



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

DEC 29 1976

Docket Nos: 50-322, 50-352 & 50-353, 50-358, 50-367
50-373 & 50-374, 50-387 & 50-388, 50-397, 50-410

FACILITIES: Shoreham Nuclear Power Station Unit No. 1, Limerick
Generating Station Units No. 1 and No. 2, William H. Zimmer
Nuclear Power Station, Unit 1, Bailly Generatin Station
Nuclear No. 1, LaSalle County Station Units No. 1 and No. 2,
Susquehanna Steam Electric Station Units No. 1 and No. 2,
WPPSS Nuclear Project No. 2, Nine Mile Point Nuclear
Station Unit No. 2.

APPLICANTS: Long Island Lighting Co., Philadelphia Electric, Cincinnati
Gas and Electric Co., Northern Indiana Public Service Co.,
Commonwealth Edison, Pennsylvania Power and Light Co.,
Washington Public Power Supply System and Niagara Mohawk
Power Corporation

SUBJECT: SUMMARY OF MEETINGS HELD ON DECEMBER 2, 1976 TO DISCUSS
MARK II CONTAINMENT STRUCTURAL DESIGN AND POOL DYNAMIC
LOADS SUPPORTING PROGRAM

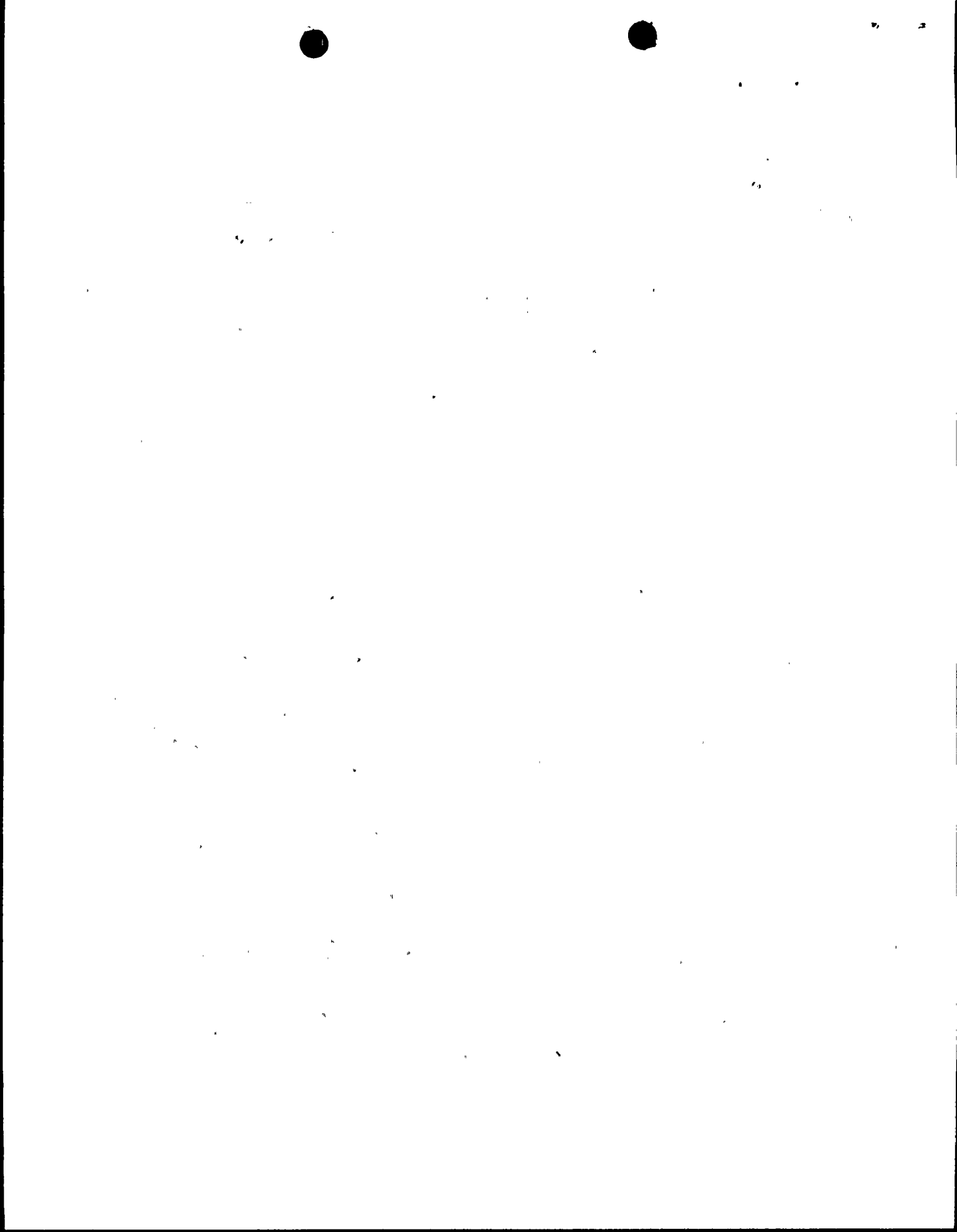
A meeting was held on December 2, 1976 between representatives of the
Mark II Owners, the General Electric Company and the NRC staff. The
purpose of the meeting was to discuss with GE and the Mark II Owners
(1) the method for combining dynamic loads for structural design and
(2) the status of the Pool Dynamics Load Supporting Program. The attendee
lists and copies of some of the slides given to the attendees are enclosed.
Copies of the remainder of the slides are available in my office. The
major topics discussed are as follows:

A. Dynamic Load/Response Combinations

In Section 5.2.2 of the Dynamic Forcing Function Report (DFFR)
NEDO-21061 it is stated that "the peak dynamic responses due to
individual loads should be combined in the SRSS method." We
indicated this is currently unacceptable.

The General Electric Company stated that they were not asking for
blanket approval of the SRSS method but for selective application
of the method (figure 1). They further stated the SRSS method has
been used for many years for combining rapidly varying dynamic
loads/responses and that the method provides adequate margin in
design (figure 2). If the absolute sum of the dynamic response
method, which is acceptable to the staff, has to be used for all
cases there is a high probability that existing plant hardware

MA 4



DEC 29 1976

will have to be modified. This will result in delays to a number of Mark II plants. We indicated that the blanket statement as now provided in the DFFR on the use of the SRSS method gave no indication of its application or justification and therefore is unacceptable.

The Mark II owners suggested the following approach to resolve the issue. They will (1) establish a quantitative program to provide details on Dynamic Loads/Response combinations and justifications, (2) provide in January a description of the program, (3) meet with the staff to discuss the program and provide a schedule for its completion, and (4) revise the DFFR when the program is complete.

B. Pool Dynamic Loads Supporting Program

(1) Steam Loads (Chugging) Program

General Electric Company provided the current schedule for the Mark II Supporting Program (fig. 3). The pool swell model report is now scheduled to be completed on January 31, 1971.

The program for defining the steam loads (chugging loads) developed by the Mark II owners consists of a parallel analytical and experimental approach. GE stated their analysis indicates that the single cell tests provide the bounding chugging load. Therefore, the objective of their chugging program will be to first confirm the conservatism of the single cell approach and then to develop a more realistic predictive method for individual plants (Fig. 4).

The overall chugging program technical strategy (the analytical and experimental program) is shown on Fig. 4. The analytical approach is to develop an analytical model from first principles and to compile and use all known experimental data to verify and refine the model. As a parallel effort GE is planning a multi vent test and has started the acquisition of equipment. However, they expect that their analytical approach will resolve the chugging problem and they do not expect to have to run the multi vent tests. The decision on whether to proceed with the tests will be made in January. The analytical program is a Mark I and Mark II owners jointly funded program. The current status of the program is shown in Fig. 5.

