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Effluent discharges to the Southern California Bight from power generating stations in 2005

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ABSTRACT

Nearly 17 million residents consume an average of 122 million megawatts of electricity per year in the counties bordering the Southern California Bight (SCB). Thirteen power generating stations (PGS) located along the coast of the SCB help to meet this regional electricity demand. Twelve of the facilities are powered by conventional fossil fuels, primarily natural gas, and one is powered by nuclear fuel. Each facility uses seawater or estuarine water drawn from adjacent water bodies to dissipate heat generated in the electricity production process. The cooling water is then discharged along with waste streams produced within the plants. The intake and discharge of once-through cooling water results in several impacts, including impingement and entrainment of aquatic organisms, thermal pollution, and discharge of contaminant loads. This study focuses on the contaminant loads from PGS in 2005 and continues an ongoing series of assessments of point sources discharge emissions and trends in the SCB. Combined discharges of cooling water and in-plant wastes from PGS totaled 7 trillion liters in 2005. This volume was 4 times greater than the 1.7 trillion liter effluent volume discharged by municipal wastewater treatment plants, historically the largest point source of contaminants to the SCB. Mass loads of several metals and organic constituents from PGS combined discharges were greater than from any other point source, including 180 metric tons (mt) of arsenic, 104 mt of zinc, and 167 mt of phenols. The majority of the volume and constituent loads from PGS result from the discharge of cooling water. Cooling water accounted for over 99% of the total PGS discharge in 2005; with in-plant wastes contributing just 0.11% of the combined discharge. Constituent mass emissions from in-plant wastes were similarly minor, generally contributing less than 1% of the loads discharged in the combined effluent. California recently adopted a statewide policy to reduce the use of once-through cooling water by existing PGS facilities. The policy requires each facility to reduce intake of cooling water by 93%, primarily to address the impacts of impingement and entrainment of aquatic organisms. The restriction of cooling water use will also significantly decrease the volume and constituent loads from PGS discharges in the future.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2010AnnualReport/ar10_015_028.pdf