GENERAL MAINTENACNE ORDER –EFFLUENT PROVISIONS

1. Based on information contained in the DREDGE database, the discharge may contain concentrations of aluminum as high as 5,200 µg/l. **Aluminum** can be toxic to aquatic organisms. The Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for aluminum is 87 µg/l as a 4-day average. The discharge has a reasonable potential to cause violation of the Basin Plan narrative toxicity objective. Therefore, an aluminum effluent limitation has been included in this General Order.

2. Sediments contain organic material and **Ammonia**. Dredging operations may result in the discharge of ammonia to the receiving stream. Furthermore, retention time in the confined disposal area may be insufficient to allow biological processes sufficient time to convert the ammonia to nitrate. Ammonia is known to cause toxicity to aquatic organisms in surface waters. The Basin Plan contains a narrative toxicity objective for surface water. U.S. EPA has developed Ambient Water Quality Criteria for ammonia, which is dependent on pH and the presence of salmonids. Because salmonids may be present in the Delta during dredging operations, an effluent limitation, based on the Ambient Water Quality Criteria for ammonia with salmonids present, has been included in this Order consistent with the Policy for Application of Water Quality Objectives.

3. The Basin Plan contains a chemical constituent objective for **Arsenic** of 10 µg/l in the Sacramento-San Joaquin Delta. Based on information contained in the DREDGE database, the discharge may contain concentrations of arsenic as high as 37 µg/l. The discharge has a reasonable potential to cause violation of the Basin Plan chemical constituent objective for arsenic. Therefore, an arsenic effluent limitation, based on the Basin Plan chemical constituents objective, has been included in this General Order.

4. The Basin Plan contains a chemical constituent objective for **Barium** of 100 µg/l in the Sacramento-San Joaquin Delta. The Delta waterways have been found to periodically contain barium concentrations that exceed the chemical constituent objective. Dredging operations utilize surface water for sediment transport and therefore, the discharge may contain concentrations of barium that also exceed the chemical constituent objective. The discharge has a reasonable potential to cause violation of the Basin Plan chemical constituent objective for dissolved barium. Therefore, a barium effluent limitation, based on the Basin Plan chemical constituents objective, has been included in this General Order.

5. The Basin Plan contains a Chemical Constituents objective that states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. **Boron** can be toxic to plants. The San Joaquin River is impaired for boron. Dredging operations utilize surface water for sediment transport and therefore, the discharge may contain concentrations of boron that also exceed the chemical constituent objective. The discharge of dredge material may impact water designated for agricultural supply. The *Water Quality for Agriculture*, Food and

Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985), recommends that the boron concentrations in waters used for agricultural irrigation (Agricultural Water Quality Goal) not exceed 700µg/l, since levels above 700 µg/l will reduce crop yield for sensitive plants. Applying the Basin Plan "Policy for Application of Water Quality Objectives", the limiting numeric standard that implements the narrative objective is the Agricultural Water Quality Goal of 700 µg/l. The discharge has a reasonable potential to cause violation of the Basin Plan Chemical Constituents objective. Therefore, a boron effluent limitation presented in total concentration has been included in this General Order.

6. Historical data in the DREDGE database is for total chromium and not for chromium VI. **Chromium VI** is highly soluble and is not sorbed to any significant degree by clays or hydrous metal oxides and therefore may not be adequately removed by settling in the confined disposal facility. The Delta waterways are impaired for unknown toxicity, and chromium VI is highly toxic to aquatic life. The Basin Plan contains a narrative toxicity objective. USEPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for chromium VI is 11 µg/l for the 4-day average. Applying the Policy for Application of Water Quality Objeetives, a chromium VI effluent limitation, based on the Basin Plan narrative toxicity objective, has been included in this General Order.

7. The Basin Plan contains a chemical constituent objective for **Copper** of 10 µg/l in the Sacramento-San Joaquin Delta. In addition, the CTR contains criteria for protection of freshwater aquatic life that vary with hardness. Below a hardness of 120 mg/l as $CaCO_3$, the 4-day average CTR criterion is more stringent than the Basin Plan objective. Based on information contained in the DREDGE database. the discharge may contain concentrations of copper as high as 441 µg/l. The discharge has a reasonable potential to cause violation of the Basin Plan chemical constituent objective and the CTR criteria for copper. Applying the Policy for Application of Water Quality Objectives, a copper effluent limitation, based on the Basin Plan chemical constituents objective and the CTR criteria, presented in dissolved concentrations, has been included in this General Order.

8. Dredging operations may increase the mineral content of the water as minerals are resuspended and dissolved from the dredged sediments. The salinity of water is determined by measuring **electrical conductivity (EC)**, an important parameter in determining the suitability of the water for irrigation. When water evaporates, salts accumulate. Water in the confined disposal unit is subject to evaporation, which may further increase the EC. The Basin Plan contains a constituent objective for EC is 700 µmhos/cm, as calculated on a 30-day running average, from 1 April to 31 August each year. During the time period from September 1 to March 31 of each year. the constituent objective for EC is 1,000 µhmos/cm, as calculated by a 30-day running average. An effluent limitation, based on the Basin Plan EC constituent objective, has been included in this General Order.

