BRAIDWOOD SIMULATOR
ANSI/ANS-3.5-1985 CERTIFICATION REPORT
APRIL, 1996

****
* NOTE *
* Approval signatures are on SRB *
* Approval Sheet BW-96-02 *
****

BRAIDWOOD SIMULATOR
ANSI/ANS-3.5-1985 CERTIFICATION REPORT
APRIL, 1996

TABLE OF CONTENTS

BRAIDWOOD SIMULATOR
ANSI/ANS-3.5-1985 CERTIFICATION REPORT
APRIL, 1996

TABLE OF CONTENTS

A.1 Simulator Information

A.1.1 General

This report is being submitted as the 1995 update to the NRC Certification Report of April, 1992. The Commonwealth Edison owned Westinghouse PWR 4-loop, 3411 MW power plant simulator is used for training the Braidwood plant operators. Because of the near exact duplication between the two units, it is considered a plant specific simulator for both Braidwood units, hereafter referred to as the Braidwood Simulator. However, since only one unit is modeled, Braidwood Unit 1 shall be considered the reference unit. The simulator was constructed by Westinghouse in the early 1980's with the first training classes conducted in the fall of 1983. The simulator software was updated by Simulation, Systems and Services Technologies (S3 Technologies) in the fall of 1991 and declared "ready for training" on January 13, 1992. During the Fall of 1994, the interface between the simulation computers and the main control board I/O was replaced which required a complete testing program to be performed. The results of this testing are documented in the 1994-95 testing results. Appendix 5 of this report lists a cross reference of sections that satisfy ANSI/ANS-3.5-1985 requirements.

This report summarizes the results of simulator testing for the certification years of 1992 - 1996.

A.1.2.1 Control Room Physical Arrangement

The physical arrangement of the simulator's control room duplicates Braidwood Station with the following exceptions:

1. The simulator does not have breathing air pack cases.
2. The simulator's Switchyard Panel (0PM03J) and General Services Panel (0PM01J) are in-line with 1PM01J instead of being located approximately three feet inboard.
3. Two IBM computers used for log taking and trending plant data.

These exceptions are considered minor and the requirements of ANSI/ANS-3.5 - 1985, Section 3.2.3, Control Room Environment, have been met.

A.1.2.2 Panels/Equipment

The Braidwood Simulator contains sufficient operational panels to provide the controls, instrumentation, alarms, and other man-machine interfaces to conduct normal plant evolutions of ANSI/ANS-3.5-1985, section 3.1.1 and respond to the malfunctions of section 3.1.2 for each of the Braidwood Units to the extent identified in the Certification Report. Attachment 5 is the control room layouts of Braidwood Units 1/2 and the simulator. The following panels are simulated:

a. 1PM01J
b. 1PM02J
c. 1PM03J
d. 1PM04J
e. 1PM05J
f. 1PM06J
g. 1PM07J
h. 1PM08J
i. 1PM11J
j. 0PM01J
k. 0PM02J (Includes selected U-2 components)
l. 0PM03J
m. RM-11/ESD/SER (1PM14J)
* n. Plant Computer (1CX05J)

* The in-plant computer possesses sufficient modeling for the operators to review the necessary data for the normal, abnormal, and emergency evolutions required by ANSI/ANS-3.5-1985.

A.1.2.2 Panels/Equipment (Cont.)

The Braidwood Simulator does not model the following panels/equipment:

a. 0PM05J - center desk area (partially modeled).
b. 1PM10J - radiation monitoring and turbine supervisory panel.
c. 1PM09J - fire protection panel.
d. ESD (installed, not modeled on 1PM14J).
e. DC supply to MIDS (installed, not modeled on 1PM08J).
f. MIDS picoammeter panel (1PM08J).

The Braidwood Simulator is partially modeled for 1PM12J. The following components are modeled:

a. Lift coil disconnect switch box (located at 1PM07J).
b. Containment drain sump flowrate chart recorder.
c. RIL vs. bank position (8-pen) chart recorder.

A.1.2.2 Panels/Equipment (Cont.)

Differences between the Braidwood Simulator and Braidwood Station are:

BRAIDWOOD	SIMULATOR	EXPLANATION
1. Status lights are push-to-test.	Some status lights are not push-to-test.	Does not impact training.
2. Mechanical step counters.	LED step counters.	Does not impact training. LED step counters are used due to high failure rate of mechanical step counters.
3. Black meter needles.	Orange meter needles.	Does not impact training.
4. 0PM02J has a clock.	0PM02J does not have a clock.	Does not impact training.
5. Boric acid and Primary water totalizers are mechanical counters.	Boric acid and Primary Water totalizers are digital counters.	Does not impact training. Digital counters are used due to high failure rate of mechanical counters.
6. Trip and status light lenses are circular.	Various trip and status lights are square lenses vs. circular lenses.	Does not impact training.

BRAIDWOOD	SIMULATOR	EXPLANATION
7. Sound powered phone jacks are installed on the control boards.	Sound powered phone jacks are not installed.	Does not impact training.
8. Backplates exist for pressurizer safety valve indication and AF005 valve indication.	Backplates do not exist.	Does not impact training.
9. Color banding located on meter face.	Color banding located on meter scale.	Does not impact training.
10. Manufacturer's name is on control board components.	Manufacturer's name may be missing on control board components.	Does not impact training.
11. Chart recorders have a mixture of magnetic and screw closure covers.	Chart recorders have magnetic closure covers.	Does not impact training.
12. Screws are used on nametags and mimic.	Screws are not used on nametags and mimic.	Does not impact training.
13. Switch backplate wording alignment is straight-line.	Switch backplate wording alignment is combination of straight-line and 45° angle.	Does not impact training.

BRAIDWOOD	SIMULATOR	EXPLANATION
14. Reheater temp. control panel is positioned ~ 1 inch from guard rail.	Reheater temp. control panel is positioned ~ 1.5 inches from guard rail.	Does not impact training.
15. Ceiling tile is 3/8 inch thick.	Ceiling tile is 1/2 inch thick.	Does not impact training.
16. FW34 and FW46 valves have new style controllers	FW34 and FW 46 use old style controllers	Does not impact training. As the controllers on the simulator wear out, they will be replaced with the new style controllers(SRB # BW-96-01).

A.1.2.3 Systems

The Braidwood Simulator models most of the plant's control room operated systems. Systems not modeled by the simulator are:

a. Turbine-Generator Temperature Monitoring System (TGTMS).
b. Fire Protection Detection System.
c. Radiation Monitors (RM-23's).
d. Equipment Status Display (ESD).

The systems that are not modeled do not detract from training. The tasks related to these systems are handled administratively to ensure procedural compliance is maintained. The Turbine-Generator Temperature Monitoring System, Fire Protection Detection System, and Radiation Monitors (RM-23's) are located outside the normal operating area. In addition, these non-modeled systems do not impact on the ability to perform the normal plant evolutions in ANSI/ANS-3.5-1985, Section 3.1.1 or respond to the malfunctions in Section 3.1.2. The Equipment Status Display (ESD) is located inside the normal operating area and is considered visually simulated hardware.

A.1.2.4 Simulator Control Room Environment

The Braidwood Simulator simulates the control room environment to a high degree. The plant's communication systems are present in the simulator. These include the PA system, Motorola radio system and the GSEP phones.

The simulator's lighting was compared to Braidwood Unit 1 in accordance with Work Request B88-115. Minor differences were noted but these differences do not impact training and the requirements of ANSI/ANS-3.5-1985, section 3.2.3, Control Room Environment, have been met.

The simulator's annunciator tones were tuned to Braidwood Unit 0/1 data in accordance with Work Request U00638 in 1991. The annunciators were tuned as close as possible to match the station's annunciators.

A.1.3 Instructor Interface

A.1.3.1 Initial Conditions

The Braidwood Simulator has 60 predetermined initial conditions with the capacity for an additional 40 initial conditions to be used by the instructor/software staff when appropriate to store non-protected initial conditions. Additionally, the simulator has 60 backtrack steps to backup the simulator from 1 minute to 60 minutes. The requirements of ANSI/ANS-3.5-1985, section 3.4.1 have been met. All initial conditions can be found in Appendix 1.

A.1.3.2 Malfunctions

The current malfunction cause and effects sheets which serve as the malfunction test abstracts can be found in Attachment 6.

The Braidwood Simulator malfunction assessment process utilizes LER's, plant specific operating experiences, NRC bulletins, information notices, and circulars as well as other industry events for determining additions/deletions to the existing simulator malfunctions.

Each accident analyzed in the Braidwood Updated Final Safety Analysis Report that results in observable indications on Control Room instrumentation is simulated.

A.1.3.2 Malfunctions (Cont.)

The applicable Attachment 6 malfunctions are cross-referenced to the ANSI/ANS-3.5-1985, Section 3.1.2 required malfunctions as follows:

ANSI/ANS-3.5-1985 Section 3.1.2	Simulator Malfunctions corresponding to the ANSI requirement
(1) Loss of coolant:	(1)
(a) Significant PWR S/G tube leaks	(a) TH03
(b) Inside/outside primary containment	(b) CV13, CV22, CV24, CV25, NI12, RH11, TH01, TH07,
(c) Large/small Rx coolant breaks (including demonstration of saturation condition)	(c) TH04, TH05, TH06, TH19
(d) Failure of safety/relief valves	(d) TH11, TH12
(2) Loss of instrument air to the extent that the whole system or individual headers can lose pressure and affect the plant's static or dynamic performance.	(2) IA01, IA02, IA03, IA04 IA05, IA06, IA07, IA08 IA09
(3) Loss or degraded electrical power to the station, including loss of offsite power, loss of emergency power, loss of emergency generators, loss of power to the plant's electrical distribution buses and loss of power to the individual instrumentation buses (AC as well as DC) that provide power to control room indication or plant control functions affecting the plant's response.	(3) ED01, ED02, ED03, ED04, ED05, ED06, ED07, ED08, ED09, ED10, ED11, ED12, ED13, ED14, ED15, ED16, ED17, EG01, EG03, EG04, EG06, EG07, EG08, EG09
(4) Loss of forced core coolant flow due to single or multiple pump failure.	(4) TH16, TH17, TH18
(5) Loss of condenser vacuum including loss of condenser level control.	(5) CW01, CW02, FW36,FW37, FW38, FW39, FW40

ANSI/ANS-3.5-1985 Section 3.1.2	Simulator Malfunctions corresponding to the ANSI requirement
(6) Loss of service water or cooling to individual components	(6) SW01, SW02, SW03, SW04, SW05, SW06
(7) Loss of shutdown cooling	(7) RH01, RH02
(8) Loss of component cooling system or cooling to individual components	(8) CC01, CC04, CC05, CC06, CC07, CC08, CC09
(9) Loss of normal feedwater or normal feedwater system failure	(9) FW01, FW02, FW03, FW04, FW05, FW06, FW07, FW08, FW09, FW10, FW11, FW12, FW13, FW14, FW15, FW16, FW17, FW18, FW22, FW23, FW24, FW25, FW26, FW27, FW28, FW29, FW30, FW31, FW32, FW33, FW34, FW35, FW41, FW42, FW47, RP09, RX29, RX30
(10) Loss of all feedwater (normal and emergency)	(10) FW43, FW44, FW45
(11) Loss of protective system channel	(11) CH08, RH05, RP04, RP05, RP07, RP08, RP13, RP14, RP15, RP16, RP17, RP18, RP19, RP20, RP21, RP22, RP23, RX01, RX06, RX13, RX18, RX21, RX22, RX23, RX24, RX28
(12) Control rod failure including stuck rods, uncoupled rods, drifting rods, rod drops, and misaligned rods.	(12) RD02, RD03, RD04, RD05
(13) Inability to drive control rods	(13) RD06, RD09, RD10, RD11
(14) Fuel cladding failure resulting in high activity in reactor coolant or off gas and the associated high rad alarms	(14) TH08
(15) Turbine trip	(15) TC02, TC15, TC17

ANSI/ANS-3.5-1985 Section 3.1.2		Simulator Malfunctions corresponding to the ANSI requirement
(16)	Generator trip	(16) EG02, EG05
(17)	Failure in automatic control system(s) that affect reactivity and core heat removal	(17) RD07, RD12, RX17
(18)	Failure of reactor coolant pressure and volume control systems (PWR)	(18) CV01, CV04, CV05, CV06, CV07, CV10, CV11, CV12, CV14, CV15, CV19, CV21, CV23, CV26, CV27, CV28, CV29
(19)	Reactor trip	(19) RD01
(20)	Main steam line as well as main feed line break (both inside and outside containment)	(20) FW19, FW20, FW21, MS07, MS08, MS09
(21)	Nuclear instrumentation failure(s)	(21) NI01, NI02, NI03, NI04, NI05, NI06, NI07, NI08, NI09
(22)	Process instrumentation, alarms, and control system failures	(22) AN01, CC02, CC03, CV08, CV09, CV16, CV17, CV18, CV20, MS04, MS06, MS11, RD08, RD13, RX02, RX03, RX04, RX05, RX07, RX08, RX09, RX10, RX11, RX12, RX14, RX15, RX16, RX19, RX20, RX25, RX26, RX27, SI02, TH10, TH14, TH15
(23)	Passive malfunctions in systems, such as engineered safety features, emergency feedwater systems	(23) CS02, FW46, RH06, RH07, RH08, RH09, RH10, SI03, SI04, SI05, SI06, SI07, SI08, SI09, SI10, SI11
(24)	Failure of the automatic reactor trip system	(24) RP01, RP02, RP03
(25)	Reactor pressure control system failure including turbine bypass failure (BWR)	(25) N/A - BWR only

A.1.3.3 Controls Provided For Items Outside Control Room

Appendix 2 is a listing of remote functions for the simulator. The appropriate remote functions exist for systems that are operated outside of the Control Room and that are needed to perform normal plant evolutions and/or the malfunctions required by ANSI/ANS-3.5-1985, section 3.1.1/3.1.2.

A.1.3.4 Additional Special Instructor/Training Features Available

a. Backtrack — As previously mentioned, the Braidwood Simulator has the capability of backtracking. Normally, the students can be backtracked anywhere from 1 to 60 minutes. However, the time frame for tracking the backtrack snapshots is adjustable so that, if the instructor desires, he can offer a backtrack capability of 60 discrete steps with any amount of time between each step ranging from 2 seconds to several hours.

b. Freezing — The Braidwood Simulator has the capability to freeze the dynamic simulation.

c. Simulator Speed — The Braidwood Simulator has the capability to vary the speed of simulation. The most useful portion of this feature is slowing down the simulation to allow the students and instructor to observe and discuss all parameters. The simulator also has the capability to go into fast time for RCS and pressurizer heatup rate, Xenon, decay heat removal, condenser evacuation, turbine coastdown and turbine metal temperatures.

A.1.3.4 Additional Special Instructor/Training Features Available (Cont.)

d.	Override	The Braidwood Simulator has the capability of failing any control board panel control switch or light either in the on or off position. In addition, each control board meter can be overridden.
e.	Annunciator	The Braidwood Simulator has the capability of failing any point on the sequence of events recorder either on or off causing the associated annunciator to alarm or reset.
f.	Auxiliary Instructor Console	The Braidwood Simulator has an auxiliary instructor console which can be used when the instructor wishes to interact to a large degree with the students. This console is a full scope instructor station identical to the main instructor console.
g.	Plant Parameters	The Braidwood Simulator also uses Environmental Plant Parameters which give the instructor the flexibility to modify parameters which are outside the operating staff's control. Examples include atmospheric temperature, atmospheric pressure and electrical grid parameters.

A.1.4 Operating Procedures for Reference Plant

The procedures used on the Braidwood Simulator are copies of Braidwood Unit 1 controlled procedures. When required, (i.e. - changes made to the plant but not yet incorporated into the simulator), temporary procedure changes may be used to accommodate differences in the simulator and the plant operations. The simulator uses locally generated BOL, MOL and EOL axial flux difference curves since the plant's axial flux difference curves are based on the plant's core age. The locally generated curves are based on Braidwood Station actual performance. In addition, one set of annunciator response procedures (Braidwood Unit 1) are utilized during simulator training.

A.1.5 Changes Since Last Report

System modifications/setpoint changes performed on the simulator for 1992 - 1993:

a.	Modification #20-1-88-032:	In-plant Computer post accident monitoring NI points added (U00626)
b.	Modification #20-1-90-014:	PS228B/229A failure mode (U01715)
c.	MCR #20-1-91-706:	CC9473A/B stroke time change (U02270)
d.	SSCR #92-002:	Pressurizer pressure SI setpoint (U02698)
e.	EC #92-00012:	Auxiliary Building pressure alarm time delay (U02857)
f.	SSCR #92-003:	CST low level alarm setpoint (U02807)
g.	MCR #20-1-91-708:	RY8000's stroke time (U02403)
h.	MCR #20-1-91-671:	SI8807's stroke time (U02691)
i.	SSCR #92-015:	Degraded voltage relay setpoint (U02835)
j.	SSCR #92-007:	Tave deviation alarm setpoint (U02615)
k.	EC #92-07/08/09:	200 secs. time delay added to trouble alarms (U02842)
l.	MCR #20-1-91-670:	SI8804B stroke time (U02987)
m.	SSCR #92-012:	MCR pressure low alarm time delay increased to 50 secs. (U03040)
n.	SSCR #92-031:	RH suction pressure alarm change (U03342)
o.	Modification #20-1-91-014:	Non-ESF DC breakers replaced with fuses (U02474)
p.	MCR #20-1-89-024:	Turbine Supervisory recorders replaced (U01001/2)
q.	MCR #20-1-89-046:	1PM01/6J guardrails (U01063)
r.	Modification #20-1-89-069:	RH pump bearing temp. IPC points (U01107)
s.	Control Room Change:	Carpet replacement (U02256)

A.1.5 Changes Since Last Report (Cont.)

System modifications/setpoint changes performed on the simulator for 1993 - 1994:

a.	Modification #20-1-89-034:	Blowdown computer points added (U02997)
b.	MCR #20-1-92-667:	SI8924 & SI8923A/B stroke times (U04495)
c.	Modification #20-1-93-005:	Removal of "EAB Press Low" alarm (U05072)
d.	SSCR #92-025:	Turbine trip setpoints change (U04350)
e.	Modification #20-1-89-034:	S/G upper blowdown computer points added (U02997)
f.	Modification #20-1-92-004:	Remove PZR PORV interposing relays (U05178)
g.	Modification #20-1-91-013:	Main Generator alarm enhancement (U04747)
h.	MCR #20-1-91-011:	CS007's stroke time (U05198)
i.	Modification #20-1-92-005:	Change slave relay power for CV8152/8160 (U05196)

System modifications/setpoint changes performed on the simulator for 1994 - 1995:

a.	Modification #20-1-92-005:	CV8152/8160 Slave Relay (U05196)
b.	SSCR #93-014:	S/G NR level setpoints change (U05291)
c.	SSCR #93-02/021:	MS Line/SJAE GS Condenser rad mon. setpoint change (U05110)
d.	SSCR #93-005:	BA Batch Tank temp high setpoint change (U05313)
e.	MCR #20-1-91-689:	New plant radio system (U02996)

A.1.5 Changes Since Last Report (Cont.)

System modifications/setpoint changes performed on the simulator for 1995 - 1996:

a.	SSCR 94-06:	PZR PORV setpoints changed (U05455)
b.	Modification #20-1-94-003:	Aux feed suction relay change (U05606)
c.	SSCR 95-01:	Tave change (U06318)
d.	SSCR 94-19:	Aux feed suction setpoints changed (U06366)
e.	Modification #20-1-94-001:	Prevent a VC chiller trip during an SI (U06409)
f.	SSCR 95-16:	FW nozzle high flow setpoint changed (U06520)
g.	P20-1-92-601:	Changed power supply of 1PA20JB to ESF power (U06553)
h.	E20-1-95-209-003:	Seperated ESF MCC power for fire concerns (U06611)
i.	SSCR 95-07:	Changed RWST lo-2 setpoint (U06684)
j.	E20-1-95-209-005:	Changed power supply of EDG relays (U06685)
k.	SSCR 95-10:	Changed OPDT and OTDT setpoints (U06718)
l.	SSCR 95-34 to 39:	Changed IA/SA alarm setpoints (U06942)
m.	E20-1-95-209-010:	Changed power supplies for fire barrier concern (U06939)
n.	Modification #20-1-93-002:	RTD bypass elimination (U06557)

A.1.5 Changes Since Last Report (Cont.)

Significant items added to the simulator and tested satisfactory for 1992-1993 include:

ITEM	DESCRIPTION/TITLE	REASON FOR CHANGE
U00638	Modified annunciator tones.	Student Feedback.
U02117	Modified delta T channel failure mode when tripping bistables.	Student Feedback.
U02272	Modified main condenser hogging pump minimum suction pressure.	Student Feedback.
U02003	Modified pressure tap location for 1PI-CC107.	Student Feedback.
U02567	Modified maximum dilution flow with CV-111A and CV-111B full open.	Student Feedback.
U02804	Revised HD-046 controller demand at 100% power.	Student Feedback.
U03092	Modified CV pump bearing temps.	NRC Fidelity Feedback.

A.1.5 Changes Since Last Report (Cont.)

Significant items added to the simulator and tested satisfactory for 1993-1994 include:

ITEM	DESCRIPTION/TITLE	REASON FOR CHANGE
U01123	Added 3rd Non-accessible Area Filter Plenum to 0PM02J.	Add U-2 components addressed in U-1 Emergency Procedures.
U01758	Deenergized chart recorder drive motor on loss of power.	Training enhancement.
U03748	Modified Fuel Handling Ch. Booster Fans rad. monitor interlock power supply.	Student Feedback.
U03789	Modified DC Bus voltage degradation on a loss of it's battery charger.	Student Feedback.
U03878	Modified limit switches for CV8114/8116.	Student Feedback.
U03905	Modified rate of VCT pressure drop during venting operations.	Student Feedback.
U04555	Modified circ. water blow down flowrates.	Station Feedback.
U04554	Modified CW pump amps.	Station Feedback.
U02986	Created new malfunction FW47 "MFP Suction Header Break".	Malfunction Assessment

A.1.5 Changes Since Last Report (Cont.)

Significant items added to the simulator and tested satisfactory for 1994-1995 include:

ITEM	DESCRIPTION/TITLE	REASON FOR CHANGE
U05197	Modified slave relay K621 latching.	Student Feedback.
U05382	Modified RCS loop flow on a single RCP trip.	Station Feedback.
U05481	Modified RVLIS response to restoration of power.	Student Feedback.
U05285	Modified iconics response to a Rx trip.	Student Feedback.
U05096	Modified SGTR N-16 response.	Station Feedback.
U06212	Modified floor drain sump pumps start setpoints.	Student Feedback.

A.1.5 Changes Since Last Report (Cont.)

Significant items added to the simulator and tested satisfactory for 1995-1996 include:

ITEM	DESCRIPTION/TITLE	REASON FOR CHANGE
U06312	Modified EH system so second pump will start upon turbine trip.	Station Feedback.
U06410	Modified the silencing of back panel alarms.	Student Feedback.
U06610	Raised boron concentration in the RWST and SI Accum.	Station Change.
U06442	Modified CS pump recirc flow to match station.	Station Data.
U06456	Created new malfunction CH09A/B for CNTM H2 monitor line break.	Malfunction Assessment.
U06506	Modified RCFC check dampers close and open times.	Station Data.
U06598	Added 3 new valves to allow isolating of MS drip legs.	Station Data.
U06659	Modified 1CC053 to isolate on high CC flow.	Station Data.
U06745	Modified EDG cooling such that with a loss at near full load, the EDG will overheat and trip in about 20 minutes.	Station Feedback.

A.2 Simulator Design Data Base

The simulator design data base for the Braidwood Simulator is maintained from Braidwood Unit 1 data. The data base includes the data from which the simulator was designed and built, and on which upgrades and modifications are based. The data base includes design documents, performance data, records, assumptions, simplifications, derivations and other definable data on which the current design of the simulator hardware and software is based. These documents are located in the General Files Simulator (SIM) File.

