Northeast
Utilities System

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February 29, 1996

Docket No. 50-423
B15519

Re: IR 50-423/94-21

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Millstone Nuclear Power Station, Unit No. 3
Update on Erosion of Cement from the
Millstone Unit No. 3 Containment Mat

In response to a request by the NRC Staff,[1] Northeast Nuclear Energy Company (NNECO) provided information by a letter dated October 14, 1994,[2] regarding the effort to resolve the issue of erosion of the containment mat porous concrete.

The October 14, 1994, letter stated that the schedule to complete the testing and assimilate and evaluate all the empirical data will allow for NRC review during the first quarter of 1996. However, due to the changes described below, the completion of the phase III testing and a complete report with the detailed test parameters and results for NRC's review is now targeted for December 1996. The following is an update on the current mock-up testing:

Audit Item No. 1

The placement of the phase III mock-up test molds, which simulate the "as-built" construction of the containment foundation, was completed in June of 1995. The time dependent compressive strength tests completed to date indicate that there is no discernable trend in concrete strength reduction as a result of the water flows introduced into the test molds. Attachment 1 to this letter describes the construction of the mockup test molds and the testing sequence. Attachment 2

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(1) U.S. Nuclear Regulatory Commission letter to J. F. Opeka, "NRC Inspection Report No. 50-423/94-21," dated August 11, 1994.

(2) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 3, Response to Inspection Report 50-423/94-21, Erosion of Cement from the Millstone Unit No. 3 Containment Mat," dated October 14, 1994.

A001

provides the results of the time dependent compressive strength results of the porous concrete core samples. NNECO has conservatively decided to extend the time dependent compressive strength tests for the full 12 months duration to gain all the information possible from the molds.

Audit Item No. 2

This item will be completed once the time dependent compressive strength data is available and long term effects can be assessed.

Audit Item No. 3

The feasibility of drilling a boring through the existing fault plane which could act as a piezometer has been reviewed. The congestion of permanent plant equipment and underground utilities in the area impede the potential area where the fault plane could be accessed. Since the exact location of all the underground facilities is not known, NNECO concludes that the drilling of the holes would involve some risk to the underground utilities which could be interrupted during drilling operations.

Furthermore, NNECO has initiated a study to determine the correlation between surface rain fall data, Long Island Sound tide levels and the quantity of water removed from the containment underdrain sumps. Since this study will provide an assessment of the source of the water entering the sumps, and does not involve any risk associated with the drilling of bore holes, it has been determined to be a more prudent course of action.

Commitments

The following is NNECO's commitment made within this letter. Other statements within this letter are provided as information only.

B15519-1 The completion of the phase III testing and a complete report with the detailed test parameters and results for the NRC's review is now targeted for December 1996.

If the NRC Staff should have any questions or comments regarding this matter, please contact Mr. W. J. Temple at (860) 437-5904.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

E. A. DeBarba
Vice President - Nuclear Technical Services

cc: T. T. Martin, Region I Administrator
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3
A. C. Cerne, Senior Resident Inspector, Millstone Unit No. 3
M. C. Modes, Chief Materials Section, Division of Reactor Safety

