

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8409070114 DOC. DATE: 84/09/04 NOTARIZED: NO DOCKET #
 FACIL: 50-275 Diablo Canyon Nuclear Power Plant, Unit 1, Pacific Gas 05000275
 50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Gas 05000323
 AUTH. NAME AUTHUR AFFILIATION
 SCHUYLER, J.O. Pacific Gas & Electric Co.
 RECIP. NAME RECIPIENT AFFILIATION
 KNIGHTON, G.W. Licensing Branch 3

SUBJECT: Forwards response to 840627 SER for safety parameter display sys (SPDS) & request for addl info. SPDS design work performed in 1981 & 1982 satisfied requirements of Suppl 1 to NUREG-0737. Ack of matl receipt requested.

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J. O. SCHUYLER
VICE PRESIDENT
NUCLEAR POWER GENERATION

September 4, 1984

PGandE Letter No.: DCL-84-299

Mr. George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Docket No. 50-275, OL-DPR-76
Docket No. 50-323
Diablo Canyon Units 1 and 2
SPDS Safety Analysis - Additional Information

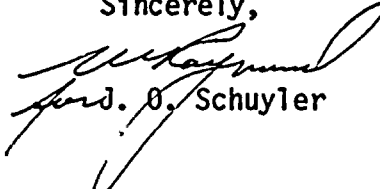
Dear Mr. Knighton:

Your letter of June 27, 1984, provided a Safety Evaluation Report for the Diablo Canyon Safety Parameter Display System (SPDS) and requested additional information on the SPDS. PGandE's response to this request is enclosed.

The initial SPDS design work was performed in 1981 and met the recommendations specified in NUREG-0696, "Functional Criteria for Emergency Response Facilities", issued in February 1981. The conceptual design was submitted to the NRC on November 6, 1981 and a delivery contract awarded to the Babcock and Wilcox Company in early 1982 for production and delivery of the system. The as-built SPDS also met the intent of the requirements of Supplement 1 to NUREG-0737, even though Supplement 1 was not issued until December 17, 1982. Supplement 1 notes that the NRC will make allowances for work already done by licensees in a good-faith effort to meet requirements as they understand them. PGandE believes the SPDS design work performed in 1981 and 1982 met all requirements understood at that time. The SPDS has been in operation for more than one year and all additional process parameters suggested by the NRC, with the exception of containment hydrogen, are included in secondary data displays.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,


J. O. Schuyler

B409070114 B40904
PDR ADCK 05000275
PDR

Enclosure

cc: J. B. Martin
H. E. Schierling
Service List

Bo21

11



ENCLOSURE

Included in this enclosure is information requested in the SPDS Safety Evaluation Report.

B. Parameter Selection (Section B of SER, Page 4)

The Safety Parameter Display System was designed, using the guidelines of NUREG 0696, "Function Criteria For Emergency Response Facilities". NUREG-0696 requires a high availability. In order to attain the high degree of reliability and provide the operators with a usable system, a single simple redundant display was developed. In an effort to meet the availability recommendation, the minimum number of plant variables were selected which would provide information about the Critical Safety Functions listed below:

- Reactivity
- Reactor core cooling and heat removal from the primary system
- Reactor coolant system integrity
- Radioactivity control
- Containment conditions

The SPDS display was not intended to be used in conjunction with the Emergency Operating Procedures but to provide a highly reliable display for the operator to assess plant conditions.

Seventeen additional displays were developed to further aid the operator. Eleven displays addressed the Westinghouse Owners Group's (WOG) Emergency Response Guidelines (ERG), five specifically keyed to the Emergency Procedures and six reproduced the Critical Safety Function Status Trees. The remaining six displays supply the operator with information used during normal plant conditions as well as during upset plant conditions. Appendix A to this enclosure provides illustration of these seventeen displays plus the SPDS display. Because of the high degree of reliability specified in NUREG 0696 for the SPDS these seventeen displays were not considered as a part of the SPDS.

Parameters suggested as possible additions in the staff's review are included on the secondary displays with the exception of Containment H₂. The Westinghouse Owners Group's Critical Safety Function (CSF) Status Tree on Containment Integrity does not include this parameter, and the ERG's do not refer to it in any immediate action. PGandE believes that the installed plant instrumentation is adequate without this parameter.

The WOG CSF status trees have been revised since PGandE's displays were implemented. PGandE is in the process of revising these displays to conform with the latest WOG's recommendation.



D. Human Factors Program (Section D of SER, Page 7)

PGandE has previously committed to performing a Human Factors review of the SPDS. This review will be expanded to include the seventeen additional displays discussed earlier. This review, which is part of the ongoing Control Room Design Review will specifically address the potential human engineering discrepancies identified by the SER.

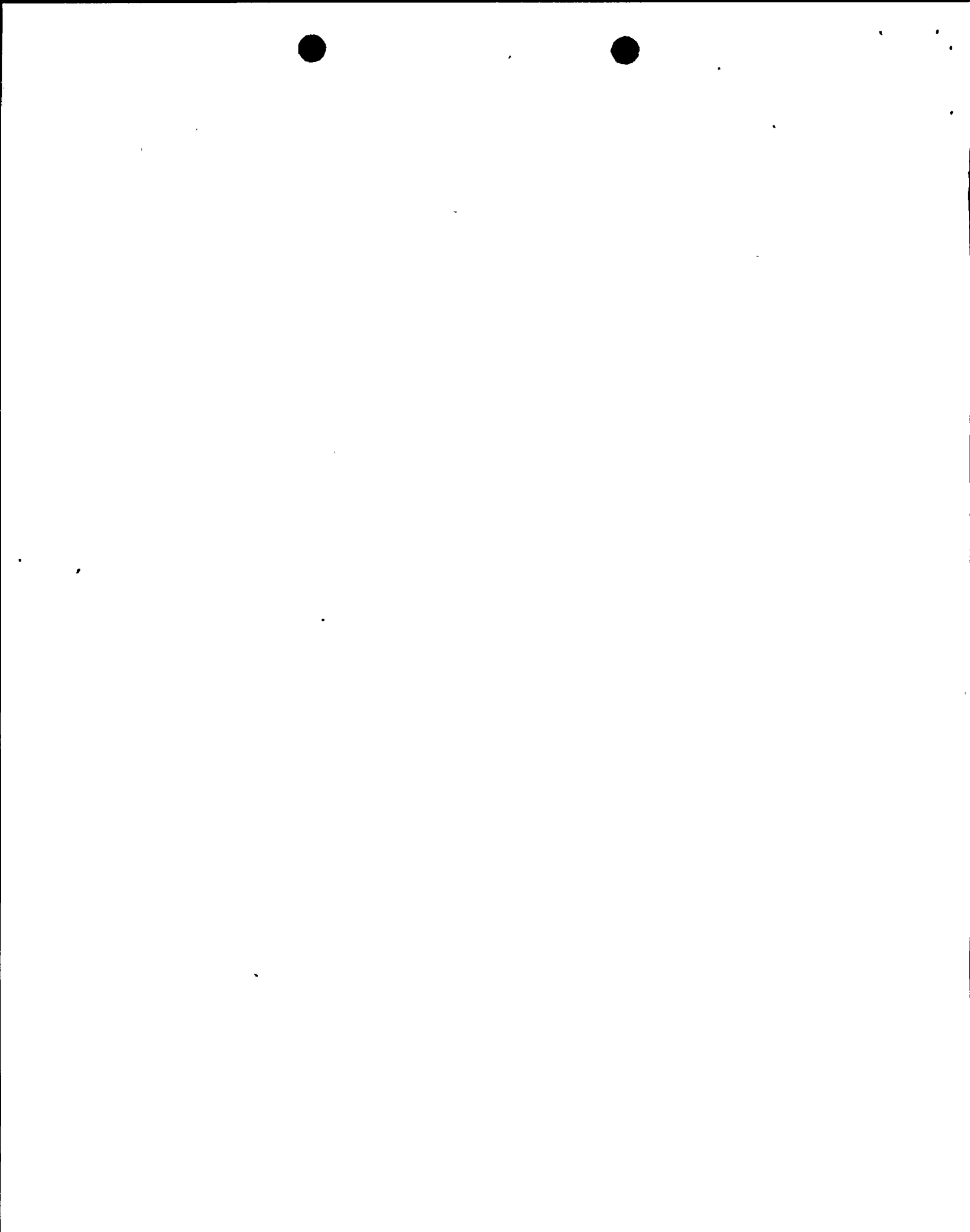
E. Electrical and Electronic Isolation (Section E of SER, Page 11)

Since the Diablo Canyon System uses fiber-optic isolation between Class I instrumentation and Class II ERFDS equipment, items 2 (a-e) are not directly applicable. The following addresses all those items:

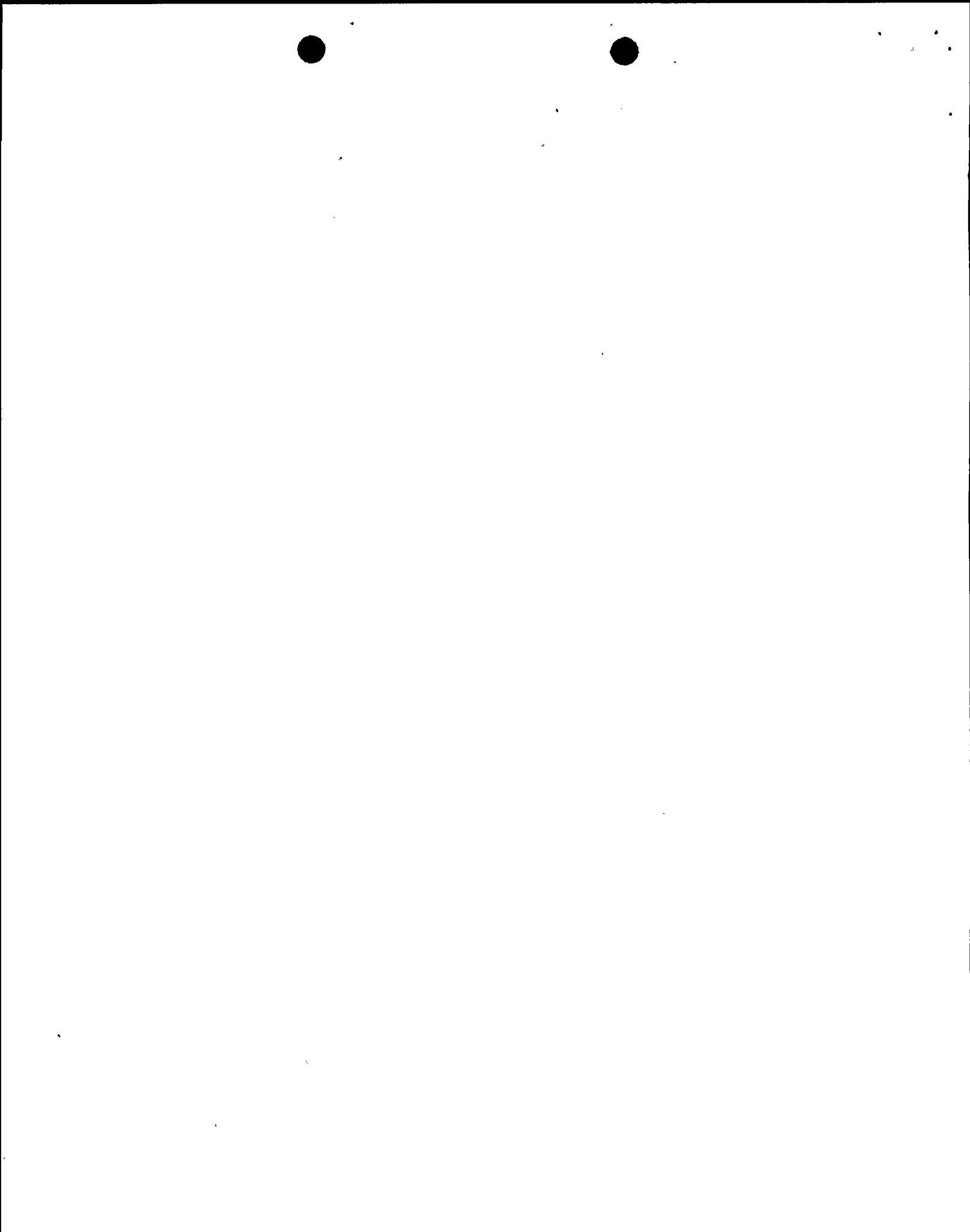
The Emergency Respose Facility Data System (ERFDS) of which the Safety Parameter Display System (SPDS) is part, is composed of both Class I and non-Class I equipment. The majority of the system is non-Class I except where the system interfaces with Class I instrument loops. Where the remote multiplexers interface with Class I instrument loops qualified Class IE devices are installed⁽¹⁾. In this way, both class and channel separation is maintained and the multiplexer in this case is not acting as an isolator between separate channels.