A.3 Simulator Tests

A.3.1 Computer Real Time Test

Real time test (RT-l) was performed per Appendix A of ANSI/ANS-3.5-1985. The results of the test are as follows with the most recent test being located in Attachment 2:

a. 1992 - 1993 test acceptable
b. 1993 - 1994 test acceptable
c. 1994 - 1995 test acceptable
d. 1995 - 1996 test acceptable

A.3.2 Steady State and Normal Operations Tests

Steady state tests (SS-l) were performed per Appendix B of ANSI/ANS-3.5-1985. The results of these tests are as follows with the most recent test being located in Attachment 2:

a. 1992 - 1993 test acceptable
b. 1993 - 1994 test acceptable
c. 1994 - 1995 test acceptable
d. 1995 - 1996 test acceptable

Normal operations test (NO-l) was performed per Appendix B and section 3.1.1 of ANSI/ANS-3.5-1985. The results of this test are as follows with the most recent portion of this test being located in Attachment 2:

a. 1992 - 1993 test acceptable
b. 1993 - 1994 test acceptable
c. 1994 - 1995 test acceptable
d. 1995 - 1996 test acceptable

A.3.2 Steady State and Normal Operations Tests (Cont.)

Surveillance tests (SV-l) are performed once every 4 years per section 3.1.1(9)(10) of ANSI/ANS-3.5-1985. The results of these tests are as follows with the test procedure being located in Attachment 2:

a. 1992 - 1993 test acceptable
b. 1994 - 1995 test acceptable

Valve stroke time test (ST-l) was performed in 1992 and 1994. The Simulator Review Board approved modification of ANSI/ANS-3.5-1985, Section 4.1 criteria for valve stroke times of less than twenty seconds. The acceptance criteria (section 4.1) for each valve's stroke time is ± 10% of the reference plant valve's stroke time. However, ± 10% of most valve's stroke time of less than 20 seconds would yield a small tolerance which does not lend itself to enhanced operator training due to the fact that the operator is not directly affected by a difference in valve stroke time of a few seconds.

In response to the potential problem of continually changing most valve's stroke time to that of Braidwood's, our tolerance was changed to ±10% or ±2 seconds, whichever is greater as long as Braidwood acceptance criteria is not violated. A biennial comparison of Braidwood Unit 1 valve stroke times to the simulator valve stroke times will be performed to ensure that the revised valve stroke time criteria will be maintained. This minor change in the criteria does not detract from operator training. The results of this test are as follows with the test procedure being located in Attachment 2:

a. 1992 - 1993 test acceptable after completion of WR U03364.
b. 1994 - 1995 test acceptable after completion of WR U06114.

A.3.3 Transient Tests

Transient tests (TR-1 through 10) were performed per Appendix B of ANSI/ANS-3.5-1985. Appendix 4 contains the Transient Test Review Board Members and Qualifications that are used for transient test comparison. The results of these tests are as follows with the most recent test being located in Attachment 2:

a.	Manual reactor trip (TR-1)	Acceptable (1992-1996)
b.	Simultaneous trip of all feedwater pumps (TR-2)	Acceptable (1992-1996)
c.	Simultaneous closure of main steam isolation valves (TR-3)	Acceptable (1992-1996)
d.	Simultaneous trip of all reactor coolant pumps (TR-4)	Acceptable (1992-1996)
e.	Trip of any single reactor coolant pump (TR-5)	Acceptable (1992-1996)
f.	Main turbine trip (Maximum power level which does not result in immediate reactor trip) (TR-6)	Acceptable (1992-1996)
g.	Maximum rate power ramp (100% down to approximately 90% and back up to 100%) (TR-7)	Acceptable (1992-1996)
h.	Maximum size reactor coolant system rupture combined with loss of all offsite power (TR-8)	Acceptable (1992-1996)

A.3 Transient Tests (Cont.)

i.	Maximum size unisolable main steam line rupture (TR-9)	Acceptable (1992-1996)
j.	Slow primary system depressurization to saturated condition using pressurizer relief or safety valve stuck open (inhibited actuation of high head SI) (TR-10)	Acceptable (1992-1996)

Comparison data for TR-1, TR-2, TR-3 and TR-4 was obtained from Braidwood and Byron Stations Computer System. The data gathering capability is limited to a once per minute interval. The data for the simulator was gathered on a twice per second interval. The difference in scan rates was taken into account during the comparison process.

A.3.4 Malfunction Tests

Malfunctions have been tested in accordance with ANSI/ANS-3.5-1985. Approximately 25% of the malfunctions identified in Appendix 6 are tested annually. All malfunctions were tested in 1994-95. The malfunction tests are located in General Files under file SIM-BW-9E1. The malfunction test results were satisfactory with the following exceptions:

YEAR	MALFUNCTION	BRIEF DESCRIPTION OF PROBLEM	WORK REQUEST	DATE TESTED SATISFACTORY
1992-1993	TH19	Rx vessel level can't be restored	U02818	10-12-93
1992-1993	ED05	6.9 KV voltmeter response is incorrect.	U02532	6-7-92
1993-1994	SI06	PZR pressure response is incorrect.	U04320	7-14-93
1993-1994	ED08	Diesel FP pump & Service Air Compressor response is incorrect.	U04065 U04066 U04067	5-10-93
1993-1994	RH06	CC system rad. response is incorrect.	U04243	6-1-93
1993-1994	RX06	P-14 annunciator response is incorrect.	U04250	6-1-93
1994-1995	RX06, RP23	P-14 response for FW sys. is incorrect.	U06111	12-6-94
1994-1995	CV02	0B PW pump response is incorrect.	U06127	12-6-94
1994-1995	CC08	Leak isolation response is incorrect.	U06126	12-14-94
1994-1995	CV13	Cnmt rad. response is incorrect.	U06128	12-12-94

A.3.4 Malfunction Tests (Cont.)

YEAR	MALFUNCTION	BRIEF DESCRIPTION OF PROBLEM	WORK REQUEST	DATE TESTED SATISFACTORY
1994-1995	FW18	17 FW heater emergency drain response is incorrect.	U06113	12-8-94
1994-1995	NI12	MIDS leak detection alarm response is incorrect.	U06129	12-14-94
1994-1995	RM02	Liquid release rad. monitor response is incorrect.	U06158	12-12-94
1994-1995	RM05	S/G blowdown rad. monitor response is incorrect.	U06160	12-12-94
1994-1995	RP02	Manual Rx trip switch response is incorrect.	U06110	12-15-94
1994-1995	TC12	HD check valve response is incorrect.	U06115	12-12-94
1994-1995	TU04	Turbine DC emer. oil pump response is incorrect.	U05820	12-21-94
1995-1996	CV28	1C RCP's seal failure is incorrect.	U06871	1-10-96
1995-1996	EG07	EDG Gov. response is incorrect.	U06887	1-10-96

A.3.4 Malfunction Tests (Cont.)

In the event that a malfunction fails its test, a Work Request is written to correct the problem. In the interim, any malfunctions that are unavailable for training are documented on a "Not Authorized for Use" letter which is kept in the Malfunction Cause & Effects Book. This letter informs each instructor as to which malfunctions are currently unavailable for training.

In order to avoid negative training which can result when the simulator progresses beyond design limits, the instructor system computer console displays a message to the instructor. This message alerts the instructor when selected parameters approach values indicative of events beyond the implemented model or known plant behavior. The requirements of ANSI/ANS-3.5-1985, Section 4.3, Simulator Operating Limits, have been met.

A Licensee Event Report (LER) review of all Braidwood events is performed on an annual basis. The LER's will be reviewed as part of the plant malfunction assessment process. A summary of the Braidwood Unit 1 LER's that were determined to effect simulation follow:

LER	DESCRIPTION	COMMENTS
20-1-92-004	Inadvertent jumper placement results in phase A valve closure.	LER tested satisfactorily.
20-1-94-012	Inadvertant MS isolation at power due to equipment failure.	LER tested satisfactorily.
20-1-95-004	Reactor trip due to Inst. Bus failure.	LER tested satisfactorily.

A.4 Simulator Discrepancy Resolution and Upgrading

1. Identifying, logging, correcting, and testing simulator discrepancies.

   TDI 700-02, Simulator Work Request Procedure, describes how an identified simulator discrepancy is resolved. See Attachment 3 for a copy of TDI 700-02, Simulator Work Request Procedure.

2. Tracking of design changes incorporated into the reference plant but not yet incorporated into the simulator.

   The Training Staff receives modifications from Braidwood Station. Modifications are reviewed and if a modification is deemed appropriate to change simulation, a Work Request is written in accordance with TDI 700-02, Simulator Work Request Procedure. In addition, all modifications that require simulator work are approved and tracked by the Simulator Review Board in accordance with TDI 700-01, Simulator Review Board Procedure. See Attachment 4 for a copy of TDI 700-01, Simulator Review Board Procedure.

APPENDIX 1

LIST OF INITIAL CONDITIONS

APPENDIX 1

LIST OF INITIAL CONDITIONS (IC's)

IC	DESCRIPTION
1	BOL, COLD SHUTDOWN, ALL RODS IN, RCS TEMP 128°F, PZR SOLID, XENON FREE, LOW DECAY HEAT, RH IN S/D L/U, RCPs STOPPED. PZR PORVs IN "ARM LOW TEMP", SX & CC IN OPERATION, CV OPERATING W/ SEAL INJECTION, ENTER BwGP 100-1
2	BOL, COLD SHUTDOWN, ALL RODS IN, RCS TEMP 170°F, RCS PRESS 340 PSIG, PZR SOLID, BORON 1992 PPM, 1D RCP RUNNING, BwGP 100-1
3	BOL, COLD SHUTDOWN, BUBBLE IN PZR, ALL RODS IN, RCS TEMP 156°F, RCS PRESS 375 PSIG, PZR LEVEL 25%, BORON 2003 PPM, 1D RCP RUNNING, BwGP 100-1
4	BOL, COLD SHUTDOWN, ALL RODS IN, RCS TEMP 193°F, RCS PRESS 349 PSIG, BORON 2000 PPM, 1C & 1D RCPs RUNNING, CS PUMPS OOS, BwGP 100-1
5	BOL, HOT SHUTDOWN, PLANT HEATUP, ALL RODS IN, RCS TEMP 341°F, RCS PRESS 340 PSIG, PZR LEVEL 25%, BORON 1491 PPM, RCPs RUNNING, SI PUMPS OOS, 1B CV PUMP OOS, PDP OOS, AF013's CLOSED, REMOVING RH, BwGP 100-1
6	MOL, HOT STANDBY, PLANT HEATUP, ALL RODS IN, RCS TEMP 489°F, RCS PRESS 1750 PSIG, PZR LEVEL 25%, BORON 1510 PPM, LOW STEAMLINE PRESS SI BLOCKED, BwGP 100-1
7	BOL, HOT STANDBY, PLANT STARTUP, ALL RODS IN, RCS NOT NOP, S/G LVLs @ 66%, STM DUMPS IN "STEAM PRESS MODE", BDPS NOT BLOCKED, PRIOR TO PULLING S/D BANKS, ENTER BwGP 100-2
8	EOL, HOT STANDBY, PLANT STARTUP, ALL RODS IN, RCS NOT NOP, S/G LVLs @ 66%, STM DUMPS IN "STEAM PRESS MODE", MSIVs CLOSED & EQUALIZING ON BYPASS, BwGP 100-2
9	BOL, REACTOR STARTUP, S/D BANK RODS WITHDRAWN, RCS NOT NOP, STM DUMPS IN "STEAM PRESS MODE", CRITICAL BORON CONC, HI FLUX AT S/D ALARM NOT BLOCKED, BwGP 100-2
10	MOL, REACTOR STARTUP, S/D BANK RODS WITHDRAWN, RCS NOT NOP, STM DUMPS IN "STEAM PRESS MODE", CRITICAL BORON CONC, HI FLUX AT S/D ALARM NOT BLOCKED, BwGP 100-2

APPENDIX 1

LIST OF INITIAL CONDITIONS (IC's)

IC	DESCRIPTION
11	EOL, REACTOR STARTUP, S/D BANK RODS WITHDRAWN, RCS NOT NOP, STM DUMPS IN "STEAM PRESS MODE", CRITICAL BORON CONC, HI FLUX AT S/D ALARM NOT BLOCKED, BwGP 100-2
12	BOL, 2% POWER, RCS TEMP 560°F, RCS PRESS 2235 PSIG, STM DUMPS IN "STEAM PRESS MODE", PRIOR TO TURBINE STARTUP, ENTER BwGP 100-3
13	MOL, 14% POWER, RCS TEMP 565°F, RCS PRESS 2235 PSIG, STM DUMPS IN "STEAM PRESS MODE", TURBINE SPEED 1800 RPM, XENON SLOWLY INCREASING, READY FOR MAIN GEN SYNCHRONIZATION, BwGP 100-3
14	EOL, 14% POWER, RCS TEMP 558°F, RCS PRESS 2235 PSIG, STM DUMPS IN "STEAM PRESS MODE", TDFWP OPERATING, XENON SLOWLY INCREASING, BwGP 100-3
15	BOL, 22% POWER, RCS NOT NOP, XENON SLOWLY INCREASING, MAIN GEN AT 220 MW, 1 TDFWP IN OPERATION, PLACING ELECTRIC PLANT IN AT POWER LINE-UP, BwGP 100-3
16	MOL, 49% POWER, RCS NOT NOP,MAIN GEN AT 550 MW, XENON EQUILIBRIUM, STEADY STATE POWER, BwGP 100-3
17	MOL, 49% POWER, 12-3-6-3 LOAD FOLLOW FOR 5 HOURS, XENON INCREASING
18	MOL, 74% POWER, RCS NOT NOP, STEADY STATE POWER, XENON EQUILIBRIUM, BwGP 100-3
19	BOL, 100% POWER, RCS NOT NOP, XENON INCREASING, JUST COMPLETED POWER RAMP, BwGP 100-3
20	EOL, 100% POWER, RCS NOT NOP, XENON EQUILIBRIUM, STEADY STATE FULL BASE LOAD, BwGP 100-3
21	BOL, 100% POWER, RCS NOT NOP, XENON EQUILIBRIUM, STEADY STATE FULL BASE LOAD, BwGP 100-3
22	MOL, 100% POWER, RCS NOT NOP, XENON EQUILIBRIUM, STEADY STATE FULL BASE LOAD, BwGP 100-3

APPENDIX 1

LIST OF INITIAL CONDITIONS (IC's)

IC	DESCRIPTION
23	MOL, 30% POWER, RCS NOT NOP, XENON INCREASING, 3 CD/CB PUMPS OPERATING, DOWNPOWER FROM 50%, ELECTRIC PLANT IN AT POWER LINE-UP, BwGP 100-4
24	BOL, 13% POWER, RCS NOT NOP, XENON INCREASING, FW CONTROL ON FRVs, STM DUMPS IN "TAVE MODE",1 TDFWP IN OPERATION, DOWNPOWER FROM 100%, BwGP 100-4
25	MOL, REACTOR SHUTDOWN, RCS NOT NOP, ENTER BwGP 100-5
26	BOL, COOLDOWN, RCS TEMP 331°F, RCS PRESS 376 PSIG, PZR PORVs IN "ARM LOW TEMP", PRIOR TO RH LINE-UP, BwGP 100-4
27	BOL, COOLDOWN TO COLD SHUTDOWN, RCS TEMP 192°F, RCS PRESS 355 PSIG, 1C & 1D RCPs RUNNING, TAKING PZR SOLID, BwGP 100-5
28	BOL, TRIP RECOVERY, RCS NOT NOP, XENON INCREASING, S/D BANKS WITHDRAWN, REACTOR STARTUP 7 HOURS AFTER A TRIP, BwGP 100-2
29	RCS LEVEL @ 394.0, MID-LOOP OPS., 1A SI PUMP AVAILABLE, CHARGING & LETDOWN FLOWS EQUAL
30	MOL, 49% POWER, RCS NOT NOP, XENON EQUILIBRIUM, STEADY STATE POWER, BwGP 100-3
31	BOL, 90% POWER, RCS NOT NOP, XENON EQUILIBRIUM, STEADY STATE POWER, BwGP 100-3
32	SPARE
33	RCS LEVEL @ 398.0, REACTOR CAVITY EMPTY, ALL FUEL ASSEMBLIES IN PLACE, VESSEL HEAD READY TO BE REMOVED
34	REACTOR CAVITY FILLED, READY TO BEGIN REFUELING, ALL FUEL ASSEMBLIES IN PLACE
35-38	SPARE
39	MOL, REACTOR STARTUP IN PROGRESS, INCORRECT ECC, CRITICALITY=BANK C @ 100 STEPS

APPENDIX 1
LIST OF INITIAL CONDITIONS (IC's)

IC	DESCRIPTION
40	SPARE
41-60	REQUAL ICs
61-94	INSTRUCTOR ICs
95-100	SOFTWARE ICs

APPENDIX 2

REMOTE FUNCTION LISTING

APPENDIX 2

REMOTE FUNCTION LISTING

CC01	CC SUCT HDR XTIE 1CC9459A	(0-100%)
CC02	CC SUCT HDR XTIE 1CC9459B	(0-100%)
CC03	RCP A UP BRNG CLR 1CC9493A	(0-100%)
CC04	RCP B UP BRNG CLR 1CC9493B	(0-100%)
CC05	RCP C UP BRNG CLR 1CC9493C	(0-100%)
CC06	RCP D UP BRNG CLR 1CC9493D	(0-100%)
CC07	CC PP 0 CONNECT BUS 142	(RI/RO)
CC08	CC PP 0 DISCH ISOL 0CC9465	(0-100%)
CC09	CC PP 1A DISCH 1CC9466A	(0-100%)
CC10	CC PP 1B DISCH 1CC9466B	(0-100%)
CC11	CC DISCH HDR XTIE 1CC9458	(0-100%)
CC12	CC HX X-TIE 1CC9467C	(0-100%)
CC13	U2 SUP/RTN 2CC9473A/B,59B	(0-100%)
CC14	CC HDR MAN XTIE 0CC9509	(0-100%)
CC15	CC SURGE TK DRN 1CC2020B	(0-100%)
CC16	CC SURGE TK DRN 1CC2020A	(0-100%)
CC17	WM M/U AOV IA 1CC183	(ON/OFF)
CC18	WM M/U AOV POS 1CC183	(0-100%)
CC19	PW M/U AOV IA 1CC182	(ON/OFF)
CC20	PW M/U AOV POS 1CC182	(0-100%)
CC21	CC HX 1 INLET 1CC9470B	(0-100%)
CC22	CC HX 0 INLET 0CC9471B	(0-100%)
CC23	CC HX 1 INLET 1CC9470A	(0-100%)
CC24	CC HX 0 OUTLET 0CC9471A	(0-100%)
CC25	TRAIN A CC ISOL 1CC9467A	(0-100%)
CC26	TRAIN B CC ISOL 1CC9467B	(0-100%)
CC27	RH HX B CC INLET 1CC9504B	(0-100%)
CC28	RH HX A CC INLET 1CC9504A	(0-100%)
CC29	RCP A LO BRNG CLR 1CC9494A	(0-100%)
CC30	RCP B LO BRNG CLR 1CC9494B	(0-100%)
CC31	RCP C LO BRNG CLR 1CC9494C	(0-100%)
CC32	RCP D LO BRNG CLR 1CC9494D	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

CC33	RH HX B CC OUTLT 1CC9507B	(0-100%)
CC34	RH HX A CC DISCH 1CC9507A	(0-100%)
CC35	EX LTDN HX B CC OUT 1CC9411B	(0-100%)
CC36	EX LTDN HX A CC OUT 1CC9411A	(0-100%)
CC37	LTDN HX A CC INLET 1CC9452A	(0-100%)
CC38	SL WTR HX CC INLET 1CC9449A	(0-100%)
CC39	LTDN HX B INLET 1CC9452C	(0-100%)
CC40	LTDN HX A DISCH 1CC9452B	(0-100%)
CC41	SL WTR HX OUT 1CC9449B	(0-100%)
CC42	CC PP 0 CONNECT - BUS 141	(RI/RO)
CC43	LTDN HX B CC DISCH 1CC9452D	(0-100%)
CC44	RCP A THERM BARR 1CC9496A	(0-100%)
CC45	RCP B THERM BARR 1CC9496B	(0-100%)
CC46	RCP C THERM BARR 1CC9496C	(0-100%)
CC47	RCP D THERM BARR 1CC9496D	(0-100%)
CC48	CC TO SFP HX 1CC9503	(0-100%)
CC49	1CC685 VALVE MANUAL OPERATION	(0-100%)
CC50	CC SRG TK ISOL 1CC9462	(0-100%)
CC51	DEMIN WTR TO SRG TK ISOL 1CC185	(0-100%)
CC52	PRI WTR TO SRG TK ISOL 1CC184	(0-100%)
CC53	CC053 LOCAL RESET	(NORMAL/RESET)

APPENDIX 2

REMOTE FUNCTION LISTING

CH01	H2 ANALYZER PS-343 STATUS	(OFF/LOW/HIGH)
CH02	H2 RECOMBINER CONTROL	(OFF/ON)
CH03	RX CAVITY DRN V RE9152A & RE152B	(CLOSE/OPEN)
CH04	EMERG HATCH(CNMT INTEGRITY)	(0-100%)
CH05	REACTOR HEAD	(REINSTALL/REMOVE)
CH06	H2 ANALYZER PS-344 STATUS	(OFF/LOW/HIGH)
CH07	XFER CANAL GATE VALVE	(CLOSE/OPEN)
CH08	FUEL BUNDLE IN REFUELING MACHINE	(OUT/IN)
CH09	CNMT CHIL 1A CONDENSER PS RESET	(RESET/HI)
CH10	CNMT CHIL 1B CONDENSER PS RESET	(RESET/HI)
CH11	1A+1C CH WTR INLT CNMT ISO 1WO006A	(CLOSE/OPEN)
CH12	1B+1D CH WTR INLT CNMT ISO 1WO006B	(CLOSE/OPEN)
CH13	1A+1C CH WTR OUTLT CNMT ISO 1WO020A	(CLOSE/OPEN)
CH14	1B+1D CH WTR OUTLT CNMT ISO 1WO020B	(CLOSE/OPEN)

APPENDIX 2
REMOTE FUNCTION LISTING

CR01	QUADRANT 1 REFUELING	(NO CHG/DEFUEL/REFUEL)
CR02	QUADRANT 2 REFUELING	(NO CHG/DEFUEL/REFUEL)
CR03	QUADRANT 3 REFUELING	(NO CHG/DE-FUEL/RFUEL)
CR04	QUADRANT 4 REFUELING	(NO CHG/DE-FUEL/RFUEL)
CR05	FUEL ASSEMBLY G-15 REFUELING	(OUT/IN)
CR06	FUEL ASSEMBLY J-03 REFUELING	(OUT/IN)
CR07	FUEL ASSEMBLY H-03 REFUELING	(OUT/IN)
CR08	FUEL ASSEMBLY G-03 REFUELING	(OUT/IN)
CR09	FUEL ASSEMBLY J-02 REFUELING	(OUT/IN)
CR10	FUEL ASSEMBLY H-02 REFUELING	(OUT/IN)
CR11	FUEL ASSEMBLY G-02 REFUELING	(OUT/IN)
CR12	FUEL ASSEMBLY J-01 REFUELING	(OUT/IN)
CR13	FUEL ASSEMBLY H-01 REFUELING	(OUT/IN)
CR14	FUEL ASSEMBLY G-01 REFUELING	(OUT/IN)

APPENDIX 2

REMOTE FUNCTION LISTING

CS01	1CS022 SPRAY ADD TK DRN	(0-100%)
CS02	1CS040B SAT TO EDUC TRN B	(0-100%)
CS03	1CS040A SAT TO EDUC TRN A	(0-100%)

