CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

REVISED TENTATIVE ORDER
WASTE DISCHARGE REQUIREMENTS FOR:
CARGILL INCORPORATED
POND A18 LOW SALINITY SALT POND
SANTA CLARA COUNTY

FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

1. ***Discharger and Permit Application***. Cargill Incorporated (Discharger) owns an 856-acre salt pond (Pond A18) in south San Francisco Bay (South Bay). It submitted a Report of Waste Discharge (ROWD) to the Board for discharge of low salinity waters from this pond to waters of the State. Once Cargill obtains permits and commences discharge from Pond A18, it expects to transfer ownership and operational responsibility to the City of San Jose.

Facility Description

2. Pond A18 is located near Alviso in the City of San Jose, south of Coyote Slough, east of Artesian Slough, west of BFI's Newby Island Landfill, and north of the Zanker Road landfill and the San Jose/Santa Clara Water Pollution Control Plant (Plant). The location of Pond A18 is shown in Attachment A.

3. Pond A18 used to be part of Cargill's concentrator system; however, the ponds adjacent to Pond A18 were sold in 2003 to the U.S. Fish and Wildlife Service (Service). Order No. R2-2004-0018 permits the Service to discharge saline waters from eight systems that consist of 22 ponds in the Alviso Complex (i.e., Pond Systems A2W, A3W, A7, A14, A16, A19, A20, and A21) to the South Bay and tributaries to the Bay. In July 2004, the Service commenced discharging from Pond Systems A2W, A3W, and A7. The Service intends to begin discharging from Pond Systems A14 and A16 in April 2005, but will not initiate discharge from Pond Systems A19, A20, and A21 (also referred to as the Island Ponds) until 2006 at the earliest.

4. The ROWD indicates that Pond A18 will be managed in a similar manner (circulating Bay water through the pond to control salinity) to those regulated by Order No. R2-2004-0018. The goals of the Pond A18 Management Plan are to: (a) cease salt production, (b) circulate Bay water through the pond and introduce tidal hydrology, (c) maintain existing open water habitat and avoid seasonal pond formation, (d) minimize pond management costs, and (e) meet water quality standards.

5. In implementing the Pond A18 Management Plan, the Discharger proposes to initially release brines within the pond to Artesian Slough, and then circulate Bay water through the pond at a rate that ensures discharge salinities remain near Bay water salinity. The control structures have the ability to close off all flow, allow inflow only, or outflow only, which offers flexibility in management to control salinity and/or water levels. Because of the elevation of tide and pond water levels, water intake must occur at high tide, and discharge must occur at low tide. The initial release of brines from Pond A18 to Artesian Slough should take about two months. Once discharge salinity levels fall below 44 parts per thousand (ppt), the Discharger will operate Pond A18 under continuous circulation conditions.

6. ***Initial Release Scenarios.*** The ROWD proposes that the initial release from Pond A18 commence in March 2005, cease for the month of April, and resume in May 2005 with salinity levels falling below 40 ppt by June 2005. The reason for this staggered initial release is that the Service will commence discharge from Pond

A14 to Coyote Creek and from Pond A16 to Artesian Slough in April 2005. As the initial release of saline waters from these two pond systems will increase salinity levels in receiving waters near the Pond A18 discharge point, the Discharger needs to coordinate with the Service to ensure that the most saline discharges from Ponds A14 and A16 do not coincide with those from Pond A18. There are two scenarios for an initial release from Pond A18, which are as follows:

a. **South Initial Release.** The south initial release would intake water from lower Artesian Slough near Coyote Creek, and discharge in upper Artesian Slough.
b. **North Initial Release.** The north initial release would intake water from upper Artesian Slough, and discharge to lower Artesian Slough near Coyote Creek.

The South Initial Release will result in larger salinity increases than the North Initial Release. This is because ambient salinity levels in upper Artesian Slough (near the Plant) are much lower than those in lower Artesian Slough near Coyote Creek. This salinity differential between upper Artesian Slough and Pond A18 salinities will result in a larger salinity increase under the South Initial Release. While the North Initial Release will not cause a significant increase in receiving water salinity levels, it has a greater potential than the South Initial Release to cause dissolved oxygen depressions in the receiving water. This is because under the North Initial Release, Pond A18 would intake water from upper Artesian Slough (predominantly effluent from the Plant) that is high in nutrient content, and therefore, has the potential to significantly increase the amount of algal growth in Pond A18.

7. ***Continuous Circulation Period.*** After salinity levels fall below 44 ppt, the Discharger will operate Pond A18 under continuous circulation conditions. The ROWD indicates that Pond A18 will have the ability to intake water by gravity through a north culvert structure from Artesian Slough near Coyote Creek, circulate water through the pond, and discharge by gravity through a south culvert to Artesian Slough near the Plant's weir. Additionally, the control structures offer the flexibility to close, allow inflow only, allow outflow only, and the ability to reverse the direction of inflows and outflows when necessary to control salinity and/or water levels. The flow rates will vary over the tidal cycle depending on the difference in water level in the pond and water level in the Bay and associated sloughs where culverts are located. The ROWD indicates that the hydraulic residence time will vary as tidal conditions vary, but will typically range from 15 to 50 days. Table 1 below indicates that the average residence for May through November may be slightly higher than 50 days.

Table 1: Average Summer Hydraulic Residence Time (May through November) for A18 South Discharge

Pond	Area (acres)	Depth (ft)	Volume (acre-ft)	Outlet Flow (ft^3/s)	Residence Time (days)
A18	856	1.8	1540.8	12.6	61.7

While the hydraulic residence time indicated in Table 1 reflects average discharge flows and will likely change based on management practices employed by the Discharger, it does illustrate the management constraint of using flow management as a corrective measure to reduce salinities or increase dissolved oxygen levels.

Applicable Plans, Policies, and Regulations

8. ***Basin Plan***. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21,1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board (State Board) and the Office of Administrative Law on July 20, 1995 and November 13, 1995, respectively. A summary of the regulatory changes is contained in Title 23 of the California Code of Regulations, Section 3912. The Basin Plan identifies beneficial uses and water quality objectives (WQOs) for waters of the state in the Region, including surface waters and groundwater. The Basin Plan also

identifies discharge prohibitions intended to protect beneficial uses. The Board amended the Basin Plan on January 21, 2004, to adopt California Toxics Rule criteria for eight metals in lieu of existing Basin Plan objectives. The State Board and Office of Administrative Law approved this amendment on July 22, 2004, and October 4, 2004, respectively. This Order implements the Basin Plan.

9. Existing and potential beneficial uses for the South Bay and its tributaries, as identified in the Basin Plan and based on known uses of the receiving waters in the vicinity of the discharges, are:

   a. Industrial Service Supply
   b. Navigation
   c. Water Contact Recreation
   d. Non-contact Water Recreation
   e. Commercial and Sport Fishing
   f. Wildlife Habitat
   g. Preservation of Rare and Endangered Species
   h. Fish Migration
   i. Shellfish Harvesting
   j. Fish Spawning
   k. Estuarine Habitat

10. ***California Toxics Rule***. On May 18, 2000, the U.S. EPA published the *Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California* (Federal Register, Volume 65, Number 97, 18 May 2000). These standards are generally referred to as the CTR. The CTR specified water quality criteria (WQC) for numerous pollutants, of which some are applicable to the discharges covered by this Order.

Other Regulatory Bases

11. WQOs/WQC and limitations in this permit are based on the plans, policies and WQOs and criteria of the Basin Plan; California Toxics Rule (Finding 10); *Quality Criteria for Water* (U.S. EPA 440/5-86-001, 1986 and subsequent amendments, "U.S. EPA Gold Book"); the National Toxics Rule (57 FR 60848, 22 December 1992 and 40 CFR Part 131.36(b), "NTR"); NTR Amendment (Federal Register Volume 60, Number 86, 4 May 1995, pages 22229-22237); U.S. EPA December 10, 1998 "National Recommended Water Quality Criteria" compilation (Federal Register Vol. 63, No. 237, pp. 68354-68364); "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" (Thermal Plan)**;** and Best Professional Judgment (BPJ) as defined in the Basin Plan. Discussion of the specific bases and rationale for limits in this Order are given in the associated Fact Sheet, which is incorporated as part of this Order.

12. ***Basin Plan Receiving Water Salinity Definitions.*** The Basin Plan states that the salinity characteristics (i.e., freshwater vs. saltwater) of the receiving water shall be considered in determining the applicable WQC. Freshwater criteria shall apply to discharges to waters with salinities equal to or less than one 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 water with salinities in between these two categories, or tidally influenced freshwaters that support estuarine beneficial uses, the criteria shall be the lower of the salt or freshwater criteria (the latter calculated based on ambient hardness) for each substance.

Receiving Water Salinity and Hardness

13. a. Salinity. The receiving water for the subject discharge is Artesian Slough. This is a tidally influenced waterbody, mostly with significant fresh water inflows during the wet weather season. This Order conservatively assumes that this water body is estuarine under both the Basin Plan and CTR definitions.

Therefore, the applicable WQOs and WQC considered in this Order for all these discharges are based on the lower of the marine and freshwater Basin Plan WQOs, and CTR and NTR WQC.

b. Hardness. Some freshwater WQOs and WQC are hardness dependent. Hardness data collected through the Regional Monitoring Program (RMP) are available for water bodies in the San Francisco Bay Region. In determining the WQOs and WQC for this Order, the Board conservatively used a hardness of 400 mg/L. The minimum observed hardness at the RMP San Jose Slough Station (C-3-0) from 1994-2002 was 510 mg/L. However, the CTR states that if the hardness is over 400 mg/L, criteria are calculated using a hardness of 400 mg/L in the hardness equation. The data from the RMP San Jose Slough Station represents the best available information for the hardness of the receiving water after it has mixed with the discharge.

Receiving Waters

14. ***South San Francisco Bay***. The South Bay is a complex and dynamic estuarine system influenced by ocean tides, winds, and freshwater flows. The ROWD explains that currents in the South Bay are predominately tidal driven and that wind and density driven currents are less important. The salinity levels in the South Bay are dependent on salinity in the Central Bay and its exchange of water with the South Bay, freshwater input, and evaporation. Of these three, freshwater input into the South Bay is the most variable during the year and between different years. Therefore, freshwater input primarily drives salinity variations in the South Bay.

15. ***Tidal Sloughs near Pond A18***. Tidal sloughs that border Pond A18 include Coyote Creek, the Coyote Creek Bypass Channel, and Artesian Slough. Coyote Creek and the Coyote Bypass Channel border Pond A18 to the north. Coyote Creek is a large tidal slough and a significant source of freshwater to the South Bay in the winter and spring. Artesian Slough borders ponds A16, A17, and A18, and is a tributary to Coyote Creek. The San Jose/Santa Clara Water Pollution Control Plant (Plant) discharges approximately 120 million gallons per day (mgd) (~190 ft^3/s) at the upstream end of Artesian Slough. The ROWD indicates that Coyote Creek and Artesian Slough both contain strong salinity gradients and frequently contain vertical salinity stratifications. Typically, Coyote Creek is stratified during the winter and Artesian Slough is stratified year round.

Overview of Pond A18 Discharge

16. This Order permits discharge from Pond A18 under an initial release scenario where high salinities will likely impact beneficial uses in the short term, but impacted areas are expected to fully recover within one year. This Order also permits subsequent discharge from Pond A18 as waters from Artesian Slough are taken into Pond A18 and then discharged more or less continuously (continuous circulation). For the continuous circulation period, the Discharger must manage Pond A18 to ensure beneficial uses remain protected. The initial release refers to the time expected to substantially empty Pond A18 of its current contents. Modeling performed by the Discharger indicates that the duration of the initial release will be about eight weeks or less. As described in further detail in later findings, it is the position of the Board that the long-term water quality benefits of this project (i.e., cessation of salt-making and maintaining open water habitat) outweigh potential short-term impacts associated with the initial release.

17. There are two types of discharge associated with the Pond A18 Management Plan: (a) initial release of saline waters already in Pond A18, and (b) continuous circulation of water in and out of Pond A18. The main parameters of concern for this discharge include salinity, metals, dissolved oxygen, pH, and temperature. The initial release section focuses on salinity and metals since dissolved oxygen, pH, and temperature will be more of a concern during the late summer months of the continuous circulation period. The initial release is proposed to commence in March 2005 and end by June 2005.

18. ***Hydrological Modeling***. To determine the spatial extent and duration of salinity and metals increases under various planning scenarios, the Discharger performed hydraulic modeling to predict salinity and water elevation changes under conditions expected under the Pond A18 Management Plan. The model used recorded tides, evaporation, and rainfall for the period from spring 1994 through the fall of 1995. For the

initial release, 1994 represents a dry year, and therefore, illustrates a worst-case scenario. The ROWD indicates that computer models were used to estimate water surface elevations, velocities, and salinity within Pond A18 and its receiving waters. The pond model estimates inflows to the Pond, water evaporated from the pond, water added by precipitation, and flow rates from the Pond to Artesian Slough. To estimate conditions in the South Bay and Artesian Slough, a three-dimensional hydrodynamic model was used. The pond model assumes (a) complete mixing, (b) uniform bottom elevation, and (c) unidirectional flow from the intake to the outlet.