Docket No. 50-423
B15519

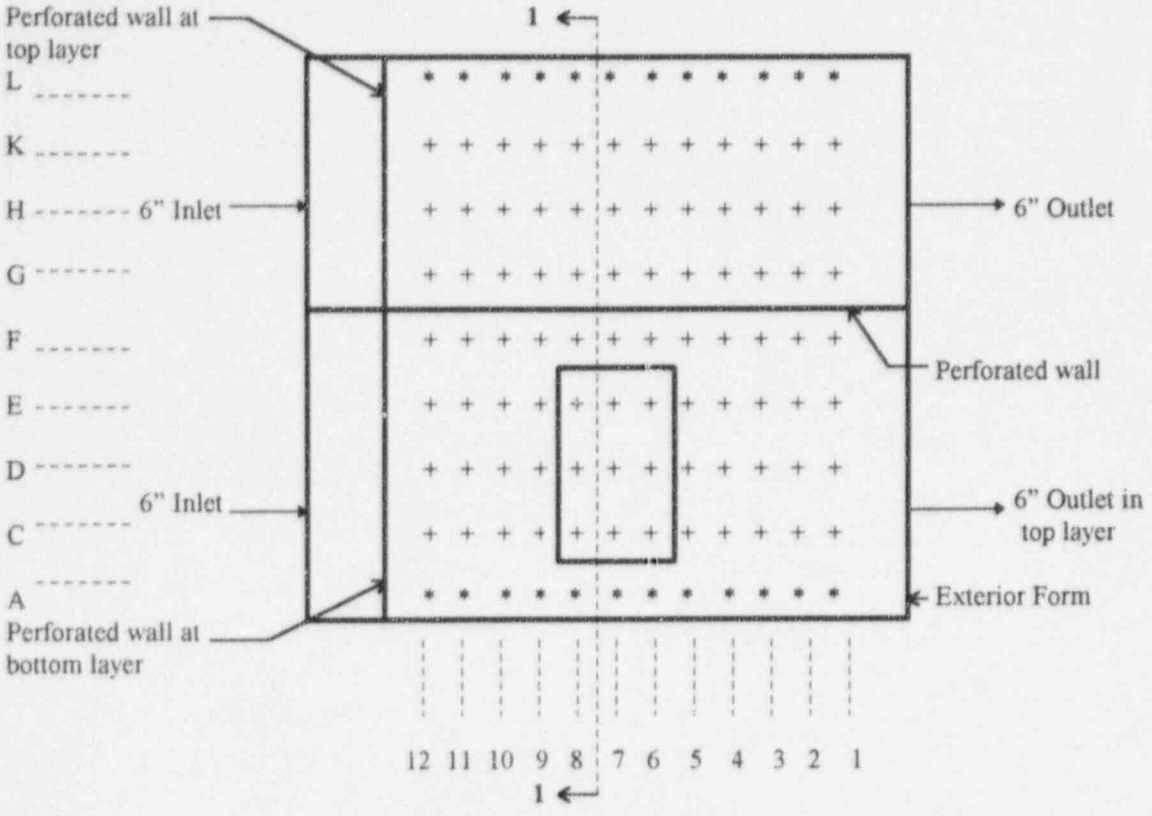
Attachment 1

Millstone Nuclear Power Station, Unit No. 3

Update on Erosion of Cement from
the Millstone Unit No. 3 Containment Mat

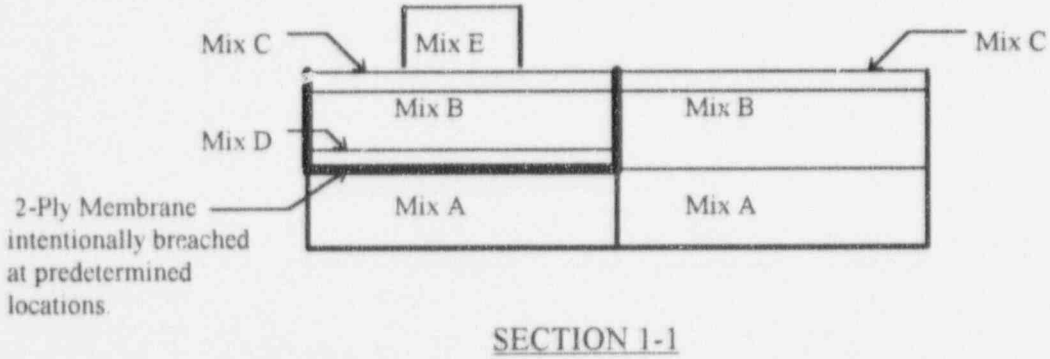
Phase III Mock-up Test Molds and Testing Sequence

February 1996



PLAN VIEW TEST MOLD

+ Indicates location of proposed core bore
* Indicates location of inserted metal cage, as contingency



SECTION 1-1

Mix A-Porous Portland Concrete (1000 psi Design Strength)
Mix B-Porous Calcium Aluminate Concrete (1000 psi Design Strength)
Mix C-Calcium Aluminate Seal Mortar
Mix D-Portland Seal Mortar
Mix E-Portland Concrete

TESTING SEQUENCE

Water is introduced into the test mold through the six inch diameter inlet pipes. A total of 28 to 47 gpm/square foot flow is run continuously through the molds for a period of a month. At the end of each month a total of 5 cores are removed from the mold, two from the area without a rubber membrane and three from the area with the rubber membrane. The cores are separated at the interface between the various types of concrete and compression tested. One set of the cores from the area without a rubber membrane is tested in confined compression, and one set is tested in unconfined compression. In the area with the membrane, one of the sets of cores is tested in confined compression and two sets are tested in unconfined compression. Time dependent cores testing results are included in Attachment 2.

