CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER No. R5-2004-0137
WASTE DISCHARGE REQUIREMENTS
FOR
PORT OF STOCKTON
WEST COMPLEX DOCK DREDGING PROJECT
SAN JOAQUIN COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Board) finds that:

1. The Port of Stockton, hereafter referred to as Discharger, submitted a Report of Waste Discharge (RWD) on 3 July 2003 describing proposed dredging activities at the Discharger's West Complex docks (formerly Rough and Ready Island) and additional information on 1 August 2003, 5 May 2004 and 5 August 2004.

2. The dredging activities regulated in this Order include disposal or discharge of dredged sediments into a diked disposal site, the Dredged Material Disposal (DMD) site, discharges of effluent from the DMD site into surface water, and water quality monitoring during dredging operations.

3. In July 2000, the United States Navy conveyed approximately 1,400 acres of Rough and Ready Island through transfer and lease to the Discharger. The Discharger refers to this area as the West Complex. The Discharger plans to have a phased development of the site for maritime, industrial, commercial and other related operations over the next 20 years. In order to facilitate access of deep draft commercial vessel traffic, the Discharger would dredge the sediments from in front of the existing docks.

4. The West Complex is situated on the south shore of the San Joaquin River (Assessor's Parcel No. 145-02-04) in Section 1, T2N, R5E, MDB&M, at Embarcadero Avenue, in San Joaquin County. The 1,400 acre West Complex is bounded on all sides by water. Burns Cutoff runs along the south and west boundary; the San Joaquin River runs along the east and north; and the Stockton Deep Water Ship Channel, where the dredging operations will occur, is on the north side of the West Complex and is situated between River Mile 37 and River Mile 40. The location of the West Complex is shown on Attachment A, which is attached hereto and made part of this Order by reference.

5. Dredging activities are proposed for a distance of 6,200 feet in front of the West Complex Docks 14 –20, and will extend outward from the docks for 125 feet to the intersection of the Stockton Deep Water Ship Channel (DWSC). The project will remove sediment and debris to a normal depth of 35 feet below mean low, low water (MLLW) with one additional foot for overdredge. The project will lower the elevation of the river bottom by six feet below previous permitted depths.

6. In January 2002, the Discharger conducted a bathymetric survey of the project area. The survey indicates that shallowest sediments are deposited near docks 14, 16 and 17 at a depth slightly less than 20 feet MLLW. The average depth of sediment for the project area is approximately 30 feet MLLW. The bottom of the DWSC is approximately 35 feet MLLW. In December 2001 the Discharger dredged docks 19 and 20 but the dredging project was limited to approximately 30 feet MLLW. The proposed project will deepen the river bottom, adjacent to the docks, to a new depth of 36 feet MLLW, which is approximately the same elevation as the DWSC. The location of the designated dredging area is shown on Attachment A, which is attached hereto and made part of this Order by reference.

7. Based on the information from the bathymetric survey, the total volume of slurry (solids and entrained water) generated by the project will be approximately 1,400 acre-feet. Using an assumed solids content of 10 to 15 percent solids, the RWD shows that the total slurry volume will contain approximately 326,000 cubic yards of sediment and approximately 800 acre feet of water.

8. The dredge spoils will be transported approximately 10,000 feet via a HDPE pipeline and discharged to an unlined DMD site situated on the northern boundary of Roberts Island (Assessor's Parcel No. 131-23-02). After modifications, the holding capacity of the DMD site is calculated to be approximately 250 acre-feet with two feet of freeboard. This site is sufficient to retain only approximately 20 percent of the total dredging volume (1,400 acre-feet) that will be generated by the project if the Discharger is unable to discharge effluent from the site into surface water. After settling, the effluent may be discharged to the San Joaquin River at latitude 37° 59' 09.97" N and longitude 121° 23' 38.03" W. The location of the DMD site and the effluent discharge point are shown on Attachment A.

9. On 4 June 2002, the Discharger completed a magnetometer sweep of the project area in order to locate the presence of potential significant submerged or buried metallic objects. The survey identified 46 magnetic anomalies of significant size including 2-inch diameter metal cables, abandoned vehicles, backhoes and a large 12,000 pound anchor. During the dredging operation in 2001, an estimated 50 tons of metal debris and cables were recovered from the sediment. Metallic anomalies buried in the sediment near the docks are believed to be associated with past U.S. Navy activity.

10. In order to facilitate hydraulic dredging, the metallic objects must be removed from the river. The Discharger will use divers to assist in the identification of the magnetic anomalies. Large objects will be removed from the river bottom using a hydraulic dredge and crane dredge. Sediment and any waste constituents that are associated with the submerged objects may be resuspended in the water column as the objects are lifted from the river bottom depending on the physical characteristics of the sediment (grain size, compaction) and characteristics of the water body (depth, amount of flow, tidal influences, existing water quality). Monitoring surface water conditions during the removal of metal debris is appropriate.

DESCRIPTION OF DREDGING OPERATIONS

11. The excavation, transport and placement of dredge sediments are the primary components of the dredging process. Sediment and the associated waste constituents can be suspended or dissolved in nearby waters if entrainment of the dislodged sediments is incomplete.

12. The dredging operation may cause some degradation temporarily to surface waters as concentrations of turbidity, total suspended solids, and other wastes may increase and dissolved oxygen (DO) decrease as bottom sediments are disturbed in the excavation process. In order to determine if the dredging activities are impacting the river, surface water monitoring during dredging operations is appropriate.

13. Dredging will be accomplished with a 2000 horsepower hydraulic dredge, which is equipped with a rotating cutter head to dislodge sediment along the bottom of the channel. The dislodged sediment along with the surrounding water is drawn into an 18-inch diameter tube by suction via the hydraulic pump. The slurry of sediment and water is then discharged to a plastic pipeline, which transports the material to the DMD site.

14. The slurry discharge rate for the dredge operation is estimated to be between 4.3 and 6.6 cubic feet per second, or approximately 1,900 to 3,000 gallons per minute. Dredging operations will occur up to 8 hours per day and will produce a total daily discharge of approximately 1,200,000 gallons per day.

15. The Discharger has calculated that the percentage of sediment/elutriate lost to resuspension as a result of contact with the dredge's cutter head to be 0.21 to 0.33 percent based on the dimensional model and 0.48 to 0.78 percent with the non-dimensional model.

16. Based on a maximum resuspension rate of 19.8 kg/m^3 during slack tide event, the Discharger indicated that the contribution of suspended solids downstream of the dredging operation to be approximately 2.4 mg/L. The Discharger indicated that the average background concentration of suspended solids for this reach of the river is 24 mg/L. Therefore, the discharge may result in approximately a 10 percent increase of total suspend solids downstream of the dredge operation.

17. The Discharger conducted a chemical oxygen demand test (COD) subsequent to a standard elutriate test, on sediment samples collected from the project area. Although there is uncertainty in the use of the elutriate COD test for predicting the actual oxygen depletion in the surface water, the results may be used to provide a conservative indication of potential impacts, particularly when the data is considered with other sediment data such as iron, which ranged from 3 to 6 percent by weight in the sediment.

18. The COD for the elutriate samples ranged from 93 to 232 mg/L for the upper portion of the sediment (old), 67 to 130 mg/L for the middle portion of the sediment (comp) and 10 to 63 mg/L for the bottom sediment (new). The reference elutriate sample contained a COD concentration of 11 mg/L.

19. Based on the non-dimension model's calculation that the elutriate emission rate from the cutter head is approximately to 0.78 percent, the COD concentration released to the water column may range from 0.74 mg/L to 1.8 mg/L for the old sediment, 0.5 mg/L to 1.0 mg/L for the comp sediment and .08 mg/L to 0.5 mg/L for the new sediment layer.

20. In order to mitigate potential DO impacts from the dredge operation, the Discharger will operate a portable aeration device within 1,000 feet of the dredge. The aeration device is capable of delivering approximately 500 pounds of oxygen per day to the water column.

21. Many chemical constituents are lipophilic and will preferentially sorb or attach to organically enriched or fine particles of sediment. Water column effects from dredging may occur when contaminants on the sediment particles are either dissolved or resuspended in the water column. The maximum concentrations of ammonia, sulfide and total organic carbon observed in the sediment core samples were 1,380 mg/kg, 350 mg/kg and 12,700 mg/kg, respectively.

22. Reduced, anaerobic conditions found in the sediments favor sulfide generation that generally makes metals biologically unavailable. Dredging operations expose the sediment/materials to oxygenated water and aerobic conditions that can oxidize the sulfide precipitates to sulfate salts resulting in an increase in acidity. The oxidation process continues as the sediments dry in the DMD site, which results in further acid production. As the acidity increases, the pH lowers, which generally makes various metals more soluble, bio-available, and toxic. In order to maintain a neutral pH condition in the dredged materials, soil amendments, such as lime, can be added to the dewatered dredged materials to compensate for the acid generation.

23. Dredging is a potential source of habitat destruction, mobilization of contaminated sediment and general disturbance to native fish species. The U.S Department of the Interior Fish and Wildlife Service approved *Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes*, November 1996, recommends restricting dredging operations to a time period, window, between September 1 through November 31 each year when Chinook salmon and Central Valley steelhead are absent from the river. Restricting dredging operations to seasonal time frames "windows" that minimizes the effects to critical life-stages of these endangered species is appropriate.

ROBERT'S ISLAND DMD SITE

24. The Discharger will discharge dredge material from the project to a DMD site, which is situated on Robert's Island. WDRs Order No. 5-01-235, adopted by the Regional Board on 7 September 2001, is one of two Orders that prescribes requirements for the DMD site. After the project is completed, subsequent discharges of waste to DMD site will result in the waste being commingled with the deposited spoils. Therefore, discharges from future dredging operations to the DMD site must comply with requirements specified in this Order.

25. The DMD site is located adjacent to the San Joaquin River along its northern boundary of the island as shown on Attachment A. The DMD site topography slopes gently away from the river in a southwestern direction. The land adjacent to the DMD site is owned by the Discharger but is currently leased for agriculture. An agricultural ditch extends along the southwest boundary of the site and is adjacent to the toe of the containment berm. Water in the ditch flows via gravity to the northern boundary of Robert's Island where it is discharged to the river via a pump station.

26. The DMD site consists of two tracts of land; a 40-acre tract that acts primarily as a sedimentation basin and an additional 80-acre tract that serves as an overflow area for the decant from the sedimentation basin. The final effluent may be either retained on site for disposal through evaporation and percolation or pumped back into the river. Based on the actual berm elevations with two feet of freeboard, the RWD indicates that the DMD site does not have sufficient capacity for dredge spoils generated by the project. As shown on the 2002 survey map, the storage capacity for the DMD site is as follows: Northern Overflow Area: 83,326 cubic yards, Southern Overflow Area: 36,497 cubic yards and Sedimentation Basin Area: 9,868 cubic yards. Based on the volumes listed above the total estimated liquid capacity for the DMD site is approximately 130,000 cubic yards. The Discharger estimated that the volume of sediment generated by the project is approximately 326,000 cubic yards.

27. WDRs Order No. 5-01-235 prescribes requirements for maintenance dredging operations at West Complex berths J, K, and I to a depth of 30 feet MLLW. The dredge operation discharged approximately 65,000 cubic yards of sediment to the DMD site. Sediment monitoring indicates that the dredge spoils were potential acid generating and contains elevated concentrations of copper, lead and zinc.

28. In addition, the DMD site also has received dredge material from maintenance dredging of the San Joaquin DWSC as specified in General WDRs Order No. R5-2003-0145. In 2001, the U.S. Army Corps of Engineers discharged approximately 65,000 cubic yards of dredge material to the site from maintenance of the DWSC. In 2003, maintenance operations discharged an additional 120,000 cubic yards of dredge spoils to the site.

29. On 15 October 2002, the Discharger collected five soil borings from the 40-acre portion of the DMD site. The core samples were collected with a sleeved, split-spoon sampler. The sample depth ranged from one to five feet and samples were collected where significant breaks in lithology were noted. In general, soils were graded by grain size across the DMD site; coarser sand materials were found in the greatest quantity near the river and finer silt/clay materials were in the greatest quantity near the western side of the DMD site. The distribution of soil is attributable primarily to past discharge practices. Generally the influent discharge point for past dredging operations was positioned near the river side of the DMD site, and the effluent overflow was situated on the northwestern boundary. Samples collected were analyzed for trace metals using the DI-WET test. The soil leachate contained concentrations of lead that ranged from 2 µg/L to 21 µg/L, with an average concentration of 11 µg/L.

30. As water infiltrates the soil it will move downward towards the groundwater table and migrate laterally towards the topographically lower agricultural fields southwest of the overflow area. The water may intercept the agricultural ditches and then be discharged via the agricultural return pumps. In order to determine if water from the overflow area is migrating via subsurface flow to the ditches, monitoring the agricultural ditches is appropriate.

31. The Discharger has installed a network of four groundwater monitoring wells around the 40-acre tract but has not installed groundwater wells for the overflow area. In order to determine if the discharge is having an impact to the underlying groundwater, the groundwater monitoring well network must be expanded to incorporate the overflow area.

32. The Discharger has submitted soil pH monitoring reports that indicate acidic conditions exist at the DMD site. The data indicates that the previously deposited dredge spoils are acid generating in nature and that the soil in the DMD site is now acidic. In an effort to control the acidic condition, the Discharger has applied lime to the DMD site on two separate occasions, December 2002 and August 2003. The applications of lime were only temporarily successful in neutralizing the sediments, and acidic conditions returned in the months following the applications. The Discharger's May 2004 monitoring report indicates that the soil conditions at the DMD site are again acidic. The report indicates that the soil pH currently ranges from 5.2 to 5.8.