APPENDIX 2
REMOTE FUNCTION LISTING

CV01	CV8408A PCV-CV131 ISOL	(0-100%)
CV02	CV8409 PCV-CV131 BYPASS	(0-100%)
CV03	CV8421 RC FILTER BYPASS	(0-100%)
CV04	CV8107A LD RH HX BYPASS ISOL	(0-100%)
CV05	CV8108 LD RH HX MAN BYPASS	(0-100%)
CV06	CV8387A 1A CV PP DISCH BYP	(0-100%)
CV07	CV8387B 1B CV PP DISCH BYP	(0-100%)
CV08	CV8322A REGEN HX LTDWN	(0-100%)
CV09	CV8322B REGEN HX LTDWN	(0-100%)
CV10	CV8402B CV182 MAN ISOL	(0-100%)
CV11	CV8403 CV182 BYPASS ISOL	(0-100%)
CV12	CV8439 MAN EMER BOR ISOL	(0-100%)
CV13	CV8441 PW TO AB FLUSH ISOL	(0-100%)
CV14	CV8479A 1A CV PP RECIRC	(0-100%)
CV15	CV8479B 1B CV PP RECIRC	(0-100%)
CV16	CV8346 LP FILL CV184 ISOL	(0-100%)
CV17	CV8100 SL RTN ISOL POS	(0-100%)
CV18	CV8396A SL WTR FILTER ISOL	(0-100%)
CV19	CV8398A SL HX INLET ISOL	(0-100%)
CV20	CV8398B SL HX OUTLET ISOL	(0-100%)
CV21	CV8399 SL FILTER BYPASS	(0-100%)
CV22	CV8400 SL RTN HX BYPASS	(0-100%)
CV23	CV8376 N2 SUPPLY REGULATOR STPT	(0-50 PSIG)
CV24	CV8410 H2 SUPPLY REGULATOR STPT	(0-80 PSIG)
CV25	CV8419 VCT DRAIN	(0-100%)
CV26	CV8482 SL RTN-VCT INLET	(0-100%)
CV27	CV8484 SL RTN-VCT OUTLET	(0-100%)
CV28	AB8461 BA TANK SUCT ISOL	(0-100%)
CV29	AB8459 BAT PP RECIRC	(0-100%)
CV30	AB8478 AB RECIRC ORIFI BYP	(0-100%)
CV31	AB8457 AB RECIRC ORIFI ISO	(0-100%)
CV32	AB8465 BAT 2 ISOL	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

CV33	AB8460 BAT PP 1 DISCH	(0-100%)
CV34	AB8458 AB FILT BYPASS	(0-100%)
CV35	AB8469 BAT PP 0 DISCH	(0-100%)
CV36	AB8468 U2 MINIFLOW ISOL	(0-100%)
CV37	AB8476 BATCH TK TO PP SUCT	(0-100%)
CV38	AB8494 MAKEUP TO BATCH TK	(0-100%)
CV39	BAT PUMP 0/1 CONNECTED	(PMP1/PMP0)
CV40	CV8104 EMER BOR POS	(0-100%)
CV41	CV8384A SL INJ FILT A ISOL	(0-100%)
CV42	CV8384B SL INJ FILT B ISOL	(0-100%)
CV43	1CV012 SL INJ FILT BYP	(0-100%)
CV44	CV8369A SL INJ ISOL 1A	(0-100%)
CV45	CV8369B SL INJ ISOL 1B	(0-100%)
CV46	CV8369C SL INJ ISOL 1C	(0-100%)
CV47	CV8369D SL INJ ISOL 1D	(0-100%)
CV48	CV8514 CATION BYPASS	(0-100%)
CV49	CV8516 CATION ISOL	(0-100%)
CV50	CV8524A MB DEMIN 1A ISOL	(0-100%)
CV51	CV8524B MB DEMIN 1B ISOL	(0-100%)
CV52	CV8542 BTRS BYPASS IA BLOCKAGE	(0-100%)
CV53	BTRS DEMIN A STATUS	(NORM/BOR/UNBOR)
CV54	BTRS DEMIN B STATUS	(NORM/BOR/UNBOR)
CV55	BTRS DEMIN C STATUS	(NORM/BOR/UNBOR)
CV56	BTRS DEMIN D STATUS	(NORM/BOR/UNBOR)
CV57	BTRS DEMIN E STATUS	(NORM/BOR/UNBOR)
CV58	CHILLER PP 0/1 CONNECTED	(PUMP1/PUMP0)
CV59	AB8465 BAT PP 0 SUCTION	(0-100%)
CV60	AB8468 BAT PP 0 DISCH	(0-100%)
CV61	CV8455 PW TO CV M/U	(0-100%)
CV62	CV8464A PW ORIFI TO CV M/U	(0-100%)
CV63	CV8467A LTDN HX 1A OUTLET	(0-100%)
CV64	CV8467B LTDN HX 1B OUTLET	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

CV65	CV8432 MAKEUP TO RWST	(0-100%)
CV66	CV8350 LP DRN HDR TO RCDT	(0-100%)
CV67	CV8486A SL INJ FILT 1A DRN	(0-100%)
CV68	CV8486B SL INJ FILT 1B DRN	(0-100%)
CV69	RAD MONITOR BYPASS 1FI132	(0-100%)
CV70	CV112B CV PP VCT SUCT POS	(0-100%)
CV71	CV112C CV PP VCT SUCT POS	(0-100%)
CV72	CV112D CV PP RWST SUCT POS	(0-100%)
CV73	CV112E CV PP RWST SUCT POS	(0-100%)
CV74	CV8804A CV PP RH SUCT POS	(0-100%)
CV75	1A CV PP AUX L.O. PP	(OFF/ON)
CV76	1B CV PP AUX L.O. PP	(OFF/ON)
CV77	CV8321A/8392A REGEN HX CHG	(CLOSE/OPEN)
CV78	CV8321B/8392B REGEN HX CHG	(CLOSE/OPEN)
CV79	BORON CONC MASTER RESET	(0-2100 PPM)
CV80	0PW02PA PUMP CONTACT 3-4 ON MUX 4 LOW VCT LEVEL	(NORMAL/OPEN)
CV81	1CV8355A/D VALVE MANUAL OPERATION (CONTROLS ALL 4 VALVES)	(0-100%)
CV82	1AB03P PUMP CONTACT 3-4 ON MUX 5 LOW VCT W/RMCS AUTO	(NORMAL/OPEN)
CV83	CV8105 CHRG TO RCS ISOL VLV	(CLOSE/OPEN)
CV84	CV8106 CHRG TO RCS ISOL VLV	(CLOSE/OPEN)
CV85	1CV8483A CV-121 ISOLATION VALVE	(0-100%)
CV86	CV8428 BA BLENDER TO CHG PUMP ISOL VALVE	(0-100%)
CV87	CV8553 BA BLENDER TO HUT	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

ED001	0104 LINE DISCONNECT	(CLOSE/OPEN)
ED002	2002 LINE DISCONNECT	(CLOSE/OPEN)
ED003	U-1 MAIN XFMR DISCONNECT	(CLOSE/OPEN)
ED004	U-2 MAIN XFMR DISCONNECT	(CLOSE/OPEN)
ED005	UNIT 1 SAT DISCONNECT	(CLOSE/OPEN)
ED006	BUS 241 AVAIL TO BUS 141	(CLOSE/OPEN)
ED007	BUS 242 AVAIL TO BUS 142	(CLOSE/OPEN)
ED008	BUS 133U1 FEED BREAKER	(CLOSE/OPEN)
ED009	BUS 134U1 FEED BREAKER	(CLOSE/OPEN)
ED010	U-1 FEED TO BUS 033Z1	(CLOSE/OPEN)
ED011	U-2 FEED TO BUS 033Z1	(CLOSE/OPEN)
ED012	U-2 FEED TO BUS 033W	(CLOSE/OPEN)
ED013	U-2 FEED TO BUS 034W	(CLOSE/OPEN)
ED014	CHARGER 123 FROM BUS 134Z	(CLOSE/OPEN)
ED015	DC BUS 123 FEED BREAKER	(CLOSE/OPEN)
ED016	IC BUS 111A FEED BREAKER	(NORM/OPEN/RESERVE)
ED017	IC BUS 112A FEED BREAKER	(NORM/OPEN/RESERVE)
ED018	IC BUS 113A FEED BREAKER	(NORM/OPEN/RESERVE)
ED019	IC BUS 114A FEED BREAKER	(NORM/OPEN/RESERVE)
ED020	CHARGER 111 FEED BREAKER	(CLOSE/OPEN)
ED021	CHARGER 112 FEED BREAKER	(CLOSE/OPEN)
ED022	DC BUS 113 SUPPLY FUSE	(INSTALLED/REMOVED)
ED023	DC BUS 114 SUPPLY FUSE	(INSTALLED/REMOVED)
ED024	DC BUS 111 TO INV 111	(CLOSE/OPEN)
ED025	DC BUS 111 TO INV 113	(CLOSE/OPEN)
ED026	DC BUS 112 TO INV 112	(CLOSE/OPEN)
ED027	DC BUS 112 TO INV 114	(CLOSE/OPEN)
ED028	BUS 156 LOCKOUT RELAYS	(NORM/RESET)
ED029	BUS 157 LOCKOUT RELAYS	(NORM/RESET)
ED030	BUS 158 LOCKOUT RELAYS	(NORM/RESET)
ED031	BUS 159 LOCKOUT RELAYS	(NORM/RESET)
ED032	BUS 141 LOCKOUT RELAYS	(NORM/RESET)

APPENDIX 2
REMOTE FUNCTION LISTING

ED033	BUS 142 LOCKOUT RELAYS	(NORM/RESET)
ED034	BUS 143 LOCKOUT RELAYS	(NORM/RESET)
ED035	BUS 144 LOCKOUT RELAYS	(NORM/RESET)
ED036A	AC BUS 111A:01:1PM07J	(CLOSE/OPEN)
ED036B	AC BUS 111A:02:1PA09J	(CLOSE/OPEN)
ED036C	AC BUS 111A:03:1PA01J	(CLOSE/OPEN)
ED036D	AC BUS 111A:05:1PA27J	(CLOSE/OPEN)
ED036E	AC BUS 111A:06:1PA11J	(CLOSE/OPEN)
ED036F	AC BUS 111A:07:1PM07J	(CLOSE/OPEN)
ED036G	AC BUS 111A:08:1PA10J	(CLOSE/OPEN)
ED036H	AC BUS 111A:09:1PA13J	(CLOSE/OPEN)
ED036I	AC BUS 111A:10:1PM06J	(CLOSE/OPEN)
ED036J	AC BUS 111A:11:1PA45J	(CLOSE/OPEN)
ED036K	AC BUS 111A:12:1PA09J	(CLOSE/OPEN)
ED036L	AC BUS 111A:16:1PA05J	(CLOSE/OPEN)
ED036M	AC BUS 111A:18:1PM06J	(CLOSE/OPEN)
ED037A	AC BUS 112A:01:1PM07J	(CLOSE/OPEN)
ED037B	AC BUS 112A:02:1PA09J	(CLOSE/OPEN)
ED037C	AC BUS 112A:03:1PA02J	(CLOSE/OPEN)
ED037D	AC BUS 112A:06:1PA16J	(CLOSE/OPEN)
ED037E	AC BUS 112A:07:1PM07J	(CLOSE/OPEN)
ED037F	AC BUS 112A:08:1PM10J	(CLOSE/OPEN)
ED037G	AC BUS 112A:11:1PA45J	(CLOSE/OPEN)
ED037H	AC BUS 112A:16:1PA06J	(CLOSE/OPEN)
ED037I	AC BUS 112A:18:1PM06J	(CLOSE/OPEN)
ED038A	AC BUS 113A:01:1PM07J	(CLOSE/OPEN)
ED038B	AC BUS 113A:02:1PA09J	(CLOSE/OPEN)
ED038C	AC BUS 113A:03:1PA03J	(CLOSE/OPEN)
ED038D	AC BUS 113A:06:1PA15J	(CLOSE/OPEN)
ED038E	AC BUS 113A:07:1PM07J	(CLOSE/OPEN)
ED038F	AC BUS 113A:08:1PA10J	(CLOSE/OPEN)
ED038G	AC BUS 113A:16:1PA07J	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED038H	AC BUS 113A:18:1PM05J	(CLOSE/OPEN)
ED039A	AC BUS 114A:01:1PM07J	(CLOSE/OPEN)
ED039B	AC BUS 114A:02:1PA09J	(CLOSE/OPEN)
ED039C	AC BUS 114A:03:1PA04J	(CLOSE/OPEN)
ED039D	AC BUS 114A:05:1PA28J	(CLOSE/OPEN)
ED039E	AC BUS 114A:06:1PA12J	(CLOSE/OPEN)
ED039F	AC BUS 114A:07:1PM07J	(CLOSE/OPEN)
ED039G	AC BUS 114A:08:1PA10J	(CLOSE/OPEN)
ED039H	AC BUS 114A:09:1PA14J	(CLOSE/OPEN)
ED039I	AC BUS 114A:10:1PM06J	(CLOSE/OPEN)
ED039J	AC BUS 114A:11:1PA34J	(CLOSE/OPEN)
ED039K	AC BUS 114A:12:1PA10J	(CLOSE/OPEN)
ED039L	AC BUS 114A:16:1PA08J	(CLOSE/OPEN)
ED039M	AC BUS 114A:18:1PM05J	(CLOSE/OPEN)
ED040A	DC MCC 123:CG1:1WG046	(CLOSE/OPEN)
ED040B	DC MCC 123:DG2:1CX08J	(CLOSE/OPEN)
ED041A	DC BUS 111:BF1-01:1IP05E	(CLOSE/OPEN)
ED041B	DC BUS 111:BF1-12:1RD05E	(CLOSE/OPEN)
ED041C	DC BUS 111:BF1-14:1PM11J	(CLOSE/OPEN)
ED041D	DC BUS 111:BF1-16:1PL07J	(CLOSE/OPEN)
ED041E	DC BUS 111:BR1-01:1IP07E	(CLOSE/OPEN)
ED041F	DC BUS 111:BR1-05:1DC10J	(CLOSE/OPEN)
ED041G	DC BUS 111:BR1-11:1PL07J	(CLOSE/OPEN)
ED041H	DC BUS 111:BR1-12:1AF004A	(CLOSE/OPEN)
ED041I	DC BUS 111:BR1-13:1PA27J	(CLOSE/OPEN)
ED041J	DC BUS 111:BR1-14:1PA13J	(CLOSE/OPEN)
ED041K	DC BUS 111:BR1-15:1PM02J	(CLOSE/OPEN)
ED041L	DC BUS 111:BR1-17:1PL07J	(CLOSE/OPEN)
ED041M	DC BUS 111:BR1-18:1PA31J	(CLOSE/OPEN)
ED042A	DC BUS 112:BF1-01:1IP06E	(CLOSE/OPEN)
ED042B	DC BUS 112:BF1-13:1RD05E	(CLOSE/OPEN)
ED042C	DC BUS 112:BF1-14:1PM11J	(CLOSE/OPEN)

APPENDIX 2
REMOTE FUNCTION LISTING

ED042D	DC BUS 112:BF1-16:1PL08J	(CLOSE/OPEN)
ED042E	DC BUS 112:BF1-19:1PL08J	(CLOSE/OPEN)
ED042F	DC BUS 112:BR1-01:1IP08E	(CLOSE/OPEN)
ED042G	DC BUS 112:BR1-03:1DC11J	(CLOSE/OPEN)
ED042H	DC BUS 112:BR1-13:1PL08J	(CLOSE/OPEN)
ED042I	DC BUS 112:BR1-14:1PA14J	(CLOSE/OPEN)
ED042J	DC BUS 112:BR1-15:1PA32J	(CLOSE/OPEN)
ED042K	DC BUS 112:BR1-16:0PM02J	(CLOSE/OPEN)
ED042L	DC BUS 112:BR1-19:1AF004B	(CLOSE/OPEN)
ED042M	DC BUS 112:BR1-20:1PA28J	(CLOSE/OPEN)
ED043A	DC BUS 113:EF1-03:1PA31J	(CLOSE/OPEN)
ED043B	DC BUS 113:EF1-10:1RD03E	(CLOSE/OPEN)
ED043C	DC BUS 113:EF1-14:1PA27J	(CLOSE/OPEN)
ED043D	DC BUS 113:EF1-16:1PM02J	(CLOSE/OPEN)
ED043E	DC BUS 113:EF1-17:1PM04J	(CLOSE/OPEN)
ED043F	DC BUS 113:EF1-18:1PM01J	(CLOSE/OPEN)
ED043G	DC BUS 113:ER1-02:1DC12J	(CLOSE/OPEN)
ED043H	DC BUS 113:ER1-08:1PM02J	(CLOSE/OPEN)
ED043I	DC BUS 113:ER1-09:1PM11J	(CLOSE/OPEN)
ED043J	DC BUS 113:ER1-13:0PM03J	(CLOSE/OPEN)
ED043K	DC BUS 113:ER1-18:0PM02J	(CLOSE/OPEN)
ED043L	DC BUS 113:ER1-19:1PA26J	(CLOSE/OPEN)
ED043M	DC BUS 113:ER1-20:0PM01J	(CLOSE/OPEN)
ED044A	DC BUS 114:EF1-05:1PA42J	(CLOSE/OPEN)
ED044B	DC BUS 114:EF1-12:1RD03E	(CLOSE/OPEN)
ED044C	DC BUS 114:EF1-17:1PM04J	(CLOSE/OPEN)
ED044D	DC BUS 114:EF1-18:1PM02J	(CLOSE/OPEN)
ED044E	DC BUS 114:EF1-20:1TG07JB	(CLOSE/OPEN)
ED044F	DC BUS 114:ER1-07:1DC13J	(CLOSE/OPEN)
ED044G	DC BUS 114:ER1-10:1PM11J	(CLOSE/OPEN)
ED044H	DC BUS 114:ER1-14:0PM03J	(CLOSE/OPEN)
ED044I	DC BUS 114:ER1-16:1PA28J	(CLOSE/OPEN)

