CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2003-0145

WASTE DISCHARGE REQUIREMENTS
GENERAL ORDER

FOR
UNITED STATES ARMY CORPS OF ENGINEERS,
DEPARTMENT OF WATER RESOURCES AND
THE PORT OF STOCKTON
STOCKTON DEEP WATER SHIP CHANNEL MAINTENANCE DREDGING
ACTIVITES FROM CHANNEL MILE 4.4 TO MILE 41.0
CONTRA COSTA, SACRAMENTO AND SAN JOAQUIN COUNTIES

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

1. The U.S. Army Corps of Engineers (Corps), Department of Water Resources, and the Port of Stockton, hereafter jointly referred to as Discharger, have been performing annual maintenance dredging of the Stockton Deep Water Ship Channel (Channel) under General Order Waste Discharge Requirements (WDR) Order Number 5-01-115.

2. The Discharger submitted a Report of Waste Discharge (RWD) on 15 July 2003 and additional information on 1 August 2003. The Discharger has requested that the Order be updated to include additional dredge material disposal sites at Sherman Island and Bradford Island.

3. Order No. 5-01-115 is neither adequate nor consistent with current plans and policies of the Regional Board. This order updates Order 5-01-115 to reflect changes in constituents of concern, constituents on the Clean Water Act 303(d) list of impaired water bodies.

4. The maintenance dredging activities regulated in this Order include disposal or discharge of dredged sediments into diked disposal sites on land (Dredged Material Disposal sites), discharges of effluent from the Dredged Material Disposal (DMD) sites into surface water, pre-dredge sampling, and water quality monitoring during dredging operations.

5. Under this General Order WDR, maintenance dredging is defined as maintenance of the Channel to a 35-foot depth (plus two-foot allowable overdredge) for navigation of ship traffic to the Port of Stockton. Maintenance dredging also includes a section of 40-foot depth (no allowable overdredge) from River Mile (RM) 39.3 to 40.2 to trap sediments from the San Joaquin River. The average

width of the ship channel is 330 feet. The ship channel varies in width from 200 feet to 600 feet, except in the turning basin where it is 970 feet wide. This Order is for maintenance dredging activities from the turning basin in the Port of Stockton at channel mile 41.0, to the western boundary of the Central Valley Region near Antioch (approximately mile 4.4 of the San Joaquin River's Deep Water Ship Channel). See Attachment "A", incorporated herein and made part of this Order.

6. When the Discharger decides that maintenance dredging activities are needed in a specific reach of the Stockton Deep Water Ship Channel, the Discharger must file a separate Notice of Intent and submit a filing fee to the Regional Board for each proposed maintenance dredging project to be eligible for coverage under this Order. The minimum contents of the Notice of Intent are detailed in Attachment "B", Application Requirements, incorporated herein and made part of this Order.

7. The removal or excavation, transport and placement of dredge sediments are the primary components of the dredging process. Discharges from dredging operations may contain suspended solids, turbidity, oxygen-depleting compounds, and increased metal concentrations, which impact water quality near the dredging site. The dredging operations primarily involve the use of a pipeline hydraulic suction dredge or a sealed clamshell bucket dredge for maintaining needed depth for navigational access.

8. Clamshell dredging may be used in limited cases where access is restricted or debris is too large for hydraulic dredging. The lifting action created by bucket being pulled up from the channel bottom may suspend sediment and increase turbidity throughout the water column 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).

9. Hydraulic dredging typically uses a cutter-head suction dredge that cuts into the sediment with a rotary cutting tool and suctions the dredge material out through a pipe. Sediment can be suspended in the water if entrainment of the dislodged sediments is incomplete.

10. The material removed by the hydraulic dredge is pumped as slurry that consist of approximately 10 to 20 percent solids, which is usually delivered to a DMD sites via pipeline for settling and disposal. The maximum distance that slurry can be transported via a pipeline is approximately three miles. If longer distances are required, the slurry can be pumped to a barge and offloaded hydraulically at the DMD site. The location of the DMD sites is shown on Attachment A.

11. Many chemical constituents are lipophilic and will preferentially sorb or attach to organically enriched or fine particles of sediment. Therefore, sediment contaminants may correlate with measured physical properties such as grain size and total organic carbon. Water column effects from dredging may occur when contaminants on the sediment particles are either dissolved or resuspended in the water column. Dredging operations may cause some degradation temporarily to surface waters as concentrations of turbidity, total suspended solids, and other wastes may increase and dissolved oxygen decrease as bottom sediments are disturbed in the excavation process. In order to determine if the dredging activities have an impact to the surface waters, receiving water monitoring is appropriate.

12. In the DMD sites, solids settle out and the "effluent" or "return water" is often discharged back into the adjacent surface water by a pump, weir or outfall pipe. The DMD sites are designed to remove a significant portion of suspended material from the effluent, with the maximum allowable Total Suspended Solids (TSS) to be defined in an approved Operation Plan for each disposal site. The disposal site will be designed and operated with guidance provided by the U.S. Army Corps of Engineers guidance document "Confined Disposal of Dredged Material". The details of the DMD sites covered under this permit, including capacity, location, property owner, discharge location and receiving water body can be found in Attachment "C".

Table 1: Approved Dredge Material Disposal Sites

Site	Owner	Location	Discharge to Water Body
Stockton	Port of Stockton	Adjacent to San Joaquin River near Port	San Joaquin River, upstream from Channel RM 40-41
Roberts Is. 1	Port of Stockton	Roberts Island RM 36.5	San Joaquin River (Stockton Channel RM 36.5)
Roberts Is. 2	Port of Stockton	Roberts Island RM 34.5	San Joaquin River (Stockton Channel RM 34.5)
Spud Is.	Port of Stockton	Spud Island RM 31.5	San Joaquin River (Stockton Channel RM 31.5)
Bradford Is.	Port of Stockton	Bradford Island	San Joaquin River (Stockton Channel RM 14.0)
Sherman Is. (Scour Pond I)	Department of Water Resources	Sherman Island	San Joaquin River (Stockton Channel RM 8.0)
Sherman Is. (McCormack Pit)	Department of Water Resources	Sherman Island	San Joaquin River (Stockton Channel RM 11.0)

13. The estimated rate of effluent discharge during a typical dredging operation are as follows:
    a. Effluent Average Flow (into receiving water): 9 mgd
    b. Effluent Maximum Flow (into receiving water): 10 mgd

14. The DMD sites will fully contain dredged material and prevent any surface runoff or erosion into waters of the state, unless specifically allowed in the NOA. This Order allows surface runoff from the DMD site if the approved site operation plan has provisions for erosion control and monitoring.

15. Berms can fail, typically, from a lack of maintenance or overtopping due to wave action. This Order requires a minimum pond freeboard of two feet be maintained to prevent overtopping.

16. Many areas of the Delta consist largely of peat soil formations that may become unstable when loads are placed on them. The RWD indicates that peat soils underlie several of the DMD site. Since the DMD sites are used for the containment of water and dredged materials, there is a potential for subsidence. In order to prevent berm failure, monitoring of the DMD berms for seepage and other evidence of potential berm failure is appropriate. Repair and maintenance of the DMD berms will be performed under the supervision of a registered engineer.

17. A poorly maintained and operated DMD site 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. In addition, the DMD site may be hydraulically overloaded if the slurry discharge rate exceeds the disposal site's capacity.

18. Order No. 5-01-115 required the Discharge to submit an Operation Plan, which described site operations and procedures to be followed before, during, and after maintenance dredging sediment disposal for each DMD site. The Discharger failed to comply with the Order and did not submit the Operation Plan. Therefore, prohibiting the discharge to the DMD sites until an Operation Plan which has been approved by the Executive Officer is appropriate.

19. 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 complexes to sulfate salts resulting in an increase in acidity. The oxidation process continues as the sediments dry in the DMD, 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.

20. After dewatering the dredge material may be reused for levee maintenance and improvement projects. If the size of the projects disturbs more than one acre of land, the discharger is required to obtain a NPDES General Permit for Storm Water Discharges Associated with Construction Activities, Order No. 99-28-DWQ for the clearing, grading, disturbances to the ground, such as stockpiling, or excavation. Some reuse options may be restricted in the Notice of Applicability, depending on the quality of the sediment.

SITE CONDITIONS FOR SHERMAN ISLAND AND BRADFORD ISLAND

21. Sherman Island is approximately 20 feet below sea level. The island is bounded by the San Joaquin River on the south and the Sacramento River on the north, and is protected by levees.

22. The Discharger proposes to situate two DMD sites, Scour Pond I and McCormack Pit, along the southern boundary of Sherman Island. Scour Pond I and McCormack Pit have previously received dredge materials under Resolution No. 82-036 which waived WDRs for certain types of discharges.

23. The size and capacity of the Sherman Island DMD sites: Scour Pond I (13.5 acres and 65,000 cubic yard capacity and McCormack Pit (26 acres and 124,000 cubic yard capacity).

24. Bradford Island is bounded by the San Joaquin River on the north and False River on the south, and is protected by levees. The island will contain a single DMD site along the western boundary. The RWD states that dredge material was last placed on Bradford Island in December 1999. The DMD site is approximately 121 acres in size and has an estimated capacity of 435,000 cubic yard.

25. Both islands have systems of reclamation ditches that are used to keep the water beneath the ground surface. Water extracted by the ditches, flows via of gravity to pump stations where it is subsequently discharged to surface waters. The surface of Sherman Island is approximately 20 feet below the surrounding water bodies and would fill with water if the pumping were to cease. If effluent discharges from the DMD sites are necessary, the effluent will be discharged to surface waters via the reclamation ditches.

26. The Discharger has indicated that stormwater collected during the wet season will be retained on the DMD sites and subsequently will be disposed of through evaporation and percolation. However, the RWD did not contain a water balance

for the DMD sites to demonstrate that the DMD sites have adequate hydraulic capacity. Prior to discharging waste, the Discharger must submit a water balance for each DMD sites that show the site has adequate hydraulic capacity to retain all the flows from seasonal precipitation using a 100-year return period.

27. The 100-year annual maximum-recorded rainfall is 25.18 inches, based on the gauging station situated in Anitoch for data collected between 1969 and 1988.

28. Surface water drainage from the DMD sites on Sherman and Bradford Islands is to the San Joaquin River.

29. The Discharger dug several test pits at the DMD sites on Sherman Island and Bradford Island. The soil logs indicates that peat soils underlie the DMD sites on Sherman Island and Bradford Island at variable depths of between five and ten feet below the surface elevation. In addition, the Discharger conducted soil pH monitoring at the test pits. The pH data indicates that the underlying soil is moderately acidic.

30. A network of groundwater monitoring wells has been installed at for the Dredge Material Rehandling Project covered by WDRs Order No. 5-01-206. The Dredge Material Rehandling Project is situated adjacent to Scour Pond I. The network of wells may be expanded and/or modified to allow groundwater monitoring of the Scour Pond I site. Groundwater monitoring data indicates that the groundwater elevation ranges from between approximately zero to six feet below the ground surface. WDRs Order No. 5-01-206 requires monitoring to be performed on the water in the reclamation ditch adjacent to the DMD site. A comparison of the electric conductivity (EC) data from the groundwater and the ditch indicates that water in the adjacent reclamation ditch is similar in characteristic to the underlying groundwater and follows seasonal groundwater trends.

31. The underlying groundwater at Sherman Island and Bradford Island is very shallow and may also subject to seasonal variations and tidal influence. Waste characterization for “inert waste” requires that the Discharger use a waste attenuation factor for characterization purposes. Because of the shallow depth of the groundwater, waste attenuation within the unsaturated soil column is limited. Therefore, a waste attenuation factor of one is assigned for the purpose of waste classification. The Discharger shall perform a geological evaluation to determine the actual soil characteristics, depth to groundwater and groundwater quality at the proposed disposal sites. Based on site-specific considerations, the waste attenuation factor maybe used with the approval of the Executive Officer.

32. On 22 August 2003, in accordance with CEQA (PRC, Section 21000, et seq.), the Reclamation District 341 adopted a Negative Declaration for the DMD sites known

as Scour Pond I and McCormack Pit. The document provides for the stockpiling of dredge material at the existing McCormack and Scour Pond I Dredge Material Rehandling Sites. Dredge material will be derived from ongoing maintenance dredging of the San Joaquin River ship channel conducted by the U.S. Army Corps of Engineers and will be used for levee rehabilitation and reinforcement on Sherman Island.