The ERFDS/SPDS does not interface with the protection portion of any instrument loops. The ERFDS/SPDS interface is after existing isolation devices which separate the protection part of the control loop (Class IA) and the monitoring part of the loop (either IB or non-Class I). For purposes of clarification, PGandE defines instrument Class IA as those instruments which meet IEEE Class IE safety-related requirements. PGandE defines instrument Class IB types A-E as those instruments which meet the requirements of Regulatory Guide 1.97, Revision 3. The remote multiplexers which interface with the monitoring part of the loop are qualified and powered by IE power sources. Multiplexers which interface with non-Class I loops are Class II. Isolation between the Class I remote multiplexers and the Class II ERFDS/SPDS equipment is accomplished by way of a digital fiber-optic link. The fiber-optic link which transmits the signal using light instead of electric current has characteristics such that it is not affected by any electrical interference (i.e., Electrostatic Coupling, EMI, Common Mode, and Crosstalk). Therefore, disturbances in the non-Class I portion of the system cannot feed back into the Class I equipment.

(1) Class I instrument loops are wired to qualified Class IE multiplexers such that required channel separation is maintained.

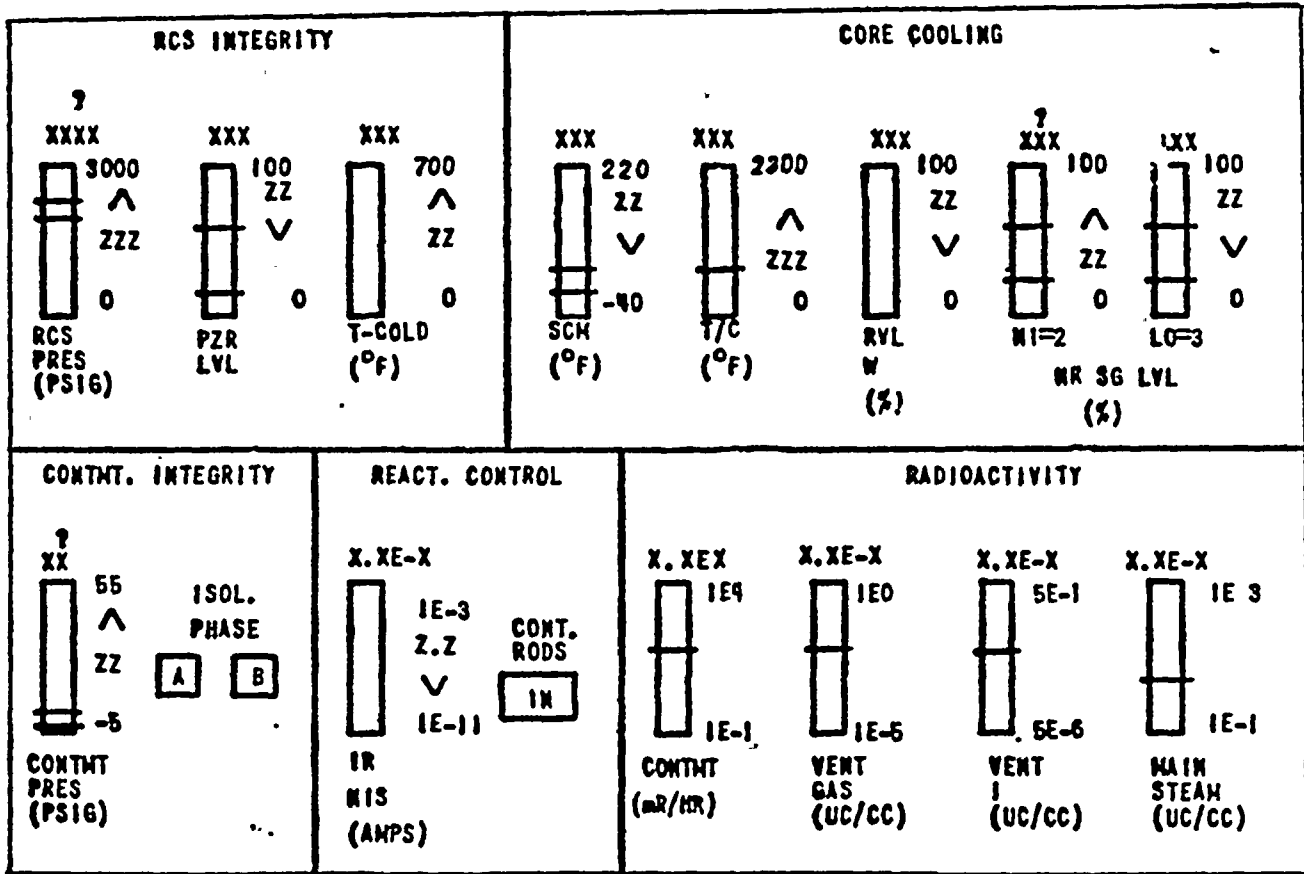


APPENDIX A



DIABLO CANYON UNIT 1
SPDS

XX/XX/XX
YY:YY:YY

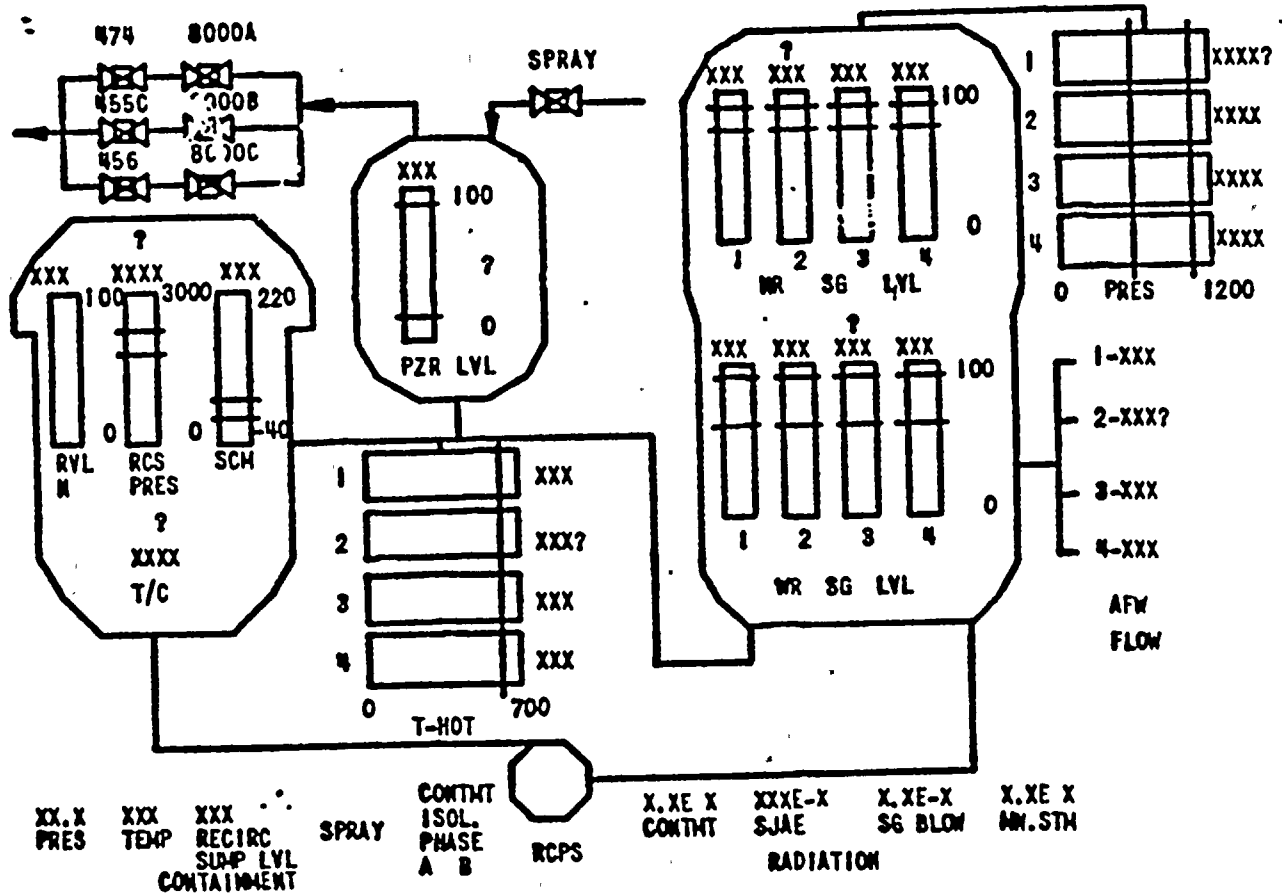




DIABLO CANYON UNIT 1
E-0

(Reactor Trip With Safety Injection)