APPENDIX 2
REMOTE FUNCTION LISTING

ED044J	DC BUS 114:ER1-17:0PA01J	(CLOSE/OPEN)
ED045A	BUS 156:02:1RC01PB	(NORM/CLOSE/OPEN)
ED045B	BUS 156:03:1HD01PB	(NORM/CLOSE/OPEN)
ED045C	BUS 156:04:1FW01PA	(NORM/CLOSE/OPEN)
ED046A	BUS 157:01:1RC01PA	(NORM/CLOSE/OPEN)
ED046B	BUS 157:03:1HD01PA	(NORM/CLOSE/OPEN)
ED046C	BUS 157:04:RSH	(NORM/CLOSE/OPEN
ED046D	BUS 157:05:1HD01PC	(NORM/CLOSE/OPEN)
ED047A	BUS 158:01:1CD05PB	(NORM/CLOSE/OPEN)
ED047B	BUS 158:03:1CD05PD	(NORM/CLOSE/OPEN)
ED047C	BUS 158:05:1RC01PC	(NORM/CLOSE/OPEN)
ED048A	BUS 159:02:1CD05PA	(NORM/CLOSE/OPEN)
ED048B	BUS 159:03:1CD05PC	(NORM/CLOSE/OPEN)
ED048C	BUS 159:04:1FW02P	(NORM/CLOSE/OPEN)
ED048D	BUS 159:05:1RC01PD	(NORM/CLOSE/OPEN)
ED049A	BUS 141:02:1SX01PA	(NORM/CLOSE/OPEN)
ED049B	BUS 141:03:1SI01PA	(NORM/CLOSE/OPEN)
ED049C	BUS 141:04:1RH01PA	(NORM/CLOSE/OPEN)
ED049D	BUS 141:06:DG1A	(NORM/CLOSE/OPEN)
ED049E	BUS 141:08:1AF01PA	(NORM/CLOSE/OPEN)
ED049F	BUS 141:09:1CS01PA	(NORM/CLOSE/OPEN)
ED049G	BUS 141:11:1CV01PA	(NORM/CLOSE/OPEN)
ED049H	BUS 141:12:1CC01PA	(NORM/CLOSE/OPEN)
ED049I	BUS 141:18:0CC01P	(NORM/CLOSE/OPEN)
ED050A	BUS 142:02:1SX01PB	(NORM/CLOSE/OPEN)
ED050B	BUS 142:03:1SI01PB	(NORM/CLOSE/OPEN)
ED050C	BUS 142:04:1RH01PB	(NORM/CLOSE/OPEN)
ED050D	BUS 142:06:DG1B	(NORM/CLOSE/OPEN)
ED050E	BUS 142:08:1CS01PB	(NORM/CLOSE/OPEN)
ED050F	BUS 142:09:1CC01PB	(NORM/CLOSE/OPEN)
ED050G	BUS 142:10:1CV01PB	(NORM/CLOSE/OPEN)
ED050H	BUS 142:12:0CC01P	(NORM/CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED051A	BUS 143:03:HTRA&D	(NORM/CLOSE/OPEN)
ED051B	BUS 143:08:0WS01PA	(NORM/CLOSE/OPEN)
ED051C	BUS 143:09:1CW01PA	(NORM/CLOSE/OPEN)
ED051D	BUS 143:12:1CW01PC	(NORM/CLOSE/OPEN)
ED051E	BUS 143:15:0SA01C	(NORM/CLOSE/OPEN)
ED052A	BUS 144:03:HTRB&C	(NORM/CLOSE/OPEN)
ED052B	BUS 144:04:1SA01C	(NORM/CLOSE/OPEN)
ED052C	BUS 144:07:0WS01PB	(NORM/CLOSE/OPEN)
ED052D	BUS 144:11:1CW01PB	(NORM/CLOSE/OPEN)
ED053A	131X1:B4:1CS001A	(CLOSE/OPEN)
ED053B	131X1:C1:1CS009A	(CLOSE/OPEN)
ED053C	131X1:D4:1AF013A	(CLOSE/OPEN)
ED053D	131X1:E1:1AF013B	(CLOSE/OPEN)
ED053E	131X1:E2:1AF013C	(CLOSE/OPEN)
ED053F	131X1:E3:1AF013D	(CLOSE/OPEN)
ED053G	131X1:F2:1RH610	(CLOSE/OPEN)
ED053H	131X1:F3:1RH8716A	(CLOSE/OPEN)
ED053I	131X1:F4:1SI8801A	(CLOSE/OPEN)
ED053J	131X1:G4:1SI8807A	(CLOSE/OPEN)
ED053K	131X1:H4:1SI8821A	(CLOSE/OPEN)
ED053L	131X1:K1:1CV8106	(CLOSE/OPEN)
ED053M	131X1:K2:1CS019A	(CLOSE/OPEN)
ED053N	131X1:K3:1CC9412A	(CLOSE/OPEN)
ED053O	131X1:K4:1CV112D	(CLOSE/OPEN)
ED053P	131X1:M3:1SI8811A	(CLOSE/OPEN)
ED053Q	131X1:F1:0SX165A	(CLOSE/OPEN)
ED054A	131X1:L208 (120):0PM02J	(CLOSE/OPEN)
ED054B	131X1:L216 (120):1PA51J	(CLOSE/OPEN)
ED054C	131X1:L218 (120):0PR3132	(CLOSE/OPEN)
ED054D	131X1:L221 (120):1PA03J	(CLOSE/OPEN)
ED054E	131X1:L224 (120):1PA33J	(CLOSE/OPEN)
ED055A	131X1A:N1:1SI8920	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED055B	131X1A:N2:1SI8814	(CLOSE/OPEN)
ED055C	131X1A:P1:1SI8802A	(CLOSE/OPEN)
ED055D	131X1A:P2:1SI8809A	(CLOSE/OPEN)
ED055E	131X1A:P3:1SI8806	(CLOSE/OPEN)
ED055F	131X1A:P4:1SI8835	(CLOSE/OPEN)
ED055G	131X1A:Q1:1SI8812A	(CLOSE/OPEN)
ED055H	131X1A:Q2:1SI8840	(CLOSE/OPEN)
ED056A	131X2:B1:1RH8701A	(CLOSE/OPEN)
ED056B	131X2:B4:1RH8702A	(CLOSE/OPEN)
ED056C	131X2:C3:1VQ001A	(CLOSE/OPEN)
ED056D	131X2:C41RC8003D	(CLOSE/OPEN)
ED056E	131X2:C5:1RC8003A	(CLOSE/OPEN)
ED056F	131X2:F1:1VQ002A	(CLOSE/OPEN)
ED056G	131X2:G1:1RC8001A	(CLOSE/OPEN)
ED056H	131X2:G2:1RC8001B	(CLOSE/OPEN)
ED056I	131X2:G3:1RC8001C	(CLOSE/OPEN)
ED056J	131X2:G4:1RC8001D	(CLOSE/OPEN)
ED057A	131X2:F220 (120):1PA33J	(CLOSE/OPEN)
ED057B	131X2:F221 (120):1PA01J	(CLOSE/OPEN)
ED057C	131X2:F212 (120):1PM06J	(CLOSE/OPEN)
ED057D	131X2:F209 (120):1PA20JB	(CLOSE/OPEN)
ED058A	131X2A:A2:1SI8808D	(CLOSE/OPEN)
ED058B	131X2A:A3:1SI8808A	(CLOSE/OPEN)
ED058C	131X2B:A5:1RY8000A	(CLOSE/OPEN)
ED058D	131X2B:B1A:1MS018A	(CLOSE/OPEN)
ED058E	131X2B:B1B:1MS018D	(CLOSE/OPEN)
ED059A	131X3:B4:1AF006A	(CLOSE/OPEN)
ED059B	131X3:B5:1AF017A	(CLOSE/OPEN)
ED059C	131X3:D5:1CC9473A	(CLOSE/OPEN)
ED059D	131X3:E4:1SX001A	(CLOSE/OPEN)
ED060A	131X3:C205 (120):1PA45J	(CLOSE/OPEN)
ED060B	131X3:C210 (120):1PM01J	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED060C	131X3:C220 (120):1PA31J	(CLOSE/OPEN)
ED061	131X4:A5:1CV8100	(CLOSE/OPEN)
ED062A	131X5:A4:1CS007A	(CLOSE/OPEN)
ED062B	131X5:A5:1CV112B	(CLOSE/OPEN)
ED062C	131X5:C4:1SX016A	(CLOSE/OPEN)
ED062D	131X5:C5:1SX027A	(CLOSE/OPEN)
ED063A	132X1:C1:1SX001B	(CLOSE/OPEN)
ED063B	132X1:C2:1SI8924	(CLOSE/OPEN)
ED063C	132X1:C4:1RH611	(CLOSE/OPEN)
ED063D	132X1:D4:1CC9412B	(CLOSE/OPEN)
ED063E	132X1:D5:1CC9473B	(CLOSE/OPEN)
ED063F	132X1:E4B:1MS018B	(CLOSE/OPEN)
ED063G	132X1:G1:1CS009B	(CLOSE/OPEN)
ED063H	132X1:G2:1CS009B	(CLOSE/OPEN)
ED063I	132X1:G3:1SI8807B	(CLOSE/OPEN)
ED063J	132X1:G4:OSX165B	(CLOSE/OPEN)
ED064A	132X1:J209 (120):1PA32J	(CLOSE/OPEN)
ED064B	132X1:J211 (120):1AR021	(CLOSE/OPEN)
ED064C	132X1:J219 (120):1PA04J	(CLOSE/OPEN)
ED064D	132X1:J221 (120):1PA34J	(CLOSE/OPEN)
ED064E	132X1:J215 (120):1PA52J	(CLOSE/OPEN)
ED065A	132X2:B1:1RH8702B	(CLOSE/OPEN)
ED065B	132X2:B3:1RH8701B	(CLOSE/OPEN)
ED065C	132X2:B4:1CV8112	(CLOSE/OPEN)
ED065D	132X2:C4:1RY8000B	(CLOSE/OPEN)
ED065E	132X2:D4:1RC8003B	(CLOSE/OPEN)
ED065F	132X2:D5:1RC8003C	(CLOSE/OPEN)
ED065G	132X2:G1:1RC8002A	(CLOSE/OPEN)
ED065H	132X2:G2:1RC8002B	(CLOSE/OPEN)
ED065I	132X2:G3:1RC8002C	(CLOSE/OPEN)
ED065J	132X2:G4:1RC8002D	(CLOSE/OPEN)
ED066A	132X2:F214 (120):1PM09J	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED066B	132X2:F216 (120):0/1AR056/12	(CLOSE/OPEN)
ED066C	132X2:F219 (120):1PA02J	(CLOSE/OPEN)
ED066D	132X2:F208 (120):1PM06J	(CLOSE/OPEN)
ED066E	132X2:F221 (120):1PA20JB	(CLOSE/OPEN)
ED067A	132X2A:A2:1SI8808C	(CLOSE/OPEN)
ED067B	132X2A:A3:1SI8808B	(CLOSE/OPEN)
ED068A	132X3:A4:1AF006B	(CLOSE/OPEN)
ED068B	132X3:A5:1AF017B	(CLOSE/OPEN)
ED069A	132X3:B207 (120 #1):1PM01J	(CLOSE/OPEN)
ED069B	132X3:B220 (120 #1):0PM02J	(CLOSE/OPEN)
ED070A	132X3:F209 (120 #2):0PR033J	(CLOSE/OPEN)
ED070B	132X3:F211 (120 #2):0PR34J	(CLOSE/OPEN)
ED071A	132X4:A1:1SX016B	(CLOSE/OPEN)
ED071B	132X4:A2:1SX027B	(CLOSE/OPEN)
ED071C	132X4:A3:1CS001B	(CLOSE/OPEN)
ED071D	132X4:A4:1RH8716B	(CLOSE/OPEN)
ED071E	132X4:B1:1AF013F	(CLOSE/OPEN)
ED071F	132X4:B2:1AF013E	(CLOSE/OPEN)
ED071G	132X4:B3:1CS007B	(CLOSE/OPEN)
ED071H	132X4:B4:1AF013H	(CLOSE/OPEN)
ED071I	132X4:C1:1AF013G	(CLOSE/OPEN)
ED071J	132X4:C2:1CV112E	(CLOSE/OPEN)
ED071K	132X4:C3:1CV8105	(CLOSE/OPEN)
ED071L	132X4:D4:1CC685	(CLOSE/OPEN)
ED071M	132X4:F1:1SI8821B	(CLOSE/OPEN)
ED071N	132X4:H1:1SI8811B	(CLOSE/OPEN)
ED071O	132X4:H3:1VQ001B	(CLOSE/OPEN)
ED071P	132X4:H4:1VQ002B	(CLOSE/OPEN)
ED072A	132X4A:L2:1SI8802B	(CLOSE/OPEN)
ED072B	132X4A:L3:1SI8813	(CLOSE/OPEN)
ED072C	132X4A:M1:1SI8809B	(CLOSE/OPEN)
ED072D	132X4A:M2:1SI8812B	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED073A	132X5:A4:1SI8801B	(CLOSE/OPEN)
ED073B	132X5:B1:1CV8104	(CLOSE/OPEN)
ED073C	132X5:C2B:1MS018C	(CLOSE/OPEN)
ED073D	132X5:C4:1CV112C	(CLOSE/OPEN)
ED074	133Y:3C:1RD01E	(CLOSE/OPEN)
ED075A	133U1:B1:1CW01JA	(CLOSE/OPEN)
ED075B	133U1:C3:1CW001C	(CLOSE/OPEN)
ED075C	133U1:C4:1CW001A	(CLOSE/OPEN)
ED075D	133U1:E3:1CW01JC	(CLOSE/OPEN)
ED076	133U1:D203 (120):OFT-CW040	(CLOSE/OPEN)
ED077A	133V2:B202 (120):1PA27J	(CLOSE/OPEN)
ED077B	133V2:B204 (120):1PA26J	(CLOSE/OPEN)
ED077C	133V2:B205 (120):1[illegible]A22J	(CLOSE/OPEN)
ED077D	133V2:B206 (120):1PA24J	(CLOSE/OPEN)
ED077E	133V2:B208 (120):1PM05J	(CLOSE/OPEN)
ED077F	133V2:B215 (120):1PA31J	(CLOSE/OPEN)
ED077G	133V2:B216 (120):1PA38J	(CLOSE/OPEN)
ED077H	133V2:B218 (120):1PA19J	(CLOSE/OPEN)
ED077I	133V2:B224 (120):0PM02J	(CLOSE/OPEN)
ED078A	133V3:C5:1CW018	(CLOSE/OPEN)
ED078B	133V3:F2A:0PR05J	(CLOSE/OPEN)
ED079A	133V4:A1A:1PR09J	(CLOSE/OPEN)
ED079B	133V4:A2A:0PR09J	(CLOSE/OPEN)
ED079C	133V4:E2:1FW01PB-A	(CLOSE/OPEN)
ED079D	133V4:E4:1FW059	(CLOSE/OPEN)
ED080A	133V4:C203 (120):1PA35J	(CLOSE/OPEN)
ED080B	133V4:C207 (120):1MS01JG	(CLOSE/OPEN)
ED080C	133V4:C212 (120):1CB039A-M	(CLOSE/OPEN)
ED081A	133X1A:C204 (120):1TS-CC671A	(CLOSE/OPEN)
ED081B	133X1A:C206 (120):1PR11J	(CLOSE/OPEN)
ED081C	133X1A:C208 (120):1TIS-CV129	(CLOSE/OPEN)
ED081D	133X1A:C224 (120):1PA05J	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED082A	133X1B:B201 (120):1PA36J	(CLOSE/OPEN)
ED082B	133X1B:B203 (120):1PA37J	(CLOSE/OPEN)
ED082C	133X1B:B204 (120):1PM12J	(CLOSE/OPEN)
ED082D	133X1B:B219 (120):1PA20JA	(CLOSE/OPEN)
ED082E	133X1B:B220 (120):1PA50J	(CLOSE/OPEN)
ED082G	133X1B:B222 (120):1PA07J	(CLOSE/OPEN)
ED082H	133X1B:B223 (120):1PA20JC	(CLOSE/OPEN)
ED083	133X1B:C1B:1PI03EA	(CLOSE/OPEN)
ED084A	133X3:A1B:1CV06J	(CLOSE/OPEN)
ED084B	133X3:E4A:1PR02J	(CLOSE/OPEN)
ED085A	133X3:C202 (120 #1):1CV06J	(CLOSE/OPEN)
ED085B	133X3:C203 (120 #1):1PM04J	(CLOSE/OPEN)
ED085C	133X3:C205 (120 #1):1PM04J	(CLOSE/OPEN)
ED085D	133X3:C207 (120 #1):1PM03J	(CLOSE/OPEN)
ED085E	133X3:C209 (120 #1):1PM02J	(CLOSE/OPEN)
ED085F	133X3:C211 (120 #1):1PM02J	(CLOSE/OPEN)
ED085G	133X3:C213 (120 #1):0PM01J	(CLOSE/OPEN)
ED085H	133X3:C215 (120 #1):1PM01J	(CLOSE/OPEN)
ED086A	133X3:G204 (120 #2):1PA17J	(CLOSE/OPEN)
ED086B	133X3:G212 (120 #2):1PR21/28JX1PA17J	(CLOSE/OPEN)
ED086C	133X3:G224 (120 #2):1PR28J	(CLOSE/OPEN)
ED087A	133X4:J204 (120):1PA21J	(CLOSE/OPEN)
ED087B	133X4:J209 (120):1PM06J	(CLOSE/OPEN)
ED088A	133Y1:A4:1CB01PC-A	(CLOSE/OPEN)
ED088B	133Y1:A5:1CB01PA-A	(CLOSE/OPEN)
ED088C	133Y1:A6:1CD05PA-B	(CLOSE/OPEN)
ED088D	133Y1:B1:1CD05PC-B	(CLOSE/OPEN)
ED088E	133Y1:E4:1CW002A	(CLOSE/OPEN)
ED088F	133Y1:E5:1CW003A	(CLOSE/OPEN)
ED088G	133Y1:G4:1CW002D	(CLOSE/OPEN)
ED088H	133Y1:G5:1CW003D	(CLOSE/OPEN)
ED089A	133Y1:D203 (120):1CD05PC-B	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED089B	133Y1:D205 (120):1CD05PA-B	(CLOSE/OPEN)
ED089C	133Y1:D221 (120):CD210/211	(CLOSE/OPEN)
ED090A	133Z2:C202 (120):1PM11/12J	(CLOSE/OPEN)
ED090B	133Z2:C205 (120):1FW01PC-J	(CLOSE/OPEN)
ED090C	133Z2:C208 (120):MSR VLVS	(CLOSE/OPEN)
ED091A	133Z2:D3:1FW005	(CLOSE/OPEN)
ED091B	133Z2:E4:1FW04A	(CLOSE/OPEN)
ED091C	133Z2:G3:1FW002A	(CLOSE/OPEN)
ED091D	133Z2:G4:1FW02P-B	(CLOSE/OPEN)
ED091E	133Z2:H2:1T008PA	(CLOSE/OPEN)
ED091F	133Z2:H3:1T008PB	(CLOSE/OPEN)
ED091G	133Z2:H4:1T008PC	(CLOSE/OPEN)
ED091H	133Z2:H5:1FW002C	(CLOSE/OPEN)
ED092	134Y:2A:1RD02E	(CLOSE/OPEN)
ED093A	134U1:B3:1CW01JB	(CLOSE/OPEN)
ED093B	134U1:B4:1CW001B	(CLOSE/OPEN)
ED094	134V1:A1A:1PI03EB	(CLOSE/OPEN)
ED095A	134V1:C202 (120):1CC9415	(CLOSE/OPEN)
ED095B	134V1:C204 (120):1TIS-CC672	(CLOSE/OPEN)
ED095C	134V1:C207 (120):1PM12J	(CLOSE/OPEN)
ED095D	134V1:C208 (120):1PA38J	(CLOSE/OPEN)
ED095E	134V1:C210 (120):1PA43J	(CLOSE/OPEN)
ED095F	134V1:C211 (120):1PA35J	(CLOSE/OPEN)
ED095G	134V1:C212 (120):1PA22J	(CLOSE/OPEN)
ED095H	134V1:C214 (120):1PA36J	(CLOSE/OPEN)
ED095I	134V1:C216 (120):1PA37J	(CLOSE/OPEN)
ED095J	134V1:C218 (120):1PA50J	(CLOSE/OPEN)
ED095K	134V1:C219 (120):1PA20JA	(CLOSE/OPEN)
ED095L	134V1:C220 (120):1PM10J	(CLOSE/OPEN)
ED095N	134V1:C223 (120):1PA20JC	(CLOSE/OPEN)
ED096A	134V2:F201 (120):0PA01J	(CLOSE/OPEN)
ED096B	134V2:F217 (120):1PA08J	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED097	134V3:A1A:1PR03J	(CLOSE/OPEN)
ED098	134V3:C208 (120):TIS-684/6	(CLOSE/OPEN)
ED099A	134V4:D202 (120):1PA28J	(CLOSE/OPEN)
ED099B	134V4:D204 (120):1PA25J	(CLOSE/OPEN)
ED099C	134V4:D206 (120):1PM03J	(CLOSE/OPEN)
ED099D	134V4:D207 (120):1PM01J	(CLOSE/OPEN)
ED099E	134V4:D209 (120):1PM04J	(CLOSE/OPEN)
ED099F	134V4:D210 (120):1PM02J	(CLOSE/OPEN)
ED099G	134V4:D211 (120):1PM04J	(CLOSE/OPEN)
ED099H	134V4:D212 (120):0PM01J	(CLOSE/OPEN)
ED099I	134V4:D218 (120):1PM08J	(CLOSE/OPEN)
ED099J	134V4:D220 (120):1PA30/32J	(CLOSE/OPEN)
ED099K	134V4:D222 (120):1PA06J	(CLOSE/OPEN)
ED099L	134V4:D223 (120):1PA42J	(CLOSE/OPEN)
ED099M	134V4:D224 (120):1PM08J	(CLOSE/OPEN)
ED100A	134V6:C210 (120):1FW01PB-J	(CLOSE/OPEN)
ED100B	134V6:F4:1CB003C	(CLOSE/OPEN)
ED101A	134X5:J202 (120):1PA44J	(CLOSE/OPEN)
ED101B	134X5:J216 (120):1PA21J	(CLOSE/OPEN)
ED101C	134X5:J218 (120):1PM09J	(CLOSE/OPEN)
ED102A	134Y1:A4:1CD01PD-A	(CLOSE/OPEN)
ED102B	134Y1:A5:1CD01PB-A	(CLOSE/OPEN)
ED102C	134Y1:A6:1CD05PB-B	(CLOSE/OPEN)
ED102D	134Y1:B1:1CD05PD-B	(CLOSE/OPEN)
ED103A	134Y2:A4:1CW002B	(CLOSE/OPEN)
ED103B	134Y2:A5:1CW003B	(CLOSE/OPEN)
ED103C	134Y2:D4:1CW002C	(CLOSE/OPEN)
ED103D	134Y2:D5:1CW003C	(CLOSE/OPEN)
ED104A	134Y2:C203 (120):1CD05PB-B	(CLOSE/OPEN)
ED104B	134Y2:C205 (120):1CD05PD-B	(CLOSE/OPEN)
ED105	134Y3:E1:1FW01PB-B	(CLOSE/OPEN)
ED106A	134Z2:D3:1TO07P	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

ED106B	134Z2:E3:1FW002B	(CLOSE/OPEN)
ED106C	134Z2:F1:1FW01PA-B	(CLOSE/OPEN)
ED106D	134Z2:G1:1FW01PC-B	(CLOSE/OPEN)
ED106E	134Z2:F4:1CB003B	(CLOSE/OPEN)
ED107A	134Z4:C1:1TO08PD	(CLOSE/OPEN)
ED107B	134Z4:C2:1TO08PE	(CLOSE/OPEN)
ED107C	134Z4:C3:1TO08PF	(CLOSE/OPEN)
ED108	SAT LOCKOUT RESET	(NORM/RESET)
ED110	CROSS-TIE BUSES 35-1/35-2	(CLOSE/OPEN)
ED111	CROSS-TIE UNIT 2 BKR 211	(CLOSE/OPEN)
ED112	CROSS-TIE UNIT 2 BKR 212	(CLOSE/OPEN)
ED113	JUMPER AT CONTACTS 5-6 FOR ACB 1411	(NORMAL/BYPASS)
ED114	JUMPER AT CONTACTS 5-6 FOR ACB 1421	(NORMAL/BYPASS)
ED115	2001 LINE DISCONNECT	(CLOSE/OPEN)
ED116	OSCGRAPH OPER ANNU BKR RESET	(NORM/RESET)
ED117	133V5:A4:CB003A	(CLOSE/OPEN)
ED118	132X3:B220:VQ003	(CLOSE/OPEN)

APPENDIX 2
REMOTE FUNCTION LISTING

EG01	GEN LOCKOUT RELAY 86G1A	(NORM/RESET)
EG02	GEN LOCKOUT RELAY 86G1B	(NORM/RESET)
EG03	DG1A CONTROL MODE SELECT	(LOCAL/REMOTE/MAINT_O)
EG04	DG1A UNIT PARALLEL SWITCH	(DROOP/ISOCH)
EG05	DG1A LOCAL START/STOP	(STOP/NORM/START)
EG06	DG1A LOCAL RESET	(NORM/RESET)
EG07	DG1A VOLTAGE RAISE/LOWER	(LOWER/NORM/RAISE)
EG08	DG1A SPEED RAISE/LOWER	(LOWER/NORM/RAISE)
EG09	DG1B CONTROL MODE SELECT	(LOCAL/REMOTE/MAINT_O)
EG10	DG1B UNIT PARALLEL SWITCH	(DROOP/ISOCH)
EG11	DG1B LOCAL START/STOP	(STOP/NORM/START)
EG12	DG1B LOCAL RESET	(NORM/RESET)
EG13	DG1B VOLTAGE RAISE/LOWER	(LOWER/NORM/RAISE)
EG14	DG1B SPEED RAISE/LOWER	(LOWER/NORM/RAISE)
EG15	BRKR 41M TRIP	(NORM/TRIP)
EG16	GEN TRIP TB TEST SW J	(CLOSE/OPEN)

APPENDIX 2
REMOTE FUNCTION LISTING

EP01	POND WATER LEVEL	(584'-599')
EP02	POND WATER TEMPERATURE	(32-100°F)
EP03	ATMOSPHERIC WIND SPEED 34'	(0-100 MPH)
EP04	ATMOSPHERIC WIND DIRECTION 34'	(0-360°)
EP05	ATMOSPHERIC WET BULB TEMPERATURE	(0-100°F)
EP06	ATMOSPHERIC DRY BULB TEMPERATURE	(-20-+100°F)
EP07	ATMOSPHERIC PRESSURE	(12-17 PSIA)
EP08	EXTERNAL GRID FREQUENCY	(58-62 Hz)
EP09	EXTERNAL GRID VOLTAGE	(300-370 KV)
EP10	EXTERNAL GRID EQUIVALENT REACTANCE	(0-100%)
EP11	ATMOSPHERIC WIND SPEED 203'	(0-100 MPH)
EP12	ATMOSPHERIC WIND DIRECTION 203'	(0-360°)
EP13	DELTA T ON RECORDER 0UR-EM002	(-10°-10°F)

APPENDIX 2

REMOTE FUNCTION LISTING

FP01	MPT 1E FP DELUGE RESET	(NORMAL/RESET)
FP02	MPT 1W FP DELUGE RESET	(NORMAL/RESET)
FP03	UAT 141-1 FP DELUGE RESET	(NORMAL/RESET)
FP04	UAT 141-2 FP DELUGE RESET	(NORMAL/RESET)
FP05	SAT 142-1 FP DELUGE RESET	(NORMAL/RESET)
FP06	SAT 142-2 FP DELUGE RESET	(NORMAL/RESET)
FP07	FP/WS CROSSTIE FP347 VLV POS	(0-100%)
FP08	FP/WS CROSSTIE FP507 VLV POS	(0-100%)
FP09	MOTOR DRIVEN FP LOCAL CONTROL	(STOP/AUTO/START)
FP10	DIESEL DRIVEN FP LOCAL CONTROL	(STOP/AUTO/START)

APPENDIX 2

REMOTE FUNCTION LISTING

FW001	STM DUMP SPRAY ISO 1CB038A	(0-100%)
FW002	STM DUMP SPRAY ISO 1CB038B	(0-100%)
FW003	STM DUMP SPRAY ISO 1CB038C	(0-100%)
FW004	STM DUMP SPRAY ISO 1CB038D	(0-100%)
FW005	STM DUMP SPRAY ISO 1CB038E	(0-100%)
FW006	STM DUMP SPRAY ISO 1CB038F	(0-100%)
FW007	STM DUMP SPRAY ISO 1CB038G	(0-100%)
FW008	STM DUMP SPRAY ISO 1CB038H	(0-100%)
FW009	STM DUMP SPRAY ISO 1CB038J	(0-100%)
FW010	STM DUMP SPRAY ISO 1CB038K	(0-100%)
FW011	STM DUMP SPRAY ISO 1CB038L	(0-100%)
FW012	STM DUMP SPRAY ISO 1CB038M	(0-100%)
FW013	CD PP RECIRC BYP 1CD154	(0-100%)
FW014	CD PP 1A DIS ISO 1CD041A	(0-100%)
FW015	CD PP 1B DIS ISO 1CD041B	(0-100%)
FW016	CD PP 1C DIS ISO 1CD041C	(0-100%)
FW017	CD PP 1D DIS ISO 1CD041D	(0-100%)
FW018	CP DEMIN ISO VLV 1CD189	(0-100%)
FW019	CP DEMIN ISO VLV 1CD190	(0-100%)
FW020	CB PP A DIS VLV 1CB002A	(0-100%)
FW021	CB PP B DIS VLV 1CB002B	(0-100%)
FW022	CB PP C DIS VLV 1CB002C	(0-100%)
FW023	CB PP D DIS VLV 1CB002D	(0-100%)
FW024	FW PP A SUCT ISO 1CB005A	(0-100%)
FW025	FW PP B SUCT ISO 1CB005B	(0-100%)
FW026	FW PP C SUCT ISO 1CB005C	(0-100%)
FW027	FW PP A RCRC ISO 1FW027A	(0-100%)
FW028	FW PP B RCRC ISO 1FW027B	(0-100%)
FW029	FW PP C RCRC ISO 1FW027C	(0-100%)
FW030	S/U FW PUMP RECIRC 1FW098	(0-100%)
FW031	TEMPER ISOL VLV 1FW033A	(0-100%)
FW032	TEMPER ISOL VLV 1FW033B	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

