MASTER RESPONSE NO. 8 - WATER QUALITY

This master response addresses three types of potential impacts to water quality: 1) potential impacts to indigenous groundwater quality due to the introduction of water from the Colorado River Aqueduct; 2) potential impacts to indigenous groundwater quality due to induced flow of lower quality groundwater from Bristol and Cadiz dry lakes; and 3) potential impacts to water quality in the Colorado River Aqueduct due to introduction of indigenous groundwater.

POTENTIAL IMPACTS TO INDIGENOUS GROUNDWATER QUALITY DUE TO THE INTRODUCTION OF WATER FROM THE COLORADO RIVER AQUEDUCT

Groundwater quality in California is protected pursuant to the California Porter-Cologne Water Quality Control Act. In the Cadiz Project area, water quality is regulated by the State Water Resources Control Board (State Board) and the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Board). Pursuant to its statutory authority, the Regional Board prepared and adopted its Water Quality Control Plan in 1994 (Basin Plan), which identifies surface and groundwater within its geographical jurisdiction, existing and potential future beneficial uses of those waters, and water quality objectives to protect the beneficial uses of the waters. The Bristol groundwater hydrologic unit is identified in the Basin Plan as having municipal, industrial, and agricultural beneficial uses. The Cadiz groundwater hydrologic unit has municipal and industrial beneficial uses. The Basin Plan also states the Regional Board's goal of maintaining the existing water quality of all non-degraded groundwater basins. The State Board follows a similar non-degradation policy.

The potential impacts to indigenous groundwater quality due to the introduction of water from the Colorado River Aqueduct are addressed in Section 5.5.4 of the Final EIR/EIS, Volume I. These potential impacts include transport of salts from the unsaturated soil into the indigenous groundwater, and introduction of undesirable constituents, such as TDS and perchlorate, from Colorado River water.

Results obtained during operation of the pilot spreading basin and groundwater analyses from the nearby observation wells indicate that the initial infiltration of Colorado River water will dissolve salts in the upper parts of the unsaturated zone and carry them downward to the water table (Metropolitan 1999b). Although this process would create some initially high TDS concentrations below and adjacent to the spreading basins, over time the effect would be transitory. The dissolved salts will be pumped out when water is delivered from storage or assimilated into the groundwater within the project area. Accordingly, such impacts are less than significant.

Colorado River water has a higher level of TDS (600 mg/L) than indigenous groundwater (300 mg/L) in the project area. Colorado River water also has levels of perchlorate (up to 9 μ/L) that are higher than the indigenous groundwater, although they are lower than state action levels. As a result, storage operations will result in an increase in groundwater concentrations of these constituents. However, this effect will be limited to the area of groundwater mounding caused by the project spreading operations. Selected project production wells will be screened in the permeable upper alluvial sediment to ensure the extraction of the stored water, along with the higher levels of TDS and perchlorate. During periods of prolonged storage of Colorado River water in the aquifer system, the project wellfield would be operated to manage the stored Colorado River water to prevent it from migrating outside the zone of influence of the extraction wellfield. Any increase in TDS or perchlorate concentrations within the project area groundwater will be small and will not affect compliance with beneficial groundwater uses (municipal, industrial and agricultural) in or adjacent to the project area.

The Cadiz Project will be operated in accordance with the provisions of the Groundwater Monitoring and Management Plan (Final EIR/EIS, Volume IV). These provisions include the requirement that operations meet the requirements of the Regional Board's Basin Plan. (Final EIR/EIS, Volume IV, Section 7.2.1) Future updates of the applicable Basin Plan may alter the requirements that Cadiz Project operations must meet.

The monitoring provisions of the Management Plan include regular water quality testing. During storage operations, the quality of Colorado River water will be monitored weekly at Lake Havasu. Water samples from project area wells will also be tested on an annual or semi-annual basis. Should the storage of imported Colorado River water present a potential violation of the Basin Plan, Metropolitan will implement corrective measures that may include curtailing delivery of Colorado River water, treating the water prior to storage, or such other measures as may be required by the Regional Board.

