OFFICIAL USE ONLY

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

February 12, 1974

D. Okrent

THEOFANOUS' COMMENTS ON GRAND GULF

On February 5, 1974, I received a telephone call from Dr. Theofanous in which he identified the following list of items as still open to resolution:

A. ECCS

1. GETAB calculations for Grand Gulf
2. Jet Pump data quality at the suction
3. Inertia effects and asymmetries in the downcomer node
4. Adequacy of long term model for water inventory
5. System effects and modeling for short and long term models
6. System effects for application of FLECHT data
7. Significance of dissolved gases on lower plenum flashing
8. Evaluation of design margins for blowdown forces on internals (acoustic decompression)
9. Adequacy of the Moody model and current noding for break flow (possibility of the discharge coefficient (c) being a function of time or $c > 1.0$)

B. Containment

1. Adequacy of blowdown calculations for determining containment design criteria
2. Adequacy of noding and added mass calculation for the vent clearing model
3. Vent clearing for large scale tests do not compare as closely with predictions as do the small scale tests
4. There is very little fundamental understanding of the initial air sweeping transient for the Mark III containment as well as all previous pressure suppression containments (Mark I and II)
5. Quantification of splashing (also relevance of Swedish tests)
6. Experimental information on pool stratification and effects on containment pressure

ATTACHMENT A

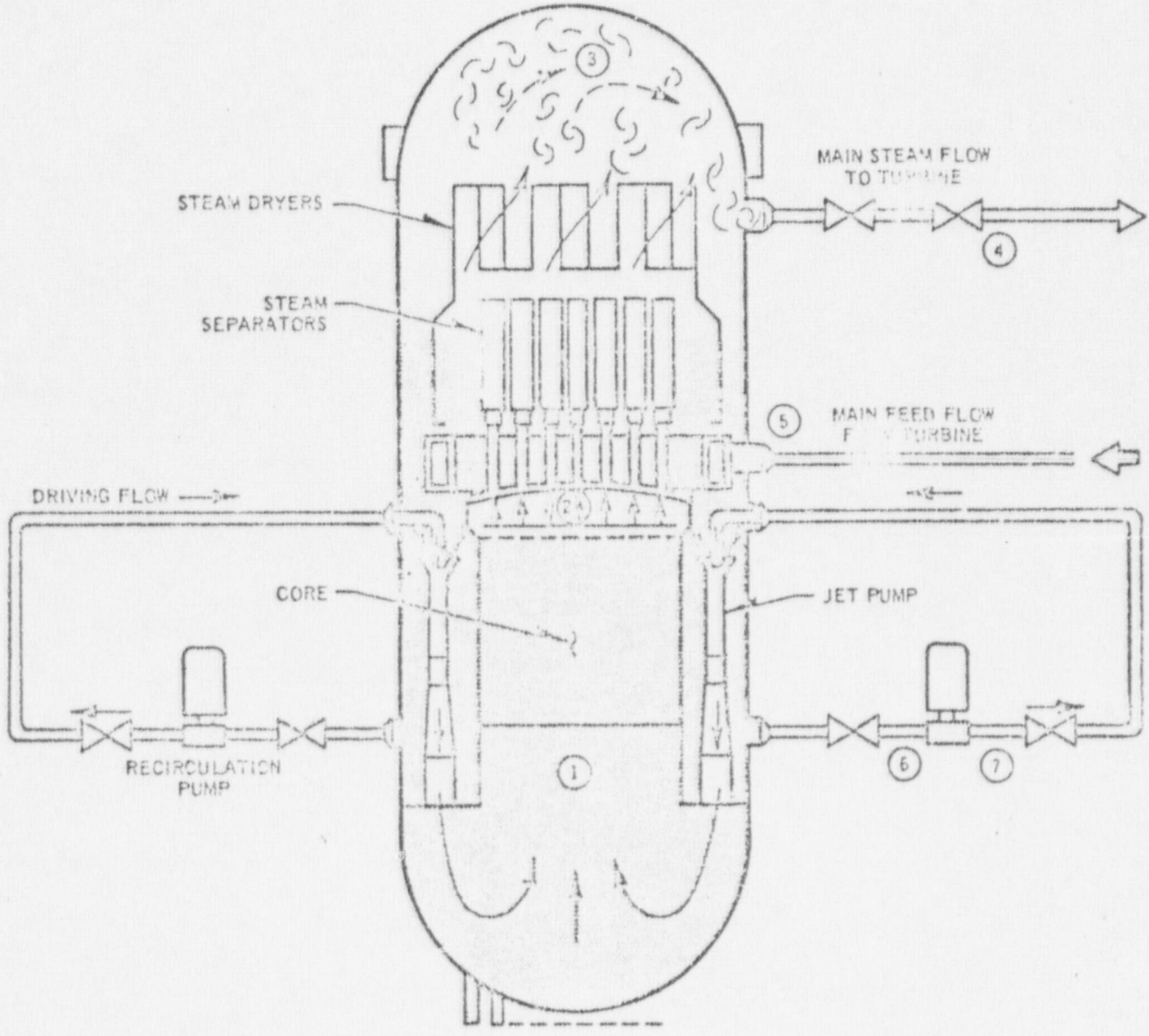
7. Flow regimes at injection points (vents and relief valve discharge)
8. Experimental and theoretical information on loadings due to pool splashing

