate. The decision was made based on engineering knowledge and expertise. The absurdity of the allegation is even more apparent when one compares the cost of the digester cleaning (regardless of the methodology selected) to the money spent by NSD on the new plant. *See Exhibit 2, Page 6, Figure 4.*

Bruce Wolfe
Regional Water Quality Control Board, San Francisco Bay Region
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NSD appreciates the opportunity to submit this information in support of the Settlement Agreement and Stipulation for Entry of Order in the matter of Administrative Civil Liability Complaint No. R2-2010-0102. If you have any questions or require additional information, please contact Beverly James or Sandeep Karkal of NSD at (415) 892-1694.

Sincerely,


for Beverly James
District Engineer


Michael Di Giorgio
President, NSD Board of Directors

cc: Brian Thompson