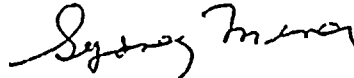
(2) SRI/EPRI

The SRI/EPRI tests were completed and the report will be available the end of February or the beginning of March. The report will be made available to the staff. The Mark II owners have not yet



DEC 9 1976

made the determination whether the tests could be used to satisfy the staff request for air tests. If the tests are applicable they will be used to satisfy this requirement. EPRI has not decided whether to conduct the 1/13 scale single downcomer tests.



Sydney Miner, Project Manager
Light Water Reactors Branch No. 3
Division of Project Management

Enclosures:
As stated

CC: Pennsylvania Power and Light Company
ATTN: Mr. Norman W. Curtis
Vice President - Engineering
and Construction
2 North Ninth Street
Allentown, Pennsylvania 18101

Gerald Charnoff, Esq.
Shaw, Pittman, Potts,
Trowbridge & Madden
Barr Building
910 17th Street, N.W.
Washington, D.C. 20006

Mr. William E. Barberich
Licensing Engineer
Pennsylvania Power & Light Company
2 North Ninth Street
Allentown, Pennsylvania 18101

Mr. Robert J. Shovlin, Project
Manager Susquehanna
Pennsylvania Power & Light Company
2 North Ninth Street
Allentown, Pennsylvania 18101

Commonwealth Edison Company
ATTN: Mr. Byron Lee, Jr.
Vice President
P. O. Box 767
Chicago, Illinois 60690

Richard E. Powell, Esq.
Isham, Lincoln & Beale
One First National Plaza, Suite 2400
Chicago, Illinois 60670



ATTENDEES LIST
DECEMBER 2, 1976
DYNAMIC LOADS MEETING

NRC

S. Miner
C. Anderson
J. Kudrick
G. Lainas

CFE/EBASCO

Y. Oktay

PP&L Co.

E. Mead

Stone & Webster

R. Klause
W. Hennessy
S. Chow

LILCO

H. Chau
J. Novarro

CGE Co.

H. Brinkmann

GE

P. Marriott
L. Frauenholz
A. Smith

Burns & Roe

P. Hsueh

WPPSS

G. Gelhaus

CECO

B. Shelton

Sargent & Lundy

R. Crawford

Nuclear Services Corp.

F. Schraub

REPCO

R. Logue

BECHTEL

E. McFarland

NIPSCO

J. Dunn



ATTENDEES LIST
DECEMBER 2, 1976
STRUCTURAL MEETING

NRC

S. Miner
P. Kuo
F. Schauer
D. Jeng
S. Hou
W. Paulson

GE

L. Frauenholz
P. Marriott
D. Ditmore
A. Smith

PECO

R. Logue

S&L

B. Erler
R. Crawford

WPPSS

G. Gelhaus

Burns & Roe

P. Hsueh

CECO

B. Shelton
3

CGE

H. Brinkmann

LILCO

H. Chau
J. Novarro

Stone & Webster

S. Chow
W. Hennessy
R. Klause

Nuclear Services

F. Schraub

PP&LCO

E. Mead

CFE/EBASCO

Y. Oktay

BECHTEL

E. McFarland

NIPSCO

J. Dunn



PERSPECTIVE ON PROBLEM

Fig. 1

- o NOT PRESSING FOR BLANKET APPROVAL OF SRSS
 - BOTH ABS & SRSS ARE EMPLOYED

- o SRSS APPLICATION IS SELECTIVE
 - ACTUAL LOAD NOT EXPECTED TO EXCEED SRSS
 - MINIMAL IMPACT IF SRSS EXCEEDED

- o BLANKET REQUIREMENT FOR ABS NOT APPROPRIATE
 - NOT NECESSARY TO ASSURE DESIGN ADEQUACY
 - DESIGN IMPACT IS SIGNIFICANT

- o SRSS IS TECHNICALLY JUSTIFIED IN SPECIFIC APPLICATIONS



QUALITATIVE FACTORS
INFLUENCING SRSS APPLICATION

Fig. 2

● ACTUAL LOAD UNLIKELY TO EXCEED SRSS

- LOAD EVENTS TIME OVERLAP UNLIKELY
- RESPONSES RANDOM AMPLITUDE AND PHASE
- RESPONSES VARY RAPIDLY AND SHORT DURATION
- RESPONSE FREQUENCIES COMPARABLE

SO

- MAX. PEAKS UNLIKELY TO COINCIDE
- STRESS/STRAIN RISE AND DECAY RAPIDLY

● CONSEQUENCES OF EXCEEDING STRSS MINIMAL

- DYNAMIC LOADS AND MODELS CONSERVATIVE
- CODE RULES PROVIDE LARGE DESIGN MARGIN



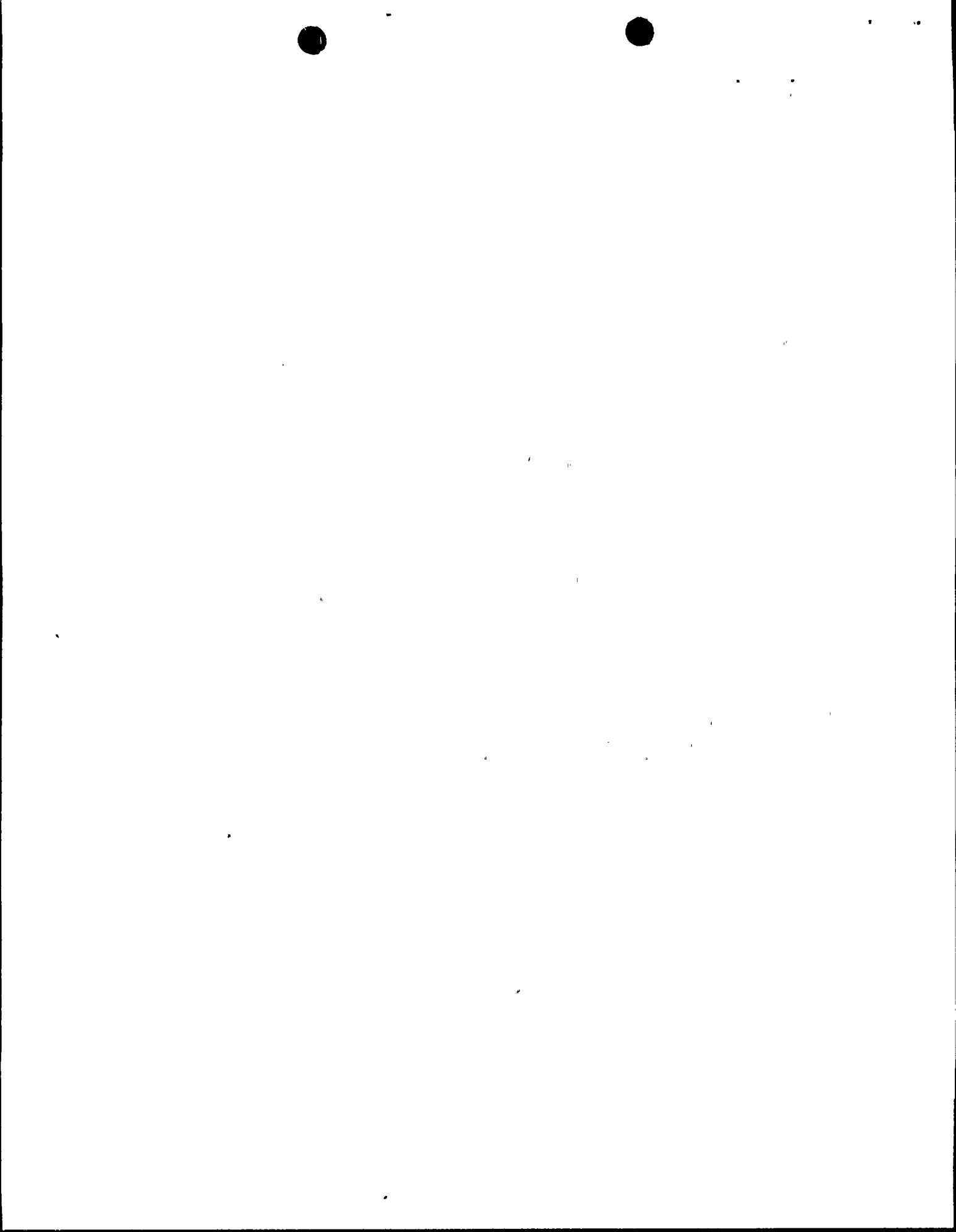
Fig. 3

MARK II SUPPORTING PROGRAM

A. LOCA RELATED ACTIVITIES

- | | | |
|----|---|----------|
| 1. | 4T POOL SWELL TESTS | |
| | PHASE II & III TEST REPORT | 12/31/76 |
| | PHASE II & III APPLICATIONS
MEMORANDUM | 1/31/77 |
| 2. | POOL SWELL MODEL REPORT | 1/31/77 |
| 3. | IMPACT TESTS | COMPLETE |
| 4. | IMPACT MODEL | COMPLETE |

L.H.F.
11/76



MARK II SUPPORTING PROGRAM

B. S/RV RELATED ACTIVITIES

- | | | |
|----|--------------------------------|----------|
| 1. | QUENCHER MODEL | COMPLETE |
| 2. | RAMSHEAD MODEL | COMPLETE |
| 3. | S/RV TESTS - RAMSHEAD | COMPLETE |
| | PRELIMINARY TEST REPORT | 12/31/76 |
| | FINAL TEST REPORT | 4/30/77 |
| 4. | CONSECUTIVE ACTUATION ANALYSIS | 6/77 |
| 5. | S/RV TESTS - QUENCHER | 4-6/77 |
| | TEST PLAN | 1/2/77 |
| | FINAL REPORT | 10/77 |
| 6. | THERMAL MIXING | 6/77 |

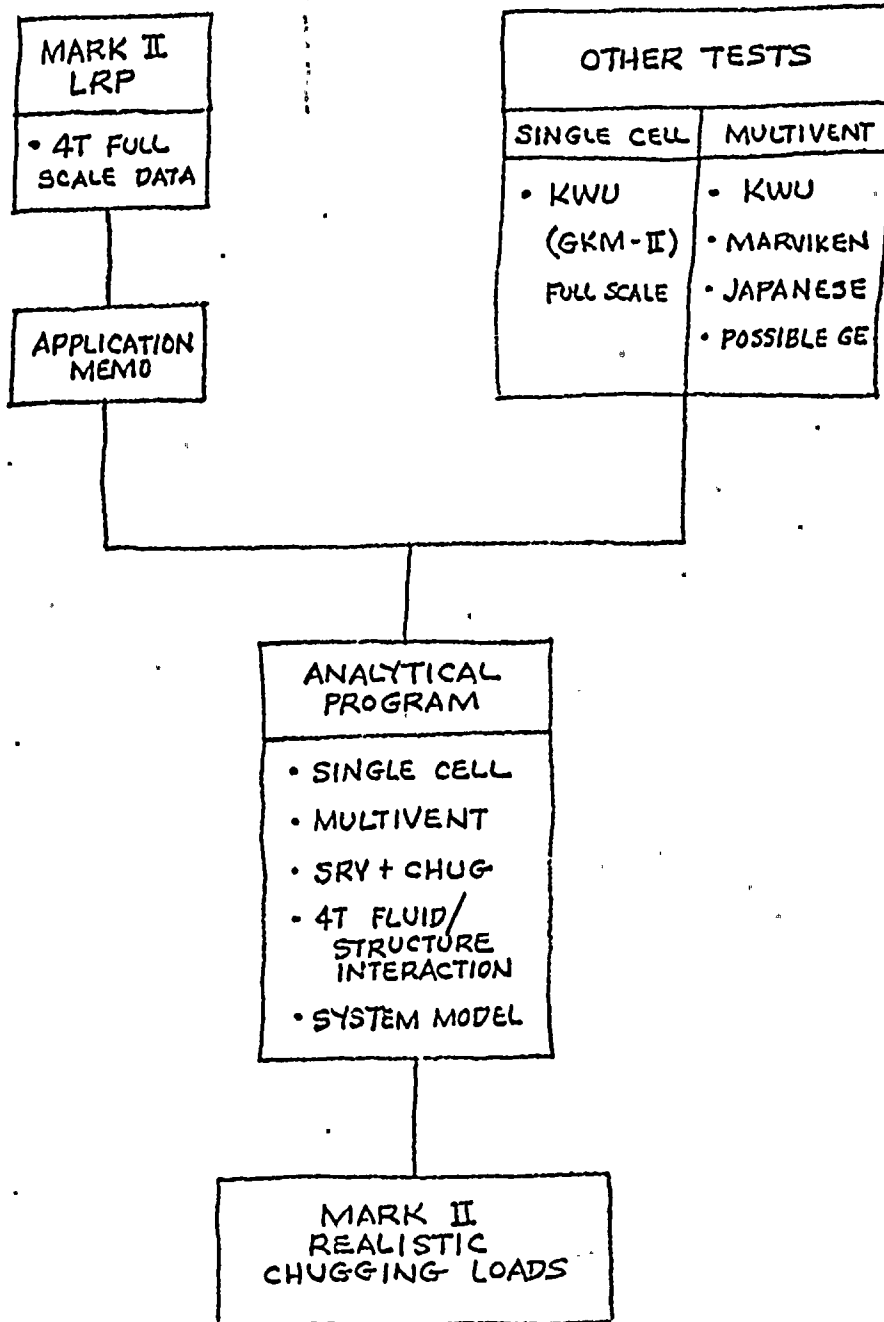
L.H.F.
11/76



Fig. 4

CHUGGING PROGRAM

OVERALL TECHNICAL STRATEGY





[The body of the document contains extremely faint and illegible text, likely bleed-through from the reverse side of the page. The text is scattered across the page and cannot be transcribed accurately.]

