September 1, 1995

FILE

MEMO TO: BOARD OF DIRECTORS

THROUGH: FRANKLIN WHITE

NTEROFFICE MEMO

FROM: STAN PHERNAMBUCQ

SUBJECT: ENVIRONMENTAL SAFETY OF SODIUM SILICATE CHEMICAL GROUT

Los Angeles County Metropolitan Transportation Authority

ISSUE: DATE OF REQUEST - 3/19/95

An inorganic chemical grout, known as Sodium silicate, was proposed for use as soil stabilization. Alternate Board Member Mike Bolke expressed concern as to the environmental safety in using chemical grout.

BACKGROUND

This report discusses the construction material known as sodium silicate grout. This is an inorganic chemical grout that is commercially used to stabilize soils adjacent to shafts, tunnels and excavations. The grout is a proven means to increase strength, and stiffness of predominantly granular soils.

In the past, concern about environmental effects from the use of organically based chemical grouts has led to a shift in preference from organically based grouts to the more environmentally favorable inorganic chemical grouts. The literature indicates that this material is now used in over 90% of chemical grouting applications. As an example, the literature indicates that more than 6 million liters of sodium silicate based grout were injected into the earth in 1993, for soil stabilization purposes. Sodium silicate grout has been used in the Segment 2 Red Line construction program as a means to stabilize granular soils for the prevention of further settlement.

A cursory literature search was conducted into the chemical composition and the use of inorganic chemical grout for soil stabilization. The following are findings of the search:

1. Sodium silicate grout is a commercially accepted means to stabilize soils, and is used in over 90 % of all chemical grout applications.

2. Sodium silicate grouts for soil stabilization are more environmentally acceptable than organic chemical grouts.

3. Not unlike the mixing of concrete, precautions are recommended to protect the construction workers from the alkaline nature of the grout and reagent products as they are mixed and handled, prior to placement.

4. Sodium silicate grout has no known chronic hazard, and is not listed by regulatory agencies as a carcinogen.

5. The reagent components of the grout are not listed as carcinogens, according to MSDS forms supplied by the Contractor. Chemical grout may result in elevated levels of alkalinity, and will contain residual grout reagent, in the soil where grout has been placed. The presence of alkalinity is also common to the universal use of concrete in building and construction projects.

6. The current annual usage of sodium silicate grout in California is estimated at 1.5 million gallons. The annual usage of sodium silicate grout in the nation is estimated at 2 to 3 million gallons.

As a result of the literature search, we conclude that the effects of sodium silicate chemical grout are no different than other universally used building and construction materials, such as concrete (for foundations, structures and slabs), and asphalt products (for pavements).

RG:kld [Box.doc]