9. Based on information contained in the DREDGE database, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for **Lead**. Lead is a heavy metal and was detected in the elutriate samples as high as 448 µg/l. Lead toxicity to aquatic life is hardness dependent. The CTR limit for lead is 1.8 µg/l for the 4-day chronic limit at 65 mg/l hardness. In addition, lead can cause toxicity in humans. The Basin Plan prohibits toxic chemicals to be present in surface waters in toxic concentrations. The Cal/EPA Office of Environmental Health Hazard Assessment has published a Public Health Goal of 2 ug/L for lead in drinking water. Beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, which includes drinking water uses. Applying the Policy for Application of Water Quality Objectives, an effluent limit for lead, based on CTR criteria and the Public Health Goal and presented in total concentration, has been included in this Order.

10. The Basin Plan contains a chemical constituent objective for **Manganese** of 50 µg/l in the Sacramento-San Joaquin Delta. Based on information contained in the DREDGE database, the discharge may contain concentrations of manganese as high as 597 µg/l. The discharge has a reasonable potential to cause violation of the Basin Plan chemical constituent objective for manganese. Therefore, a manganese effluent limitation, based on the Basin Plan chemical constituents objective, has been included in this General Order.

11. Based on information contained in the DREDGE database, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR Standard for **Mercury.** Mercury is a bioaccumulative substance in animal tissue and can be harmful to human health. MET samples indicate that the discharge may contain concentrations of mercury as high as 4.0 µg/l. The CTR limit for mercury is 0.05 µg l for the sources of drinking water limit. Applying the Policy for Application of Water Quality Objectives, an effluent limit for mercury, based on the CTR and presented in total concentration, has been included in this General Order.

12. Based on information contained in the DREDGE database, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR Standard for **Nickel**. Nickel is a heavy metal and was detected in the elutriate samples as high as 411 µg/l. Nickel toxicity is hardness dependent. The CTR limit for nickel is 52 µg/l for the 4-day chronic limit at 100 mg/l hardness. Applying the Policy for Application of Water Quality Objectives, an effluent limit for nickel, based on the CTR and presented in total concentration, has been included in this General Order.

13. **Tributyltin** can be toxic to aquatic organisms. Based on information contained in the DREDGE database, the discharge may contain concentrations of tributyltin as high as 1,400 µg/l. The USEPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for tributyltin is 0.063 µg/l for the 4-day average. The discharge has a reasonable potential to exceed the Ambient Water Quality Criteria for tributyltin, and, therefore the narrative toxicity objective in the Basin Plan. Applying

the Policy for Application of Water Quality Objectives, an effluent limitation for tributyltin, based on the Basin Plan narrative toxicity objective, has been included in this General Order.

14. The Basin Plan contains a chemical constituent objective for **Zinc** of 100 µg/l in the Sacramento-San Joaquin Delta. CTR criteria for the protection of freshwater aquatic life also apply to the discharge. These CTR criteria vary with hardness. Below a hardness of 81 ug/L, the 4-day average criterion for zinc, as dissolved, is more stringent than the Basin Plan objective. Based on information contained in the DREDGE database, the discharge may contain concentrations of zinc as high as 31,390 µg/l. The discharge has a reasonable potential to cause violation of the Basin Plan chemical constituent objective for dissolved zinc and the CTR criteria for aquatic life protection. Applying the Policy for Application of Water Quality Objectives, a zinc effluent limitation, based on the Basin Plan chemical constituents objective and the CTR criteria, presented as dissolved, has been included in this General Order.

Pesticides

15. **Chlorpyrifos** can be toxic to aquatic organisms. Delta waters are CWA 303(d) listed for chlorpyrifos. The USEPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for chlorpyrifos is 0.014 µg/l for the 4-day average. Dredging operations utilize surface water for sediment transport, and therefore the discharge may contain concentrations of chlorpyrifos that exceed the Ambient Water Quality Criteria, and therefore, violate the narrative toxicity objective in the Basin Plan. Applying the Policy for Application of Water Quality Objectives, a chlorpyrifos effluent limitation, based on the Basin Plan narrative toxicity objective, has been included in this General Order.

16. **Diazinon** can be toxic to aquatic organisms. Delta waters are CWA 303(d) listed for diazinon. The CDFG Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for diazinon is 0.05 µg/l for the 4-day average. Dredging operations utilize surface water for sediment transport and, therefore, the discharge may contain concentrations of diazinon that exceed the Ambient Water Quality Criteria, and, therefore, the narrative toxicity objective. Applying the Policy for Application of Water Quality Objectives, a diazinon effluent limitation, based on the Basin Plan narrative toxicity objective, has been included in this General Order.

17. The Basin Plan contains a pesticide objective for OC pesticides. The Basin Plan states, "Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by either the EPA or the Executive Officer." Based on information contained in the DREDGE database, the discharge may contain OC pesticides. This General Order contains an effluent limitation prohibiting the discharge of OC pesticides at concentrations detectable within the accuracy of analytical methods.