33. To evaluate the potential impacts from the disposal of dredge material, the Discharger assumed neutral conditions and used deionized water as the extractant for the Waste Extraction Test (WET) instead of citrate buffer. In the RWD, the Discharger proposed to continue the application of lime, as needed, to maintain a neutral soil pH in the DMD site. In order to evaluate if the dredge material is sufficiently neutralized, requirements for monitoring the soil pH value are appropriate.

34. The RWD contains data on chemical constituents present in leachate extracted from the dock's core samples using the WET with deionized water (DIWET). The DIWET data

are used to predict the potential characteristics of leachate from dredge materials that are discharged to the DMD site. Leachate from dredged sediments may migrate through the soil column via soil pore space to the underlying groundwater. Antimony, arsenic, lead, mercury, and nickel were detected in the DIWET leachate at concentrations that have the potential to impact groundwater. The actual leachate concentrations for waste may vary depending on dilution, pH, salinity, and the oxidation state of the waste constituent.

35. Soluble waste constituents from the dredged material are expected to migrate downwards towards the underlying groundwater. As the waste migrates through the soil towards the groundwater, a degree of attenuation will occur for some waste constituents such as metals. Some of the processes that control attenuation include adsorption, diffusion, dispersion and advection. The degree of expected attenuation at the site may be approximated with an attenuation factor. The Discharger has estimated that the soil column attenuation factors for the DMD site range from 5 to10.

36. The Discharger has not submitted sufficient information and monitoring data needed to verify the estimated attenuation factor. In addition, the Discharger has not properly characterized the background groundwater quality. The total quantity of waste that is applied at a site may also influence the soil attenuation. As more waste is applied, the attenuation sites in the soil column are used and the attenuation factor is reduced. After the project is completed, the Discharger will likely continue to utilize the DMD site for disposal of dredge material generated from maintenance dredging activities of the DWSC. In order to determine if the disposal of dredge material is impacting the underlying groundwater, continued groundwater monitoring at the DMD site is appropriate. This Order requires the Discharger to continue monitoring and to expand the groundwater monitoring well network and to characterize background water quality.

37. On 18 November 2002, the Discharger collected five soil borings from the overflow area to assess the capacity of the soil to attenuate the possible constituents of concern in the decant water and leachate from the dredge materials. The soil samples had a reported pH values from 4.8 to 7.3 and a cation exchange capacity that ranged from 8.3 to 32.3 milliequivalents per 100 grams of soil. Surface soils are described as being predominately silts and clays interbedded with lenses of silty sands. In addition, peat layers were noted in the boring logs, generally at depths greater than 6 feet. The groundwater elevations in the borings ranged in depth from approximately 10 to 13 feet below ground surface.

38. In the past, dredge spoils deposited in the DMD site were periodically mined and reused. The RWD did not include descriptions of reuse activities or site-specific conditions related to the discharge of the dredge spoils outside the DMD site. The dredge spoils have been founds to be acid generating and contain soluble waste constituents. The potential impact to both groundwater and surface water quality if the dredge spoils are discharged outside the DMD site has not been evaluated at this time.

Therefore, the discharge of dredge material is restricted to the DMD site, and reuse activities are not covered by this Order.

39. Peat soils have been found underlying the DMD site. Peat soil formations may become unstable when loads are placed on them. Since the DMD site is used for the containment of water and dredged materials, there is a potential for subsidence. Periodic inspection of the containment berms is necessary in order to detect and minimize the potential for berm failure. In addition, berms can fail from a lack of maintenance or overtopping due to wave action. Requirements that a minimum freeboard level of two feet be maintained to prevent overtopping and that the Discharger implement an Operation and Maintenance Plan for the DMD site are appropriate.

40. A poorly designed and constructed confined disposal facility may allow short-circuiting of the slurry within the settling pond(s) to occur. Short-circuiting reduces the retention time and may allow waste to be discharged with the return water. Therefore, requirement for the DMD site be designed and constructed under the supervision of an appropriate qualified professional is appropriate.

41. The RWD contained a water balance for the DMD site, which showed that wastewater could be retained for land disposal if the effluent quality exceeds limitations. Based on an eight-hour production day and a total maximum daily influent flow rate of approximately 1.2 MGD, the water balance indicates that the storage capacity of the DMD site is limited during the wet season. Inflows from precipitation were estimated using the seasonal precipitation from a 10-year return period. Water lost to evaporation was calculated based on 100 percent of the pan evaporation rate.

42. Storm water runoff from the DMD site may contain soluble waste constituents from the deposited dredge spoils. In addition, storm water may also transport waste via erosion from the DMD site. The storm water that is commingled with dredge spoils from the DMD site must comply with Effluent Limitations and Receiving Water Limitations when discharged to surface waters.

43. San Joaquin County land use designation for Roberts Island is agricultural.

CHARACTERISTICS OF DREDGED MATERIALS

44. In order to determine the physical and chemical characteristics of the dredge sediments, the Discharger collected two Vibracores samples from each dock. The first series of the core samples were collected along a fixed bathymetric contour of approximately 30 foot depth in front of each dock. The other core samples were collected randomly at each dock site by using a grid system and random number generator. In addition, the Discharge collected a sample from outside the project near State Highway 4 and the San Joaquin River, which the Discharger used as a reference sample for comparison purposes.

45. Dredge material undergoes sedimentation in the DMD site that results in a thickened deposit of material, which is overlaid by a layer of clarified water. The clarified water may be discharged as effluent to the San Joaquin River.

46. The RWD contains chemical constituents extracted from dredged sediments using the modified elutriate test (MET). The MET simulates the dredging process by mixing four parts river water and one part sediment. The material is then mechanically mixed and aerated for one hour. Afterwards, the mixture is allowed to settle in order to simulate conditions in the retention pond. After settling, the supernatant is decanted off and then is analyzed for various waste constituents including metals, pesticides and semi-volatile organic compounds. The MET data were used to predict the potential characteristics of the effluent discharges.

47. The metals identified in the elutriate test with the reasonable potential to impact receiving waters are arsenic, barium, cadmium, copper, lead, mercury and nickel. In addition, Endosulfan II, an organochlorine pesticide, was detected in the elutriate sample from dock 19. The actual concentrations in the return water may vary depending on pH, hardness, and the retention time in the confined disposal facility.

BASIN PLAN, BENEFICIAL USES, AND REGULATORY CONSIDERATIONS

48. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*, (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board (State Board). These requirements implement the Basin Plan.

49. The beneficial uses of the Sacramento-San Joaquin Delta are municipal supply; domestic supply; agricultural irrigation; process; service supply; water contact recreation; noncontact water recreation; warm fresh water habitat; cold fresh water habitat; warm water migration; cold water migration; warm water spawning; wildlife habitat; and navigation.

50. Designated beneficial uses of groundwater are municipal and domestic supply, industrial service and process supplies, and agricultural supply.

51. The Basin Plan states, "…*We will adopt requirements for all significant dredging operations and upland disposal projects in the Region."* The dredging and subsequent upland disposal of approximately 326,000 cubic yards sediment from the West Complex is considered to be a significant dredging operation within the Central Valley Region.

52. Section 13267(b) of the California Water Code provides that: "*In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports*."

    The technical reports required by this Order and the attached "Monitoring and Reporting Program No. R5-2004-0137" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

53. USEPA adopted the *National Toxics Rule* (NTR) on 5 February 1993 and the *California Toxics Rule* (CTR) on 18 May 2000. These Rules contain water quality standards applicable to this discharge. The State Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters (SIP), Enclosed Bays, and Estuaries of California* (known as the State Implementation Plan), which contains guidance on implementation of the *National Toxics Rule* and the *California Toxics Rule.* The Basin Plan contains the "Policy for Application of Water Quality Objectives" that requires consideration of published standards of other agencies in implementing narrative water quality objectives. The CTR and NTR standards may be incorporated in waste discharge requirements where appropriate to implement the Basin Plans consistent with the Policy for Application of Water Quality Objectives.

54. The Basin Plan numerical and narrative water quality objectives for surface and groundwater within the basin are achieved primarily through the adoption of waste discharge requirements. Narrative water quality objectives are implemented consistent with the Policy for Application of Water Quality Objectives contained in the Basin Plan by establishing numerical limitations based on, among other factors, published standards.

55. The Basin Plan contains a Chemical Constituents water quality objective that, among other objectives, identifies numerical water quality objectives for waters designated as municipal supply. At a minimum water designated for domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the California maximum contaminant levels (MCLs) specified in the following provisions of Title 22, California Code of Regulations: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444,

and Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) of Section 64449. The Basin Plan's incorporation of these provisions by reference is prospective, and includes future changes to the incorporated provisions as the changes take effect. The Basin Plan recognizes that the Regional Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

56. The Basin Plan contains narrative water quality objectives for chemical constituents, taste and odor, and toxicity. The narrative toxicity objective requires that surface waters and groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in plants or animals. The chemical constituent objective requires that surface water and groundwater shall not contain chemical constituents in concentrations that adversely affect beneficial uses.

57. CWC Section 13241 requires the Regional Board to consider various factors, including economic considerations, when adopting water quality objectives into its Basin Plan. Water Code Section 13263 requires the Regional Board to address the factors in Section 13241 in adopting waste discharge requirements. The State Board, however, has held that a Regional Board need not specifically address the Section 13241 factors when implementing existing water quality objectives in waste discharge requirements because the factors were already considered in adopting water quality objectives. This Order implements adopted water quality objectives. Therefore, no additional analysis of Section 13241 factors is required.

58. State Board Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality Waters in California") requires that the Regional Board, in regulating the discharge of waste, must maintain high quality waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Board's policies (e.g., quality that exceeds water quality objectives). Any activity that produces a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters shall be required to meet waste discharge requirements which will result in best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur and that the highest water quality consistent with maximum benefit to the people of the state will be maintained.

59. The discharges authorized by this Order are consistent with State Board Resolution No. 68-16 and 40 CFR 131.12 (the federal antidegradation policy). With respect to surface waters, this Order may result in minor changes in water quality, therefore, this Order imposes requirements that will result in best practicable treatment or control necessary to assure that pollution and nuisance will not occur and that water quality objectives in the Basin Plan will be met. This Order, for example, requires compliance with applicable water quality objectives and contains prohibitions to protect the waters from pollution. With respect to groundwater, this Order establishes requirements that

will result in best practicable treatment or control of the discharge to assure that pollution or nuisance will not occur and that the discharges will not unreasonably affect beneficial uses or result in water quality less than prescribed in the Basin Plans. The assimilative capacity of the underlying soil at the dredge disposal area should prevent degradation of groundwater from infiltration of incidental waste constituents. The effluent and groundwater limits prescribed herein are intended to ensure that the assimilative capacity will not be exceeded. In addition, the Discharger must conduct effluent and soil monitoring. If the discharge violates the effluent or groundwater limits, then the Discharger may be required to cease the discharge, line the ponds, implement source control, change the method of disposal, or take other action to prevent groundwater or surface water degradation. This Order is consistent with the maximum benefit to the people of the State because it requires compliance with water quality objective and allows for navigation, which is a designated beneficial use of the San Joaquin River.

60. CWC Section 13260 states that each Discharger covered under WDRs shall submit an annual fee. The filing fee accompanying the RWD is the first year's annual fee. The annual fee is based on the threat and complexity of the discharge (Title 23, California Code of Regulations, Section 2200).

61. The California Department of Water Resources set standards for the construction and destruction of groundwater wells, as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 94-81* (December 1981). These standards, and any more stringent standards adopted by the State or county pursuant to CWC section 13801, apply to all monitoring wells.

62. State regulations that prescribe procedures for detecting and characterizing the impact of waste constituents from waste management units on groundwater are found in Title 27, California Code of Regulations (CCR), Section 20005 et seq. (hereafter Title 27). Because the DMD is a waste management unit, the data analysis methods of Title 27 is appropriate for determining whether the discharge complies with the terms for protection of groundwater specified in this Order.

63. The discharge authorized herein and the treatment and storage facilities associated with the discharge are exempt from the requirements of Title 27 CCR. The exemption, pursuant to Title 27 CCR Section 20090(b), is based on the following:

    a. Issuance of waste discharge requirements,

    b. The consistency of the waste discharge requirements with the Basin Plan,

    c. No need to manage wastewater according to Title 22, CCR, Division 4.5, and Chapter 11, as a hazardous waste. In order to be eligible for coverage under this Order, the Discharger must demonstrate that the waste is not classified as a hazardous waste but is properly classified as an inert waste,

d. Slurry water from hydraulic dredging receives treatment in the confined disposal facility, and

e. The effluent return flows must comply with the specified effluent and receiving water limitations that are protective of water quality. The Discharger must verify compliance with effluent limitation by conducting effluent and receiving water monitoring.

64. The Port will classify the waste and dispose of it consistent with its classification in compliance with 27 CCR section 20200.

65. Pursuant to CWC Section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

66. This Order does not preempt or supersede the authority of municipalities, flood control agencies, and other local agencies to prohibit, restrict, or control discharges of waste subject to their jurisdiction, but such regulation by other entities may not be less stringent than this Order.