Dr. Theofanous plans to visit GE and discuss these matters prior to the March 4, 1974 meeting of the Grand Gulf Subcommittee.

J. C. McKinley
Senior Staff Assistant

cc: ACRS Members
T. Theofanous

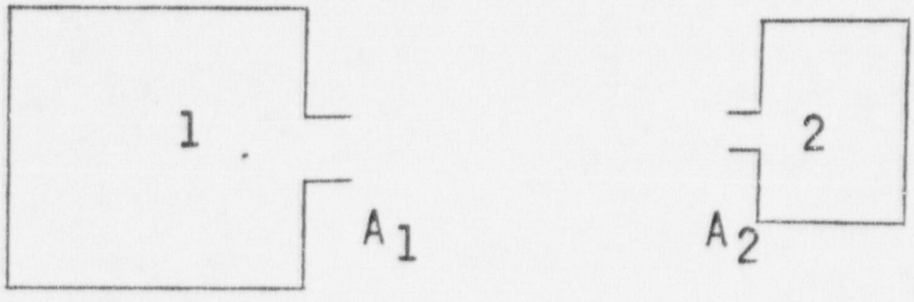
BWR PRIMARY SYSTEM



SLIDE 1

RECIRCULATION LINE BREAK

SHORT TERM GE MODEL:



A_1 = cross section area of recirc. line

$A_2 = \frac{1}{2} A_1$

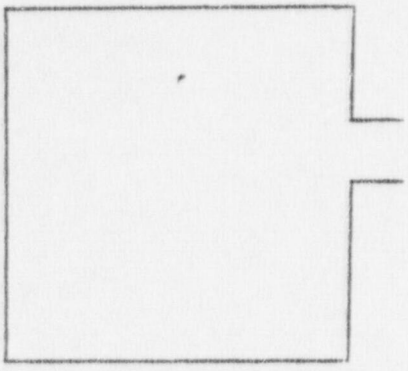
G = MOODY (A_1 A_2) = MOODY (3/2 A_1)

- VOLUME 1 REPRESENTS REACTOR VESSEL AND VOLUME 2 REPRESENTS RECIRCULATION LINE
- SHORT TERM MODEL IS USED UNTIL THE INTEGRATED MASS RELEASE FROM VOLUME 2 IS EQUAL TO THE INITIAL RECIRCULATION LOOP MASS (~ 1.9 SECONDS)

SLIDE 2

RECIRCULATION LINE BREAK

LONG TERM GE MODEL:



G = MOODY (A)