19. ***Maximum Salinities for Initial Release***. In developing salinity standards for the initial release, the Discharger indicates that Pond A18 will not contain salinity levels above 135 ppt since gypsum (calcium sulfate) begins to precipitate in water with salinities above 146 ppt. As calcium sulfate does not readily dissolve in water and the precipitation of which may cause the toxicity of saline waters above this threshold to increase significantly, the Discharger needs to ensure that salinity levels remain below this level. To ensure that the effect of the initial release is consistent with those presented in the ROWD, this Order includes constraints on the timing of the initial release from Pond A18 and contains a salinity limit that is equal to that modeled.

20. ***Significance of Salinity Increases and the Initial Release***. In determining the significance of salinity increases in Artesian Slough from the initial release, the Discharger used two thresholds: a) the magnitude and duration of salinity increases, and b) the spatial extent of those increases. To determine the level of salinities that would likely result in a significant impact, the ROWD developed levels that were likely to cause acute or chronic effects on aquatic life (these levels are described in detail in the Fact Sheet). The ROWD concluded that significant acute effects would likely occur if salinities exceeded 41 ppt for 2 hours and that significant chronic effects would likely occur if salinities exceeded 38 ppt for 24 hours. It also concluded that potentially significant acute effects might occur if salinities exceeded 38 ppt for 2 hours and that potentially significant chronic effects might occur if salinities exceeded 35 ppt for 24 hours. The ROWD considered acute and chronic effects to be significant or potentially significant, if pond waters would result in more than 10% of a receiving water exceeding these criteria.

21. ***Salinity Increases***. During the initial release period, the ROWD indicates that salinity levels in Artesian Slough and Coyote Creek will be elevated under both the North and South Initial Release scenarios. For the North Initial Release scenario, the Discharger predicts relatively small increases in salinity, and indicates adverse affects on aquatic life are unlikely. For the South Initial Release scenario the ROWD predicts that salinity increases in Artesian Slough may be high enough to cause a temporary impact to some resident aquatic species near the discharge point, but expects recovery from such impacts to occur in less than one year. During the continuous circulation period, the ROWD predicts that salinity increases in Artesian Slough and Coyote Creek should be localized and not exceed 1 to 2 ppt, which should not present a risk to resident aquatic life.

    a. <u>South Initial Release:</u> The highest salinity elevations in Artesian Slough and Coyote Creek are predicted to occur during the first week of March. On a depth-averaged basis, the ROWD predicts salinity increases of 10-20 ppt in most of Artesian Slough, and 1-5 ppt in portions of Coyote Creek. Salinity increases near the bottom of Artesian Slough up to 25 ppt are expected. During the initial release, the highest depth-averaged salinity predicted in Artesian Slough is 34 ppt near the Pond A18 discharge point.

    b. <u>North Initial Release:</u> The highest salinity elevations in Artesian Slough and Coyote Creek are predicted to occur during the month of March with a maximum bottom salinity increase of about 5 ppt. The ROWD indicates that most of Artesian Slough should experience salinity increases of about 2-3 ppt, and portions of Coyote Creek should experience salinity increases of about 1-3 ppt. The highest depth-average salinity should be about 23 ppt near the confluence of Artesian Slough and Coyote Creek.

c. Continuous Circulation Before Island Pond Breaching: Modeling efforts indicate that on September 15 (worst-case scenario), salinity increases in Artesian Slough will be in the range of 1-2 ppt for continuous discharges from the southern structure.

d. Continuous Circulation After Island Pond Breaching: Modeling efforts indicate that on September 15 (worst-case scenario), salinity increases in Artesian Slough will be about 1 ppt for continuous discharges from the southern structure.

22. ***Salinity as a Surrogate for Metals***. If only evaporation affected metals concentrations, they would increase proportionately with salinity. However, other factors within Pond A18, such as biological uptake and adsorption to fine sediments, reduce metals concentrations. Accordingly, using salinity as a surrogate for metals concentrations should be more protective, as it will only consider evaporation, which is the mechanism by which metals concentrations increase. Besides offering more protection, the use of salinity will give the Discharger immediate feedback on conditions at discharge points and within Pond A18, and thereby, enable it to implement corrective measures in a timely manner based on monitoring results.

23. ***Salinity and Metals Concentrations for Initial Release.*** To determine expected metals concentrations for different salinity ranges, the Discharger (a) collected samples from the salt ponds in October 2002 along a salinity gradient (salinities ranged from 31.6 to 279 ppt), and (b) used RMP data from the South Bay and Dumbarton Bridge (salinities ranged from 12 to 20 ppt). Table 2 below show the modeled salinity in ppt for Pond A18 and the corresponding estimated maximum metals concentration in μg/L (except for mercury which is in ng/L). Metal concentrations in the discharge that are expected to exceed the minimum applicable receiving water quality objective or criterion are shown in italics.

Table 2: Proposed Maximum Salinities and Metals for Initial Discharge from Pond A18

Pond System	Modeled Salinity	Cr	Ni	Cu	Zn	As	Se	Ag	Cd	Hg	Pb
A18	135	2.36	21.8	3.39	4.49	*56.2*	0.31	0.15	0.119	49.7	1.37
WQO[1]		11.4	27	13	86	36	5.0	2.2	0.76	50	8.5

[1] The water quality objectives south of Dumbarton Bridge apply to discharges from the Alviso Ponds. The water quality objectives for chromium and cadmium are freshwater driven and are based on a hardness of 400 mg/L. The initial release of highly saline waters from Alviso Ponds may cause some receiving waters to contain salinity and arsenic in excess of water quality objectives for a short duration.

As shown in Table 2 above, the initial release from Pond A18 has the potential to cause Artesian Slough to exceed the water quality objective for arsenic. However, modeling efforts by the Discharger indicate that if this exceedance occurs it is expected to be short-lived (i.e., less than one month) and would only occur near the discharge point since waters from Pond A18 mixed with Artesian Slough arsenic concentrations would quickly fall well below the water quality objective.

24. ***Calculation of Discharge Limits for Initial Release***. In estimating maximum salinities for the initial release, the Discharger considered salinity values from Pond A18 for the whole calendar year. The ROWD indicates that salinity values have varied from 100 to 200 ppt. To ensure that salinity levels are below the level at which calcium sulfate precipitates (i.e., 146 ppt), the Discharger proposed a salinity limit of 135 ppt. Since this proposed limit is below historical levels in the pond, performance-based limits for the initial release were not considered as was done for certain ponds associated with Order No. R2-2004-0018.

25. ***Timing of Initial Release***. During the late summer and early fall, the salinity levels in the South Bay are near uniform and may be close to oceanic (31-33 ppt). This is because freshwater inputs to the South Bay during the summer months are almost exclusively from wastewater treatment plants and evaporation nearly offsets these inputs. In the winter months, salinity levels in the South Bay are often stratified and variable

due to large freshwater inputs and the resulting density-driven exchange between the Central Bay and the South Bay. The ROWD includes the variability of salinities measured by the U.S. Geological Service in the main channel of the South Bay between 1988 and 2000. This shows that the lower salinity values typically occur between February and April. As the discharge of high salinity waters from Pond A18 has the potential to cause salinity increases that may be toxic to aquatic life, it is appropriate to require relatively higher salinity discharges during a time-period that has the smallest potential to adversely affect aquatic life in the South Bay. The ROWD indicates that late February/early March was proposed for the commencement of the initial release since it would (a) take advantage of higher assimilative capacity for saline waters, and (b) be during the period when few bay shrimp are present.

26. ***Migration of Salmonids***. The ROWD indicates that steelhead trout and Chinook salmon migrate in areas in Coyote Creek, which is near the Pond A18 discharge. The ROWD also indicates that salt pond discharges will not affect spawning areas for both of these species. The table below describes the upstream and downstream migration periods when saline waters have the potential to affect migrating salmonids.

Table 3: Migration Periods for Salmonids

Species	Upstream Migration	Downstream Migration
Steelhead Trout	January-March	March-April
Chinook Salmon	September-November	March-April

For the March initial release, modeling efforts by the Discharger show minimal increases in salinity in Coyote Creek. For adult salmonids migrating upstream, the circulation of water through Pond A18 is not expected to interfere with the signal adults use to find their spawning grounds (i.e., natal-stream water gradients in Coyote Creek will remain intact during upstream migration periods). On entrainment, the ROWD indicates that juvenile salmonids migrating downstream should not be substantially affected by the Pond A18 intake. This is because the migration corridor for salmonids is Coyote Creek, and hydrodyanmic modeling indicates that only about two percent of Coyote Creek water should enter the Pond A18 intake structure, which is in Artesian Slough.

27. ***Bay Shrimp***. Bay shrimp are present in the South Bay and adjoining tributaries and sloughs throughout the entire year. The density and age structure of the bay shrimp population exhibits considerable temporal variability. The ROWD indicates that the amount of bay shrimp in the main channel of the South Bay (the prime fishing area) varies considerably over the course of a year, with the high point occurring in September and October and the low point occurring in March and April. For the proposed March 2005 initial release, the ROWD indicates that no significant decreases in bay shrimp habitat should occur from May through August 2005. Since bay shrimp are not normally present in sloughs in March or April, the beginning of the initial release should not adversely affect them. For continuous discharges, the ROWD indicates that no loss of bay shrimp habitat should occur due to the Pond A18 discharge. To minimize potential impacts to bay shrimp from the initial release, this Order requires that it commence between mid-February and mid-March.

28. ***Initial Release and Recovery***. During the initial release, Pond A18 may adversely affect aquatic life in zones near the discharge point. The ROWD explains that such effects would be short-lived and that the aquatic community would recover quickly. For the North Initial Release, the ROWD does not predict impacts to benthic organisms since salinity increases should be small, but for the South Initial Release, the ROWD predicts that salinity increases in Artesian Slough may be high enough to cause a temporary impact to some resident aquatic species near the discharge point, but expects recovery from such impacts to occur in less than one year. To support this position, the ROWD cites studies that describe quick recovery times for benthic communities subject to perturbations that significantly reduced their numbers. The Fact Sheet summarizes a number of these studies and describes the effect of the initial release on benthic communities in more detail.

29. ***Providing Open Water Habitat and Cessation of Salt-Making Outweighs Short-Term Exceedances***. To maintain open water conditions in Pond A18, the ROWD indicates that the Discharger must provide circulation of Bay water. This is because the hydrologic connection between Pond A17 and A18 is being severed due to the implementation of the Initial Stewardship Plan (ISP) (historically, a siphon under Artesian Slough transferred brine from Pond A17 to A18). Without the introduction of Bay water, Pond A18 would dry out during the summer and become a seasonal pond in the winter, which would significantly reduce open water habitat. The finding of net environmental benefit is also based on timely cessation of salt-making operations and the avoidance of the negative consequences of project delays on buildup of salt in the former salt pond and the associated water quality risks and management costs, as historically experienced by the dischargers with the North Bay salt ponds.

30. ***Lagoon Management and Ultimate Use of Pond A18:*** The continuous circulation phase is considered by the Board to be a transitional phase between salt-making and future uses. This transitional lagoon management phase benefits the environment in the near term by avoiding the consequences of maintaining Pond A18 as a seasonal pond. In order to provide water quality and ecosystem benefit to offset potential low dissolved oxygen conditions associated with lagoon management, the Discharger shall commit to a long-term planning effort for the ultimate uses of Pond A18. The planning effort must include analysis of benefits to water quality and beneficial uses.

Continuous Circulation Period

31. After the eight-week period of initial release, Bay waters will be taken into Pond A18 and discharged based on tidal flows. The continuous circulation period refers to the long-term operation of Pond A18 after the initial release. Since Cargill intends to transfer ownership of Pond A18 to the City of San Jose, the long-term management/restoration efforts are unknown at this time. As ponds will concentrate waters from the South Bay and/or sloughs, the main concern with discharges from these systems is for pollutants that have the potential to adversely affect aquatic life. The main parameters of concern for the continuous circulation period include salinity, metals, dissolved oxygen, pH, and temperature.

32. ***Design and Operation of Water Control Structures for Continuous Circulation.*** After the initial release of brines, the discharge is designed to provide adequate circulation and water quality control to operate at 40 ppt. Additionally, the ROWD indicates that control structures offer the flexibility to close, allow inflow only, allow outflow only, and the ability to reverse the direction of inflows and outflows when necessary to control salinity and/or water levels. Intake of Bay water into Pond A18 will occur at high tide and discharge will occur at low tide. While the Discharger designed Pond A18 to ensure that salinity levels remain below 40 ppt, to ensure a factor of safety, it modeled salinity levels near 44 ppt to be conservative in determining impacts. The Discharger based pond operations described in its ROWD on modeling results. As such, the Discharger indicates that it may need to modify the operation of Pond A18 based on the results of wildlife and water quality monitoring.

33. ***Salinity Increases from Continuous Circulation***. To evaluate potential impacts to receiving waters from increases in salinity, the Discharger used hydrodynamic modeling and the criteria it developed for determining impacts during the initial release (described in Finding No. 21). In this evaluation, the Discharger showed that continuous circulation of pond waters would not cause any significant or potentially significant impacts to any receiving waters. The Fact Sheet describes the rationale of this conclusion in detail.

34. ***Continuous Circulation Salinity***. The ROWD indicates that under the continuous circulation period, water control structures at Pond A18 are designed to maintain year-round discharge levels below 40 ppt, but to account for operational issues the Discharger evaluated salinity peaks up to 44 ppt. Pond A18 will discharge saline waters to Artesian Slough, which flows to Coyote Creek, and eventually to the South Bay. To predict increases in salinity under the initial release and continuous circulation periods, the Discharger conducted

hydrodyanmic modeling. To evaluate the potential effect of stratification on benthic organisms, the ROWD explains that the Discharger performed a sensitivity analysis for Artesian Slough and Coyote Creek to compare the extent and intensity of bottom salinities to depth-averaged salinities. This analysis showed no difference in daily average conditions and larger difference in intensity for daily maximum values. The differences in intensity for daily maximum salinity values are expected to occur near the pond discharge due to stratification at low tide.