67. On 23 June 2004, in accordance with the California Environmental Quality Act (CEQA) (PRC, Section 21000, et seq.), the Port of Stockton adopted an Environmental Impact Report (EIR) for the West Complex project. The project that was the subject of the EIR was to dredge material from the river bottom adjacent to the West Complex docks to an elevation of 36 MLLW to allow for increased navigation activities at the West Complex. The project as described in the EIR but did not describe maintenance dredging activities for the West Complex docks. Therefore, maintenance dredging activities for the West Complex are not included in this Order. The Regional Board, as a responsible agency, has considered the EIR prepared by the Port of Stockton as required by 14 California Code of Regulations section 15096. As described herein, the Regional Board has included mitigation measures and requirements in this Order to address significant environmental impacts identified in the EIR that are within the jurisdiction of the Regional Board:

- The EIR identified impacts to water quality resulting from return flows from the DPS as a potentially significant effect. This Order establishes additional aeration, effluent limits and monitoring requirements for the return flows to address water quality impacts.

- The EIR identified Long-Term, Far-Field Reduction of Dissolved Oxygen in the San Joaquin River as having a less than significant impact. The EIR also states that the Port shall take ownership and operational responsibility of the aeration device currently owned and operated by the USACOE. This Order requires operation of the USACOE's aeration device to deliver 2,500 pounds per day of oxygen as required by the EIR. In addition, the Order requires that the Port operate the aeration device from September to November until 2013

and provide 2,500 pounds per day of oxygen from December to September indefinitely. This Order also requires operation of an additional aeration device to address dissolved oxygen impacts while dredging operations are underway. The Order contains other requirements to address dissolved oxygen.

SITE-SPECIFIC FACTORS

68. The Delta waterways near Stockton are listed pursuant to Clean Water Act (CWA) section 303(d) as impaired for chlorpyrifos, DDT, diazinon, Group A pesticides, pathogens, mercury, and unknown toxicity. Low dissolved oxygen also causes impairment in the Stockton Deep Water Ship Channel.

69. During dredging sediment can be suspended in the water column if entrainment of the dislodged sediments is incomplete. The exposure of buried anaerobic sediments, ferrous iron and sulfide species to the water column will create an oxygen demand in the river. Therefore, the project may cause some degradation temporarily to surface waters as concentrations of turbidity, total suspended solids, and other wastes increase and dissolved oxygen (DO) decrease as bottom sediments are disturbed and exposed in the excavation process. Dredging operations in the Stockton Deep Water Ship Channel have the potential to exacerbate the existing low dissolved oxygen impairment in this CWA 303(d) listed water body.

70. The Discharger will incrementally add to the net DO impairment in the river by dredging the depth of the docks to 36 feet MLLW. In addition, the activities associated with the West Complex may contribute to an increase in the amount of oxygen demanding substances discharged to the river.

71. Mitigation measures in the EIR specify that the Discharger would assume the operation and maintenance of the USACOE jet aeration device. As part of the mitigation measure, the Discharger proposed to continuously operate the aeration device year round to provide a 0.2 mg/L DO increment above background conditions using the following formula:

$$\text{DO load (lbs/day)} = 5.4 \times \text{flow (cfs)} \times \text{DO concentration (mg/L)}$$

The Discharger would also continue to operate the jet aeration device to comply with USACOE mitigation requirements from September to November each year. Based on the above formula, the aerators will be operated until 250,000 pounds of oxygen are diffused into the river.

72. In order to mitigate the potential reduction in DO concentrations related to the dredging operation, the Discharger will operate a localized oxygen diffuser to artificially increase the DO concentrations. The aerator will be situated upstream and within 1,000 feet of the dredge. The Discharger will diffuse a minimum of 500 pounds of

oxygen per day while dredging operations are underway. In order to determine if the dredging activities are having an impact to water quality, monitoring the surface water during dredging operations is appropriate.

73. The dissolved oxygen objective in the Basin Plan is, "…*6.0 mg/L in the San Joaquin River (between Turner Cut and Stockton, 1 September through 30 November; and 5.0 mg/L in all other Delta waters*…" All in-water construction activities must comply with the Basin Plan dissolved oxygen requirements. If the ambient DO in the river should fall below 5.0 mg/L, then suspending dredging activity until the DO rises above 5.0 mg/L is appropriate to protect the beneficial uses of the river.

74. Whole sediment toxicity monitoring results indicate that the new sediment horizon for docks 18, 19 and 20 exhibited a positive toxic response for *Chironimus tentans*. However, the reference site monitoring also showed increased mortality for this specie with a mean survival rate of 68 percent. The Discharger did not repeat the sediment tests or conduct further characterization of the sediment to identify the responsible toxicant(s). Therefore, the potential for sediment phase toxicity has not been adequately determined for the new river bottom. In order to determine if the sediment is toxic, sediment sampling would occur immediately after dredging operations expose the new river bottom. The Discharger will use a phased approach for dredging the docks at the West Complex. One dock would be dredged at a time until the new depth of 35 MLLW is reached. Within 24 hours after exposing the new river bottom, the Discharger will collect a series of grab sediment samples for toxicity testing. If toxicity monitoring shows that the new river bottom is toxic, then all dredging operations for the remaining docks shall be suspended until all the appropriate corrective actions necessary to remediate the exposed toxic sediment are completed.

75. The Basin Plan general objective for turbidity is that 50 NTUs shall not be exceeded in the Central Delta and 150 NTUs shall not be exceeded in other Delta waters. Exceptions to the Delta specific objective can be considered for dredging operations. Because dredging operations can be modified to reduce the amount of turbidity, the point of compliance with the turbidity limitation shall be 100 feet downstream of the dredging operation. However, the dredging operation cannot cause or contribute to acute toxicity in the water body at any point of discharge. The point of compliance with the toxicity limitation shall be at the point of discharge (i.e. the dredging operation).

76. The Delta is subject to tidal influence, seasonal water pumping, and agricultural return flows. These factors may each have significant impacts on the amount of water available for dilution, water quality and flow direction in the region. Upstream flow diversions have a significant impact on flow rates in the vicinity of Stockton. During the late summer and fall period the net flow rate near Stockton may become negative due to flow diversion at Old River. No reliable dilution may be available in the receiving stream for a mixing zone. The hydraulic residence time from the site to

roughly River Marker 26 can vary from nearly 5 days at a downstream river flow of 2,000 cfs, to about 30 days for a flow rate of 100 cfs.

77. Based upon an analysis of available information, the Regional Board has found, and the State Board has upheld on appeal, that at times there is little to no dilution available in the San Joaquin River in the vicinity of the City of Stockton WWTP.

78. In determining if the discharge would have the potential to impact surface waters, the Discharger's EIR assumed no dilution and evaluated dredging operations at slack tide conditions. The Discharger has proposed to test effluent prior to releasing the wastewater from the DMD site. If monitoring results show that the discharge would violate a water quality objective, then the wastewater would be retained on-site for disposal via evaporation and percolation.

EFFLUENT LIMITATIONS FOR RETURN FLOWS

79. Sediments contain organic material and **Ammonia**. Ammonia concentrations in the elutriate samples was found to be as high as 25.5 mg/L. Ammonia is known to cause toxicity to aquatic organisms. In addition, ammonia concentrations detected in the elutriate toxicity tests were converted to un-ionized ammonia, and the un-ionized portion is known to be the most toxic fraction to fish. Calculated un-ionized ammonia concentrations in the elutriate samples were found to be above the LC_{50} range as reported by Nimmo et al. (1989). The Basin Plan contains a narrative toxicity objective for surface water. U.S. EPA has developed Ambient Water Quality Criteria for ammonia, which is dependent on pH and the presence of salmonids. Because salmonids may be present in the Delta during dredging operations, an effluent limitation, based on the Ambient Water Quality Criteria for ammonia with salmonids present, has been included in this Order consistent with the Policy for Application of Water Quality Objectives.

80. Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the toxicity objective for **Arsenic**. Based on information contained in the RWD, the discharge may contain concentrations of arsenic as high as 8.1 µg/l. The Cal/EPA Office of Environmental Health Hazard Assessment has published a Public Health Goal of 2.1 ug/L for arsenic in drinking water. Beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, which includes drinking water uses. Applying the Policy for Application of Water Quality Objectives, an effluent limit for arsenic, based on the Public Health Goal and presented in total concentration, has been included in this Order.

81. The Basin Plan contains a chemical constituent objective for **Barium** of 100 µg/l in the Sacramento-San Joaquin Delta. Based on information contained in the RWD, the discharge may contain concentrations of barium as high as 237 µg/l. The discharge has

a reasonable potential to cause violation of the Basin Plan chemical constituent objective for dissolved barium. Therefore, a barium effluent limitation based on the Basin Plan chemical constituents objective and presented in dissolved concentrations, has been included in this Order.

82. Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the toxicity objective for **Cadmium**. Based on information contained in the RWD, the discharge may contain concentrations of cadmium as high as 0.27 µg/l. The Cal/EPA Office of Environmental Health Hazard Assessment has published a Public Health Goal of 0.07 ug/L for cadmium in drinking water. Beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, which includes drinking water uses. Applying the Policy for Application of Water Quality Objectives, an effluent limit for cadmium, based on the Public Health Goal and presented in total concentration, has been included in this Order.

83. The Basin Plan contains a chemical constituent objective for **Copper** of 10 µg/l in the Sacramento-San Joaquin Delta. In addition, the CTR contains criteria for protection of freshwater aquatic life that vary with hardness. Below a hardness of 120 mg/L as $CaCO_3$, the 4-day average CTR criterion is more stringent than the Basin Plan objective. Based on information contained in the RWD database, the discharge may contain concentrations of copper as high as 33.1 µg/l. The discharge has a reasonable potential to cause violation of the Basin Plan chemical constituent objective and the CTR criteria for copper. Applying the Policy for Application of Water Quality Objectives, a copper effluent limitation, based on the Basin Plan chemical constituents objective and the CTR criteria, presented in dissolved concentrations, has been included in this Order.

84. Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for **Lead**. Lead is a heavy metal and was detected in the elutriate samples as high as 15.5 µg/l. Lead toxicity to aquatic life is hardness dependent. The CTR limit for lead is 1.8 µg/l for the 4-day chronic limit at 65 mg/L hardness. In addition, lead can cause toxicity in humans. The Basin Plan prohibits toxic chemicals to be present in surface waters in toxic concentrations. The Cal/EPA Office of Environmental Health Hazard Assessment has published a Public Health Goal of 2 ug/L for lead in drinking water. Beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, which includes drinking water uses. Applying the Policy for Application of Water Quality Objectives, an effluent limit for lead, based on CTR criteria and the Public Health Goal and presented in total concentration, has been included in this Order.

85. Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR Standard for **Mercury.**

Mercury is a bioaccumulative substance in animal tissue and can be harmful to human health. MET samples indicate that the discharge may contain total concentrations of mercury as high as 0.151 µg/l. The CTR limit for mercury is 0.05 µg/l for the sources of drinking water limit. Applying the Policy for Application of Water Quality Objectives, an effluent limit for mercury, based on the CTR and presented in total concentration, has been included in this Order.

86. Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the toxicity objective for **Nickel**. Nickel is a heavy metal and was detected in the elutriate samples as high as 21.9 µg/l. The Basin Plan prohibits toxic chemicals to be present in surface waters in toxic concentrations. The Cal/EPA Office of Environmental Health Hazard Assessment has published a Public Health Goal of 12 ug/L for nickel in drinking water. Beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, which includes drinking water uses. Applying the Policy for Application of Water Quality Objectives, an effluent limit for nickel, based on the Public Health Goal and presented in total concentration, has been included in this Order.

87. Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the toxicity objective for **Benzo (b) flouranthene**. Benzo(b) flouranthene is a polynuclear aromatic hydrocarbon and was detected in the elutriate samples as high as 0.0088 µg/l. The CTR limit for Benzo(b) flouranthene is 0.0044 µg/l for the sources of drinking water limit. The Applying the Policy for Application of Water Quality Objectives, an effluent limit for Benzo(b) flouranthene, based on the CTR and presented in total concentration, has been included in this Order.

88. Toxicity testing found fathead minnow survival was statistically elevated relative to the laboratory control sample. A toxic identification evaluation was not conducted; therefore, the responsible toxicant is unknown. The Basin Plan contains a narrative toxicity objective for surface water. The Basin Plan requires that "*as a minimum, compliance with this objective…shall be evaluated with a 96-hour bioassay*." Therefore, effluent toxicity limitation, based on 96-hour bioassay, is included in this Order.

89. The Basin Plan contains a pesticide objective for organochlorine (OC)pesticides. The Basin Plan states, "*Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by either the EPA or the Executive Officer*." Based on information in the RWD, sediment core sample for dock 17 contained 4,4,DDE, an OC pesticide. In addition, MET monitoring detected Endosulfan II at a concentration of 0.012 µg/l. Therefore, the discharge has the reasonable potential to cause or contribute to an in-stream excursion above the pesticide objective for OC pesticides. This Order contains an effluent limitation, based on the Basin Plan

pesticide objective prohibiting the discharge of OC pesticides at concentrations detectable within the accuracy of analytical methods.

PUBLIC NOTICE

90. All the above and the supplemental information and details in the attached Information Sheet, incorporated by reference herein, were considered in establishing the following conditions of discharge.

91. Interested agencies and persons were notified of the intent to prescribe an Order for this discharge and provided an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

92. In a public meeting, all comments pertaining to the discharges were heard and considered.

IT IS HEREBY ORDERED that the Port of Stockton, its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions:

1. The discharge from dredging operations, including material disturbed by either the cutter head or bucket during dredging, shall not cause or contribute to acute toxicity in the receiving waters.

2. Except as designated in Finding No. 8, the discharge of treated effluent from the DMD site to surface waters and surface water drainage courses is prohibited.

3. Except for activities permitted by the U.S Army Corps of Engineers under Section 10 of the Rivers and Harbors Act and Section 404 of the CWA, soil, silt, or other organic material shall not be placed where such material could pass into surface water or surface water drainage courses.

