implementation to achieve WQOs. The Basin Plan was adopted by the Regional Water Board and approved by the State Water Board, USEPA, and the Office of Administrative Law (OAL), as required. Requirements of this Order implement the Basin Plan.

The Basin Plan does not specifically identify present and potential beneficial uses for Moffett Channel, which is a narrow inlet within South San Francisco Bay. It does identify beneficial uses for South San Francisco Bay, to which Moffett Channel is tributary via Guadalupe Slough. The Basin Plan states that the beneficial uses of any specifically identified water body generally apply to all its tributaries (Basin Plan tributary rule). Table F-7 identifies existing and potential beneficial uses of South San Francisco Bay. These beneficial uses also apply to Moffett Channel in accordance with the Basin Plan tributary rule.

State Water Board Resolution No. 88-63 establishes State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply (MUN). Monitoring data at Guadalupe Slough station C-1-3 (about 7,000 feet downstream of the discharge outfall) ranged from 220 mg/L to 26,800 mg/L (with an average of above 11,000 mg/L), thereby meeting an exception to Resolution No. 88-63. The MUN designation is therefore not applicable to Moffett Channel.

Although South San Francisco Bay is listed to support shellfish harvesting, according to a City of San Jose report, *Alternative Effluent Bacteriological Standards Pilot Study*, 2003, representatives from the California Department of Fish and Game have stated that no shellfish harvesting occurs in the San Francisco Bay south of Foster City. In addition, the Shellfish Harvesting (SHELL) beneficial use likely does not exist in Moffett Channel or Guadalupe Slough. Both water bodies are characterized with soft mudflats and subtidal marsh, which are not suitable shellfish habitats. The Discharger's 2003 beneficial use survey of Moffett Channel and Guadalupe Slough found no attempts by the public at shellfish harvesting over a period of 18 months.

Table F-7. Beneficial Uses of South San Francisco Bay

Discharge Point	Receiving Water Name	Beneficial Uses of South San Francisco Bay
001	Moffett Channel (tributary to South San Francisco Bay via Guadalupe Slough)	Industrial Service Supply (IND) Ocean, Commercial, and Sport Fishing (COMM) Shellfish Harvesting (SHELL) Estuarine Habitat (EST) Fish Migration (MIGR) Preservation of Rare and Endangered Species (RARE) Fish Spawning (SPWN) Wildlife Habitat (WILD) Non-contact Water Recreation (REC2) Contact Recreation (REC1) Navigation (NAV)

2. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, and amended it on May 4, 1995, and November 9, 1999. About forty criteria in the NTR applied in California. On May 18, 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on

February 13, 2001. These rules contain water quality criteria (WQC) for priority toxic pollutants, which are applicable to South San Francisco Bay.

3. **State Implementation Policy (SIP).** On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Board in the Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria promulgated by the USEPA through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

4. **Alaska Rule.** On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes [65 Fed. Reg. 24641 (April 27, 2000), codified at 40 CFR 131.21]. Under the revised regulation (also known as the Alaska Rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

5. **Antidegradation Policy.** 40 CFR 131.12 requires that the state WQS include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. The permitted discharge must be consistent with the antidegradation provision of 40 CFR 131.12 and State Water Board Resolution No. 68-16.

6. **Anti-Backsliding Requirements.** 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed.

D. Impaired Water Bodies on CWA 303(d) List

In November 2006, the USEPA approved a revised list of impaired water bodies prepared by the State [the 303(d) list] pursuant to provisions of CWA section 303(d), which requires identification of specific water bodies where it is expected that WQS will not be met after implementation of technology-based effluent limitations on point sources. Moffett Channel and Guadalupe Slough are not identified as impaired waterbodies; however, South San Francisco Bay is listed as an impaired waterbody for chlordane, DDT, dieldrin, dioxin compounds, exotic species, furan compounds, mercury, PCBs and dioxin-like PCBs, and selenium. The SIP

requires final effluent limitations for all 303(d)-listed pollutants to be consistent with total maximum daily loads (TMDLs) and associated waste load allocations (WLAs).

The Regional Water Board plans to adopt TMDLs for pollutants on the 303(d) list in South San Francisco Bay within the next ten years (a TMDL for mercury became effective on February 12, 2008).

TMDLs will establish WLAs for point sources and load allocations (LAs) for non-point sources, and will be established to achieve the WQS for impaired waterbodies. The discharge of mercury from the Plant is regulated by the Regional Water Board Order No. R2-2007-0077, which implements the mercury TMDL and contains monitoring and reporting requirements.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in 40 CFR: section 122.44(a) requires that permits include applicable technology-based limitations and standards; and section 122.44(d) requires that permits include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative WQC to protect the beneficial uses of the receiving water. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established.

Several specific factors affecting the development of limitations and requirements in this Order are discussed as below:

A. Discharge Prohibitions

1. **Discharge Prohibitions III.A (No discharge other than that described in this Order):** This prohibition is the same as in the previous permit and is based on CWC section 13260, which requires filing a Report of Waste Discharge (ROWD) before discharges can occur. Discharges not described in the ROWD, and subsequently in this Order, are prohibited.

2. **Discharge Prohibition III.B (No bypass except as provided for in the conditions stated in Subsections I.G.2 and I.G.4 of Attachment D of this Order):** This prohibition is based on 40 CFR 122.41(m)(4) (see Federal Standard Provisions, section G, Attachment D) and is retained from the previous Order.

3. **Discharge Prohibition III.C (The average dry weather effluent flow shall not exceed 29.5 MGD):** Exceedance of the treatment Plant's average dry weather flow design capacity may result in lowering the reliability of achieving compliance with water quality requirements. This prohibition is meant to ensure effective wastewater treatment by limiting flows to the Plant's design treatment capability. The average dry weather effluent flow is to be determined over three consecutive dry weather months each year and is to include both flows discharged and recycled.

4. **Discharge Prohibition III.D (No sanitary sewer overflows to waters of the United States).** Discharge Prohibition No. 15 from Basin Plan Table 4-1 and the CWA prohibit the

discharge of wastewater to surface waters except as authorized under an NPDES permit. POTWs must achieve secondary treatment, at a minimum, and any more stringent limitations that are necessary to achieve WQS [33 U.S.C. § 1311 (b)(1)(B and C)]. Therefore, a sanitary sewer overflow that results in the discharge of raw sewage, or sewage not meeting secondary treatment requirements, is prohibited under the CWA and the Basin Plan.

B. Exceptions to Basin Plan Prohibitions

1. Basin Plan Discharge Prohibition 1

Discharge prohibition 1 in Table 4-1 of the Basin Plan states that it shall be prohibited to discharge:

> *1. Any wastewater which has particular characteristics of concern to beneficial uses at any point at which the wastewater does not receive a minimum initial dilution of at least 10:1, or into any nontidal water, dead-end slough, similar confined waters, or any immediate tributaries thereof.*

Basin Plan section 4.2 provides for exceptions to this prohibition in the following circumstances:

- An inordinate burden would be placed on the discharger relative to beneficial uses protected and an equivalent level of environmental protection can be achieved by alternate means, such as an alternative discharge site, a higher level of treatment, and/or improved treatment reliability; or

- A discharge is approved as part of a reclamation project; or

- It can be demonstrated that net environmental benefits will be derived as a result of the discharge; or

- A discharge is approved as part of a groundwater clean-up project….

2. History of Granting Exception to Prohibition 1

The treated wastewater discharges from the Sunnyvale, San Jose/Santa Clara, and Palo Alto wastewater treatment plants are discharged to confined waters and do not receive a minimum initial dilution of 10:1. In 1973, these dischargers formed the South Bay Dischargers Authority to jointly consider relocating their outfalls to a location north of the Dumbarton Bridge, but instead, based on studies they conducted between 1981 through 1986, they concluded that their discharges provided a net environmental benefit.

At the same time, the Regional Water Board amended the Basin Plan to establish several new WQOs. Due to the unique hydrodynamic environment of the South Bay, however, the 1986 Basin Plan exempted the South Bay from the new WQOs, instead calling for the development of site-specific objectives (SSOs).