35. ***Metals Concentrations during Continuous Circulation.*** During the continuous circulation period, metals concentrations in the discharge should not exceed applicable water quality objectives provided the Discharger operates the pond system to maintain salinities below 44 ppt. The table below shows the estimated maximum salinity of 44 ppt for the pond system and the corresponding estimated maximum metals concentration in µg/L (except for mercury which is in ng/L). This indicates that during continuous discharges from Pond A18, water quality objectives for metals will be met.

Table 4: Estimated Maximum Salinities and Metals Levels for Continuous Circulation for Pond A18[1]

Maximum Salinity	Cr	Ni	Cu	Zn	As	Se	Ag	Cd	Hg	Pb
44 (ROWD)	6.94	11.8	5.92	10.45	11.9	0.42	0.02	0.108	23.9	1.52
WQO[2]	11.4	27	13	86	36	5.0	2.2	0.76	50	8.5

[1] To estimate the maximum metals concentrations from Pond A18 for continuous discharges, the ROWD considered an average of RMP data from 1997-1999 at the South Bay Station and salt ponds with salinities of 31.6 and 42 ppt.

[2] The Basin Plan only specifies water quality objectives south of Dumbarton Bridge for copper and nickel. For the other inorganics, water quality objectives are from the California Toxics Rule. Since the Board must express limits for metals in the total recoverable form, Board staff used default translators to convert dissolved water quality objectives to total. The water quality objectives for chromium and cadmium are freshwater driven and based on a hardness of 400 mg/L as $CaCO_3$.

36. ***Salinity and Metals Limits for Continuous Circulation***. Modeling performed by the Discharger indicates that, provided salinities remain below 44 ppt, salinity levels will not adversely affect receiving waters. To support this position, the ROWD documents the magnitude and spatial scale of salinity increases and shows that these increases are unlikely to adversely affect aquatic organisms. The Fact Sheet describes the results of this analysis in more detail. Additionally, analytical data shows that ponds with salinity levels below 44 ppt should result in discharges of metals that do not exceed water quality objectives. To ensure that salinity levels from the discharge do not pose a threat to aquatic life, the Discharger will operate Pond A18 in a manner that ensures the maximum discharge salinity does not exceed 44 ppt. Since this Order uses salinity as a surrogate to regulate the concentrations of metals discharged, the Discharger needs to ensure through monitoring that evaporation does not concentrate metals to a point where they could be toxic to aquatic life. Accordingly, this Order includes monitoring for salinity and metals to ensure the Discharger has data to adaptively manage Pond A18. This will ensure corrective measures if increases in salinity and metals concentrations from evaporation pose a threat to water quality. If self-monitoring data shows that the salinity limitations do not offer adequate protection, this Order will be reopened.

37. ***Downstream Migration of Salmonids during Continuous Circulation***. The ROWD explains that one concern with the circulation of pond water was that it could potentially interfere with the signal migrating salmonids follow to reach their spawning grounds. To address this concern, the ROWD indicates that the Discharger performed 3-dimensional modeling to show that "natal-stream water" gradients will remain intact in migration corridors during upstream migration periods. On entraining outmigrating juvenile salmonids, the ROWD indicates that the percentage of Coyote Creek water expected to enter the intake of Pond A18 would be 2.33% under average flow conditions, and 1.34% under peak winter flow conditions. This would be indicative of the likelihood for juveniles to be entrained in Pond A18 (assuming juveniles were floating in the water, and not actively swimming downstream towards the Bay). Once the Island Ponds are breached, the ROWD indicates that these percentages decrease to 1.61% and 1.07%, respectively.

38. ***Dissolved Oxygen and pH***. In lower salinity ponds, dissolved oxygen and pH may present water quality concerns. Studies of salt ponds conducted in the 1980s[1] indicate that dissolved oxygen concentrations in low salinity ponds (less than 30 ppt) have ranged from 1.4 to 20.0 mg/L and that pH levels in these ponds have ranged from 7.2 and 9.5. Observed low dissolved oxygen levels and high pH values in low salinity ponds are likely a result of excessive algal growth. According to the Restoration Report[1], these low salinity ponds are likely conducive to algal growth because (a) more algal species can tolerate salinities in this range, and (b) they tend to have elevated nitrogen and phosphorus concentrations from local urban sources, and warm temperatures.

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[1] A report by Stuart Siegel and Philip Bachand: *Feasibility Analysis: South Bay Salt Ponds Restoration* (referred to in this Order as the Restoration Report) cites two studies conducted in the 1980s: *The Causes and Control of Hydrogen Sulfide Emissions in the Leslie Salt Company Alviso Evaporation Ponds* and *Algal Proliferation in Salt Ponds of the South San Francisco Bay*.

39. ***Dissolved Oxygen***. In evaluating the potential for dissolved oxygen depressions (or sags) in Artesian Slough and Coyote Creek, the ROWD indicates that the Discharger (a) evaluated dissolved oxygen conditions in receiving waters associated with the pond discharges, (b) reviewed dissolved oxygen monitoring data collected during the initial release period from the Initial Stewardship Plan (ISP) ponds during the summer of 2004, and (c) performed a laboratory study to evaluate the potential for dissolved oxygen sags in Artesian Slough from Pond A18 discharges. Based on these analyses (described below), the Discharger indicates that the potential for dissolved oxygen sags in Artesian Slough from Pond A18 discharges is less than significant.

    a. ISP Analysis: This evaluation involved evaluating oxygen demand and dissolved oxygen dynamics in ponds. The Discharger determined that increased oxygen demand or low dissolved oxygen levels is due to the presence and respiration of algae in pond water, and with minimal ambient light conditions (~8 hrs) no net loss of dissolved oxygen should occur in sloughs or the Bay over a 24-hour period. As described in a later finding, the results of a September 2003 study on dissolved oxygen dynamics showed that dissolved oxygen levels drop below 5.0 mg/L in many of the ponds near dawn, but that levels recover in the afternoon hours.

    b. Review of ISP Data: In the summer of 2004, the Service commenced the initial release of pond waters from Ponds A2W, A3W, and A7. Monitoring efforts showed that dissolved oxygen levels in Ponds A2W and A7 exhibited a strong diurnal pattern (low dissolved oxygen near dawn), but that receiving water monitoring in the South Bay and Alviso Slough did not detect reductions in dissolved oxygen levels from these discharges. The discharge from Pond A3W showed consistently low dissolved oxygen levels, and monitoring of Guadalupe Slough indicates that Pond A3W may have caused dissolved oxygen depressions. To evaluate why dissolved oxygen levels in Pond A3W were severely depressed on a consistent basis, the Discharger performed two surveys and learned the low dissolved oxygen levels in the Pond A3W discharge were the result of a mat of decaying algae, and were not representative of the general state of the pond. Since the discharge point for Pond A3W is located on the edge of this algae mat, it contains depressed dissolved oxygen levels. The ROWD indicates that salt ponds should exhibit a diurnal dissolved oxygen pattern, with supersaturated conditions during the day, and low levels during the night and predawn hours. The ROWD explains that this should not cause significant dissolved oxygen depression in sloughs. In situations where the discharge point is near accumulating dead algae, the discharge could produce a significant dissolved oxygen sag in receiving waters. For the Pond A18 discharge, the ROWD explains that accumulation of dead algae near the discharge point should not occur because the discharge structures are on the upwind side of the Pond.

    c. Laboratory Study: To evaluate the potential for dissolved oxygen sags in Artesian Slough from Pond A18 discharges, the Discharger performed laboratory simulations in which algal populations developed densities similar to those expected in Pond A18 during a later-summer continuous circulation period.

The laboratory simulation formulated estimated compositions of water (i.e., Bay water, Artesian Slough water, Pond A18 discharge water, and Pond A16 discharge water), and tested oxygen demand. The ROWD indicates that circulating water through Pond A18 (under both scenarios) should not reduce dissolved oxygen levels in Artesian Slough to a point where adverse affects to aquatic life would occur. However, the ROWD explains that Pond A18 discharges would remain higher in dissolved oxygen when discharging through the south structure because intake water at the north structure will contain less effluent from the Plant. The ROWD indicates that the laboratory study showed that for simulations using intake water from the south structure, algae levels were significantly higher than those found in simulations using water from the north structure or the control (all Bay water). This indicates that Pond A18 would have a higher potential to discharge waters low in dissolved oxygen should it intake water from the south structure (i.e., near the Plant's discharge point).

40. ***Diurnal Variations in Dissolved Oxygen, and pH***. Algal growth in salt ponds could cause dissolved oxygen and pH levels to vary significantly over the course of a day. This is because during daylight hours, photosynthesis will produce oxygen and consume dissolved carbon dioxide (which behaves similar to carbonic acid). During nighttime hours, respiration will produce dissolved carbon dioxide and consume oxygen. Therefore, any significant algal growth will cause dissolved oxygen and pH levels to peak during the late afternoon and to be at their lowest levels in pre-dawn. As described in Finding 38, studies conducted in the 1980s indicate that dissolved oxygen and pH values could be at levels of concern. To determine the diurnal and spatial variation of dissolved oxygen and pH levels in low salinity ponds, the Discharger collected a number of samples from ponds A2E, A3W, B2, B4, and A13. These results, summarized in Table 5 below, show a diurnal variation in dissolved oxygen, but not pH.

Table 5: Dissolved Oxygen and pH Ranges

Pond	Salinity	Dissolved Oxygen Range		pH Range
		At Dawn (mg/L)	At Midday (mg/L)	
A2E	32.9	2.9 to 9.2	7.8 to 12.6	9.68 to 10.03
A3W	40.8	4.3 to 5.5	6.6 to 7.4	9.47 to 9.68
B2	39.3	3.8 to 5.9	7.1 to 10.5	8.07 to 8.27
B4	42.0	0.3 to 5.4	6.8 to 13.3	8.44 to 9.04
A13	63.3	2.5 to 3.4	6.5 to 8.0	8.47 to 8.57

The above results indicate that some pond waters may not meet the receiving water objectives in the Basin Plan of 5.0 mg/L for dissolved oxygen, and 6.5 to 8.5 for pH at the discharge point. However, it is difficult to collect data that will be fully representative of continuous circulation discharges for these parameters. This is because the amount of algal growth will relate to how quickly Bay waters flow through pond systems. To address potential exceedances of receiving water objectives in the Basin Plan for dissolved oxygen and pH, this Order requires that the Discharger document in its Operation Plan how it will ensure that mitigation measures can be readily implemented (e.g., increasing flow-through, installing portable aerators, harvesting algae, and/or temporarily ceasing discharge).

41. ***Temperature***. Due to shallow water depths and limited tidal exchange, water temperature in the salt ponds becomes elevated and varies widely throughout the day. Annual water temperatures within salt ponds generally range from 40 to 80°F and generally track with air temperature. The State's Thermal Plan indicates that discharges shall not exceed the natural temperature of receiving waters by 20°F, and discharges shall not cause temperatures to rise greater than 4°F above the natural temperature of the receiving water at any time or place. The ROWD indicates that temperatures collected in the salt ponds on August 26 and 27, 2002, showed values ranging from 19.5 to 32.8°C (67.1 to 91.0°F), and values in the Bay ranging from 26.7 and 28.1°C (80.1 to 82.6 °F). These results indicate that salt pond discharges, including Pond A18, should comply with the Thermal Plan.

42. ***Dissolved Oxygen, pH, and Temperature Limits***. As Pond A18 is of shallow depth (one to three feet), near the Plant outfall, and will be subject to significant heating and potentially excessive algal growth in the late summer months, the Discharger needs to ensure that pond circulations are adequate to comply with Basin Plan objectives for pH, dissolved oxygen, and temperature. Compliance with these limits may be dependent on a number of factors beyond the Discharger's control. Factors that influence dissolved oxygen levels both in the pond and in the receiving waters include strength and level of tides, other inflows into receiving waters (such as pond discharges from ISP ponds), rainfall, wind direction, temperature, time of day, amount of sunlight, and seasonal effects. Sloughs, creeks, lagoons, and other shallow areas of the Bay also experience significant variability in dissolved oxygen levels as a result of a combination of these factors. Therefore, this Order requires that the Discharger make a timely report to the Board, and implement corrective measures (e.g., increase flow-through rates, daily restrictions on discharge, and/or aeration), as appropriate, if monitoring data suggests that salt pond discharges have the potential to adversely affect receiving waters. To ensure that dissolved oxygen levels in the receiving water are not adversely affected, this Order requires that the receiving water or discharge contain at least 5 mg/L of dissolved oxygen at any time Pond A18 is discharging, or that the Discharger document that if the receiving water dissolved oxygen upstream of the discharge point is below 5 mg/L, that the discharge will not further depress dissolved oxygen levels.

