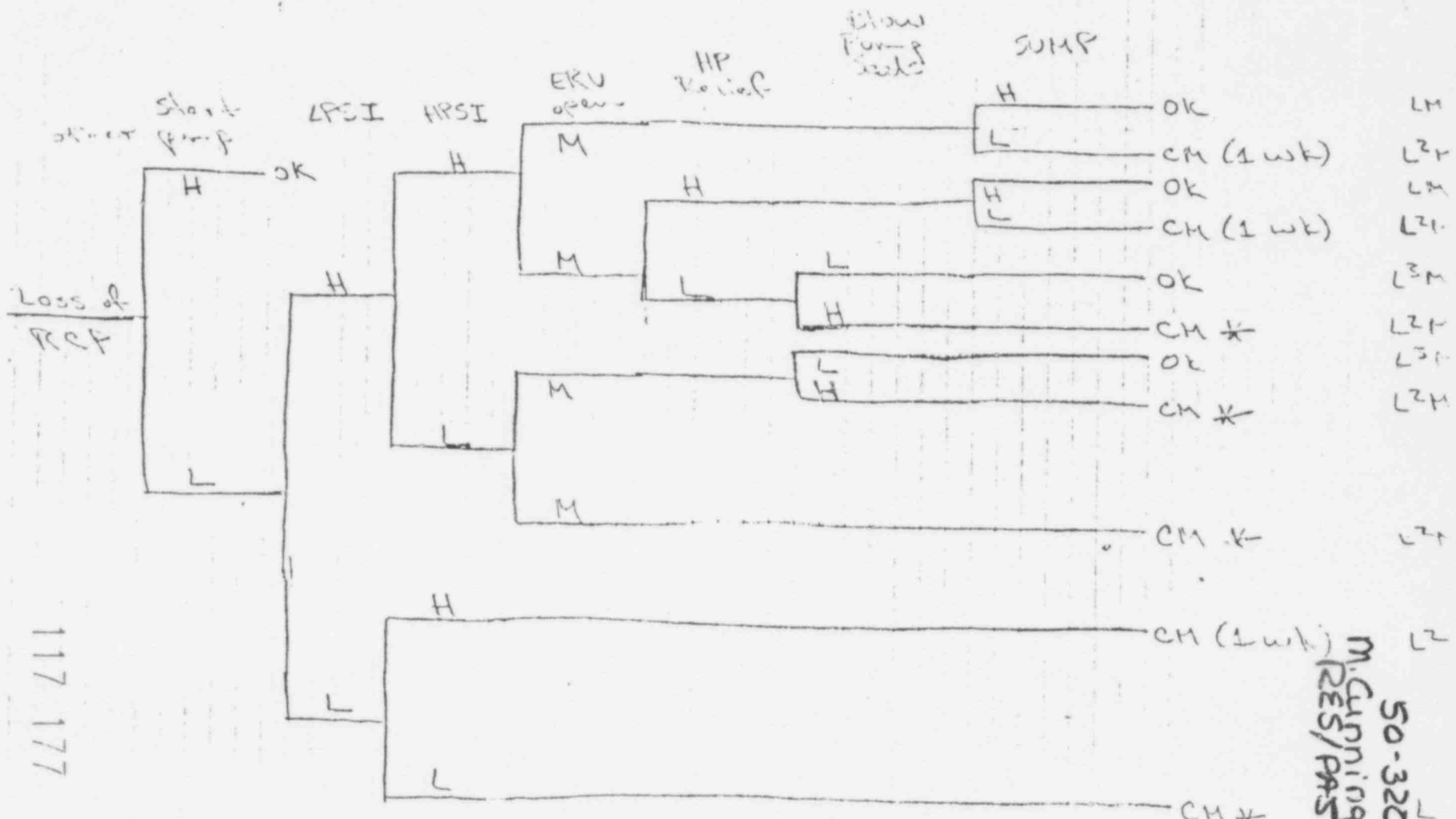
LOSS of RCP EVENT TREE



50-320
M. Cunningham
RES/PRAB

7905160019

117 177

Mark I
SO-320

APR 2 3 1979

MEMORANDUM FOR: Robert J. Budnitz, Deputy Director
Office of Nuclear Regulatory Research

THRU: Anthony R. Dahl, Director
Probabilistic Analysis Staff
Office of Nuclear Regulatory Research

FROM: Raymond DiSalvo
Probabilistic Analysis Staff
Office of Nuclear Regulatory Research

SUBJECT: VENTED CONTAINMENT CONCEPTUAL DESIGN AT THREE MILE ISLAND - 2

Reference: R. J. Budnitz to File, Same Subject, April 10, 1979.