Docket No. 50-423
B15519

Attachment 2

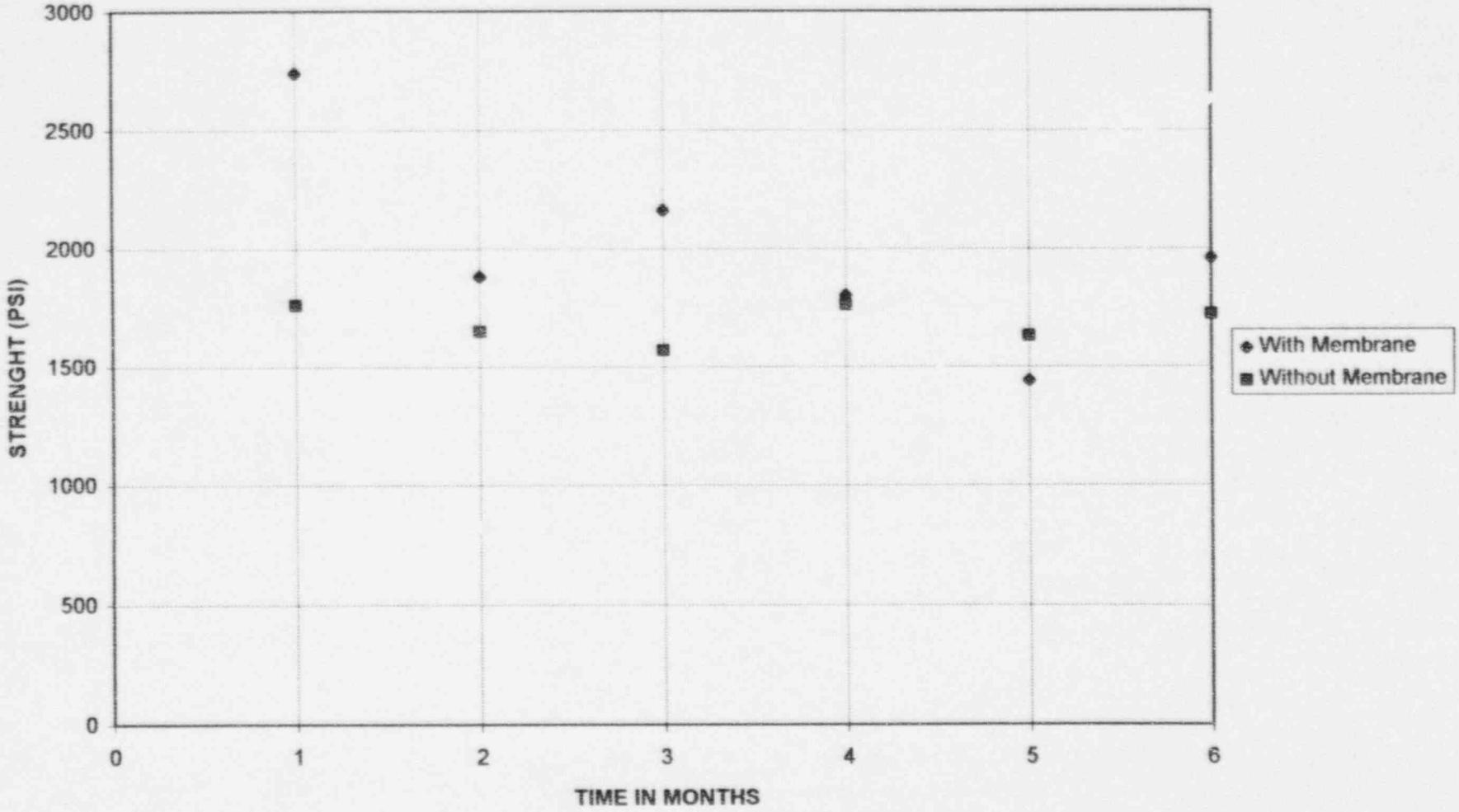
Millstone Nuclear Power Station, Unit No. 3