    To ensure that dissolved oxygen levels from the discharge are not adversely affecting receiving waters, this Order also includes a trigger value for the continuous circulation period. If dissolved oxygen levels fall below a 10^{th} percentile of 3.3 mg/L (calculated on a weekly basis) at the point of discharge, the Discharger shall make a timely report to the Board, and implement Best Management Practices described in its Operations Plan, as appropriate. These adaptive management techniques may include aeration, controlling the flow rate of the intake or discharge, reversing direction of flow, controlling the timing of the discharge, or temporarily suspending the discharge until this trigger is met. The dissolved oxygen trigger is based on levels found in Artesian Slough near the Heron Rookery in July 1997. These values are the most relevant representation of natural dissolved oxygen variations in sloughs or lagoon systems currently available. Once the Discharger has collected sufficient data to establish a connection between discharge monitoring and receiving water data, it may be possible for the Discharger to develop more relevant performance criteria. Therefore, this Order provides the Discharger with the opportunity to develop alternative trigger values subject to Executive Officer or Board approval.

    For pH, this Order requires that discharges contain a level between 6.5 and 8.5 or that the Discharger document that receiving waters near the point of discharge meet this limit. For temperature, this Order requires that discharges comply with the State's Thermal Plan (i.e., discharges shall not exceed the natural temperature of receiving waters by 20°F and shall not cause temperatures to rise greater than 4°F above the natural temperature of the receiving water at any time or place). The Operations Plan will describe receiving water monitoring for pH, dissolved oxygen, and temperature. The Fact Sheet discusses the rationale for dissolved oxygen and pH limits in further detail.

43. ***Toxic Organic Pollutants***. To evaluate the potential for toxic organic pollutants to be present, the Discharger sampled five ponds with salinities ranging from 16 to 185 ppt. The results showed that only one pollutant (bis(2-ethylhexyl) phthalate) was detected at a trace level (1.93 µg/L) that could not be quantified. The ROWD also indicates that dioxins and furans were analyzed from three ponds, and were nondetect or found at concentrations below the method calibration limit. For the most toxic organic pollutants, the primary concern is the mass discharged, as their water quality objectives are driven by bioaccumulation in aquatic organisms. Since Pond A18 will be circulating waters from the South Bay or sloughs, the mass of toxic organic pollutants discharged will be the same as that taken in by the Pond.

Sediments

44. ***Summary of Sediment Data***. Based on sediment data collected by the Discharger, this Order concludes that pollutants have not accumulated in Pond A18 to levels that (a) exceed ambient conditions in the South Bay, and (b) could be toxic to wildlife. Findings 47-54 provide the basis for this conclusion.

45. ***Collection of Pond Sediment Samples.*** Based on topographical maps, the ROWD indicates that Pond A18 was first operated for salt production between 1929 and 1947. In the area of Pond A18, sediments have historically been subject to significant sources of contamination from mining, which resulted in the mobilization of large amounts of mercury-rich sediment to downstream areas. Since Pond A18 was diked for salt-making operations, the source of contaminant input has been restricted to intake water. In 2002, 14 sediment samples were collected as cores to a depth of 5 feet with subsamples taken at 0.5 and 5 feet to be analyzed for pH, sulfate, sulfide, chloride, and 17 metals. In conjunction with the ISP, the Discharger also collected samples for inorganics and toxic organic pollutants from several salt ponds.

46. ***Screening Values***. To determine if sediments in salt ponds contain elevated levels of inorganics, the Discharger compared available sediment data with screening values. Screening values include: San Francisco Bay Ambient Values developed by the Board in 1998, Effects Range-Low and Effects Range-Median toxicity based thresholds developed by the National Oceanic and Atmospheric Administration (NOAA) in 1995, and ambient data from the Guadalupe River and other areas near the Pond A18.

47. ***Ambient Levels***. A Board staff report entitled *Ambient Concentrations of Toxic Chemicals in San Francisco Bay Sediments* (hereafter Sediment Report) summarizes ambient concentrations of chemical compounds found in San Francisco Bay sediments. It recommends setting the ambient threshold at the 85th percentile and explains that sediment concentrations above this threshold would be considered evidence of contamination. In developing the ambient threshold, the Sediment Report explains that (a) samples were collected in the upper 5 cm at sampling stations away from point and nonpoint sources of pollution to represent the cleanest sediments in the Bay, (b) a statistical approach was used to remove outliers, and (c) the 85th percentile was established with a 95% confidence level.

48. The Sediment Report indicates that establishing background conditions for metals was difficult, as the concentration of metals in sediment was dependent upon grain size. Additionally, the Sediment Report explains that the relationship between chemical concentration of metals and percent fines is a complex function of differences in surface area, ion exchange capacity, organic carbon content, and minerology. To account for different background concentrations based on grain size, the Sediment Report established two bounds: one for 40% fines and one for 100% fines for coarse grain and fine grain sediments. The ROWD indicates that for wetland and floodplain environments, natural sedimentation predominately involves fine-grained sediments, and therefore, it compared the concentrations of pollutants in pond sediments with the background concentrations established for 100% fines.

49. The Sediment Report indicates that there would be little environmental benefit to insist that sediment concentrations in a restored pond or wetland fall below ambient concentrations, as the new pond or wetland substrate will be comprised of sediment deposited by re-suspension from surrounding sources.

50. NOAA in 1995 published effect-ranges that relate to the potential toxic effects of pollutants. The cutoff points corresponding to the effect ranges are the low (ER-L) and median (ER-M). NOAA calculated these values by examining a range of chemical concentrations associated with adverse biological affects. Further, the ER-L values represent the lower 10th percentile concentration of the data; concentrations near these values should rarely cause adverse biological effects, while the ER-M values represent the 50th percentile of the data; concentrations above these values are likely to cause adverse biological effects.

51. ***Data Evaluation***: In analyzing inorganics, the Board compared the median of Pond A18 values to ambient values contained in the Sediment Report and to the ER-L values published by NOAA. Table 6 below summarizes the results of this analysis:

Table 6: Summary of Inorganics in Pond A18 and Screening Levels

Constituent	Pond A18 Value[1]	Ambient	ER-Low	Above Ambient and ER-Low?
Arsenic	Nondetect	15.3	8.2	No
Cadmium	Nondetect	0.33	1.2	No
Chromium	82	112	81	No
Copper	36	68.1	34	No
Lead	Nondetect	43.2	46.7	No
Mercury	0.11	0.43	0.15	No
Nickel	102	112	20.9	No
Selenium	Nondetect	0.64	N/A	No
Silver	Nondetect	0.58	1	No
Zinc	86	158	150	No

[1] These values are in mg/kg dry weight.

As shown in the Table 6, the Discharger did not detect any inorganics above ambient levels in the Bay. Therefore, it does not appear sediments contain inorganics at levels that could be toxic to wildlife.

52. ***Toxic Organic Pollutants***. Salt ponds are not expected to contain toxic organic pollutants above background levels, as the mechanism by which salt ponds would accumulate toxic organic pollutants is through the intake of Bay water. This is because suspended solids are the transport mechanism for toxic organic pollutants, and according to the Restoration Report, the current hydraulic regime results in muted flows that minimize the amount of suspended solids that enter the ponds. To confirm that salt pond sediments do not contain elevated levels of toxic organic pollutants, the ISP indicates that the Discharger collected samples from several ponds. The ISP indicates that toxic organic pollutants were either nondetect or similar to ambient concentrations found in the Bay.

Mercury Methylation. Mobilization of Inorganics, and Baseline Sampling

53. While this Order finds that concentrations of inorganics in pond sediments are not elevated over background levels, one area of concern is the potential for mercury methylation. Additionally, it is possible that changes in the hydraulic regime could cause inorganics in the sediment to mobilize if pH levels decrease.

54. ***Inorganic Mobilization.*** The ROWD indicates that very shallow water depths or sediment exposure to air can result in oxidation of sulfides and organic matter that strongly bind to inorganic contaminants. The oxidation of sulfides ultimately creates sulfuric acid, which has the potential to significantly reduce pH levels in the sediment. Released heavy metals from this process will bind with clays and iron hydroxides provided the pH of the system remains near neutral. However, if the pH drops below 6.0, heavy metals will stay in the dissolved form, as they do not readily bind with solids under acidic conditions. Accordingly, the Discharger should continually assess the potential for exposed sediment or extremely shallow water levels to depress pH.

55. ***Mercury Methylation***. The ecological and health effects of mercury are greatly affected by the transformation of the less toxic form (e.g., Hg^{2+}) to the extremely toxic form (methyl mercury or MeHg) that bioaccumulates in the food chain. Methyl mercury is primarily formed by microorganisms, but the rate of methylation is also affected by other factors that include: redox potential, pH, sulfides, clays, iron hydroxides, and salinity. The ROWD concludes that at: (a) very low redox potentials, mercury is bound in highly insoluble HgS and is relatively unavailable to methylating organisms, (b) moderately low redox

potentials (-220mV), Hg^{2+} levels rise, and with adequate organic matter and sulfate, sulfate-reducing bacteria can methylate appreciable amounts of mercury; and (c) high redox potentials, mercury methylation ceases and demethylation predominates.

56. ***Mitigation for Mercury Methylation***. The ROWD indicates that to minimize mercury methylation, systems with low redox potential should be left flooded. This is because if the redox potential in flooded systems is very low and if the systems become dry, the redox potential will increase, which may allow Hg^{2+} to become more available to methylating bacteria. If the system is then subsequently flooded, sulfate-reducing bacteria may increase MeHg production.

57. ***Mercury Methylation and Pond A18.*** To ensure that mercury methylation does not accelerate in Pond A18, the Discharger should manage water levels to prevent drying/wetting cycles. The ROWD indicates that the flow into and out of Pond A18 on a daily basis will be relatively small compared to the volume of the Pond, and that typically the daily water surface elevation would fluctuate by less than 0.1 feet. This suggests that the proposed management scheme for Pond A18 should not enhance mercury methylation.

Pond A18 Operations

58. The proposed initial release conditions are based on discharges from Pond A18 commencing between February 16 and March 16, 2005, and Ponds A14 and A16 commencing in March or April 2005. If neither system can begin as planned, then there may be a need to extend the initial release period or increase the flow rates to speed up the initial release process. While the proposed initial release commencement dates are considered reasonable, actual commencement may be delayed due to unforeseen events, such as weather conditions, equipment failure, and complications with ISP ponds. Adaptive management of the initial release plans to meet unknown contingencies may be necessary based on additional initial release studies and with prior approval from Board staff.

59. ***Pond A18 Water Depths and Bird Habitat***. The ROWD indicates that under the Pond A18 Management Plan, open water habitat and adjacent levees will continue to provide roosting and nesting habitat for waterbird species since water depths will be similar to current operations. Due to its high salinity, it is unlikely that Pond A18 supports fish habitat or any benthic invertebrates. The ROWD indicates that the major invertebrate inhabitants in the pond are brine shrimp and brine flies. Once salinity levels in Pond A18 are reduced below 40 ppt, it is expected that a benthic invertebrate and fish community will become established.

60. ***Operational Constraints***. This Order recognizes that there are constraints in managing Pond A18 that do not relate to protection of water quality. Those identified in the ROWD include:

    a. Direction of water flow (typically unidirectional);
    b. Salt pond levees (limit pond elevations);
    c. Flood control levees (the north levee at Pond A18 is a Santa Clara Valley Water District flood control levee);
    d. Bottom elevations within ponds (high pond bottom elevations require high water surface elevations, which reduces gravity-driven inflow; where as low pond bottoms require low water surface elevations to minimize erosion, which reduces gravity-driven outflows);
    e. Infrastructure effects (passive design makes it subject to natural variations in pond water levels from rainfall and tidal cycles); and
    f. Seasonal conditions (greater circulation necessary in the summer to maintain low salinity levels).

61. ***Operations Plan***. To ensure that water quality objectives are met and beneficial uses are protected during continuous circulation periods, this Order requires the Discharger to develop an Operations Plan for Pond A18. The Operations Plan should describe operational constraints pertinent to Pond A18 and indicate

corrective measures available to the Discharger should it find itself in threatened violation of discharge limits (e.g., salinity, dissolved oxygen, pH) during the initial release and continuous circulation periods.

62. ***Pond A18 Management Goals***. The ROWD indicates that Pond A18 will require limited active management, and that adjustment of the control gates may need to occur monthly or seasonally. The management goals for Pond A18 are to (a) allow adequate freeboard to prevent overtopping of levees during storm events, and (b) manage intake and outflows to achieve an adequate turnover of pond waters throughout the year to reduce excessive buildup of algae and other odor producing materials.

63. ***Adaptive Management***. As mentioned in an earlier finding, the Discharger proposes to iteratively modify Pond A18 operations, as necessary to meet objectives for protecting water quality and beneficial uses. To clarify the adaptive management strategies, the Discharger should update the Operations Plan annually, and should describe measures it can implement to improve flow-through (e.g., flexibility for allowing greater inflows and outflows and/or portable pumps).

64. ***Avian Botulism***. By reducing salinity levels, Pond A18 may create conditions that are more favorable to avian botulism. This is because the microorganism that produces the toxin causing avian botulism prefers lower salinities. It also requires warm temperatures and anaerobic conditions to become active. The cycle for an avian botulism outbreak is as follows: Invertebrates within ponds may consume the toxin, but tend to store it in their bodies without any adverse affects. Birds that consume these invertebrates may have their nervous systems impacted to the point of death. Signs of an avian botulism outbreak include dead birds or birds that have certain portions of their bodies paralyzed. Birds that die from avian botulism can pass the disease along, as maggots that consume their carcasses become concentrated with the toxin. To prevent nuisance conditions and to reduce the likelihood of an avian botulism outbreak, the Discharger needs to ensure that dissolved oxygen levels in Pond A18 do not fall below 1.0 mg/L. Additionally, the Discharger should burn or bury dead bird carcasses that it finds to reduce the likelihood of a severe outbreak of this disease.