33. The CEQA document indicates that a pond is situated within a southern portion of the Scour Pond I. The Discharger reported that the pond is estimated to be three to four feet deep and may be hydraulically connected to the underlying groundwater. The Negative Declaration did not include the area of the pond in the project site map and therefore the pond is not part of the project describe in the CEQA document. Prohibiting the discharge of dredge material to this area of the DMD site is appropriate.

34. The Port of Stockton has filed a Notice of Exemption for the for Bradford Island DMD site in accordance with Title 14, California Code of Regulations, Section 15304(g).

CHARACTERISTICS OF DREDGED MATERIALS

35. Historically, the Discharger has performed analyses of sediments to be dredged in order to determine the anticipated sediment quality during dredging operations. The sediment constituents and average concentrations found in dredge material in year 2000 maintenance dredging are listed below. Additional testing and lower detection limits will be required for further dredging operations, as described in the attached Monitoring and Reporting Program.

Table 2: Analytical results from year 2000 sediment testing:

	Average Concentration		
Constituent	**Solid analysis (mg/kg)**	**DI extraction (µg/l)**	**Modified elutriate test (µg/l)**
Antimony		1.8	ND (<1 ppb)
Arsenic	4.3	2.5	ND (<5 ppb)
Barium		47	83
Chromium			ND (<10 ppb)
Copper	22.8		ND (<5 ppb)
Lead	7.0		ND (<2 ppb)
Mercury	0.049	ND (<0.2 ppb)	0.012
Thallium	0.16	ND (<0.2 ppb)	ND (<0.5 ppb)
Zinc	51.8	91	ND(<10 ppb)
Dioxins/Furans TEQ	1.16 pg/g		

Polyaromatic Hydrocarbons (solids analysis in mg/kg)

Phenanthrene	0.007
Anthracene	0.002
Fluoranthene	0.015
Pyrene	0.018
Benzo(a)anthrene	0.007
Benzo(b)fluoranthene	0.010
Benzon(k)fluoranthene	0.008
Benzo(e)pyrene	0.004
Benzo(a)pyrene	0.006
Indeno(1,2,3-cd)pyrene	0.006
Chrysene	0.006
Dibenzo(a,h)anthracene	0.002
Benzo(g,h,i)perylene	0.004
Polychlorinated biphenyls	ND (<0.015 mg/kg)
Organochlorine pesticides	ND

37. This Order requires the Discharger to conduct chemical and physical testing of sediments that are representative of the area to be dredged before each maintenance project. The purpose of pre-dredge sediment analysis is to determine if the dredging operation will result in the disposal of dredged sediments that are characterized by constituent concentrations below the maximum concentrations in Table A.3.

BASIN PLAN, BENEFICIAL USES, AND REGULATORY CONSIDERATIONS

38. 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.

39. 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.

40. The Delta waterways are listed pursuant to Clean Water Act (CWA) section 303(d) as impaired for chlorpyrifos, DDT, diazinon, Group A pesticides, mercury, unknown toxicity and has recently been listed for pathogens near the Port of

Stockton turning basin. A portion of the Delta is listed for electrical conductivity, and low dissolved oxygen causes impairment in the Stockton Deep Water Ship Channel from Channel Point to Disappointment Slough.

Dredging operations in the Stockton Deep Water Ship Channel, which are situated between the Channel Point and Disappointment Slough have the potential to exacerbate the existing low dissolved oxygen impairment in this CWA 303(d) listed water body.

41. Sediments contain organic material and ammonia. Dredging operations may result in the discharge of ammonia to the receiving water from return flows or released during the excavation of sediment. Furthermore, retention time in the confined disposal area may be insufficient to allow biological processes sufficient time to convert the ammonia to nitrate. The Delta waterways are impaired for unknown toxicity, and ammonia is known to cause toxicity to aquatic organisms. The Basin Plan contains a narrative toxicity objective for surface water, which maintains that all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, or aquatic life. In order to determine if the discharge is contributing toxicity, bioassay monitoring is appropriate.

42. The Stockton Deep Water Ship Channel is subject to tidal influence, seasonal water pumping, discharges from municipal and industrial dischargers and agricultural return flows, which have significant impacts on the amount of water available for dilution, water quality and flow direction in the region.

43. Designated beneficial uses of ground water are municipal and domestic supply, industrial service and process supplies, and agricultural supply.

44. 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. R5-2003-0145" are necessary to assure compliance with these waste discharge requirements. The Discharger operates the facility that discharges the waste subject to this Order.

46. 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.

47. 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.

48. 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.

49. 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.

50. 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 General Order implements adopted water quality objectives. Therefore, no additional analysis of Section 13241 factors is required.

51. 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).

52. The discharges authorized by this General Order are consistent with State Board Resolution 68-16 and 40 CFR 131.12 (the federal antidegradation policy). This General 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 should prevent degradation of groundwater from infiltration of incidental waste constituents. The receiving water and groundwater limits prescribed herein are intended to ensure that the assimilative capacity will not be exceeded. If the discharge is causing such an increase, 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.

53. Projects eligible for enrollment in this General Order require a U.S. Army Corps of Engineers Section 10 permit (Rivers & Harbors Act) for dredging operations and

may require a Clean Water Act (CWA) Section 404 permit for the discharge of the "effluent" to surface waters. Though exempt from NPDES regulations, each project requires a CWA Section 401 Water Quality Certification from the Regional Board. Such Certification will be issued; in conjunction with each approved "Notice of Applicability". The federal permits must be obtained prior to discharge. Projects eligible for enrollment under this General Order may also be subject to regulation by the California Department of Fish and Game, the National Marine Fisheries Service, the United States Fish and Wildlife Service, and the State Lands Commission.

54. 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 DMD site. As part of the NOI, the Discharger must perform testing on the sediment to show that the DMD site can provide adequate treatment.

    e. The dredge material and underlying groundwater at the DMD sites will be monitored.

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

56. This General 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 General Order.

57. The Discharger submitted information about the probable constituents of concern and their concentrations in the dredged material, effluent, and receiving water. The Regional Board finds that the effluent discharges are not likely to cause or contribute to a violation of applicable water quality objectives and CTR/NTR criteria, if the sediment analyses results are at or below concentrations listed in Section A.3 of this Order. When sediment analysis results exceed these

concentrations, site-specific studies are needed to assure compliance with applicable water quality objectives and CTR/NTR criteria.

58. Dredging operations may cause some degradation to the waters of the State. Dredging operations cause only temporary impacts to surface waters, as dredging and effluent discharge occur only a few weeks out of the year. Since the effluent contains only water and sediment that originated in the water body, it does not constitute a new source of pollutants. However, dredging may cause temporary degradation of turbidity, total suspended solids, dissolved oxygen and elevated levels of some constituents. Dredging projects covered under this Order will not exceed any applicable water quality objectives. Maintenance dredging of the Stockton Deep Water Ship Channel is necessary to maintain safe navigation to the Port of Stockton and benefits the people of the State.

59. The following agencies also have jurisdiction over this dredging and disposal project:
California Department of Fish and Game
National Marine Fisheries Service
United States Fish and Wildlife Service
United States Army Corps of Engineers
State Lands Commission

60. The action to revise waste discharge requirements for the DMD facilities is exempt from the provisions of the California Environmental Quality Act (CEQA), in accordance with Title 14, California Code of Regulations (CCR), Section 15301. Annual maintenance dredging activities are exempt from the provisions of the CEQA in accordance with Title 14, CCR, Section 15304 (g).

61. Pre-dredge testing and site-specific studies (when necessary) provide assurance that dredged sediments will not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives and CTR/NTR criteria. The dredge sediments will be classified as Inert Waste as defined in Title 27 Subchapter 2 Section 20230 of the California Code of Regulations. Inert wastes do not need to be discharged at classified waste management units, therefore Title 27 waste discharge requirements are not required for this project. Pursuant to Title 27, Section 20230 of the California Code of Regulations, the Regional Board can prescribe individual or general waste discharge requirements.

The U.S. Army Corps of Engineers has issued a Section 10 permit (Rivers & Harbors Act) for dredging operations and a Clean Water Act Section 404 permit for the discharge of the “effluent” to surface waters. Therefore, these dredging operations are exempt from NPDES regulations, but require a Clean Water Act Section 401 Water Quality Certification to be issued by the Regional Board. A 401

Water Quality Certification will be issued in conjunction with each approved "Notice of Applicability".

PUBLIC NOTICE

62. 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.

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

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

65. Any person adversely affected by this action of the Regional Board may petition the State Water Resources Control Board to review the action. The petition must be received by the State Board within 30 days of the date of issuance of this Order. Copies of the law and regulations applicable to filing the petition will be provided on request.

IT IS HEREBY ORDERED that Order No. 5-01-115 is rescinded and that the Army Corps of Engineers, Department of Water Resources and the Port of Stockton, their 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. APPLICABILITY

1. All dredging discharges covered by this Order shall be limited to maintenance dredging activities associated with the Stockton Deep Water Ship Channel as identified in Finding numbers 4 and 5 above.

2. Before the maintenance dredging project can be considered for coverage by this order, a complete Notice of Intent (as detailed in Attachment B) and filing fee must be submitted to the Regional Board.

3. The *Discharge Applicability Table* to follow, establishes sediment concentrations that will not cause exceedances of water quality objectives under general conditions. Sediments with values below the concentrations in Table A.3 may be discharged to DMD sites listed in this Order for maintenance dredging and disposal projects in the Stockton Deep Water

Ship Channel. If analytical results are above the values listed in Table A.3, the Discharger may submit a technical report describing site-specific factors that could be taken into consideration by the Executive Officer in determining compliance with Section F Provisions of this Order. Section F describes the requirements of the technical report, with additional information also provided in Attachment "D". The discharge of sediments that exceed the concentrations in Table A.3 is considered a violation of this Order unless granted a site-specific exemption.

Part 1 of the Discharge Applicability Table applies to solids analysis and extractable constituents from the pre-dredge sediment analysis. The maximum soluble concentrations in Part 1 are chosen to protect groundwater and surface water beneficial uses from leachate and surface runoff. The values are based on applicable water quality objectives and CTR/NTR criteria. The solid phase maximum concentrations in Part 1 are chosen to protect humans and wildlife from potential exposure to the sediments and their constituents once they are placed in an upland environment. Part 2 of the Discharge Applicability Table applies to pre-dredge analysis of the modified elutriate test, which simulates expected conditions of the effluent from the DMD site and expected conditions near the dredging location. The maximum concentrations in Part 2 are chosen to protect the receiving water beneficial uses and are based on applicable water quality objectives and CTR/NTR criteria. Detailed information on the values used in this Order is available in the Information sheet.

4. Before commencing pre-dredge sampling and analysis, the Discharger shall have the sampling and analysis plan reviewed and approved by Regional Board Staff. If the Discharger does not receive comments or approval from Regional Board staff within 10 working days, the Discharger may proceed with sampling if the Sampling and Analysis Plan is equivalent to the latest approved Sampling and Analysis Plan.

5. If the Executive Officer finds that the proposed discharge qualifies for coverage under this Order, a Notice of Applicability shall be issued to the Discharger. Individual dredging projects are not covered under this Order until issued a Notice of Applicability by the Executive Officer.

Table A.3
Discharge Applicability Table Part 1: Applicability of sediments for upland disposal

Constituent	Max. Concentration of solids analysis[1] (dry weight)	Max. Concentration of soluble constituents[2]
Arsenic	See footnote [3]	10.0 µg/l (filtered)
Barium		100 µg/l (filtered)
Cadmium	21 mg/kg	5 µg/l (filtered)
Total Chromium	See footnote [3]	50 µg/l (filtered)
Chromium VI		11 µg/l (filtered)
Copper	61 mg/kg	9.0 µg/l [4] (filtered)
Lead	400 mg/kg	2.5 µg/l [4] (filtered)
Mercury	0.2 mg/kg	0.05 µg/l
Nickel	See footnote [3]	52 µg/l [4] (filtered)
Selenium	390 mg/kg	5 µg/l
Zinc	120 mg/kg	100 µg/l (filtered)
pH		6.5 – 8.5
Polyaromatic hydrocarbons (PAH):		
Acenaphthene	3,700 mg/kg	
Anthracene	22,000 mg/kg	

Constituent	Max. Concentration of solids analysis[4] (dry weight)	Max. Concentration of soluble constituents
Benzo(a)anthracene	0.62 mg/kg	
Benzo(b)fluoranthene	0.62 mg/kg	
Benzo(k)fluoranthene	0.61 mg/kg	

[1] Maximum concentrations in Table A.3 for solids are based on USEPA Preliminary Remediation Goals (PRG) for ecological or residential use, or background concentrations found in Delta soil. The PRG screening values are based on risk assessment of common exposure pathways in an upland environment. If the solids or soluble concentrations are exceeded, beneficial reuse options may be restricted or the Discharger may submit a technical report as described in Section F.