XX/XX/XX
YY:YY:YY

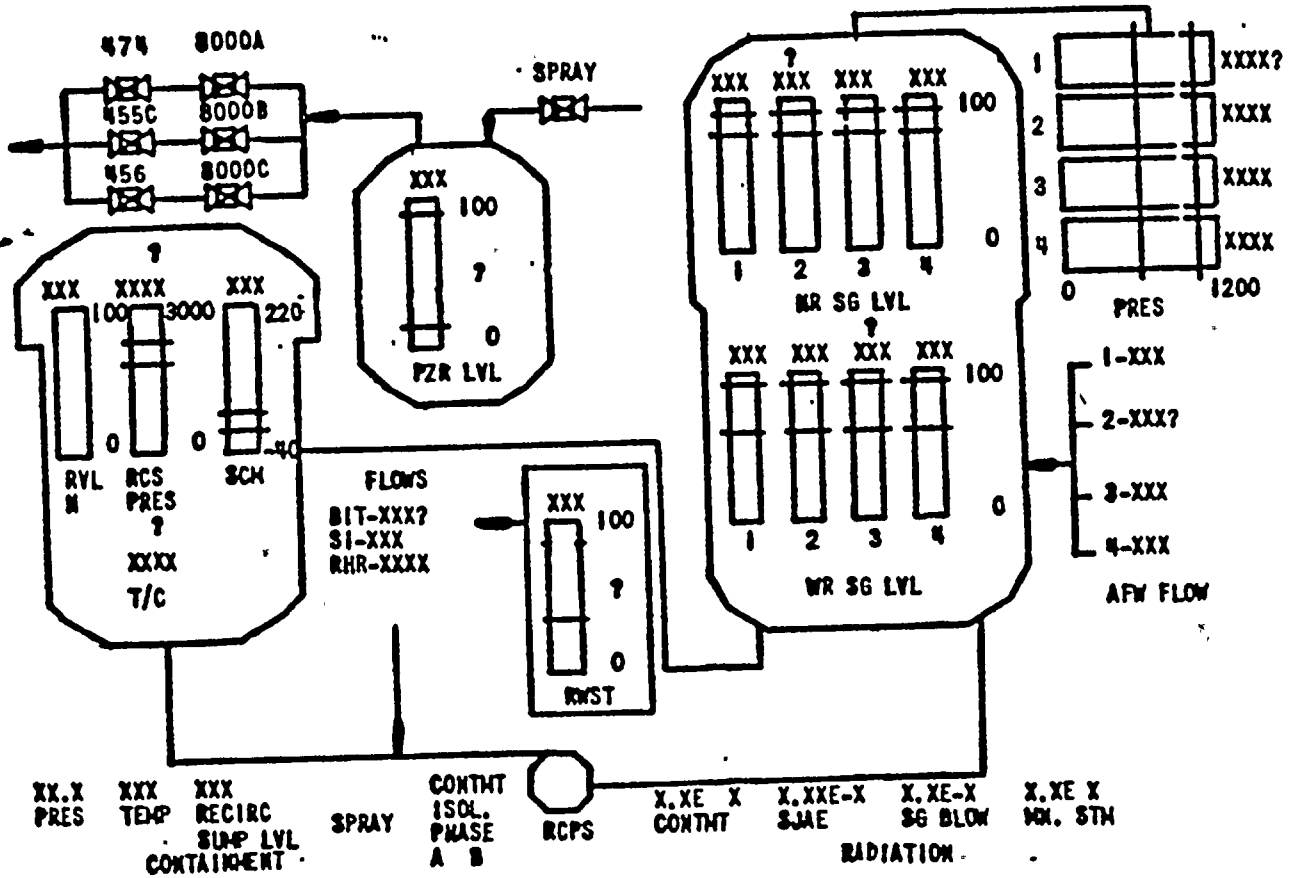


Title in Parentheses Not Shown



DIABLO CANYON UNIT 1 (Loss of Coolant Accident)
E-1

XX/XX/XX
YY:YY:YY



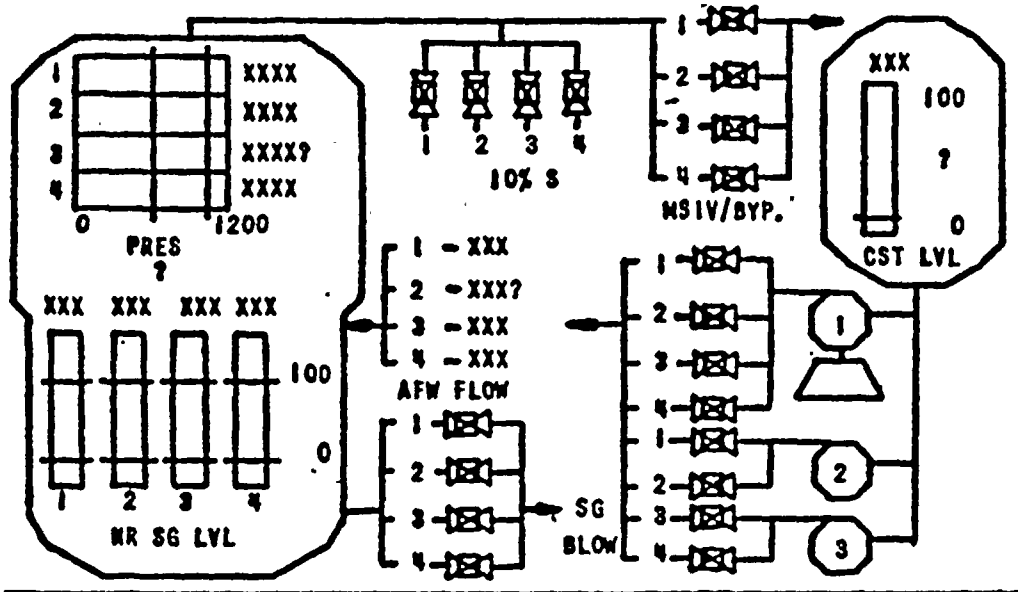
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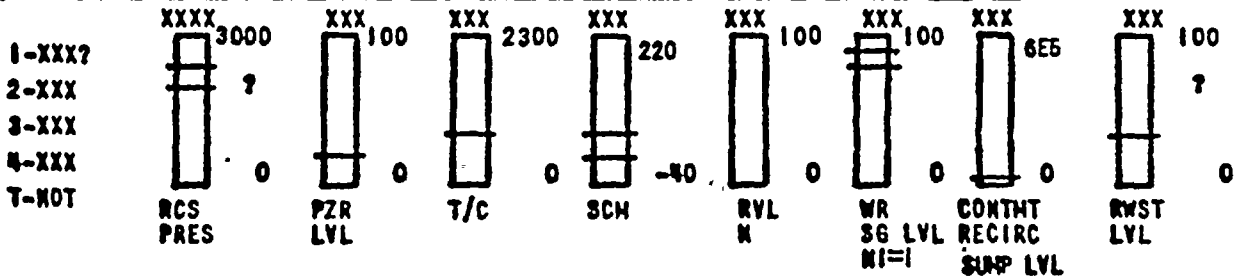
DIABLO CANYON UNIT 1
E-2

(Loss of Secondary Coolant)

XX/XX/XX
YY:YY:YY



RCPS
PORVS/BLOCKS
FLOWS
BIT-XXXX?
SI-XXXX
RHR-XXXX
CONTMT
RAD-X, XE X
PRES-XX.X
SPRAY

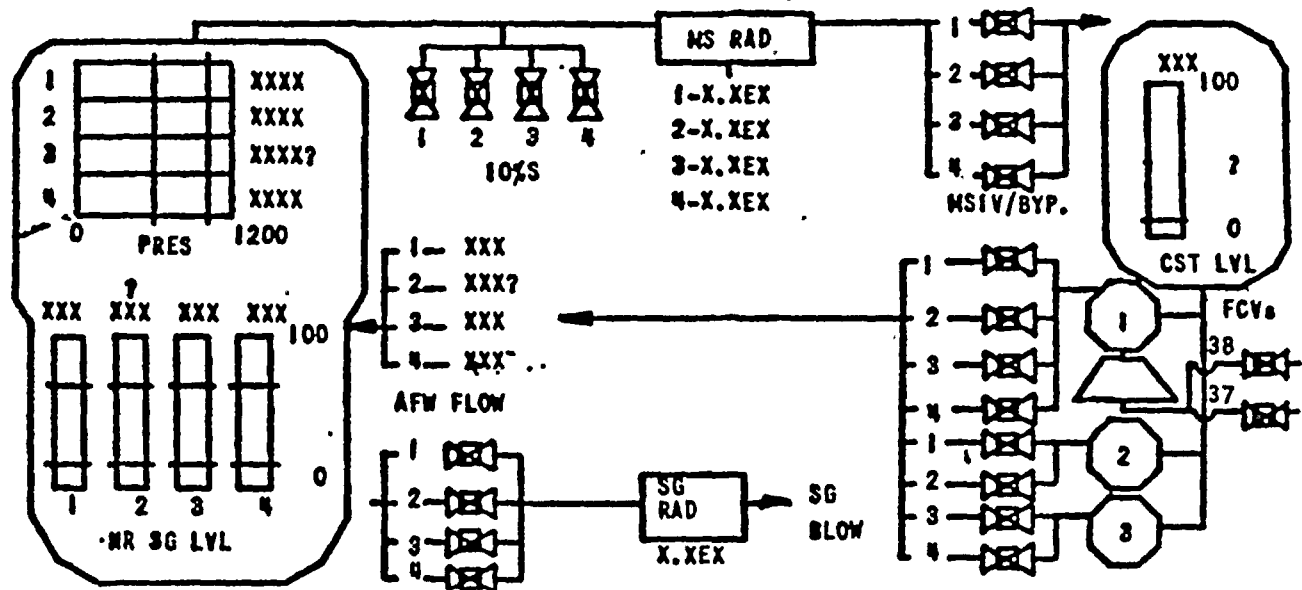


Title in Parentheses Not Shown



DIABLO CANYON UNIT 1 (Steam Generator Tube Rupture)
E-3

XX/XX/XX
YY:YY:YY



1-XXX?	XXXX 3000	XXX 100	XXXX 2300	XXX 220	XXX 100	XX.X 65	RCPS
2-XXX							PORVS/BLOCKS
3-XXX		?				?	FLWS
4-XXX		0	0	0	0	-5	BIT-XXXX?
T-NOT	RCS PRES	PZR LVL	T/C	SCH	RVL	CONTHT PRES	SI - XXXX