The following actions were taken in response to the reference memo:

1. On April 10, 1979, Sandia Laboratories and Battelle Columbus Laboratories assembled task forces to work on the problem at my request.

2. BCL provided calculations of containment atmospheric conditions and airborne radioactivity as functions of time assuming core melt.

3. Sandia developed several alternative schemes for venting and recirculating the containment atmosphere.

4. Mark Cunningham and I defined the functional requirements of the system, clarified the constraints on construction and operation, and discussed with Tom Telford (NRC) and Jim Thiesing (Bechtel) at TMI-2 the feasibility of various alternatives.

5. A draft conceptual design and backup information were telecopied to the site on April 14, 1979, for review and comment.

6. Comments were factored into a revised design and lists of options for construction and operation of the system.

7. Two revisions were telecopied to the site on April 14 and April 15. The final design is attached.

8. I was notified by Telford that the design was presented to Mattson (NRC) and the utility for their information.

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I intend to take no further action on this matter unless otherwise directed. I estimate that this exercise required less than one person-month of effort. I will be glad to discuss with you any aspect of the work performed.

Original signed by
Raymond DiSalvo

Raymond DiSalvo
Probabilistic Analysis Staff
Office of Nuclear Regulatory Research

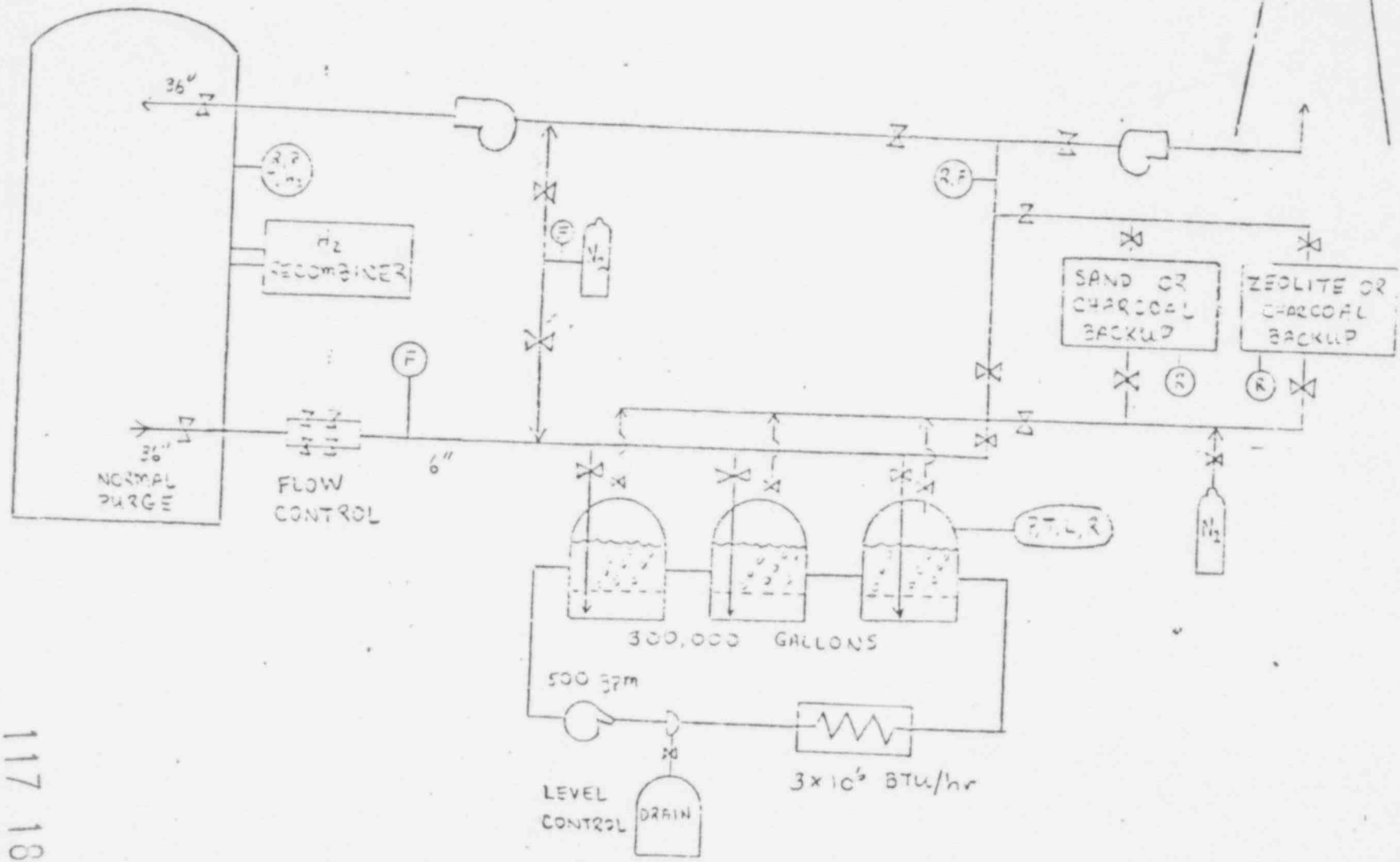
Attachment: Conceptual Design

bcc w/enclosure: H. Cunningham

Distribution:
Subject
PAS Reading
CIRC
CHRON
DiSalvo Reading
McGrath Reading
Buhl Reading

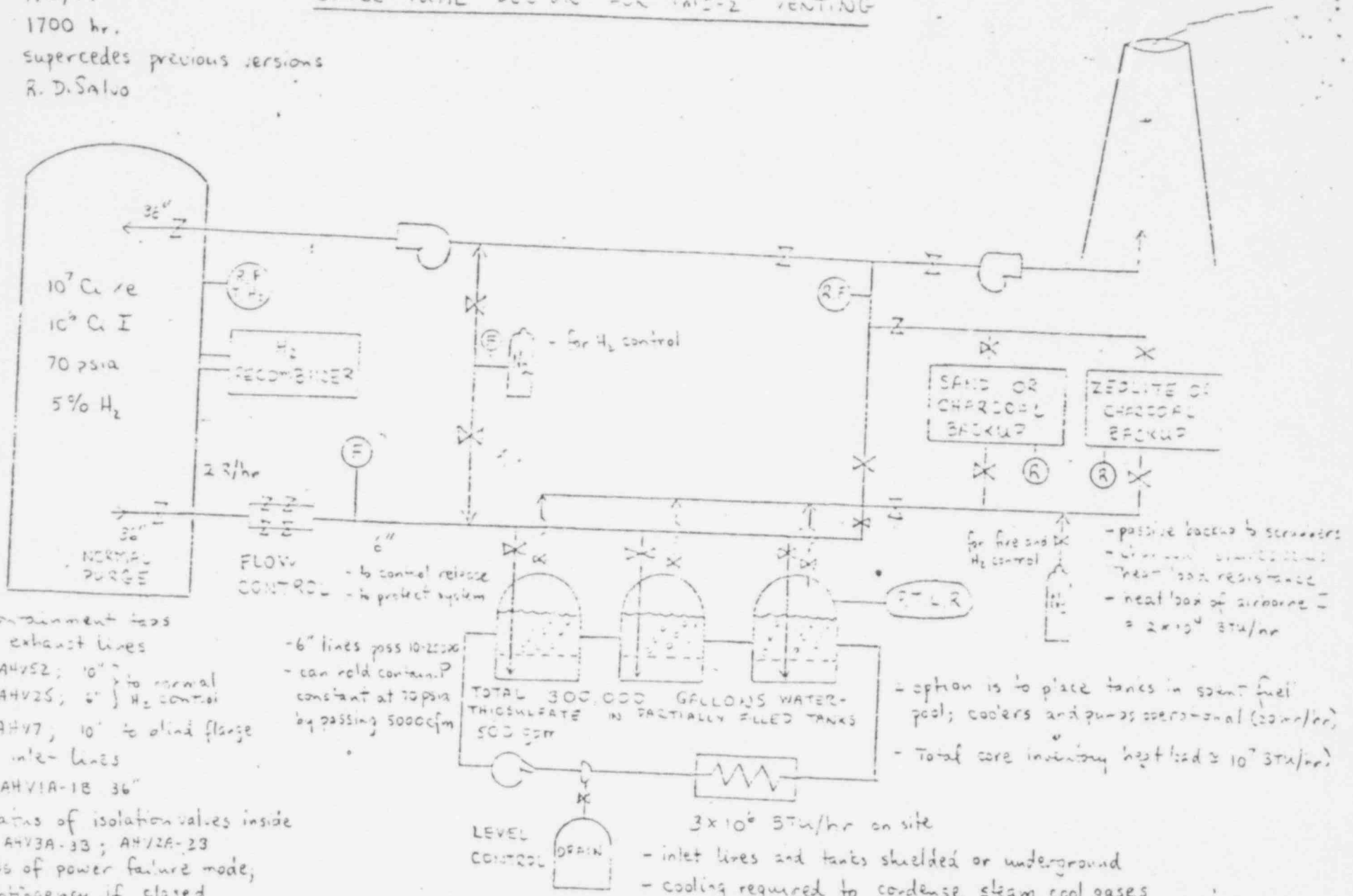
RES/PAS	RES/PAS/DD	RES/PAS/D
RDiSalvo:psr	PEMcGrath	ARBuhl
4/16/79	4/ /79	4/ /79

supercedes previous versions
R. DiSalvo
4/15/79 ; 1700 hr



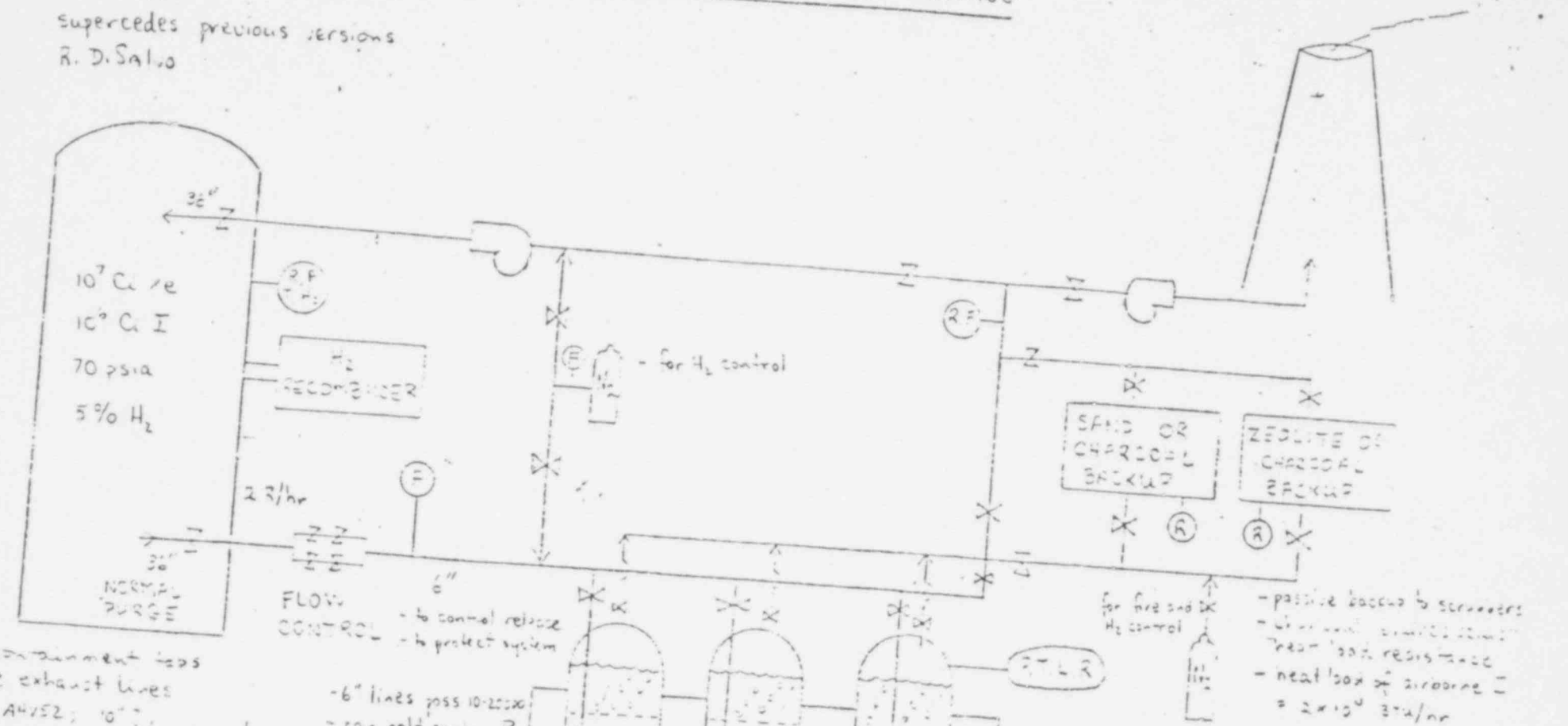
7/12/71
1700 hr.
supercedes previous versions
R. D. Salvo