FW033	TEMPER ISOL VLV 1FW033C	(0-100%)
FW034	TEMPER ISOL VLV 1FW033D	(0-100%)
FW035	FW PREHTR BYP 1FW041A	(0-100%)
FW036	FW PREHTR BYP 1FW041B	(0-100%)
FW037	FW PREHTR BYP 1FW041C	(0-100%)
FW038	FW PREHTR BYP 1FW041D	(0-100%)
FW039	FW ISOL BYP 1FW044A	(0-100%)
FW040	FW ISOL BYP 1FW044B	(0-100%)
FW041	FW ISOL BYP 1FW044C	(0-100%)
FW042	FW ISOL BYP 1FW044D	(0-100%)
FW043	AF PP 1A SUCT ISO 1AF002A	(0-100%)
FW044	AF PP 1B SUCT ISO 1AF002B	(0-100%)
FW045	AF PP 1A DIS ISOL 1AF004A	(AUTO/CLOSE/OPEN)
FW046	AF PP 1B DIS ISOL 1AF004B	(AUTO/CLOSE/OPEN)
FW047	DEMIN M/U TO CST 0WM423A	(0-100%)
FW048	CND NORM OVRFLW BYP 1CD146	(0-100%)
FW049	CND EMERG OVRFLW 1CD140	(0-100%)
FW050	CND NORM OVRFLW 1CD143	(0-100%)
FW051	CND NORM M/U BYP 1CD035	(0-100%)
FW052	CND EMRG M/U 1CD028	(0-100%)
FW053	CND NORM M/U 1CD031	(0-100%)
FW054	SJAE STM ISOL VLV 1MS107A	(0-100%)
FW055	SJAE STM ISOL VLV 1MS107B	(0-100%)
FW056	SJAE OFF GAS ISOL 10G042A	(0-100%)
FW057	SJAE OFF GAS ISOL 10G042B	(0-100%)
FW058	17A NORM DRN 1HD008A IA	(OUT/IN)
FW059	17A NORM DRN 1HD008A PSN	(0-100%)
FW060	17A EMRG DRN 1HD038A IA	(OUT/IN)
FW061	17A EMRG DRN 1HD038A PSN	(0-100%)
FW062	17B NORM DRN 1HD008B IA	(OUT/IN)
FW063	17B NORM DRN 1HD008B PSN	(0-100%)
FW064	17B EMRG DRN 1HD038B IA	(OUT/IN)

APPENDIX 2

REMOTE FUNCTION LISTING

FW065	17B EMRG DRN 1HD038B PSN	(0-100%)
FW066	16A NORM DRN 1HD011A IA	(OUT/IN)
FW067	16A NORM DRN 1HD011A PSN	(0-100%)
FW068	16A EMRG DRN 1HD041A IA	(OUT/IN)
FW069	16A EMRG DRN 1HD041A PSN	(0-100%)
FW070	16B NORM DRN 1HD011B IA	(OUT/IN)
FW071	16B NORM DRN 1HD011B PSN	(0-100%)
FW072	16B EMRG DRN 1HD041B IA	(OUT/IN)
FW073	16B EMRG DRN 1HD041B PSN	(0-100%)
FW074	15A DRN CLR OUTLT 1HD014A	(0-100%)
FW075	15B DRN CLR OUTLT 1HD014B	(0-100%)
FW076	15A EMRG DRN 1HD062A IA	(OUT/IN)
FW077	15A EMRG DRN 1HD062A PSN	(0-100%)
FW078	15B EMRG DRN 1HD062B IA	(OUT/IN)
FW079	15B EMRG DRN 1HD062B PSN	(0-100%)
FW080	14A NORM DRN 1HD020A IA	(OUT/IN)
FW081	14A NORM DRN 1HD020A PSN	(0-100%)
FW082	14A EMRG DRN 1HD048A IA	(OUT/IN)
FW083	14A EMRG DRN 1HD048A PSN	(0-100%)
FW084	14B NORM DRN 1HD020B IA	(OUT/IN)
FW085	14B NORM DRN 1HD020B PSN	(0-100%)
FW086	14B EMRG DRN 1HD048B IA	(OUT/IN)
FW087	14B EMRG DRN 1HD048B PSN	(0-100%)
FW088	14C NORM DRN 1HD020C IA	(OUT/IN)
FW089	14C NORM DRN 1HD020C PSN	(0-100%)
FW090	14C EMRG DRN 1HD048C IA	(OUT/IN)
FW091	14C EMRG DRN 1HD048C PSN	(0-100%)
FW092	13A NORM DRN 1HD023A IA	(OUT/IN)
FW093	13A NORM DRN 1HD023A PSN	(0-100%)
FW094	13A EMRG DRN 1HD051A IA	(OUT/IN)
FW095	13A EMRG DRN 1HD051A PSN	(0-100%)
FW096	13B NORM DRN 1HD023B IA	(OUT/IN)

APPENDIX 2

REMOTE FUNCTION LISTING

FW097	13B NORM DRN 1HD023B PSN	(0-100%)
FW098	13B EMRG DRN 1HD051B IA	(OUT/IN)
FW099	13B EMRG DRN 1HD051B PSN	(0-100%)
FW100	13C NORM DRN 1HD023C IA	(OUT/IN)
FW101	13C NORM DRN 1HD023C PSN	(0-100%)
FW102	13C EMRG DRN 1HD051C IA	(OUT/IN)
FW103	13C EMRG DRN 1HD051C PSN	(0-100%)
FW104	12A NORM DRN 1HD026A IA	(OUT/IN)
FW105	12A NORM DRN 1HD026A PSN	(0-100%)
FW106	12A EMRG DRN 1HD054A IA	(OUT/IN)
FW107	12A EMRG DRN 1HD054A PSN	(0-100%)
FW108	12B NORM DRN 1HD026B IA	(OUT/IN)
FW109	12B NORM DRN 1HD026B PSN	(0-100%)
FW110	12B EMRG DRN 1HD054B IA	(OUT/IN)
FW111	12B EMRG DRN 1HD054B PSN	(0-100%)
FW112	12C NORM DRN 1HD026C IA	(OUT/IN)
FW113	12C NORM DRN 1HD026C PSN	(0-100%)
FW114	12C EMRG DRN 1HD054C IA	(OUT/IN)
FW115	12C EMRG DRN 1HD054C PSN	(0-100%)
FW116	11A DRN CLR DRN 1HD029A IA	(OUT/IN)
FW117	11A DRN CLR DRN 1HD029A PSN	(0-100%)
FW118	FLSH TK 1A DRN 1HD094A IA	(OUT/IN)
FW119	FLSH TK 1A DRN 1HD094A PSN	(0-100%)
FW120	11B DRN CLR DRN 1HD029B IA	(OUT/IN)
FW121	11B DRN CLR DRN 1HD029B PSN	(0-100%)
FW122	FLSH TK 1B DRN 1HD094B IA	(OUT/IN)
FW123	FLSH TK 1B DRN 1HD094B PSN	(0-100%)
FW124	11C DRN CLR DRN 1HD029C IA	(OUT/IN)
FW125	11C DRN CLR DRN 1HD029C PSN	(0-100%)
FW126	FLSH TK 1C DRN 1HD094C IA	(OUT/IN)
FW127	FLSH TK 1C DRN 1HD094C PSN	(0-100%)
FW128	HTR 17 BYP ISO 1FW005	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

FW129	HDT VENT TO 15A ISO 1HD070A	(0-100%)
FW130	HDT VENT TO 15B ISO 1HD070B	(0-100%)
FW131	HD PP CONT VLV ISO 1HD046A	(0-100%)
FW132	HD PP CONT VLV ISO 1HD046B	(0-100%)
FW133	HD PANEL HI-2 RESET BUTTON	(NORM/RESET)
FW134	U1/U2 CST XTIE ISO 0CD116	(0-100%)
FW135	FW HDR CLEAN UP LOOP FW095	(0-100%)
FW136	CP RETURN ISO VLV 1CD211	(0-100%)
FW137	CP CONTROLLER 1CD210A/B	(0-100%)
FW138	S/U FW PP SUCT ISO 1CB133	(0-100%)
FW139	CD M/U PP 0/1 XTIE 0CD113	(0-100%)
FW140	CD PP 1A SUCT ISO 1CD037A	(0-100%)
FW141	CD PP 1B SUCT ISO 1CD037B	(0-100%)
FW142	CD PP 1C SUCT ISO 1CD037C	(0-100%)
FW143	CD PP 1D SUCT ISO 1CD037D	(0-100%)
FW144	FWP B SPEED SETTER MOTOR	(0-5800 RPM)
FW145	FWP C SPEED SETTER MOTOR	(0-5800 RPM)
FW146	AF PP A AUX L.O. PP	(STOP/START)
FW147	AF PP B AUX L.O. PP	(STOP/START)
FW148	AF PP B GEAR BOX OIL PP	(STOP/START)
FW149	S/U FW PP AUX L.O. PP	(STOP/START)
FW150	FW AUX RELAY FUSE TRAIN A	(NORMAL/REMOVED)
FW151	FW AUX RELAY FUSE TRAIN B	(NORMAL/REMOVED)
FW152	FW PP B O/S TRIP TEST	(RESET/NORMAL/TRIP)
FW153	FW PP C O/S TRIP TEST	(RESET/NORMAL/TRIP)
FW154	1HD046A/B VALVE CONTACT 09-11 ON 1LY-HD009A - LOW NPSH	(NORMAL/CLOSE)
FW155	1CD157A VALVE CONTACT 15-16 ON PS-CB14X ON LOW NPSH	(NORMAL/OPEN)
FW156	1CD152A VALVE CONTACT 17-18 ON PS-CB14XON LOW NPSH	(NORMAL/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

FW157	1CD05PD VALVE CONTACT 03-04 ON PS-CB14X ON LOW NPSH	(NORMAL/OPEN)
FW158	1PS-CB014X FOR ALL CONTACTS ON LOW NPSH	(NORMAL/OPEN)
FW159	1CD210A/B FOR CONTACTS ON LOW NPSH	(NORMAL/OPEN)
FW160	1AF01J LOCAL OPERATION (S5/S4/1HS/ 1FW120/S8)	(NORM/START/STOP)
FW161	AF 1AF005E HANDWHEEL RF	(0-100%)
FW162	AF 1AF005F HANDWHEEL RF	(0-100%)
FW163	AF 1AF005G HANDWHEEL RF	(0-100%)
FW164	AF 1AF005H HANDWHEEL RF	(0-100%)
FW165	AF 1A SUCT PRESS LO-2 (51) NORM/TRIP	(NORMAL/TRIP)
FW166	AF 1B SUCT PRESS LO-2 (55) NORM/TRIP	(NORMAL/TRIP)
FW167	FW PP 1A RECIRC VLV 1FW012A PP START	(NORMAL/BYPASS)
FW168	COND HOTWELL CONTROLLING LEVEL CHANNEL	(CD042,CD089)
FW169	1HD123 HD TANK M/U LINE ISO VLV	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

IA01	SA TO IA ISOL 1SA113	(0-100%)
IA02	SA TO IA ISOL 0SA113	(0-100%)
IA03	SA TO IA ISOL 2SA113	(0-100%)
IA04	SA TO IA X-TIE (U-0/1) 0IA147	(0-100%)
IA05	SA TO IA X-TIE (U-0/2) 0IA148	(0-100%)
IA06	AIR DRYER 1 ISOL 1IA001	(0-100%)
IA07	AIR DRYER 0 ISOL 0IA001	(0-100%)
IA08	AIR DRYER 2 ISOL 2IA001	(0-100%)
IA09	AIR RCVR INLET X-TIE (U-0/1) 0IA053	(0-100%)
IA10	AIR RCVR INLET X-TIE (U-0/2) 0IA054	(0-100%)
IA11	AIR RCVR OUTLET ISOL 1IA013	(0-100%)
IA12	AIR RCVR OUTLET ISOL 0IA013	(0-100%)
IA13	AIR RCVR OUTLET ISOL 2IA013	(0-100%)
IA14	TURB BLDG HDR X-TIE (U-0/1) 0IA114	(0-100%)
IA15	TURB BLDG HDR X-TIE (U-0/2) 0IA113	(0-100%)
IA16	TURB BLDG HDR X-TIE (U-1/2) 0IA055	(0-100%)
IA17	UNIT 1 TB TO AB 0IA097A	(0-100%)
IA18	UNIT 2 TB TO AB 0IA097B	(0-100%)
IA19	AUX BLD HDR X-TIE 0IA107	(0-100%)
IA20	AUX BLD HDR X-TIE 0IA101	(0-100%)
IA21	STM DUMP SUP ISOL 1IA061	(0-100%)
IA22	IA TO CB RECIRCS 1IA073	(0-100%)
IA23	IA TO HD VALVES 1IA056	(0-100%)
IA24	IA TO MSR VALVES 1IA055	(0-100%)
IA25	PORTABLE COMPRESSOR	(OFF/ON)
IA26	1IA065 VALVE POSITION	(0-100%)
IA27	1IA066 VALVE POSITION	(0-100%)
IA28	AF005 VALVES 0IA106	(0-100%)
IA29	EAST MSIV'S (B & C) 1IA127	(0-100%)
IA30	WEST MSIV'S (A & D) 1IA124	(0-100%)
IA31	IA TO SX/CV VALVES 0IA100	(0-100%)
IA32	IA TO CV VALVES 0IA661	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

IA33	IA TO FW PUMP RECIRCS 1IA1133	(0-100%)
IA34	IA TO FRV'S & BYPASSES 1IA1117	(0-100%)
IA35	IA TO BOTH MSIV ROOMS 1IA058	(0-100%)
IA36	AUX BLDG HEADER ISOL 0IA480	(0-100%)
IA37	STM DUMPS A-D 1IA274A	(0-100%)
IA38	STM DUMPS E-H 1IA274B	(0-100%)
IA39	STM DUMPS J-M 1IA274C	(0-100%)
IA40	AUX BLDG HEADER ISOL 0IA479	(0-100%)
IA41	N2 SUPPLY TO ALL SAC'S	(OFF/ON)
IA42	SPARE	(0-100%)
IA43	IA ISOL TO 1IA065	(ON/OFF)
IA44	IA ISOL TO 1IA066	(ON/OFF)
IA45	1PSL-SA004 U-1 COMP AUTO START PREVENT 3TR RELAY	(NORMAL/OPEN)
IA46	U-1 SAC 3CR,4CR, & 8CR LOC RESET	(NORM/RESET)
IA47	U-0 SAC 3CR,4CR, & 8CR LOC RESET	(NORM/RESET)
IA48	U-2 SAC 3CR,4CR, & 8CR LOC RESET	(NORM/RESET)
IA49	SAC 2 UNLOADER VALVE	(0-100%)

APPENDIX 2
REMOTE FUNCTION LISTING

MS01	1ST MSR A 15A VENT ES100A	(CLOSE/OPEN)
MS02	1ST MSR B 15B VENT ES100B	(CLOSE/OPEN)
MS03	1ST MSR A 15A VENT ES100C	(CLOSE/OPEN)
MS04	1ST MSR B 15B VENT ES100D	(CLOSE/OPEN)
MS05	1ST MSR A 17A VENT ES101A	(CLOSE/OPEN)
MS06	1ST MSR B 17B VENT ES101B	(CLOSE/OPEN)
MS07	1ST MSR A 17A VENT ES101C	(CLOSE/OPEN)
MS08	1ST MSR B 17B VENT ES101D	(CLOSE/OPEN)
MS09	STM DUMP ISO VLV MS003A	(0-100%)
MS10	STM DUMP ISO VLV MS003B	(0-100%)
MS11	STM DUMP ISO VLV MS003C	(0-100%)
MS12	STM DUMP ISO VLV MS003D	(0-100%)
MS13	STM DUMP ISO VLV MS003E	(0-100%)
MS14	STM DUMP ISO VLV MS003F	(0-100%)
MS15	STM DUMP ISO VLV MS003G	(0-100%)
MS16	STM DUMP ISO VLV MS003H	(0-100%)
MS17	STM DUMP ISO VLV MS003J	(0-100%)
MS18	STM DUMP ISO VLV MS003K	(0-100%)
MS19	STM DUMP ISO VLV MS003L	(0-100%)
MS20	STM DUMP ISO VLV MS003M	(0-100%)
MS21	1ST ST MSR A CND VENT ES97A	(CLOSE/OPEN)
MS22	1ST ST MSR B CND VENT ES97B	(CLOSE/OPEN)
MS23	1ST ST MSR A CND VENT ES97C	(CLOSE/OPEN)
MS24	1ST ST MSR B CND VENT ES97D	(CLOSE/OPEN)
MS25	2ND ST MSR A CND VENT ES99A	(CLOSE/OPEN)
MS26	2ND ST MSR B CND VENT ES99B	(CLOSE/OPEN)
MS27	2ND ST MSR A CND VENT ES99C	(CLOSE/OPEN)
MS28	2ND ST MSR B CND VENT ES99D	(CLOSE/OPEN)
MS29A	A MSR SHL NORM POS HD099A	(0-100%)
MS29B	B MSR SHL NORM POS HD099B	(0-100%)
MS29C	A MSR SHL NORM POS HD099C	(0-100%)
MS29D	B MSR SHL NORM POS HD099D	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

MS30A	A MSR SHL NORM IA HD099A	(CLOSE/OPEN)
MS30B	B MSR SHL NORM IA HD099B	(CLOSE/OPEN)
MS30C	A MSR SHL NORM IA HD099C	(CLOSE/OPEN)
MS30D	B MSR SHL NORM IA HD099D	(CLOSE/OPEN)
MS31A	A MSR SHL EMER POS HD087A	(0-100%)
MS31B	B MSR SHL EMER POS HD087B	(0-100%)
MS31C	A MSR SHL EMER POS HD087C	(0-100%)
MS31D	B MSR SHL EMER POS HD087D	(0-100%)
MS32A	A MSR SHL EMER IA HD087A	(CLOSE/OPEN)
MS32B	B MSR SHL EMER IA HD087B	(CLOSE/OPEN)
MS32C	A MSR SHL EMER IA HD087C	(CLOSE/OPEN)
MS32D	B MSR SHL EMER IA HD087D	(CLOSE/OPEN)
MS33A	A MSR 1ST NORM POS HD002A	(0-100%)
MS33B	B MSR 1ST NORM POS HD002B	(0-100%)
MS33C	A MSR 1ST NORM POS HD002C	(0-100%)
MS33D	B MSR 1ST NORM POS HD002D	(0-100%)
MS34A	A MSR 1ST NORM IA HD002A	(CLOSE/OPEN)
MS34B	B MSR 1ST NORM IA HD002B	(CLOSE/OPEN)
MS34C	A MSR 1ST NORM IA HD002C	(CLOSE/OPEN)
MS34D	B MSR 1ST NORM IA HD002D	(CLOSE/OPEN)
MS35A	A MSR 1ST EMER POS HD032A	(0-100%)
MS35B	B MSR 1ST EMER POS HD032B	(0-100%)
MS35C	A MSR 1ST EMER POS HD032C	(0-100%)
MS35D	B MSR 1ST EMER POS HD032D	(0-100%)
MS36A	A MSR 1ST EMER IA HD032A	(CLOSE/OPEN)
MS36B	B MSR 1ST EMER IA HD032B	(CLOSE/OPEN)
MS36C	A MSR 1ST EMER IA HD032C	(CLOSE/OPEN)
MS36D	B MSR 1ST EMER IA HD032D	(CLOSE/OPEN)
MS37A	A MSR 2ND NORM POS HD005A	(0-100%)
MS37B	B MSR 2ND NORM POS HD005B	(0-100%)
MS37C	A MSR 2ND NORM POS HD005C	(0-100%)
MS37D	B MSR 2ND NORM POS HD005D	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

MS38A	A MSR 2ND NORM IA HD005A	(CLOSE/OPEN)
MS38B	B MSR 2ND NORM IA HD005B	(CLOSE/OPEN)
MS38C	A MSR 2ND NORM IA HD005C	(CLOSE/OPEN)
MS38D	B MSR 2ND NORM IA HD005D	(CLOSE/OPEN)
MS39A	A MSR 2ND EMER POS HD035A	(0-100%)
MS39B	B MSR 2ND EMER POS HD035B	(0-100%)
MS39C	A MSR 2ND EMER POS HD035C	(0-100%)
MS39D	B MSR 2ND EMER POS HD035D	(0-100%)
MS40A	A MSR 2ND EMER IA HD035A	(CLOSE/OPEN)
MS40B	B MSR 2ND EMER IA HD035B	(CLOSE/OPEN)
MS40C	A MSR 2ND EMER IA HD035C	(CLOSE/OPEN)
MS40D	B MSR 2ND EMER IA HD035D	(CLOSE/OPEN)
MS41	ES TO 17A HTR ES006A	(0-100%)
MS42	ES TO 17B HTR ES006B	(0-100%)
MS43	ES TO 16A HTR ES003A	(0-100%)
MS44	ES TO 16B HTR ES003B	(0-100%)
MS45	ES TO 15A HTR ES009A	(0-100%)
MS46	ES TO 15B HTR ES009B	(0-100%)
MS47	MN STM SUPPLY TO GS MS167	(0-100%)
MS48	AUX STM FD TO GS MS163	(0-100%)
MS49	PRESSURE REGULATED LOAD	(0-100 PSIG)
MS50	BOILER DISCH VLV AS168	(0-100%)
MS51	SG 1A PORV ISOL VLV MS019A	(0-100%)
MS52	SG 1B PORV ISOL VLV MS019B	(0-100%)
MS53	SG 1C PORV ISOL VLV MS019C	(0-100%)
MS54	SG 1D PORV ISOL VLV MS019D	(0-100%)
MS55	SG PORV A HAND CONTROL	(0-100%)
MS56	SG PORV B HAND CONTROL	(0-100%)
MS57	SG PORV C HAND CONTROL	(0-100%)
MS58	SG PORV D HAND CONTROL	(0-100%)
MS59	AUXILIARY BOILER PRESSURE	(0-200 PSIG)
MS60	MSIV HYD PP IA ISOL	(NORM/ISOL)

APPENDIX 2

REMOTE FUNCTION LISTING

MS61	MS FLASH TK DRN MS161	(CLOSE/OPEN)
MS62	1MS031A ISOLATION VLV 1MS030A	(CLOSE/OPEN)
MS63	1MS031C ISOLATION VLV 1MS030C	(CLOSE/OPEN)
MS64	1MS031D ISOLATION VLV 1MS030D	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

NI01	SR HI S/D FLUX STPNT N31	(10E0-10E6 CPS)
NI02	SR HI S/D FLUX STPNT N32	(10E0-10E6 CPS)
NI03	INCORE DET A EMERG/STOR BOTTOM LIMIT	(0-2000 INCH)
NI04	INCORE DET A EMERG/STOR TOP LIMIT	(0-2000 INCH)
NI05	INCORE DET A CALIBRATE BOTTOM LIMIT	(0-2000 INCH)
NI06	INCORE DET A CALIBRATE TOP LIMIT	(0-2000 INCH)
NI07	INCORE DET B EMERG/STOR BOTTOM LIMIT	(0-2000 INCH)
NI08	INCORE DET B EMERG/STOR TOP LIMIT	(0-2000 INCH)
NI09	INCORE DET B CALIBRATE BOTTOM LIMIT	(0-2000 INCH)
NI10	INCORE DET B CALIBRATE TOP LIMIT	(0-2000 INCH)
NI11	INCORE DET C EMERG/STOR BOTTOM LIMIT	(0-2000 INCH)
NI12	INCORE DET C EMERG/STOR TOP LIMIT	(0-2000 INCH)
NI13	INCORE DET C CALIBRATE BOTTOM LIMIT	(0-2000 INCH)
NI14	INCORE DET C CALIBRATE TOP LIMIT	(0-2000 INCH)
NI15	INCORE DET D EMERG/STOR BOTTOM LIMIT	(0-2000 INCH)
NI16	INCORE DET D EMERG/STOR TOP LIMIT	(0-2000 INCH)
NI17	INCORE DET D CALIBRATE BOTTOM LIMIT	(0-2000 INCH)
NI18	INCORE DET D CALIBRATE TOP LIMIT	(0-2000 INCH)
NI19	INCORE DET E EMERG/STOR BOTTOM LIMIT	(0-2000 INCH)
NI20	INCORE DET E EMERG/STOR TOP LIMIT	(0-2000 INCH)
NI21	INCORE DET E CALIBRATE BOTTOM LIMIT	(0-2000 INCH)
NI22	INCORE DET E CALIBRATE TOP LIMIT	(0-2000 INCH)
NI23	INCORE DET F EMERG/STOR BOTTOM LIMIT	(0-2000 INCH)
NI24	INCORE DET F EMERG/STOR TOP LIMIT	(0-2000 INCH)
NI25	INCORE DET F CALIBRATE BOTTOM LIMIT	(0-2000 INCH)
NI26	INCORE DET F CALIBRATE TOP LIMIT	(0-2000 INCH)
NI27	COURSE GAIN ADJ. ON NI POWER RANGE	(0-5 VOLTS)