In 1988, the Regional Water Board reissued the Sunnyvale and Palo Alto permits (Order No. 88-176 and Order No. 88-175, respectively), concurring that these discharges provided a net environmental benefit. It therefore granted exceptions to the Basin Plan discharge prohibition

provided that the dischargers would conduct studies addressing salt marsh conversion, development of SSOs and effluent limitations for metals, ammonia removal, and avian botulism control. However, the Regional Water Board concluded that discharges from the San Jose/Santa Clara wastewater treatment plant did not provide a net environmental benefit. Nevertheless, the Regional Water Board found that the discharge could provide a net environmental benefit under specific circumstances, and reissued the NPDES permit (Order No. 89-012) for the San Jose/Santa Clara facility.

Interested parties objected to all three permits and petitioned the State Water Board for review. The State Water Board responded in 1990 through Order No. WQ 90-5. It concluded that all three dischargers had failed to demonstrate a net environmental benefit. Specifically, nutrient loading in South San Francisco Bay was a problem, avian botulism was harming wildlife and estuarine habitat, and metals discharges were potentially contributing to San Francisco Bay impairment.

Through Order No. WQ 90-5, the State Water Board acknowledged that relocation of the discharges north of the Dumbarton Bridge was not economically or environmentally sound. The State Water Board "strongly encouraged" the Regional Water Board and the South Bay Dischargers Authority to pursue wastewater reclamation projects as a means to reduce discharges to San Francisco Bay, and it also concluded that exceptions to the Basin Plan discharge prohibitions could be granted on the basis of "equivalent protection" (i.e., protection equivalent to relocating the discharges to a location north of the Dumbarton Bridge), provided that certain conditions were met. It stated that exceptions could be granted if (a) the discharge permits were to include numeric WQBELs for toxic pollutants, (b) the dischargers (San Jose/Santa Clara and Sunnyvale) were to continue efforts to control avian botulism, and (c) the dischargers (San Jose/Santa Clara in particular) were to properly protect threatened and endangered species. (Attachment I provides a chronological description of the actions taken by the State and Regional Water Boards and the Discharger related to the requirements of Order No. 90-5. The summary also clarifies the origin of some provisions that appear in this Order).

3. Compliance with State Water Board Order No. 90-5

The following is a summary of the Discharger's past and on-going efforts in complying with State Water Board Order No. WQ 90-5, which required (a) numeric WQBELs for toxic pollutants, (b) efforts to control avian botulism, and (c) protection of threatened and endangered species.

(a) **Toxic Pollutants.** This Order contains WQBELs for toxic pollutants with reasonable potential, including copper, nickel, cyanide, dioxin-TEQ, chlorodibromomethane, endrin, and tributyltin. As shown in Table F-4, the Discharger routinely complied with WQBELs in the previous permit. The Discharger will maintain its current performance and monitoring program for both effluent and receiving water to ensure that conditions will not degrade. As discussed in IV.D, below, compliance with all the WQBELs in this Order is expected to be feasible, with the exception of dioxin-TEQ. This Order requires specific measures to allow the Discharger to come into compliance with new dioxin-TEQ limits.

(b) **Avian botulism control**. The Discharger has maintained an avian botulism control program by monitoring Moffett Channel, Guadalupe Slough, the vicinity of the oxidation pond, and South San Francisco Bay for the presence of avian botulism since 1982. Annual avian

botulism monitoring reports submitted by both the Discharger and the San Jose/Santa Clara Water Pollution Control Plant indicate that the most recent botulism outbreak in the South Bay occurred in September 2004. Although the South Bay ecosystem is susceptible to avian botulism outbreaks, when considering the constant wastewater discharge from wastewater treatment plants the cause of these episodic outbreaks seems to lie with other environmental factors.

While treatment plant discharge is unlikely to cause botulism outbreaks, monitoring for and removing dead birds to minimize the potential for an outbreak is an appropriate environmental stewardship program to control the severity and extent of the disease. Because waterfowl are a highly mobile group of birds and are most heavily affected by avian botulism, outbreaks could quickly spread throughout the region if no action were taken. For these reasons, continuing the monitoring program and collecting dead and injured birds on Plant property and areas along Moffett Channel and Guadalupe Slough is a worthwhile public endeavor. This Order requires the Discharger to maintain its avian botulism program and continue to conduct avian botulism surveys.

4. Rationale for Continuing to Grant Exception

The following is a summary of the Discharger's past and on-going efforts in meeting the requirements for an exception to Basin Plan Prohibition 1. The Basin Plan allows exceptions when there would otherwise be an inordinate burden placed on a discharger and an equivalent level of protection is possible through such means as providing a higher level of treatment. Likewise, the Basin Plan provides for an exception when a discharge is part of a reclamation project. As discussed below, compliance with Prohibition 1 would place an undue burden on the Discharger, particularly considering the advanced treatment provided, its water recycling efforts, and its pollution prevention and pretreatment programs. The discharge qualifies for exceptions to Prohibition 1.

(a) **Undue Burden.** For the Discharger to reliably provide at least a 10:1 dilution for its effluent, it would need to construct an outfall far and deep into San Francisco Bay. However, through Order No. WQ 90-5, the State Water Board acknowledged that relocation of the discharge to a location north of the Dumbarton Bridge was not an economically or environmentally sound solution to the concerns associated with the South Bay discharges.

(b) **Advanced Treatment.** The Discharger provides advanced secondary treatment for all its discharges. In addition to meeting secondary treatment standards, the Plant removes ammonia and provides filtration of the wastewater, which constitutes "advanced" secondary treatment. This Order contains more stringent effluent limits for BOD, TSS, and turbidity than those imposed on plants that provide only secondary treatment. These more stringent effluent limits will ensure that this advanced level of treatment continues.

(c) **Water Recycling.** The Discharger has invested over $20 million in a water recycling program that produces and delivers disinfected tertiary recycled water for use in parks, golf courses, commercial landscaping, street medians, and dual plumbed systems in the northern and central sections of the City of Sunnyvale. The system consists of approximately 43,000 feet of 12-inch through 36-inch transmission pipelines, 34,000 feet of 8-inch distribution pipelines, two pump stations, and a 2 million gallon storage tank. In addition, the Discharger updated the Plant's polymer feed, disinfection, dechlorination, and associated control

systems to facilitate production of recycled water and to meet California Department of Public Heath Title 22 requirements for water quality and system reliability. During the dry season, approximately 1.2 million gallons are delivered daily to over 100 customers.

(d) **Pollution Prevention and Pretreatment.** The Discharger continues to implement an aggressive Pollution Prevention and Minimization Program that targets industrial, commercial and residential sectors. The goal of the program is to create awareness of and respect for the watershed in which people live, work, and attend school, and to provide information that leads to opportunities to improve water pollution prevention and water conservation behaviors. The Discharger communicates public outreach messages through several media outlets, including on-screen theater ads, emails, newsletter articles, community cable TV, newspaper ads, door hangers, and utility bill inserts. The Discharger also participates in numerous community and business events throughout the year to promote pollution prevention messages to residents, the general public, youth, and corporate employees. In addition to community events, the Discharger reaches the youth audience through classroom presentations, creek education field trips and treatment plant tours. To leverage resources the Discharger also participates in regional outreach campaigns.

The Discharger's Pretreatment Program staff inspects permitted industrial users and commercial businesses in 15 categories, including dental offices. The Discharger conducted a series of pollution prevention studies in the 1990s in response to Cease and Desist Order No. 93-086, which culminated in a new City Ordinance for industrial dischargers to implement reasonable source control measures, and a reduction in local limits for both copper and nickel. These actions resulted in a permanent reduction in the Plant influent and effluent copper and nickel concentrations, as documented in source identification reports submitted as part of the Discharger's Annual Pretreatment Report.

Because the Discharger has met all the historical requirements of both the State and Regional Water Boards for obtaining an exception to the Basin Plan prohibition, and continues to meet these requirements as discussed above, the Regional Water Board continues to grant an exception to Basin Plan Prohibition 1.

C. Effluent Limitations for Conventional and Non-Conventional Pollutants

1. Scope and Authority of Technology-Based Effluent Limitations

CWA section 301(b) and 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable WQS. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR 133. These Secondary Treatment Regulations include the following minimum requirements for POTWs.