Monitoring Requirements

65. ***Water Quality Monitoring***. This Order requires water quality monitoring within Pond A18, at the Pond A18 discharge point, and in the receiving waters for salinity, metals, dissolved oxygen, pH, and temperature. It also requires receiving water monitoring for benthic organisms. Additionally, this Order requires the Discharger to monitor water levels within Pond A18.

66. ***Sediment Monitoring***. This Order requires sediment monitoring within Pond A18 for pH, redox potential, selenium, and mercury (including speciation of mercury to determine the proposed management of Pond A18 creates conditions that enhance mercury methylation).

CEQA Exemption and Public Hearing

67. *Waste Discharge Requirements.* This Order serves as Waste Discharge Requirements, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code [California Environmental Quality Act (CEQA)] pursuant to Section 13389 of the California Water Code.

68. *Notification.* The Discharger and interested agencies and persons have been notified of the Board's intent to issue requirements for the proposed discharges and have been provided an opportunity to submit their written views and recommendations.

69. *Public Hearing.* The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code, regulations, and plans and policies adopted thereunder, and to the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, that the Discharger shall comply with the following:

A. DISCHARGE PROHIBITION

The commencement of the initial discharge from Pond A18 at a time any other than February 16 through March 16, 2005, is prohibited, unless the Discharger satisfies Provision D.4.

B. DISCHARGE LIMITATIONS

1. For the initial discharge, Pond A18 shall not discharge waters that exceed a salinity limit of 135 ppt.

2. Pond A18 waters discharging to Artesian Slough shall meet the following limits:

Constituent	Instantaneous Maximum	Instantaneous Minimum	Units
Salinity for continuous circulation	44		ppt
Dissolved Oxygen[1]		5.0	mg/L
pH[2]	8.5	6.5	

[1] The Discharger may select discharge station A-A18-D, or receiving water station A-A18-5 to evaluate compliance with the dissolved oxygen limitation. In cases where receiving waters do not meet the Basin Plan objective, the Discharger must show, as described in its Operations Plan, that pond discharges do not further depress the dissolved oxygen level in the receiving water.

[2] The Discharger may select discharge station A-A18-D, or receiving water monitoring A-A18-5 to evaluate compliance with the pH limitation.

3. Pond waters discharging to Artesian Slough shall not exceed the natural temperature of the receiving waters by 20°F, or more.

4. Dissolved Oxygen Trigger. The Discharger shall monitor, report, and take corrective action measures, in accordance with the Operations Plan required by Provision D.2, if dissolved oxygen levels in Pond A18 at station A-A18-M fall below 1.0 mg/L during the continuous circulation period.

C. RECEIVING WATER LIMITATIONS

1. The discharges shall not cause the following conditions to exist in waters of the State at any place:

   a. Floating, suspended, or deposited macroscopic particulate matter or foam in concentrations that cause nuisance or adversely affect beneficial uses;

   b. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;

   c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;

   d. Visible, floating, suspended, or deposited oil or other products of petroleum origin; and

   e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or which render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.

2. The discharges shall not cause nuisance, or adversely affect the beneficial uses of the receiving water.

3. The discharges shall not cause the following limits to be exceeded in waters of the State at any one place within one foot of the water surface:

   a. Dissolved Oxygen: 5.0 mg/L, minimum

      The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation. When natural factors cause concentrations less than that specified above, then the discharges shall not cause further reduction in ambient dissolved oxygen concentrations.

   b. Dissolved Sulfide: 0.1 mg/L, maximum

   c. pH: The pH shall not be depressed below 6.5 nor raised above 8.5, nor caused to vary from normal ambient pH by more than 0.5 pH units.

   d. Un-ionized Ammonia: 0.025 mg/L as N, annual median; and
      0.16 mg/L as N, maximum

   e. Nutrients: Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

4. The discharges shall not cause a violation of any particular water quality standard for receiving waters adopted by the Board or the State Board as required by the Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

D. PROVISIONS

1. **Permit Compliance**
   The Discharger shall comply with all sections of this Order beginning on the date of its adoption, except for Discharge Limitation B.4, which does not become effective until after Pond A18 has completed the initial release of pond waters.

2. **Operations Plan and Adaptive Management**
   The Discharger shall develop an Operations Plan for Pond A18 **before it initiates discharge** to ensure that beneficial uses remain protected under the continuous circulation period. The Operations Plan shall describe operational constraints pertinent to Pond A18, indicate corrective measures available to the Discharger should it find itself in threatened violation of discharge limits and triggers (e.g., salinity, dissolved oxygen, pH), and how the Discharger proposes to adaptively manage Pond A18 during the initial release and continuous circulation periods. The Discharger shall update the Operations Plan **annually** (as necessary) to reflect any modifications in operation (e.g., increased flow-through) that it might need to implement in order to protect water quality and beneficial uses. Additionally, the Operations Plan shall prevent and control avian botulism control, mercury methylation and inorganic mobilization. To document avian botulism efforts, the Discharger shall monitor Pond A18 and nearby receiving waters for the presence of avian botulism, and control outbreaks through the prompt collection and disposal of sick and dead vertebrates. To demonstrate that it is managing Pond A18 to minimize conditions that could result in the mobilization of inorganics and/or the methylation of mercury, the Discharger shall describe how it manages water levels within Pond A18 and recommend corrective measures should data show that it is enhancing inorganic

mobilization and/or mercury methylation. The Discharger shall submit an annual report documenting the above to the Board **by February 1 of each year**. The Operations Plan and each annual report are subject to the written approval of the Executive Officer.

3. **Compliance with Dissolved Oxygen Trigger**
If dissolved oxygen levels at the discharge fall below a 10^{th} percentile of 3.3 mg/L (calculated on a weekly basis) during the continuous circulation period, the Discharger shall make a timely report to the Board (in accordance with Standard Provisions), and implement Best Management Practices described in its Operations Plan, as appropriate. These adaptive management practices may include aeration, controlling the flow rate of the intake or discharge, reversing direction of flow, controlling the timing of the discharge, or temporarily suspending the discharge until this trigger value is met. In order to establish a new trigger value, the Discharger shall submit a technical report that documents that alternative values are protective of beneficial uses, and satisfy Resolution No. 68-16. For alternative trigger values at the discharge point to become effective, the Discharger must receive approval from the Executive Officer or the Board.

4. **Timing Variance**
In the event the Discharger cannot meet the timing requirement for initial release (Prohibition A), it may apply to the Executive Officer for a variance by submitting a technical report that demonstrates that there is an equivalent level of protection for the proposed alternative discharge. The Fact Sheet describes parameters that, at a minimum, the Discharger must address in showing that there is equivalent protection. The Executive Officer may grant a variance administratively. All variances must be in writing.

5. **Initial Release from Ponds A14 and A16**
The Discharger shall coordinate with the U.S. Fish and Wildlife Service to ensure that the initial release from Pond A18 does not commence at the same time as the initial release of saline waters from Ponds A14 and A16. The staggering of these initial releases must be consistent with hydrologic modeling (i.e., the first month of the initial release from Pond A18 should not coincide with the first month of the initial release from Pond A16).

6. **Status Report on Long-Term Operations**
Within three years of the adoption of this Order, the Discharger shall submit a status report that describes how it proposes to modify operating Pond A18. The status report shall describe the planning effort for potential uses of Pond A18, as well as a timeline for implementing the transition from lagoon management to future uses of Pond A18. The status report will also describe how the potential uses for Pond A18 will achieve protection of water quality and beneficial uses. Based on the review of the report, the Executive Officer may recommend to the Board that this Order be modified or rescinded, as appropriate.

7. **Self-Monitoring Program**
The Discharger shall comply with the Self-Monitoring Program (SMP) for this Order as adopted by the Board. The Discharger shall submit an annual self-monitoring report **by February 1 of each year**. The SMP may be amended by the Executive Officer in response to a written request by the Discharger, or as necessary to assure collection of information to demonstrate compliance with this Order.

8. **Standard Provisions and Reporting Requirements**
The Discharger shall comply with all applicable items of the Standard Provisions and Reporting Requirements for Non-NPDES Wastewater Discharge Permits, August 1993 (attached), or any amendments thereafter with the exception of General Provisions A.4, A.5, and A.10; Treatment Reliability B.2 and B.3; and General Reporting Requirements C.5, as these requirements are not relevant to this discharge. Where provisions or reporting requirements specified in this Order are different from equivalent or related provisions or reporting requirements given in 'Standard Provisions', the specifications of this Order shall apply.

a. **Change in Control or Ownership**

a. In the event of any change in control or ownership of land or discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Board.

a. To assume responsibility of and operations under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code.

10. **Review and Modification of Requirements**

The Board shall review the waste discharge requirements in this Order periodically, and may modify this Order under, but not limited to, any of the following circumstances:

a. If present or future investigations demonstrate that the discharge(s) governed by this Order might have adverse impacts on water quality and/or beneficial uses of the receiving waters; and

b. New or revised WQOs come into effect for the San Francisco Bay estuary and contiguous water bodies (whether statewide, regional, or site-specific). In such cases, discharge limitations in this Order will be modified as necessary to reflect updated WQOs.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on [**fill in date**], 2005.

_____

BRUCE H. WOLFE
Executive Officer

Attachments:

A. Discharge Facility Location Map
B. Self-Monitoring Program
C. Fact Sheet
D. Standard Provisions and Reporting Requirements for Non-NPDES WDR (August 1993)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

REVISED TENTATIVE

SELF-MONITORING PROGRAM

FOR

CARGILL INCORPORATED

POND A18 LOW SALINITY SALT POND
SANTA CLARA COUNTY

ORDER NO. XXXX

WDID No. 2 XXXX

Adopted: [fill in date]
Effective: [fill in date]

A. BASIS AND PURPOSE

Reporting responsibilities of waste dischargers are specified in Sections 13225(a),13267(b), 13268, 13383 and 13387(b) of the California Water Code and this Board's Resolution No. 73-16.

The principal purposes of a monitoring program by a waste discharger, also referred to as self-monitoring program, are: (1) to document compliance with waste discharge requirements and prohibitions established by this Board, (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge, (3) to develop or assist in the development of discharge or other limitations, discharge prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards, and (4) to prepare water and wastewater quality inventories.

B. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performed according to *Standard Methods for the Examination of Water and Wastewater*, 20th Edition, or other methods approved and specified by the Executive Officer of this Board.

Water and waste analyses shall be performed by a laboratory approved for these analyses by the State Department of Health Services (DOHS) or a laboratory waived by the Executive Officer from obtaining a certification for these analyses by DOHS. The director of the laboratory whose name appears on the certification or his/her laboratory supervisor who is directly responsible for analytical work performed shall supervise all analytical work including appropriate quality assurance/quality control procedures in his or her laboratory and shall sign all reports of such work submitted to the Board.

All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

C. SPECIFICATIONS FOR SAMPLING AND ANALYSES

The Discharger is required to perform sampling and analyses according to the schedule in Tables 1 and 2, and in accordance with the following conditions:

Receiving Waters

1. Receiving water samples shall be collected on days coincident with discharge sampling.

2. Samples shall be collected within one foot below the surface of the receiving water body, unless otherwise stipulated.

Bottom Sediment Samples and Sampling and Reporting Guidelines

Bottom sediment sample means: (1) a separate grab sample taken at each sampling station for the determination of selected physical-chemical parameters, or (2) four grab samples collected from different locations in the immediate vicinity of a sampling station while the boat is anchored and analyzed separately for macroinvertebrates. Physical-chemical sample analyses include as a minimum:

1. pH

2. TOC (Total Organic Carbon)

3. Selected metals mg/kg dry weight (and soluble metals in mg/l)

4. Particle size distribution, i.e. , % sand, % silt-clay

5. Depth of water at sampling station in feet

6. Water salinity and temperature in the water column within one foot of the bottom.

D. STANDARD OBSERVATIONS

1. Receiving Water

a. Floating and suspended materials of waste origin (to include oil, grease, algae, and other macroscopic particulate matter, presence or absence, source, and size of affected area).

b. Discoloration and turbidity: description of color, source, and size of affected area.

c. Odor: presence or absence, characterization, source, distance of travel, and wind direction.

d. Evidence of beneficial water use: presence of water–associated waterfowl or wildlife, fisherpeople, and other recreational activities in the vicinity of the sampling stations.

e. Hydrographic condition:

1) Time and height of corrected high and low tides (corrected to nearest NOAA location for the sampling date and time of sample and collection).

2) Depth of water columns and sampling depths.

f. Weather conditions:

1) Air temperatures.

2) Wind – direction and estimated velocity.

3) Total precipitation during the previous five days and on the day of observation.

2. Pond A18 Discharge

a. Floating and suspended material of waste origin (to include algae, and other macroscopic particulate matter): presence or absence.

b. Odor: presence or absence, characterization , source, distance of travel and wind direction.

E. RECORDS TO BE MAINTAINED

1. Written reports, strip charts, calibration and maintenance records, and other records shall be maintained by the Discharger and accessible for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Board. Such records shall show the following for each sample:

a. Identity of sampling and observation stations by number.

b. Date and time of sampling and/or observations.

c. Method of sampling (e.g., grab, composite, or continuous)

d. Date and time that analyses are started and completed, and name of personnel performing the analyses.

e. Complete procedure used, including method of preserving sample and identity and volumes of reagents used. A reference to specific section of Standard Methods is satisfactory.

f. Calculations of results.

g. Results of analyses and/or observations.