APPENDIX 2

REMOTE FUNCTION LISTING

RD01	DRPI PWR TRANSFER SWITCH	(ED133X1B/ED134V1)
RD02	PA CONVERTER CB A	(0-235 STEPS)
RD03	PA CONVERTER CB B	(0-235 STEPS)
RD04	PA CONVERTER CB C	(0-235 STEPS)
RD05	PA CONVERTER CB D	(0-235 STEPS)
RD06	MG SET BRK A	(NORMAL/TRIP)
RD07	MG SET BRK B	(NORMAL/TRIP)
RD08	RESET STEP COUNTER DURING TRAINER RESET IC & FROZEN	(NOT STEP,0 ,STEP)
RD09A	BANK OVERLAP SETPOINTS	(0-500 STEPS)
RD09B	BANK OVERLAP SETPOINTS	(0-500 STEPS)
RD09C	BANK OVERLAP SETPOINTS	(0-500 STEPS)
RD09D	BANK OVERLAP SETPOINTS	(0-500 STEPS)
RD09E	BANK OVERLAP SETPOINTS	(0-500 STEPS)
RD09F	BANK OVERLAP SETPOINTS	(0-500 STEPS)

APPENDIX 2

REMOTE FUNCTION LISTING

RH01	RH TO CV LETDOWN RH8734A	(0-100%)
RH02	RH TO CV LETDOWN RH8734B	(0-100%)
RH03	RH RECIRC TO RWST RH8735	(0-100%)
RH04	TRN A RH/RCS SUCT RH8701A	(0-100%)
RH05	TRN A RH/RCS SUCT RH8701B	(0-100%)
RH06	TRN B RH/RCS SUCT RH8702A	(0-100%)
RH07	TRN B RH/RCS SUCT RH8702B	(0-100%)
RH08	TRN A RH DISCH XTIE RH8716A	(0-100%)
RH09	TRN B RH DISCH XTIE RH8716B	(0-100%)
RH10	TRN A RH MINIFLOW RH610	(0-100%)
RH11	TRN B RH MINIFLOW RH611	(0-100%)
RH12	TRN A RECIRC SUMP SI8811A	(0-100%)
RH13	TRN B RECIRC SUMP SI8811B	(0-100%)
RH14	TRN A RWST TO RH SI8812A	(0-100%)
RH15	TRN B RWST TO RH SI8812B	(0-100%)
RH16	RH HX A FLOW CONTROL RH606	(0-100%)
RH17	RH HX B FLOW CONTROL RH607	(0-100%)
RH18	RWST LO-2 930C NORM/TRIP	(NORMAL/TRIP)
RH19	RWST LO-2 931C NORM/TRIP	(NORMAL/TRIP)
RH20	RWST LO-2 932C NORM/TRIP	(NORMAL/TRIP)
RH21	RWST LO-2 933C NORM/TRIP	(NORMAL/TRIP)

APPENDIX 2
REMOTE FUNCTION LISTING

RM01	1PR11J LOC VLV ISOLATION	(NORM/RESET)

APPENDIX 2

REMOTE FUNCTION LISTING

RP01	RX TRIP BRK A (52/RTA)	(NORMAL/TRIP)
RP02	RX TRIP BRK B (52/RTB)	(NORMAL/TRIP)
RP03	SSPS GEN WARN BOTH TRAIN	(NORMAL/TRIP)
RP04	BYPASS BRK A (52/RTA)	(NORMAL/TRIP)
RP05	BYPASS BKR B (52/RTB)	(NORMAL/TRIP)
RP06	BYA STATUS-BKR A	(NORMAL/RACKIN)
RP07	BYB STATUS-BKR B	(NORMAL/RACKIN)
RP08	LIFTED LEADS CLEARS P-4: TRN A	(NORMAL/LIFTED)
RP09	LIFTED LEADS CLEARS P-4: TRN B	(NORMAL/LIFTED)
RP10	CNMT PRESSURE HI-3 PB934A	(NORMAL/BYPASS)
RP11	CNMT PRESSURE HI-1 PB934B	(NORMAL/TRIP)
RP12	CNMT PRESSURE HI-2 PB934C	(NORMAL/TRIP)
RP13	CNMT PRESS HI-3 PB935A	(NORMAL/BYPASS)
RP14	CNMT PRESS HI-1 PB935B	(NORMAL/TRIP)
RP15	CNMT PRESS HI-2 PB935C	(NORMAL/TRIP)
RP16	CNMT PRESS HI-3 PB936A	(NORMAL/BYPASS)
RP17	CNMT PRESS HI-1 PB936B	(NORMAL/TRIP)
RP18	CNMT PRESS HI-3 PB937A	(NORMAL/BYPASS)
RP19	CNMT PRESS HI-2 PB936C	(NORMAL/TRIP)
RP20	PROTECTION CABINET DOOR #1	(CLOSE/OPEN)
RP21	PROTECTION CABINET DOOR #2	(CLOSE/OPEN)
RP22	PROTECTION CABINET DOOR #3	(CLOSE/OPEN)
RP23	PROTECTION CABINET DOOR #4	(CLOSE/OPEN)
RP24	BDPS TEST SW RP-31A	(NORM/BYPASS)
RP25	BDPS TEST SW RP-32A	(NORM/BYPASS)
RP26	SLAVE K606 PHASE A TRN A	(NORMAL/IN/OUT)
RP27	SLAVE K612 PHASE A TRN A	(NORMAL/IN/OUT)
RP28	SLAVE K614 PHASE A TRN A	(NORMAL/IN/OUT)
RP29	SLAVE K605 PHASE A TRN A	(NORMAL/IN/OUT)
RP30	SLAVE K607 PHASE A TRN A	(NORMAL/IN/OUT)
RP31	SLAVE K613 PHASE A TRN A	(NORMAL/IN/OUT)
RP32	SLAVE K622 CNMT VENT TRN A	(NORMAL/IN/OUT)

APPENDIX 2
REMOTE FUNCTION LISTING

RP33	SLAVE K615 CNMT VENT TRN A	(NORMAL/IN/OUT)
RP34	SLAVE K623 MS ISOL TRN A	(NORMAL/IN/OUT)
RP35	SLAVE K616 MS ISOL TRN A	(NORMAL/IN/OUT)
RP36	SLAVE K644 CS ACT TRN A	(NORMAL/IN/OUT)
RP37	SLAVE K643 CS ACT TRN A	(NORMAL/IN/OUT)
RP38	SLAVE K633 AF PUMPS 1/4 S/G LO-2 TRN A	(NORMAL/IN/OUT)
RP39	SLAVE K647 SI TRN A	(NORMAL/IN/OUT)
RP40	SLAVE K626 PHASE B TRN A	(NORMAL/IN/OUT)
RP41	SLAVE K618 PHASE B TRN A	(NORMAL/IN/OUT)
RP42	SLAVE K648 RWST LO-2 TRN A	(NORMAL/IN/OUT)
RP43	SLAVE K621 FW TRIP TRN A	(NORMAL/IN/OUT)
RP44	SLAVE K602 SI TRN A	(NORMAL/IN/OUT)
RP45	SLAVE K604 SI TRN A	(NORMAL/IN/OUT)
RP46	SLAVE K609 SI TRN A	(NORMAL/IN/OUT)
RP47	SLAVE K611 SI TRN A	(NORMAL/IN/OUT)
RP48	SLAVE K631 LO LO TAVG TRN A	(NORMAL/IN/OUT)
RP49	SLAVE K603 SI TRN A	(NORMAL/IN/OUT)
RP50	SLAVE K608 SI TRN A	(NORMAL/IN/OUT)
RP51	SLAVE K610 SI TRN A	(NORMAL/IN/OUT)
RP52	SLAVE K606 PHASE A TRN B	(NORMAL/IN/OUT)
RP53	SLAVE K612 PHASE A TRN B	(NORMAL/IN/OUT)
RP54	SLAVE K614 PHASE A TRN B	(NORMAL/IN/OUT)
RP55	SLAVE K605 PHASE A TRN B	(NORMAL/IN/OUT)
RP56	SLAVE K607 PHASE A TRN B	(NORMAL/IN/OUT)
RP57	SLAVE K613 PHASE A TRN B	(NORMAL/IN/OUT)
RP58	SLAVE K622 CNMT VENT TRN B	(NORMAL/IN/OUT)
RP59	SLAVE K615 CNMT VENT TRN B	(NORMAL/IN/OUT)
RP60	SLAVE K623 MS ISOL TRN B	(NORMAL/IN/OUT)
RP61	SLAVE K616 MS ISOL TRN B	(NORMAL/IN/OUT)
RP62	SLAVE K644 CS ACT TRN B	(NORMAL/IN/OUT)
RP63	SLAVE K643 CS ACT TRN B	(NORMAL/IN/OUT)
RP64	SLAVE K633 AF PUMPS 1/4 S/G LO-2 TRN B	(NORMAL/IN/OUT)

APPENDIX 2

REMOTE FUNCTION LISTING

RP65	SLAVE K647 SI B TRN B	(NORMAL/IN/OUT)
RP66	SLAVE K626 PHASE B TRN B	(NORMAL/IN/OUT)
RP67	SLAVE K618 PHASE B TRN B	(NORMAL/IN/OUT)
RP68	SLAVE K648 RWST LO-2 TRN B	(NORMAL/IN/OUT)
RP69	SLAVE K621 FW TRIP TRN B	(NORMAL/IN/OUT)
RP70	SLAVE K602 SI TRN B	(NORMAL/IN/OUT)
RP71	SLAVE K604 SI TRN B	(NORMAL/IN/OUT)
RP72	SLAVE K609 SI TRN B	(NORMAL/IN/OUT)
RP73	SLAVE K611 SI TRN B	(NORMAL/IN/OUT)
RP74	SLAVE K631 LO LO TAVG TRN B	(NORMAL/IN/OUT)
RP75	SLAVE K603 SI TRN B	(NORMAL/IN/OUT)
RP76	SLAVE K608 SI TRN B	(NORMAL/IN/OUT)
RP77	SLAVE K610 SI TRN B	(NORMAL/IN/OUT)
RP78	FW PP/VLV TRIP FUSES TRN A	(NORMAL/REMOVED)
RP79	FW PP/VLV TRIP FUSES TRN B	(NORMAL/REMOVED)
RP80	MULTIPLEXER TEST SW A,B	(NORM/INHA/INHB/AA_B/BA_B)
RP81	INPUT ERROR INHIBIT A,B	(NORM/INHIBITA/INHIBITB)
RP82	MSTR OUTPUT SELECTOR SW A,B	(NORM/TESTA/TESTB)
RP83	SAFEGUARD ACTUATION SARA 1-2	
	CONTACT FOR 1ACV	(NORMAL/OPEN)
RP84	SAFEGUARD ACTUATION SARB 3-4	
	CONTACT FOR 1BSI	(NORMAL/OPEN)
RP85	SAFEGUARD ACTUATION SARB 7-8	
	CONTACT FOR 1BRH	(NORMAL/OPEN)
RP86	SAFEGUARD ACTUATION SARA 9-10	
	CONTACT FOR OA VC CHILLER	(NORMAL/OPEN)
RP87	SAFEGUARD ACTUATION SARB 11-12	
	CONTACT FOR 1BCS	(NORMAL/OPEN)
RP88	SAFEGUARD ACTUATION SARA 13-14	
	CONTACT FOR 1A + 0 CC	(NORMAL/OPEN)
RP89	SAFEGUARD ACTUATION SARB 15-16	
	CONTACT FOR 1BSX	(NORMAL/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

RP90	SAFEGUARD ACTUATION SARA 17-18 CONTACT FOR 1AAF	(NORMAL/OPEN)
RP91	TRIP ALL ATWS SG LEVEL B/S AND IMP B/S (TEST/BYPASS)	(NORMAL/TEST)

APPENDIX 2

REMOTE FUNCTION LISTING

RX001	RCS LO FLOW LOOP 1 FB414A	(NORMAL/TRIP)
RX002	RCS LO FLOW LOOP 1 FB415A	(NORMAL/TRIP)
RX003	RCS LO FLOW LOOP 1 FB416A	(NORMAL/TRIP)
RX004	RCS LO FLOW LOOP 2 FB424A	(NORMAL/TRIP)
RX005	RCS LO FLOW LOOP 2 FB425A	(NORMAL/TRIP)
RX006	RCS LO FLOW LOOP 2 FB426A	(NORMAL/TRIP)
RX007	RCS LO FLOW LOOP 3 FB434A	(NORMAL/TRIP)
RX008	RCS LO FLOW LOOP 3 FB435A	(NORMAL/TRIP)
RX009	RCS LO FLOW LOOP 3 FB436A	(NORMAL/TRIP)
RX010	RCS LO FLOW LOOP 4 FB444A	(NORMAL/TRIP)
RX011	RCS LO FLOW LOOP 4 FB445A	(NORMAL/TRIP)
RX012	RCS LO FLOW LOOP 4 FB446A	(NORMAL/TRIP)
RX013	RCS OT DELTA T TB411C	(NORMAL/TRIP)
RX014	RCS OP DELTA T TB411G	(NORMAL/TRIP)
RX015	LO-LO TAVG TB412D	(NORMAL/TRIP)
RX016	LOW TAVG TB412G	(NORMAL/TRIP)
RX017	RCS OT DELTA T TB421C	(NORMAL/TRIP)
RX018	RCS OP DELTA T TB421G	(NORMAL/TRIP)
RX019	LO-LO TAVG TB422D	(NORMAL/TRIP)
RX020	LOW TAVG TB422G	(NORMAL/TRIP)
RX021	RCS OT DELTA T TB431C	(NORMAL/TRIP)
RX022	RCS OP DELTA T TB431G	(NORMAL/TRIP)
RX023	LO-LO TAVG TB432D	(NORMAL/TRIP)
RX024	LOW TAVG TB432G	(NORMAL/TRIP)
RX025	RCS OT DELTA T TB441C	(NORMAL/TRIP)
RX026	RCS OP DELTA T TB441G	(NORMAL/TRIP)
RX027	LO-LO TAVG TB442D	(NORMAL/TRIP)
RX028	LOW TAVG TB442G	(NORMAL/TRIP)
RX029	PZR HI WATER LEVEL LB459A	(NORMAL/TRIP)
RX030	PZR HI WATER LEVEL LB460A	(NORMAL/TRIP)
RX031	PZR HI WATER LEVEL LB461A	(NORMAL/TRIP)
RX032	PZR HI PRESSURE PB455A	(NORMAL/TRIP)

APPENDIX 2

REMOTE FUNCTION LISTING

RX033	PZR ENABLE BLOCK SI PB455B	(NORMAL/TRIP)
RX034	PZR LOW PRESS TRIP PB455C	(NORMAL/TRIP)
RX035	PZR LOW PRESS SI PB455D	(NORMAL/TRIP)
RX036	PZR HI PRESSURE PB456A	(NORMAL/TRIP)
RX037	PZR ENABLE BLOCK SI PB456B	(NORMAL/TRIP)
RX038	PZR LOW PRESS TRIP PB456C	(NORMAL/TRIP)
RX039	PZR LOW PRESS SI PB456D	(NORMAL/TRIP)
RX040	PZR HI PRESSURE PB457A	(NORMAL/TRIP)
RX041	PZR ENABLE BLOCK SI PB457B	(NORMAL/TRIP)
RX042	PZR LOW PRESS TRIP PB457C	(NORMAL/TRIP)
RX043	PZR LOW PRESS SI PB457D	(NORMAL/TRIP)
RX044	PZR HI PRESSURE PB458A	(NORMAL/TRIP)
RX045	PZR LOW PRESS TRIP PB458C	(NORMAL/TRIP)
RX046	PZR LOW PRESS SI PB458D	(NORMAL/TRIP)
RX047	SG1 HI-HI LEVEL LB517A	(NORMAL/TRIP)
RX048	SG1 LO-2 WATER LB517B	(NORMAL/TRIP)
RX049	SG1 HI-HI LEVEL LB518A	(NORMAL/TRIP)
RX050	SG1 LO-2 WATER LVL LB518B	(NORMAL/TRIP)
RX051	SG1 HI-HI LEVEL LB519A	(NORMAL/TRIP)
RX052	SG1 LO-2 WATER LVL LB519B	(NORMAL/TRIP)
RX053	SG2 HI-HI LEVEL LB527A	(NORMAL/TRIP)
RX054	SG2 LO-2 WATER LVL LB527B	(NORMAL/TRIP)
RX055	SG2 HI-HI LEVEL LB528A	(NORMAL/TRIP)
RX056	SG2 LO-2 WATER LVL LB528B	(NORMAL/TRIP)
RX057	SG2 HI-HI LEVEL LB529A	(NORMAL/TRIP)
RX058	SG2 LO-2 WATER LVL LB529B	(NORMAL/TRIP)
RX059	SG3 HI-HI LEVEL LB537A	(NORMAL/TRIP)
RX060	SG3 LO-2 WATER LVL LB537B	(NORMAL/TRIP)
RX061	SG3 HI-HI LEVEL LB538A	(NORMAL/TRIP)
RX062	SG3 LO-2 WATER LVL LB538B	(NORMAL/TRIP)
RX063	SG3 HI-HI LEVEL LB539A	(NORMAL/TRIP)
RX064	SG3 LO-2 WATER LVL LB539B	(NORMAL/TRIP)

APPENDIX 2
REMOTE FUNCTION LISTING

RX065	SG4 HI-HI LEVEL LB547A	(NORMAL/TRIP)
RX066	SG4 LO-2 WATER LVL LB547B	(NORMAL/TRIP)
RX067	SG4 HI-HI LEVEL LB548A	(NORMAL/TRIP)
RX068	SG4 LO-2 WATER LVL LB548B	(NORMAL/TRIP)
RX069	SG4 HI-HI LEVEL LB549A	(NORMAL/TRIP)
RX070	SG4 LO-2 WATER LVL LB549B	(NORMAL/TRIP)
RX071	SG1 LO-2 WATER LVL LB556C	(NORMAL/TRIP)
RX072	SG1 LO-2 WATER LVL LB557C	(NORMAL/TRIP)
RX073	SG1 LO-2 WATER LVL LB558C	(NORMAL/TRIP)
RX074	SG1 LO-2 WATER LVL LB559C	(NORMAL/TRIP)
RX075	SG1 HI STM RATE PB514A	(NORMAL/TRIP)
RX076	SG1 LO STM PRESS PB514B	(NORMAL/TRIP)
RX077	SG1 HI STM RATE P PB515A	(NORMAL/TRIP)
RX078	SG1 LO STM PRESS PB515B	(NORMAL/TRIP)
RX079	SG1 HI STM RATE PB516C	(NORMAL/TRIP)
RX080	SG1 LO STM PRESS PB516A	(NORMAL/TRIP)
RX081	SG2 HI STM RATE P PB524A	(NORMAL/TRIP)
RX082	SG2 LO STM PRESS PB524B	(NORMAL/TRIP)
RX083	SG2 HI STM RATE P PB525A	(NORMAL/TRIP)
RX084	SG2 LO STM PRESS PB525B	(NORMAL/TRIP)
RX085	SG2 HI STM RATE P PB526C	(NORMAL/TRIP)
RX086	SG2 LO STM PRESS PB526A	(NORMAL/TRIP)
RX087	SG3 HI STM RATE P PB534A	(NORMAL/TRIP)
RX088	SG3 LO STM PRESS PB534B	(NORMAL/TRIP)
RX089	SG3 HI STM RATE P PB535A	(NORMAL/TRIP)
RX090	SG3 LO STM PRESS PB535B	(NORMAL/TRIP)
RX091	SG3 HI STM RATE P PB536D	(NORMAL/TRIP)
RX092	SG3 LO STM PRESS PB536A	(NORMAL/TRIP)
RX093	SG4 HI STM RATE P PB544A	(NORMAL/TRIP)
RX094	SG4 LO STM PRESS PB544B	(NORMAL/TRIP)
RX095	SG4 HI STM RATE P PB545A	(NORMAL/TRIP)
RX096	SG4 LO STM PRESS PB545B	(NORMAL/TRIP)

APPENDIX 2

REMOTE FUNCTION LISTING

RX097	SG4 HI STM RATE P PB546D	(NORMAL/TRIP)
RX098	SG4 LO STM PRESS PB546A	(NORMAL/TRIP)
RX100	SG1 WTR HAMMER PROT. PB514C	(NORMAL/TRIP)
RX101	SG2 WTR HAMMER PROT. PB524C	(NORMAL/TRIP)
RX102	SG3 WTR HAMMER PROT. PB534C	(NORMAL/TRIP)
RX103	SG4 WTR HAMMER PROT. PB544C	(NORMAL/TRIP)
RX104	SG1 WTR HAMMER PROT. PB515C	(NORMAL/TRIP)
RX105	SG2 WTR HAMMER PROT. PB525C	(NORMAL/TRIP)
RX106	SG3 WTR HAMMER PROT. PB535C	(NORMAL/TRIP)
RX107	SG4 WTR HAMMER PROT. PB545C	(NORMAL/TRIP)
RX108	SG1 WTR HAMMER PROT. LB517D	(NORMAL/TRIP)
RX109	SG1 WTR HAMMER PROT. LB519F	(NORMAL/TRIP)
RX110	SG1 WTR HAMMER PROT. LB556A	(NORMAL/TRIP)
RX111	SG2 WTR HAMMER PROT. LB528D	(NORMAL/TRIP)
RX112	SG2 WTR HAMMER PROT. LB529F	(NORMAL/TRIP)
RX113	SG2 WTR HAMMER PROT. LB557A	(NORMAL/TRIP)
RX114	SG3 WTR HAMMER PROT. LB538D	(NORMAL/TRIP)
RX115	SG3 WTR HAMMER PROT. LB539F	(NORMAL/TRIP)
RX116	SG3 WTR HAMMER PROT. LB558A	(NORMAL/TRIP)
RX117	SG4 WTR HAMMER PROT. LB547D	(NORMAL/TRIP)
RX118	SG4 WTR HAMMER PROT. LB549F	(NORMAL/TRIP)
RX119	SG4 WTR HAMMER PROT. LB559A	(NORMAL/TRIP)
RX120	SG1 WTR HAMMER PROT. PB516D	(NORMAL/TRIP)
RX121	SG2 WTR HAMMER PROT. PB526D	(NORMAL/TRIP)
RX122	SG3 WTR HAMMER PROT. PB536C	(NORMAL/TRIP)
RX123	SG4 WTR HAMMER PROT. PB546C	(NORMAL/TRIP)
RX124	SG1 HI-HI LEVEL LB556B	(NORMAL/TRIP)
RX125	SG2 HI-HI LEVEL LB557B	(NORMAL/TRIP)
RX126	SG3 HI-HI LEVEL LB558B	(NORMAL/TRIP)
RX127	SG4 HI-HI LEVEL LB559B	(NORMAL/TRIP)
RX135	RC LP1 OT DELTA T C3 TB411D	(NORMAL/TRIP)
RX136	RC LP1 OP DELTA T C4 TB411H	(NORMAL/TRIP)

APPENDIX 2

REMOTE FUNCTION LISTING

RX137	RC LP2 OT DELTA T C3 TB421D	(NORMAL/TRIP)
RX138	RC LP2 OP DELTA T C4 TB421H	(NORMAL/TRIP)
RX139	RC LP3 OT DELTA T C3 TB431D	(NORMAL/TRIP)
RX140	RC LP3 OP DELTA T C4 TB431H	(NORMAL/TRIP)
RX141	RC LP4 OT DELTA T C3 TB441D	(NORMAL/TRIP)
RX142	RC LP4 OP DELTA T C4 TB441H	(NORMAL/TRIP)
RX143	TURBINE POWER P-13 PB505A	(NORMAL/TRIP)
RX144	TURBINE POWER P-13 PB506A	(NORMAL/TRIP)
RX145	SG1 LO-3 LEVEL LIS 431	(NORMAL/TRIP)
RX146	SG2 LO-3 LEVEL LIS 432	(NORMAL/TRIP)
RX147	SG3 LO-3 LEVEL LIS 433	(NORMAL/TRIP)
RX148	SG4 LO-3 LEVEL LIS 434	(NORMAL/TRIP)
RX149	1PS-0505 AMS C-20	(NORMAL/TRIP)
RX150	1PS-0506 AMS C-20	(NORMAL/TRIP)