- ONE VOLUME REPRESENTS ENTIRE PRIMARY SYSTEM

- FLOW AREA, A, EQUALS AREA OF RECIRC. LINE PLUS AREA OF JET PUMP NOZZLES PLUS AREA OF CLEANUP LINE

SLIDE 3

STAFF POSITION

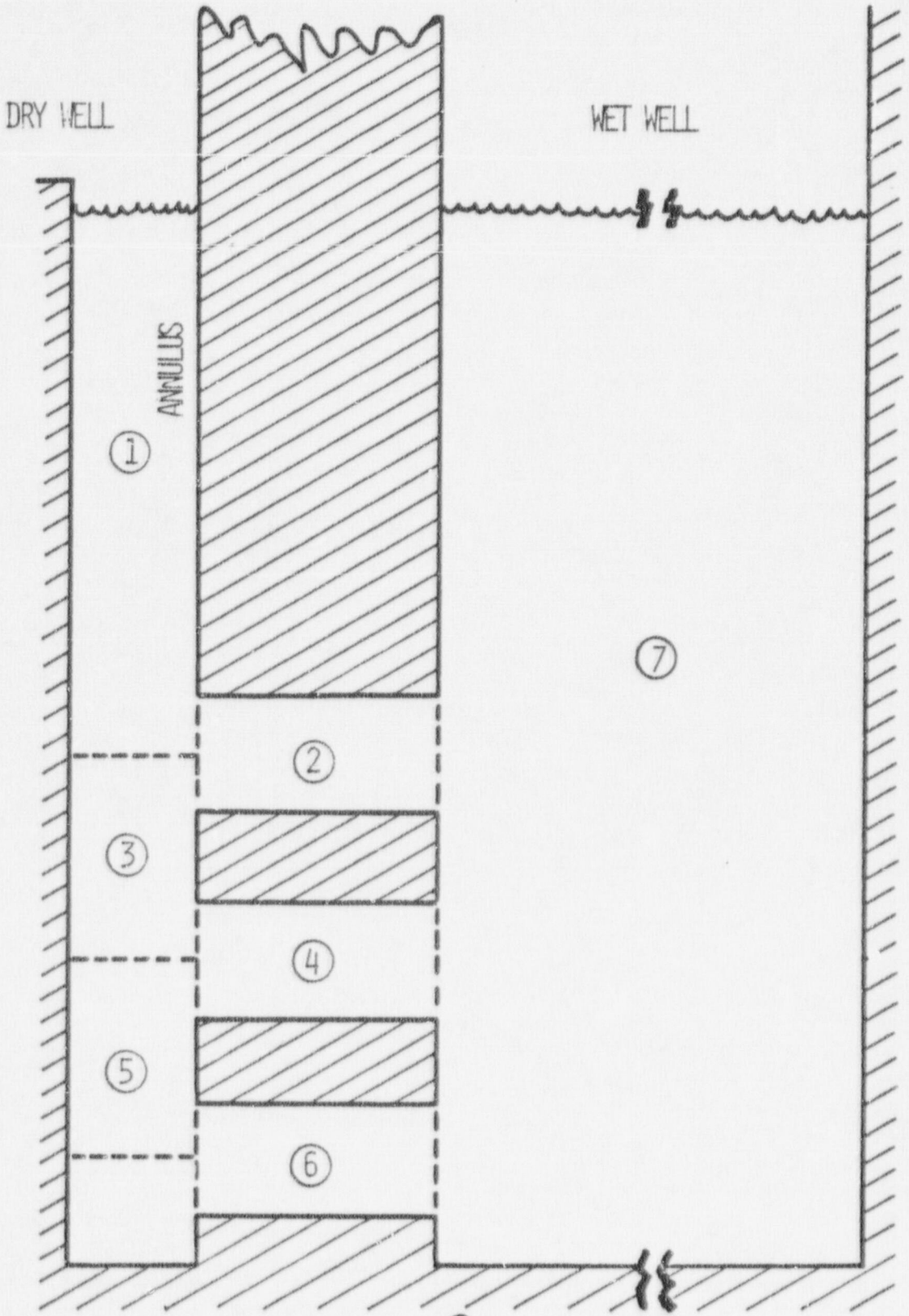
1) LONG TERM MODEL IS ACCEPTABLE

2) USE OF .5 AREA COEFFICIENT IN SHORT TERM MODEL HAS NOT BEEN JUSTIFIED

3) COEFFICIENT OF 1.0 WOULD BE ACCEPTABLE

SLIDE 4

MARK-III VENT CLEARING MODEL



SLIDE 5

NODALIZATION

SYSTEM CHARACTERISTICS

1. Pure, Incompressible Liquid
2. Isothermal
3. Branched 1-D Flow

RATIONALE FOR 7-NODE MODEL

1. 3 Pressure Drops = 6 Nodes
2. Wet Well Node
3. Velocity Gradients
4. Irreversible Losses
5. Transport Time