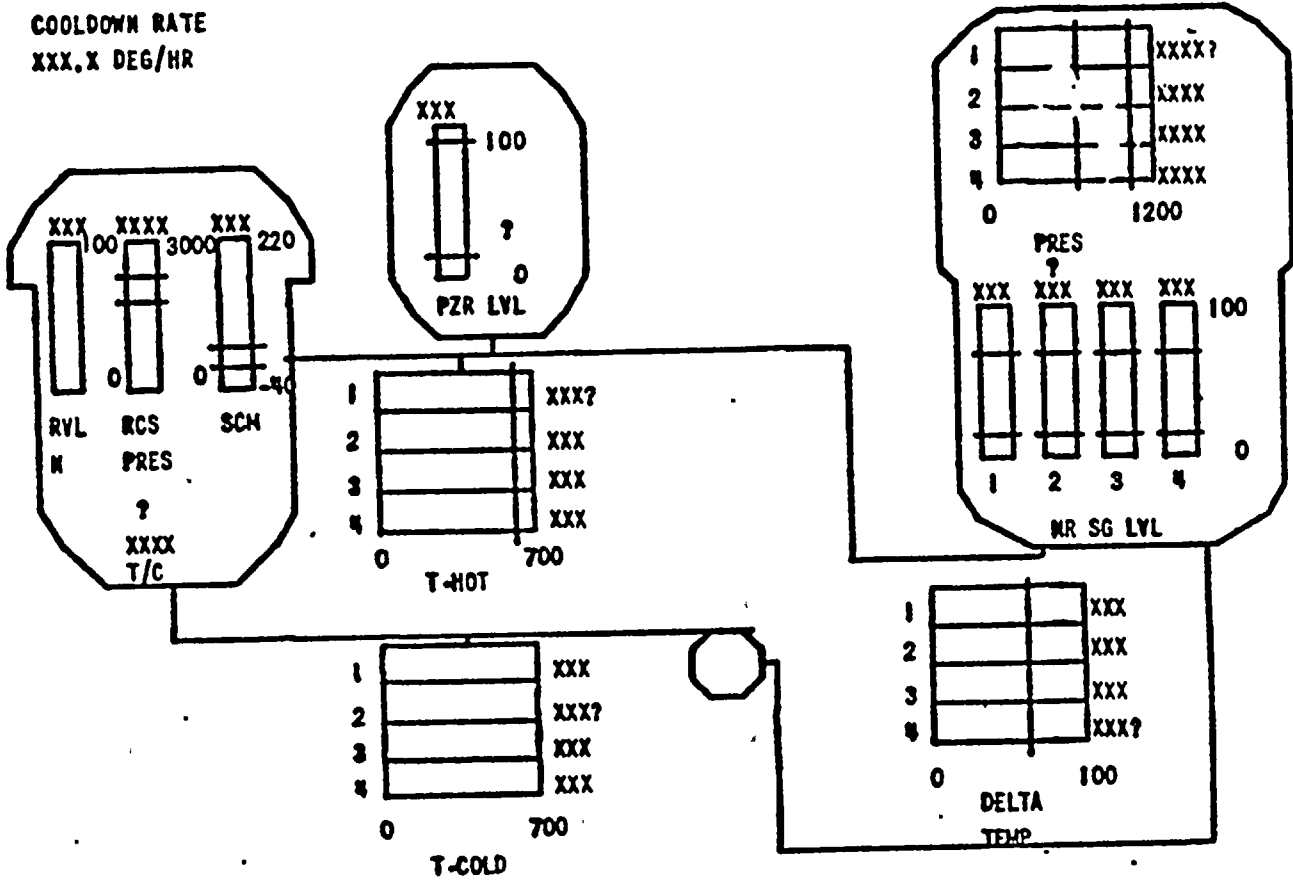
Title in Parentheses Not Shown



DIABLO CANYON UNIT 1 (Natural Circulation)
E-0.2

XX/XX/XX
YY:YY:YY

COOLDOWN RATE
XXX.X DEG/HR



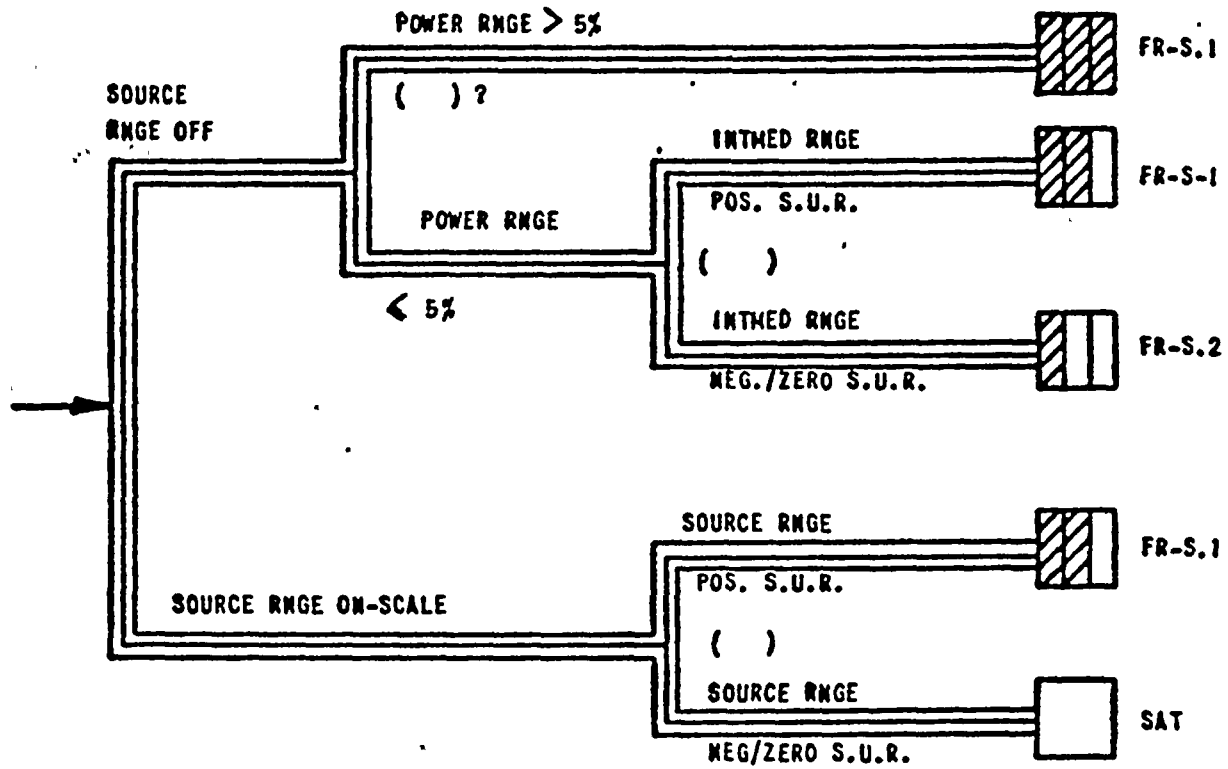
Title in Parentheses Not Shown on Display