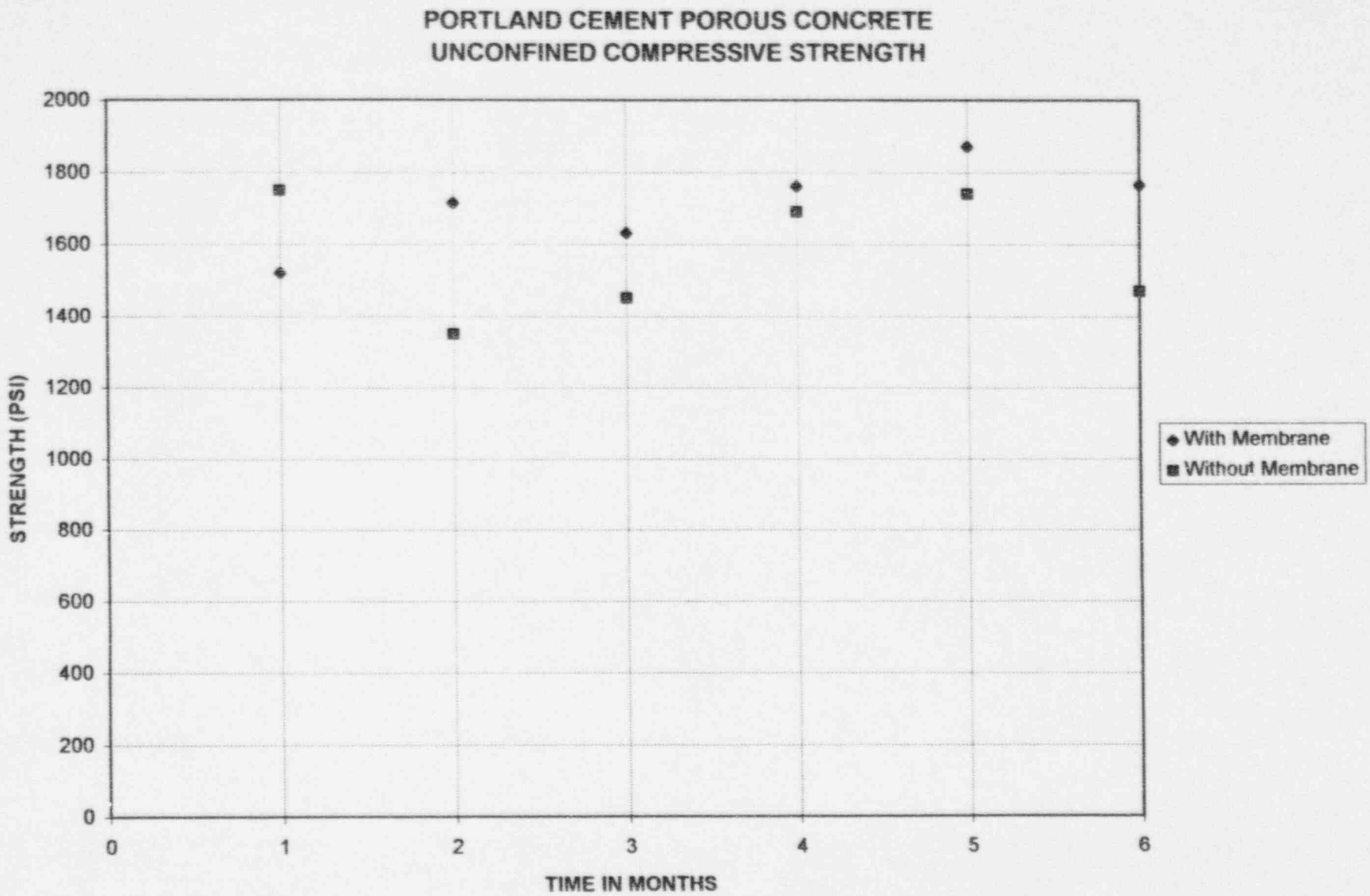
Update on Erosion of Cement from
the Millstone Unit No. 3 Containment Mat

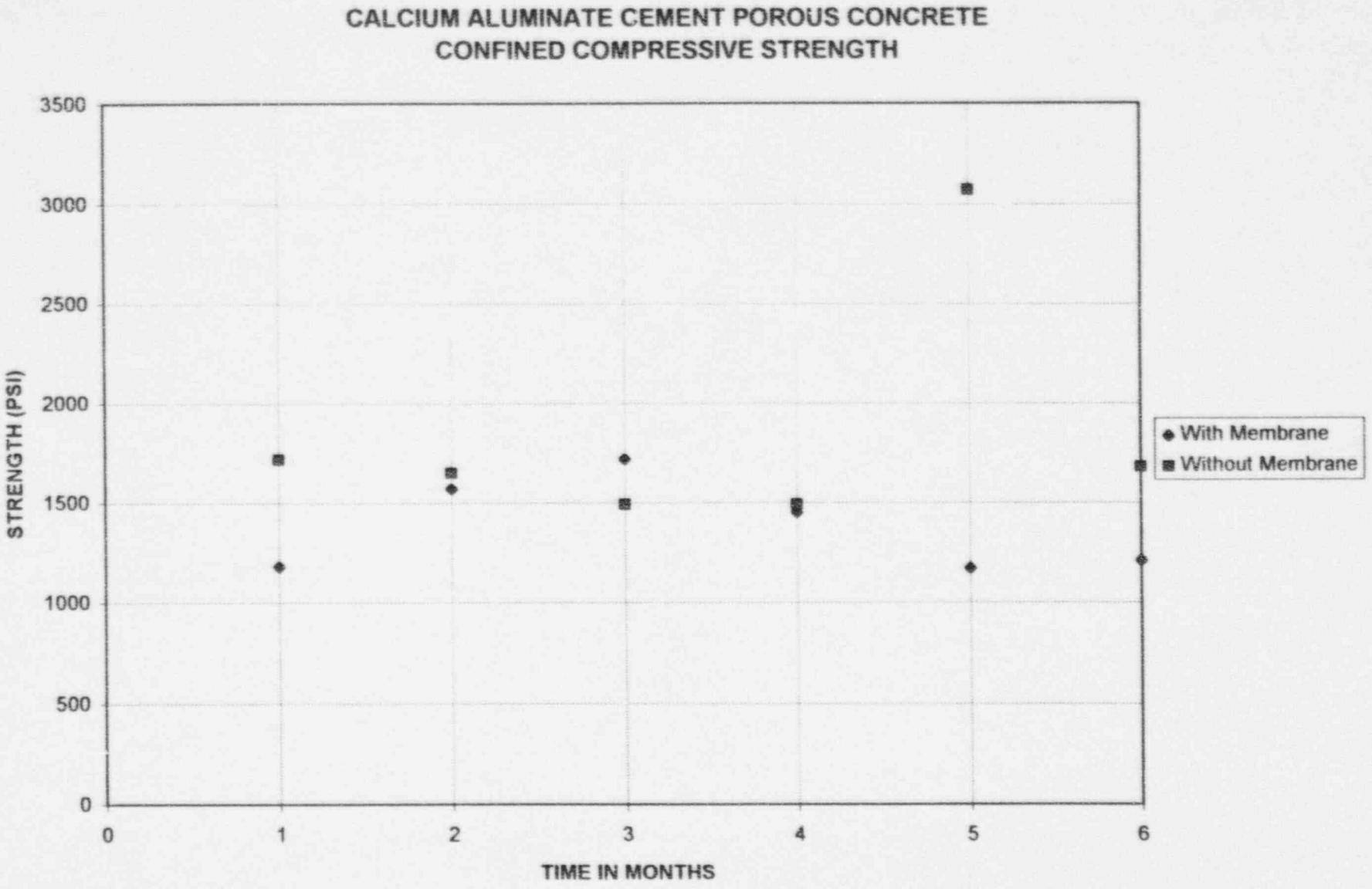
Time Dependent Core Testing Results

February 1996

PORTLAND CEMENT POROUS CONCRETE
CONFINED COMPRESSIVE STRENGTH




PORTLAND CEMENT POROUS CONCRETE
UNCONFINED COMPRESSIVE STRENGTH
STRENGTH (PSI)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
1
2
3
4
5
6
TIME IN MONTHS
With Membrane
Without Membrane


CALCIUM ALUMINATE CEMENT POROUS CONCRETE
CONFINED COMPRESSIVE STRENGTH
STRENGTH (PSI)
3500
3000
2500
2000
1500
1000
500
0
0
1
2
3
4
5
6
TIME IN MONTHS
With Membrane
Without Membrane

CALCIUM ALUMINATE CEMENT POROUS CONCRETE
UNCONFINED COMPRESSIVE STRENGTH