4. Bypass or overflow of untreated or partially treated waste from the DMD site is prohibited.

5. The discharge of dredge return water from hopper dredges to surface waters is prohibited.

6. Discharge of waste classified either as ‘hazardous,’ defined in Section 20164 of Title 27, CCR, or ‘designated,’ as defined in Section 13173 of the California

Water Code, is prohibited.

7. The discharge of petroleum products to surface waters is prohibited.

8. Activities shall not cause visible oil, grease, or foam in the work area or downstream.

9. Dredging operations are prohibited anytime the ambient dissolved oxygen concentration within the impaired reach of the San Joaquin River is less than 5.0 mg/L. From 1 September to 30 November dredging operations are prohibited anytime the ambient dissolved oxygen concentration within the impaired reach of the San Joaquin River is less than 6.0 mg/L.

10. Dredging operations shall be confined to the project area described in Findings 5 and 6. The maximum depth of dredging shall not exceed a depth of 36 feet below mean low, low water.

11. The discharge of domestic wastewater is prohibited.

12. The discharge of dredge materials other than to the DMD site described in Finding No. 8 and shown on Attachment A is prohibited.

13. After drying, dredged sediments shall remain in the DMD site. The removal of dredge spoils deposited in the DMD site is prohibited.

14. The Discharger shall only dredge one berth location at a time and shall not proceed to dredge the next berth until after sediment toxicity testing described in Monitor Reporting Program is completed. If the Executive Officer determines that the new sediment horizon has the potential to impact water quality or beneficial uses, then the Discharger shall not proceed with dredging the remaining docks until corrective actions/remediation measures detailed in Provision No. 9 Sediment Toxicity Assessment/Remediation Workplan for the exposed toxic sediment have been completed.

15. Increasing the heights of the berms at the DMD site is prohibited.

B. Discharge Specifications:

1. The monthly average daily influent flow rate to the DMD site shall not exceed 1.2 MGD.

2. The daily maximum effluent daily flow rate for the DMD site shall not exceed 2.0 MGD.

3. The total amount of dredged material discharged to the DMD site shall not exceed 326,000 cubic yards.

4. Neither the treatment nor the discharge shall cause a nuisance or condition of pollution as defined by the California Water Code, Section 13050.

5. No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitation.

6. The Port shall classify the waste and dispose of it consistent with its classification in compliance with 27 CCR section 20200.

7. Objectionable odors originating at this facility disposal site shall not be perceivable beyond the limits of the property owned by the Discharger.

8. As a means of discerning compliance with Discharge Specification No. 5, the dissolved oxygen content in the upper zone (1 foot) of all wastewater in the ponds shall not be less than 1.0 mg/L.

9. The Discharger shall maintain two feet of freeboard in the DMD facility at all times. Freeboard shall be measured vertically to the lowest point of overflow for all ponds.

10. The DMD facility shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

11. Newly constructed or rehabilitated levees at the confined disposal facility shall be designed and constructed under the direct supervision of the appropriate California Registered Professional.

12. The Discharger shall operate all systems and equipment to maximize treatment of effluent water and optimize the quality of the discharge.

13. The Discharger shall diffuse 2,500 pounds of oxygen per day, as specified in the Attachment F.

14. The Discharger shall diffuse 500 pounds of oxygen per day, while dredging operations are underway. The DO shall be delivered within 1,000 feet of the dredge operation and is in addition to the 2,500 pounds per day of oxygen required by this Order.

15. The Discharger shall diffuse 1,000 pounds of oxygen per day, when discharging effluent to the river from the DMD site. The DO shall be delivered within 1,000

feet of the outfall discharge point and is in addition to the 2,500 pounds per day of oxygen required by this Order.

C. Groundwater Limitation:

Release of waste constituents from any storage, treatment, or disposal component associated with the Dredge Material Disposal Site shall not, in combination with other sources cause the following in groundwater:

1. Adversely impact beneficial uses or exceed water quality objectives.

2. The discharge, in combination with other site–derived sources, shall not cause underlying groundwater to contain waste constituents statistically greater than background water quality.

D. Effluent Limitations:

The point of monitoring for effluent limitations is the location where the effluent discharge from the DMD facility occurs and upstream prior to entering the receiving water.

1. Effluent discharged to surface waters, including storm water runoff from the DMD site, shall not exceed the following limits:

Constituent	Units	Maximum Concentration [1]
Arsenic, total	µg/L	2.1
Barium dissolved	µg/L	100
Benzo(b) flouranthene total	µg/L	0.0044 µg/l
Cadmium, total	µg/L	0.07
Copper, total	µg/L	Attachment C
Lead, total	µg/L	Attachment D
Mercury, total	µg/L	0.05
Nickel, total	µg/L	12

[1] Concentrations shall be determined using methods specified in the Monitoring and Reporting Program.

2. The discharge shall not exceed the pH-Dependent Effluent Limits for Ammonia shown on Attachment B.

3. The discharge shall not have a pH less than 6.5 nor greater than 8.5.

4. The effluent shall not contain any constituent at concentrations that could cause acutely toxic conditions to aquatic life nor adversely impact biologically sensitive or critical habitats.

5. Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the discharge at concentrations detectable within the accuracy of analytical methods approved by either the EPA or the Executive Officer.

6. Survival of aquatic organisms in 96-hour toxicity tests of undiluted waste shall be no less than:

   Minimum for any one toxicity test - - - - - - - - - 70%
   Median for any three or more consecutive toxicity tests - - - - 90%

E. Dredge Material Disposal Site-Soil Limitation

The soil pH shall not be less than 6.0 or greater than 8.0 standard units.

F. Receiving Water Limitations

Receiving Water Limitations are based upon water quality objectives contained in the Basin Plan. As such, they are a required part of this Order.

The discharge shall not cause or contribute to the following in the receiving water:

1. Concentrations of dissolved oxygen to fall below 6.0 mg/L in the San Joaquin River (between Turner Cut and Stockton, 1 September through 30 November); and 5.0 mg/L in all other Delta waters except for those bodies of water which are constructed for special purposes and from which fish have been excluded or where the fishery is not important as a beneficial use.

2. Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the discharge at concentrations detectable within the accuracy of analytical methods approved by either the EPA or the Executive Officer.

3. Oils, greases, waxes, floating material (liquids, solids, foams, and scums) or suspended material to create a nuisance or adversely affect beneficial uses.

4. Activities shall not cause turbidity increases in surface waters to exceed:

(a) where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU;
(b) where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
(c) where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs;
(d) where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

In determining compliance with the above turbidity limit for in-water construction and excavation work (i.e. the dredge cutterhead operation) shall be 100 feet down current of the operation.

5. Esthetically undesirable discoloration.

6. Fungi, slimes, or other objectionable growths.

7. The ambient pH to fall below 6.5, exceed 8.5, or the 30-day average to change by more than 0.5 units.

8. The ambient temperature to increase more than 5°F.

9. Deposition of material that causes nuisance or adversely affects beneficial uses.

10. Radionuclides to be present in concentrations that exceed maximum contaminant levels specified in the California Code of Regulations, Title 22; that harm human, plant, animal or aquatic life; or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

11. Aquatic communities and populations, including vertebrate, invertebrate, and plant species, to be degraded.

12. Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels which are harmful to human health.

13. Violation of any applicable water quality standard for receiving waters adopted by the Regional Board or the State Board pursuant to the CWA and regulations adopted thereunder.

14. Taste or odor-producing substances to impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to cause nuisance or adversely affect beneficial uses.

15. The fecal coliform concentration in any 30-day period to exceed a geometric mean of 200 MPN/100 ml or cause more than 10 percent of total samples to exceed 400 MPN/100 ml.

G. Provisions

All of the following reports shall be submitted pursuant to California Water Code Section 13267 and shall be prepared by registered professionals as described by Provision No. G. 13:

1. Prior to discharging waste to the DMD site, the Discharger shall develop and implement an Operation Plan that describes site operations and procedures to be followed before, during, and after dredging sediment disposal including storm water management and dust control. The Operation Plan shall contain the appropriate certification required for the construction of new containment berms. The Operation Plan must be submitted for Executive Officer approval and shall include emergency procedures for potential risks, including levee failures and overflow events.

2. Prior to discharging waste to the DMD site, the Discharger shall develop and implement an Emergency Spill/Operation Plan (ESOP) that describes dredging operations and procedures to be followed when removing debris from the river bottom. The ESOP must be submitted for approval of the Executive Officer prior to discharging waste dredge material to the DMD site and shall include emergency procedures for potential risks associated with debris removal, including spills of petroleum or other wastes from the identified magnetic anomalies. The ESOP shall also specify all necessary materials, staffing, and equipment required to implement the Plan.

3. Within **30 days** of receiving sample data that shows that the dewatered dredge material has a pH value less than 6.0 standard unit, the Discharger must submit and implement a Dredge Material pH Management Workplan. The workplan shall describe the improvements and/or corrective action(s) taken to stabilize and maintain the dredge material's pH value between 6.0 and 8.0 standard units. Finally, the workplan must contain an analysis of the potential impacts to water quality from total dissolved solids and salts discharged from the neutralization of acidic dredge spoils.

4. Within **30 days** after implementing the Dredge Material pH Management Workplan, the Discharger shall submit a report certifying that all the improvements and corrective actions specified in the workplan have been implemented. The report shall also evaluate the effectiveness that the improvements and corrective actions have on controlling the dredge material pH condition.

5. By **30 January 2005,** the Discharger shall submit a technical report assessing the potential consolidation of the sediments, including peat layers, underlying the foundation of the DMD site. The report shall evaluate the potential magnitude for settlement of the underlying sediments under both existing conditions and when the site is at full capacity. If the report shows that consolidation of the foundation sediment may occur, then the report shall also determine the depth between the dredge spoils and the underlying groundwater.

6. By **30 January 2005**, the Discharger shall submit a *Groundwater Monitoring Workplan* prepared in accordance with, and including the items listed in, the first section of Attachment E: *"Monitoring Well Workplan and Monitoring Well Installation Report Guidance."* The workplan shall describe a groundwater monitoring network of at least five new groundwater monitoring wells specifically designed to ensure that background water quality (upgradient and out of the influence of waste management activity at the site) is adequately characterized and any potential water quality impacts from the discharge are detected. The groundwater monitoring system shall be designed to yield samples representative of the uppermost portion of the first aquifer underlying the site.

7. By **30 May 2005**, the Discharger shall submit a *Monitoring Well Installation Report* prepared in accordance with, and including the items listed in, the second section of Attachment E: *"Monitoring Well Workplan and Monitoring Well Installation Report Guidance."* The report shall describe the installation and development of the monitoring wells and explain any deviation from the approved workplan.

8. By **30 June 2006**, the Discharger shall submit a *Background Groundwater Quality Study and Groundwater Impacts Assessment Report*. For each groundwater monitoring parameter/constituent identified in the MRP, the report shall present a summary of monitoring data, calculation of the concentration in background monitoring wells, and comparison of background groundwater quality to that in wells used to monitor the facility. The report shall include at least the following:

   i. A narrative discussion of the hydrogeology of the DMD site and overflow application areas, including subsurface stratigraphy, soil infiltration characteristics, depth to groundwater, groundwater gradient, and seasonal gradient variations over the previous five years.

   ii. Groundwater elevation contour maps for each monitoring event to date.

   iii. Historical summary data tables for all monitored constituents.

iv. Concentration vs. time graphs for each constituent listed in the MRP. Each graph shall represent the results for a single constituent, and multiple wells may be plotted on a single graph.

v. Definition of site-specific background concentration for each of the constituents listed in the MRP.

vi. A narrative analysis of spatial and temporal trends for each of the constituents listed in the MRP with respect to established background concentrations.

vii. An evaluation of monitoring data from background monitoring well(s) in an appropriate data analysis method as described in Title 27, Section 20415(e)(7-9).

If any established background concentrations have been exceeded, then also include a specific plan for source control and a corrective action program and time schedule to assure compliance with the Discharge Specifications and Groundwater Limitations of this Order.

9. A month prior to discharge, the Discharger shall submit a Waste Determination Workplan that describes in detail the rationale, approach, and specific methods to be used to develop the report required by Provision 10 of this Order. The workplan shall define all additional data needs and a detailed scope and schedule for data acquisition that ensures compliance with the schedule for that report. The Discharger shall provide notification of the availability of the Waste Determination Workplan for all parties who have expressed an interest in writing. After approval by the Executive Officer, the Discharger shall implement the Workplan.

10. **Prior to discharge**, the Discharger shall submit a Waste Determination Report that fully characterizes the following wastes and shows whether any are properly classified as designated waste, as defined in Section 13173 of the California Water Code:

- Existing dredge spoils in the DMD site;
- Dredge spoils from the West Complex Project including liquid slurry;
- Leachate discharged to the agricultural ditches adjacent to the DMD site and the San Joaquin River;

For each waste stream, the report shall thoroughly document all site-specific information used in any modeling, all analytical results, background groundwater quality, all assumptions (with justification), all model inputs, and calculations performed. The report shall present conclusions regarding the character of each waste and all the related potential impacts to water quality. If the listed wastes may impact water quality, then the report shall also contain a revised RWD, which details how the Discharger shall comply with Title 27 and

the Basin Plan requirements for the handling, storage and management of designated waste at the DMD site. Prior to discharging any dredge spoils to the DMD site, the Executive Officer must first concur with the findings and conclusions used in the Report for the classification of the dredge spoils.