Table F-8. Secondary Treatment Requirements

Parameters	30-Day Average	7-Day Average
BOD_5 (1)	30 mg/L	45 mg/L
$CBOD_5$ (1) (2)	25 mg/L	40 mg/L
TSS (1)	30 mg/L	45 mg/L
pH	6.0 – 9.0	

Footnotes for Table F-8:

(1) The 30-day average percent removal, by concentration, shall not be less than 85 percent.

(2) At the option of the permitting authority, these effluent limitations for $CBOD_5$ may be substituted for limitations for BOD_5.

San Francisco Bay south of the Dumbarton Bridge is a unique water body, with a limited capacity to assimilate wastewater. Due to limited circulation, wastewater discharges to this area may take several months to reach the ocean. In addition, the unique wetlands and ambient conditions of South San Francisco Bay sometimes result in natural dissolved oxygen levels that are lower than the Basin Plan's receiving water limit of a minimum of 5.0 mg/L. The limited assimilative capacity of South San Francisco Bay necessitates effluent BOD and TSS limitations that are more restrictive than those required for secondary treatment.

The Discharger constructed advanced secondary wastewater treatment facilities in the late 1970's and has consistently met limits on conventional pollutants that are more stringent than the secondary treatment standards.

2. Applicable Effluent Limitations

This Order retains the following effluent limitations for conventional and non-conventional pollutants, applicable to Discharge Point 001, from the previous Order.

Table F-9. Summary of Effluent Limitations for Conventional and Non-Conventional Pollutants

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
$CBOD_5$	mg/L	10	---	20	---	---
TSS	mg/L	20	---	30	---	---
$CBOD_5$ and TSS	% Removal	85	---	---	---	---
Oil and Grease	mg/L	5	---	10	---	---
pH	s.u.	---	---	---	6.5	8.5
Total Chlorine Residual	mg/L	---	---	---	---	$0.0^{(1)}$
Turbidity	NTU	---	---	---	---	10
Enterococcus Bacteria	Colonies/ 100 mL	$35^{(2)}$	---	---	---	---
Ammonia Nitrogen (Jun-Sep)	mg/L as nitrogen	2.0	---	5.0	---	---
Ammonia Nitrogen (Oct-May)	mg/L as nitrogen	18	---	26	---	---

Footnotes for Table F-9:

(1) The Discharger may elect to use a continuous on-line monitoring system for measuring flow, chlorine, and sulfur dioxide dosage (including a safety factor) and concentration to prove that chlorine residual exceedances are false positives. Convincing evidence must be provided to Regional Water Board staff to conclude these false positive exceedances are not violations of this permit.

(2) Expressed as a 30-day geometric mean.

This Order does not retain the previous Order's technology-based effluent limitations for settleable matter because Basin Plan Table 4-2 no longer requires them for POTWs.

a. **$CBOD_5$ and TSS.** The effluent limitations for $CBOD_5$ and TSS, including the 85 percent removal requirement are unchanged from the previous Order. These limitations are technologically feasible for advanced wastewater treatment technologies. 40 CFR 122.45(d) specifies that discharge limitations for POTWs shall be stated as average weekly limitations and average monthly limitations, unless impracticable. Expressing effluent limitations for $CBOD_5$ and TSS as maximum daily limitations instead of average weekly limitations effectively results in more stringent limits, as effluent variability is not averaged out over a period of a week. Self-monitoring data show the Discharger has been able to consistently comply with these $CBOD_5$ and TSS effluent limits.

b. **Oil and Grease.** The effluent limitations for oil and grease are technology-based and are unchanged from the previous Order. These limitations are based on Basin Plan Table 4-2 for shallow water dischargers. Self-monitoring data show the Discharger has been able to consistently comply with these oil and grease effluent limits.

c. **pH.** The effluent limitations for pH are water quality-based and are unchanged from the previous Order. These limitations are based on Basin Plan Table 4-2 for shallow water dischargers. Self-monitoring data show the Discharger has been able to consistently comply with these pH effluent limits.

d. **Total chlorine residual.** The effluent limitation for total chlorine residual is based on water quality and on Basin Plan Table 4-2. It is unchanged from the previous Order. The Discharger may use a continuous on-line monitoring system to measure flow, chlorine, and sodium bisulfite concentration and dosage to prove that chlorine residual exceedances are false positives. If convincing evidence is provided, Regional Water Board staff may conclude that these false positives of chlorine residual exceedances are not violations of the limitation. Self-monitoring effluent data show the Discharger can comply with this effluent limit.

e. **Turbidity.** The effluent limitation for turbidity is unchanged from the previous Order and is representative of adequate and reliable advanced-secondary level wastewater treatment. This limitation is technologically feasible for advanced secondary wastewater treatment technologies. Self-monitoring data show the Discharger has been able to consistently comply with this turbidity effluent limit.

f. **Enterococcus bacteria.** The 30-day geometric mean effluent limitation for enterococcus bacteria is unchanged from the previous Order; however, the single sample maximum limit of 276 colonies per 100 mL is not retained to be consistent with other recently adopted NPDES permits and USEPA criteria. Basin Plan Table 3-2 cites the 30-day geometric mean enterococcus bacteria limit, which is based on the USEPA criteria at 40 CFR 131.41 for coastal recreational waters, including costal estuaries, in California.

These water quality criteria became effective on December 16, 2004 [69 Fed. Register 67218 (November 16, 2006)].

Although USEPA also established single sample maximum criteria for enterococci bacteria, this Order implements only the geometric mean criterion of 35 colonies per 100 milliliters as an effluent limitation. When these water quality criteria were promulgated, USEPA expected that the single sample maximum values would be used for making beach notification and beach closure decisions. "Other than in the beach notification and closure decision context, the geometric mean is the more relevant value for assuring that appropriate actions are taken to protect and improve water quality because it is a more reliable measure, being less subject to random variation …" [69 Fed Reg. 67224 (November 16, 2004)].

The removal of the daily maximum bacteria limit is consistent with the exception to the Clean Water Act's backsliding provisions, expressed at CWA 402(o)(2)(B)(ii) for technical mistakes.

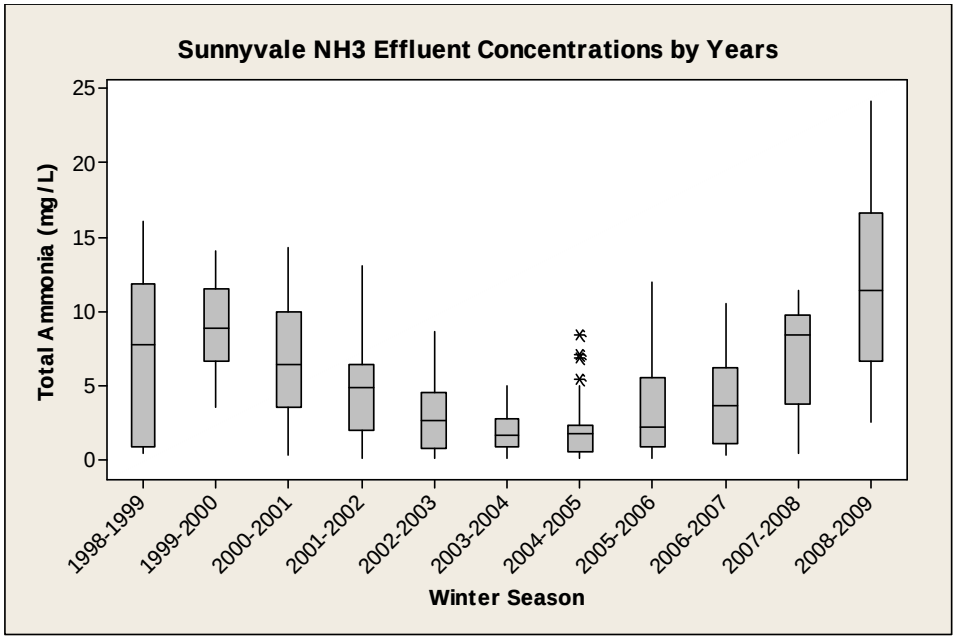
The Discharger has previously conducted a study, from June 2003 to December 2004, and submitted results in a final report, *City of Sunnyvale Water Pollution Control Plant Receiving Water User Survey Confirmation Study,* dated December 23, 2004, demonstrating that the "lightly used" water contact category is conservative for both Moffett Channel and Guadalupe Slough. Therefore effluent limitations for enterococcus bacteria are protective of water contact beneficial uses of the receiving water.