F. REPORTS TO BE FILED WITH THE BOARD

Self–Monitoring Reports

Annual self-monitoring report: The purpose of the report is to document performance, discharge quality and compliance with waste discharge requirements prescribed by this Order, as demonstrated by the monitoring program data and the Discharger's operation practices. For each calendar year, a self-monitoring report (SMR) shall be submitted to the Board in accordance with the following:

1. The report shall be submitted to the Board no later than February 1 to:

California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
ATTN: Executive Officer

2. *Letter of Transmittal:* Each report shall be submitted with a letter of transmittal. This letter shall include the following:
   a. Order Number and WDID number (see cover sheet of this SMP);
   b. Identification of all violations of discharge limits or other discharge requirements found during the monitoring period;
   c. Details of the violations: parameters, magnitude, test results, frequency, and dates;
   d. The cause of the violations;
   e. Discussion of corrective actions taken or planned to resolve violations and prevent recurrence, and dates or time schedule of action implementation. If previous reports have been submitted that address corrective actions, reference to such reports is satisfactory;
   f. Signature: The letter of transmittal shall be signed by the Discharger's principal executive officer or ranking elected official, or duly authorized representative, and shall include the following certification statement:

> "I certify under penalty of law that this document and all attachments have been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

3. *Compliance Evaluation Summary:* Each report shall include a compliance evaluation summary. This summary shall include, for each parameter for which discharge limits are specified in the Order, the

number of samples taken during the monitoring period, and the number of samples in violation of applicable discharge limits.

4. *Results of Analyses and Observations*.
   a. Tabulations of all required analyses and observations, including parameter, sample date and time, sample station, and test result;
   b. If any parameter specified in Tables 1 and 2 are monitored more frequently than required by this SMP, the results of this additional monitoring shall be included in the monitoring report, and the data shall be included in data calculations and compliance evaluations for the monitoring period;
   c. Calculations for all discharge limits that require averaging of measurements shall utilize an arithmetic mean, unless specified otherwise in this SMP.

5. *Data Reporting for Results Not Yet Available*: The Discharger shall make all reasonable efforts to obtain analytical data for required parameter sampling in a timely manner. The Board recognizes that certain analyses require additional time in order to complete analytical processes and result reporting. For cases where required monitoring parameters require additional time to complete analytical processes and reporting, and results are not available in time to be included in the SMR for the subjected monitoring period, such cases shall be described in the SMR. Data for these parameters, and relevant discussions of any observed violations, shall be included in the next following SMR after the data become available.

6. *Electronic Submittals:* The Discharger has the option to submit all monitoring results in an electronic reporting format approved by the Executive Officer. If the Discharger chooses to submit SMRs electronically, it shall submit SMRs electronically via the process approved by the Executive Officer in a letter dated December 17, 1999, Official Implementation of Electronic Reporting System (ERS).

G. DEFINITION OF TERMS

1. A grab sample is defined as an individual sample collected in a short period of time not exceeding 15 minutes. Grab samples shall be collected during normal peak loading conditions for the parameter of interest, which may or may not be during hydraulic peaks. It is used primarily in determining compliance with daily maximum limits. Grab samples represent only the condition that exists at the time the water is collected.

2. A composite sample is defined as a sample composed of individual grab samples mixed in proportions varying not more than plus or minus five percent from the instantaneous rate (or highest concentration) of waste flow corresponding to each grab sample collected at regular intervals not greater than one hour, or collected by the use of continuous automatic sampling devices capable of attaining the proportional accuracy stipulated above throughout the period of discharge for 8 consecutive or of 24 consecutive hours, whichever is specified in the tables of this SMP.

3. A flow sample is defined as the accurate measurement of the average daily flow volume using a properly calibrated and maintained flow measuring device.

4. Duly authorized representative is one whose:

   a. Authorization is made in writing by a principal executive officer or ranking elected official;

   b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as general partner in a partnership, sole proprietor in a sole proprietorship, the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized

representative may thus be either a named individual or any individual occupying a named position.)

5. Average values for daily and monthly values is obtained by taking the sum of all daily values divided by the number of all daily values measured during the specified period.

6. Median of an ordered set of values is that value below and above which there is an equal number of values, or which is the arithmetic mean of the two middle values, if there is no one middle value.

7. Daily Maximum limit is the total discharge in a calendar day for pollutants measured by mass or the average measurement obtained for other pollutants.

8. A depth-integrated sample is defined as a water or waste sample collected by allowing a sampling device to fill during a vertical traverse in the waste or receiving water body being sampled and shall be collected in such a manner that the collected sample will be representative of the waste or water body at that sampling point.

9. Bottom sediment sampling and reporting guidelines mean those guidelines developed by Board staff to provide for standard bottom sampling, laboratory, and reporting procedures.

H. Description of Monitoring or Sampling and Observation Stations

Figure 1 (attached) shows the location of each monitoring or sampling station within Pond A18, at the discharge points, and in receiving waters. The location of continuous monitoring in the receiving waters will be selected by the Discharger and approved by the Executive Officer at a point downstream of the discharge. Tables 1 and 2 (attached) indicate the sampling stations for Pond A18, constituents to sample, and the sample function.

The Discharger may need to operate the intake point as a discharge structure in order to comply with limits in this Order (e.g., salinity, dissolved oxygen). In such a case, the Discharger should monitor for parameters required for the discharge point, as indicated in Tables 1 and 2.

I. Sediment Monitoring

The Discharger shall collect annual samples for mercury and methyl mercury in August or September of each year from Pond A18. In collecting mercury samples, the Discharger shall follow the guidelines in Section C of the SMP, and monitor for pH, TOC, sulfides, and redox potential. Further, the Discharger shall report concentrations of mercury in mg/kg dry weight.

J. Self-Monitoring Program Certification

I, Bruce H. Wolfe, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Board Order No. XXXX-.

2. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the Discharger, and revisions will be ordered by the Executive Officer.

3. Is effective as of **date**.

_____

BRUCE H. WOLFE
Executive Officer

Attachments:
Table 1 – Initial Release Monitoring for Pond A18
Table 2 – Continuous Circulation Monitoring for Pond A18
Figure 1 – Pond A18 Monitoring for South Discharge
Figure 2 – Pond A18 Monitoring for North Discharge

TABLE 1 – INITIAL RELEASE MONITORING FOR POND A18

Sampling Station:	D.O.	pH	Temp	Salinity	Turbidity	Benthos	Sample Function
A-A18-M	A	A	A	A			Management
A-A18-D	B	B	B	B			Discharge
A-A18-1	D	D	D	D	D	C	Receiving Water
A-A18-2	D	D	D	D	D	C	Receiving Water
A-A18-3	D	D	D	D	D	C	Receiving Water
A-A18-4	D	D	D	D	D	C	Receiving Water
A-A18-5	E	E	E	E			Receiving Water

LEGEND FOR TABLE 1

A = Monitoring shall be conducted within Pond A18 at least twice per month for at least the previous 2 months before discharge commences. Dissolved oxygen monitoring shall be conducted between 0800 and 1000 hours. Time of monitoring shall be reported.

B = Once discharge begins, discharge monitoring shall be conducted before pond water mixes with receiving water using a continuous monitoring device. Downtime of continuous monitoring devices shall be minimized to the maximum extent feasible, and addressed annually in the Discharger's Operations Plan.

C = Samples for benthos shall be collected from discrete locations at the convenient stage of tide at the following frequency: within one week before initiating discharge, 14 days (±2 days) after the initial discharge, 28 days (±2 days) after, once in the late summer (August/September), and then once in the late summer of the following year.

D = Receiving water monitoring shall be conducted at discrete locations from downstream to upstream at the following frequency: within one week before initiating discharge, one day (± 1 day) after the initial discharge, 3 days (± 1 day) after, 7 days (± 1 day) after, then weekly until the Discharger documents that discharge salinity levels are below 44 ppt. For days it monitors receiving waters, the Discharger shall also (1) document if it monitors at flood tide, ebb tide, or slack tide, (2) monitor receiving water for dissolved oxygen, pH, temperature, salinity, and turbidity near the water surface and bottom, and (3) report standard observations, as described in Section D of the SMP.

E = Receiving water continuous monitoring for the purposes of determining compliance with the dissolved oxygen and pH limits shall be conducted at a location selected by the Discharger and approved by the Executive Officer at a point downstream of the discharge. Downtime of continuous monitoring devices shall be minimized to the maximum extent feasible, and addressed annually in the Discharger's Operations Plan.

TABLE 2 – CONTINUOUS CIRCULATION MONITORING FOR POND A18

Sampling Station:	D.O.	pH	Temp	Salinity	Turbidity	Chlorophyll a	Metals/Water Column	Sample Function
A-A18-M	A	A	A	A		A		Management
A-A18-D	B	B	B	B			C	Discharge
A-A18-1	D	D	D	D	D			Receiving Water
A-A18-2	D	D	D	D	D			Receiving Water
A-A18-3	D	D	D	D	D			Receiving Water
A-A18-4	D	D	D	D	D			Receiving Water
A-A18-5	E	E	E	E				Receiving Water

LEGEND FOR TABLE 2

A = Monitoring shall be conducted within Pond A18 monthly from May through October. Dissolved oxygen monitoring shall be conducted between 0800 and 1000 hours. Time of monitoring shall be reported.

B = Discharge monitoring shall be conducted before pond water mixes with receiving water using a continuous monitoring device from May through October. Downtime of continuous monitoring devices shall be minimized to the maximum extent feasible, and addressed annually in the Discharger's Operations Plan.

C = Water column samples for total and dissolved arsenic, chromium, nickel, copper, zinc, selenium, silver, cadmium, lead, and mercury shall be collected annually in August or September. When collecting metals samples, the Discharger shall also monitor for salinity, and total suspended solids.

D = Receiving water monitoring shall be conducted at discrete locations from downstream to upstream monthly from May through October. The positions indicated on Figures 1 should be considered approximate. For days it monitors receiving water, the Discharger shall also (1) document if it monitors at flood tide, ebb tide, or slack tide (samples shall be collected as close to low tide as practicable), (2) monitor receiving water for dissolved oxygen, pH, temperature, salinity, and turbidity near the water surface and bottom, and (3) report standard observations, as described in Section D of the SMP.

E = Receiving water continuous monitoring for the purposes of determining compliance with the dissolved oxygen and pH limits shall be conducted from May through October at a location selected by the Discharger and approved by the Executive Officer at a point downstream of the discharge. Downtime of continuous monitoring devices shall be minimized to the maximum extent feasible, and addressed annually in the Discharger's Operations Plan.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
1515 CLAY STREET, SUITE 1400
OAKLAND, CA 94612
(510) 622-2300 Fax: (510) 622-2460

FACT SHEET

for

WASTE DISCHARGE REQUIREMENTS for
CARGILL INCORPORATED
POND A18 LOW SALINITY SALT POND
SANTA CLARA COUNTY
ORDER NO. R2-2005-XXXX

PUBLIC NOTICE:

Written Comments

- Interested persons are invited to submit written comments concerning this draft Order.
- Comments must be submitted to the Water Board no later than 5:00 p.m. **on January 18, 2005**.
- Send comments to the Attention of Robert Schlipf.

Public Hearing

- The draft Order will be considered for adoption by the Board at a public hearing during the Board's regular monthly meeting at: Elihu Harris State Office Building, 1515 Clay Street, Oakland, CA; 1st floor Auditorium.
- This meeting will be held on: **February 16, 2005**, starting at 9:00 am.

Additional Information

- For additional information about this matter, interested persons should contact Water Board staff member: Mr. Robert Schlipf, Phone: (510) 622-2478; email: rschlipf@waterboards.ca.gov

This Fact Sheet contains information regarding an application for waste discharge requirements for Cargill Incorporated. The Fact Sheet further describes the factual, legal, and methodological basis for the sections addressed in the proposed Order, and provides supporting documentation to explain the rationale and assumptions used in deriving limitations and requirements.

I. INTRODUCTION

Cargill Incorporated (hereafter Discharger) has applied to the Board for issuance of waste discharge requirements to discharge low salinity waters from Pond A18 to waters of the State. The Application and Report of Waste Discharge (ROWD) are dated November 10, 2004.

The Discharger proposes to discharge saline waters from Pond A18 to Artesian Slough. The purpose of this discharge is to maintain open water habitat, and cease salt production. Artesian Slough is a tidally influenced waterbody, with significant fresh water inflows from the San Jose/Santa Clara Water Pollution Control Plant. The existing and potential beneficial uses for receiving waters in the vicinity of the discharges, as identified in the Basin Plan are:

a. Industrial Service Supply
b. Navigation
c. Water Contact Recreation

d. Non-contact Water Recreation
e. Commercial and Sport Fishing
f. Wildlife Habitat
g. Preservation of Rare and Endangered Species
h. Fish Migration
i. Shellfish Harvesting
j. Fish Spawning
k. Estuarine Habitat

This Order conservatively assumes that Artesian Slough is estuarine under both the Basin Plan and California Toxics Rule (CTR) definitions. Therefore, the discharge limitations specified in this Order for all these discharges are based on the lower of the marine and freshwater Basin Plan WQOs and federally promulgated WQC.