DIABLO CANYON UNIT 1
SUBCRITICALITY 1

123456

XX/XX/XX
YY:YY:YY

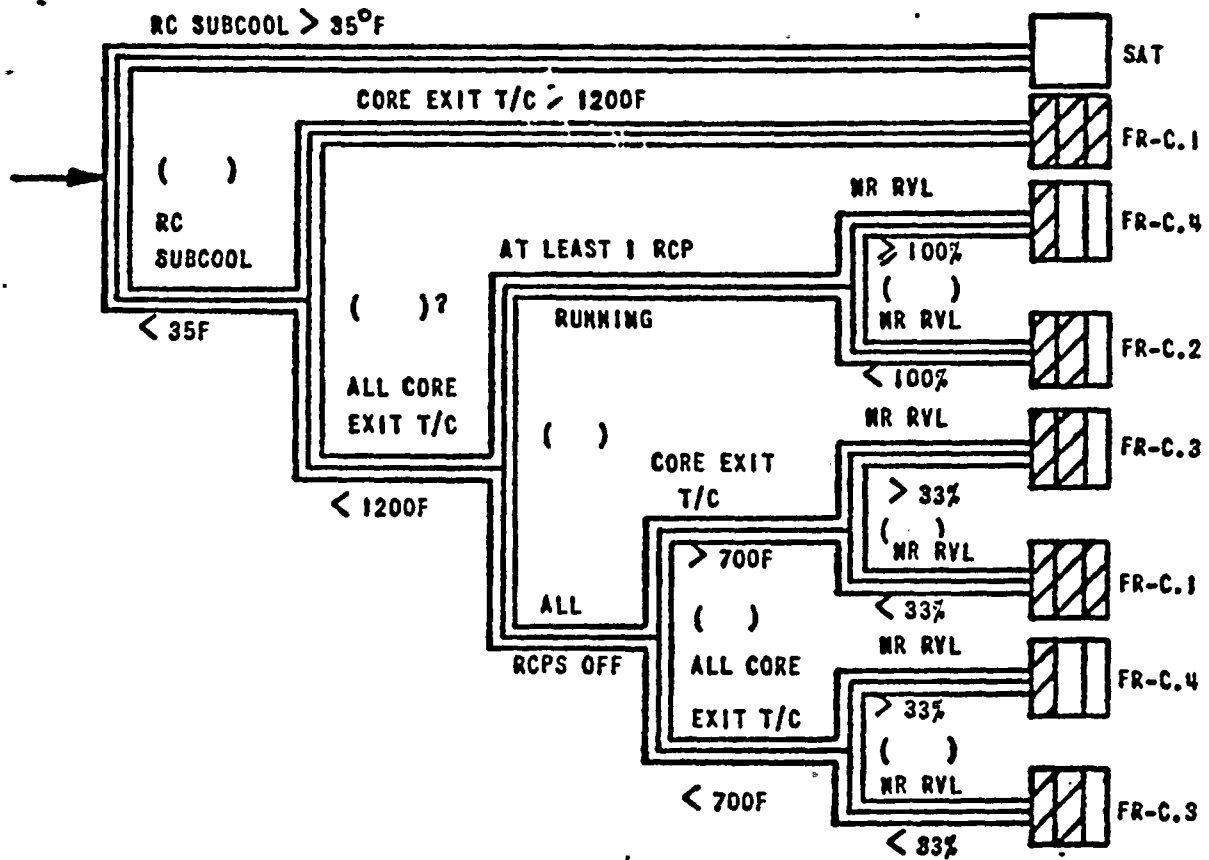


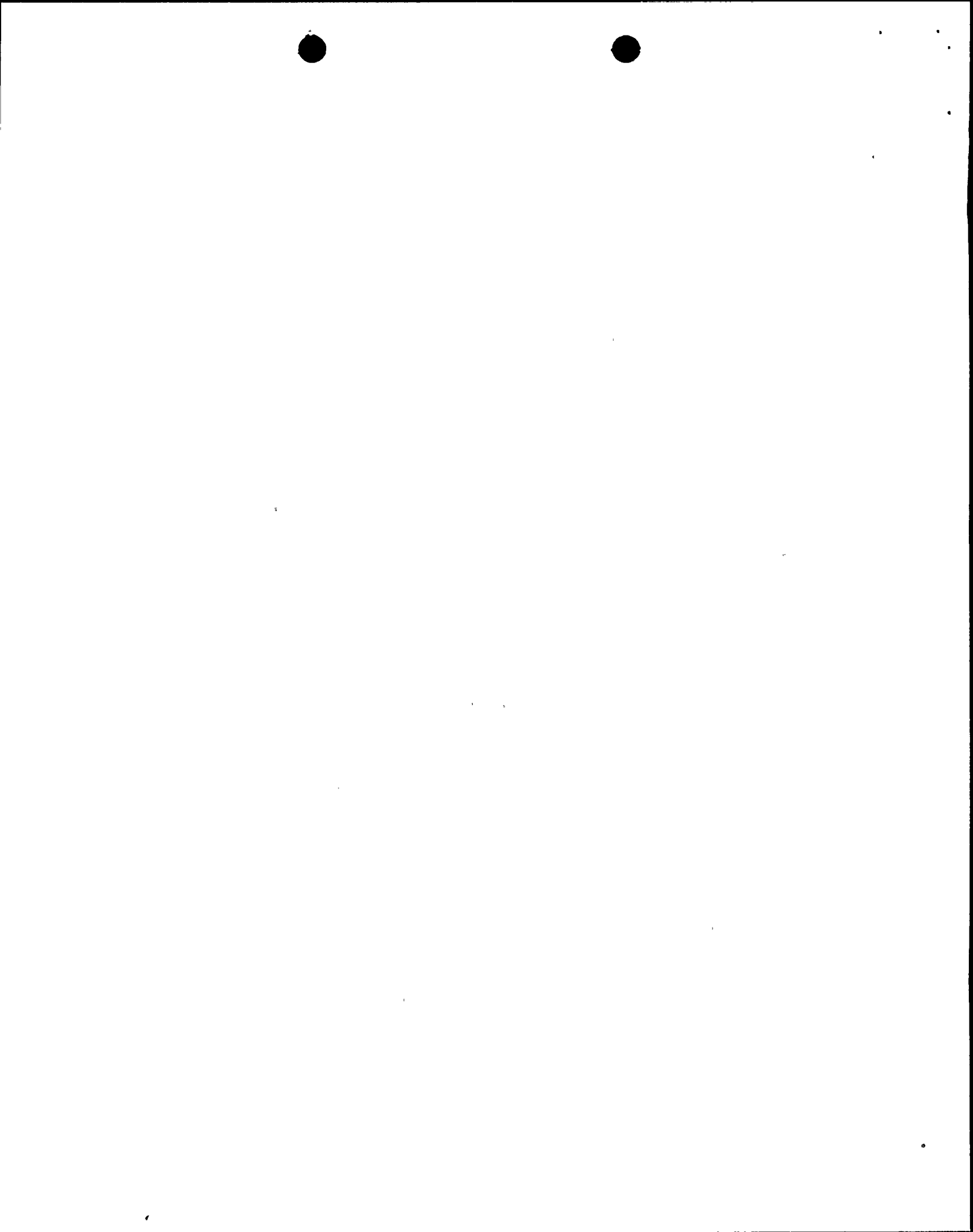


DIABLO CANYON UNIT 1
CORE COOLING 2

123456

XX/XX/XX
YY:YY:YY

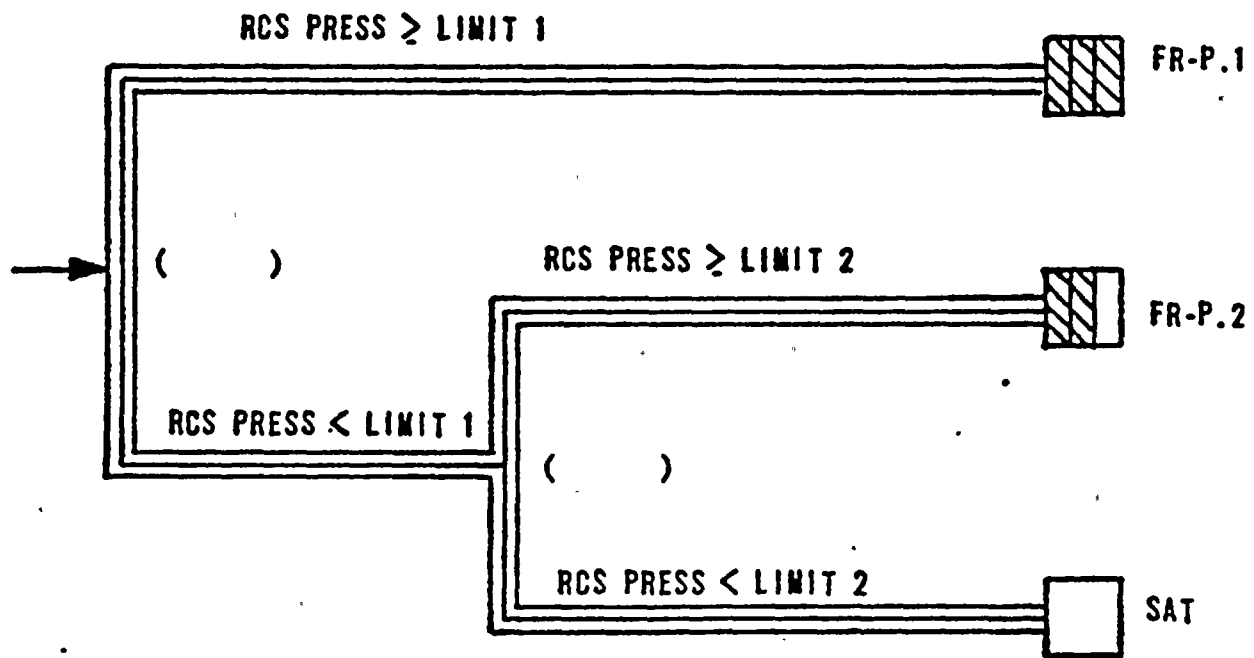




DIABLO CANYON UNIT 1
RCS INTEGRITY 3

123456

XX/XX/XX
YY:YY:YY



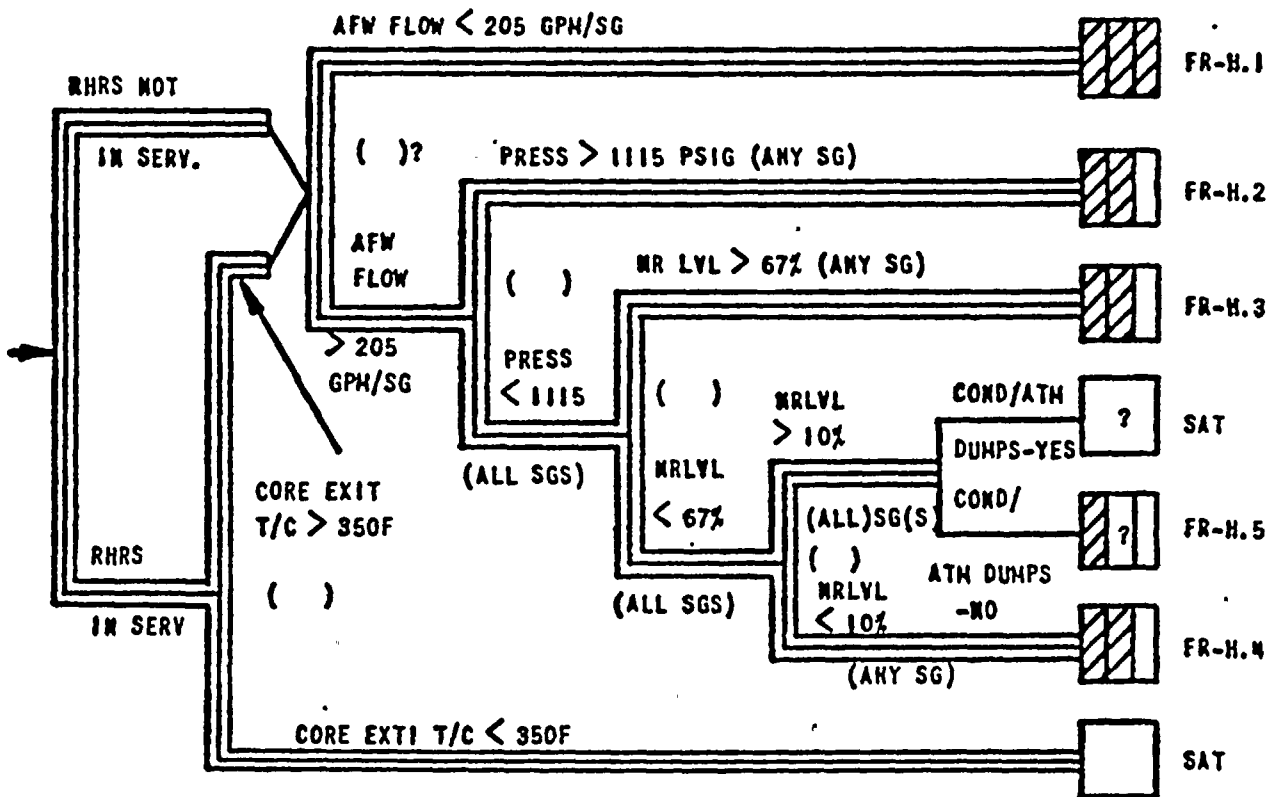