Self-monitoring data show the Discharger has been able to consistently comply with this enterococcus 30-day geometric mean effluent limit.

Although South San Francisco Bay is listed to support shellfish harvesting, as explained under Section III.C.1, shellfish harvesting does not exist in the South San Francisco Bay south of Foster City, nor does it exist near the vicinity of the discharge outfall. Therefore, this Order does not establish fecal coliform effluent limits for protecting shellfish harvesting.

g. **Total Ammonia.** The effluent limits during June through September are retained from the previous Order. In addition, this Order includes new performance-based ammonia effluent limits for colder weather months, October through May. The new performance-based effluent limits are intended to ensure that the Discharger maintains its Plant's existing ammonia removal performance and that current ammonia conditions are maintained in the receiving water. Effluent monitoring data from 1998 through 2009 during the winter months (November through March) indicate that ammonia effluent concentrations vary from year to year. There were years that ammonia effluent concentrations showed a decreasing trend, but there were times that ammonia effluent concentrations showed an increasing trend. The box plot below illustrates the general trend of ammonia effluent concentrations during the winter seasons of 1998 through 2009. Average total ammonia concentrations during these winter seasons were 7.0, 8.9, 6.7, 4.6, 2.9, 1.8, 2.0, 3.3, 3.8, 6.7, and 11.6 mg/L for 1998-1999, 1999-2000, 2000-2001, 2001-2002, 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008, and

2008-2009, respectively. Effluent limits are necessary to prevent Plant performance from deteriorating as seen in recent years.



How to read a box plot: The box plot has a box, with two whiskers extending upward and downward of the box, and stars beyond the whiskers. The bottom of the box is the first quartile (Q1, or 25% of the data values are less than or equal to this value) and the top box is the third quartile (Q3) – 75% of the data values are less than or equal to this value. The upper whisker extends to the highest data value within the upper limit (upper limit = Q3 + 1.5 (Q3-Q1)); the lower whisker extends to the lowest value within the lower limit (lower limit = Q1+1.5 (Q3 - Q1)). The stars are unusually large or small observations. Values beyond the whiskers are considered outliers. The line in the middle of the box is the median of the data, which half of the observations are less than or equal to. The little circle inside the box is the mean value.

The new winter performance-based effluent limits are based on cold-weather (October through May) Plant performance from November 2003 through March 2009. The daily maximum effluent concentrations and monthly average concentrations for those months fit a lognormal distribution after data transformation (the 0.3 root of daily maximum concentrations and the square root of monthly average concentrations were taken). The 99.87^{th} percentile (three standard deviations above the mean) of the maximum daily concentrations is 26 mg/L; this value is established as the daily maximum effluent limit. The 99^{th} percentile of the monthly average concentrations is 18 mg/L; this value is established as the monthly average effluent limit. The maximum daily effluent concentration during October through May of 2003-2009 ranged from <0.08 mg/L to 24.1 mg/L. Monthly average concentrations during this period ranged from 0.1 mg/L to 17.4 mg/L. Therefore, the Discharger is expected to be able to comply with these new effluent limits.

D. WQBELs

WQBELs have been derived to implement WQOs that protect beneficial uses. Both the beneficial uses and the WQOs have been approved pursuant to federal law. The procedures for calculating individual WQBELs are based on the SIP, which was approved by the USEPA prior to May 1, 2001, or Basin Plan provisions approved by the USEPA on May 29, 2000. Most beneficial uses and WQOs contained in the Basin Plan were approved under state law and submitted to and approved by the USEPA prior to May 30, 2000. Any WQOs and beneficial uses submitted to the USEPA prior to May 30, 2000, but not approved by the USEPA before that date, are nonetheless "applicable water quality standards for purposes of the [Clean Water] Act" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than the applicable WQS for purposes of the CWA.

1. Scope and Authority

a. 40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a WQS, including numeric and narrative objectives within a standard. As specified in 40 CFR 122.44(d)(1)(i), permits are required to include WQBELs for all pollutants "which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard." Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric WQC, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in section 122.44(d)(1)(vi).

   The process for determining "reasonable potential" and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable WQOs/WQC that are contained in other State plans and policies, and applicable WQC contained in the CTR and NTR.

b. NPDES regulations and the SIP provide the basis to establish maximum daily effluent limitations (MDELs).

   (1) **NPDES Regulations.** NPDES regulations at 40 CFR 122.45(d) state: "For continuous discharges all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall *unless impracticable* be stated as maximum daily and average monthly discharge limitations for all discharges other than publicly owned treatment works."

   (2) **SIP.** The SIP (Section 1.4) requires WQBELs to be expressed as MDELs and average monthly effluent limitations (AMELs).

c. MDELs are used in this Order to protect against acute water quality effects. The MDELs are necessary for preventing fish kills or mortality to aquatic organisms.

2. Applicable Beneficial Uses and WQC

The WQC applicable to the receiving waters for this discharge are from the Basin Plan; the CTR, established by USEPA at 40 CFR 131.38; and the NTR, established by USEPA at 40 CFR 131.36. Some pollutants have WQC established by more than one of these three sources.

a. **Basin Plan.** The Basin Plan specifies numeric WQOs for 10 priority toxic pollutants, for all marine and freshwaters *except for* South San Francisco Bay, south of Dumbarton Bridge. For this portion of South Bay, the CTR WQC apply, except SSOs have been adopted for copper and nickel for marine and estuarine waters of South San Francisco Bay, south of Dumbarton Bridge. Site-specific objectives for cyanide have been adopted for all segments of San Francisco Bay.

b. **CTR.** The CTR specifies numeric aquatic life criteria for 23 priority toxic pollutants and numeric human health criteria for 57 priority toxic pollutants. These criteria apply to all inland surface waters and enclosed bays and estuaries of the San Francisco Bay Region, including South San Francisco Bay south of the Dumbarton Bridge.

c. **NTR.** The NTR establishes numeric aquatic life criteria for selenium and numeric human health criteria for 33 toxic organic pollutants for waters of San Francisco Bay upstream to, and including Suisun Bay and the Delta. These NTR WQC are applicable to South San Francisco Bay.

d. **Narrative Objectives for Water Quality-Based Toxics Controls.** Where numeric objectives have not been established or updated in the Basin Plan, NPDES regulations at 40 CFR 122.44(d) require that WQBELs be established based on USEPA criteria, supplemented where necessary by other relevant information, to attain and maintain narrative WQOs to fully protect designated beneficial uses.

   To determine the need for and establish WQBELs, when necessary, the Regional Water Board staff has followed the requirements of applicable NPDES regulations, including 40 CFR 122 and 131, as well as guidance and requirements established by the Basin Plan; USEPA's Technical Support *Document for Water Quality-Based Toxics Control* (the TSD, EPA/505/2-90-001, 1991); and the SIP.

e. **Basin Plan Receiving Water Salinity Policy.** The Basin Plan and CTR state that the salinity characteristics (i.e., freshwater versus saltwater) of the receiving water shall be considered in determining the applicable WQOs. Freshwater criteria shall apply to discharges to waters with salinities equal to or less than 1 ppt at least 95 percent of the time. Saltwater criteria shall apply to discharges to waters with salinities equal to or greater than 10 ppt at least 95 percent of the time in a normal water year. For discharges to waters with salinities in between these two categories, or tidally influenced fresh waters that support estuarine beneficial uses, the WQOs shall be the lower of the salt- or freshwater criteria (the freshwater criteria for some metals are calculated based on ambient hardness) for each substance.