SLIDE 6

STANDARD CASE

TWICE FRICTION

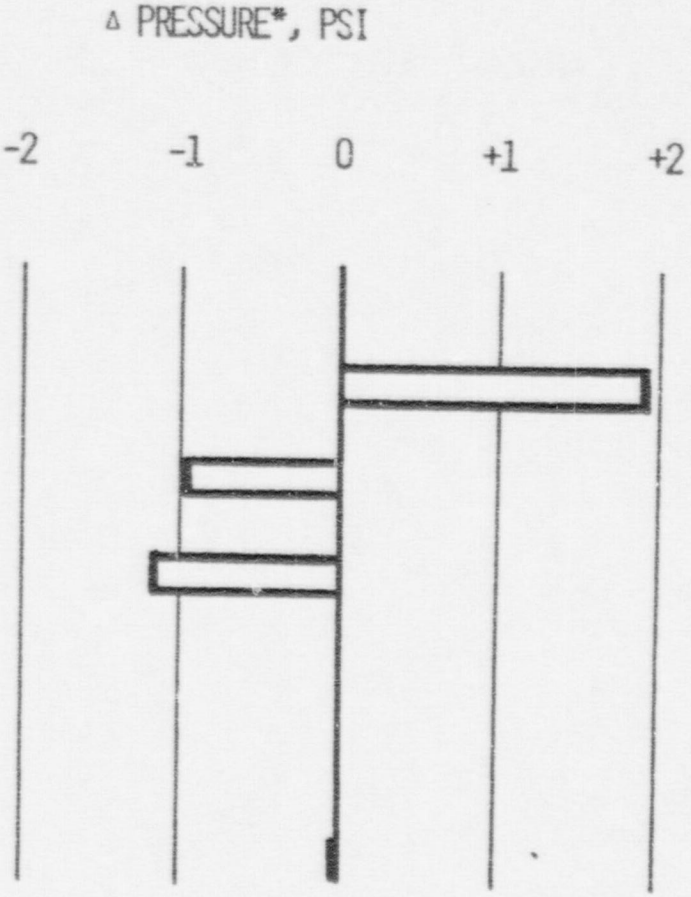
HALF FRICTION

NO CROSS MOMENTUM

CONVERGENCE:

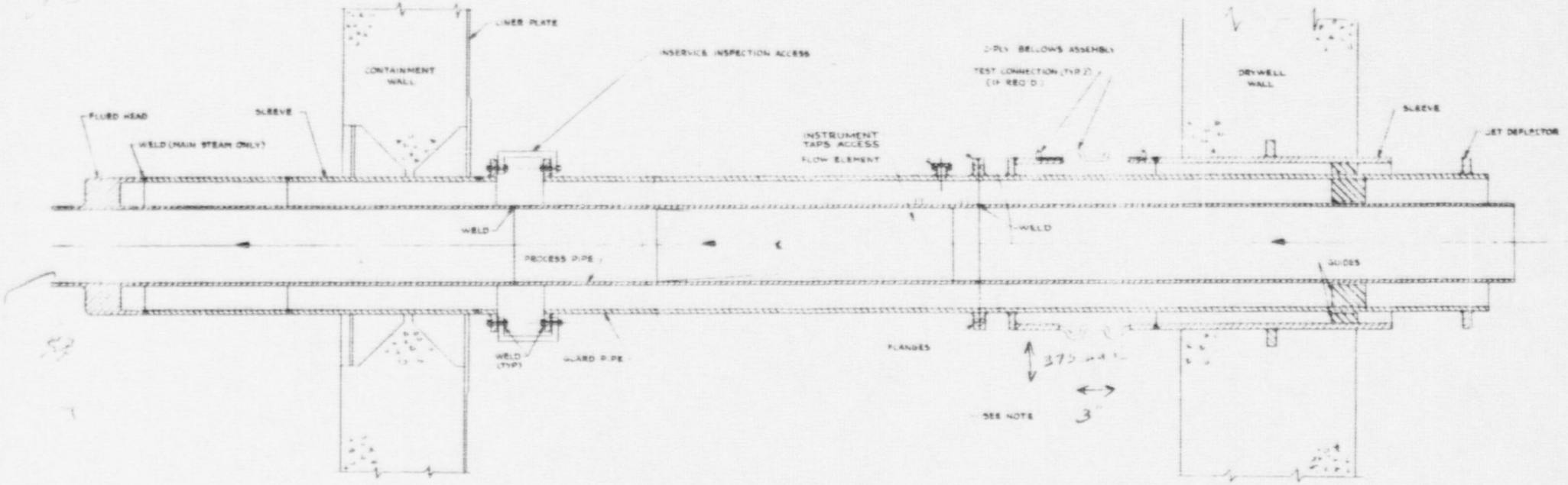
TIME (± 2 ORDERS)

NODE (± 1 ORDER)



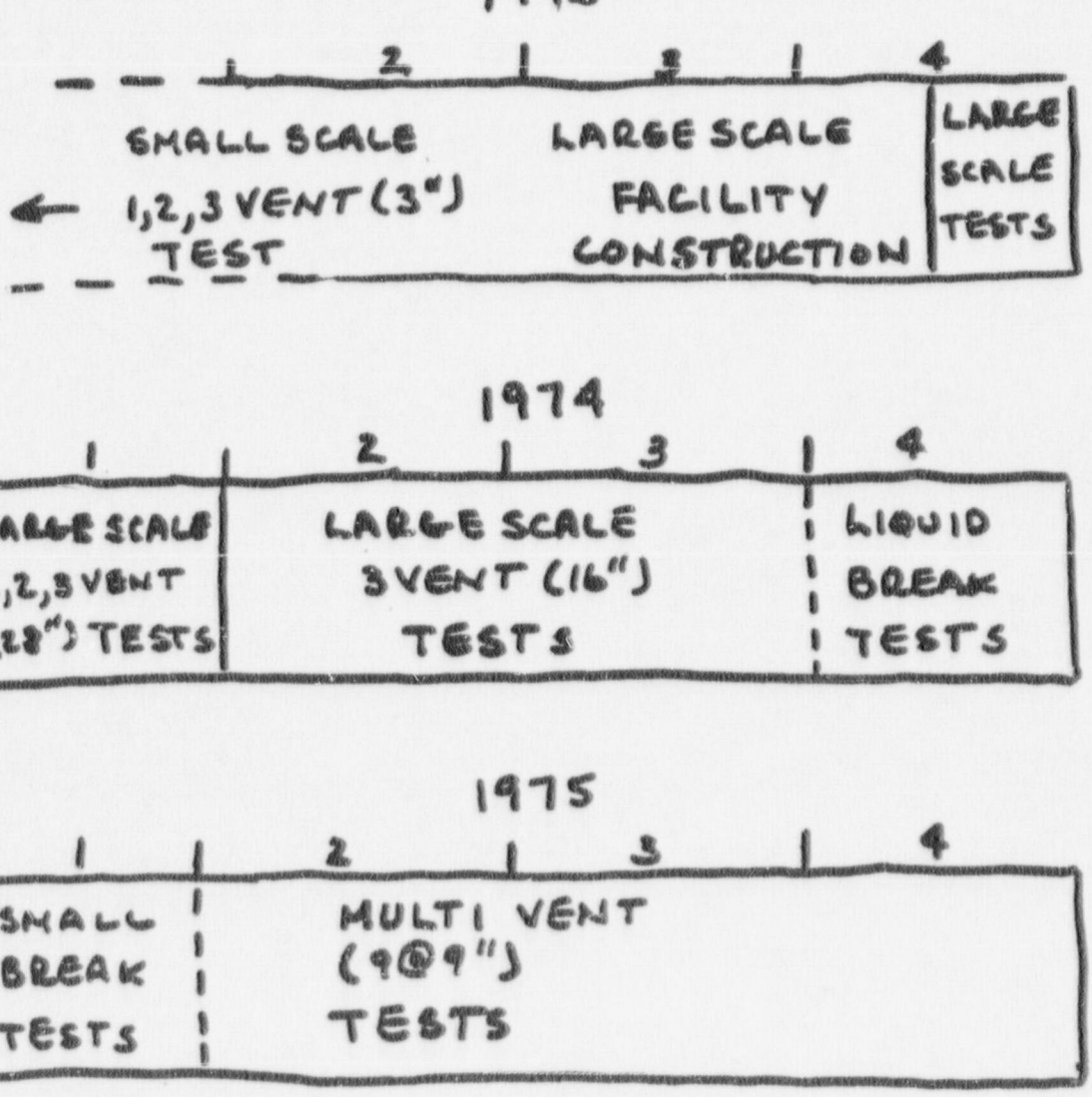
* 20 PSI/SEC

SLIDE 7


LINER PLATE
CONTAINMENT WALL
INSERVICE INSPECTION ACCESS
SLEEVE
FLUED HEAD
WELD (MAIN STEAM ONLY)
INSTRUMENT TAPS ACCESS
FLOW ELEMENT
TEST CONNECTION (TYP 2)
(IF REQ'D)
DRYWELL WALL
SLEEVE
JET DEFLECTOR
WELD
PROCESS PIPE
GUIDES
WELD (TYP)
GUARD PIPE
FLANGES
SEE NOTE
3"

SLIDE 8

TEST PROGRAM

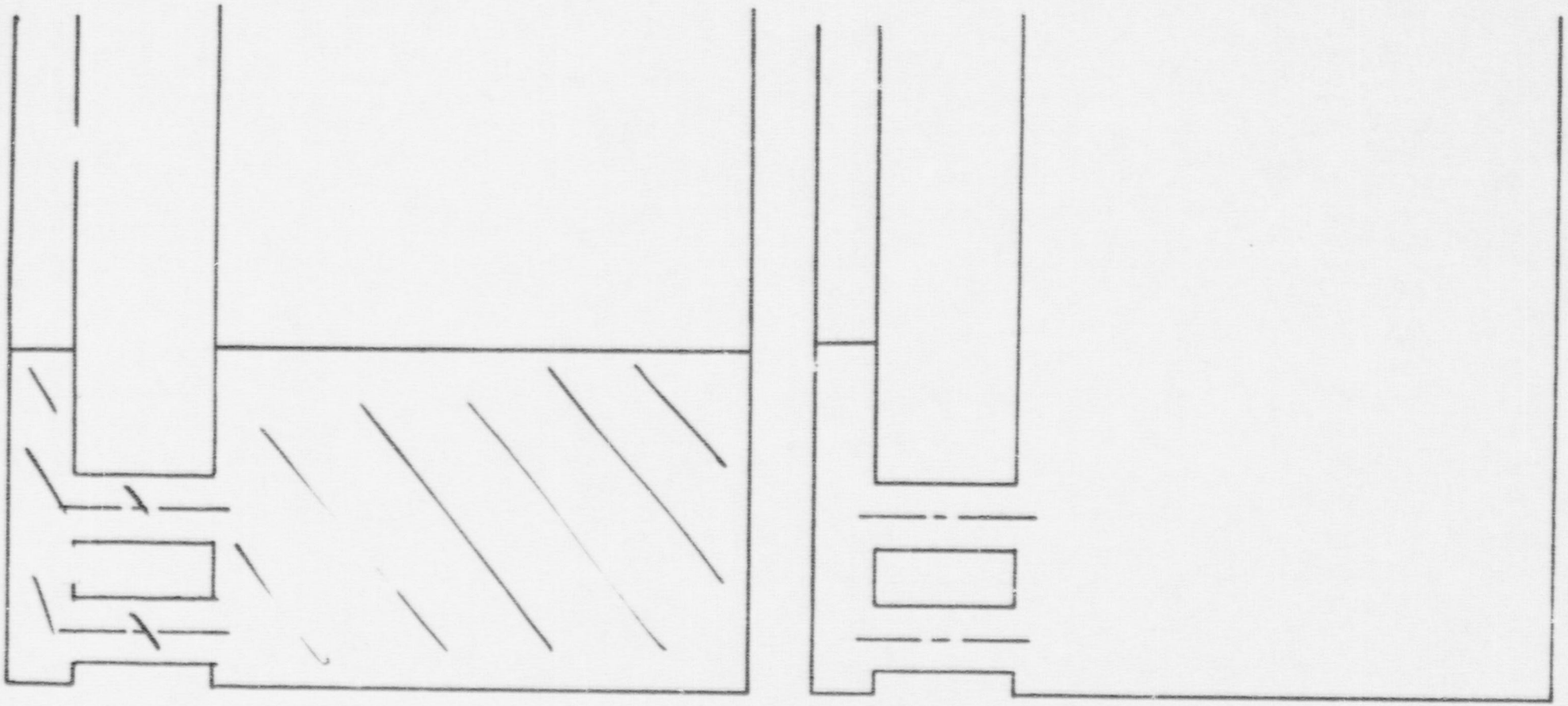


SLIDE 9

---- ESTIMATED

DAR 2/6/74

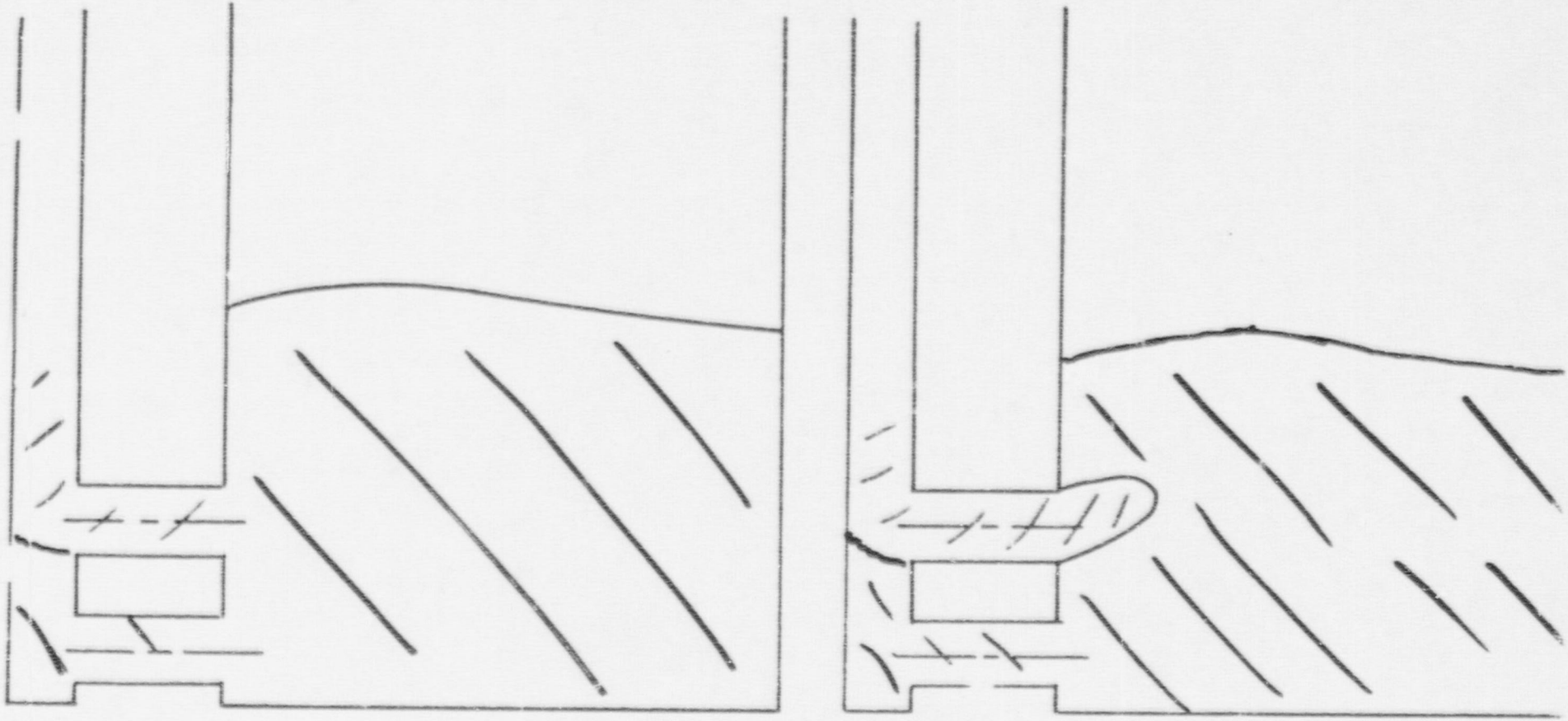
MARK III POOL SWELL



T = 0 SECS

SLIDE 10

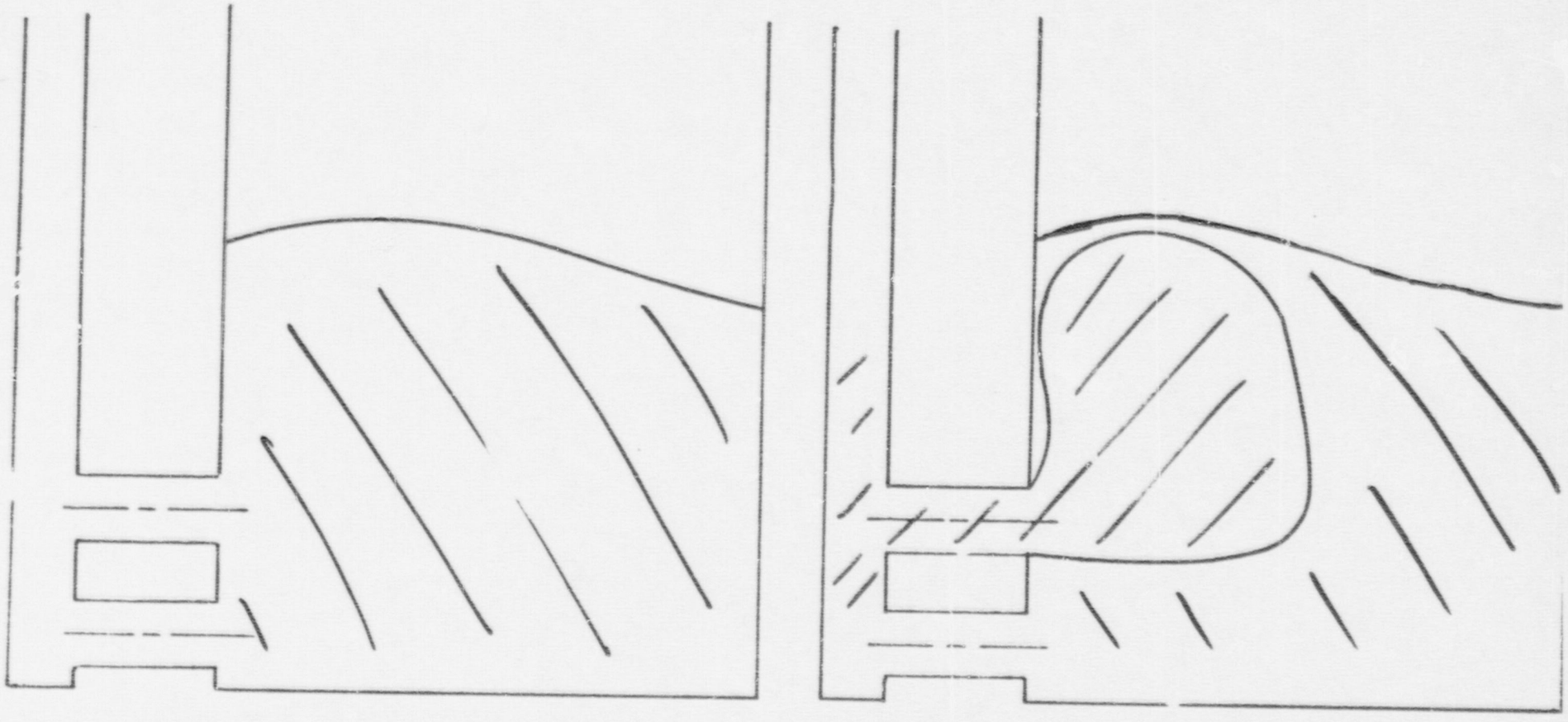
MARK III POOL SWELL



T = .8 secs

SLIDE 11

