Impacts to Soils and Vegetation

The Marsh Landing Generating Station (MLGS) site has been historically used as a power plant since 1952 and is surrounded by other industrial and commercial uses. Much of the area is developed, lacking natural soils, vegetation and habitat.

Many of the soils found in the vicinity of the project are hydric (high moisture) soils associated with the floodplains, marshes and wetlands adjacent to the San Joaquin River. Delhi Sands cover most of the project site and surrounding area (including the areas of the proposed water lines and treatment facility at Bridgehead Lift Station). Delhi Sands while not hydric soils, are typically associated with floodplains and alluvial fans. The remaining areas are largely mucky soils, which are high in organic material content and associated with the shoreline marshes.

Soil types present offsite include: Joice Muck, Shima Muck , Sycamore Silty Clay Loam, Zamora Silty Clay Loam, Fluvaquents, Gazwell Mucky Clay, Medisaprists, Rindge Muck and Rindge Mucky Silt Loam, and Xeropsamments. Absent from this area are nutrient-poor soil types such as are associated with rock outcroppings found in other, higher elevations in the Bay Area. Therefore, potential deposition of nitrogen-based nutrients from the air will not cause a significant increase in the nutritive properties of the local soils.

Natural vegetation communities within a one-mile radius around the project site include: freshwater wetlands, riparian woodland, woodlands, stabilized interior dunes, tidal marshes, and annual grassland. The majority of the area south of the project site, however consists of disturbed/ruderal grasslands, agriculture, landscaping, and developed areas.

Several special-status species are known to occur near the project site. Federal special-status plants that are known to occur or could potentially occur within one mile of the project area include the Antioch Dunes Evening Primrose (*Oenothera deltoides* ssp. *howellii*) and the Contra Costa Wallflower (*Erysimum capitatum* ssp. *angustatum*). Neither of these plants occurs on the project site. Central Valley steelhead (*Oncorhynchus mykiss*), Central Valley spring-run and winter-run Chinook salmon (*Oncorhynchus tshawytscha*), green sturgeon (*Acipenser medirostris*) and Delta smelt (*Hypomesus transpacificus*) are also known to occur within one mile, within the San Joaquin River. The river will not be impacted as a result of this project.

The maximum project 1-hour average nitrogen dioxide (NO_2) concentration estimated by modeling emissions, corresponding to the turbine startup conditions, is 75.3 $\mu g/m^3$. When added to the maximum monitored local background concentration of 122.1 $\mu g/m^3$, the resulting total of 197.4 $\mu g/m^3$ is below the California Ambient Air Quality Standard of 339 $\mu g/m^3$. The maximum project annual average NO_2 concentration estimated by modeling is 0.3 $\mu g/m^3$. When added to the maximum monitored local background concentration of 22.4 $\mu g/m^3$, the total of 22.7 $\mu g/m^3$ is below the California Ambient Air Quality Standard of 57 $\mu g/m^3$. NO_2 has been shown to be potentially harmful to vegetation but at much higher concentrations than these as discussed below.

EPA has established a screening procedure for determining impacts to plants, soils and animals (EPA 450/2-81-078, "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals," December 1980). Table 3.1 of this EPA guidance document lists screening concentrations for various pollutants, representing minimum concentrations at which adverse growth effects or tissue injuries have been reported in the scientific literature. Shown in Table 1 below is a comparison of the screening concentrations from the EPA document and the modeled impacts from MLGS. Note that we have made very conservative comparisons using the highest modeled short-term (hourly) NO_2 concentrations, even when the screening threshold concentrations are expressed in 4-hour, 8-hour or monthly averages. Despite this conservatism, maximum predicted concentrations, including background levels, remain far below the screening criteria.

Table 1
Screening Assessment of MLGS Impacts of Soils and Vegetation

Pollutant	Screening Concentration[a] ($\mu g/m^3$)	Averaging Period	MLGS Maximum Modeled Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total (MLGS impact plus background) ($\mu g/m^3$)	Averaging Period for Comparison
NO_2	3,760	4-hr	75.3	122.1	197.4	1-hr
	3,760	8-hr	75.3	122.1	197.4	1-hr
	564	1 month	75.3	122.1	197.4	1-hr
	94	1 year	0.3	22.4	22.7	Annual
CO	1,800,000	1 week	115	2,222	2,337	8-hr

[a]EPA 450/2-81-078, "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals," December 1980

Table 1 also shows similar comparisons of modeled concentrations and screening levels for carbon monoxide (CO). Sulfur dioxide (SO_2) impacts from MLGS are very low due to the exclusive use of pipeline quality natural gas fuel and will not result in any significant impacts to soils and vegetation.

The ground level concentrations of NO_2 and CO emissions resulting from MLGS operation would be well below the threshold concentrations shown in Table 1 that have been found to have negative impacts on soils or vegetation. Accordingly, the MLGS project will not result in any significant impacts to soils or vegetation.

The deposition of airborne particulates (PM_{10}) can affect vegetation through either physical or chemical mechanisms. Physical mechanisms include the blocking of stomata so that normal gas exchange is impaired, as well as potential effects on leaf adsorption and reflectance of solar radiation. Deposition rates of 365 g/m^2/year have been shown to cause damage to fir trees, but rates of 274 g/m^2/year and 400-600 g/m^2/year did not damage vegetation at other sites (Lerman, S.L. and E.F. Darley. 1975. Particulates, pp. 141-158. In: Responses of plants to air pollution, edited by J.B. Mudd and T.T. Kozlowski. Academic Press. New York.).

The maximum annual predicted concentration for PM_{10} from the MLGS is 0.08 µg/m^3. Assuming a deposition velocity of 2 cm/sec (average deposition velocity, as measured by the California Air Resources Board [CARB] "Lake Tahoe Atmospheric Deposition Study", September 2006, p. 4-71 for PM_{08} www.arb.ca.gov/research/ltads/final/ch4.pdf) this concentration converts to an annual deposition rate of 0.05 g/m^2/year, which is several orders of magnitude below the level that is expected to result in injury to vegetation (i.e., 365 g/m^2/year).

The addition of the maximum predicted annual particulate deposition rate resulting from MLGS emissions plus the maximum recorded background local concentration of 22 µg/m_3, measured at the nearest monitoring station, yields a total estimated particulate deposition rate of 13.9 g/m^2/year, utilizing the same 2 cm/sec deposition velocity. This total is still more than an order of magnitude less than levels expected to result in plant injury.