The receiving water for this discharge is Moffett Channel which ultimately flows into South San Francisco Bay via Guadalupe Slough. Salinity data are not available for Moffett Channel; however, salinity as measured at the Regional Monitoring Program (RMP) Sunnyvale Slough station (C-1-3) indicates an estuarine environment (59 percent of the salinity data fell between 1 and 10 ppt). Moffett Channel and Guadalupe Slough are tidally influenced and are therefore considered estuarine receiving waters. The lower of the marine and freshwater WQOs from the Basin Plan, NTR, and CTR apply to this discharge.

f. **Receiving Water Hardness.** Ambient hardness values are used to calculate freshwater WQOs that are hardness dependent. In determining the WQOs for this Order, Regional Water Board staff used a hardness value of 103 mg/L as $CaCO_3$, the minimum hardness value observed at the Guadalupe Slough RMP station.

g. **Site-Specific Translators.** 40 CFR 122.45(c) requires that effluent limitations for metals be expressed as total recoverable metal. Since applicable WQC for metals are typically expressed as dissolved metal, factors or translators must be used to convert metals concentrations from dissolved to total recoverable and vice versa. The CTR includes default conversion factors that are used in NPDES permitting activities; however, site-specific conditions, such as water temperature, pH, suspended solids, and organic carbon, greatly impact the form of metal (dissolved, filterable, or otherwise) that is present in the water and therefore available to cause toxicity. In general, the dissolved form of the metals is more available and more toxic to aquatic life than the filterable forms. Site-specific translators can be developed to account for site-specific conditions, thereby preventing exceedingly stringent or under protective WQOs.

Site-specific translators for copper and nickel were developed for South San Francisco Bay and are in the Basin Plan. The site-specific translators for copper and nickel are presented in Table F-10.

For this permit reissuance, Regional Water Board staff developed site-specific translators for chromium (VI), zinc, and lead for the South San Francisco Bay using data from the Dumbarton Bridge RMP station (BA30), and following USEPA's recommended guidelines for translator development. These translators were applied in determining reasonable potential and/or effluent limitations for these constituents. These translators were updated using additional RMP data collected since the previous permit issuance and Minitab statistical software. The newly calculated translators for Zn, Cr(VI), and Pb are also presented in Table F-10, below. In determining the need for and calculating WQBELs for all other metals, where appropriate, Regional Water Board staff used default conversion factors in the CTR, Table 2.

Table F-10. Site-Specific Translators for Cu, Ni, Zn, Cr(VI), and Pb for South San Francisco Bay

Pollutant	AMEL Translator	MDEL Translator
Copper	0.53	0.53
Nickel	0.44	0.44
Zinc	0.24	0.56
Chromium (VI)	0.037	0.089
Lead	0.060	0.15

3. Determining the Need for WQBELs

Assessing whether a pollutant has Reasonable Potential is the fundamental step in determining whether or not a WQBEL is required. Using the methods prescribed in section 1.3 of the SIP, Regional Water Board staff analyzed the effluent data to determine if the discharge demonstrates Reasonable Potential. The Reasonable Potential Analysis (RPA) compares the effluent data with numeric and narrative WQOs in the Basin Plan, the NTR, and the CTR.

a. **SIP Reasonable Potential Methodology.** The RPA identifies the observed MEC in the effluent for each pollutant based on effluent concentration data. There are three triggers in determining Reasonable Potential according to Section 1.3 of the SIP.

(1) The first trigger (Trigger 1) is activated if the MEC is greater than or equal to the lowest applicable WQC (MEC ≥ WQC), which has been adjusted, if appropriate, for pH, hardness, and translator data. If the MEC is greater than or equal to the adjusted WQC, then that pollutant has Reasonable Potential, and a WQBEL is required.

(2) The second trigger (Trigger 2) is activated if the observed maximum ambient background concentration (B) is greater than the adjusted WQC (B > WQC), and the pollutant is detected in any of the effluent samples.

(3) The third trigger (Trigger 3) is activated if a review of other information determines that a WQBEL is required to protect beneficial uses, even though both MEC and B are less than the WQC.

b. **Effluent Data.** The Regional Water Board's August 6, 2001, letter titled *Requirement for Monitoring of Pollutants in Effluent and Receiving Water to Implement New Statewide Regulations and Policy* formally required the Discharger to initiate or continue monitoring for the priority pollutants using analytical methods that provide the best detection limits reasonably feasible. Regional Water Board staff analyzed these effluent data and the nature of the discharge to determine if the discharge has Reasonable Potential. The RPA was based on the effluent monitoring data collected by the Discharger from February 2005 through January 2008 for most inorganic pollutants, and from November 2003 through January 2008 for most organic pollutants.

c. **Ambient Background Data.** Ambient background values are typically used to determine reasonable potential and to calculate effluent limitations, when necessary. For the RPA, ambient background concentrations are the observed maximum detected water column

concentrations. The SIP states that, for calculating WQBELs, ambient background concentrations are either the observed maximum ambient water column concentrations or, for criteria intended to protect human health from carcinogenic effects, the arithmetic mean of observed ambient water concentrations.

The background data used in the RPA were generated at the Dumbarton Bridge RMP station, except for ammonia, for which the maximum ambient concentration at the Guadalupe Slough RMP station was used. The Discharger conducted an ammonia special study during 1997 through 2000. Ammonia data collected at this same station were also used in the RPA.

Not all the constituents listed in the CTR have been analyzed by the RMP. These data gaps are addressed by the Regional Water Board's August 6, 2001, Letter, which formally required dischargers to conduct ambient background monitoring and effluent monitoring for those constituents not currently monitored by the RMP and to provide this technical information to the Regional Water Board.

On May 15, 2003, a group of several San Francisco Bay Region Dischargers (known as the Bay Area Clean Water Agencies, or BACWA) submitted a collaborative receiving water study, entitled the San Francisco Bay Ambient Water Monitoring Interim Report (2003). This study includes monitoring results from sampling events in 2002 and 2003 for the remaining priority pollutants not monitored by the RMP. The study included the Dumbarton Bridge monitoring station. Additional data were provided from the BACWA Ambient Water Monitoring: Final CTR Sampling Update Report, dated June 15, 2004.

The RPA was conducted and the WQBELs were calculated using RMP data from 1993 through 2006 at the Dumbarton Bridge RMP station, and additional data from the BACWA receiving water study.

d. **Reasonable Potential Analysis for Ammonia**

Ammonia is a toxic pollutant, but not a priority pollutant as defined by the CTR; therefore, Regional Water Board staff used the procedures outlined in the *Technical Support Document for Toxics Control* (TSD) (EPA/505/2-90-001, March 1991) to determine if ammonia in the discharge has a reasonable potential to cause water quality objectives to be exceeded in the receiving water.

(1) TSD RPA Procedure

TSD allows using measured receiving water concentrations (RWC) or projected RWC from effluent data to perform RPA. The following summarizes steps to determine reasonable potential for excursions above ambient criteria using effluent data:

Step 1. Determine the number of total observations (n) for a set of effluent data and determine the highest value from that data set (the maximum effluent concentration or MEC).

Step 2. Determine the coefficient of variation (CV) from the data set. For a data set where n<10, the CV is estimated to equal 0.6. For a data set where n>10, the CV is calculated as the standard deviation divided by the mean.

Step 3. Determine an appropriate ratio for projecting a selected upper bound concentration (e.g., the 99th or 95th percentile) assuming a lognormal distribution.

To do this, the percentile represented by the MEC in a data set of "*n*" samples, p_n, needs to be determined based on the desired confidence interval, e.g., 95% or 99%.

$$p_n = (1 - \text{confidence interval})^{1/n}$$

Then concentrations based on two percentile values, $C_{upper\ bound}$, and C_{Pn} need to be calculated using the following equation.

$$C_p = \exp(Z_p\sigma - 0.5\sigma^2)$$

where $\sigma = \ln(CV^2+1)$, p is the percentile (upper bound or p_n), and Z_p is the standard normal distribution value for the percentile p.

The ratio, *R,* is then determined to be

$$R = \frac{C_{upper\ bound}}{C_{Pn}}$$

Step 4. Multiply the MEC by the ratio, R, determined by Step 3. Use this value with the appropriate dilution to project the receiving water concentration (RWC) (this analysis assumes no dilution or D=1).

RWC = MEC × R / dilution ratio

Step 5. Compare the projected RWC to the applicable WQC (CCC, CMC, human health criteria, etc). If a RWC is greater than or equal to a criterion, then there is reasonable potential.