II. HISTORICAL CONTEXT AND POND SYSTEMS

Historical Context. One of the focuses with the Discharger's application was to ensure that it had adequate controls in place to prevent significant salinity increases and acidification of soils as occurred in the North Bay Salt Ponds. According to *Feasibility Analysis: South Bay Salt Pond Restoration* by Stuart Siegel and Philip Bachand, 2002 (hereafter Restoration Report), insufficient water flows to the North Bay Salt Ponds created conditions favorable to sediment oxidation, which decreased sediment pH, and made ponds inhospitable for vegetation colonization. In order to minimize salinity and metals concentration, the potential for low pH in the sediment, mercury methylation, and conditions favorable to low dissolved oxygen in Pond A18, the Discharger conducted hydrodynamic modeling to ensure that the proposed sizing of inlet and outlet structures would result in adequate flow through. Historically, the salt ponds have not experienced decreased pH.

Pond A18. The Discharger proposes to discharge saline waters from Pond A18, which is 856 acres in size. Pond A18 has two control structures that have the ability to close off all flow, all inflow only, or outflow only, which offers the Discharger flexibility in management to control salinity and/or water levels. Water will enter and leave Pond A18 by gravity. The flow rates will vary over the tidal cycle depending on the difference in water level in the pond and water level in the Bay and associated sloughs where culverts are located. The ROWD indicates that the hydraulic residence time will vary as tidal conditions vary, but will typically range from 15 to 50 days. Table 1 below indicates that the average residence for May through November may be slightly higher than 50 days.

Table 1: Average Summer Hydraulic Residence Times (May through November) for A18

Pond	Area (acres)	Depth (ft)	Volume (acre-ft)	Outlet Flow (ft^3/s)	Residence Time (days)
A18	856	1.8	1540.8	12.6	61.7

While the hydraulic residence time indicated in Table 1 reflects average discharge flows and will likely change based on management practices employed by the Discharger, it does illustrate the management constraint of using flow management as a corrective measure to reduce salinities or increase dissolved oxygen levels. As such, the Order requires that the Discharger's operations plan consider corrective measures such as within pond targets for certain constituents in order to comply with the Order's limitations

III. WATER QUALITY

There are two types of discharge associated with the Pond A18 Management Plan. These are the initial release of higher salinity waters currently in Pond A18, and the continuous circulation of water in and out of Pond A18. The main parameters of concern for these discharges include salinity, metals, dissolved oxygen, pH, and temperature. The subsections below describe the potential for adverse affects from each of these parameters under the initial release and continuous circulation period.

SALINITY

During the initial release, hydrodynamic modeling predicts that Artesian Slough will contain elevated levels of salinity under both the south initial release (intake water from lower Artesian Slough near Coyote Creek, and discharge to upper Artesian Slough), and north initial release (intake water from upper Artesian Slough and discharge to lower Artesian Slough near Coyote Creek) scenarios. In developing salinity standards for the initial release, the Discharger indicates that Pond A18 will not contain salinity levels above 135 ppt since gypsum (calcium sulfate) begins to precipitate in water with salinities above 146 ppt. As calcium sulfate does not readily dissolve in water and the precipitation of which may cause the toxicity of saline waters above this threshold to increase significantly, the Discharger needs to ensure that salinity levels remain below this level.

For the North Initial Release scenario, the Discharger predicts relatively small increases in salinity, and indicates adverse affects on aquatic life are unlikely. For the South Initial Release scenario the ROWD predicts that salinity increases in Artesian Slough may be high enough to cause a temporary impact to some resident aquatic species near the discharge point, but expects recovery from such impacts to occur in less than one year. The salinity increase associated with the initial release are described in Attachment 1 and below:

a. South Initial Release: The highest salinity elevations in Artesian Slough and Coyote Creek are predicted to occur during the first week of March. On a depth-averaged basis, the ROWD predicts salinity increases of 10-20 ppt in most of Artesian Slough, and 1-5 ppt in portions of Coyote Creek. Salinity increases near the bottom of Artesian Slough up to 25 ppt are expected. During the initial release, the highest depth-averaged salinity predicted in Artesian Slough is 34 ppt near the Pond A18 discharge point.

b. North Initial Release: The highest salinity elevations in Artesian Slough and Coyote Creek are predicted to occur during the month of March with a maximum bottom salinity increase of about 5 ppt. The ROWD indicates that most of Artesian Slough should experience salinity increases of about 2-3 ppt, and portions of Coyote Creek should experience salinity increases of about 1-3 ppt. The highest depth-average salinity should be about 23 ppt near the confluence of Artesian Slough and Coyote Creek.

During the continuous circulation period, the Order requires that the maximum salinity discharged from Pond A18 not exceed 44 parts per thousand (ppt). Modeling efforts by the Discharger show that beneficial uses of Artesian Slough will be protected under the continuous circulation period because the magnitude and spatial scale of salinity increases will be small (for reference, these increases are shown in Attachment 1). The expected effect of salinity on the Bay and Coyote Creek should be minimal.

The ROWD predicts that during Continuous Circulation the salinity elevation in Artesian Slough and Coyote Creek will be low. For daily-averaged salinity, it is predicted that any increases will be 1-2 ppt or less and will occur in creek segments in the immediate vicinity of the Pond A18 discharge point. The area of Artesian Slough/Coyote Creek is directly affected by the freshwater discharge from the San Jose/Santa Clara Water Pollution Control Plant (WPCP). For the modeled conditions, all areas in Artesian Slough/Coyote Creek are expected to have salinities below 33 ppt. Consequently, adverse affects to aquatic life in Coyote Creek as a whole, resulting from elevated salinity, are not expected during the long-term Continuous Circulation Period.

METALS

The ROWD estimates metals concentrations at each discharge point based on salinity and some empirical salt pond data. To match metals concentrations with the range of salinities proposed for discharge, the ROWD considered (a) samples collected from the salt ponds in October 2002 along a salinity gradient (salinities ranged from 31.6 to 279 ppt), and (b) RMP data from the South Bay and Dumbarton Bridge (salinities ranged from 12 to 20 ppt). Table 2 below shows the modeled salinity in ppt for Pond A18 and the corresponding estimated maximum metals concentration in μg/L (except for mercury which is in ng/L). Metal concentrations in the

discharge that are expected to exceed the minimum applicable receiving water quality objective are shown in italics.

Table 2: Proposed Maximum Salinity and Metals for Initial Discharge from Pond A18

Pond System	Modeled Salinity	Cr	Ni	Cu	Zn	As	Se	Ag	Cd	Hg	Pb
A18	135	2.36	21.8	3.39	4.49	*56.2*	0.31	0.15	0.119	49.7	1.37
WQO[1]		11.4	27	13	86	36	5.0	2.2	0.76	50	8.5

[1] The water quality objectives south of Dumbarton Bridge apply to discharges from Pond A18. The water quality objectives for chromium and cadmium are freshwater driven and based on a hardness of 400 mg/L. The initial release of highly saline waters from Alviso Ponds will cause some receiving waters to contain salinity and arsenic in excess of water quality objectives for a short duration.

As indicated in Table 2, Pond A18 may contain concentrations of arsenic that exceed water quality objectives during the initial release. To determine if pond discharges would cause receiving waters to exceed water quality objectives, the Discharger performed hydrodynamic modeling. This showed that during the initial release, the Pond A18 discharge should not cause any exceedances for arsenic in Artesian Slough. Under the continuous circulation period, metals are not expected to exceed water quality objectives provided the Discharger ensures that salinities remain below 44 ppt. Accordingly, this Order proposes to use a salinity limit of 44 ppt, as a surrogate for specific limits for metals. This should offer more protection because a) metals do not increase proportionately with increasing salinity because other factors such as biological uptake and adsorption to fine sediments reduce their concentrations, and b) the Discharger can monitor salinity continuously, which will provide it with immediate feedback and the ability to implement corrective measures in a more timely manner.

DISSOLVED OXYGEN AND PH

In lower salinity ponds, dissolved oxygen and pH may present water quality concerns. The Restoration Report indicates that low salinity ponds are likely conducive to algal growth because (a) more algal species can tolerate salinities in this range, and (b) they tend to have elevated nitrogen and phosphorus concentrations, warm temperatures, and good light attenuation. Excessive algal growth can cause dissolved oxygen and pH levels to vary significantly over the day. This is because during daylight hours, photosynthesis will produce oxygen and consume dissolved carbon dioxide (which behaves similar to carbonic acid). During nighttime hours, decomposition of algae will produce dissolved carbon dioxide and consume oxygen. Therefore, any significant algal growth will cause dissolved oxygen and pH levels to peak during the evening hours and to be at their lowest levels in the morning. This diurnal and seasonal variation in dissolved oxygen levels is similar to patterns observed in lagoons and sloughs and other shallow areas of the Bay. Factors that influence dissolved oxygen levels, both in the pond and in receiving waters, include strength and level of tides, other inflows into the receiving waters, rainfall, wind direction, temperature, time of day, amount of sunlight, and seasonal effects.

To ensure that dissolved oxygen levels from the discharge are not adversely affecting receiving waters, this Order also includes a trigger value for the continuous circulation period. If dissolved oxygen levels fall below a 10^{th} percentile of 3.3 mg/L (calculated on a weekly basis), the Discharger shall make a timely report to the Board, and implement Best Management Practices described in its Operations Plan, as appropriate. These adaptive management techniques may include aeration, controlling the flow rate of the intake or discharge, reversing direction of flow, controlling the timing of the discharge, or temporarily suspending the discharge. The dissolved oxygen trigger is based on levels found in Coyote Creek in July 1997. These values are the most relevant representation of natural dissolved oxygen variations in sloughs or lagoon systems currently available. As it may be possible for the Discharger to develop more relevant trigger values, this Order provides the Discharger with the opportunity to develop alternative values subject to Executive Officer or Board approval.

In evaluating the potential for dissolved oxygen sags in Artesian Slough and Coyote Creek, the ROWD indicates that the Discharger (a) evaluated dissolved oxygen conditions in receiving waters associated with pond discharges, (b) reviewed dissolved oxygen monitoring data collected during the initial release period from the summer of 2004, and (c) performed a laboratory study to evaluate the potential for dissolved oxygen depressions (or sags) in Artesian Slough from Pond A18 discharges. Based on these analyses (described below), the Discharger indicates that the potential for dissolved oxygen sags in Artesian Slough from Pond A18 discharges is less than significant.

a. **Initial Stewardship Plan (ISP) Analysis:** This evaluation involved evaluating oxygen demand and dissolved oxygen dynamics in ponds. The Discharger determined that increased oxygen demand or low dissolved oxygen levels is due to the presence and respiration of algae in pond water, and with minimal ambient light conditions (~8 hrs) no net loss of dissolved oxygen should occur in sloughs or the Bay over a 24-hour period. As described in Finding No. 40, the results of a September 2003 study on dissolved oxygen dynamics showed that dissolved oxygen levels drop below 5.0 mg/L in many of the ponds near dawn, but that levels recover in the afternoon hours.

b. **Review of ISP Data:** In the summer of 2004, The Service commenced the initial release of pond waters from Ponds A2W, A3W, and A7. Monitoring efforts showed that dissolved oxygen levels in Ponds A2W and A7 exhibited a strong diurnal pattern (low dissolved oxygen near dawn), but that receiving water monitoring in the Bay and Alviso Slough did not detect reductions in dissolved oxygen levels from these discharges. The discharge from Pond A3W showed consistently low dissolved oxygen levels, and monitoring of Guadalupe Slough indicates that Pond A3W may have caused dissolved oxygen depressions. To evaluate why dissolved oxygen levels in Pond A3W were severely depressed on a consistent basis (i.e., below 1 mg/L), the Discharger performed two surveys and learned the low dissolved oxygen levels in the Pond A3W discharge was the result of a mat of decaying algae, and was not representative of the general state of the pond. Since the discharge point for Pond A3W is located on the edge of this algae mat, it contains depressed dissolved oxygen levels. The ROWD indicates that salt ponds should exhibit a diurnal dissolved oxygen pattern, with supersaturated conditions during the day, and low levels during the night and predawn hours. The ROWD explains that this should not cause significant dissolved oxygen depression in sloughs. In situations where the discharge point is near accumulating dead algae, the discharge could produce a significant DO sag in receiving waters. For the Pond A18 discharge, the ROWD explains that accumulation of dead algae near the discharge point should not occur because the discharge structures are on the upwind side of the pond.

c. **Laboratory Study:** To evaluate the potential for dissolved oxygen sags in Artesian Slough from Pond A18 discharges, the Discharger performed laboratory simulations in which algal populations developed densities similar to those expected in Pond A18 during a later-summer continuous circulation period. The laboratory simulation formulated estimated compositions of water (i.e., Bay water, Artesian Slough water, Pond A18 discharge water, and Pond A16 discharge water), and tested oxygen demand. The ROWD indicates that circulating water through Pond A18 (under both scenarios) should not reduce dissolved oxygen levels in Artesian Slough to a point where adverse affects to aquatic life would occur. However, the ROWD explains that Pond A18 discharges would remain higher in dissolved oxygen when discharging through the south structure because intake water at the north structure will contain less effluent from Plant. The ROWD indicates that the laboratory study showed that for simulations using intake water from the south structure, algae levels were significantly higher than those found in simulations using water from the north structure or the control (all Bay water). This indicates that Pond A18 would have a higher potential to discharge waters low in dissolved oxygen should it intake water from the south structure (i.e., near the San Jose/Santa Clara Water Pollution Control Plant discharge point).

For pH, the data collected by the Discharger in the ISP analysis shows it does not exhibit a diurnal variation. This data showed that there is little spatial variation in pH across each pond, and that the Discharger would likely

have trouble meeting the water quality objective for pH of 6.5 to 8.5 at the discharge point (Finding No. 40 includes a summary of pH data). To minimize the potential for high pH values in the discharge, the Discharger needs to ensure that ponds have adequate flow through. It is also appropriate to consider a receiving water limitation for this parameter due to the impracticalities of chemically controlling pH in salt ponds to meet Basin Plan objectives.