[2] Soluble concentrations shall be determined using methods specified in the Monitoring and Reporting Program. Soluble metal concentrations are for total recoverable concentrations unless otherwise noted.

[3] The mean solids concentration of the sediment shall not exceed the mean solids concentration of background soils from the Delta based on a statistical comparison using an approved Title 27 statistical method.

[4] Maximum concentration based on chronic aquatic toxicity with a receiving water hardness of 100 mg/l $CaCO_3$, but will be recalculated based on the CTR and on receiving water hardness determined during predredge analysis or reasonable worst case value.

[4] Maximum concentrations in Table A.3 for solids are based on USEPA Preliminary Remediation Goals (PRG) for ecological or residential use, or background concentrations found in Delta soil. The PRG screening values are based on risk assessment of common exposure pathways in an upland environment. If the solids or soluble concentrations are exceeded, beneficial reuse options may be restricted or the Discharger may submit a technical report as described in Section F.

Benzo(a)pyrene	0.062 mg/kg
Chrysene	6.1 mg/kg
Dibenz(a,h)anthracene	0.062 mg/kg
Fluoranthene	2,300 mg/kg
Fluorene	2,600 mg/kg
Indeno(1,2,3-cd)pyrene	0.62 mg/kg

Table A.3 (Continued)
Discharge Applicability Table Part 1: Applicability of sediments for upland disposal.

Constituent	Max. Concentration of solids analysis[1] (dry weight)
Naphthalene	56 mg/kg
Pyrene	2,300 mg/kg
Polychlorinated Biphenyls (PCB):	
Aroclor 1016	3.9 mg/kg
Aroclor 1221	0.22 mg/kg
Aroclor 1232	0.22 mg/kg
Aroclor 1242	0.22 mg/kg
Aroclor 1248	0.22 mg/kg
Aroclor 1254	0.22 mg/kg
Aroclor 1260	0.22 mg/kg
Organochlorine Pesticides:	
Aldrin	0.029 mg/kg
Alpha BHC	0.090 mg/kg
Beta BHC	0.032 mg/kg
Gamma BHC (Lindane)	0.44 mg/kg
Chlordane	1.6 mg/kg
4,4-DDD	2.4 mg/kg
4,4-DDE	1.7 mg/kg
4,4-DDT	1.7 mg/kg
Dieldrin	0.011 mg/kg
Endosulfan	370 mg/kg
Endrin	18 mg/kg
Heptachlor	0.11 mg/kg
Heptachlor epoxide	0.052 mg/kg
Hexachlorocylopentadienne	420 mg/kg
Methoxychlor	8 mg/kg
Toxaphene	0.44 mg/kg

[1] Solids concentrations are based on USEPA Preliminary Remediation Goals (PRG) for ecological or residential use, or background concentrations found in Delta soil. The PRG screening values are based on risk assessment of common exposure pathways in an upland environment. If the solids concentrations are exceeded, beneficial reuse options may be restricted or the Discharger may submit a technical report as described in Section F.

Table A.3 (Continued)
Discharge Applicability Table Part 2: Applicability of sediment elutriate and solids analysis for dredge site impacts and effluent discharges from the disposal site.

Constituent	Max. Concentration of solids analysis[4,5] (dry weight)	Max. Concentration of soluble constituents[2,4]
Acute or Chronic Toxicity Bioassay		80% survival
Arsenic		10 µg/l (filtered)
Barium		100 µg/l (filtered)
Cadmium		5 µg/l (filtered)
Total Chromium		50 µg/l (filtered)
Chromium VI		11 µg/l (filtered)
Copper		9.0 µg/l [3](filtered)
Lead		2.5 µg/l [3](filtered)
Mercury		0.05 µg/l
Nickel		52 µg/l [3] (filtered)
Selenium		5 µg/l
Zinc		100 µg/l (filtered)
pH		6.5-8.5
Specific conductivity (EC)		700 µmhos/cm [6]
Total Dissolved Solids(TDS)		450 mg/l [6]
Chloride		106 mg/l [6]
Ammonia + Ammonium		See footnote [7]
BOD		Compare to RW
COD		Compare to RW
Tributyl Tin		0.063 µg/l
Oil and Grease		5 mg/l

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[2] Soluble concentrations shall be determined using methods specified in the Monitoring and Reporting Program. Metal concentrations are for total recoverable concentrations unless otherwise noted.

[3] Maximum concentration depends on hardness of receiving water. The number shown is based on a receiving water hardness of 100 mg/l $CaCO_3$, but will be recalculated based on the CTR and on receiving water hardness determined during predredge analysis, or reasonable worst case value.

[4] If the elutriate results exceed Table A.3 Part 2 concentrations, then the Discharger may submit a technical report as described in Section F.

[5] Solids concentrations for effluent discharge are based on an assumption of 100 mg/l suspended solids in the effluent. If the concentrations are exceeded, the Discharger may submit a technical report that demonstrates how suspended solids will be reduced so that water quality criteria are not exceeded in the effluent.

[6] The effluent concentration shall not exceed values for EC, TDS or chloride or shall not be above ambient background levels of the receiving water if the receiving water exceeds the values.

[7] Ammonia and ammonium concentrations will be calculated based on the pH and temperature of the receiving water according to the following formula:
$CCC=\{[0.0577/(1+10^{7.688-pH})] + [2.487/(1+10^{pH-7.688})]\} \times \{MIN[2.85, 1.45x10^{0.028x(25-T)}]\}$

Table A.3 (Continued)
Discharge Applicability Table Part 2 Continued: Applicability of sediment elutriate and solids analysis for dredge site impacts and effluent discharges from the disposal site.

Constituent	Max. Concentration of solids analysis[4,5] (dry weight)		Max. Concentration of soluble constituents[2,4]
Polyaromatic hydrocarbons (PAH):			
Acenaphthene	12,000 mg/kg	***or***	1,200 µg/l
Anthracene	96,000 mg/kg	***or***	9600 µg/l
Benzo(b)fluoranthene	44 µg/kg	***or***	0.0044 µg/l
Benzo(k)fluoranthene	44 µg/kg	***or***	0.0044 µg/l
Benzo(a)pyrene	44 µg/kg	***or***	0.0044 µg/l
Chrysene	44 µg/kg	***or***	0.0044 µg/l
Dibenz(a,h)anthracene	44 µg/kg	***or***	0.0044 µg/l
Fluoranthene	3,000 mg/kg	***or***	300 µg/l
Fluorene	13,000 mg/kg	***or***	1,300 µg/l
Indeno(1,2,3-cd)pyrene	44 µg/kg	***or***	0.0044 µg/l
Naphthalene	6,200 mg/kg	***or***	620 µg/l
Pyrene	9,600 mg/kg	***or***	960 µg/l
Polychlorinated Biphenyls (PCB):	1.7 µg/kg (Total sum)	***or***	0.00017 µg/l (Sum of PCBs in elutriate)
Organochlorine Pesticides:			
Aldrin			ND (<0.005 µg/l)
Alpha BHC			ND (<0.01 µg/l)
Beta BHC			ND (<0.005 µg/l)
Gamma BHC (Lindane)			ND (<0.02 µg/l)
Chlordane			ND (<0.1 µg/l)
4,4-DDD			ND (<0.05 µg/l)

[2] Soluble concentrations shall be determined using methods specified in the Monitoring and Reporting Program.

[4] If the elutriate results exceed Table A.3 Part 2 concentrations, then the Discharger may submit a technical report as described in Section F.

[5] Solids concentrations for effluent discharge are based on an assumption of 100 mg/l suspended solids in the effluent. If the concentrations are exceeded, the Discharger may submit a technical report that demonstrates how suspended solids will be reduced so that water quality criteria are not exceeded in the effluent.

Table A.3 (Continued)
Discharge Applicability Table Part 2: Applicability of sediment elutriate and solids analysis for dredge site impacts and effluent discharges from the disposal site.

Constituent	Max. Concentration of solids analysis[4,5] (dry weight)	Max. Concentration of soluble constituents[2,4]
Organochlorine Pesticides continued**:**		
4,4-DDE		ND (<0.05 µg/l)
4,4-DDT		ND (<0.01 µg/l)
Dieldrin		ND (<0.01 µg/l)
Endosulfan I		ND (<0.02 µg/l)
Endosulfan II		ND (<0.01 µg/l)
Endosulfan sulfate		ND (<0.05 µg/l)
Endrin		ND (<0.01 µg/l)
Endrin aldehyde		ND (<0.01 µg/l)
Heptachlor		ND (<0.01 µg/l)
Heptachlor epoxide		ND (<0.01 µg/l)
Hexachlorocyclopentadienne		ND (<0.01 µg/l)
Methoxychlor		ND (<0.1 µg/l)
Toxaphene		ND (<0.5 µg/l)
Organophosphorous Pesticides:		
Chlorpyrifos		0.014 µg/l
Diazinon		0.05 µg/l
Dimethioate		1.0 µg/l
Malathion		0.43 µg/l
Parathion		0.013 µg/l
Phorate		0.7 µg/l

[2] Soluble concentrations shall be determined using methods specified in the Monitoring and Reporting Program.
[4] If the elutriate results exceed Table A.3 Part 2 concentrations, then the Discharger may submit a technical report as described in Section F.
[5] Solids concentrations for effluent discharge are based on an assumption of 100 mg/l suspended solids in the effluent.

6. The dredging operations primarily involve the use of a pipeline hydraulic suction dredge for maintaining needed depth for navigational access. Clamshell dredging may be used in limited cases where access is restricted or debris is too large for hydraulic dredging. Recent advances in clamshell dredging buckets have produced 'sealed' or 'environmental' buckets, which greatly reduce the amount of turbidity in the water column and the amount of water produced during the dredging operation. This Order allows the use of a sealed bucket and barge for maintenance dredging. Other dredge types may be approved by the Executive Officer upon a demonstration of their ability to meet water quality objectives

B. 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. The discharge of 'hazardous waste' or 'designated waste' is prohibited. 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.

3. The discharge of dredged materials other than to a Dredged Material Disposal site specifically designed for their containment is prohibited.

4. The discharge of solid waste, liquid waste, leachate, or waste constituents shall neither cause nor contribute to any contamination, pollution, or nuisance to surface waters, ponded water, or surface water drainage courses, including, but not limited to:

    a. floating, suspended, or deposited macroscopic particulate matter or foam;

    b. increases in bottom deposits or aquatic growth;

    c. exceedances of water quality objectives for temperature, turbidity, or color that causes nuisance or adversely affects beneficial uses;

    d. the creation or contribution of visible, floating, suspended, or deposited oil or other products of petroleum origin; and

e. the introduction or increase in concentration of toxic or other contaminants/pollutants resulting in impairment of beneficial uses of waters of the State.

5. The direct discharge of wastes to surface waters or surface water drainage courses other than effluent from the DMD site is prohibited. Surface runoff from the site may be permitted if the approved site operation plan has provisions for erosion control and monitoring.

6. Bypass or overflow of untreated or partially treated waste from the confined disposal facility is prohibited.

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

8. The discharge of sanitary waste to the DMD sites is prohibited.

9. The discharge of dredge material to the pond that is situated on the southern boundary of the DMD site known as Scour Pond I is prohibited.

C. DISCHARGE SPECIFICATIONS

(For discharge of dredged materials into Dredged Material Disposal Site)

1. The discharge of dredged materials shall only be to the sites identified in Finding No. 10 of this Order, or to a DMD Site with Waste Discharge Requirements approved for accepting dredge materials from the Stockton Deep Water Ship Channel.

2. The discharge to the DMD site shall consist solely of inert waste as defined by Title 27, Chapter 3, Section 20230 of the California Code of Regulations.

3. The discharge of any materials generated during dredging operations shall not cause a nuisance or condition of pollution as defined by the California Water Code.

4. The discharge shall not cause concentrations of any materials that are deleterious to animals, aquatic, human or plant life in adjacent water bodies.

5. The discharge shall not cause the pollution or contamination of any water supply.

6. The discharge shall not alter the apparent color of adjacent water bodies such that it causes nuisance or adversely affects beneficial uses.