CONCEPTUAL DESIGN FOR TMI-2 VENTING



7/12/77
1700 hr.
supercedes previous versions
R. D. Salvo

CONCEPTUAL DESIGN FOR TMI-2 VENTING



Containment has
2 exhaust lines
AHV52; 10"
AHV25; 6" } to normal H_2 control
AHV7, 10" to blind flange
2 inlet lines
AHV1A-1B 36"
- Status of isolation valves inside
AHV3A-33; AHV2A-23
- loss of power failure mode;
contingency if closed
- access, radiation levels in
pokup area are tolerable
- emergency

-6" lines pass 10-20 cfm
- can hold containment
constant at 70 psia
by passing 5000 cfm

→ 117 → 82

- option is to place tanks in spent fuel pool; coolers and pumps operational (20 mr/hr)
- Total core inventory heat load = 10^7 BTU/hr)

- inlet lines and tanks shielded or underground
- cooling required to condense steam, cool gases (hold at 70 psia without cooling, reach saturation in 36 hr; 4°F/hr)
- level control to prevent overflow; keep backups dry (hold at 70 psia, 4 days to fill tanks)
- 99% decontamination possible with [illegible]

CONSTRUCTION OPTIONS

OPTION 1 : AS SHOWN

OPTION 2 : DELETE BACKUP FILTERS

OPTION 3 : INSTALL ADDITIONAL H_2 RECOMBINERS DOWNSTREAM OF SCRUBBERS

OPTION 4 : PUT SCRUBBING TANKS IN SPENT FUEL POOL #2

OPTION 5 : DELETE RECIRCULATION LINE TO CONTAINMENT

OPTION 6 : ADD HYDROGEN COMBUSTION MECHANISM

OPTION 7 : VENT DIRECTLY TO SPENT FUEL POOL #2

OPTION 8 : VENT DIRECTLY TO STACK

OPERATION OPTIONS

VENT PRESSURE

TIME DEPENDENCE OF PRESSURE

USE OR BYPASS SCRUBBERS

USE OR BYPASS BACKEND FILTERS

RELEASE THROUGH STACK