11. By **January 2005**, The Discharger shall submit a Jet Aeration Operation and Maintenance Plan, which describe operation and maintenance procedures for the jet aeration device. The Plan shall also (a) detail how the Discharger will monitor the dissolved oxygen discharged to the impaired reach of the river, (b) specify how the aerator efficiency will be evaluated, and (c) describe a monitoring program for demonstrating compliance with dissolved oxygen requirements specified in this Order.

12. If through sediment toxicity monitoring, as described in the MRP, the new river bottom sediment is found to contain toxic areas or if the Executive Officer determines that the sediment is a threat to water quality, then within **90 days** following notification of a toxic sediment condition, the Discharger must submit a Sediment Toxicity Assessment/Remediation Workplan for the Executive Officer's approval.

    The workplan shall determine the responsible toxicant(s) in the sediment, characterize the extent of the contamination in the new river bottom sediments, and describe in detail remedial corrective action(s) such that under environmental conditions the exposed sediment layer does not pose a threat to water quality. The workplan must contain a detailed time schedule to assure compliance with the Discharge Prohibitions and Receiving Water Limitations of this Order. The schedule must include proposed dates for each major step of the process (e.g., hiring an engineer, completing preliminary plans, completing final plans, executing contract for major components, complying with CEQA, commencing construction, completing construction, etc.).

    The Discharger shall provide notification of the availability of the Sediment Toxicity Assessment/Remediation Workplan for all parties who have expressed an interest in writing.

13. Prior to surface water discharge, the Discharger shall obtain samples from the DMD site that are representative of the potential decant water. The Discharger shall monitor for toxicity using bioassay tests, ammonia, arsenic, barium, cadmium, copper, lead, mercury, nickel, organochlorine pesticides, and polyaromatic hydrocarbons. If samples are found to exceed water quality standards, then the water shall not be discharged. Monitoring frequency is required as described in the effluent section of the Monitoring and Reporting Program No. R5-2004-0137.

14. The Discharger shall comply with the Attachment F "Aeration Agreement," which specifies the amount of oxygen that the Discharger must diffuse into the water column of the San Joaquin River on a daily basis. Failure to diffuse the prescribed amounts of oxygen is a violation of this Order.

15. Pursuant to Section 13267 of the California Water Code, the Discharger may be required to submit other technical reports as directed by the Executive Officer.

16. The Discharger shall comply with the attached Monitoring and Reporting Program No. R5-2004-0137, which is part of this Order, and any revision thereto as ordered by the Executive Officer.

17. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall contain a statement of qualifications of the responsible licensed professional(s) as well as the professional's signature and/or stamp of the seal.

18. The Discharger shall take all reasonable steps to prevent any discharge in violation of this Order. Violations may result in enforcement action, including Regional Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

19. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are by reference a part of this Order. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."

20. The Discharger shall immediately notify the Regional Board by telephone whenever a violation or an adverse condition occurs as a result of the dredging and disposal operation or the discharge of effluent. Written confirmation shall follow within two (2) weeks. An "adverse condition" is defined as any action or incident that may result in a risk to public health and safety, condition of nuisance, violation of water quality standards or violation of other conditions of this Order.

21. The Discharger shall not alternate any material or change the character, location, or volume of the discharge as described in the RWD.

22. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Regional Board or court orders requiring corrective action, or imposing civil monetary liability, or in revision or rescission of this Order. The Regional Board considers the Discharger to have continuing responsibility for correcting any problems which may arise in the future as a result of the dredging activities and of the subsequent use of the dredge material disposal sites.

23. This Order does not relieve the Discharger from the responsibility to obtain other necessary local, State, and Federal permits to construct facilities necessary for compliance with this Order, nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency.

24. A copy of this Order shall be kept as a reference for personnel operating the dredge or DMD site. Key operating personnel shall be familiar with the contents of the Order.

I, THOMAS R. PINKOS, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region on 15 October 2004.

_____
THOMAS R. PINKOS, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2004-0137

PORT OF STOCKTON
WEST COMPLEX DOCK DREDGING PROJECT
SAN JOAQUIN COUNTY

This Monitoring and Reporting Program (MRP) includes requirements for monitoring dredging operations, Dredge Material Disposal facility, dredged materials, effluent and the receiving waters. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. Regional Board staff shall approve specific sample station locations prior to implementation of sampling activities.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

Field test instruments (such as those used to test pH, turbidity and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of this MRP.

DREDGE OPERATION MONITORING

Sampling shall be conducted any time dredging operations are performed, including site preparation and debris removal. Grab samples shall be taken at approximately 2/3 of the distance to the bottom. Water samples shall be taken from the following stations:

Station	Description
R-1	In an area undisturbed by the dredging operation, and not to exceed 5,000 feet up current from the dredge operation.
R-2	within 100 feet down current of the dredge suction head or clamshell.

Samples shall be collected and analyzed from Stations R-1 and R-2 as follows:

DREDGE OPERATION MONITORING TABLE

Constituent	Units	Type of Sample	Sampling Frequency[5]
Dissolved Oxygen[1,2]	mg/l	Grab/Meter	Once every 4 hours
pH[1]	Standard units	Grab/Meter	Once every 4 hours

DREDGE OPERATION MONITORING TABLE

Constituent	Units	Type of Sample	Sampling Frequency[5]
Temperature	°F or °C	Measurement	Once every 4 hours
Turbidity[1, 3]	NTU	Grab/Meter	Once every 4 hours
Ammonia	mg/l	Grab [1]	Daily
Acute Toxicity Test [4]	% Survival	Grab [1]	Twice Weekly

1. Samples shall be collected at four-hour intervals after dredging operations have commenced and shall continue until all in-river construction work has ceased for the day.
2. Dissolved oxygen monitoring shall be conducted at two foot below the water surface, mid-depth and within two (2) feet of the river bottom. The temperature and depth for each dissolved oxygen sample shall be recorded.
3. If monitoring shows a violation of the Receiving Water Limitations, then the Discharger shall immediately collect samples to be analyzed for OC pesticides, metals and acute toxicity test. Metal monitoring shall include the following constituents: arsenic, barium, copper, iron, mercury and zinc.
4. Acute toxicity tests shall be conducted in accordance with EPA/600/4-90/027, or later amendment, with Regional Board staff approval, using juvenile fathead minnow, *Pimephales promelas*, and a Cladocern, *Ceriodaphnia dubia* as the test species. The ambient water temperature and pH shall be recorded at the time the bioassay sample is collected. Sampling for R-2 shall be performed down current, mid-depth and in the center of any visible turbidity plume from the dredging operations. If dredging operations are conducted after 1 November, then a cold water fish specie, *Oncorhynchus mykiss*, shall be substituted for warm water fish, *Pimephales promelas.*
5. The Discharger shall collect and analyze a grab sample for pH, dissolved oxygen, temperature and turbidity when a magnetic anomaly identified in the Marine Magnetometer Survey, dated 4 June 2004, are being removed from the sediment and lifted out of the river. The magnetic anomaly monitoring shall be in addition to the daily Monitoring described in the Dredge Operation Monitoring Table and shall be collected every hour that in-water work removing the metallic debris is performed.
6. The Discharger shall maintain daily logs that accurately describe the area dredged each day and the total volume of sediment/material removed from the river including debris.

DREDGE MATERIAL DISPOSAL FACILITY MONITORING

Monitoring shall commence immediately after dredging materials are discharged into the Dredge Material Disposal (DMD) facility. Monitoring shall continue until the DMD is completely empty of water. The confined disposal facility shall be sampled for the parameters specified below:

DMD MONITORING TABLE

Constituent	Units	Type of Sample	Sampling Frequency
Influent Flow	Gallons	Meter/Gauge	Daily[1]
Freeboard	0.1 feet	Measurement	Daily[1]
Odors	--	Observation	Daily[1]
Dissolved Oxygen[2,3]	mg/l	Grab	Weekly
pH	Standard units	Grab	Weekly
Levee condition[4]	--	Observation	Weekly

1 Inspections for freeboard measurements and odors shall be performed daily during the normal business week (i.e. Monday through Friday).

2 Samples shall be collected at a depth of one foot from each pond in use, opposite the inlet. Samples shall be collected between 0700 and 0900 hours. Monitoring for dissolved oxygen may cease any time that freeboard measurements indicate that level of water in the confined disposal facility is less than 0.5 feet.
3 If odors are detected during the daily site inspection, then the Discharger shall conduct daily monitoring for dissolved oxygen until the odors are abated.
4 Containment levees shall be observed for signs of seepage or surfacing water along the exterior toe of the levees. If surfacing water is found, then a sample shall be collected and tested for pH and total dissolved solids.

After dewatering, the Discharger shall conduct sediment monitoring in the DMD site. The pH of the sediment in the DMD shall be monitored on a monthly basis after the initial placement for at least 12 consecutive months. At least two soil samples shall be collected per ten acres, i.e. 120 acres equals at least 12 sample sites, from the DMD and tested for pH. The two soil samples shall be collected from six inches and eighteen inches below the ground surface at locations approved by Regional Board staff. If additional dredge spoils are deposited in the DMD from maintenance dredging operations, then the Discharger shall collect a third sample at a depth of approximately 24 inches. Additional samples shall be added to the monitoring program for subsequent maintenance dredging events at increasing depth intervals of six inches for each event. This information shall be submitted in the monthly reports. If the pH monitoring data shows that the soil pH is less than 6.0 standard units, then the Discharger shall continue to conduct the soil pH monitoring for an additional two years from the time the acidic condition was detected. The Discharger must implement a soil management plan to control the acidic soil conditions and report the results in the following monthly report for any ten-acre parcel found to be acidic. If saturated soil conditions are found during soil sampling, then the Discharger shall collect a grab sample of the leachate and analyze the sample as described in the Groundwater Monitoring table.

AGRICULTURAL DITCH MONITORING

If water is found in the agricultural ditches/drainage systems surrounding the DMD site and standing water is also present in the DMD site, then a sample shall be collected from each ditch/drain system containing water. The sample(s) shall be tested as described in the Effluent Monitoring. Agricultural ditch monitoring shall be conducted on a weekly basis when standing water is found in the DMD site.

EFFLUENT MONITORING

Effluent samples shall be collected when effluent is discharged to the receiving waters and shall be representative of the volume and nature of the discharge. If no effluent is discharged, then monitoring, with the exception of flow monitoring does not have to be performed. Effluent monitoring shall include the following:

EFFLUENT MONITORING TABLE

Constituents	Units	Type of Sample	Sampling Frequency*
Flow	MGD	Meter/Gauge	Daily
Turbidity	NTU	Meter	Daily
pH[1,2]	Standard units	Grab [1]	Daily
Temperature	°F or °C	Grab [1]	Daily

EFFLUENT MONITORING TABLE

Constituents	Units	Type of Sample	Sampling Frequency*
Electrical Conductivity (EC) at 25 °C	µmhos/cm	Grab [1]	Daily
Ammonia [2] as Nitrogen	mg/l	Grab [1]	Daily
Nitrates as Nitrogen	mg/l	Grab [1]	Daily
BOD [3]	mg/l	Grab [1]	Daily
Total Suspended Solids (TSS)	mg/l	Grab [1]	Daily
Settleable Solids (SS)	ml/l	Grab [1]	Daily
Oil and Grease	mg/l	Grab [1]	Daily
Total Dissolved Solids (TDS)	mg/l	Grab [1]	Daily
Acute Toxicity Test [4]	% Survival	Grab [1]	Twice Weekly
Hardness	mg/l	Grab [1]	Daily
Aluminum[5]	µg/l	Grab [1]	Daily
Arsenic	µg/l	Grab [1]	Daily
Barium, dissolved	µg/l	Grab [1]	Daily
Benzo(b) flouranthene total	*µg/l*	*Grab [1]*	*Daily*
Cadmium	*µg/l*	*Grab [1]*	*Daily*
Total Chromium [5]	µg/l	Grab [1]	Daily
Copper	µg/l	Grab [1]	Daily
Lead[5]	µg/l	Grab [1]	Daily
Iron	µg/l	Grab [1]	Daily
Manganese	µg/l	Grab [1]	Daily
Total Mercury	µg/l	Grab [1]	Daily
Methyl Mercury[6]	µg/l	Grab [1]	Weekly
Nickel, total [5]	µg/l	Grab [1]	Daily
Zinc	µg/l	Grab [1]	Daily
Chlorinated hydrocarbon pesticides	µg/l	Grab [1]	Daily
Organophosphorous pesticides	µg/l	Grab [1]	Daily
Total Fecal Coliform Organisms[7]	MPN/100 ml	Grab [1]	Daily

1 Grab samples shall not be collected at the same time each day.
2 pH and temperature data shall be collected at the same time as the ammonia sample.
3 5-day, 20 °C biochemical oxygen demand (BOD)
4 Acute Bioassays shall be conducted in accordance with EPA/600/4-90/027, or later amendment, with Regional Board staff approval, using both juvenile fathead minnow, *Pimephales promelas*, and a Cladocern, *Ceriodaphnia dubia,* as the test species. Temperature and pH shall be recorded at the time of bioassay collection. If effluent discharge occurs after 1 November, then a cold water fish specie, *Oncorhynchus mykiss*, shall be substituted for warm water fish, *Pimephales promelas.* The Discharger may use a reference site, which has been approved by Regional Board staff as the test control sample provided that the reference sample is not outside the control survival standard for the test and therefore is itself not potentially toxic.
5 Hardness, pH, and temperature data shall be collected at the same time as aluminum, total chromium and nickel.
6 Unfiltered methylmercury samples shall be taken using clean hands/dirty hands procedures and shall be analyzed by EPA method 1630/1631 with a method detection limit of 0.02 ng/L. A travel blank must also be collected and analyzed with every other set of samples.
7 Using a minimum of 15 tubes or three dilutions.