7. The discharge to the DMD site shall consist solely of sediment and water produced from dredging operations.

8. Appropriate soil erosion control measures shall be made and maintained to prevent discharge of sediment to surface waters or surface water drainage courses from disturbed areas at the DMD sites. Surface runoff from the site may be permitted if the approved site operation plan has provisions for erosion control and monitoring. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with the historical rainfall patterns.

9. Objectionable odors originating at this facility shall not be perceivable beyond the limits of the activity area.

10. Newly constructed or rehabilitated levees at the DMD sites shall be designed and constructed under the direct supervision of a California Registered Civil Engineer.

11. All retention dikes or levees shall be so constructed and maintained to prevent sloughing that causes turbidity in excess of Receiving Water Limitations No. 11.

12. The discharge shall remain within the DMD sites area at all times, except for effluent discharges specified in Section D Effluent Limitations. After drying, the solid material may be removed for beneficial reuse at other locations subject to restrictions specified in the Notice of Applicability. Surface runoff from the site may be permitted if the approved site operation plan has provisions for erosion control and monitoring.

13. The discharge of waste to all the DMD sites is prohibited until an Operation Plan for each DMD site has been approved by the Executive Officer.

14. The Discharger shall operate all systems and equipment to maximize treatment of the wastewater and optimize the quality of the discharge.

15. The ponds shall be managed to prevent breeding of mosquitoes. In particular,
    a. An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.

b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.

c. Dead algae, vegetation, and debris shall not accumulate on the water surface.

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

17. All stockpiled dredge materials shall be managed to prevent erosion of sediment to surface water drainage courses.

18. Newly constructed or rehabilitated levees or berms that hold back water shall be designed and constructed under the direct supervision of a California Registered Civil Engineer or Engineering Geologist.

19. The freeboard in all ponds shall never be less than two feet as measured vertically from the water surface to the lowest point of overflow.

20. One week prior to the date of discharge, available ponds storage capacity shall at least equal the volume necessary to comply with Discharge Specifications C. 19.

D. EFFLUENT LIMITATIONS

(Return flows from the Dredged Material Disposal Site to the specified receiving water)

1. The effluent discharge from the Dredge Material Disposal sites are subject to the following flow limitations:

   The average daily flow shall not exceed 9 mgd.
   The maximum daily flow shall not exceed 10 mgd.

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

3. In areas where the receiving water is on the 303(d) list as an impaired water body for nutrient enrichment or low dissolved oxygen, concentrations of dissolved oxygen in the effluent shall not fall below 5.0 mg/l. Concentrations of dissolved oxygen in the effluent shall not fall below 6.0 mg/l at DMD sites where the effluent is discharged into or upstream from the San Joaquin river inside the reach from Turner Cut to Stockton during the period of 1 September through 30 November. Roberts Island #1, Roberts Island #2, and the Port of Stockton DMD sites are the currently permitted sites in this impaired reach.

4. In areas where the receiving water is on the 303(d) list as an impaired water body for low dissolved oxygen, the effluent shall not contain oxygen depleting constituents (BOD, COD, and ammonia) that are above the ambient levels in the receiving water upstream from the effluent discharge point.

5. The effluent shall not exceed water quality objectives or CTR/NTR criteria for any constituent that is on the 303(d) list for the receiving water where the effluent is discharged, unless a mixing zone is granted in the NOA. If the water entrained during dredging contains constituents that exceed water quality objectives, the effluent shall not exceed ambient levels in the receiving water. Mixing zones for 303(d) constituents may be granted by the Executive Officer if the Discharger demonstrates that the receiving water has assimilative capacity and the discharge meets the conditions of this Order.

6. In some DMD sites, the effluent is discharged directly into agricultural drainage ditches. Since agricultural drainage ditches are eventually discharged into rivers and sloughs in the Delta, the 303(d) constituents of the eventual surface water destination will be applied to the drainage ditch.

7. The following constituents are on the current 303(d) list for impaired water bodies in the area of the Delta that includes the Stockton Deep Water Ship Channel:

    Mercury
    DDT
    Chlorpyrifos
    Diazinon
    Group A Pesticides (Aldrin, Dieldrin, chlordane, Endrin, heptachlor, heptachlor expoxide, hexachlorocyclohexane (including Lindane), Endosulfan, and Toxaphene)
    Unknown toxicity
    Organic enrichment / Low D.O. (Channel Point to Disappointment Slough)
    Electrical Conductivity
    Dioxin (RM 39 to RM 41)
    Furans (RM 39 to RM 41)
    PCBs (RM 39 to RM 41)
    Pathogens

8. 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.

9. Survival of aquatic organisms in 96-hour bioassays of undiluted effluent shall be no less than:
   Minimum for any one bioassay…….... 70%
   Median for any three or more consecutive bioassays …… 90%

10. 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.

11. The point of compliance for effluent limitations is the point just before the effluent enters the receiving water.

E. RECEIVING WATER LIMITATIONS:

Receiving water limitations (RWL) implement Water Quality Objectives in applicable water quality control plans. As such, they are a required part of this Order.

A mixing zone is defined as a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality objectives and CTR/NTR criteria may be exceeded without causing adverse effects to the overall water body. A mixing zone may be allowed if there is assimilative capacity in the receiving water. If the Discharger proposes a mixing zone for any constituent, they shall show justification that the receiving water has assimilative capacity and that dilution is likely to occur within the mixing zone. The mixing zone has a maximum length of 300 feet and shall not exceed 50% of the cross-section of the receiving water. Acutely toxic conditions are not permitted at any place inside the mixing zone. Chronic aquatic criteria and all other water quality objectives and CTR/NTR criteria must be met at the edge of the mixing zone in the receiving water. In addition the mixing zone shall not:

- adversely impact beneficial uses.
- compromise the integrity of the entire water body.
- cause acutely toxic conditions to aquatic life passing through the mixing zone.
- restrict the passage of aquatic life.
- adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws.
- produce undesirable or nuisance aquatic life.
- result in floating debris, oil, or scum.
- produce objectionable color, odor, taste or turbidity.
- cause objectionable bottom deposits.
- cause nuisance.

- dominate the receiving water body or overlap a mixing zone from different outfalls.
- be allowed at or near any drinking water intake.
- be allowed for any constituents in agricultural drainage ditches due to the lack of assimilative capacity, unless the Discharger can demonstrate that the discharge improves water quality in the agricultural drainage ditch.

If the Discharger proposes a mixing zone that meets the requirements of this Order, the Executive Officer may approve the mixing zone in the Notice of Applicability.

In the following limitations, the discharge is defined as the effluent from the DMD sites and/or sediment released to the receiving waters from the dredge cutting head. The Discharger shall not cause the following Receiving Water Limits to be exceeded in the receiving water or at the edge of the allowed mixing zone, if applicable:

1. Concentrations of dissolved oxygen to fall below 5.0 mg/l or below 6.0 mg/l at DMD sites where the effluent is discharged into or upstream from the San Joaquin River inside the reach from Turner Cut to Stockton during the period of 1 September through 30 November.

2. Oils, greases, waxes, or other materials to form a visible film or coating on the water surface or on the stream bottom.

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

4. Toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal or aquatic life.

5. Aesthetically undesirable discoloration.

6. Fungi, slimes, or other objectionable growths.

7. The normal ambient pH to fall below 6.5, exceed 8.5 or change by more than 0.5.

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

9. 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.

10. The normal ambient temperature to increase more than 5^{o} F.

11. The discharge shall not cause an increase in turbidity exceeding the following limits in the receiving water:
    a. 1.0 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs;
    b. 20 percent where natural turbidity is between 5 and 50 NTUs;
    c. 10 NTUs where natural turbidity is between 50 and 100 NTUs;
    d. 10 percent where natural turbidity is greater than 100 NTUs.

12. Taste or odor-producing substances to impart undesirable tastes or odors to domestic or municipal water supplies, or to fish flesh or other edible products of aquatic origin or to cause nuisance or otherwise adversely affect beneficial uses.

13. Violation of any applicable water quality objective for receiving waters adopted by the Regional Board or the SWRCB, or to CTR/NTR criteria promulgated by the USEPA, pursuant to the Clean Water Act and regulations adopted thereunder.

F. GROUNDWATER LIMITATIONS:

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

G. PROVISIONS

1. If the concentration(s) of the predredge sediment samples exceed those specified in Applicability Section A.3, then the Discharger may submit a technical report with the NOI to the Executive Officer demonstrating the Discharger's ability to comply with this Order while exceeding the applicability numbers in the A.3 Discharge Applicability Table. The dredging project may not proceed until the technical report is reviewed by the Executive Officer and a Notice of Applicability has been granted. If the Executive Officer finds that the technical report is consistent with the conditions of this Order, new values will be substituted for the numbers listed in Table A.3, but only for the discharge covered by the NOA. Attachment "D" gives additional information on the content of the Technical Report.

2. If the maximum concentration of the solids analysis listed in Applicability Table A.3 Part 1 are exceeded, restrictions may be placed on some beneficial reuse options. The Discharger may propose appropriate EPA PRG values (Preliminary Remediation Goals) or risk analysis calculations that address the likely exposure pathways of the specific DMD location and use of the dredged material once it is placed on land.

3. If the maximum concentration for soluble constituents listed in Applicability Table A.3 Part 1 are exceeded, the Discharger may propose site-specific calculations, based on site-specific attenuation and dilution factors, to demonstrate that the dredged material will not produce leachate that will exceed water quality objectives for the groundwater. If direct surface runoff poses a potential threat to surface water, beneficial reuse may be restricted to areas with no direct surface runoff to surface waters.

4. During the predredge analysis, if the modified elutriate test results exceed the maximum concentrations listed in Part 2 of the Discharge Applicability Table (A.3), the Discharger may submit a technical report that provides justification for a mixing zone in the receiving water. The mixing zone can be used if the Executive Officer finds that it meets the conditions of this Order. Mixing zone calculations shall use the maximum effluent flow listed in the WDR and the average receiving water flow expected for the time of the discharge.

5. Calculations need be submitted only for the constituent exceeding concentrations in the Discharge Applicability Table (A.3). Within 7 days after the Discharger submits copies of the technical report prepared for compliance with Provision F, Regional Board staff shall mail copies of the technical report to interested parties or agencies that request a copy. Interested parties will have two weeks to review the report and provide comments to the Executive Officer for consideration prior to issuance of a Notice of Applicability. Separate NOIs may be submitted for different reaches of the project.

6. The Discharger shall submit an Operation Plan for each DMD Site. This Operation Plan shall describe site operations and procedures to be followed before, during, and after maintenance dredging sediment disposal. The DMD Site's Operation Plan must be submitted with the Notice of Intent. At a minimum, the Site Operation Plan shall include (a) site preparation such as grading, berm construction or repair, and vegetation management, (b) emergency procedures for potential risks, including levee failures, (c) placement of inflow points and effluent weirs, (d) the calculated retention time based on the maximum flow limit and removal efficiency for Total Suspended Solids, (e) operation procedures for the DMD site, (g) stormwater management and erosion

control measures, and (h) description of the reuse activities for the dredge material (if any).

7. 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.

8. The Discharger shall comply with the attached Monitoring and Reporting Program No. R5-2003-0145, which is part of this Order, and any revision thereto as ordered 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 the Notice of Applicability.

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

10. In the event of any change in control or ownership of land or control of dredging and disposal operations described herein, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.

11. The Discharger shall notify the Regional Board when each dredging project that is covered by these requirements is complete, so that the Notice of Applicability may be withdrawn and the Discharger will no longer be covered by this Order, although long-term maintenance of sediments in the DMD sites will continue to be covered.

12. 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.

13. The Discharger shall report promptly to the Regional Board any material change or proposed change in the character, location, or volume of the discharge.

14. The Regional Board considers the Discharger to have continuing responsibility for correcting any problems which may arise in the future as a result of

maintenance dredging activities and of the subsequent use of the dredge material disposal sites.

15. 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 the Notice of Applicability.

16. A copy of this Order and the Notice of Applicability shall be kept as a reference for dredging operation personnel. Key operating personnel shall be familiar with its contents.