In addition to the above provisions, the Management Plan requires the implementation of a Closure Plan (Final EIR/EIS, Volume IV, Section 8). The overall purpose of the Closure Plan is to ensure that no residual effects of project operations will result in adverse impacts to critical resources in or adjacent to the project area and to protect groundwater quantity and quality for future beneficial uses in and adjacent to the project area. If delivery of Colorado River water into the Basin is determined to be necessary as a corrective measure to avoid long term impacts, the water will meet the water quality requirements of the Basin Plan so that there is no impairment of the groundwater for beneficial use.

Operation of the Cadiz Project in accordance with the provisions of the Management Plan will protect groundwater resources within the project area. Accordingly, adverse impacts to groundwater quality as a result of project operations will be less than significant.

POTENTIAL FOR IMPACTS TO INDIGENIOUS GROUNDWATER QUALITY DUE TO INDUCED LOW OF LOWER QUALITY GROUNDWATER FROM BRISTOL AND CADIZ DRY LAKES

The potential impacts from migration of lower-quality groundwater from the Bristol and Cadiz dry lakes is discussed in Section 5.5.4 of the Final EIR/EIS, Volume I. Such an occurrence is not likely to result from project extraction operations. The location of the saline groundwater interface (defined by the 1,000 mg/L TDS concentration line) was determined using groundwater data from wells in the vicinity of the project area. Regular monitoring of potential movements of this saline groundwater interface will be undertaken as part of the Management Plan (Final EIR/EIS, Volume IV, Section 7.2.6). A measured change in excess of 25% of background TDS concentrations will be evaluated and if appropriate, corrective measures will be implemented. Corrective measures may include modification of project storage and extraction operations to re-establish the natural hydraulic gradient and background TDS concentrations at the margins of Bristol and Cadiz dry lakes.

Operation of the project in accordance with the Management Plan will avoid adverse impacts to the fresh water aquifer in the vicinity of the project area due to movement of the saline groundwater interface.

POTENTIAL IMPACTS TO WATER QUALITY IN THE COLORADO RIVER AQUEDUCT DUE TO INTRODUCTION OF INDIGENOUS GROUNDWATER

The potential impacts to water quality in the Colorado River Aqueduct due to introduction of indigenous groundwater are analyzed in Section 5.5.4 of the Final EIR/EIS, Volume I. Potential

impacts include increased concentrations of bromide, arsenic, hexavalent chromium, and nitrates. Introduction of indigenous groundwater can provide water quality benefits through the reduction of certain constituents, such as TDS and perchlorate. Although introduction of indigenous groundwater into the Colorado River Aqueduct would raise concentrations of some undesirable constituents, these constituent levels in the Colorado River Aqueduct will not appreciably increase and will not affect the ability to meet drinking water standards. Accordingly, adverse impacts to water quality in the Colorado River Aqueduct will be less than significant.

Several comments expressed concern regarding the existence of hexavalent chromium in the indigenous groundwater. Sampling and analysis of groundwater yielded values in the range of approximately 0.015 mg/L (15 ppb) to 0.026 mg/L (26 ppb). The distribution of the groundwater samples within the project area, and the similarity in values to other groundwater basins, suggest that the hexavalent chromium in the groundwater is a natural phenomenon, unrelated to industrial or man-made causes. There are no applicable standards for hexavalent chromium in drinking water, but the state standard for total chromium in drinking water is 50 ppb (a federal standard of 100 ppb applies to total chromium in drinking water). The California Department of Health Services and the U. S. Environmental Protection Agency consider the drinking water standards for total chromium to be protective from the effects of hexavalent chromium. The Cadiz Project will include routine monitoring for this constituent and the delivery of water from the groundwater basin will comply with any future applicable federal or state standards.