RECEIVING WATER MONITORING

The Discharger shall conduct receiving water monitoring when discharging effluent to surface waters. If no effluent is discharged, then receiving water monitor does not need to be performed. All receiving water samples shall be grab samples. Receiving water monitoring stations are located as follows:

Station	Description
R-3	3000 feet upstream from the point of discharge
R-4	25 feet or less downstream from the point of discharge
R-5	500 feet downstream from the point of discharge

RECEIVING WATER MONITORING TABLE

Constituent	Units	Type of Sample	Sampling Frequency
Dissolved Oxygen	mg/l	Grab[1]	Daily
Temperature	°F or °C	Measurement[1]	Daily
pH	Standard units	Grab[1]	Daily
Turbidity	NTU	Meter[1]	Daily
Electrical Conductivity (EC) at 25	μmhos/cm	Grab[1]	Daily
Total Fecal Coliform Organisms	MPN/100 ml	Grab [1]	Daily
Ammonia	mg/l	Grab [1]	Daily
Arsenic	μg/l	Grab [1]	Daily
Barium	μg/l	Grab [1]	Daily
Copper	μg/l	Grab [1]	Daily
Lead	μg/l	Grab [1]	Daily
Manganese	μg/l	Grab [1]	Daily
Mercury	μg/l	Grab [1]	Daily
Nickel	μg/l	Grab [1]	Daily
Zinc	μg/l	Grab [1]	Daily

[1] Daily inspections/monitoring shall be performed anytime that effluent is discharged to surface waters.

Furthermore, in conducting the receiving water sampling, a separate log shall be kept of the receiving water conditions. Notes on receiving water conditions shall be summarized in the monitoring report. Attention shall be given to the presence or absence of:

a. Floating or suspended matter
b. Discoloration
c. Bottom deposits
d. Aquatic life
e. Visible films, sheens, or coatings
f. Fungi, slimes, or objectionable growths
g. Potential nuisance conditions
h. Flow Direction
i. Upstream Conditions

All receiving water monitoring results, log notations, and notes shall be reported monthly. Date and time of sample collection shall be recorded and reported.

AERATION DEVICE MONITORING

The Discharger shall conduct monthly monitoring as specified in the approved Jet Aeration Operation and Maintenance Plan.

SAN JOAQUIN RIVER SEDIMENT MONITORING

No later than **24** hours after dredging operations reach the project depth of approximately 36 feet MLLW at each dock, the Discharger shall collect five grab samples from the river bottom. Two of the grab samples shall be from the same location as the original core samples listed in the Report of Waste Discharge. The remaining three samples shall be collected from new locations distributed randomly across the dock's dredged area.

Sediment toxicity monitoring shall be conducted in accordance with EPA100.1 (600/R-99/064) using the following test species, *Hyalella azteca* and *Chironomus tentans.* In order to determine if either test species shows significant toxicity when exposed to the new sediment layer, each sediment sample shall be statistically compared to the control sample by running the one-tailed t-test. The Discharger may use a reference site, which has been approved by Regional Board staff as the test control sample provided that the reference sample is not outside the control survival standard for the test and therefore is itself not potentially toxic. If the laboratory control sample is also outside the specified control survival standard for the test, then the Discharger shall repeat the sediment toxicity test.

The Discharger shall report the results of the sediment toxicity monitoring to the Regional Board no later than **48** hours after receiving the laboratory test results. The Discharger shall provide copies of the laboratory data including test acceptability criteria with the report.

GROUNDWATER MONITORING

Beginning with the first quarter 2005, the Discharger shall conduct the following groundwater monitoring program. Prior to construction of any groundwater monitoring wells, the Discharger shall submit plans and specifications to the Regional Board for review and approval. Once installed, all new wells shall be added to the MRP, and shall be sampled and analyzed according to the schedule below.

Prior to sampling, groundwater elevations shall be measured and the wells shall be purged at least three well volumes until pH and electrical conductivity have stabilized. Depth to groundwater shall be measured to the nearest 0.01 feet. Water table elevations shall be calculated and used to determine groundwater gradient and direction of flow. Samples shall be collected using approved EPA methods. Groundwater monitoring shall include, at a minimum, the following:

GROUNDWATER MONITORING TABLE

Constituents	Units	Type of Sample	Sampling and Reporting Frequency[1]
Groundwater elevation	0.01 Feet	Measurement	Quarterly
pH	S.U.	Grab	Quarterly
Electrical Conductivity (EC) at 25 °C	μmhos/cm	Grab	Quarterly
Total Dissolved Solids	mg/l	Grab	Quarterly
Nitrates as Nitrogen	mg/l	Grab	Quarterly
Ammonia as Nitrogen	mg/l	Grab	Quarterly
Aluminum	μg/l	Grab	Quarterly
Arsenic	μg/l	Grab	Quarterly
Barium	μg/l	Grab	Quarterly
Boron	μg/l	Grab	Quarterly
Calcium	μg/l	Grab	Quarterly
Copper	μg/l	Grab	Quarterly
Chloride	mg/l	Grab	Quarterly
Iron	μg/l	Grab	Quarterly
Lead	μg/l	Grab	Quarterly
Manganese	μg/l	Grab	Quarterly
Potassium	μg/l	Grab	Quarterly
Sodium	μg/l	Grab	Quarterly
Sulfate	mg/l	Grab	Quarterly
Zinc	μg/l	Grab	Quarterly

[1] Groundwater monitoring begins with the first quarter 2005.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, equalization basin, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported to the Regional Board.

A. Monthly Monitoring Reports

Daily, weekly, and monthly monitoring data shall be reported in monthly monitoring reports. Monthly reports shall be submitted to the Regional Board on the **1st day of the second month following sampling** (i.e. the January Report is due by 1 March). At a minimum, the reports shall include:

1. Results of dredging operations, effluent, DMD, agricultural ditch, receiving water, jet aeration device and soil monitoring;
2. A comparison of monitoring data to the discharge specifications and an explanation of any violation of those requirements. Data shall be presented in tabular format;
3. Copies of laboratory analytical report(s);
4. A calibration log verifying calibration of all hand-held monitoring instruments and devices used to comply with the prescribed monitoring program;
5. If soil monitoring indicates that the soil in the DMD is acidic, then the report shall include a discussion of the corrective action steps taken to neutralize and stabilize the acidic soil condition;
6. A description of all magnetic anomalies and debris removed from the river; and
7. A comparison of the monitoring data with discharge prohibitions, limitations and specifications. The Discharger shall provide explanations of any violation(s) of the requirements and detailed descriptions of all steps taken to minimize the impacts including any corrective actions taken to prevent the violation reoccurrence in the future.

B. Quarterly Report

Beginning with the first quarter 2005, the Discharger shall establish a quarterly sampling schedule for groundwater monitoring such that samples are obtained approximately every three months. Quarterly monitoring reports shall be submitted to the Board by the **1st day of the second month after the quarter** (i.e. the January-March quarterly reports is due by May 1st) each year. The Quarterly Report shall include the following:

1. Results of groundwater monitoring. The results of regular monthly monitoring reports for March, June, September and December may be incorporated into their corresponding quarterly monitoring report;
2. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater; parameters measured before, during, and after purging; method of purging; calculation of casing volume; and total volume of water purged;
3. Calculation of groundwater elevations, an assessment of groundwater flow direction and gradient on the date of measurement, comparison of previous flow direction and gradient data, and discussion of seasonal trends if any;

4. A narrative discussion of the analytical results for all groundwater locations monitored including spatial and temporal trends, with reference to summary data tables, graphs, and appended analytical reports (as applicable);
5. A comparison of the monitoring data to the groundwater limitations and an explanation of any violation of those requirements;
6. Summary data tables of historical and current water table elevations and analytical results;
7. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum; and
8. Copies of laboratory analytical report(s) for groundwater monitoring.

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program as of the date of this Order.

Ordered by: _____
THOMAS PINKOS, Executive Officer

15 October 2004
(Date)

ORDER NO. R5-2004-0137
INFORMATION SHEET

PORT OF STOCKTON
WEST COMPLEX DOCK DREDGING PROJECT
SAN JOAQUIN COUNTY

Background Information
In July 2000, the United States Navy conveyed approximately 1,400 acres of Rough and Ready Island through transfer and lease to the Discharger. The Discharger refers to this area as the West Complex. The 1,400-acre West Complex site was previously zoned for institutional uses, and land use designation has been changed to accommodate maritime, industrial and commercial land uses. The Discharger plans redevelopment of marine terminals on the existing 500 acres northern portion of the island and development of a commercial and industrial park on the undeveloped 500 acres portion of the island. When completed, the commercial phase is expected to house approximately 20,000 people.

In order to allow commercial shipping access to the West Complex, the Discharger proposes to dredge the river bottom between the docks No. 14 thru 20 to a new depth of 36 feet MLLW.

The groundwater underlying the West Complex is near or at surface elevations in some areas and may also be subject to seasonal variations and tidal influence. Most of the land elevation on the island is less than the surrounding water and would flood in a natural state. In order to maintain the groundwater elevation, the site uses a system of reclamation ditches to drain the shallow groundwater. The collected water flows via gravity to a pump station and is subsequently pumped to the river on the western edge of the island.

A municipal groundwater well is situated on the northeastern portion of the Rough & Ready Island with a production capacity of approximately 750 gpm. Historically, this well has been used as a backup municipal water supply for the island.

CEQA Compliance
On 23 June 2004, in accordance with CEQA (PRC, Section 21000, et seq.), the Port of Stockton adopted an Environmental Impact Report (EIR) for the West Complex project. The EIR included dredging the river bottom in front of the West Complex docks to 36 feet MLLW but did not describe maintenance dredging activities for the West Complex docks. Therefore, maintenance dredging activities for the West Complex are not cover under this Order.

Dredging to the new depth would create a new river bottom and would expose a new layer of sediment. The sediment toxicity testing show a lower survival rate for benthic organisms at several sample locations of the proposed new river bottom. In order to determine if toxicity exist, the Discharger proposed to take a phased approach to the dock deepening portion of the project. In the event that the new river bottom exhibits toxicity, the Discharger would take corrective action which may include either removal of the sediments by dredging deeper to 40 feet MLLW or covering/capping the exposed sediment with a clean fill material, or treatment in place.

Order Limitations

Limitations proposed in this General Order are intended to protect beneficial uses of inland surface waters and other water resources, and are based on limitations specified in the Basin Plan.

Discharge Prohibition A.1

Discharge Prohibition A.1 prohibits the discharges from causing or contributing to acute toxicity in the receiving waters. The Basin Plan requires that all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal or aquatic life. Water column effects occur when contaminants on the sediment particles are either dissolved or suspended in the water column. During the dredging operation, waste may be discharged from either the bucket or hydraulic cutter head. This discharge prohibition is based on the Basin Plan narrative toxicity objective. The Basin Plan states that "*all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*. *This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances*." The Basin Plan requires that "*as a minimum, compliance with this objective…shall be evaluated with a 96-hour bioassay*." This Order requires toxicity monitoring for effluent discharges and downstream of the dredging operation to evaluate compliance with this water quality objective. In addition, supplemental bioassay monitoring is required if the receiving water monitoring for pH, dissolved oxygen or turbidity indicates that the dredge operation has exceeded specified Basin Plan water quality objectives for any of the listed monitoring parameters. The point of compliance for Discharge Prohibition A.1 shall be at the point of discharge (i.e. dredging operation).

Discharge Prohibition A.2

Limiting the discharge of effluent to the outfall location described in Report of Waste Discharge (RWD) is appropriate.

Discharge Prohibition A.5

In the RWD, the Discharger indicated that the dredging operation would not use hopper dredges. Furthermore, analysis of waste constituent concentrations detected in the standard elutriate indicates that the direct discharge of dredge material to surface waters may have significant impacts to water quality.

Discharge Prohibition A.6

Discharge Prohibition A.6 prohibits the discharge of either hazardous waste or designated waste. For the purposes of this Order, the term 'hazardous waste' is as defined in Title 23, California Code of Regulations, Section 2510 et seq., and 'designated waste' is as defined in California Water Code Section 13173. The DMD site is not a lined facility and groundwater in the Delta is very shallow. The discharge of either hazardous or designated waste to the DMD may degrade the underlying groundwater. In addition, effluent from the DMD may be discharged to surface waters. Therefore, prohibiting the discharge of hazardous and designated waste is appropriate.

Discharge Prohibition A.13
After drying, dredge shall remain in the DMD site. The reuse or removal of dredge spoils deposited in the DMD is prohibited until the Discharger obtains Regional Board approval for reuse.

Discharge Prohibition A.14
Whole sediment toxicity monitoring results indicate that the new sediment horizon for docks 18, 19 and 20 exhibited a positive toxic response for *Chironimus tentans*. However, the reference site monitoring also showed increased mortality for this specie with a mean survival rate of 68 percent. The Discharger did not repeat the sediment tests or conduct further characterization of the sediment to identify the responsible toxicant. Therefore, the potential for sediment phase toxicity has not been adequately determined for the new river bottom. In order to determine if the sediment is toxic, sediment sampling would occur immediately after dredging operations expose the new river bottom. The Discharger will use a phased approach for dredging the docks at the West Complex. One dock would be dredged at a time until the new depth of 35 feet MLLW is reached. Within 24 hours after exposing the new river bottom, the Discharger will collect a series of grab sediment samples for toxicity testing. If toxicity monitoring shows that the new river bottom is toxic, then all dredging operations for the remaining docks shall be suspended until all the appropriate corrective actions necessary to remediate the exposed toxic sediment are completed. Because sediment toxicity testing indicates that the exposure of the new river bottom sediment may be harmful to aquatic life, limiting the area of exposed sediment is appropriate.