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 5 September 2003.

original signed by

_____

THOMAS R. PINKOS, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2003-0145

FOR
UNITED STATES ARMY CORPS OF ENGINEERS, DEPARTMENT OF WATER RESOURCES AND
THE PORT OF STOCKTON
STOCKTON DEEP WATER SHIP CHANNEL MAINTENANCE DREDGING ACTIVITIES FROM CHANNEL MILE 4.4 TO MILE 41.0
CONTRA COSTA, SACRAMENTO AND SAN JOAQUIN COUNTIES

This monitoring program includes pre-dredge sediment and elutriate analysis, dredge site monitoring, effluent (return-water) monitoring and receiving water monitoring.

PRE-DREDGE SEDIMENT AND ELUTRIATE MONITORING

Pre-dredge sediment sampling and analyses shall be performed to determine sediment constituent concentrations for those items listed in Applicability Section A.3, Discharge Applicability Table. Soluble metal constituents shall be measured after performing a Title 22 Waste Extraction Test (WET) procedure. The WET procedure may be modified to use deionized water in place of the citrate buffer when the ratio of neutralizing potential (NP) to Acid Generating Potential (AGP) is greater than 3. Another extraction procedure may be used with approval by the Executive Officer. In some cases, the Waste Extraction Test with citrate buffer may be required to show that the dredge material is not classified as hazardous waste. A modified elutriate test (MET)(USACOE Tech Note EEDP 04-2) shall be performed on representative sediment samples and receiving water from the site. The supernatant from the MET shall be analyzed for the constituents listed in Part 2 of Table A.3. Approved analytical methods are listed in Table 3 below.

The frequency of samples required depends on a number of factors including: previous analysis results, location, distribution of the sediments and type of analysis. Historically, some reaches of the channels have smaller amounts of sediment deposited and other sections have had massive sediment deposits. It is assumed that the sediments within a reach have been recently deposited, and have similar characteristics and source of materials. Therefore, the sampling frequency will be adjusted for the amount of material to be dredged from a reach, so that reaches with large amounts of material will have a lower sampling frequency. In addition, sampling frequency may be decreased in the future if there are sufficient number of results to indicate that the constituent has a low probability of being found in levels that would cause concern. If ten samples taken in a given sampling frequency category have results well below the levels of concern, the sampling frequency can be decreased by one category (for example from A to B) for that constituent, with category D as a maximum. If results from a sample are above levels of concern, the sampling frequency may be increased by one category (for example from B to A). Table 2 shows the sampling frequency categories for different constituents depending on the amount of material in each discrete reach to be dredged.

A "reach" is defined as a segment of channel where the material to be removed has the following similarities: similar grain size, similar sources of contaminants, and a similar depositional environment.

Table 1: Sampling frequency categories

Category	Sampling Frequency Minimum
A	One sample per 12,500 cubic yards, or part thereof
B	One sample per 25,000 cubic yards, or part thereof
C	One composite sample per 50,000 cubic yards, or part thereof (composite of 2 different sample locations)
D	One composite sample per 75,000 cubic yards, or part thereof (composite of at least 3 different sample locations)

Table 2: Sampling frequency assignments based on constituent and amount of material to be dredged in a reach.

Constituent	Sampling category based on volume of dredge material to be removed from reach			
	Under 25,000	25,000-50,000	50,000-100,000	Over 100,000
Acid Generating Potential/ Neutralizing Potential	A	B	C	D
WET metals	A	B	C	D
MET metals	A	B	C	D
MET Ammonia & Ammonium	A	B	C	D
MET COD	A	B	C	D
MET BOD	A	B	C	D
Metal solids	A	B	C	D
PAH solids	A	B	C	D
PCB solids	A	B	C	D
OC Pesticide solids	A	B	C	D
MET PAH	A	B	C	D
MET PCB	A	B	C	D
MET OC Pesticides	A	B	C	D
MET OP Pesticides	A	B	C	D
MET Toxicity Bioassay	A	B	C	D
MET pH	A	B	C	D
MET Specific conductivity (EC)	A	B	C	D
MET Total Dissolved Solids(TDS)	A	B	C	D
MET Chloride	A	B	C	D
Receiving Water Hardness, pH	A	B	C	D
MET Tributyltin (filtered)	If within 500 yards of the Port or a marina			
MET Oil and Grease	If within 500 yards of the Port or a marina			

The sampling and analysis plan for pre-dredge sampling shall be approved by Regional Board staff before samples are taken.

Table 3: Analytical Methods

	Sample preparation	Analysis method
Acid Generating Potential/ Neutralizing Potential		
WET metals	Waste Extraction Test (citrate buffer or deionized water)	Arsenic 7062 Barium 6010B Cadmium 7131A Total Chromium 6010B Chromium VI 7195, 7196, or 7191 Copper 6010B Lead 7421 Mercury 7471A (RL<25 ng/l) Nickel 7521 Selenium 7740 or 7741 Zinc 6010B
MET metals	Modified Elutriate Test (USACOE Tech Note EEDP 04-2)	
MET Ammonia & Ammonium	Modified Elutriate Test	Standard Method 4500-NH_3
MET COD	Modified Elutriate Test	5220B
MET BOD	Modified Elutriate Test	5210B
Metal solids		6010B except Mercury
PAH solids		8310
PCB solids		8082
OC Pesticide solids		8081A
MET PAH	Modified Elutriate Test	8310 or 8270C
MET PCB	Modified Elutriate Test	8082
MET OC Pesticides	Modified Elutriate Test	8081A
MET OP Pesticides	Modified Elutriate Test	8141A
MET Toxicity Bioassay	Modified Elutriate Test	EPA 821-R-02-012
MET pH	Modified Elutriate Test	150.1
MET Specific conductivity (EC)	Modified Elutriate Test	2510
MET Total Dissolved Solids(TDS)	Modified Elutriate Test	2540C
MET Chloride	Modified Elutriate Test	300.0
Receiving Water Hardness		2340B
MET Tributyltin (filtered)	Modified Elutriate Test	Gas chrom. w/ FPD detect.
MET Oil and Grease	Modified Elutriate Test	5520C/8440

BOD: Biological Oxygen Demand
COD: Chemical Oxygen Demand

MET: Modified Elutriate Test U.S. Army Corps of Engineers Tech Note EEDP-04-1,-2,-3,-4
OP: Organophosphorous
OC: Organochlorine
PAH: Polyaromatic Hydrocarbons
PCB: Polychlorinated Biphenyls
WET: Waste Extraction Test

Equivalent analytical methods may be substituted with approval of Regional Board staff.

DREDGE SITE RECEIVING WATER MONITORING

Grab samples shall be taken at two depths: 1) five feet below the surface, 2) approximately 2/3 of the distance to the bottom. The two grab samples from each station shall be composited together in equal volumes resulting in one sample from each station for analysis. Water samples shall be taken from the following stations:

Station	Description
R-1	Upcurrent of the dredging location undisturbed by the dredging operation, and not to exceed 3000 feet from the dredge.
R-2	within 50 feet downcurrent of the dredge suction head or clamshell.

In environments without significant current, R-1 should be located at a distance that is unaffected by dredging and R-2 shall be taken within 50 feet of the dredge. Other monitoring points may be required at the dredge site if the predredge analysis shows contaminants of concern that have the potential to cause toxicity at the dredge site.

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

Constituent/ analysis	Units	Sampling Frequency
Turbidity	NTUs	Daily
Dissolved Oxygen	mg/l	Daily
Temperature	^{o}F	Daily
Suspended Solids	mg/l	Twice a week
Constituents of concern[1]	µg/l	To be determined by staff

[1] Constituents of concern will be identified by Regional Board staff after reviewing the pre-dredge sediment and elutriate analysis. The Notice of Applicability will include a list of constituents of concern for monitoring.

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 DMD facility shall be sampled for the parameters specified below:

DMD MONITORING TABLE

Constituent	Units	Type of Sample	Sampling Frequency
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.

DMD SITE EFFLUENT MONITORING

The effluent from the sedimentation basin or Dredged Material Disposal (DMD) site shall be monitored at the overflow weir or discharge pipe during discharge. The initial set of samples shall be collected within 24 hours of the initiation of discharge. Subsequent samples shall be collected from the effluent discharge and analyzed according to the following schedule:

DMD SITE EFFLUENT MONITORING (Continued)

Constituent/ analysis	Units	Sampling Frequency
Flow	MGD	Daily
pH		Daily
Suspended solids	mg/l	Daily
Turbidity	NTU	Daily
Dissolved Oxygen	mg/l	Daily
Temperature	^{o}F	Daily

Constituents of concern[2]	µg/l	To be determined by staff [3]

[2] Constituents of concern will be identified by Regional Board staff after reviewing the pre-dredge sediment and elutriate analysis. The Notice of Applicability will include a list of constituents of concern for monitoring.
[3] The following are the "normal" expected turnaround times for laboratory analysis:

Total Suspended Solids	3 days after sample collection
Chronic bioassays	21 days after sample collection
Acute bioassays	7 days after sample collection
BOD	10 days after sample collection
Ammonia	Field measurement verified with laboratory analysis
Other analyses	14 days after sample collection

Sample holding times must be observed according to U.S. EPA recommendations. Regional Board staff may ask for shorter turnaround times in cases where there is potential for the effluent to exceed water quality objectives in the receiving water and to impair beneficial uses.

RECEIVING WATER MONITORING FOR THE DMD SITE DISCHARGE

Grab samples shall be taken at two depths: 1) five feet below the surface of the water, 2) approximately 2/3 of the distance to the bottom. Two grab samples from each station shall be composited together in equal volumes resulting in one sample from each station for analysis. Water samples shall be taken from the following stations:

Station	Description
R-3	Upcurrent of the discharge location and undisturbed by the effluent discharge from the DMD site, not to exceed 300 feet from the point of discharge.
R-4	within 50 feet down current of the discharge point and on the same side of the river as the discharge point.

Samples shall be collected and analyzed from Stations R-3 and R-4 as follows:

Constituent/ analysis	Units	Sampling Frequency
pH		Daily
Turbidity	NTU	Daily
Dissolved Oxygen	mg/l	Daily
Temperature	^{o}F	Daily
Suspended solids	mg/l	Twice weekly
Constituents of concern[4]	µg/l	To be determined by staff. [5]

[4] Constituents of concern will be determined by Regional Board staff after reviewing the analytical results from the pre-dredge analysis. The Notice of Applicability will include a list of constituents of concern for monitoring.
[5] The following are the "normal" expected turnaround times for laboratory analysis:

Total Suspended Solids	3 days after sample collection
Chronic bioassays	21 days after sample collection
Acute bioassays	7 days after sample collection

BOD	10 days after sample collection
Ammonia	Field measurement verified with laboratory analysis
Other analyses	14 days after sample collection

Sample holding times must be observed according to U.S. EPA recommendations. Regional Board staff may ask for shorter turnaround times in cases where there is potential for the effluent to exceed water quality objectives in the receiving water and to impair beneficial uses.

REPORTING

The following constituents shall have monitoring performed with field equipment at the dredge site, in the effluent and in the receiving water with violations reported to Regional Board staff immediately:

Flow	pH
Dissolved Oxygen	Temperature
Turbidity	Ammonia (with lab analysis for validation)

The following are the "normal" expected turnaround times for laboratory analysis:

Total Suspended Solids	3 days after sample collection
Chronic bioassays	21 days after sample collection
Acute bioassays	7 days after sample collection
BOD	10 days after sample collection
Ammonia	Field measurement verified with laboratory analysis
Other analyses	14 days after sample collection

Sample holding times must be observed according to U.S. EPA recommendations. Regional Board staff may ask for shorter turnaround times in cases where there is potential for the effluent to exceed water quality objectives in the receiving water and to impair beneficial uses.

The Discharger shall immediately notify the Board by telephone whenever a violation or adverse condition occurs as a result of the dredging and disposal operation or the discharge of effluent. Written confirmation shall follow within 2 weeks.

If the project is in operation for more than one month, monthly Self Monitoring Reports shall be submitted to Regional Board Staff no more than 15 days after the end of the month. The Self Monitoring Reports shall include:

1. The date, exact place, time of sampling and the name of the person taking the sample.
2. The dates analyses were performed and the name of the person who performed the analyses.
3. Analytical techniques/methods used.
4. Results of the analyses.

The Discharger shall compile and summarize the data from the Self Monitoring Reports and submit an Annual Report to Board staff within 90 days of project completion.

If dredge material from a project has restrictions on beneficial reuse options, the owner of the DMD site shall be responsible for tracking and documenting the location of that material while it is in the site. If the material is removed from the site, the owner shall notify Board staff within

10 days and provide a description of how the material was appropriately reused. If the material is sold or used in another location, the owner of the DMD site shall inform the recipient of the restrictions and their responsibility for proper use of the material.