TEMPERATURE

Due to shallow water depths and limited tidal exchange, water temperature in the salt ponds is elevated and varies widely throughout the day. Annual water temperatures within the ponds generally range from 40 to 80°F and generally track air temperature. The State's Thermal Plan indicates that discharges shall not exceed the natural temperature of receiving waters by 20°F, and the discharges shall not cause temperatures to rise greater than 4°F above the natural temperature of the receiving water at any time or place. The ROWD indicates that temperatures collected in the salt ponds on August 26 and 27, 2002, showed values ranging from 19.5 to 32.8°C (67.1 to 91.0°F), and values in the Bay ranging from 26.7 and 28.1°C (80.1 to 82.6 °F). These results indicate that salt pond discharges should comply with the Thermal Plan.

SEDIMENTS

The Restoration Report indicates that the level of contaminants in salt pond sediments are expected to be lower than surrounding areas. This is because the pond systems are currently managed to maintain long detention times that can result in significant algal growth. Algae typically settle to the bottom of ponds, thereby increasing sediment organic content. This addition of biomass dilutes contaminants in these soils. Sediment data collected by the Discharger confirms this with organics at nondetect, and metals typically lower than ambient conditions.

IV. SHORT-TERM EXCEEDANCES AND RECOVERY TIMES

The ROWD indicates that the South Bay environment requires resident aquatic organisms to have the ability to tolerate fluctuations (e.g., benthic species) and/or have the ability to move to more optimal conditions (e.g., planktonic species). Since benthic organisms do not have the ability to move away from unsuitable conditions, they must be much more tolerant than mobile organisms in order to survive. The ROWD indicates that it is not possible to develop a threshold salinity value for the South Bay that would be protective of all exposed organisms because of the variety of species, and the lack of scientific data on salinity tolerance ranges. To address potential adverse affects to resident aquatic organisms, the ROWD approximates salinity levels that could have acute (lethal) or chronic (altered physiological function) effects. Table 3 below (from the Discharger's ROWD) provides the matrix developed by the Discharger that relates certain salinity levels to acute and chronic effects.

Table 3: Summary of Potential Salinity Response Characteristics (Summer Conditions)[1]

Class	Salinity Range	Potential Response
Ambient	<33	Benthic species population may vary depending upon species salinity preferences.
Drought	33-35	Chronic exposure: benthic community changes to salinity tolerant species similar to drought years, effects quickly reversed with normal salinity regime. Acute exposure: less of a shift is species composition. In either case, impacts less than significant
Salinity ranges above those encountered in South Bay		
Stage 1	36-38	Chronic exposure: benthic community may lose most sensitive species, impacts considered potentially significant. Acute exposure: less impact on community, impacts considered less than significant.
Stage 2	39-41	Chronic exposure: benthic community may lose larger number of species, impacts considered significant. Acute exposure: less impact on community, impacts considered potentially significant.

Stage 3	41-45	Chronic exposure: community may be limited to most salinity tolerant species, impacts considered significant. Acute exposure: less impact on community but still loss of large number of species, impacts considered significant.
Stage 4	>45	For both chronic and acute exposures, community would be severely reduced. In either case, impacts considered significant.
NOTE: Response criteria based on scant scientific data for local species and therefore must be considered speculative.		

[1] The ROWD indicates that the Discharger based the stages on some species that do not inhabit the bay. This is because there is limited information on the tolerance of native species

Since the initial release has the potential to adversely affect aquatic life, the Discharger also investigated the potential for recovery should adverse affects occur. The ROWD indicates that any adverse affects to aquatic organisms during the initial release will be short-lived and that the aquatic community will quickly recover. Based on available literature, the ROWD indicates that benthic communities adversely affected by the initial release should completely recover within one year. To support this position, the ROWD cites a number of studies (enumerated below) that describe quick recovery times for benthic communities subject to perturbations that significantly reduced their numbers.

1) The ROWD indicates that from 1974-1983, Nichols and Thompson studied benthic invertebrate communities in South Bay mudflats. This report found that benthic communities were very persistent over time because of the ability of species to respond quickly to environmental perturbations such as changes in salinity. According to the ROWD, perturbations that greatly reduced or almost eliminated resident species were short-lived, as when favorable conditions returned these species would reestablish within months.

2) The ROWD also cites a report by Hopkins that studied two sites near Palo Alto and Hayward that are close to proposed discharge points from the ISP Alviso pond systems, and therefore, should have a similar benthic invertebrate community. This report found that an unusually wet period resulted in the loss of many benthic invertebrates, but that these species recovered when normal rainfall patterns returned the following year.

3) Additionally, the ROWD cites a report by the California Department of Water Resources (CDWR) that describes an accidental spill of metam sodium in the upper Sacramento River, which eliminated the benthic community for a 26-mile stretch. The CDWR study reports that within four months the diversity found at impacted areas was similar to the upstream control area and that within one year most metrics of then benthic community indicated recovery.

Providing Open Water Habitat and Cessation of Salt-Making Outweighs Short-term Exceedances. As potential adverse affects from the Pond A18 discharge include short-term impacts from the initial discharge related to salinity and metals, the ROWD indicates that the benefit of providing open water habitat outweighs the environmental cost of the project. To maintain open water conditions in Pond A18, the ROWD indicates that the Discharger must provide circulation of Bay water. This is because the hydrologic connection between Pond A17 and A18 is being severed due to the implementation of the ISP (historically, a siphon under Artesian Slough transferred brine from Pond A17 to A18). Without the introduction of Bay water, Pond A18 would dry down during the summer and become a seasonal pond in the winter, which would significantly reduce open water habitat. The finding of net environmental benefit is also based on timely cessation of salt-making operations and the avoidance of the negative consequences of project delays on buildup of salt in the former salt ponds and the associated water quality risks and management costs, as experienced by the dischargers with the North Bay salt ponds.

V. GENERAL RATIONALE

The following documents are the basis for the requirements contained in the proposed Order, and are referred to under the specific rationale section of the Fact Sheet.

- The Water Board's June 21, 1995 *Water Quality Control Plan San Francisco Bay Basin (Region 2)* (the Basin Plan);
- U.S. EPA's May 18, 2000 *Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California* (the California Toxics Rule – the CTR);
- U.S. EPA's National Toxics Rule as promulgated [Federal Register Volume 57, 22 December 1992, page 60848] and subsequently amended (the NTR);
- U.S. EPA's March 1991 Technical Support Document for Water Quality-Based Toxics Control (the TSD);
- The State Board's *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California* (Thermal Plan).

VI. SPECIFIC RATIONALE

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

1. Basis for Prohibitions

a) Prohibition A. (initial release from Pond A18 cannot commence at any time other than February 16 through March 16): This prohibition is to ensure that the initial release of waters from Pond A18 occurs at a time when mixing with freshwater will be maximized, and exposure to sensitive species (e.g., bay shrimp) will be minimized. Additionally, this prohibition is to ensure that the initial release is consistent with modeled results, which used March 2 as the date for commencing the initial release.

2. Basis for Discharge Limitations

a) Discharge Limitation B.1 (salinity limits for the initial release): These limits are based on the narrative salinity objective in the Basin Plan. The Fact Sheet provides the rationale for this limit.

b) Discharge Limitation B.2 (salinity limits for continuous circulation, dissolved oxygen, and pH limits): These limits are based on the Basin Plan. The Fact Sheet contains the rationale for the salinity, dissolved oxygen, and pH limits.

c) Discharge Limitation B.3 (temperature): This limit is based on the narrative temperature objective in the Basin Plan and the Thermal Plan.

d) Discharge Limitation B.4 (Dissolved Oxygen Trigger within ponds): The purpose of this trigger is to ensure the Discharger will implement corrective measures to minimize the potential for odors, avian botulism, and mercury methylation. This limit is based on previous permits adopted by the California Regional Water Quality Control Board, Central Valley Region (e.g., Order No. 5-01-243 for the El Portal Wastewater Treatment Facility).

3. Basis for Receiving Water Limitations

a) Receiving water limitations C.1, C.2, and C.3 (conditions to be avoided): These limits are based on the narrative/numerical objectives contained in Chapter 3 of the Basin Plan, page 3-2 – 3-5, and are identical to language in nearly all WDRs adopted by the Water Board.

b) Receiving water limitation C.4 (compliance with State Law): This requirement requires compliance with Federal and State Law, and is self-explanatory. This is identical to language in nearly all WDRs adopted by the Water Board.

4. Basis for Self-Monitoring Requirements

This Order requires water quality monitoring within ponds, at discharge points, and in the receiving waters for salinity, metals, dissolved oxygen, pH, temperature, and turbidity. It also requires receiving water monitoring for benthic organisms. Additionally, this Order requires the Discharger to monitor water levels, and conduct sediment monitoring for pH, TOC, redox potential, and metals (including speciation of mercury to determine if the management of Pond A18 creates conditions that enhance mercury methylation).

5. Basis for Provisions

a) Provision D.1 (Permit Compliance): This purpose of this provision is to specify the date that the Order becomes effective. The effective date allows the Discharger to release waters from Pond A18 provided it complies with the terms and conditions in the Order. It also provides the starting date for which the Discharger must begin to comply with monitoring requirements contained in the Order.

b) Provision D.2 (Operations Plan and Adaptive Management)**:** This provision requires that the Discharger submit an Operations Plan for Pond A18 that describes how it will review self-monitoring data and adaptively manage Pond A18 to ensure that during the continuous circulation period the beneficial uses of receiving waters remained protected. In this case, adaptive management is essential because of the uncertainty associated with managing low salinity ponds and the potential for avian botulism outbreaks and changes in salinity, metals, pH, dissolved oxygen, temperature, and mercury methylation. This provision is necessary to ensure that the Discharger implements best management practices to minimize the potential for these parameters to affect water quality and beneficial uses.

d) Provision D.3 (Compliance with Dissolved Oxygen Limitation): This provision requires that the Discharger submit a timely report to the Board, and implement Best Management Practices described in its Operations Plan if dissolved oxygen levels fall below a 10^{th} percentile of 3.3 mg/L (calculated on a weekly basis) at the point of discharge. This trigger is based on dissolved oxygen data from July 1997 from Artesian Slough near the Heron Rookery (10^{th} percentile equals 3.3 mg/L). This provision is necessary to ensure that the Discharger implements corrective measures to minimize the potential for depressed dissolved oxygen levels to affect water quality and beneficial uses.

e) Provision D.4 (Timing Variance): The Discharger may petition the Executive Officer to receive a variance from the timing requirements contained in this Order for the initial release, if it can demonstrate that its proposed alternative discharge will offer an equivalent level of protection. Specifically, the Discharger must address potential impacts to aquatic life (e.g., bay shrimp) if it proposes to commence the initial release of saline waters at a time other than that prescribed by Prohibition A. This provision is to provide the Discharger some flexibility in operating subject to natural factors beyond the Discharger's control (e.g., weather conditions, equipment failure, and complications with coordinating the initial release from Ponds A14 and A16 with The Service), as long as it does not harm water quality.

f) Provision D.5 (Initial Release from Ponds A14 and A16): This provision requires the Discharger to coordinate with The Service to ensure that the commencement of the initial release from Pond A18 does not coincide with the commencement of the initial release from Pond A16. A staggering of the beginning of the initial releases of A18 and A16 is necessary to minimize salinity increases in Artesian Slough during this period.

g) Provision D.6 (Status Report on Long-Term Operations): The purpose of this provision is to ensure the Discharger will commit to a long-term planning effort for Pond A18 that will benefit water quality and beneficial uses. This is necessary to offset potential low dissolved oxygen conditions associated with lagoon management during the continuous circulation period.

f) Provision D.7 (Self-Monitoring Program): This provision requires compliance with the Self-Monitoring Program (SMP) and is necessary to ensure that the Discharger conducts monitoring of the permitted discharges in order to evaluate compliance with Order conditions. Monitoring requirements are contained in the SMP of the Order and are necessary to ensure the Discharger has sufficient information to adaptively manage pond systems (if necessary) to ensure beneficial uses of receiving waters remain protected.

g) Provision D.8 (Standard Provisions and Reporting Requirements): The purpose of this provision is to require compliance with the standard provisions and reporting requirements given in this Water Board's document titled *Standard Provisions and Reporting Requirements for NON-NPDES Wastewater Discharge Permits, August 1993* (Standard Provisions), or any amendments thereafter. That document is incorporated in this Order as an attachment to it. Where provisions or reporting requirements specified in this Order are different from equivalent or related provisions or reporting requirements given in Standard Provisions, this Order's specifications shall apply. The standard provisions and reporting requirements given in the above document are based on various state and federal regulations with specified references cited therein.

h) Provision D.9 (Change in Control or Ownership): This provision is necessary to ensure that if this land changes control or ownership, the succeeding owner or operator recognizes that it must comply with the terms and conditions contained in the Order.

i) Provision D.10 (Review and Modification of Requirements): This provision is necessary to notify the Discharger that the Board may modify permit conditions to ensure that beneficial uses or receiving waters remain protected.

VII. WASTE DISCHARGE REQUIREMENT APPEALS

Any person may petition the State Water Resources Control Board to review the decision of the Board regarding the Waste Discharge Requirements. A petition must be made within 30 days of the Board public hearing.

Attachment 1: Magnitude and Spatial Scale of Salinity Increases under the Initial Release and the Continuous Circulation Period