Discharge Specifications B.1, B.2 and B.3
Discharge Specifications for the maximum influent flow, maximum effluent flow and the total solid loading are based on information contained in the RWD and water balance for the facility.

Discharge Specification B.13
The CEQA document indicates that dredge operations may have an impact on dissolved oxygen concentrations near the dredge operation as the sediment is disturbed. In order to mitigate potential impacts to water quality, the Discharger will diffuse 500 pounds of oxygen per day, while dredging operations are underway. Incorporating CEQA mitigation measures for the protection of water quality is appropriate.

Groundwater Limitation C.1 and C.2
State Water Resources Control Regional Board Resolution No. 68-16 requires the Regional Board to maintain high quality waters of the state in regulating discharges until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Board's policies.

Dredging operations regulated under this Order provide treatment and control of the discharge that incorporates:

1. Pre-dredge testing and site-specific studies to provide assurance that dredged sediments will not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives. Only dredge material that is classified as "inert waste" as defined in Title 27 Subchapter 2 Section 20230 of the California Code of Regulations is eligible for coverage under this Order;

2. The discharge of 'hazardous waste' or 'designated waste' is prohibited. Only waste properly classified as inert will be discharged;

3. pH neutralization of potential acid generating sediments; and

4. Inspection and monitoring to ensure that wastes are properly handled and comply with discharge limitations.

Because of these measures, there is essentially no potential for groundwater degradation. Therefore, this Order does not permit groundwater degradation. Accordingly, the discharge is consistent with the antidegradation provisions of Resolution 68-16. If there is evidence that degradation is occurring at any regulated facility, the Executive Officer may revoke coverage for that facility. Additionally, the Regional Board may reopen this Order at any time to reconsider groundwater limitations and other requirements to comply with Resolution No. 68-16 as appropriate.

Effluent Limitations
Sediments contain organic material and ammonia. Ammonia concentrations in the elutriate samples was found to be as high as 25.5 mg/L. Ammonia is known to cause toxicity to aquatic organisms. In addition, ammonia concentrations detected in the elutriate toxicity tests were converted to un-ionized ammonia, and the un-ionized portion is known to be the most toxic fraction to fish. Calculated un-ionized ammonia concentrations in the elutriate samples was found to be above the LC_{50} range as reported by Nimmo et al. (1989). The Basin Plan contains a narrative toxicity objective for surface water. U.S. EPA has developed Ambient Water Quality Criteria for ammonia, which is dependent on pH and the presence of salmonids. Because salmonids may be present in the Delta during dredging operations, an effluent limitation, based on the Ambient Water Quality Criteria for ammonia with salmonids present, has been included in this Order consistent with the Policy for Application of Water Quality Objectives.

Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the toxicity objective for arsenic. Based on information contained in the RWD, the discharge may contain concentrations of arsenic as high as 8.1 µg/L. The Cal/EPA Office of Environmental Health Hazard Assessment has published a Public Health Goal of 2.1 ug/L for arsenic in drinking water. Beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, which includes drinking water uses. Applying the Policy for Application of Water Quality Objectives, an effluent limit for arsenic, based on the Public Health Goal and presented in total concentration, has been included in this Order.

The Basin Plan contains a chemical constituent objective for Copper of 10 µg/L in the Sacramento-San Joaquin Delta. In addition, the CTR contains criteria for protection of freshwater aquatic life that vary with hardness. Below a hardness of 120 mg/L as $CaCO_3$, the 4-day average CTR criterion is more stringent than the Basin Plan objective. Based on information contained in the RWD database, the discharge may contain concentrations of copper as high as 33.1 µg/L. The discharge has a reasonable potential to cause violation of the Basin Plan chemical constituent objective and the CTR criteria for copper. Applying the Policy for Application of Water Quality Objectives, a copper effluent limitation, based on the Basin Plan chemical constituents objective and the CTR criteria, presented in dissolved concentrations, has been included in this Order.

Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for lead. Lead is a heavy metal and was detected in the elutriate samples as high as 15.5 µg/L. Lead toxicity to aquatic life is hardness dependent. The CTR limit for lead is 1.8 µg/L for the 4-day chronic limit at 65 mg/L hardness. In addition, lead can cause toxicity in humans. The Basin Plan prohibits toxic chemicals to be present in surface waters in toxic concentrations. The Cal/EPA Office of Environmental Health Hazard Assessment has published a Public Health Goal of 2 ug/L for lead in drinking water. Beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, which includes drinking water uses. Applying the Policy for Application of Water Quality Objectives, an effluent limit for lead, based on CTR criteria and the Public Health Goal and presented in total concentration, has been included in this Order.

Based on information contained in the RWD, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR Standard for Mercury**.** Mercury is a bioaccumulative substance in animal tissue and can be harmful to human health. MET samples indicate that the discharge may contain total concentrations of mercury as high as 0.151 µg/L. The CTR limit for mercury is 0.05 µg/L for the sources of drinking water limit. Applying the Policy for Application of Water Quality Objectives, an effluent limit for mercury, based on the CTR and presented in total concentration, has been included in this Order.

Toxicity testing found fathead minnow survival was statically elevated relative to the laboratory control sample. A toxic identification evaluation was not conducted; therefore, the responsible toxicant is unknown. The Basin Plan contains a narrative toxicity objective for surface water. The Basin Plan requires that "*as a minimum, compliance with this objective…shall be evaluated with a 96-hour bioassay*." Therefore, effluent toxicity limitation, based on 96-hour bioassay, is included in this Order.

The Basin Plan contains a pesticide objective for OC pesticides. The Basin Plan states, "*Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by either the EPA or the Executive Officer*." Based on information in the RWD, sediment core sample for dock 17 contained 4,4,DDE an OC pesticide. In addition, MET monitoring detected Endosulfan II at a concentration of 0.012 µg/L. Therefore, the discharge has the reasonable potential to cause or contribute to an in-stream excursion above the pesticide objective for OC

pesticides. This Order contains an effluent limitation, based on the Basin Plan pesticide objective prohibiting the discharge of OC pesticides at concentrations detectable within the accuracy of analytical methods.

Dredge Material Disposal Site-Soil Limitation
The RWD contains data on chemical constituents present in leachate extracted from the dock's core samples using the Waste Extraction Test with deionized water (DIWET). The DIWET data are used to predict the potential characteristics of leachate from dredge materials that are discharged to the DMD. Because the DMD site is not equipped with a liner, leachate from dredged sediments may migrate through the soil column via soil pore space to the underlying groundwater. Acidic soil conditions may increase the solubility of some waste constituents such as metals. Limiting acid generation to maintain neutral soil conditions in order to control acid leachate is appropriate.

Receiving Water Limitation F.1
Receiving Water Limitations are based upon water quality objectives contained in the Basin Plan; as such, they are a required part of this Order. The Basin Plan contains an objective for dissolved oxygen in the Delta. The Basin Plan states "*Within the legal boundaries of the Delta, the dissolved oxygen concentration shall not be reduced below: Concentrations of dissolved oxygen to fall below 7.0 mg/L in the Sacramento River (below the I Street Bridge) and in all Delta waters west of the Antioch Bridge; 6.0 mg/L in the San Joaquin River (between Turner Cut and Stockton, 1 September through 30 November); and 5.0 mg/L in all other Delta waters except for those bodies of water which are constructed for special purposes and from which fish have been excluded or where the fishery is not important as a beneficial use.*" Dredging operations have the potential to cause oxygen depletion in surface waters. Buried sediments are typically in anoxic environments. As these sediments are resuspended in the water column, they consume oxygen as both chemical and biological processes oxidize the sediments. This receiving water limitation, based on the Basin Plan dissolved oxygen objective, has been included in this Order.

Receiving Water Limitation F.3
The Basin Plan contains objectives for floating material and oil/grease. This receiving water limitation, based on the Basin Plan oil/grease and floating material objectives, has been included in this Order.

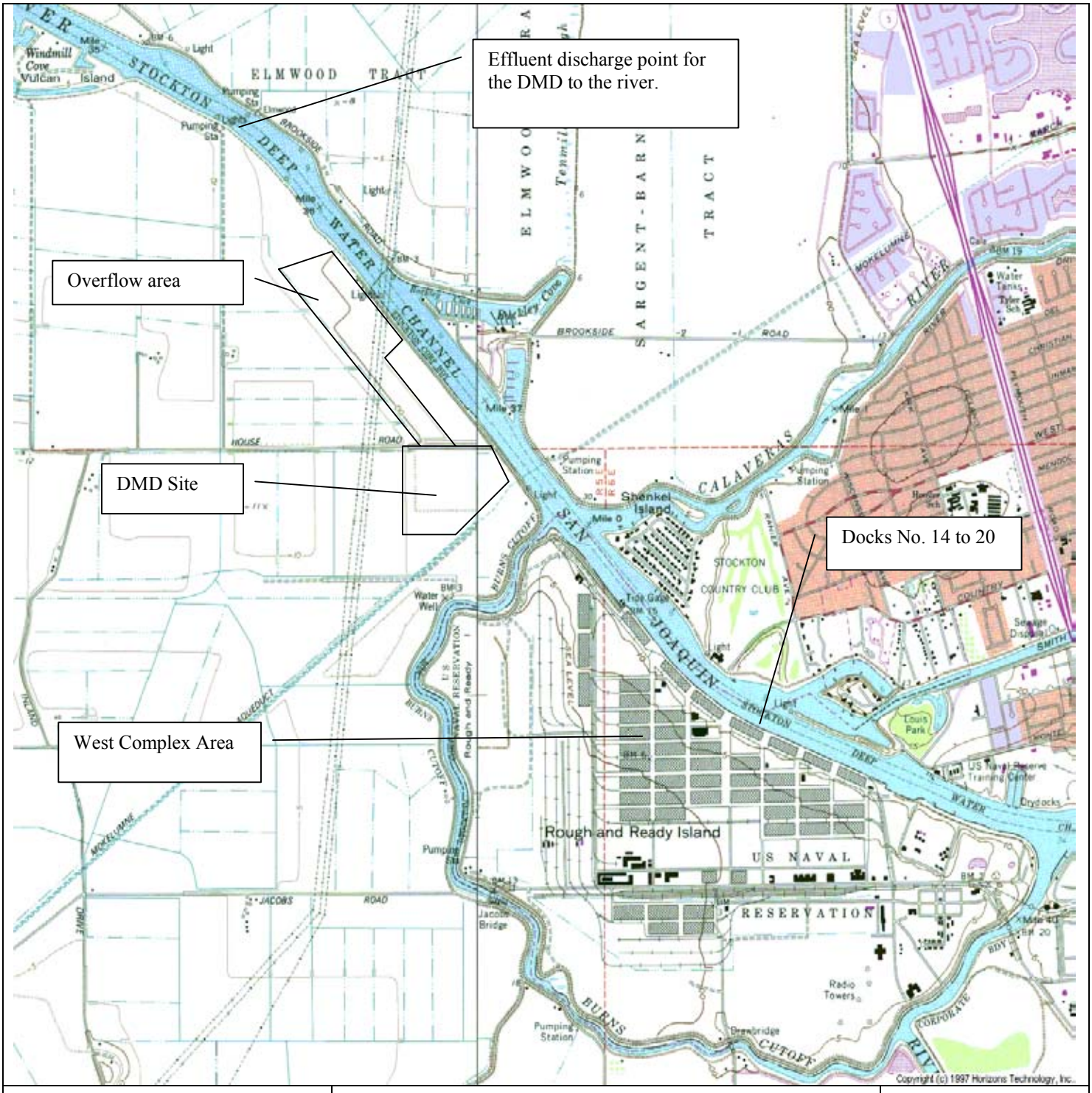
Receiving Water Limitation F.7
For all surface water bodies in the Sacramento River and San Joaquin River basins, the Basin Plan includes water quality objectives stating that "*The pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses*." The Sacramento-San Joaquin Delta has the beneficial uses of both COLD and WARM (warm freshwater habitat); therefore, this Order includes receiving water limitations for both pH range and pH change. Reduced, anaerobic conditions found in the sediments favor sulfide generation that generally makes metals biologically unavailable. Dredging operations expose the sediment/materials to oxygenated water that oxidize the sulfide precipitates to sulfate salts resulting in an increase in acidity.

The Basin Plan allows an appropriate averaging period for pH change in the receiving stream. Since there is no technical information available that indicates that aquatic organisms are adversely affected by shifts in pH within the 6.5 to 8.5 range, an averaging period is considered appropriate and a monthly averaging period for determining compliance with the 0.5 receiving water pH limitation is included in the Order.

Receiving Water Limitation F.15
The Basin Plan contains a water quality objective for fecal coliform in surface waters that are designated for contact recreation. In particular, fecal concentration in any 30-day period to exceed a geometric mean of 200 MPN/100 ml or cause more than 10 percent of total samples to exceed 400 MPN/100 ml. The DWSC is situated in the San Joaquin River, the beneficial uses of this surface water includes water contact recreation. The San Joaquin River in the vicinity of Rough and Ready Island is CWA 303d listed for pathogens. The San Joaquin River receives discharges from dairies, livestock yards, municipal treatment plants, urban stormwater discharges, and illicit discharges from boats. Therefore, sediments may also contain fecal organism, which may discharged with return waters from the DMD sites.