The Discharger shall implement the above monitoring program on the effective date of this Program.

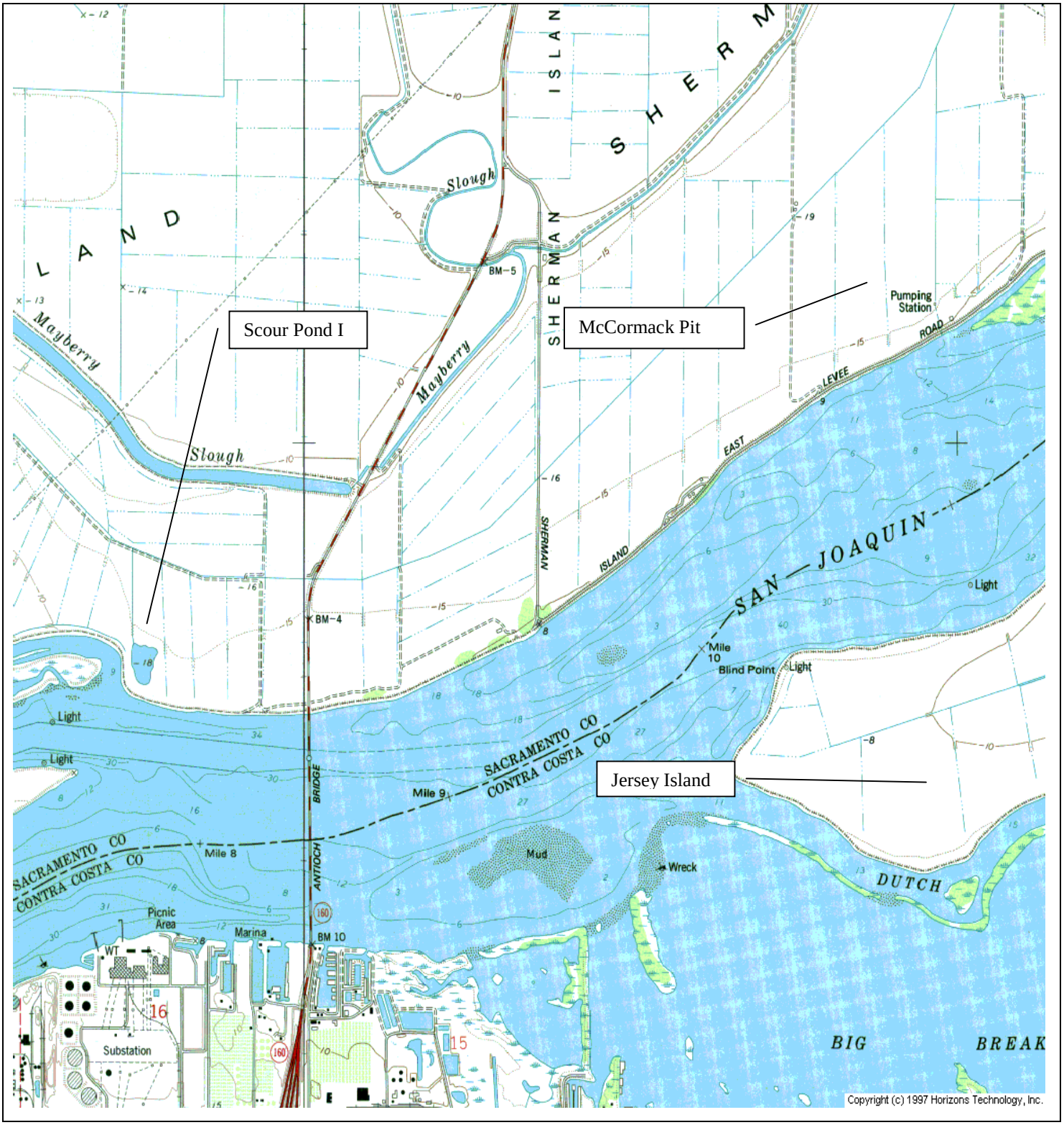
original signed by

Ordered by: _____

THOMAS R. PINKOS, Executive Officer

5 September 2003

(Date)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Slough
Mayberry
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Pumping Station
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Light
Mile 10
Blind Point
BM-4
SACRAMENTO CO
CONTRA COSTA CO
Mile 9
Mile 8
BRIDGE
ANTIOCH
Mud
Wreck
DUTCH
Picnic Area
Marina
BM 10
WT
Substation
BIG
BREAK
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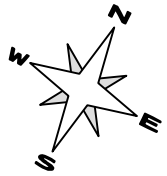
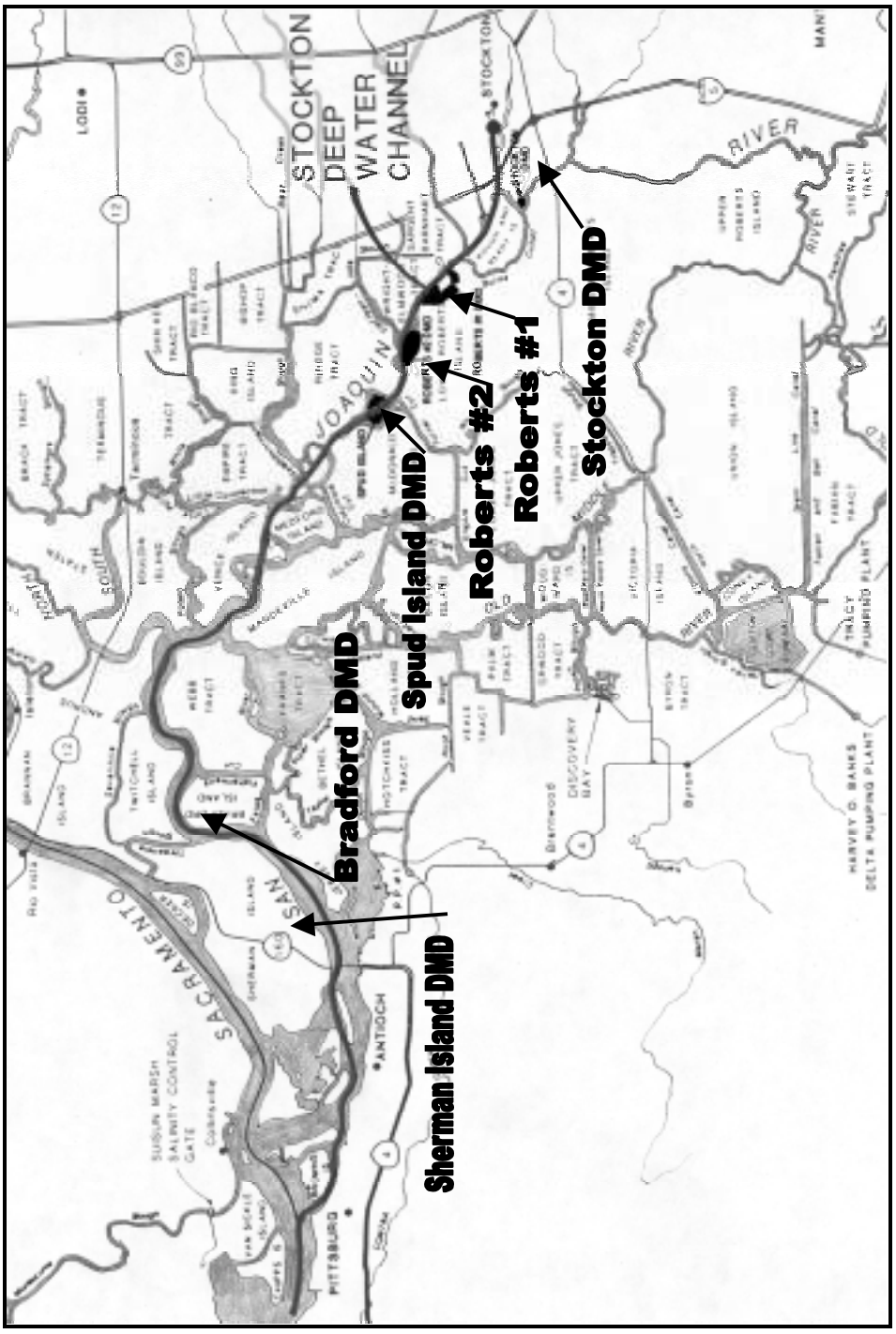
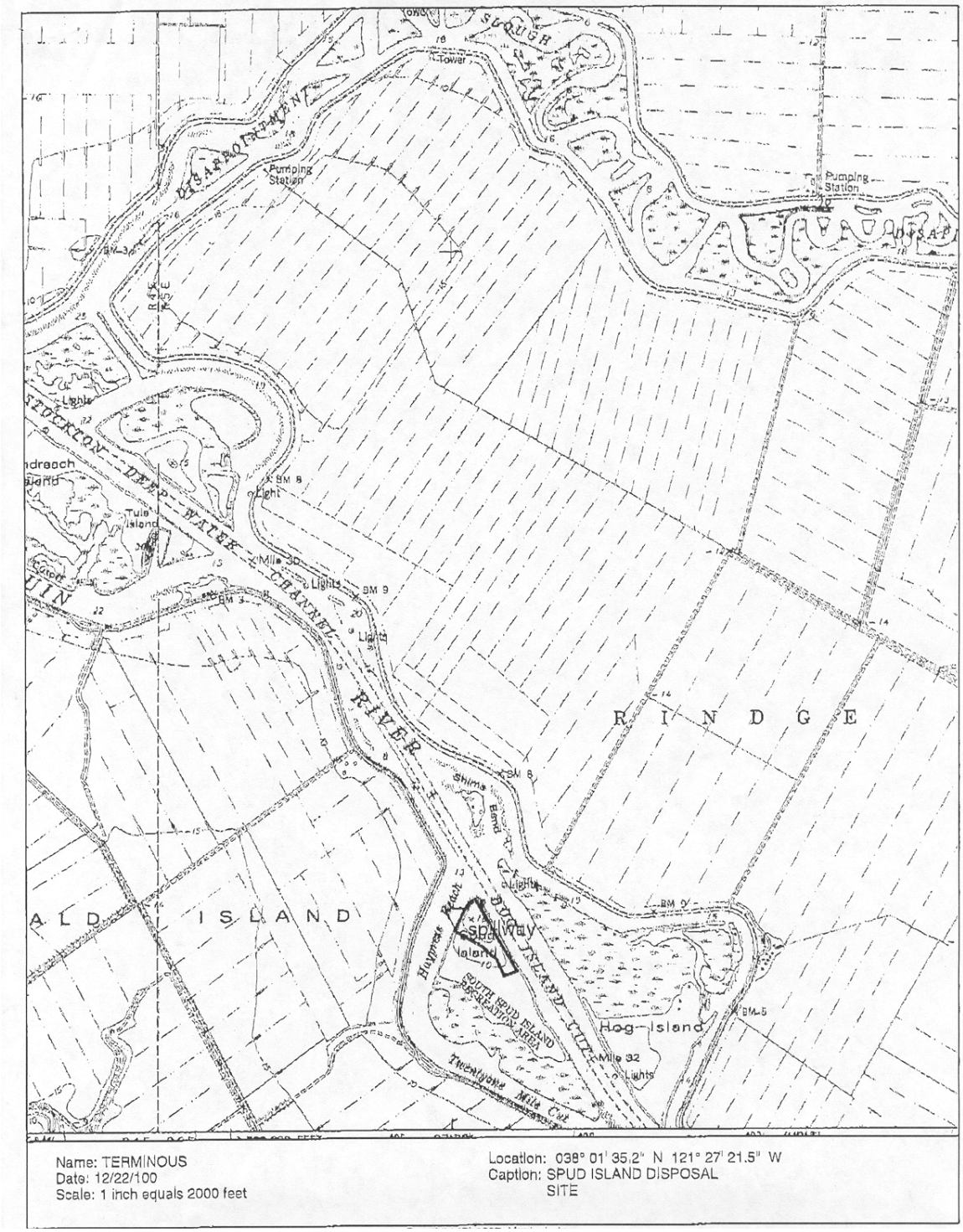
Drawing Reference: United States Army Corps of Engineers	**SITE PLAN** **STOCKTON DEEP WATER SHIP CHANNEL MAINTENANCE DREDGING** **SHERMAN ISLAND DMD SITES** **(SCOUR POND I and MCCORMACK PIT)**	