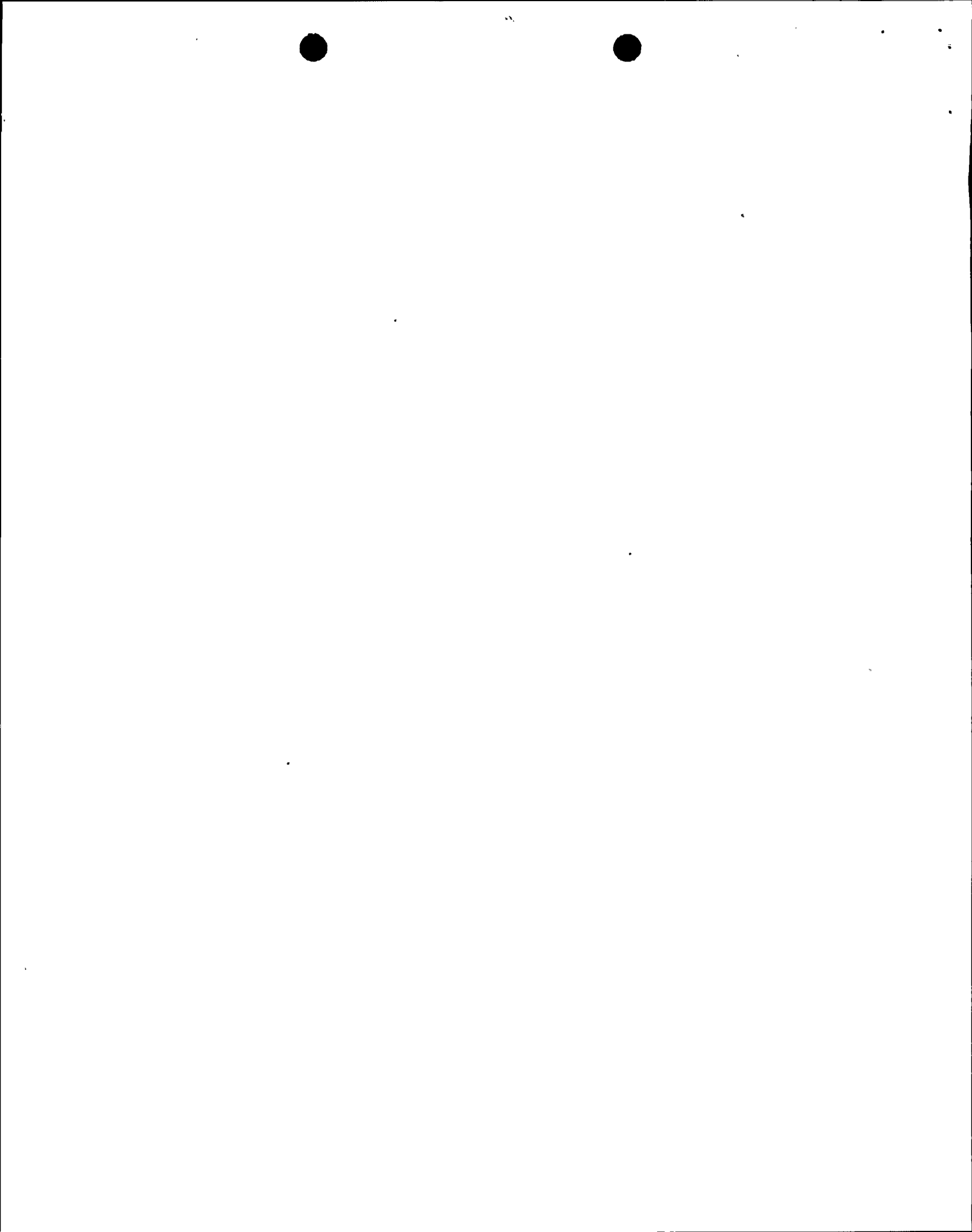
1

DIABLO CANYON UNIT 1
HEAT SINK 4

123456

XX/XX/XX
YY:YY:YY

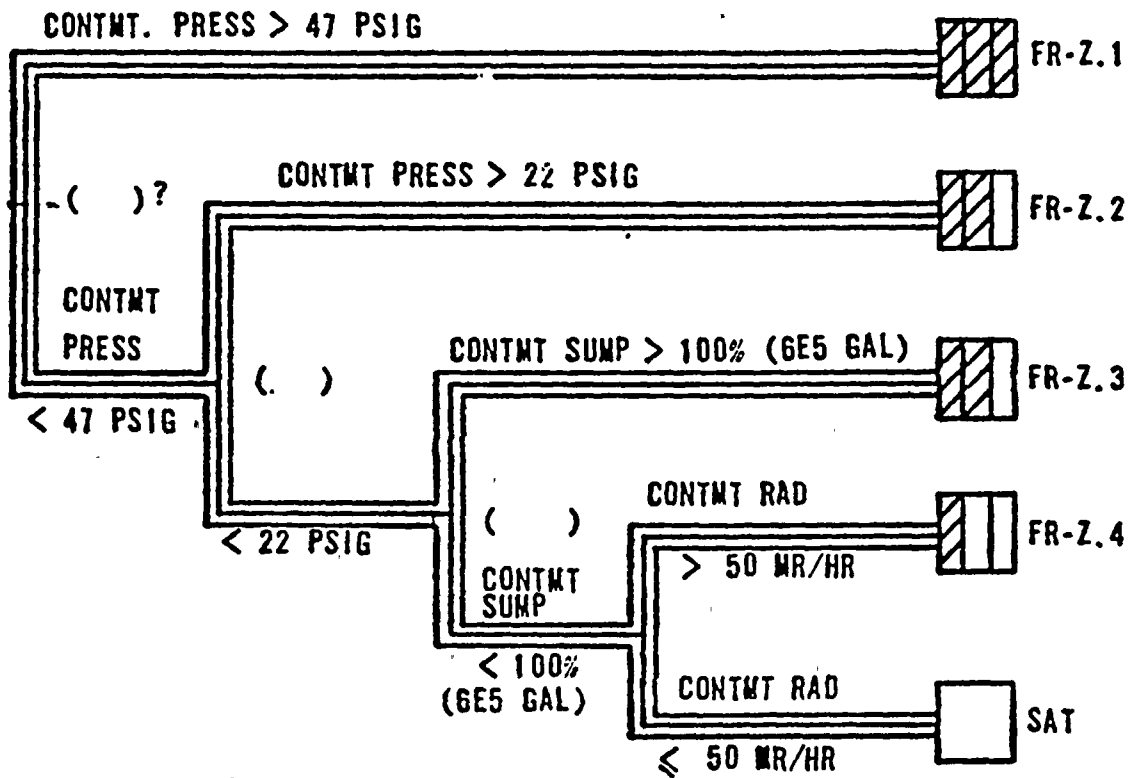




DIABLO CANYON UNIT 1
CONTAINMENT 5

123456

XX/XX/XX
YY:YY:YY

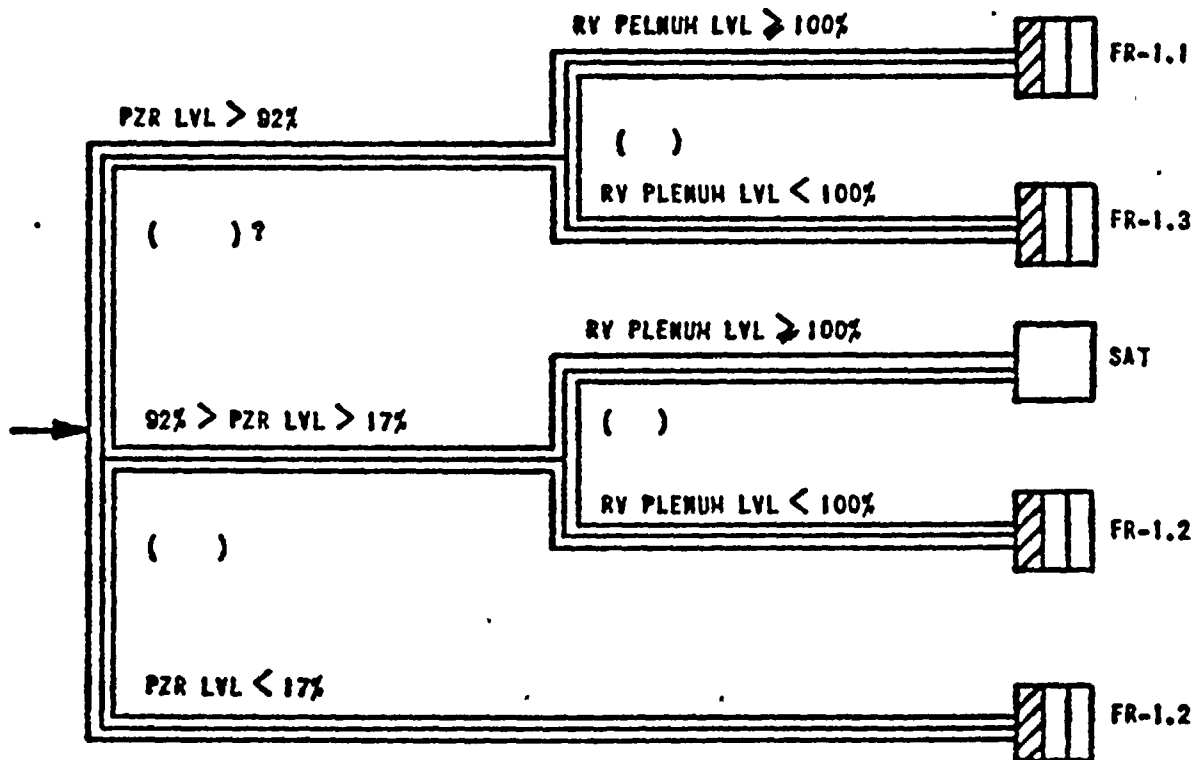


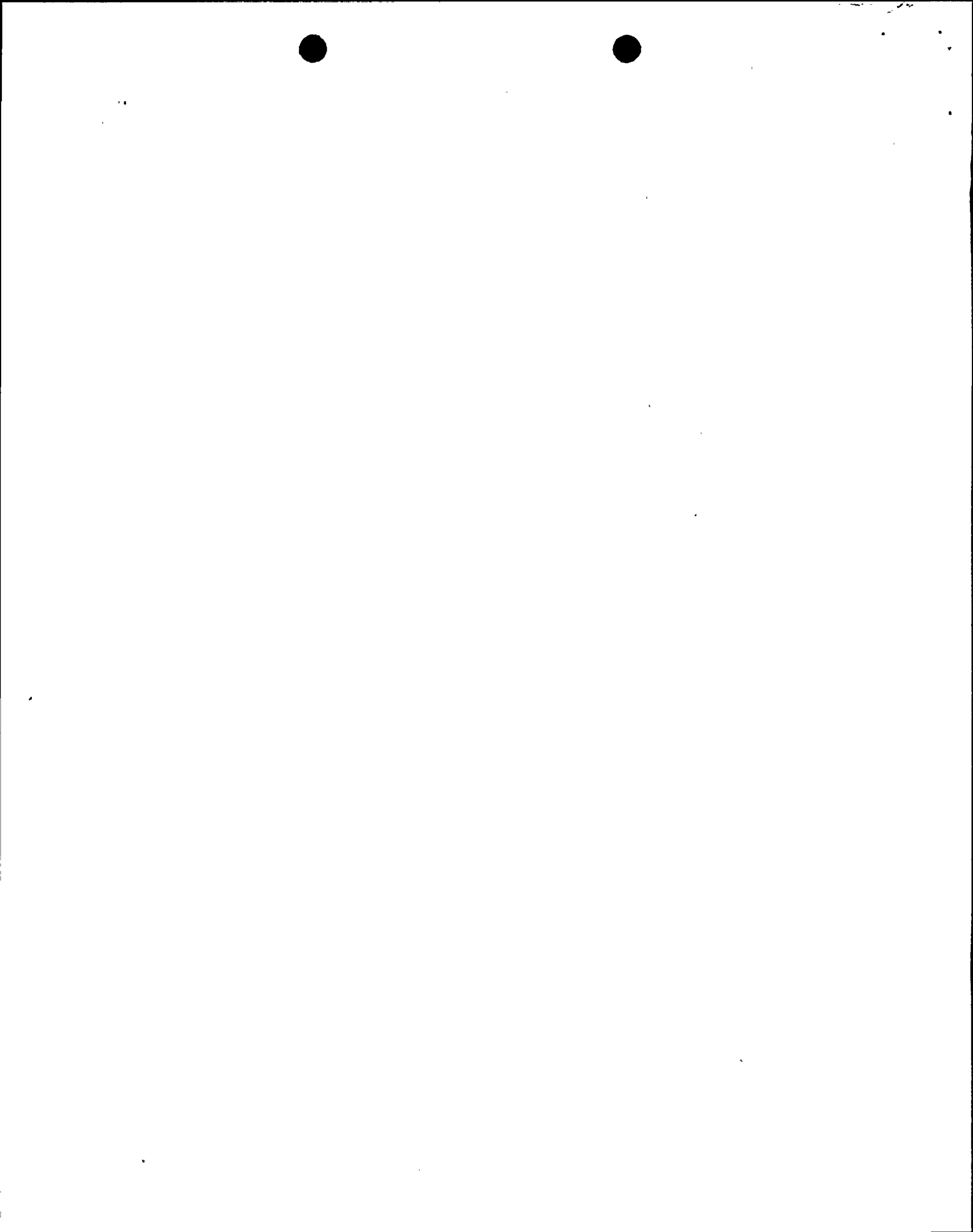


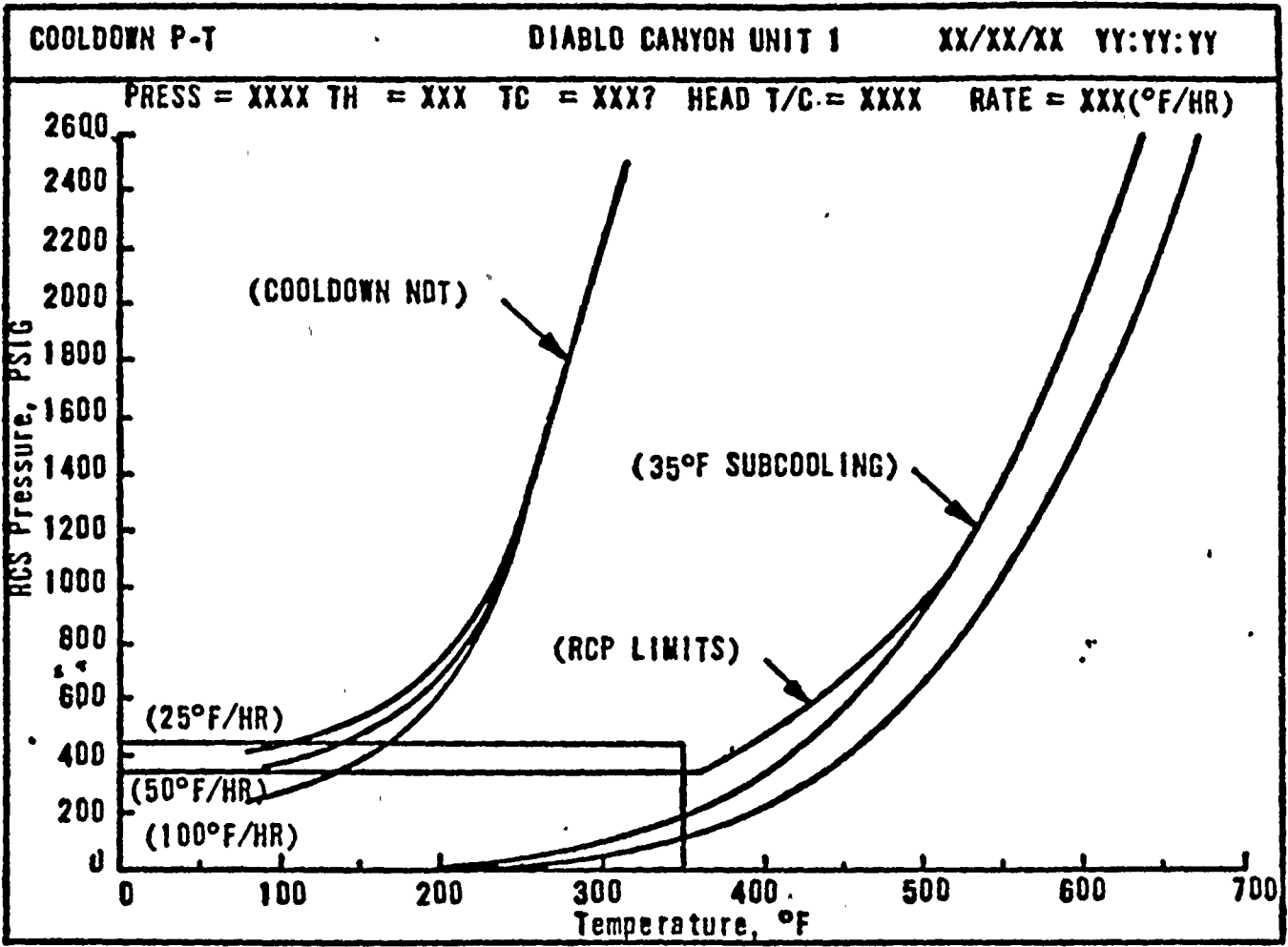
DIABLO CANYON UNIT 1