Monitoring and Reporting Requirements
The Basin Plan states that "*all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances*." The Basin Plan requires that "*as a minimum, compliance with this objective…shall be evaluated with a 96-hour bioassay*." Furthermore, toxicity tests have the advantage of directly assessing the biological effects of all effluent constituents, including the interactive effects of multiple chemicals. In order to cover the potential range of differing species sensitivity to chemical toxicants, toxicity testing requires that the test be conducted with multiple species, which represent different phyla.

The Discharger has requested that effluent toxicity testing be performed using a reference site sample as the control sample for the test. The river is impaired for unknown toxicity and is not appropriate to use control sample that is toxic. The Discharger may use a reference site, which has been approved by Regional Board staff as the test control sample provided that the reference sample is not outside the control survival standard for the test and therefore is itself not potentially toxic.



Drawing Reference:
United States Department of the Interior Geological Survey
East Stockton 7.5' Quadrangle
Section 1, T2N, R5E, MDB&M

SITE PLAN

PORT OF STOCKTON
WEST COMPLEX DREDGING PROJECT

N
W E
S

Not to scale

pH-Dependent Effluent Limits for Ammonia
Criterion Maximum Concentration, Maximum 1-hour Average

pH	Ammonia Concentration Limit (mg N/*l*)
6.5	**32.6**
6.6	**31.3**
6.7	**29.8**
6.8	**28.0**
6.9	**26.2**
7.0	**24.1**
7.1	**21.9**
7.2	**19.7**
7.3	**17.5**
7.4	**15.3**
7.5	**13.3**
7.6	**11.4**
7.7	**9.64**
7.8	**8.11**
7.9	**6.77**
8.0	**5.62**
8.1	**4.64**
8.2	**3.83**
8.3	**3.15**
8.4	**2.59**
8.5	**2.14**
8.6	**1.77**
8.7	**1.47**
8.8	**1.23**
8.9	**1.04**
9.0	**0.885**

$$CMC_{salmonids\ present} = \left(\frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}} \right)$$

Where: CMC = criteria maximum concentration

ORDER NO. R5-2004-0137
ATTACHMENT B

Hardness-Dependent Effluent Limits for Copper
Criterion Maximum Concentration

Hardness (mg/l as $CaCO_3$)	Copper Concentration Limitation [1,2]
<25	Must Calculate
25	2.7
30	3.2
35	3.7
40	4.1
45	4.5
50	5.0
55	5.4
60	5.8
65	6.2
70	6.6
75	7.0
80	7.4
85	7.8
90	8.2
95	8.6
100	9.0
110	9.7
120	10^2
130	10
140	10
150	10
160	10
170	10
180	10

[1] Criteria Maximum Concentration = $(e\{0.8545[\ln(\text{hardness})] - 1.702\} \times (0.960)$

[2] The Basin Plan contains a chemical constituent objective for copper of 10 µg/l in the Sacramento-San Joaquin Delta. For surface water that contains a hardness greater 120 mg/l as $CaCO_3$ the Basin Plan chemical constituent objective for copper shall apply.

Hardness-Dependent Effluent Limits for Lead
Criterion Maximum Lead Concentration

Hardness (mg/L as $CaCO_3$)	Lead Concentration Limitation[1] (ug/L)
< 25	use formula
25	0.54
30	0.69
35	0.84
40	0.99
45	1.2
50	1.3
55	1.5
60	1.7
65	1.8
70	2.0[2]
75	2.0
80	2.0

*CMC=(EXP(1.273*LN(hardness)-4.705))*

Where: CMC = criteria maximum concentration

[1]Concentrations are expressed as total recoverable lead.
[2] For surface water that has hardness greater than 70 mg/l as $CaCO_3$, the concentration of lead shall not exceed 2.0 µg/l .

ORDER NO. R5-2004-0137
WEST COMPLEX DOCK DREDGING PROJECT
ATTACHMENT E

MONITORING WELL WORKPLAN AND MONITORING WELL
INSTALLATION REPORT GUIDANCE
PORT OF STOCKTON
WEST COMPLEX DOCK DREDGING PROJECT
SAN JOAQUIN COUNTY

Prior to installation of groundwater monitoring wells, the Discharger shall submit a workplan containing at least the information listed below. Following installation of the monitoring wells, the Discharger shall submit a report of results, as described below. All workplans and reports must be prepared under the direct supervision of, and signed by, a geologist registered by the State of California.

Monitoring Well Installation Workplan

A. General Information:
   - Proposed monitoring well locations and rationale for location selection
   - Equipment decontamination procedures
   - Topographic map showing any existing monitoring wells, proposed wells, waste handling facilities, utilities, and other major physical and man-made features.

B. Drilling Details: describe proposed drilling and logging methods

C. Monitoring Well Design:
   - Casing diameter
   - Borehole diameter
   - Depth of surface seal
   - Well construction materials
   - Diagram of well construction
   - Type of well cap
   - Size of perforations and rationale
   - Grain size of sand pack and rationale
   - Thickness and position of bentonite seal and sand pack
   - Depth of well, length and position of perforated interval

D. Well Development:
   - Method of development to be used
   - Method of determining when development is complete
   - Method of development water disposal

E. Surveying Plan: discuss how each well will be surveyed to a common reference point.

F. Well Sampling:
- Minimum time after development before sampling (48 hours)
- Well purging method and amount of purge water
- Sample collection and preservation method
- QA/QC procedures

G. Water Level Measurement:
- The elevation reference point at each monitoring well shall be within 0.01 foot.
- Ground surface elevation at each monitoring well shall be within 0.1 foot.
- The method and time of water level measurement shall be specified.

H. Proposed time schedule for well installation and development.

Monitoring Well Installation Report

A. Well Construction:
- Number and depth of wells drilled
- Date(s) wells drilled
- Description of drilling and construction
- Approximate locations relative to facility site(s)
- A well construction diagram for each well must be included in the report, and should contain the following details:
  - Total depth drilled
  - Depth of open hole (same as total depth drilled if no caving occurs)
  - Footage of hole collapsed
  - Length of slotted casing installed
  - Depth of bottom of casing
  - Depth to top of sand pack
  - Thickness of sand pack
  - Depth to top of bentonite seal
  - Thickness of bentonite seal
  - Thickness of concrete grout
  - Boring diameter
  - Casing diameter
  - Casing material
  - Size of perforations
  - Number of bags of sand
  - Well elevation at top of casing
  - Depth to ground water
  - Date of water level measurement
  - Monitoring well number
  - Date drilled
  - Location

B. Well Development:
   Date(s) of development of each well
   Method of development
   Volume of water purged from well
   How well development completion was determined
   Method of effluent disposal
   Field notes from well development should be included in report.

C. Well Survey Data: provide reference elevations for each well and surveyor's notes

D. Water Sampling:
   Date(s) of sampling
   How well was purged
   How many well volumes purged
   Levels of temperature, EC, and pH at stabilization
   Sample collection, handling, and preservation methods
   Sample identification
   Analytical methods used
   Laboratory analytical data sheets
   Water level elevation(s)
   Groundwater contour map

Explanation of any deviation from the approved workplan.

ORDER NO. R5-2004-0137
ATTACHMENT F
Aeration Requirements

As a condition of this Order and as mitigation for the proposed project, the Port of Stockton (Port) shall provide aeration to address the following dissolved oxygen (DO) water quality impacts:

- Immediate effects of dredging and the discharge of decant water
- Long-term effects of increased channel geometry

Immediate Effects of Dredging and Dredge Water Returns
To address the potential localized impacts of the dredging operations on DO, the Port shall provide:

- 500 pounds per day of DO to the water within 1,000 feet of the dredger and;
- 1,000 pounds per day of DO at the point of discharge whenever the decant water is returned to the river from the dredge materials placement site.

Long-Term Effects of Increased Channel Geometry
To mitigate for the long-term effects of increased channel geometry on the existing DO impairment, the Port shall:

1. Operate the existing aerator constructed by the United States Army Corps of Engineers (Corps) during the months of September through November, to provide 2,500 pounds per day of DO up to a maximum of 227,500 pounds per year whenever background DO concentrations drop below the Basin Plan objective of 6 mg/l.
2. Provide an additional 2,500 pounds per day of DO during the months of December through August, up to a maximum of 250,000 pounds per year whenever background DO concentrations drop below the Basin Plan objective of 5 mg/l.
3. Provide an additional 840 pounds per day of DO, up to a maximum of 84,000 pounds per year, to contribute one-third of the oxygen deficit based on the current level of development.[1]
4. Provide 750 pounds per day of DO, up to a maximum of 75,000 pounds per year, to mitigate for the additional DWSC volume in the vicinity of the Port of Stockton West Complex dredging project.[2]

[1] The current level of development is based on an assumed daily deficit of 10,000 pounds per day of DO (Jones and Stokes, Aeration Technology Feasibility Report for the San Joaquin River Deep Water Ship Channel, 2004); 840 lbs/day plus 2,500 lbs/day yields 3,340 lbs/day which is approximately one-third of the assumed daily deficit of 10,000 pounds per day of DO; this one-third "split" is based upon an assumed three-way split of responsibility between channel geometry, flow, and load factors. This one-third "split" is subject to modification, if necessary, to implement the Total Maximum Daily Load currently under consideration by the Regional Board.

[2] This 750 pounds is based upon an assumed 7.5 % increase in DWSC volume in the vicinity of the proposed dredge projects (the average width of 600 feet is multiplied by the average depth of 25 feet, multiplied by a length of 1.5 miles from Rough and Ready Island monitoring station to Channel Point; this yields a current DWSC volume of 4.4 million cubic yards; 326,000 cubic yards of the proposed dredge divided by 4.4 million cubic yards current volume yields an approximate 7.5% increase in channel volume); this 7.5% increase is applied to an assumed daily deficit of 10,000 pounds per day to yield 750 pounds per day of DO.

The maximum aeration required as a condition for this Order and as mitigation for this project is 4,090 pounds per day, with a maximum annual cap of 636,500 pounds per year, as shown in table F-1, except as described below. The quantities shown reflect the quantities of oxygen that must be *dissolved* into the Deep Water Ship Channel. In other words, it is the responsibility of the Port to demonstrate that these quantities of oxygen are transferred or dissolved into the water column and not just "bubbled through" the water column.

This mitigation does not release the Port from responsibility to contribute, along with others[3], to fixing the existing DO impairment. Portions of the mitigation, however, will be applied towards any additional assignment of responsibility as described below.

The aeration requirements are based on assumed oxygen deficits of 10,000 pounds per day and 1,000,000 pounds per year. The mitigation requirements therefore represent a maximum mitigation, for this project, at this level of oxygen deficit. If actual daily deficits are greater than 10,000 pounds per day and 1,000,000 pounds per year, the Port may be required to contribute an additional 7.5 percent of the oxygen needed for deficits in excess of these amounts. Modification will be made to this Order, as necessary, when information becomes available from:

- the on-going development of a Total Maximum Daily Load and Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton DWSC, including results from California Bay Delta Authority funded monitoring and modeling studies and
- design, construction, and/or assessment of the operation of an aeration demonstration project in the DWSC[4]

The aeration requirements of this Order will not be reduced if the actual daily deficits are shown to be less than 10,000 pounds per day and 1,000,000 pounds per year.

If future actions by the Regional Board assign a specific allocation of responsibility for the DO impairment in the DWSC to entities responsible for increased channel geometry, then the quantity of aeration provided under this Order, in excess of the 7.5 percent increase to account for changes in channel geometry and the 2,500 pounds of DO per day provided during the months of September through November, will be credited to the Port towards fulfillment of this allocation of responsibility.

The quantities of aeration in this Order must be provided first, irrespective of the participation to provide aeration by any other entity (e.g. the Port pays for the first incremental part of any aeration provided up to the daily and annual caps described above).

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[3] Additional responsibility for entities responsible for: (1) increased channel geometry; (2) reduced flow and; (3) loads of oxygen demanding substances; will be identified in a Total Maximum Daily Load (TMDL) adopted by the Regional Board in a subsequent action.

[4] The California Bay Delta Authority is funding the design, construction and demonstration of a 10,000 pound per day aeration demonstration device in the DWSC.

Table F-1 Daily and Annual Aeration Requirements Summary

		Long-term Aeration (pounds per day)					
		Corps of Engineers Aerator		DWR Demostration Project Aerator			
Aeration items[1]		-1-	-2-	-3-	-4-		
Month	Dissolved Oxygen Objective (mg/L)	COE	Port of Stockton	Port of Stockton	Port Expansion Mitigation Port of Stockton	Total Daily	Total Monthly
January	5		2,500	840	750	4,090	126,790
February	5		2,500	840	750	4,090	114,520
March	5		2,500	840	750	4,090	126,790
April	5		2,500	840	750	4,090	122,700
May	5		2,500	840	750	4,090	126,790
June	5		2,500	840	750	4,090	122,700
July	5		2,500	840	750	4,090	126,790
August	5		2,500	840	750	4,090	126,790
September	6	2,500		840	750	4,090	122,700
October	6	2,500		840	750	4,090	126,790
November	6	2,500		840	750	4,090	122,700
December	5		2,500	840	750	4,090	126,790
Annual Cap (pounds per year)[2]		227,500	250,000	84,000	75,000		636,500

Notes:

1) aeration items numbered as described in Attachment A of WDR for elements of the long-term effects of increased channel geometry

2) annual cap is based on 100 days times the daily aeration required (except for the COE aeration that is based on 91 days); annual cap is based upon a dissolved oxygen deficit of 10,000 pounds per day or 1,000,000 pounds per year; the actual cap may be higher if daily or annnual deficits are higher; total daily aeration requirements do not sum to the total annual cap