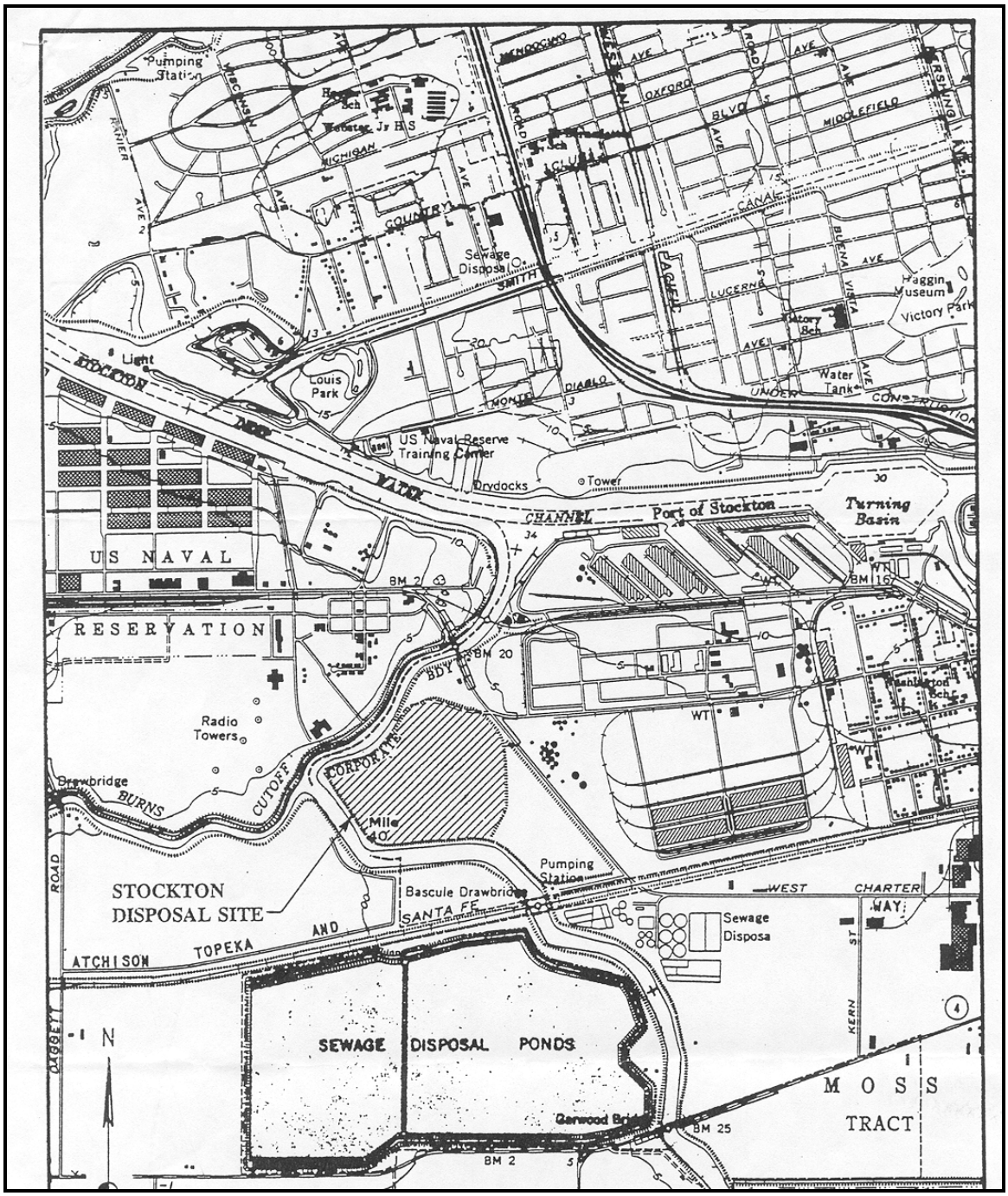
ATTACHMENT "A"
DMD SITES LOCATION MAP



ATTACHMENT "A"
PROJECT LOCATION DETAIL: SPUD ISLAND DMD SITE



ATTACHMENT "A"
PROJECT LOCATION DETAIL: STOCKTON PORT DMD SITE



INFORMATION SHEET

UNITED STATES ARMY CORPS OF ENGINEERS,
DEPARTMENT OF WATER RESOURCES, AND
THE PORT OF STOCKTON
STOCKTON DEEP WATER SHIP CHANNEL MAINTENANCE DREDGING ACTIVITES
FROM CHANNEL MILE 4.4 TO MILE 41.0
CONTRA COSTA, SACRAMENTO AND SAN JOAQUIN COUNTIES

The Discharger has requested that WDRs Order No. 5-01-115 be revised to incorporate additional dredge material disposal (DMD) sites on Sherman Island and Bradford Island. Both sites have previously been used for dredge material disposal. The disposal of dredge material to these DMD sites had been authorized under Resolution No.82-036, which waived WDRs for certain discharges. Because this resolution has now expired and the Discharger needs to dredge several shoals near Sherman Island in order to maintain navigational access in the Stockton Deep Water Ship Channel, the Order is being revised.

This General Order applies to maintenance dredging of 36.6 miles of the Stockton Deep Water Ship Channel from the boundary of the Central Valley Region near Antioch to the Port of Stockton. The dredge material will be removed with a hydraulic suction dredge, and then piped or barged to one of the four approved Dredge Material Disposal (DMD) sites. The DMD sites are used for settling solids from the dredge material slurry. After settling, excess water (effluent) will be discharged into the adjacent receiving water. The four approved DMD sites discharge into the San Joaquin River. The average rate of effluent discharge will be 9 million gallons per day. The duration of the discharge to surface waters ranges from several days to several weeks per year. Due to concerns for threatened and endangered fish species, dredging occurs between 1 September and 30 November.

Each year that the Discharger wishes to dredge under this General Order, the Discharger will submit a Notice of Intent that will include a project description and analytical results from representative sediment samples. If the sediment samples are below the maximum concentrations listed in Applicability Table A.3, the Executive Officer will grant a Notice of Applicability for the project. The maximum concentration values in Applicability Table A.3 are conservative screening values for assessing potential impacts from the dredging operation, from effluent discharges to surface waters, leaching and runoff to groundwater and adjacent surface water, and reuse of dredge material in an upland environment. Since the values in Table A.3 do not allow for site-specific attenuation factors, there are provisions allowing the Discharger to submit a technical report explaining how dredged material could exceed values in the Applicability Table and still not cause or contribute to exceedances of water quality objectives. The technical report would undergo public review and comment. The Order allows the Executive Officer to review site-specific information provided in the Discharger's technical report and find that values higher than those in the Applicability Table comply with the conditions of the Order. To provide the Discharger with additional time to collect site-specific information for the technical reports, the Discharger will be allowed to use the Applicability values from the 96-220 WDR for the 2001 dredging season only.

CEQA Compliance
The action to revise waste discharge requirements for the DMD facilities is exempt from the provisions of the California Environmental Quality Act (CEQA), in accordance with Title 14, California Code of Regulations (CCR), Section 15301. Annual maintenance dredging activities are exempt from the provisions of the CEQA in accordance with Title 14, CCR, Section 15304 (g).

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 B.1
Discharge Prohibition B.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 acute toxicity monitoring for effluent return flows to evaluate compliance with this water quality objective. In addition, supplemental bioassay monitoring is required if the dredge operation monitoring for pH, dissolved oxygen and turbidity indicates that the dredge operation has exceeded specified limitations 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 B.2 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 sites are not 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. The Discharger must conduct pre-dredge analysis which shows that the waste is properly classified as inert. Therefore, prohibiting the discharge of hazardous and designated waste is appropriate.

Receiving Water Limitation E.1
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 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 E.2
The Basin Plan contains objectives for floating material and oil/grease. Concentrations of oil/grease were found in sediment samples from marinas and riverine areas. The highest concentrations for oil/grease were observed in marinas, which may be attributed to boating activities. These receiving water limitations, based on the Basin Plan oil/grease and floating material objectives, have been included in this Order.

Receiving Water Limitation E.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 complexes 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 E.8
The Basin Plan contains a water quality objective for fecal coliform in waters that are designated 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 ship channel is situated in the San Joaquin River, the beneficial uses of this surface water includes water contact recreation. 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.

Groundwater Limitation F.1
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.

Maintenance dredging operations regulated under this General 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 General 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 General 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.

The Monitoring and Reporting Program includes pre-dredge analysis of the sediment and effluent, as well as monitoring during dredging at three locations: the dredge site, the effluent from the disposal site, and the receiving water. During dredging and disposal, the following constituents will be monitored: turbidity, dissolved oxygen, suspended solids, pH, flow, temperature, and other constituents of concern that may be identified from the pre-dredge analysis.

The values in Table A.3 Discharge Applicability Table will be used to evaluate both potential impacts from effluent discharged from the disposal site and potential long-term impacts from dredge material placement in an upland environment. Part 1 of Table A.3 is used to assess the dredge material remaining in the DMD site or at a beneficial reuse site. The exposure pathways include: direct exposure to the solid phase dredge material, leachate and runoff to groundwater and surface water. Part 2 of Table A.3 is used to assess the effluent from the DMD site with the only exposure pathway being effluent discharge to surface water. The values for leachate, runoff and effluent pathways are based on applicable water quality objectives and criteria. The values for solid phase dredge material are based on U.S. EPA's published values for human health protection (Preliminary Remediation Goals) and ecological protection (Ecological Preliminary Remediation Goals). Each value listed in Table A.3 is explained in the table below. Figures 1

and 2 follow the table and contain an exposure pathway diagram and an explanation of pathways considered in the USEPA Residential PRGs.

LIST OF ACRONYMS:

CA DFG: California Department of Fish and Game
CTR: California Toxics Rule
DHS: California Department of Health Services
EC: Electrical Conductivity
FW: Fresh Water
MCL: Maximum Contaminant Level (for drinking water purveyors)
NAWQC: National Ambient Water Quality Criteria (developed by USEPA)
ND: Non-detect
OEHHA: Office of Environmental Health Hazard Assessment
OP: Organophosphorous
PAH: Polynuclear aromatic hydrocarbons
PCB: Polychlorinated biphenyls
PRG: Preliminary Remediation Goal (USEPA)
RWL: Receiving Water Limit
SSL: Soil Screening Level (USEPA)
TBD: To be determined
USEPA: United States Environmental Protection Agency

Table 1: EXPLANATION OF CRITERIA:
Discharge Applicability Table Part 1: Applicability of sediments for upland disposal

Constituent	Max. Concentration of solids analysis[1] (dry weight)	Reference:
Arsenic	See footnote [2]	Average Delta soil conc.
Cadmium	21 mg/kg	EPA Ecological PRG (Soil Invertebrates)
Total Chromium	See footnote [2]	Average Delta soil conc.
Copper	61 mg/kg	EPA Ecological PRG (Soil Invertebrates)
Lead	400 mg/kg	EPA PRG Residential
Mercury	0.2 mg/kg	Screening value
Nickel	See footnote [2]	Average Delta soil conc.
Selenium	390 mg/kg	EPA PRG Residential
Zinc	120 mg/kg	EPA Ecological PRG (Soil Invertebrates)
Polyaromatic hydrocarbons (PAH):		
Acenaphthene	3,700 mg/kg	EPA PRG Residential
Anthracene	22,000 mg/kg	EPA PRG Residential
Benzo(a)anthracene	0.62 mg/kg	EPA PRG Residential
Benzo(b)fluoranthene	0.62 mg/kg	EPA PRG Residential
Benzo(k)fluoranthene	0.61 mg/kg	EPA PRG Residential
Benzo(a)pyrene	0.062 mg/kg	EPA PRG Residential
Chrysene	6.1 mg/kg	EPA PRG Residential
Dibenz(a,h)anthracene	0.062 mg/kg	EPA PRG Residential
Fluoranthene	2,300 mg/kg	EPA PRG Residential
Fluorene	2,600 mg/kg	EPA PRG Residential
Indeno(1,2,3-cd)pyrene	0.62 mg/kg	EPA PRG Residential
Naphthalene	56 mg/kg	EPA PRG Residential
Pyrene	2,300 mg/kg	EPA PRG Residential
Polychlorinated Biphenyls (PCB):		
Aroclor 1016	3.9 mg/kg	EPA PRG Residential
Aroclor 1221	0.22 mg/kg	EPA PRG Residential
Aroclor 1232	0.22 mg/kg	EPA PRG Residential

[1] Maximum concentrations in Table A.3 for solids are based on USEPA Preliminary Remediation Goals (PRG) for residential use, USEPA Preliminary Remediation Goals (PRG) for upland ecological exposure, or local background soil concentrations. The PRG screening values are based on risk assessment of common exposure pathways in a residential environment or common exposure pathways for wildlife exposure to constituents in the soil. If the solids concentrations are exceeded, beneficial reuse options may be restricted or the Discharger may submit a technical report that demonstrates a risk assessment based on expected exposure routes due to dredged material placement.