RC INVENTORY 6

123456

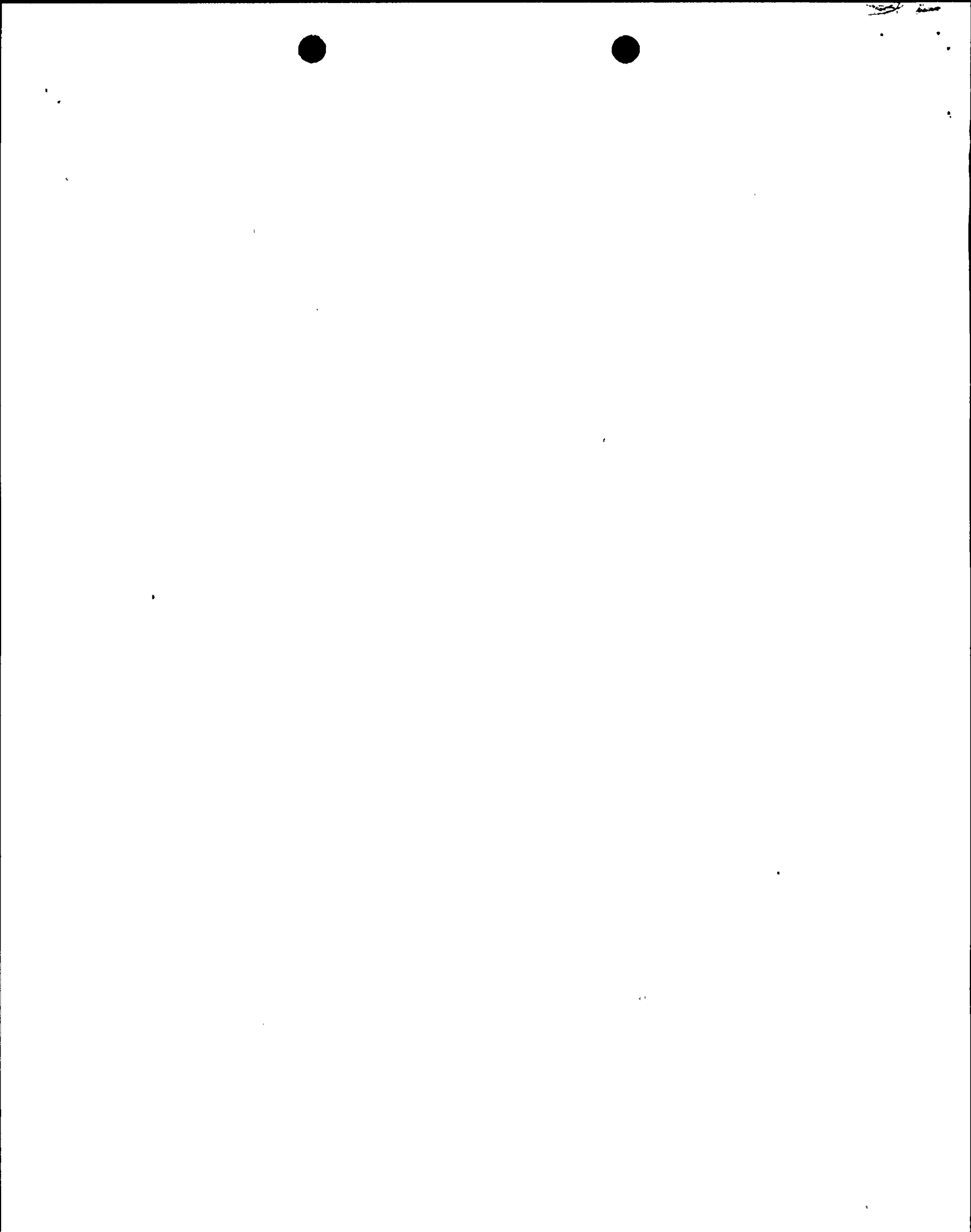
XX/XX/XX
YY:YY:YY







TITLES IN PARENTHESES WILL NOT BE DISPLAYED



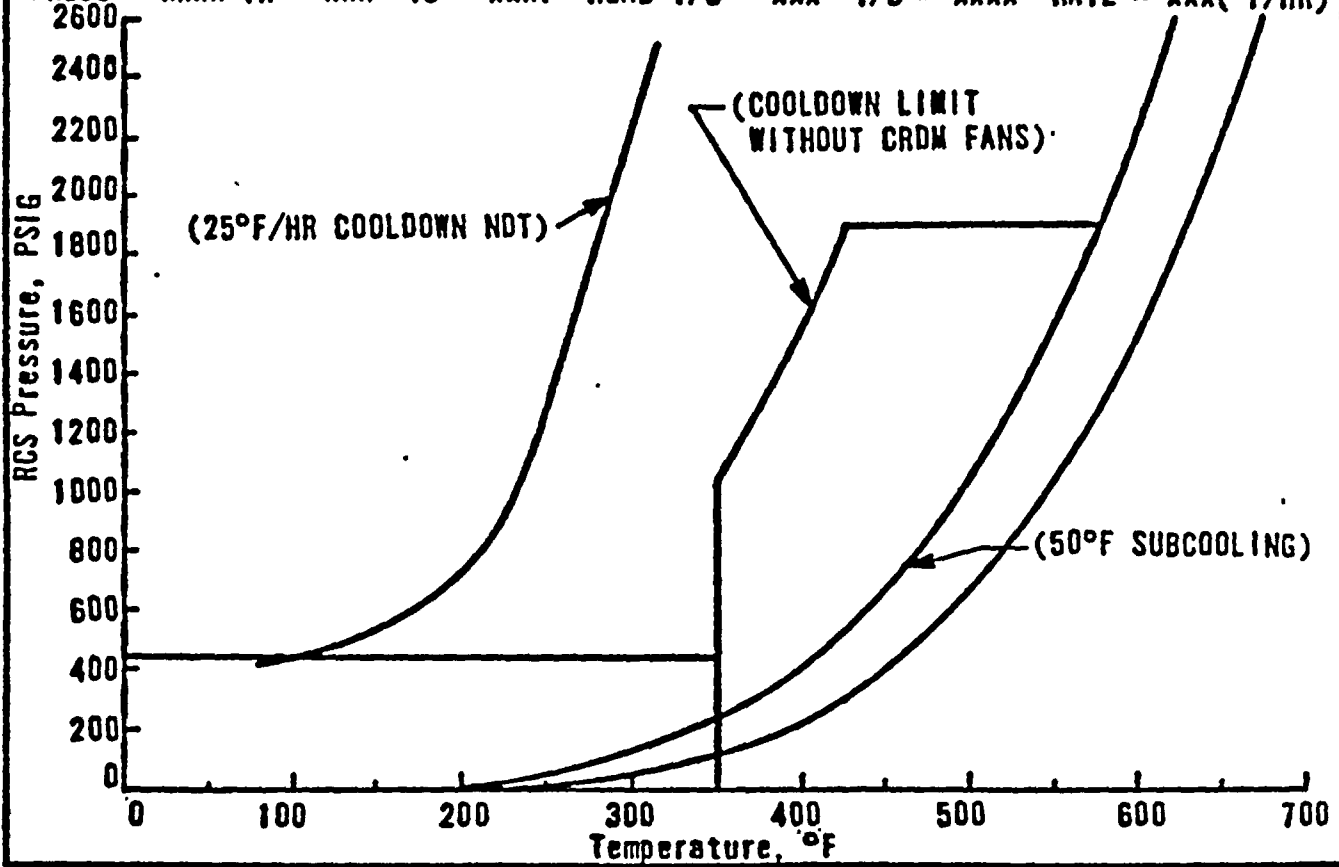
NC COOLDOWN P-T

DIABLO CANYON UNIT 1

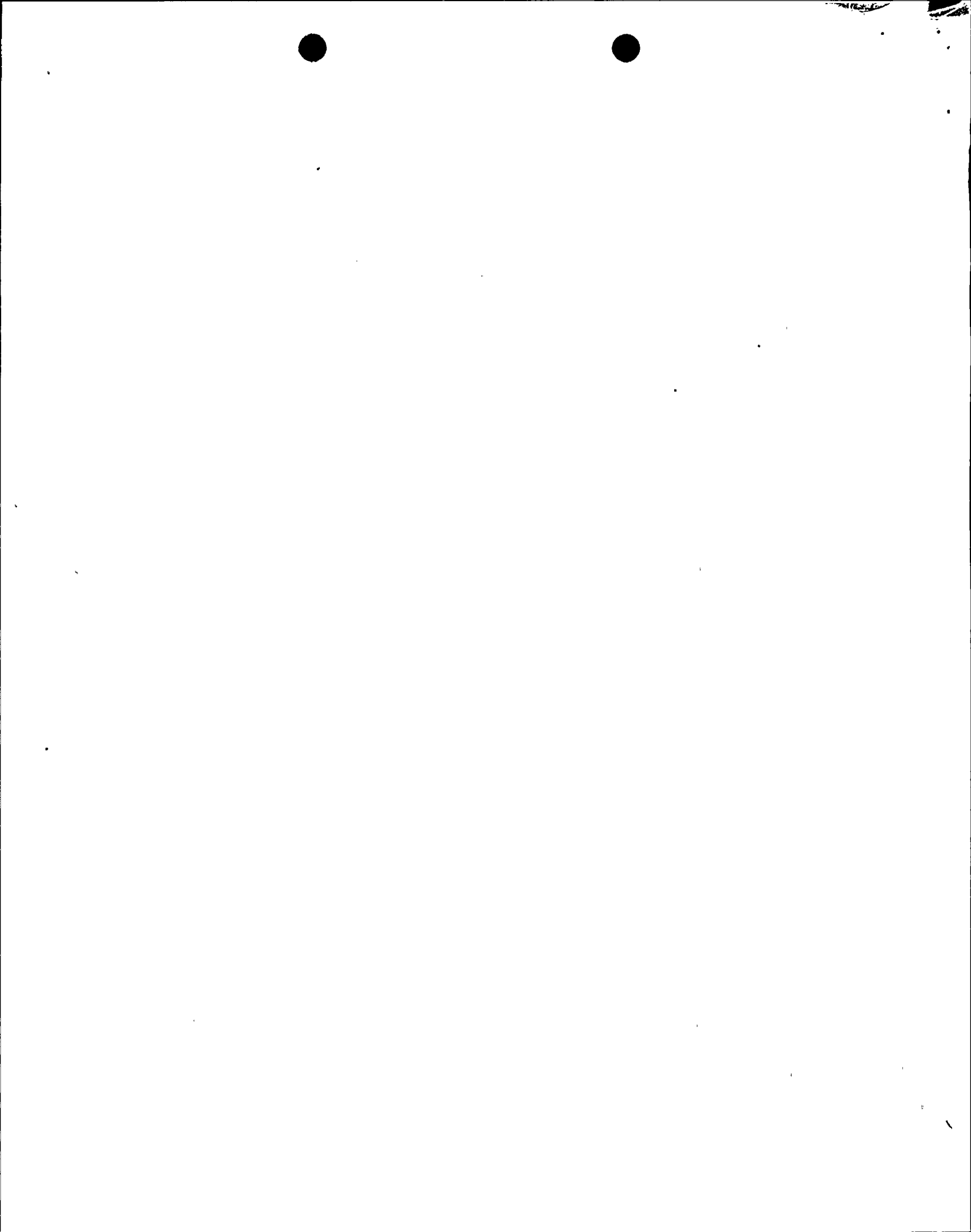
XX/XX/XX

YY:YY:YY

PRESS = XXXX TH =XXX TC =XXX? HEAD T/C = XXX T/C = XXXX RATE = XXX(°F/HR)



TITLES IN PARENTHESES WILL NOT BE DISPLAYED



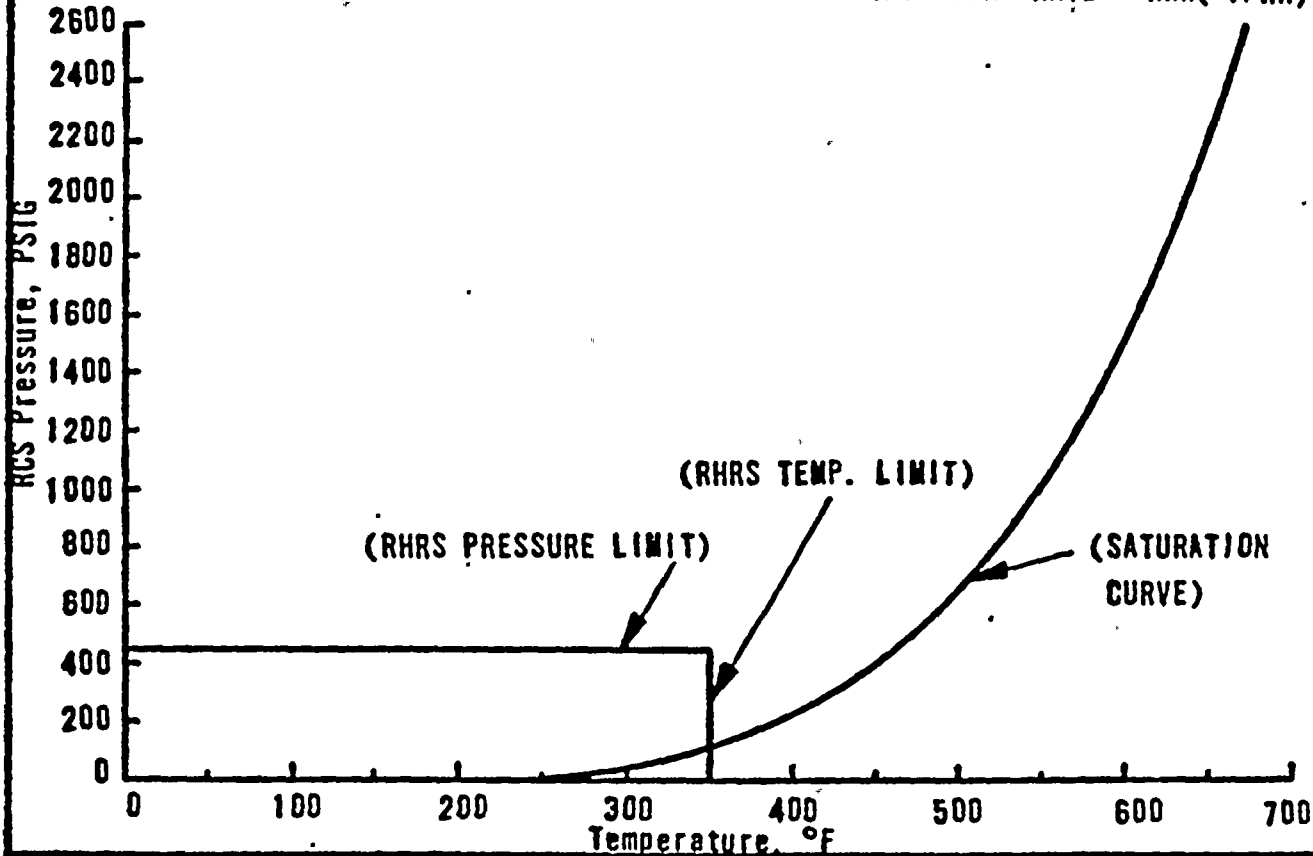
P-T

DIABLO CANYON UNIT 1

XX/XX/XX

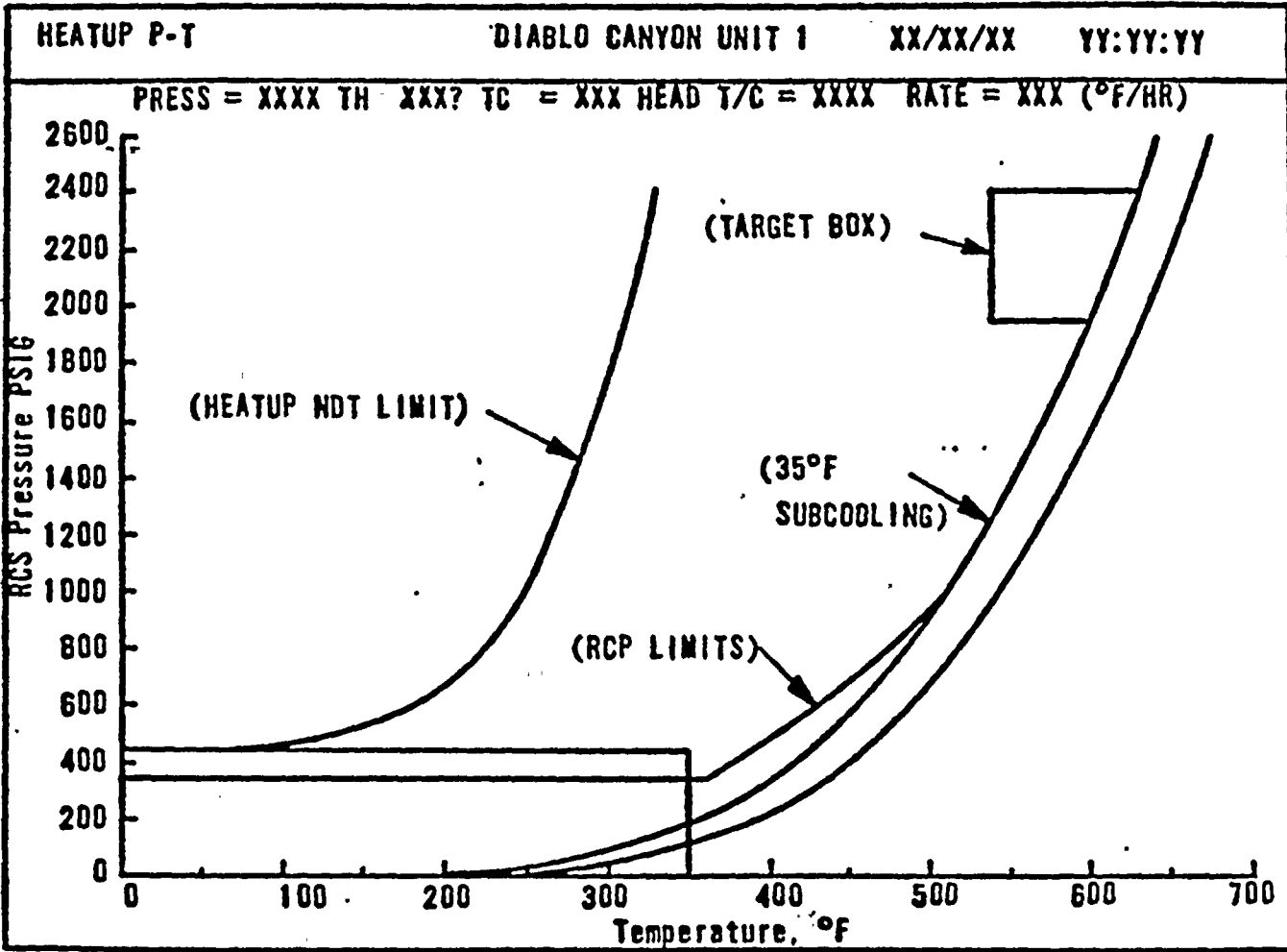
YY:YY:YY

PRESS = XXXX TH =XXX TC =XXX HEAD T/C = XXX T/C XXXX RATE = XXX(°F/HR)

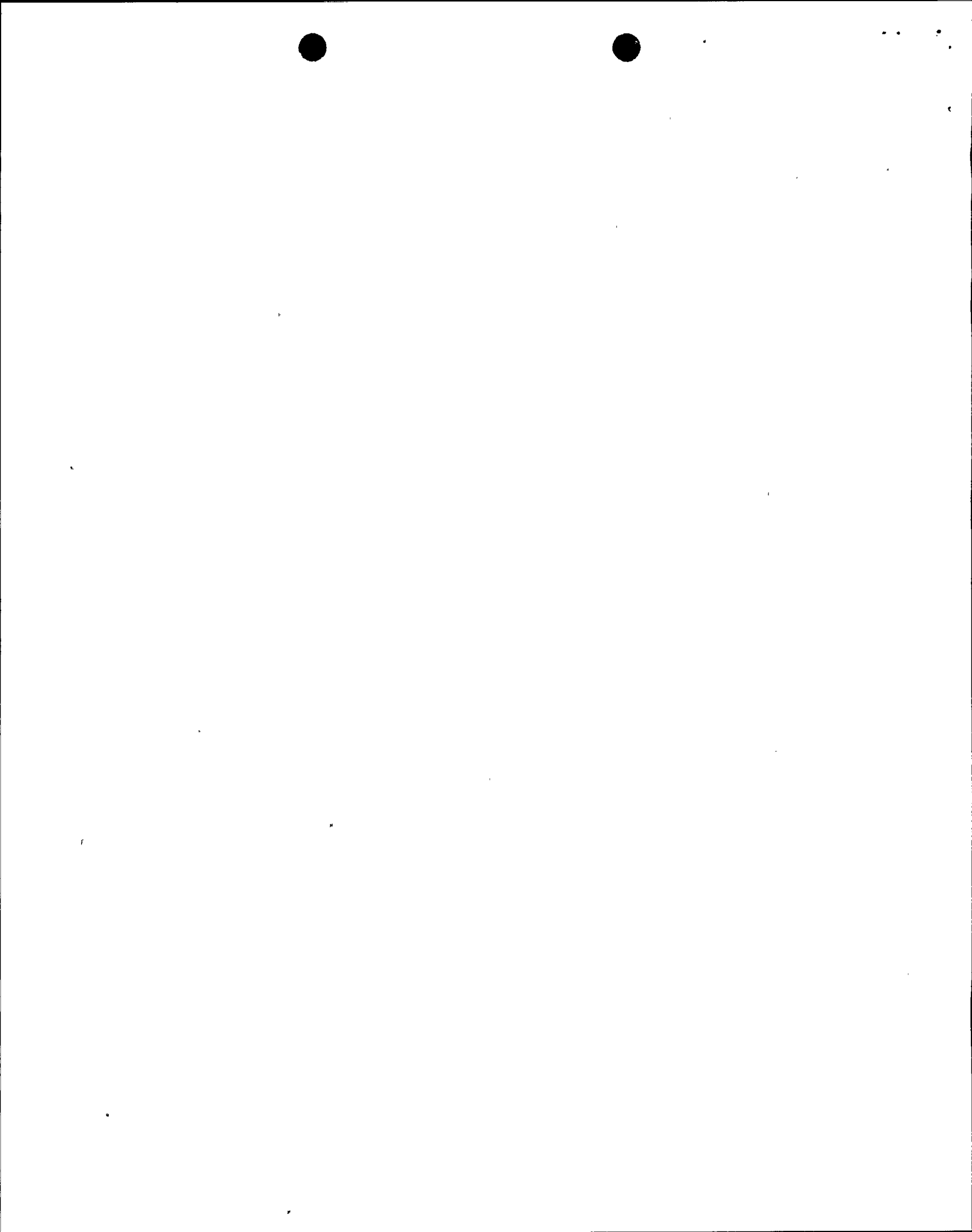


TITLES IN PARENTHESIS WILL NOT BE DISPLAYED





TITLES IN PARENTHESES WILL NOT BE DISPLAYED

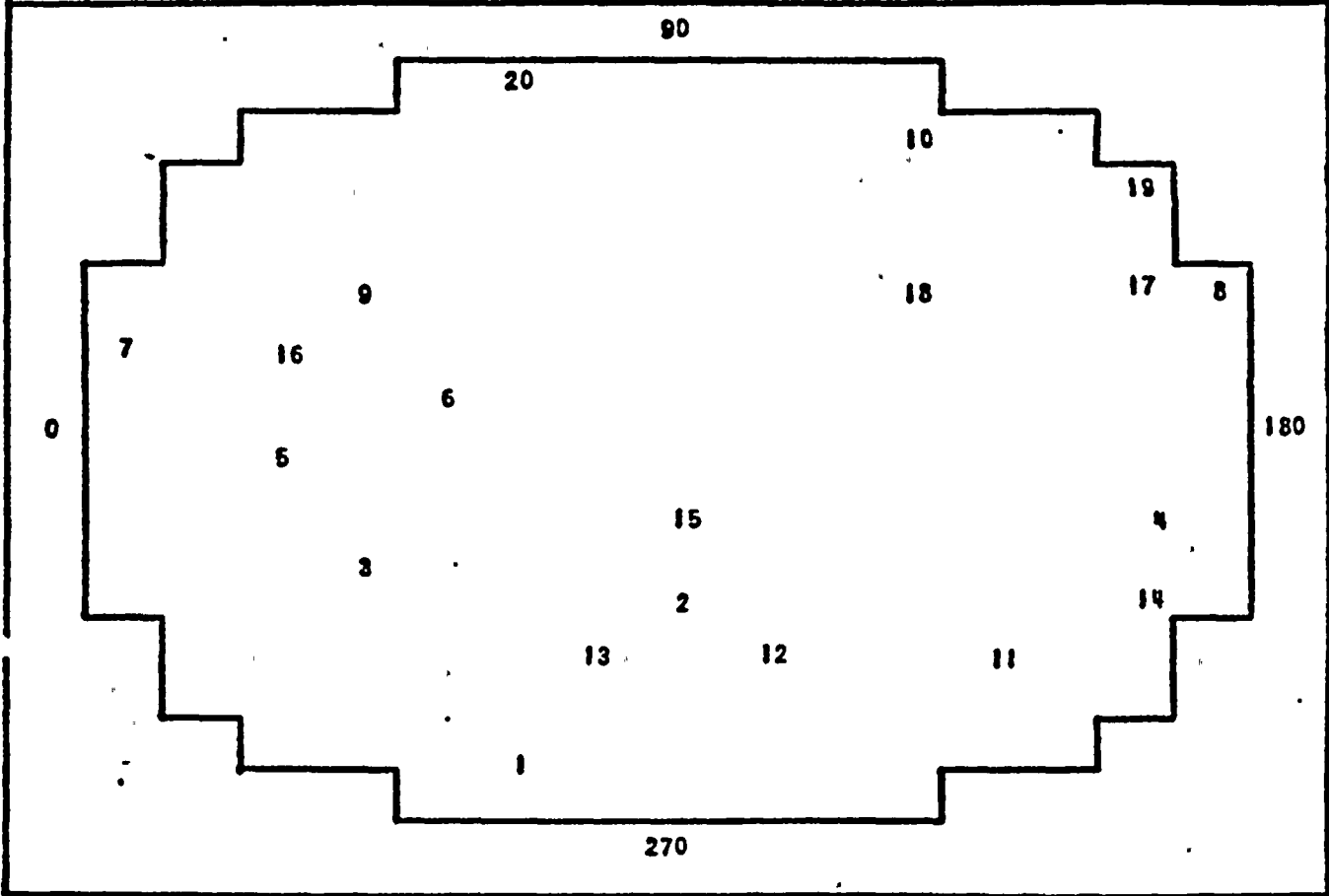


INCORE T/C MAP

DIABLO CANYON UNIT 1

XX/XX/XX

YY:YY:YY





RADIATION MONITORS

DIABLO CANYON UNIT 1

XX/XX/XX YY:YY:YY

RADIATION MONITORS

RE2	CONTMT RAD	X.XXE±X
RE7	I/C SEAL TBL	X.XXE±X
RE15	SJAE	X.XXE-X
RE19	SG BLOWDOWN	X.XXE-X
RE14A	PLANT VENT GAS	X.XXE-X
RE14B	PLANT VENT GAS	X.XXE-X
RE30	CONTMT RAD	X.XXE+X
RE31	CONTMT RAD	X.XXE+X
RE32	PLANT VENT I	X.XXE-X
RE33	PLANT VENT GAS	X.XXE±X
RE71	MN STM RAD	X.XXE±X
RE72	MN STM RAD	X.XXE±X
RE73	MN STM RAD	X.XXE±X
RE74	MN STM RAD	X.XXE±X