(2) TSD-based RPA for Ammonia

i. *Ammonia WQOs.* The Basin Plan contains WQOs for un-ionized ammonia of 0.025 mg/L as an annual median and 0.4 mg/L as a maximum for Lower San Francisco Bay.

ii. *Ammonia Data Translation*. Effluent and receiving water monitoring data are available for total ammonia, not un-ionized ammonia, because (1) sampling and laboratory methods are not available to analyze for un-ionized ammonia; and (2) the fraction of total ammonia that exists in the toxic un-ionized form depends on the pH, salinity, and temperature of water. Regional Water Board staff

translates total ammonia concentrations into un-ionized ammonia concentrations (as nitrogen) to compare with the Basin Plan un-ionized ammonia objectives based on the following equations [Ambient Water Quality Criteria for Ammonia (saltwater) – 1989, USEPA Publication 440/5-88-004, USEPA, 1989]:

For salinity > 10 ppt: fraction of $NH_3 = \frac{1}{1+10^{(pK-pH)}}$

Where:

pK = 9.245 + 0.116*(I) + 0.0324*(298-T) + 0.0415*(P)/T
I = the molal ionic strength of saltwater = 19.9273*(S)/(1000-1.005109*S)
S = salinity (parts per thousand)
T = temperature in Kelvin
P = pressure (one atmosphere)

For salinity < 1 ppt: fraction of $NH_3 = \frac{1}{1+10^{(pK-pH)}}$

Where:

pK = 0.09018 + 2729.92/ T
T = temperature in Kelvin

For this effluent data calculation, no salinity data were available and staff assumed that the effluent is fresh; therefore, staff used the equation for waters of salinity <1 ppt.

iii. *Ammonia Dilution.* For purposes of this discharge, no dilution was assumed for ammonia, i.e., dilution ratio=1; therefore, the RWC is the same as the projected upper bound concentration, i.e., RWC=MEC×R (see Step 4 under TSD RPA Procedure above).

iv. Two Approaches

According to the TSD, the RPA can be performed based on the projected RWC using effluent data (the steps summarized above) or measured receiving water concentrations. Both values may be compared directly with WQOs.

(a) RPA Based on Effluent Data

Regional Water Board staff used effluent monitoring data for total ammonia from April 1, 2006, through March 31, 2009. Un-ionized ammonia concentrations were calculated using the pH and temperature data collected for the same samples. There were 318 data points (n=318). The MEC was 0.11 mg/L un-ionized ammonia. The confidence interval was set at 95%. The percentile represented by the MEC is calculated to be:

$p_n = (1\text{-}0.95)^{1/318} = 0.99$

Therefore, the MEC represented the 99th percentile. For this analysis, $C_{upper\ bound}$ is set at the 99th percentile, which means $C_{Pn} = C_{upper\ bound}$ and R = 1. With no dilution (dilution ratio=1), the projected RWC is the same as the observed MEC, 0.11 mg/L (= MEC×R/dilution ratio). This value is less than the Basin Plan un-ionized ammonia acute objective of 0.4 mg/L, indicating no reasonable potential to exceed this objective.

The median of the effluent data is appropriate for comparing with the chronic objective, which is expressed as an annual median. Regional Water Board staff calculated the 50th percentile un-ionized ammonia concentration from the effluent data and compared this value with the annual median objective. No projection is needed because the observed 50th percentile is generally very close to the population 50th percentile. The 50th percentile value is 0.002 mg/L, which is less than the annual median objective of 0.025 mg/L.

Therefore, there is no reasonable potential based on the effluent data.

(b) RPA Based on Receiving Water

The Discharger conducted a receiving water study during 1997-2000 (*City of Sunnyvale WPCP Receiving Water Ammonia Investigations 2001 Final Report, June 29, 2001*). The Discharger collected ammonia, pH, salinity, and temperature data at seven receiving water stations located in Moffett Channel and Guadalupe Slough, both upstream and downstream of the discharge point. In addition, the Regional Monitoring Program (RMP) has monitoring data at one of the sampling stations (C-1-3). This analysis uses the RMP data as well.

Regional Water Board staff translated the measured total ammonia concentrations into un-ionized ammonia concentrations using the pH, salinity, and temperature data collected on the same sampling dates. Then they used the data from all seven stations to determine the maximum receiving water concentration to be compared with the acute objective, and the highest 50th percentile value from the seven stations to be compared to the annual median objective.

The maximum RWC as un-ionized ammonia was 0.068 mg/L. This occurred on November 19, 1998, at Station C-3-0, which is located at the confluence of Moffett Channel and Guadalupe Slough (the closest station to the outfall). This un-ionized ammonia value is less than the acute objective of 0.4 mg/L.

The highest 50th percentile at any location occurred at station C-2-0 (located about 8000 feet above the discharge outfall in Guadalupe Slough). The median value there was 0.015 mg/L, which is less than the annual median objective of 0.025 mg/L.

Therefore, there is no reasonable potential based on the receiving water data.

e. **RPA Determination.** Except for ammonia, discussed above, the RPA for this Order is based on the SIP. The MECs, most stringent applicable WQC, and background

concentrations used in the RPA are presented in Table F-11, along with the RPA results (yes or no) for each pollutant. Reasonable Potential was not determined for all pollutants because there are not applicable WQC for all pollutants, or monitoring data were not available for others. The RPA determines that cyanide, chlorodibromomethane, endrin, and tributyltin exhibit Reasonable Potential by Trigger 1. Mercury and dioxin-TEQ exhibit reasonable potential by Trigger 2. Copper and nickel have reasonable potential by Trigger 3 as explained below.

Table F-11. Summary of RPA Results

CTR #	Priority Pollutants	MEC or Minimum DL (1)(2) (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL (1)(2) (µg/L)	RPA Results (3)
1	Antimony	1	4300	1.3	No
2	Arsenic	1.4	36	5.1	No
3	Beryllium	< 1	No Criteria	0.11	Ud
4	Cadmium	0.15	2.5	0.17	No
5a	Chromium (III)	7	212	14.7	No
5b	Chromium (VI)	1.3	180	15	No
6	**Copper**	**5.4**	**13**	**8.6**	**Yes**
7	Lead	1.8	43	4.2	No
8	**Mercury (303d listed)**	**0.007**	**0.051**	**0.068**	**Yes**
9	**Nickel**	**3.4**	**27**	**16**	**Yes**
10	Selenium	2.6	5	0.63	No
11	Silver	1.6	2.2	0.12	No
12	Thallium	< 1	6.3	0.16	No
13	Zinc	50	161	21	No
14	**Cyanide**	**10**	**2.9**	**< 0.4**	**Yes**
15	Asbestos	Not Available	No Criteria	Not Available	Ud
16	2,3,7,8-TCDD	< 5.6E-07	1.4E-08	2.4E-08	No
	Dioxin TEQ (303d listed)	**1.2E-09**	**1.4E-08**	**2.6E-07**	Yes
17	Acrolein	< 0.5	780	< 0.5	No
18	Acrylonitrile	< 0.33	0.66	< 0.02	No
19	Benzene	< 0.03	71	< 0.05	No
20	Bromoform	8	360	< 0.5	No
21	Carbon Tetrachloride	0.7	4.4	0.07	No
22	Chlorobenzene	< 0.03	21000	< 0.5	No
23	**Chlorodibromomethane**	**37**	**34**	**0.057**	**Yes**
24	Chloroethane	< 0.03	No Criteria	<0.5	Ud
25	2-Chloroethylvinyl ether	< 0.1	No Criteria	< 0.5	Ud
26	Chloroform	15	No Criteria	< 0.5	Ud
27	Dichlorobromomethane	30	46	< 0.05	No
28	1,1-Dichloroethane	< 0.04	No Criteria	< 0.05	Ud
29	1,2-Dichloroethane	< 0.04	99	0.04	No
30	1,1-Dichloroethylene	< 0.06	3.2	< 0.5	No
31	1,2-Dichloropropane	< 0.03	39	< 0.05	No
32	1,3-Dichloropropylene	< 0.03	1700	Not Available	No
33	Ethylbenzene	< 0.04	29000	< 0.5	No
34	Methyl Bromide	< 0.05	4000	< 0.5	No
35	Methyl Chloride	< 0.04	No Criteria	< 0.5	Ud
36	Methylene Chloride	2.7	1600	< 0.5	No
37	1,1,2,2-Tetrachloroethane	< 0.04	11	< 0.05	No
38	Tetrachloroethylene	0.09	8.9	< 0.05	No
39	Toluene	0.2	200000	< 0.3	No
40	1,2-Trans-Dichloroethylene	< 0.05	140000	< 0.5	No
41	1,1,1-Trichloroethane	< 0.03	No Criteria	< 0.5	Ud
42	1,1,2-Trichloroethane	< 0.05	42	< 0.05	No
43	Trichloroethylene	0.3	81	< 0.5	No

CTR #	Priority Pollutants	MEC or Minimum DL (1)(2) (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL (1)(2) (µg/L)	RPA Results (3)
44	Vinyl Chloride	< 0.05	525	< 0.5	No
45	2-Chlorophenol	< 0.6	400	< 1.2	No
46	2,4-Dichlorophenol	< 0.7	790	< 1.5	No
47	2,4-Dimethylphenol	< 0.8	2300	< 1.3	No
48	2-Methyl- 4,6-Dinitrophenol	< 0.6	765	< 1.2	No
49	2,4-Dinitrophenol	< 0.6	14000	< 0.7	No
50	2-Nitrophenol	< 0.6	No Criteria	< 1.3	Ud
51	4-Nitrophenol	< 0.6	No Criteria	< 1.6	Ud
52	3-Methyl 4-Chlorophenol	< 0.5	No Criteria	< 1.1	Ud
53	Pentachlorophenol	< 0.6	7.9	< 1	No
54	Phenol	22	4600000	< 1.3	No
55	2,4,6-Trichlorophenol	< 0.6	6.5	< 1.3	No
56	Acenaphthene	< 0.03	2700	0.0026	No
57	Acenaphthylene	< 0.02	No Criteria	0.0026	Ud
58	Anthracene	< 0.02	110000	0.0023	No
59	Benzidine	< 1	0.00054	< 0.0015	No
60	Benzo(a)Anthracene	< 0.02	0.049	0.011	No
61	Benzo(a)Pyrene	< 0.02	0.049	0.045	No
62	Benzo(b)Fluoranthene	< 0.02	0.049	0.057	No
63	Benzo(ghi)Perylene	< 0.02	No Criteria	0.015	Ud
64	Benzo(k)Fluoranthene	< 0.02	0.049	0.021	No
65	Bis(2-Chloroethoxy)Methane	< 0.7	No Criteria	< 0.3	Ud
66	Bis(2-Chloroethyl)Ether	< 0.7	1.4	< 0.32	No
67	Bis(2-Chloroisopropyl)Ether	< 0.6	170000	Not Available	No
68	Bis(2-Ethylhexyl)Phthalate	1.2	5.9	0.93	No
69	4-Bromophenyl Phenyl Ether	< 0.4	No Criteria	< 0.23	Ud
70	Butylbenzyl Phthalate	3	5200	0.0055	No
71	2-Chloronaphthalene	< 0.5	4300	< 0.3	No
72	4-Chlorophenyl Phenyl Ether	< 0.5	No Criteria	< 0.31	Ud
73	Chrysene	< 0.02	0.049	0.022	No
74	Dibenzo(a,h)Anthracene	< 0.02	0.049	0.0088	No
75	1,2-Dichlorobenzene	< 0.03	17000	< 0.3	No
76	1,3-Dichlorobenzene	< 0.03	2600	< 0.3	No
77	1,4-Dichlorobenzene	0.1	2600	< 0.3	No
78	3,3 Dichlorobenzidine	< 0.3	0.077	< 0.001	No
79	Diethyl Phthalate	7.4	120000	0.3	No
80	Dimethyl Phthalate	0.8	2900000	< 0.21	No
81	Di-n-Butyl Phthalate	2.8	12000	2.2	No
82	2,4-Dinitrotoluene	< 0.6	9.1	< 0.27	No
83	2,6-Dinitrotoluene	< 0.5	No Criteria	< 0.29	Ud
84	Di-n-Octyl Phthalate	< 0.7	No Criteria	< 0.38	Ud
85	1,2-Diphenylhydrazine	< 0.6	0.54	0.0053	No
86	Fluoranthene	< 0.02	370	0.039	No
87	Fluorene	< 0.02	14000	0.0055	No
88	Hexachlorobenzene	< 0.4	0.00077	0.00048	No
89	Hexachlorobutadiene	< 0.7	50	< 0.3	No
90	Hexachlorocyclopentadiene	< 0.4	17000	< 0.3	No
91	Hexachloroethane	< 0.6	8.9	< 0.2	No
92	Indeno(1,2,3-cd)Pyrene	< 0.02	0.049	0.078	No
93	Isophorone	< 0.5	600	< 0.3	No
94	Naphthalene	< 0.02	No Criteria	0.011	Ud
95	Nitrobenzene	< 0.7	1900	< 0.25	No
96	N-Nitrosodimethylamine	< 0.6	8.1	< 0.3	No
97	N-Nitrosodi-n-Propylamine	< 0.6	1.4	< 0.001	No
98	N-Nitrosodiphenylamine	< 0.6	16	< 0.2	No
99	Phenanthrene	< 0.02	No Criteria	0.014	Ud

CTR #	Priority Pollutants	MEC or Minimum DL (1)(2) (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL (1)(2) (µg/L)	RPA Results (3)
100	Pyrene	< 0.02	11000	0.056	No
101	1,2,4-Trichlorobenzene	< 0.6	No Criteria	< 0.3	Ud
102	Aldrin	< 0.002	0.00014	1.37E-6	No
103	Alpha-BHC	< 0.003	0.013	0.00066	No
104	beta-BHC	< 0.003	0.046	0.00061	No
105	gamma-BHC	< 0.002	0.063	0.0017	No
106	delta-BHC	< 0.002	No Criteria	0.00013	Ud
107	Chlordane (303d listed)	< 0.005	0.00059	0.00057	No
108	4,4'-DDT (303d listed)	< 0.002	0.00059	0.00020	No
109	4,4'-DDE (linked to DDT)	< 0.002	0.00059	0.00068	No
110	4,4'-DDD	< 0.002	0.00084	0.00077	No
111	Dieldrin (303d listed)	< 0.002	0.00014	0.00029	No
112	Alpha-Endosulfan	< 0.002	0.0087	0.000027	No
113	beta-Endolsulfan	< 0.002	0.0087	0.000046	No
114	Endosulfan Sulfate	< 0.002	240	0.00016	No
115	**Endrin**	**0.003**	**0.0023**	**0.00012**	**Yes**
116	Endrin Aldehyde	< 0.002	0.81	Not Available	No
117	Heptachlor	< 0.003	0.00021	0.000022	No
118	Heptachlor Epoxide	< 0.002	0.00011	0.00017	No
119-125	PCBs sum (303d listed)	< 0.02	0.00017	0.0040	No
126	Toxaphene	< 0.15	0.0002	Not Available	No
	Tributylin	**0.016**	**0.0074**	**0.003**	**Yes**
	Total PAHs	< 0.02	15	0.38	No

Footnotes for Table F-11:

(1) The MEC and maximum background concentration are the actual detected concentrations unless preceded by a "<" sign, in which case the value shown is the minimum detection level (DL).

(2) The MEC or maximum background concentration is "Not Available" when there are no monitoring data for the constituent.

(3) RPA Results = Yes, if MEC > WQO/WQC, B > WQO/WQC and MEC is detected, or Trigger 3;
= No, if MEC and B are < WQO/WQC or all effluent data are undetected;
= Undetermined (Ud), if no criteria have been promulgated or there are insufficient data.

(4) The units for ammonia are expressed in mg/L.

f. **Constituents with limited data.** In some cases, Reasonable Potential cannot be determined because effluent data are limited, or ambient background concentrations are not available. The Dischargers will continue to monitor for these constituents in the effluent using analytical methods that provide the best feasible detection limits. When additional data become available, further RPA will be conducted to determine whether to add numeric effluent limitations to this Order or to continue monitoring.

g. **Pollutants with no Reasonable Potential.** WQBELs are not included in this Order for constituents that do not demonstrate Reasonable Potential; however, monitoring for those pollutants is still required. If concentrations of these constituents are found to have increased significantly, the Dischargers are required to investigate the source(s) of the increase(s). Remedial measures are required if the increases pose a threat to water quality in the receiving water.

The previous Order included interim effluent limits for dichlorobromomethane, 4,4-DDE, dieldrin, heptachlor epoxide, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene;

however, effluent limitations for these pollutants are not retained by this Order because these pollutants do not have Reasonable Potential. Elimination of these effluent limits is consistent with anti-backsliding requirements in accordance with State Water Board Order WQ 2001-16.

4. WQBEL Calculations.

a. **Pollutants with Reasonable Potential.** WQBELs were developed for the toxic and priority pollutants that were determined to have reasonable potential to cause or contribute to exceedances of the WQOs or WQC. The WQBELs were calculated based on appropriate WQOs/WQC and the appropriate procedures specified in Section 1.4 of the SIP. The WQOs or WQC used for each pollutant with Reasonable Potential are discussed below.

b. **Shallow Water Discharge.** The Discharger's effluent is discharged to Moffett Channel, a shallow water slough. Due to the tidal nature of the slough, and limited upstream freshwater flows, the discharge is classified by the Regional Water Board as a shallow water discharge. No dilution credit (D=0) was used to calculate WQBELs for most pollutants, with the exception of cyanide. Cyanide attenuates in receiving waters due to both degradation and dilution. The Basin Plan specifies dilution credits for cyanide for shallow water discharges. The cyanide WQBELs are based on a dilution ratio of 4:1 (D=3.0) as specified in the Basin Plan.

c. **Development of WQBELs for Specific Pollutants**

(1) Copper

i. *Copper WQC*. The most stringent copper chronic and acute marine WQC of 6.9 and 10.8 µg/L are the Basin Plan SSOs for South San Francisco Bay, expressed as dissolved metal. Regional Water Board staff converted these WQC to total recoverable metal using the Basin Plan site-specific translator of 0.53. The resulting chronic WQC of 13 µg/L and acute WQC of 20 µg/L were used in the RPA.

ii. *RPA Results*. Copper historically has been a pollutant of concern in South San Francisco Bay. To ensure that ambient levels of copper in South San Francisco Bay do not increase as a result of POTW discharges, the Basin Plan requires NPDES permits to include effluent limits for copper for South San Francisco Bay dischargers; therefore, reasonable potential for copper is based on Trigger 3.

iii. *Copper WQBELs*. WQBELs for copper, calculated according to SIP procedures, with an effluent data coefficient of variation (CV) of 0.46, are an AMEL of 11 µg/L and an MDEL of 20 µg/L. The previous Order contained an AMEL of 10 µg/L and an MDEL of 20 µg/L, which are more stringent. Therefore, the previous Order effluent limits are retained as the WQBELs.

iv. *Immediate Compliance Feasible*. Statistical analysis of the effluent data for copper, collected over the period of February 2005 through January 2008, shows that the 95th percentile (3.4 µg/L) is less than the AMEL (10 µg/L); the 99th percentile (4.6 µg/L) is less than the MDEL (20 µg/L); and the mean (1.7 µg/L) is

less than the LTA (7.8 µg/L) of the effluent data set after accounting for effluent variability. The Regional Water Board concludes, therefore, that immediate compliance with these WQBELs is feasible[1].

v. *Antibacksliding*. The copper effluent limits are the same as those in the previous Order; therefore, antibacksliding requirements are satisfied.

(2) Nickel

i. *Nickel WQC.* The most stringent chronic and acute marine WQC of 11.9 and 62.4 µg/L are the Basin Plan SSOs for South San Francisco Bay, expressed as dissolved metal. Regional Water Board staff converted these WQC to total recoverable metal using the Basin Plan site-specific translator of 0.44. The resulting chronic WQC of 27 µg/L and acute WQC of 142 µg/L were used in the RPA.

ii. *RPA Results.* Nickel has historically been a pollutant of concern in South San Francisco Bay. To ensure that ambient levels of nickel in South San Francisco Bay do not increase as a result of POTW discharges, the Basin Plan requires NPDES permits to include effluent limits for nickel for South San Francisco Bay dischargers; therefore, reasonable potential for nickel is based on Trigger 3.

iii. *Nickel WQBELs.* WQBELs for nickel, calculated according to SIP procedures, with an effluent CV of 0.31, are an AMEL of 24 µg/L and an MDEL of 37 µg/L.

iv. *Immediate Compliance Feasible.* Statistical analysis of the effluent data for nickel over the period of February 2005- January 2008 shows that the 95th percentile (3.0 µg/L) is less than the AMEL (24 µg/L); the 99th percentile (3.4 µg/L) is less than the MDEL (37 µg/L); and the mean (2.0 µg/L) is less than the LTA (19 µg/L). The Regional Water Board concludes that immediate compliance with these WQBELs is feasible.

v. *Antibacksliding.* Antibacksliding requirements are satisfied as nickel effluent limits established by this Order are more stringent than those in the previous Order, which were an AMEL of 24 µg/L and an MDEL of 40 µg/L.

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[1] The statistical feasibility analysis consisted of the following steps:

- Use statistical software (MiniTab) to fit a statistical distribution to the effluent data.
- Calculate the mean, 95th and 99th percentiles of the effluent data for each constituent considered (using the fitted distribution for percentiles calculation).
- Compare the mean, 95th and 99th percentile values with the long-term average (LTA), AMEL, and MDEL calculated using the SIP procedure, respectively.
- If any of the LTA, AMEL, and MDEL exceeds the mean, 95th percentile, and 99th percentile, it may be infeasible for the Discharger to immediately comply with WQBELs.
- Where the 95th and 99th percentile values cannot be estimated due to too few data or too many data being non-detect, the determination was based on staff judgment after examination of the raw data, such as direct comparison of MEC with AMEL. If MEC>AMEL, it may be infeasible for the Discharger to immediately comply with WQBELs.

(3) Cyanide

i. *Cyanide WQC*. The most stringent applicable WQC for cyanide are from the Basin Plan SSOs for marine waters, which are 2.9 µg/L as a four-day average (chronic objective), and 9.4 µg/L as a one-hour average (acute objective).

ii. *RPA Results*. This Order finds reasonable potential and thus establishes effluent limitations for cyanide because the MEC of 10 µg/L exceeds the governing WQC of 2.9 µg/L, demonstrating Reasonable Potential by Trigger 1.

iii. *Cyanide WQBELs*. Final WQBELs for cyanide, calculated according to SIP procedures with an effluent CV of 0.79 and a dilution credit of 3.0 (or a dilution ratio of 4:1), are an AMEL of 8.0 µg/L and an MDEL of 18 µg/L.

iv. *Immediate Compliance Feasible*. Statistical analysis of effluent data for cyanide over the period from February 2005 through January 2008 shows that the 95th percentile (5.1 µg/L) is less than the AMEL (8.0 µg/L); the 99th percentile (7.8 µg/L) is less than the MDEL (18 µg/L); and the mean (2.1 µg/L) is less than the LTA (4.6 µg/L). The Regional Water Board concludes that immediate compliance with cyanide WQBELs is feasible.

v. *Antibacksliding*. Antibacksliding requirements are satisfied because the previous Order did not include final effluent limitations for cyanide.

(4) Dioxin-TEQ

i. *Dioxin-TEQ WQC*. The Basin Plan narrative WQO for bioaccumulative substances states "[M]any pollutants can accumulate on particulates, in sediments, or bioaccumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered."

Because it is the consensus of the scientific community that dioxins and furans associate with particulates, accumulate in sediments, and bioaccumulate in the fatty tissue of fish and other organisms, the Basin Plan's narrative bioaccumulation WQO is applicable to these pollutants. Elevated levels of dioxins and furans in fish tissue in San Francisco Bay demonstrate that the narrative bioaccumulation WQO is not being met. USEPA has therefore included the South San Francisco Bay as impaired by dioxin and furan compounds in the current 303(d) listing of receiving waters where WQOs are not being met after imposition of applicable technology-based requirements.

The CTR establishes a numeric WQO for 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (2,3,7,8-TCDD) of 1.4 x 10^{-8} µg/L for the protection of human health, when aquatic organisms are consumed. When the CTR was promulgated, USEPA stated its support of the regulation of other dioxin and dioxin-like compounds through the use of toxicity equivalencies (TEQs) in NPDES permits. For California waters, USEPA stated specifically, "if the discharge of dioxin or dioxin-like compounds has reasonable potential to cause or contribute to a