[2] The mean solids concentration of the sediment shall not exceed the mean solids concentration of the background soils from the Delta based on a statistical comparison using an approved Title 27 statistical method.

Discharge Applicability Table Part 1 (Continued): Applicability of sediments for upland disposal

Constituent	Max. Concentration of solids analysis[1] (dry weight)	Reference:
Aroclor 1242	0.22 mg/kg	EPA PRG Residential
Aroclor 1248	0.22 mg/kg	EPA PRG Residential
Aroclor 1254	0.22 mg/kg	EPA PRG Residential
Aroclor 1260	0.22 mg/kg	EPA PRG Residential
Organochlorine Pesticides:		
Aldrin	0.029 mg/kg	EPA PRG Residential
Alpha BHC	0.090 mg/kg	EPA PRG Residential
Beta BHC	0.032 mg/kg	EPA PRG Residential
Gamma BHC (Lindane)	0.44 mg/kg	EPA PRG Residential
Chlordane	1.6 mg/kg	EPA PRG Residential
4,4-DDD	2.4 mg/kg	EPA PRG Residential
4,4-DDE	1.7 mg/kg	EPA PRG Residential
4,4-DDT	1.7 mg/kg	EPA PRG Residential
Dieldrin	0.011 mg/kg	EPA PRG Ecological (Avian)
Endosulfan	370 mg/kg	EPA PRG Residential
Endrin	18 mg/kg	EPA PRG Residential
Heptachlor	0.11 mg/kg	EPA PRG Residential
Heptachlor epoxide	0.052 mg/kg	EPA PRG Residential
Hexachlorocylopentadienne	420 mg/kg	EPA PRG Residential
Methoxychlor	8 mg/kg	EPA PRG Residential
Toxaphene	0.44 mg/kg	EPA PRG Residential

Discharge Applicability Table Part 1: Applicability of sediments for upland disposal

Constituent	Max. Concentration of soluble constituents[2]	Reference
Arsenic (filtered)	10 µg/l	Basin Plan Objective
Barium (filtered)	100 µg/l	Basin Plan Objective
Cadmium (filtered)	5 µg/l [3]	CA & USEPA Primary MCL

[1] Maximum concentrations in Table A.3 for solids are based on USEPA Preliminary Remediation Goals (PRG) for residential use, USEPA Preliminary Remediation Goals (PRG) for upland ecological exposure, or local background soil concentrations. The PRG screening values are based on risk assessment of common exposure pathways in a residential environment or common exposure pathways for wildlife exposure to constituents in the soil. If the solids concentrations are exceeded, beneficial reuse options may be restricted or the Discharger may submit a technical report that demonstrates a risk assessment based on expected exposure routes due to dredged material placement.

[2] Soluble constituents shall be extracted using the Waste Extraction Test with either deionized water or citrate buffer, depending on the ratio of neutralizing potential to acid generating potential in the dredge material.

[3] Background levels of cadmium routinely exceed the 0.07 µg/l California Public Health Goal. It is not economically feasible to require dredge material to meet the lower Public Health Goal standard, so the drinking water MCL is used for the water quality objective in this permit.

Discharge Applicability Table Part 1 (Continued): Applicability of sediments for upland disposal

Constituent	Max. Concentration of soluble constituents[2]	Reference
Total Chromium (filtered)	50 µg/l	CA MCL
Chromium VI (filtered)	11 µg/l	Chronic aq. toxicity (CTR)
Copper (filtered)	9.0 µg/l [4]	Chronic aq. toxicity (CTR)
Lead (filtered)	2.5 µg/l [4]	Chronic aq. toxicity (CTR)
Mercury	0.05 µg/l	CTR Human Health
Nickel (filtered)	52 µg/l [4]	Chronic aq. toxicity (CTR)
Selenium	5 µg/l	Chronic aq. toxicity (CTR)
Zinc (filtered)	100 µg/l	Basin Plan Objective
pH	6.5 – 8.5	Basin Plan Objective

Discharge Applicability Table Part 2: Applicability of sediment elutriate and solids analysis for effluent discharges from the disposal site and dredge site impacts.

Constituent	Max. Concentration of soluble constituents[5]	Reference
Arsenic (filtered)	10 µg/l	Basin Plan Objective
Barium (filtered)	100 µg/l	Basin Plan Objective
Cadmium (filtered)	5 µg/l [3]	CA & USEPA Primary MCL
Total Chromium (filtered)	50 µg/l	CA MCL
Chromium VI (filtered)	11 µg/l	Chronic aq. toxicity (CTR)
Copper (filtered)	9.0 µg/l [4]	Chronic aq. toxicity (CTR)
Lead (filtered)	2.5 µg/l [4]	Chronic aq. toxicity (CTR)
Mercury	0.05 µg/l	CTR Human Health
Nickel (filtered)	52 µg/l [4]	Chronic aq. toxicity (CTR)
Selenium	5 µg/l	Chronic aq. toxicity (CTR)
Zinc (filtered)	100 µg/l	Basin Plan Objective
pH	6.5 – 8.5	Basin Plan Objective

[2] Soluble constituents shall be extracted using the Waste Extraction Test with either deionized water or citrate buffer, depending on the ratio of neutralizing potential to acid generating potential in the dredge material.

[3] Background levels of cadmium routinely exceed the 0.07 µg/l California Public Health Goal. It is not economically feasible to require dredge material to meet the lower Public Health Goal standard, so the drinking water MCL is used for the water quality objective in this permit.

[4] Concentration based on chronic aquatic toxicity for an average background receiving water hardness of 100 mg/l $CaCO_3$. Values may be recalculated using equations from the California Toxics Rule with justification of different receiving water hardness.

[5] Soluble concentrations shall be determined by analysis of supernatant from the modified elutriate test or standard elutriate test for Ammonia, BOD and COD.

Discharge Applicability Table Part 2 (Continued): Applicability of sediment elutriate and solids analysis for effluent discharges from the disposal site and dredge site impacts.

Constituent	Max. Concentration of soluble constituents[5]	Reference
EC (Specific conductivity)	700 µmhos/cm	Ag. Water Quality Goal
TDS (Total Dissolved Solids)	450 mg/l	Ag. Water Quality Goal
Chloride	106 mg/l	Ag. Water Quality Goal
Ammonia + Ammonium	See footnote [6]	Chronic aq. tox. (EPA NAWQC)
Tributyltin	0.063 µg/l	Chronic aq. tox. (EPA NAWQC)

For the effluent: the following water criteria are based on applicable water quality objectives including the California Toxics Rule. The solids criteria are based on two assumptions: 1) these compounds will stay sorbed to the sediments and will not partition into the water column, and 2) a maximum of 100 mg/l suspended solids will be present in the effluent. For other TSS concentrations, the solid concentration of the constituent in Table A.3 can be recalculated as: (WQ criteria/ TSS) * unit conversion.

Constituent	Max. Concentration of solids analysis (dry weight)		Max. Concentration of soluble constituents[5]	Reference
Polynuclear aromatic hydrocarbons (PAH):				
Acenaphthene	12,000 mg/kg	***or***	1,200 µg/l	CTR Human Health
Anthracene	96,000 mg/kg	***or***	9,600 µg/l	CTR Human Health
Benzo(b)fluoranthene	44 µg/kg	***or***	0.0044 µg/l	CTR Human Health
Benzo(k)fluoranthene	44 µg/kg	***or***	0.0044 µg/l	CTR Human Health
Benzo(a)pyrene	44 µg/kg	***or***	0.0044 µg/l	CTR Human Health
Chrysene	44 µg/kg	***or***	0.0044 µg/l	CTR Human Health
Dibenzo(a,h)anthracene	44 µg/kg	***or***	0.0044 µg/l	CTR Human Health
Fluoranthene	3,000 mg/kg	***or***	300 µg/l	CTR Human Health
Fluorene	13,000 mg/kg	***or***	1,300 µg/l	CTR Human Health
Indeno(1,2,3-cd)pyrene	44 µg/kg	***or***	0.0044 µg/l	CTR Human Health
Naphthalene	6,200 mg/kg	***or***	620 µg/l	Chronic aq. toxicity U.S. EPA NAWQC
Pyrene	9,600 mg/kg	***or***	960 µg/l	CTR Human Health
Polychlorinated Biphenyls (PCB):	1.7 µg/kg (Total sum)	***or***	0.00017 µg/l (Sum of PCBs in elutriate)	CTR Human Health
Organophosphorous Pesticides:				
Chlorpyrifos			0.014 µg/l	CA DFG Chronic FW Aquatic Life protection

[5] Soluble concentrations shall be determined by analysis of supernatant from the modified elutriate test or standard elutriate test for Ammonia, BOD and COD.

[6] Ammonia and ammonium concentrations will be calculated based on the pH and temperature of the receiving water according to the following formula:

$$CCC=\{[0.0577/(1+10^{7.688-pH})] + [2.487/(1+10^{pH-7.688})]\} \times \{MIN[2.85, 1.45x10^{0.028x(25-T)}]\}$$

Discharge Applicability Table Part 2 (Continued): Applicability of sediment elutriate and solids analysis for effluent discharges from the disposal site and dredge site impacts.

Constituent	Maximum concentration of soluble constituents [5]	Reference
Diazinon	0.05 µg/l	CA DFG Chronic FW Aquatic Life protection
Dimethioate	1.0 µg/l	DHS California State Action Level (toxicity)
Malathion	0.43 µg/l	CA DFG Max 1-hr conc. FW Aq. Life protection
Parathion	0.013 µg/l	USEPA NAWQC Chronic FW aquatic life
Phorate	0.7 µg/l	National Academy of Sciences Drinking Water Health Advisory

Organochlorine Pesticides:

The Basin Plan for the Sacramento River Basin and San Joaquin River Basin (Fourth Edition) 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 the Environmental Protection Agency or the Executive Officer." (pg III-6.00 of 1998 Water Quality Control Plan, Fourth Edition) The method detection limits listed below are from Table 2d of Appendix 4 of the State Implementation Plan (*Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California,* 2000).

Constituent	Max. Concentration of soluble constituents[5]
Aldrin	ND (<0.005 µg/l)
Alpha BHC	ND (<0.01 µg/l)
Beta BHC	ND (<0.005 µg/l)
Gamma BHC (Lindane)	ND (<0.02 µg/l)
Chlordane	ND (<0.1 µg/l)
4,4-DDD	ND (<0.05 µg/l)
4,4-DDE	ND (<0.05 µg/l)
4,4-DDT	ND (<0.01 µg/l)
Dieldrin	ND (<0.01 µg/l)
Endosulfan I	ND (<0.02 µg/l)
Endosulfan II	ND (<0.01 µg/l)
Endosulfan sulfate	ND (<0.05 µg/l)
Endrin	ND (<0.01 µg/l)
Endrin aldehyde	ND (<0.01 µg/l)
Heptachlor	ND (<0.01 µg/l)
Heptachlor epoxide	ND (<0.01 µg/l)
Hexachlorocyclopentadienne	ND (<0.01 µg/l)
Methoxychlor	ND (<0.1 µg/l)

[5] Soluble constituents determined by analysis of supernatant from modified elutriate test.

Figure 1: HUMAN EXPOSURE TO DREDGED MATERIAL
Values developed by USEPA as tools for evaluating and cleaning up contaminated sites
Calculates exposure levels to humans based on a common set of exposure pathways and behavior patterns

PRG
Preliminary Remediation Goals

DOES NOT consider exposure pathways from groundwater

Exposure pathways included
Ingestion of soil
Inhalation of particulates
Inhalation of volatiles
Dermal adsorption

Risk Evaluation
10^{-6} cancer risk for carcinogens
Hazard quotient=1 for non-carcinogens

*** NOTE: The EPA Preliminary Remediation Goal (PRG) was used as a screening value. The average California soil concentrations of Arsenic, Nickel and Chromium are above PRG values, so average local background soil concentrations will be used as a screening value for those constituents.

Figure 2: EXPOSURE PATHWAYS EXPLANATION: