

TA03

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SECTION I - PURPOSE

The purpose of this report is to provide comprehensive conceptual definition and justification for the Chemical Reduction Facility, TA-3 Steam Plant at Los Alamos, New Mexico. A preliminary estimate is included.

SECTION II - GENERAL DESCRIPTION

The TA-3 power plant was constructed in 1970. Its three boilers can produce 360,000 lbs/hr of 420 psi, 750°F steam for heating and power generation. Essential heating needs of the TA-3 Area of the Los Alamos Scientific Laboratory and certain public buildings in the Los Alamos Community are provided from this plant which also has a capability for generating 20 MW of electrical energy. Necessary cooling for the power house condensers is provided by a recirculating cooling water system.

Corrosion inhibitors of the blended chromate-phosphate-silica type have been used in this cooling water system for approximately 20 years, with an annual corrosion penetration rate of 0.1 to 0.3 mils/year. Cooling tower blowdown (approximately 288,000 gallons/day) contains toxic chromate in the hexavalent form with concentrations up to 14 parts per ~~million~~ of the polluted cooling water is made to the head ~~of the canyon~~ an intermittent water course which enters the Rio Grande approximately 3 miles south of Otowi Bridge. Daily flow in Sandia Canyon from cooling tower blowdown and discharge from the TA-3 power plant is limited to the upper 3 miles of the canyon's 10 mile length.

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Only when occasional summer cloudbursts occur does runoff in Sandia Canyon reach the Rio. There is no evidence to indicate that significant amounts of hexavalent chromium reach the Rio Grande in soluble form. It is more likely that it is absorbed on the surface of clay and soil colloids due to ion exchange in the area where the surface flow disappears underground. The modified soil particles may then be transported to the Rio Grande as highly dispersible sediments. Sedimentation studies have not been made.

An immediate hazard to wildlife and, more remotely, to humans, exists in the upper 3 miles of Sandia Canyon characterized by marshy meadows and/or surface stream flow because of the toxic qualities of the hexavalent chromium. The common level of concentration after dilution with some plant effluent is 7-15 ppm. It is understood that the State of New Mexico does not have a standard limit on hexavalent chromium at this time but is considering a limit of .05 ppm.

Under this project it is proposed to utilize the process of (1) pH reduction with sulfuric acid, (2) reduction of the hexavalent chromium to trivalent chromium with sulfur dioxide and (3) the precipitation of the chromium, zinc and phosphate by lime or caustic soda in lagoons to provide settling and storage of the precipitate.

no mention of zinc & phosphate