PTL

CLIENT:

XYPEX CHEMICAL CORPORATION

125020 VICKERS WAY

RICHMOND, B.C., CANADA V6V1H9

ATTENTION: MR. MARK MAINWARING

SUBJECT:

EXPOSURE OF XYPEX TREATED CONCRETE TO GAMMA RADIATION

PREPARED BY:

PACIFIC TESTING LABORATORIES

3220 - 17TH AVENUE WEST

SEATTLE, WASHINGTON 98119

OCTOBER 22, 1982

CERTIFICATE NO. 8209-5025

PREPARED BY: Gregory D. Strand

GREGORY D. STRAND
CIVIL ENGINEER, E.I.T.

APPROVED BY: James C. Freeling

JAMES C. FREELING, P.E.
VICE-PRESIDENT, ENGINEERING

APPROVED BY: George R. Knight

DR. GEORGE R. KNIGHT, P.E.
PRESIDENT

PACIFIC TESTING LABORATORIES STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER

EXPOSURE OF XYPEX TREATED CONCRETE TO GAMMA RADIATION

SYNOPSIS

As requested, Pacific Testing Laboratories has completed an adhesion/radiation tolerance test on a Xypex treated concrete block in accordance with ASTM D-3359-78, "Adhesion of Coating Films to Substrates." Visual examination, photographic documentation, and the adhesion test performed on the Xypex treated sample do not indicate any visible changes or damage due to exposure to 5.76×10^4 rads of gamma radiation.

SAMPLE IDENTIFICATION

The sample (6 inch diameter x 2 inch thick) used for the adhesion test was cast according to ASTM standards by Pacific Testing Laboratories. Upon agreement with the client, it was decided to use 2,000 psi concrete with the following mix design:

	PER CUBIC YARD
7/8 inch max. aggregate	2,035 lbs.
Sand	1,355 lbs.
Type I cement	470 lbs.
Ad. mix	-
Slump	3 inches
Sampling conditions	70 deg. sunny
28 Day breaking strength	3,410 psi

(Average of three samples air-dried for 28 days)

The sample was brought to Pacific Testing's Seattle laboratory after being allowed to field air dry for 24 hours, and given a coat of Xypex chemical treatment (approximately one - two mm thick).

TEST METHODS AND PROCEDURES

Three, one inch squares were marked on the concrete block (see photographs). The squares were then examined and photographed at 5X, and 10X magnification. An adhesion test was then run on the two squares, marked B & C, according to ASTM D-3359-78. Each of the two squares was given a rating of 4B, according to the amount of coating removed during the test. The grids used for the adhesion test on B & C were given a visual examination and phtotographed at 5X and 10X magnification prior to and after applying the pressure sensative

tape used in the adhesion test. The concrete block was then exposed to a Cobalt 60 source of gamma radiation for a length of time sufficient to receive the required 5.76×10^4 rads exposure.

After irradiation Square "A" on the specimen was examined and photographed at a 10X magnification. The grid required for the adhesion test was then cut into Square "A" and photographed at 5X magnification. The adhesion test was then performed on Square "A", and photographs were taken at 5X magnfication for examination. The sample Square "A" showed no visible changes or damages due to the exposure to the gamma radiation and also recieved an ASTM D-3359-78 rating of 4B.

The following defects, as listed in U.S.A. Standard No. N6.9-1967 "Protective Coatings (Paints) for the Nuclear Industry," were particularly evaluated.

A. Fine-line cracking (ASTM D661-44) - No cracking observed.

B. Checking (ASTM D660-44) - No checking observed.

C. Alligatoring - No alligatoring observed.

D. Mud cracking (ASTM D661-44) - No mud-cracking observed.

E. Embrittlement - Not applicable. The Xypex material, according to available technical literature, does not act strictly as a surface covering, but rather a treatment which is absorbed into the voids and capillaries of the concrete, later filling these areas with crystalline structures.

F. Bubbling - Not applicable. See No. "E" above.

G. Blistering (ASTM D714-56) - Not applicable. See No. "E" above.

H. Orange Peeling - Not applicable. See No. "E" above.

I. Catalyst Migration - Not applicable. See No. "E" above.

J. Flaking (ASTM D772-47) - No flaking observed.

K. Chalking (ASTM D659-44) - No chalking observed.

L. Discoloration - No discoloration observed.

M. Delamination - No delamination observed. (see description of adhesion test above.

TEST RESULTS

Visual comparison, photographs, and the adhesion test performed on the Xypex coating both before and after exposure to 5.76×10^4 rads of gamma radiation do not reveal any perceptible ill effects or damages; in particular, those defects listed under "Test Methods and Procedures." Please refer to the enclosed photographs for comparisons.