Memorandum to File

SUBJECT: Laboratory application and testing of Chemotex #81 Coating

BACKGROUND:

In FEB. 1990, the Paint Technology Center, received two samples and the attached letter from Mr. George Wise, Chem-Tek, Inc. At Mr. Wise's request, testing of the two-1 quart samples of Chemotex #81 (one gray, one red) was begun on 21 MAR 1990. Tests were selected to confirm claims in product literature and to determine if the submitted products were equal to or superior to the products currently used by the Corps.

SURFACE PREPARATION AND PAINT APPLICATION:

Steel surfaces were prepared in a laboratory abrasive blast cabinet. Measured surface profile (replica tape method) was in the 1.5 to 2.2 mil range.

All coatings were spray applied using a pressure pot, MBC type gun manufactured by DeVillbis. An "E" tip and needle, and a #765 air cap was used.

Four sets of panels were labeled 2906, 2907, 2908, and 2909 and then coated. Panel set 2906 was coated with Chemotex gray as a single coat system. The material was thinned 15% with mineral spirits as per the manufacturer's recommendation. A dry film thickness (DFT) of approximately 6 mils was obtained. Application of material was easily accomplished and a higher film build would have been possible.

Panel set 2907 was aluminum metallized (flame-spray application) and then coated with the red primer. A DFT of 6-8 mils was observed. The material was thinned 15% with mineral spirits.

The panels labeled 2908 were aluminum metallized (flame-spray application) and then a double coat system, using red primer and grey topcoat, was applied. A 24 hour drying period was allowed before the application of the topcoat. A DFT of 8-10 mils was produced for the total system. Both materials were thinned 15% with mineral spirits.

Coatings were applied to panels labeled 2909 after the blasted steel panels were dipped in water. After the primer was applied, a 24 hour waiting period was allowed before the application of the topcoat. The DFT for the two coat system proved to be in the 8-10 mil range. Both the red and the grey materials were thinned 15% with mineral spirits.

After a cure time of one week, a diagonal cut approximately 3 inches long was made on the lower half of one side of each panel. This cut extended from the surface of the coating through to the substrate.

EXPOSURE:

Following application and cure, test panels were placed in the following exposures on SEP 21, 1990.

a. immersion in warm (85^0 F) aerated tap water
b. immersion in cold (70^0 F) aerated tap water
c. immersion in cold (70^0 F) aerated synthetic sea water (ASTM D 1140)
d. atmospheric exposure (ASTM G 7; 45^0 south, Champaign, IL.)

OBSERVATIONS:

Panels were given a final evaluation to observe any signs of failure. Any noted signs of failures included: color variations, blisters, poor adhesion (e.g., peeling or flaking of the coating), any difference in texture, and the presence of "chalking" or any other abnormal films on the surface.

It was noted one week after application that all coatings remained very soft, and when light pressure was applied to the coated panels fingerprints were left behind in the film.

On DEC 3, 1993 all panels were removed from their respective exposure environments and evaluated:

a. Panels 2906 exhibited a very weak, poorly adherent coating. It was easily removed with light to moderate thumbnail pressure. Corrosion on the tap water panels was limited to the scored area only. Fine mud cracking was also apparent on the backside of one panel.
b. Panels 2907 also exhibited a very weak and brittle coating. Adhesion on the tap water panels was poor, and the film could easily be disbonded from

the substrate with light jack-knife pressure. The area around the score was heavily undercut.

c. On panels 2908 the topcoat and primer were both very brittle and weak. The coating on the tap water panels lifted off easily when a knife adhesion test was performed. Both the topcoat and primer were very powdery. Heavy undercutting at the scored area was also apparent.

d. On panels 2909 the topcoat and the primer were both very brittle and weak. A knife adhesion test on the tap water panels showed the adhesion to be poor with paint flaking off easily with light pressure. Undercutting at the scored area was also present. No underfilm corrosion was exhibited.

CONCLUSION:

The system which the Army Corps. of Engineers currently employs for atmospheric exposures (CWGS-09940-System #2) was found to be superior than the submitted products.

System #2 consists of a prime coat of SSPC 25 and a topcoat of TT-P-38. This system was not designed was use underwater, but rather is used in atmospheric exposure conditions. Any coatings which are used underwater must be much more abrasion resistant than the submitted products due to the floating debris and ice flows commonly found on Corps of Engineers hydraulic structures.

The coatings in the damp steel application also exhibited very poor characteristics. The coating itself proved to be much too weak, other proprietary coatings have been proven to perform much better for damp surface painting.