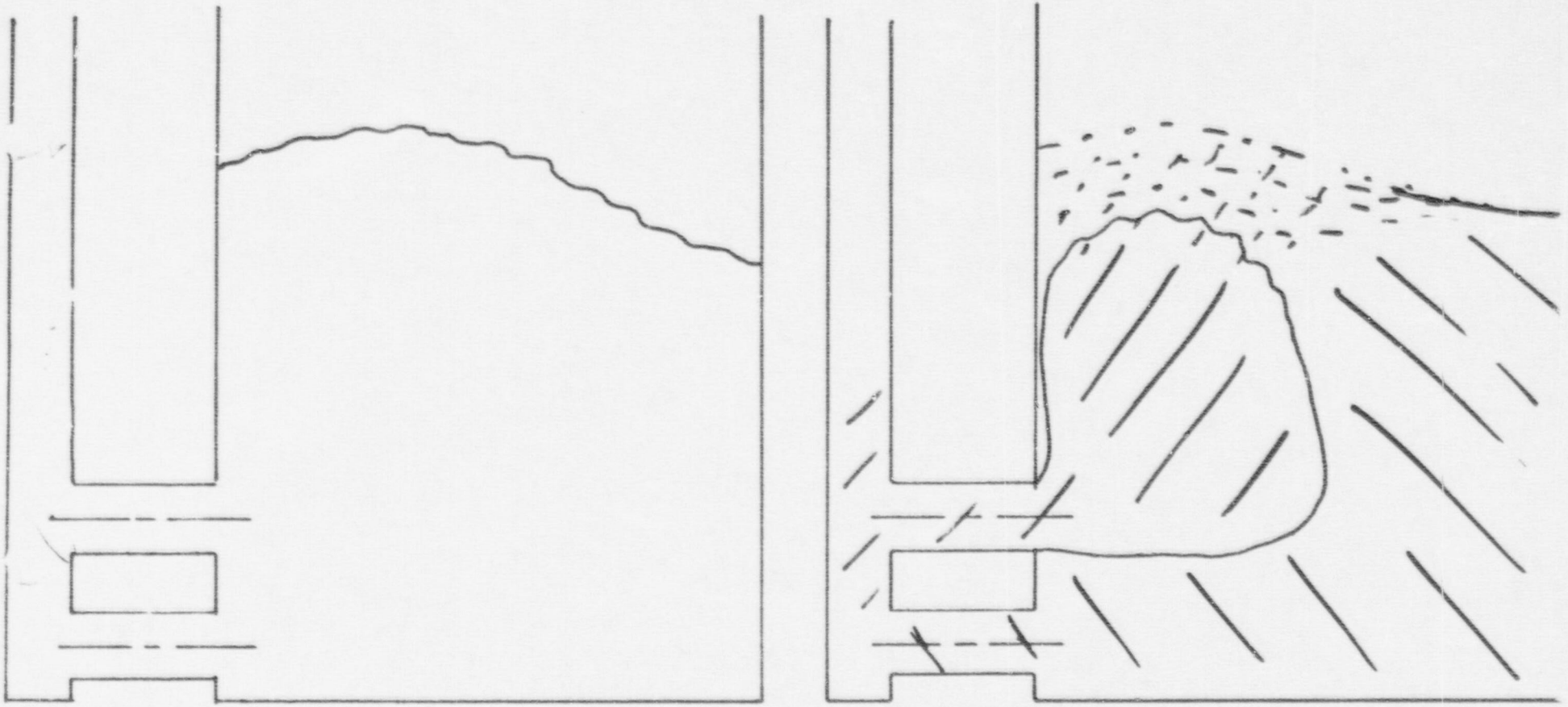
MARK III POOL SWELL



T= 1.0 SECS

SLIDE 12

MARK III POOL SWELL



T= 1·1 SECS

SLIDE 13