Fig. 5

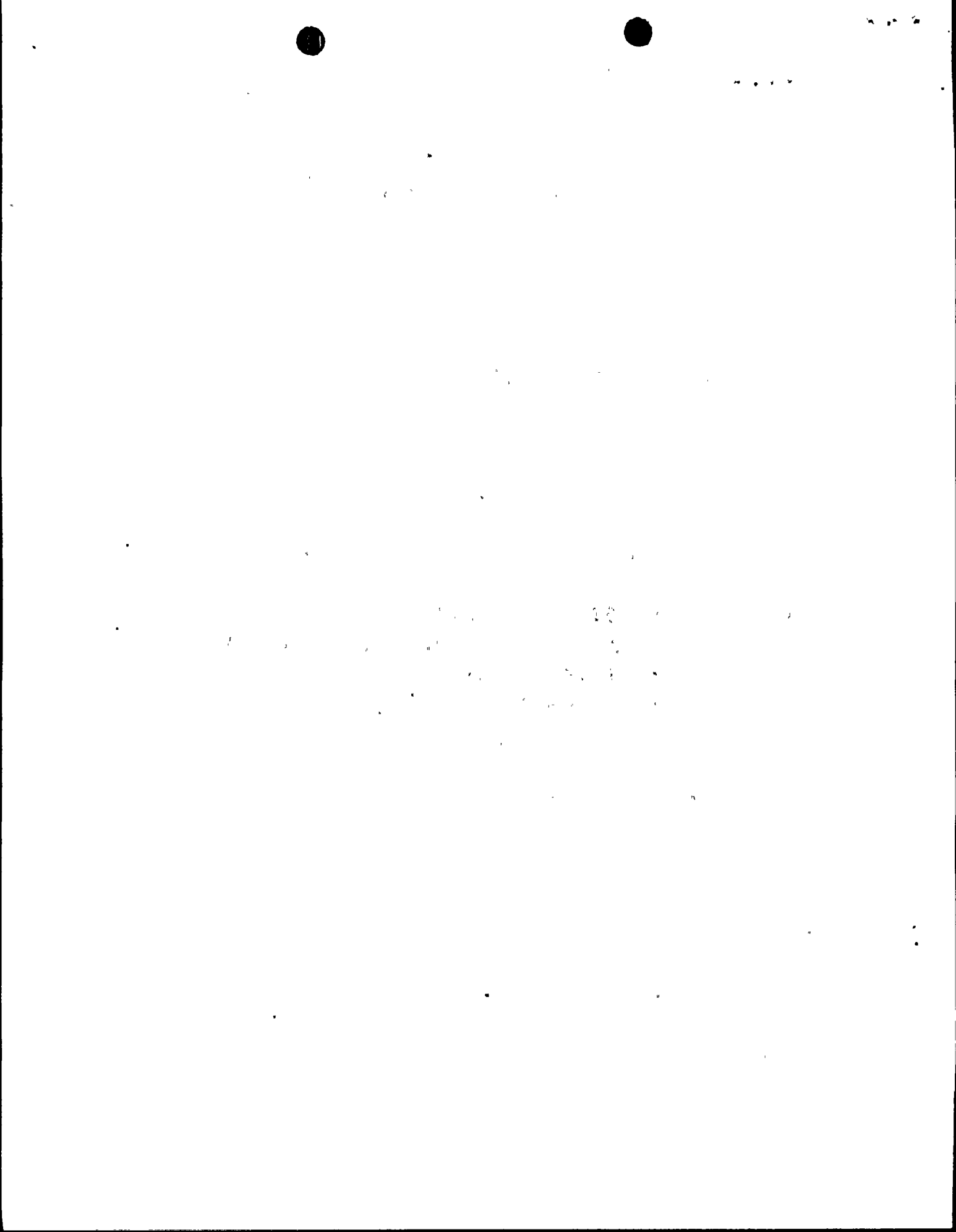
MARK II CHUGGING PROGRAM

CURRENT STATUS

- DATA COMPILATION UNDERWAY
- NEW MULTIPLE VENT TEST UNDER STUDY
- ALL ANALYTICAL TASKS UNDERWAY:
 - GE CORPORATE R&D CENTER
 - AERONAUTICAL RESEARCH ASSOCIATES at PRINCETON
 - R.M. PARSONS
 - ANAMET
- ADVISORY COMMITTEE FORMED

PWM 12-2-76

9



MEETING SUMMARY DISTRIBUTION

Docket File

NRC PDR
Local PDR
TIC
ACRS (16)
IE (3)
OELD
NRR Reading
LWR-3 File
B. Rusche
E. Case
R. Boyd
R. DeYoung
V. Stello
D. Skovholt
J. Stolz
K. Kniel
O. Parr
D. Vassallo
R. Clark
T. Speis
P. Collins
C. Heltemes
R. Houston
S. Varga
J. Miller
F. Williams
R. Heineman
H. Denton
D. Muller
W. Butler

D. Ross
R. Tedesco
J. Knight
S. Pawlicki
I. Sihweil
P. Check
T. Novak
Z. Rosztoczy
V. Benaroya
G. Lainas
T. Ippolito
V. Moore
R. Vollmer
M. Ernst
W. Gammill
G. Knighton
B. Youngblood
W. Regan
D. Bunch
J. Collins
W. Kreger
R. Ballard
M. Spangler
J. Stepp
L. Hulman
H. Smith
M. Rushbrook (3)
Project Manager
NRC Participants
P. Kuo
F. Schauer
D. Jeng
S. Hou
W. Paulson
C. Anderson
J. Kudrick
G. Lainas