APPENDIX 2
REMOTE FUNCTION LISTING

SI01	SI PP 1A DISCH VLV SI8921A	(0-100%)
SI02	SI PP 1B DISCH VLV SI8921B	(0-100%)
SI03	SI TEST TO RWST VLV SI8963	(CLOSE/OPEN)
SI04	1A CS RECIRC TO RWST SI001A	(CLOSE/OPEN)
SI05	1B CS RECIRC TO RWST SI001B	(CLOSE/OPEN)
SI06	SI PP RWST SUCT POS SI8806	(0-100%)
SI07	SI TO CL VLV POS SI8835	(0-100%)
SI08	SI TO HL A & D POS SI8802A	(0-100%)
SI09	SI TO HL B & C POS SI8802B	(0-100%)
SI10	PWR FOR SI CL TEST SI8823	(OFF/ON)
SI11	PWR FOR SI HL TEST SI8824	(OFF/ON)
SI12	PWR FOR RH HL TEST SI8825	(OFF/ON)
SI13	RH DISCH TO CL POS SI8809A	(0-100%)
SI14	RH DISCH TO CL POS SI8809B	(0-100%)
SI15	RH DISCH TO HL POS SI8840	(0-100%)
SI16	SI SUCT FROM RH POS SI8804B	(0-100%)
SI17	PWR FOR ACCUM M/U SI8871	(OFF/ON)
SI18	CV INJ LINE POS SI8801A	(0-100%)
SI19	CV INJ LINE POS SI8801B	(0-100%)
SI20	PWR TO RH HL TEST SI8890A	(OFF/ON)
SI21	PWR TO RH HL TEST SI8890B	(OFF/ON)
SI22	PWR TO SI HL TEST SI8881	(OFF/ON)
SI23	PWR TO CV HL TEST SI8843	(OFF/ON)
SI24	DRAIN TO HUT	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

SW01	CC HX 0 OUTLET 0SX007	(0-100%)
SW02	CC HX 1 OUTLET 1SX007	(0-100%)
SW03	SX PP A L.O. PP	(OFF/ON)
SW04	SX PP B L.O. PP	(OFF/ON)
SW05	SX PP 1A STNR DRN 1SX150A	(0-100%)
SW06	SX PP 1B STNR DRN 1SX150B	(0-100%)
SW07	U-2 SX SUPPLY 2SX005	(0-100%)
SW08	SX TO FP XTIE 0SX174	(0-100%)
SW10	CB PP A OIL CLR WS021A	(0-100%)
SW11	CB PP B OIL CLR WS021B	(0-100%)
SW12	CB PP C OIL CLR WS021C	(0-100%)
SW13	CB PP D OIL CLR WS021D	(0-100%)
SW14	CD PP A OIL CLR WS023A	(0-100%)
SW15	CD PP B OIL CLR WS023B	(0-100%)
SW16	CD PP C OIL CLR WS023C	(0-100%)
SW17	CD PP D OIL CLR WS023D	(0-100%)
SW18	FW PP A OIL CLR WS087	(0-100%)
SW19	GEN HYD COOLER WS044A	(0-100%)
SW20	GEN HYD COOLER WS044B	(0-100%)
SW21	GEN HYD COOLER WS044C	(0-100%)
SW22	GEN HYD COOLER WS044D	(0-100%)
SW23	BLOWDOWN CONDENSER WS069	(0-100%)
SW24	WS PP 1A DISCH VLV 0WS002A	(0-100%)
SW25	WS PP 1B DISCH VLV 0WS002B	(0-100%)
SW26	WS PP 1C DISCH VLV 0WS002C	(0-100%)
SW29	FW PP B CLR CNTL SETPT	(0-200°F)
SW30	FW PP C CLR CNTL SETPT	(0-200°F)
SW31	EH CLR TEMP CNTL SETPT	(0-200°F)
SW32	EXCITER TEMP CNTL SETPT	(0-100°C)
SW33	GC TEMP CNTL SETPT	(0-200°F)
SW34	TO CLR TEMP CNTL SETPT	(0-200°F)
SW35	ASSO CLR CNTL SETPT	(0-200°F)

APPENDIX 2

REMOTE FUNCTION LISTING

SW36	H2SSO CLR CNTL SETPT	(0-200°F)
SW37	0SX02PA PUMP CONTACT 0LS-SX096 ON BASIN LVL	(NORMAL/OPEN)
SW38	0WS01PA PUMP CONTACT 5-7 ON 0PLS-WS008A 0N LOW NPSH	(NORMAL/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

TC01	DEH COMPUTER	(RUN/HALT)
TC02	EGC PERMISSIVE	(NORM/INHIBIT)
TC03	LOCAL MANUAL TURBINE TRIP	(NORM/TRIP)
TC04	OPC CYCLING OF IV'S	(NORM/INHIBIT)
TC05	EGC RAISE SIGNAL	(NORM/RAISE)
TC06	EGC LOWER SIGNAL	(NORM/LOWER)
TC07	TURB TRIP BLOCK LEVER	(NORM/TEST)
TC08	VACUUM TRIP TEST VALVE	(0-100%)
TC09	OVERSPEED TRIP TEST VALVE	(CLOSE/OPEN)
TC10	THRUST BEAR TRIP TEST VLV	(0-100%)
TC11	BEARING OIL TRIP TEST VLV	(0-100%)
TC12	FILL EH RSVR VIA HAND PUMP	(OFF,ON)
TC13	EGC MW/MIN LIMIT THUMBWHEEL	(0-50 MW)
TC14	EGC LO LIMIT THUMBWHEEL	(0-2000 MW)
TC15	EGC HI LIMIT THUMBWHEEL	(0-2000 MW)
TC16	RESERVE EMERGENCY LIGHT	(OFF/ON)

APPENDIX 2

REMOTE FUNCTION LISTING

TH01	RCP A OC TRIP DEFEAT	(NORMAL/DEFEAT)
TH02	RCP B OC TRIP DEFEAT	(NORMAL/DEFEAT)
TH03	RCP C OC TRIP DEFEAT	(NORMAL/DEFEAT)
TH04	RCP D OC TRIP DEFEAT	(NORMAL/DEFEAT)
TH05	RCP A OVERCURRENT RESET	(NORMAL/RESET)
TH06	RCP B OVERCURRENT RESET	(NORMAL/RESET)
TH07	RCP C OVERCURRENT RESET	(NORMAL/RESET)
TH08	RCP D OVERCURRENT RESET	(NORMAL/RESET)
TH09	PRESSURIZER SPRAY ISO VLV RY023	(0-100%)
TH10	PRESSURIZER SPRAY ISO VLV RY024	(0-100%)
TH11	PRT VENT TO CNTMT 8043	(0-100%)
TH12	PRT N2 SUPPLY REG STPT	(0-50 PSIG)
TH13	LOCAL TRIP OF RCP 1A	(NORMAL/TRIP)
TH14	LOCAL TRIP OF RCP 1B	(NORMAL/TRIP)
TH15	LOCAL TRIP OF RCP 1C	(NORMAL/TRIP)
TH16	LOCAL TRIP OF RCP 1D	(NORMAL/TRIP)
TH17	REACT. VSL LVL ISOLATION	(ISO/OPEN)
TH18	LOOSE PARTS MONITORING SYS ALARM RESET	(NORMAL/RESET)
TH19	STEAM GEN 1A TUBE PLUGGING	(0-100%)
TH20	STEAM GEN 1B TUBE PLUGGING	(0-100%)
TH21	STEAM GEN 1C TUBE PLUGGING	(0-100%)
TH22	STEAM GEN 1D TUBE PLUGGING	(0-100%)

APPENDIX 2

REMOTE FUNCTION LISTING

TP01	H2 SIDE SOP BYPASS VLV 1TO5242	(0-100%)
TP02	GEN HYD VENT VLV 1HY5024	(0-100%)
TP03	GC FILT INLT GC5403/GC5404	(GC5403/GC5404)
TP04	GC HX #2 OUTLT GC5405	(0-100%)
TP05	GC HX OUTLT GC5406/GC5407	(GC5406/GC5407)
TP06	GC HX INLT GC5408/GC5409	(GC5408/GC5409)
TP07	GC DEMIN INL GC5420/GC5422	(GC5420/GC5422)
TP08	GC DEMIN BYPASS GC5424	(0-100%)
TP09	GEN H2 SUPPLY REG 1HY5054	(0-100 PSIG)
TP10	GEN CO2 SUPPLY 0CO005	(0-100 PSIG)
TP11	AIR SIDE SO B/U REG 1TO5264	(0-50 PSID)
TP12	AIR SIDE SO PRESS REG 1TO5256	(0-50 PSID)
TP13	H2 PRESS REG TO5210/TO5217	(-50-+50 INH2O)
TP14	1GC01PA PUMP CONTACT 13B-13C ON 1PDS-GC023 ON LOW D/P	(NORMAL/OPEN)
TP15	TP LOCAL ALARM ACKNOWLEDGE	(NORMAL/ACK)

APPENDIX 2

REMOTE FUNCTION LISTING

TU01	TURNING GEAR LOCAL CONTROL SWITCH	(AUTO/MANUAL)
TU02	TURNING GEAR LOCAL PUSHBUTTON	(NORMAL/STOP/START)
TU03	TURBINE OIL MAKEUP	(CLOSE/OPEN)
TU04	TURBINE OIL DRAIN	(CLOSE/OPEN)

APPENDIX 2

REMOTE FUNCTION LISTING

WD01	SG A BD FLOW CV SD0054A	(0-100%)
WD02	SG A BD FLOW CV SD0054B	(0-100%)
WD03	SG D BD FLOW CV SD0054C	(0-100%)
WD04	SG D BD FLOW CV SD0054D	(0-100%)
WD05	SG B BD FLOW CV SD0054E	(0-100%)
WD06	SG B BD FLOW CV SD0054F	(0-100%)
WD07	SG C BD FLOW CV SD0054G	(0-100%)
WD08	SG C BD FLOW CV SD0054H	(0-100%)
WD09	CST/COND SEL WX293/WX883A	(CST/CONDENSER)
WD10	RCDT DRAIN TO SUMP RE9163	(CLOSE/OPEN)
WD11	RCDT DISCH RE9171/AB8551	(RWST/HUT)
WD12	RELEASE TK PUMP	(OFF/ON)
WD13	RELEASE TK DISCH VALVE	(CLOSE/OPEN)
WD14	SG BLDN PANEL TROUBLE RESET	(RESET/SET)
WD15	BLDN SECONDARY SAMPLE ISOL VLV	(AUTO/OPEN)
WD16	BA/GW/RE LOCAL PANEL TROUBLE RESET	(NORM/RESET)

APPENDIX 2
REMOTE FUNCTION LISTING

YR01	RM11 POWER SUPPLY SW	(NORMAL/BACKUP)
YR02	RM23 REMOTE/LOCAL SW	(REMOTE/LOCAL)

APPENDIX 3

LIST OF ACRONYMS/ABBREVIATIONS

APPENDIX 3
LIST OF ACRONYMS/ABBREVIATIONS

ACRONYM/ABBREVIATION	DESCRIPTION
AF	Auxiliary Feedwater
AN	Annunciator
BDPS	Boron Dilution Prevention System
BOL	Beginning of Life
BwOS	Braidwood Operating Surveillance
BwVS	Braidwood System Engineering Surveillance
CB	Control Bank
CC	Component Cooling Water
C/D	Cooldown
CH	Containment
CS	Containment Spray
CV	Chemical & Volume Control
CW	Circulating Water
DC	Direct Current
D/G	Diesel Generator
EC	Exempt Change
ED	Electrical Distribution
EG	Electrical Generator
EOL	End of Life
ESD	Equipment Status Display
ESF	Engineered Safety Features
FP	Fire Protection
FW	Feedwater, Heater Drain, Condensate
GSEP	Generating Station Emergency Plan
HD	Heater Drains
HV	Ventilation
HX	Heat Exchanger
IA	Instrument Air
IC	Initial Condition
I/O	Input/output
IPC	In-Plant Computer

APPENDIX 3
LIST OF ACRONYMS/ABBREVIATIONS

ACRONYM/ABBREVIATION	DESCRIPTION
KV	Kilovolt
LED	Light Emitting Diode
LER	Licensee Event Report
MCR	Minor Change Request
MIDS	Movable Incore Detector System
MOL	Middle of Life
MW	Megawatt
NI	Nuclear Instrumentation
NR	Narrow Range
NO	Normal Operations
PA	Public Address
PIF	Problem Identification Form
PPM	Parts per Million
PZR	Pressurizer
PS	Primary Sampling
PW	Primary Water
PWR	Pressurized Water Reactor
RCFC	Reactor Containment Fan Cooler
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RD	Rod Drive
RF	Remote Function
RH/RHR	Residual Heat Removal
RIL	Rod Insertion Limit
RM	Radiation Monitoring
RP	Reactor Protection
RPM	Revolutions per Minute
RX	Reactor
S/D	Shutdown
SER	Sequence of Events Recorder
S/G	Steam Generator
SI	Safety Injection
SPDS	Safety Parameter Display System
SS	Steady State

APPENDIX 3
LIST OF ACRONYMS/ABBREVIATIONS

ACRONYM/ABBREVIATION	DESCRIPTION
SSCR	Setpoint/Scaling Change Request
S/U	Startup
SW	Service Water
SX	Essential Service Water
TR	Transient Test
TC	Turbine Control
TDI	Training Department Instruction
TH	Thermohydraulics Model (RETACT)
TP	Turbine Plant Auxiliaries
TR	Transient Test
TU	Turbine Oil
UF	Under Frequency
UV	Under Voltage
VC	Control Room Ventilation
WD	Waste Disposal
WR	Wide Range/Work Request
XE	Xenon
YR	Radiation Monitor Display

APPENDIX 4

BRAIDWOOD SIMULATOR TRANSIENT TEST REVIEW BOARD QUALIFICATIONS

APPENDIX 4
BRAIDWOOD SIMULATOR TRANSIENT TEST REVIEW BOARD QUALIFICATIONS

MEMBERS	QUALIFICATIONS	
1. KEN TIEFENTHAL	POSITION	BRAIDWOOD LICENSED OPERATOR INSTRUCTOR/ SIMULATOR FIDELITY COORDINATOR.
	BACKGROUND	SRO LICENSE BRAIDWOOD; NAVY EOOW (4YRS)/EWS (9 YRS)
2. DANIEL P. BURTON	POSTION	BRAIDWOOD LICENSED OPERATOR INSTRUCTOR/ REQUAL LEAD INSTRUCTOR.
	BACKGROUND	SRO CERTIFICATION - BRAIDWOOD SIMULATOR; NAVY EWS (8 YRS)
3. PAUL HIPPELY	POSTION	BRAIDWOOD LICENSED OPERATOR INSTRUCTOR.
	BACKGROUND	SRO CERTIFICATION - BRAIDWOOD SIMULATOR; NAVY RO (6 YRS)
4. DON LESNICK	POSTION	BRAIDWOOD LICENSED OPERATOR INSTRUCTOR.
	BACKGROUND	SRO CERTIFICATION - BRAIDWOOD SIMULATOR; BS NUCLEAR ENGINEERING; BRAIDWOOD STATION SYSTEM ENGINEERING 5 YRS

APPENDIX 5

ANSI/ANS - 3.5 - 1985 CERTIFICATION REPORT

CROSS REFERENCE MATRIX

APPENDIX 5
ANSI/ANS-3.5-1985 CERTIFICATION REPORT
CROSS REFERENCE MATRIX

ANSI/ANS-3.5-1985 REQUIREMENT		LOCATION IN CERTIFICATION REPORT
SECTION	DESCRIPTION	SECTION
3.1.1	Normal Plant Evolutions	A.3.2, Attachment 2
3.1.2	Plant Malfunctions	A.1.3.2, A.3.4, Attachment 6
3.2.1	Degree of Panel Simulation	A.1.2.2, Attachment 5
3.2.2	Controls on Panels	A.1.2.2
3.2.3	Control Room Environment	A.1.2.1, A.1.2.4
3.3.1	Control Room Systems	A.1.2.3
3.3.2	System Operation Outside Control Room	A.1.3.3, Appendix 2
3.4.1	Initial Conditions	A.1.3.1, Appendix 1
3.4.2	Malfunctions	A.1.3.2
3.4.3	Other Control Features	A.1.3.4
3.4.4	Instructor Interface	A.1.3.3, Appendix 2
4.1	Steady State Operation	A.3.2, Attachment 2
4.2	Transient Operation	A.1.3.2, A.3.2, A.3.3, Attachment 2
4.3	Simulator Operating Limits	A.3.4
4.4	Monitoring Capability	Attachment 2

APPENDIX 5
ANSI/ANS-3.5-1985 CERTIFICATION REPORT
CROSS REFERENCE MATRIX

ANSI/ANS-3.5-1985 REQUIREMENT		LOCATION IN CERTIFICATION REPORT
SECTION	DESCRIPTION	SECTION
5.1	Simulator Design Data	A.2, Attachment 4
5.2	Simulator Update Design Data	A.1.5, A.4.2, Attachment 4
5.3	Simulator Modifications	A.1.5, A.4.2, Attachment 4
5.4.1	Simulator Performance Testing	A.2, Attachment 2
5.4.2	Simulator Operability Testing	Attachment 2

NOTE

APPENDIX A, GUIDE FOR DOCUMENTING SIMULATOR PERFORMANCE, WAS UTILIZED AS THE FORMAT FOR THIS REPORT. THEREFORE, APPENDIX A CROSS-REFERENCE MATRIX DATA WILL NOT BE LISTED.

B.2.1	Steady State Performance	A.3.2, Attachment 2
B.2.2	Transient Performance	A.3.2, Attachment 2

APPENDIX 6

SIMULATOR TEST PROCEDURE

AND MALFUNCTION TESTING SCHEDULE

Braidwood Station

Training Department Instruction

SIMULATOR TESTING PROGRAM

A. Purpose

1. The purpose of this guideline is to establish a program to test the simulator in accordance with the requirements of:

   a. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training

   b. Reg Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations

   c. 10 CFR 55.45: Operating Tests

   d. NUREG-1258: Evaluation Procedure for Simulation Facilities Certified Under 10 CFR 55

B. References

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training

2. Reg Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations

3. 10 CFR 55.45: Operating Tests

4. NUREG-1258: Evaluation Procedure for Simulation Facilities Certified Under 10 CFR 55

5. Braidwood Simulator Certification Report

C. Instruction

1. Testing Administration

   a. Each test will utilize a Test Procedure Cover Sheet, Attachment A. Each cover sheet gives a brief summary of the status of each test. On the cover sheet, the test team will indicate:

      1) The test number, date performed and test description.

      2) For any work request written as a result of performing the test, include on the cover sheet the work request number, brief description and section of test requiring retest (as appropriate). Upon correcting a work request, the initials of the tester and the date will also be entered on the cover sheet.

      3) Test results:

         One or more of the following may be checked:

         a) Test completed satisfactorily. The test was performed and parameters are within the acceptance criteria. In addition, no work request has been written, or a work request has been written and completed which is relatively minor and does not require a complete retest. In addition, list any Deviation Record numbers (DR #) that are written. Attachment B, Simulator Testing Record, will be used to document any deviations.

         b) After correction of above discrepancies, test results are satisfactory. The test was performed and most parameters are within the acceptance criteria. However, work request(s) have been written for items which are minor in nature and have no significant effect on the test results. Therefore, a complete retest is not necessary. However, at a minimum the affected portion of the test will be retested. This will include all parameters which were initially outside the acceptance criteria. After correction of the work request, the test can be considered satisfactory and so indicated on the test cover sheet after the affected portion of the test is retested.

c) Test results unsatisfactory. Work request(s) were written having a significant impact on the test results. A complete retest is necessary. This would require the use of an additional cover sheet and copy of the test procedure. DO NOT DISCARD THE FAILED TEST PROCEDURE! File it with the appropriate test for that year.

4) Signature Block: Sign the test as each test is completed. The Simulator Fidelity/Certification Coordinator (SFCC) must also sign each test.

2: Simulator Testing Program

a. The intent of the simulator testing program is to:

1) Verify overall simulator model completeness and integration.

2) Verify the current simulator performance against the steady state and transient test criteria of ANSI/ANS-3.5-1985.

b. The program consists of annual steady state, real time, and transient tests as well as 25% of the malfunction tests, normal operations tests and surveillance tests. Valve stroke time testing will be performed biennially commencing in 1992. For the purposes of this guideline, a year shall begin on April 13 and end on April 12. The simulator testing program shall commence April 13, 1992 (Date of Simulator Certification Resubmittal).

1) Steady State Test: Annually, perform the Steady State Operability Test #SS-1.

2) Real Time Test : Annually, perform the Real Time Test #RT-1.

3) Transient Tests: Annually, perform the following transient tests:

a) Manual reactor trip #TR-1.
b) Simultaneous trip of all feedwater pumps #TR-2.
c) Simultaneous closure of all main steam isolation valves #TR-3.
d) Simultaneous trip of all reactor coolant pumps #TR-4.
e) Trip of any single reactor coolant pump #TR-5.
f) Main turbine trip (without immediate reactor trip) #TR-6.
g) Maximum rate power ramp #TR-7.
h) Maximum size reactor coolant system rupture combined with loss of all offsite power #TR-8.
i) Maximum size unisolable main steam line rupture #TR-9.
j) Slow primary system depressurization to saturation #TR-10.

4) Valve Stroke Time Test: Biennially perform the Valve Stroke Time Test #ST-1.

5) Normal Operations Test, Surveillance Test, and Malfunction Tests: Perform ~25% of the testing each year.

NOTE

ANY NEW MALFUNCTION WILL BE TESTED IN THE YEAR IT IS TURNED OVER FOR TRAINING AND AT LEAST EVERY FOUR YEARS THEREAFTER. THE NEW MALFUNCTION SHOULD BE ADDED SUCH THAT AN EVEN MALFUNCTION TESTING DISTRIBUTION (~25% PER YEAR) WILL BE MAINTAINED.

c. Simulator Malfunction Testing Schedule

1) The simulator testing program for these tests is on a four year cycle such that approximately 25% of the tests will be performed each year. Attachment 6 of the Simulator Certification Report identifies the frequency and proposed testing schedule for each simulator certified malfunction. Attachment C identifies the frequency and proposed testing schedule for each simulator non-certified malfunction. During the performance of each malfunction test, the test team will update each Malfunction Cause & Effects Sheet. This update will verify that each Malfunction Cause & Effects Sheet is complete.

d. Simulator vs. Station Hardware Comparison

1) A simulator to Braidwood Unit One hardware comparison will be performed within six months after the completion of each Braidwood Unit One refueling outage. Braidwood Unit One photographs or detailed comparison sheets similar to the forms used in NUREG-1258 may be utilized for the comparison. Noted differences between the station and the simulator will be corrected by the Work Request process or the difference will be documented in the Simulator Certification Report.

e. Malfunction Assessment Review Program

1) Braidwood LER's and other industry events will be reviewed annually to assess their potential impact on simulation. This review will determine the LER's and industry events selected for testing. Each of the selected LER's/industry events will use a Simulator LER Test Procedure, Attachment F, to check the simulator response. A Test Procedure Cover Sheet, Attachment A, will be used to document the results of each test. The LER's/industry events, once tested satisfactory, may be referenced and included as an event for the applicable malfunction in the Malfunction Cause & Effects Book. The SFCC will designate the LER's/industry events that will be selected for testing. The results of the Malfunction Assessment Review will be filed in SIM-BW-9F-YR.

f. Transient Test Review Board

1) After completion of the annual transient testing, a Transient Test Review Board will convene to determine if the simulator has the capability to reproduce the defined transients.