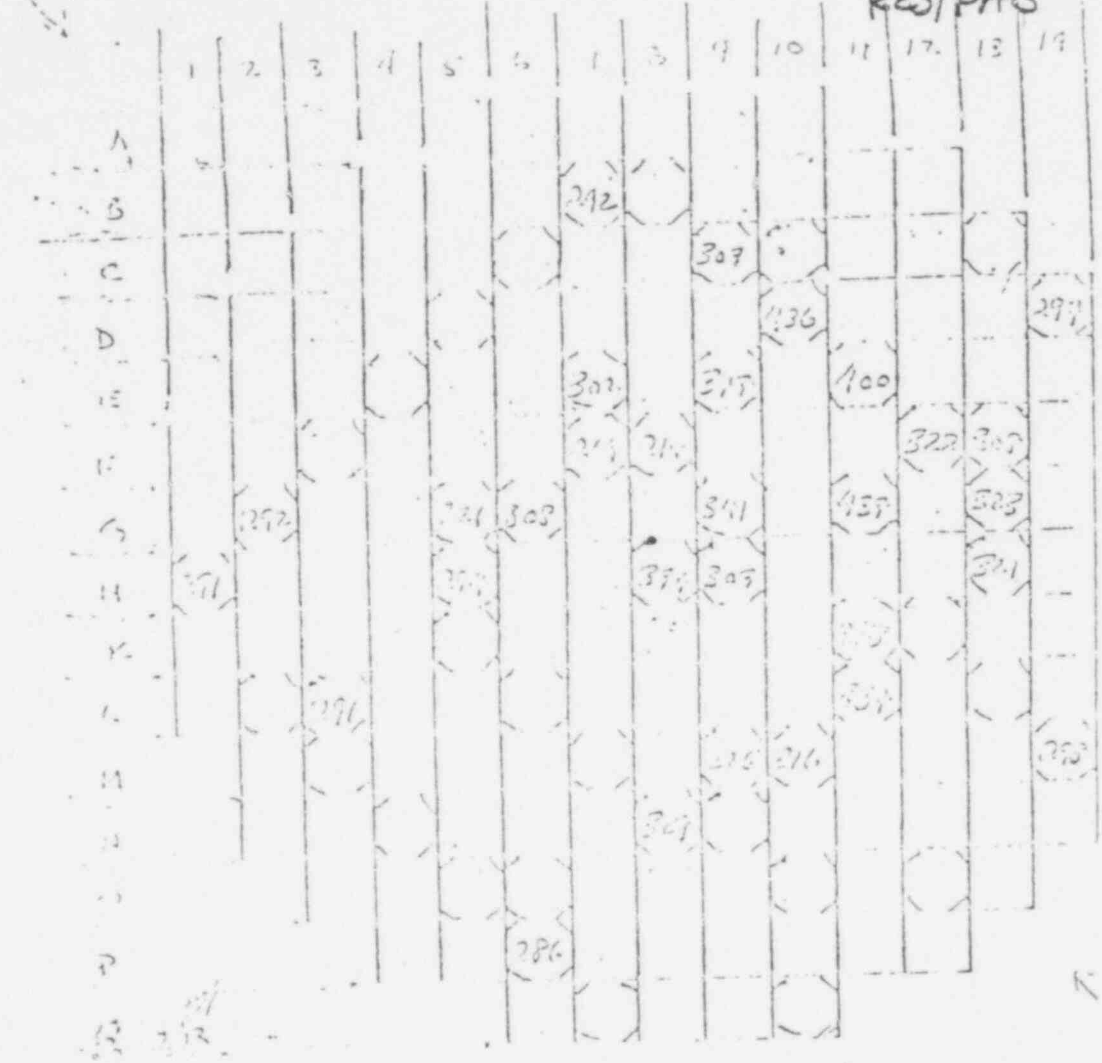
RECIRCULATE TO CONTAINMENT

H_2 CONTROL

NONEMERGENCY (NON-CORE-MELT) CLEANUP

T/C MAPS

50-320
RES/PAS



Date 4/6/79 — B out

Time 1000

RCS Pressure 1125 psig

inlet 255F

inlet 252F — & 1 B started

560F — P ... -1.2 psig

Pressurizer 242" — T_{cont} 83

SG A 16 — L_A 355"

SG B 14 — L_B 303" — Hydrogen Conc Inline: ______ Recombiner ______

Down Flow ______

Keep — lost ...
before Pump 1-A

LOCATION OF FUEL ASSEMBLIES ...
BURNABLE POISON RO...
THREE MILE ISLAND NUCLEAR ST...

7905160020

CONTAINMENT:
Pressure -1.20 psig Temp. 83F Level of Water

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A														
B							294	295						
C						296			308	294			296	
D					296					319				293
E				296			313		340		245			
F			298				276	222				293	292	
G		293			364	325			336		327		295	
H	292				335			468*	296				292	
K					301						324	292		
L		293	243			221					243		?	
M			293				299		355	333				?
N				296				316	303					
O					305	308				295		294		
P						302								
R							293			293				

Date 4/6/79
Time 1447
S.
ressure ____

inlet ____
inlet ____
ressure ____
Pressurizer ____
ess SGA ____
ess SGB ____
tdown Flow ____

B out "1B" on, "1A" off

* During transient, this TC reading varied wildly. [illegible] is out but may [illegible] suspect.

? no reading

LOCATION OF FUEL ASSEMBLIES
BURNABLE POISON ROD
THREE MILE ISLAND NUCLEAR STA
FI

Hydrogen Conc Inline: ____
Recombiner ____

CONTAINMENT:
Pressure ____ Temp. ____ Level of Water

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