2) The Review Board will consist of 3-5 members with each member holding an SRO license or SRO certification. The Review Board will compare the simulator transient test results with its baseline data and determine if the simulator has the capability to reproduce the defined transients. The transient test comparison will be documented on Attachment D, Simulator Transient Test Review. The makeup and qualifications of the Review Board and any differing professional opinions will also be documented.

g. Simulator Testing Results

1) The results of simulator testing will be documented in each year's Simulator Certification Report. Deficiencies will be handled by two methods. The first method is to write a Work Request for those items which require simulator software or hardware work. The second method is to document the deficiency on the Simulator Testing Record, Attachment B. The Deviation Record (DR) is for those items that are outside of the acceptance criteria yet do not require correction. For example, the Steady State Test compares Braidwood plant data to the simulator. If an initial simulator parameter did not fall within $\pm$ 2% of the same Braidwood parameter, then the acceptance criteria would not be met. However, the simulator parameter may be at a nominal value while the Braidwood parameter fell within its expected range during data collection. Each deviation will be approved by the SFCC. The

results of the malfunction tests will also be documented in each year's Simulator Certification Report. If a malfunction fails, a Work Request will be written to correct the failure. In addition, a record of all "NOT AUTHORIZED FOR USE" malfunctions will be kept current and placed in the Simulator Malfunction Cause & Effects Book. This "NOT AUTHORIZED FOR USE" letter will designate the malfunctions currently unavailable for training. A copy of the "NOT AUTHORIZED FOR USE" letter will be filed in SIM-BW-IC3-YR.

3. Simulator Modification Program

   a. Incorporating design data into the simulator design data control is required to provide a means for on-going verification of simulator performance. This verification will be accomplished by:

      1) Reviewing Braidwood Unit One modifications at least once per year and revising the simulator based on engineering and training value assessment. The simulator will be revised, as appropriate, within 12 months of installation of the modification at Braidwood Unit One. Simulator modifications may precede Braidwood Unit One modifications based on training value.

      2) Evaluating student feedback and updating the simulator design database, as appropriate.

4. Simulator Certification Reporting

   a. An annual update to the simulator certification report is required to be submitted to the Simulator Review Board by the anniversary date of the current simulator certification. The annual update to the simulator certification report is submitted and approved by the Simulator Review Board and maintained on file. It is not submitted to the NRC.

   b. The renewal simulator certification report is required to be approved and submitted to the NRC on or before (usually one month in advance of) every 4th anniversary of the current certification.

   c. The simulator certification date is the signature date on the current NRC Form 474 on file with the NRC.

   d. The simulator certification report will be written in the format specified in Attachment A of ANSI/ANS - 3.5 - 1985.

5. New Training Load

a. Attachment E addresses the minimum testing program that is required to be completed prior to accepting a new load for training. The testing program will include testing all work requests that were completed on the new training load, testing various malfunctions and remote functions on different IC's, testing selected malfunctions, remote functions and models as determined by the SFCC and verifying that all IC's are written to incorporate the latest hardware and software changes as well as any procedure changes since the IC's were last written.

b. Any variations from this checklist must be approved by the SFCC.

c. Upon completion of Attachment E the SFCC will accept the new load for training. Attachment E will be filed in Sim-BW-6C-YR. In addition, the lead software engineer will be informed that the new load has been accepted for training.

Approved By: [signature] **Date:** Aug 5, 1993
Training Supervisor

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: ______________ Date Performed ________________

Test Description: ____

____

____

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date

Test Results

_____ 1. Test Completed Satisfactorily

_____ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

_____ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ______________________ Date ______________

Test Complete ______________________ Date ______________

SFCC Acceptance ______________________ Date ______________

ATTACHMENT B

SIMULATOR TESTING RECORD

DR #	TEST #	COMMENTS

DR(s)______accepted

____
SFCC

ATTACHMENT C

NON-CERTIFIED MALFUNCTIONS TESTING SCHEDULE

NOTE

Although Attachment C Malfunctions are Non-Certified Malfunctions, these malfunctions shall be tested every 4 years per ANSI/ANS-3.5-1985 and Reg. Guide 1.149 guidance. These malfunctions may be used to enhance simulator training.

MALFUNCTION NUMBER	TITLE	TEST CYCLE (QUARTER - YEAR)
AN02	Loss of Fuse to the AN Cabinet Rack	2nd - 1993
CH05	Rod Stuck During Head Removal	3rd - 1993
CH07	Dropped Fuel Bundle During Refueling	2nd - 1994
FP01	Manual Fire Suppression Water System Activation	3rd - 1994
FP02	Auto Fire Suppression Water System Activation	2nd - 1995
YR01	Loss of RM-11 Communication Loop	3rd - 1995

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: ______________________ DATE: ______

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data — EVENT: ______________
b. Analytical or design data — DATA: ______________
c. Transient data from similar plant — PLANT: ______________
d. Panel of experts (best estimate)

COMMENTS: ____

____

____

____

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

____________________ ____________________

____________________ ____________________

____________________ ____________________

COMMENTS: ______________________________________

ATTACHMENT E

TRAINING LOAD ACCEPTANCE PROCEDURE

				TESTED SATISFACTORY	INITIALS/ DATE
1.	Test the work requests that still require testing on the new load (some work requests may have been previously tested).			YES/NO	
2.	RESET to the following IC's and at a minimum, perform the associated evolution(s).				
	a.	IC-21:	Ramp power to 50% at 20 MW/min.	YES/NO	
	b.	IC-16:	Ramp power to 75% at 10 MW/min.	YES/NO	
	c.	IC-13:	Synchronize the main generator to grid and raise power to 20%.	YES/NO	
	d .	IC-15:	Perform a FW transfer and establish an AT POWER electrical lineup .	YES/NO	
	e.	IC-26:	Place the plant on RH (both trains).	YES/NO	
	f.	IC-9:	Perform a Rx startup to the POAH.	YES/NO	
	g.	IC-2:	Draw a pressurizer bubble.	YES/NO	
3.	RESET to the following IC's and at a minimum, verify that the listed malfunctions operate correctly per their associated Malfunction Cause and Effects Sheet. For each evolution, use the appropriate procedures to stabilize the plant.				
	a.	IC-22:	TH06 (DBA LOCA).	YES/NO	
	b	IC-12:	CV23A (Letdown HX Tube leak).	YES/NO	
	c.	IC-17:	RD02 (Dropped Rod).	YES/NO	
	d	IC-14:	CV25 (Charging Line Leak Inside Cnmt).	YES/NO	
	e	IC-20:	ED12A (Loss of DC Bus 111).	YES/NO	
	f.	IC-18:	FW20 (Feed Break Outside Cnmt).	YES/NO	
	g.	IC-19:	NI09 (PR Failure).	YES/NO	
	h.	IC-23:	RX21A (Pressurizer Pressure Channel 455 Failure).	YES/NO	
	i.	IC-24:	RX18 (NR RTD Failure).	YES/NO	
	j.	IC-31:	TH03 (SGTR).	YES/NO	
4.	RESET to each of the remaining IC's not used in steps 2 and 3. Verify that each IC is stable (if applicable) and that the expected plant conditions exist.			YES/NO	

ATTACHMENT E

TRAINING LOAD ACCEPTANCE PROCEDURE

	TESTED SATISFACTORY	INITIALS/ DATE
5. At the discretion of the SFCC, verify that the following function properly (List may include systems/components/models recently worked on and/or ANSI-3.5 testing).		
a.	YES/NO	
b.	YES/NO	
c.	YES/NO	
d.	YES/NO	
e.	YES/NO	
f.	YES/NO	
g.	YES/NO	
h.	YES/NO	
i.	YES/NO	
j.	YES/NO	
6. Write IC's (as needed) to include any procedure changes, hardware changes or software changes. As a guide, use the attached comments noted from testing the load and comments accumulated in the SNAP Problem Book.	YES/NO	
7. Verify that the Malfunction Cause and Effects Sheets, "NOT AUTHORIZED FOR USE" letter and "Simulator Differences" are updated.	YES/NO	
8. A summary of major work performed on the simulator has been routed to the simulator instructors for review.	YES/NO	

New load is accepted for training.

____

SFCC

ATTACHMENT F

SIMULATOR LER TEST PROCEDURE

LER # __________ Title: ________________________________

Written By: ________________________ Date: ___________

The following test procedure will determine if the simulator is capable of reproducing the LER. (Complete as necessary) Attach a Test Procedure Cover Sheet (Attachment A) to document the results of this test.

Panel	Component	Instructor Action/ Expected Indication/ Operator Action	Results Agree (Y/N)	initials

APPENDIX 6
SIMULATOR MALFUNCTION TESTING SCHEDULE

NUMBER	TITLE	TEST CYCLE (QUARTER-YEAR)			
AN01	LOSS OF ANNUNCIATOR HORN	2nd-1996			
CC01	CCW PUMP FAILS TO START/TRIP	2nd-1996			
CC02	CCW PUMP DISCH PRESS SWITCH FAILURE	2nd-1996			
CC03	CCW SURGE TANK LEVEL TRANSMITTER FAILURE		2nd-1997		
CC04	CCW FROM RHR HX LEAK	2nd-1996			
CC05	CCW TO CC HX PIPING BREAK		2nd-1997		
CC06	NON-ESSENTIAL CCW SYSTEM LEAK			2nd-1998	
CC07	RCP THERMAL BARRIER LEAK				2nd-1999
CC08	CCW HX TUBE LEAK				2nd-1999
CC09	THERMAL BARRIER CCW FLOW X-MITTER FAILURE			2nd-1998	
CH01	RCFC FAN FAILS TO START/ TRIP, LOW SPEED		2nd-1997		
CH02	RCFC FAN FAILS TO START/ TRIP, HIGH SPEED			2nd-1998	
CH03	CRDM FAN FAILS TO START/ TRIP				2nd-1999
CH04	REACTOR CAVITY BOOT FAILURE			2nd-1998	
CH06	BREAK IN CNTM INTEGRITY			2nd-1998	
CH08	CNTM PRESS TRANSMITTER FAILURE			2nd-1998	
CS01	CNTM SPRAY PUMP FAILS TO START/ TRIP				2nd-1999
CS02	CNTM SPRAY PUMP SUCTION LINE BREAK			2nd-1998	
CV01	CHARGING PUMP FAILS TO START/ TRIP		2nd-1997		
CV02	PRI WATER MAKE-UP PUMP FAILS TO START/ TRIP	2nd-1996			
CV03	BORIC ACID XFER PUMP FAILS TO START/ TRIP				2nd-1999
CV04	VCT DIVERT VALVE FAILURE(122A)	2nd-1996			
CV05	PCV-131 AUTO CONTROLLER FAILURE		2nd-1997		
CV06	CLOGGED RCS FILTER (1CV3CF)	2nd-1996			
CV07	CLOGGED SEAL INJECTION FILTER		2nd-1997		
CV08	FAILURE OF PT-131 (LTDN PRESS)	2nd-1996			
CV09	FAILURE OF TE-130 (LTDN HX TEMP)		2nd-1997		
CV10	FLOW CONTROL VALVE CV121 FAILURE			2nd-1998	
CV11	CVCS UNBORATED MIXED BED DEMINERALIZER	2nd-1996			
CV12	LTDN RELIEF VALVE FAILS OPEN	2nd-1996			
CV13	CHARGING LINE LEAK OUTSIDE CNTM		2nd-1997		
CV14	REGENERATIVE HX TUBE LEAK	2nd-1996			
CV15	SEAL WATER HX TUBE LEAK		2nd-1997		
CV16	VCT LEVEL MALFUNCTION (LT-112)			2nd-1998	
CV17	VCT LEVEL MALFUNCTION (LT-185)				2nd-1999
CV18	VCT PRESS MALFUNCTION (PT-115)				2nd-1999
CV19	MAKE-UP CONTROL FAILURE		2nd-1997		
CV20	BORIC ACID FLOW TRANSMITTER FAILURE (FT-110)			2nd-1998	
CV21	CHARGING HEADER CONTROL FAILURE (HCV-182)				2nd-1999
CV22	LTDN LINE LEAK INSIDE CNTM			2nd-1998	
CV23	LTDN HX TUBE LEAK			2nd-1998	
CV24	LTDN LINE LEAK OUTSIDE CNTM				2nd-1999
CV25	CHARGING LINE LEAK INSIDE CNTM				2nd-1999
CV26	SEAL INJECTION LINE LEAK	2nd-1996			

APPENDIX 6
SIMULATOR MALFUNCTION TESTING SCHEDULE

NUMBER	TITLE	TEST CYCLE (QUARTER-YEAR)			
CV27	RCP SEAL #1 FAILURE			2nd-1998	
CV28	RCP SEAL #2 FAILURE				2nd-1999
CV29	CHARGING PUMP DEGRADED IMPELLER				2nd-1999
CW01	CIRC WATER PUMP FAILS TO START/ TRIP		2nd-1997		
CW02	CIRC WATER PUMP DISCHARGE VALVE FAILURE			2nd-1998	
ED01	345 KV SWITCHYARD BREAKER FAILS TO TRIP	2nd-1996			
ED02	345 KV SWITCHYARD BREAKER TRIPS		2nd-1997		
ED03	FAILURE OF UNIT AUX TRANSFORMER (UAT)			2nd-1998	
ED04	FAILURE OF SYSTEM AUX TRANSFORMER (SAT)				2nd-1999
ED05	LOSS OF 6.9 KV BUS	2nd-1996			
ED06	FAILURE OF 6.9 KV ABT		2nd-1997		
ED07	LOSS OF 4160V BUS	2nd-1996			
ED08	LOSS OF FEED TO 480V NON-ESF BUS OR MCC		2nd-1997		
ED09	LOSS OF FEED TO 480V ESF BUS OR MCC			2nd-1998	
ED10	LOSS OF 120 VAC ESF CONSTANT VOLTAGE XFMR	2nd-1996			
ED11	120 VAC INSTRUMENT BUS INVERTER FAILURE		2nd-1997		
ED12	LOSS OF DC DISTRIBUTION BUS				2nd-1999
ED13	DC CONTROL POWER FAILURE (4160V)			2nd-1998	
ED14	DC CONTROL POWER FAILURE (480V)				2nd-1999
ED15	345 KV BUS FAULT	2nd-1996			
ED16	LOSS OF FEED TO 120V NON-ESF PANEL			2nd-1998	
ED17	LOSS OF FEED TO 120V ESF PANEL				2nd-1999
EG01	MAIN GENERATOR AUTO VOLTAGE REG FAILURE		2nd-1997		
EG02	MAIN GENERATOR EXCITER FAILURE			2nd-1998	
EG03	MAIN GENERATOR FIELD FORCING (VOLT REG)				2nd-1999
EG04	BASE FOLLOWER UNIT FAILS TO TRACK	2nd-1996			
EG05	MAIN POWER TRANSFORMER TRIP		2nd-1997		
EG06	D/G FAILURE TO FLASH FIELD			2nd-1998	
EG07	D/G ELECTRIC SPEED CONTROL FAILURE				2nd-1999
EG08	D/G SEIZURE	2nd-1996			
EG09	D/G DIFFERENTIAL OVERCURRENT TRIP		2nd-1997		
FW01	MAIN FW PUMP FAILS TO START/ TRIP (MOTOR)	2nd-1996			
FW02	MAIN FW PUMP FAILS TO START/ TRIP (TURBINE)		2nd-1997		
FW03	START-UP FEED PUMP FAILS TO START/ TRIP			2nd-1998	
FW04	MAIN FW OIL PUMP FAILS TO START/ TRIP				2nd-1999
FW05	TURBINE DRIVEN MFP CONTROL VALVE FAILURE	2nd-1996			
FW06	TURBINE DRIVEN FW PUMP SPEED CONTROL FAILURE		2nd-1997		
FW07	FW PUMP SPEED CONTROL OSCILLATES			2nd-1998	
FW08	LOSS OF FW PUMP SPEED CONTROL				2nd-1999
FW09	S/G FW CONTROL VALVE FAILURE	2nd-1996			
FW10	FW REGULATION BYPASS VALVE FAILURE		2nd-1997		
FW11	FW TEMPERING LINE ISOLATION VALVE FAILURE			2nd-1998	
FW12	FW PREHEATER BYPASS VALVE FAILURE				2nd-1999
FW13	FW ISOLATION VALVE FAILURE	2nd-1996			

APPENDIX 6
SIMULATOR MALFUNCTION TESTING SCHEDULE

NUMBER	TITLE	TEST CYCLE (QUARTER-YEAR)			
FW14	FEED LINE BREAK BETWEEN FW009 & CNTM		2nd-1997		
FW15	MAIN FW PUMP SHAFT BREAK			2nd-1998	
FW16	FW HEADER PRESS FAILURE				2nd-1999
FW17	HEATER DRAIN TANK LEVEL CONTROLLER FAILURE	2nd-1996			
FW18	FW HEATER TUBE LEAK (17)		2nd-1997		
FW19	FW LINE BREAK INSIDE CNTM			2nd-1998	
FW20	FW LINE BREAK OUTSIDE CNTM				2nd-1999
FW21	S/G TEMPERING LINE RUPTURE	2nd-1996			
FW22	CONDENSATE PUMP FAILS TO START/ TRIP		2nd-1997		
FW23	FW HEATER BYPASS VALVE FAILURE (CB025)			2nd-1998	
FW24	FAILURE OF AF SUCTION PRESS TRANSMITTER				2nd-1999
FW25	GLAND STEAM CONDENSER MALFUNCTION	2nd-1996			
FW26	MAIN FEED REGULATING VALVE SEAT LEAKAGE		2nd-1997		
FW27	FW HEATER TUBE LEAK (11 DC)	2nd-1996			
FW28	FW HEATER TUBE LEAK (11)		2nd-1997		
FW29	FW HEATER TUBE LEAK (12)			2nd-1998	
FW30	FW HEATER TUBE LEAK (13)				2nd-1999
FW31	FW HEATER TUBE LEAK (14)	2nd-1996			
FW32	FW HEATER TUBE LEAK (15 DC)		2nd-1997		
FW33	FW HEATER TUBE LEAK (15)			2nd-1998	
FW34	FW HEATER TUBE LEAK (16)				2nd-1999
FW35	HEATER DRAIN PUMP FAILS TO START/ TRIP			2nd-1998	
FW36	LOSS OF CONDENSER VACUUM				2nd-1999
FW37	HOTWELL LEVEL CONTROLLER FAILURE (CD037)	2nd-1996			
FW38	HOTWELL LEVEL CONTROLLER FAILURE (CD038)		2nd-1997		
FW39	HOTWELL LEVEL CONTROLLER FAILURE (CD039)			2nd-1998	
FW40	HOTWELL LEVEL CONTROLLER FAILURE (CD040)				2nd-1999
FW41	FW ISOLATION AUX RELAY FAILURE (TRAIN A)	2nd-1996			
FW42	FW ISOLATION AUX RELAY FAILURE (TRAIN B)		2nd-1997		
FW43	AUX FW PUMP FAILS TO START/ TRIP (MOTOR)			2nd-1998	
FW44	AUX FW PUMP FAILS TO START/ TRIP (DIESEL)				2nd-1999
FW45	AUX FW VALVE FAILURE	2nd-1996			
FW46	AUX FW LINE RUPTURE		2nd-1997		
FW47	MFP SUCTION HEADER BREAK		4th-1997		
HV01	CONTROL ROOM MAKE-UP FAN FAILS TO START/ TRIP			2nd-1998	
HV02	AUX BLDG CHRCL BSTR FAN FAILS TO START/TRIP				2nd-1999
IA01	LOSS OF INSTRUMENT AIR	2nd-1996			
IA02	LOSS OF SERVICE AIR		2nd-1997		
IA03	IA LEAK INSIDE CNTM			2nd-1998	
IA04	IA LEAK ON TURBINE BLDG HEADER				2nd-1999
IA05	SERVICE AIR COMPRESSOR FAILS TO START/ TRIP	2nd-1996			
IA06	MSIV ROOM HEADER LEAK		2nd-1997		
IA07	STEAM DUMP HEADER LEAK			2nd-1998	
IA08	AUX FEED VALVES HEADER LEAK				2nd-1999

APPENDIX 6
SIMULATOR MALFUNCTION TESTING SCHEDULE

NUMBER	TITLE	TEST CYCLE (QUARTER-YEAR)			
IA09	PENETRATION AREA HEADER LEAK	2nd-1996			
MS01	FAILURE OF MAIN STEAM ISOLATION VALVE(S)		2nd-1997		
MS02	MSIV BYPASS VALVE FAILURE			2nd-1998	
MS03	S/G SAFETY VALVE FAILURE				2nd-1999
MS04	S/G PORV CONTROLLER FAILURE	2nd-1996			
MS05	STUCK STEAM DUMP		2nd-1997		
MS06	MSR FAILS TO ISOLATE			2nd-1998	
MS07	STEAM LINE BREAK INSIDE CNTM				2nd-1999
MS08	STEAM LINE BREAK OUTSIDE CNTM	2nd-1996			
MS09	MAIN STEAM HEADER CROSS-TIE RUPTURE		2nd-1997		
MS10	HEATER 13 EXTRACTION STEAM LINE BREAK			2nd-1998	
MS11	LOW PRESS TURBINE INLET PRESS SWITCH	2nd-1996			
NI01	SR CHANNEL FAILURE				2nd-1999
NI02	NOISY SR CHANNEL	2nd-1996			
NI03	SR CHANNEL HIGH VOLTAGE FAILURE		2nd-1997		
NI04	FAILURE OF SR HIGH VOLTAGE TO DISCONNECT			2nd-1998	
NI05	SR DISCRIMINATION FAILURE				2nd-1999
NI06	IR CHANNEL FAILURE	2nd-1996			
NI07	IR CHANNEL GAMMA COMPENSATION FAILURE		2nd-1997		
NI08	PR DETECTOR FAILURE			3rd-1998	
NI09	PR CHANNEL FAILURE				2nd-1999
NI10	INCORE MONITORING SYSTEM FAILURE	3rd-1996			
NI11	STUCK INCORE DETECTOR		3rd-1997		
NI12	LEAK INTO GUIDE TUBE FOR INCORE DETECTOR			3rd-1998	
RD01	ROD DRIVE MG SET TRIP				3rd-1999
RD02	DROPPED ROD	3rd-1996			
RD03	DROPPING ROD		3rd-1997		
RD04	ROD EJECTION			3rd-1998	
RD05	STUCK ROD				3rd-1999
RD06	RODS FAIL TO MOVE	3rd-1996			
RD07	UNCONTROLLED ROD MOVEMENT		3rd-1997		
RD08	DRPI - DATA CABINET FAILURE			3rd-1998	
RD09	AUTO ROD SPEED CONTROLLER FAILURE				3rd-1999
RD10	FAILURE ON LOGIC CABINET	3rd-1996			
RD11	POWER CABINET FAILURE		3rd-1997		
RD12	ROD STOPS FAIL			3rd-1998	
RD13	DRPI - OPEN OR SHORTED COIL				3rd-1999
RH01	RHR PUMP FAILS TO START/ TRIP	3rd-1996			
RH02	RHR HX FLOW CONTROL VALVE FAILURE		3rd-1997		
RH03	RHR HX BYPASSVALVE CONTROL FAILURE			3rd-1998	
RH04	RHR AUTO SWITCH-OVER MALFUNCTION				3rd-1999
RH05	RWST LEVEL TRASMITTER MALFUNCTION	3rd-1996			
RH06	RHR HX TUBE LEAK		3rd-1997		
RH07	RHR HX BYPASS LINE LEAK			3rd-1998	

APPENDIX 6
SIMULATOR MALFUNCTION TESTING SCHEDULE

NUMBER	TITLE	TEST CYCLE (QUARTER-YEAR)			
RH08	RWST LEAK				3rd-1999
RH09	RHR PUMP SUCTION HEADER BREAK	3rd-1996			
RH10	RHR PUMP DISCHARGE HEADER BREAK		3rd-1997		
RH11	SUCTION RELIEF VALVE FAILURE			3rd-1998	
RM01	AREA RADIATION MONITOR ACTUATION				3rd-1999
RM02	INOPERABLE RADIATION MONITOR	3rd-1996			
RM03	INADVERTANT AUTO RAD MONITOR ACTUATION		3rd-1997		
RM04	PROCESS RADIATION MONITOR ACTUATION			3rd-1998	
RM05	RAD MONITOR INTERLOCK ACTUATION FAILURE				3rd-1999
RM06	GASEOUS AIR MONITOR FAILURE	3rd-1996			
RP01	AUTOMATIC REACTOR TRIP FAILURE		3rd-1997		
RP02	REACTOR TRIP BREAKER FAILS TO OPEN			3rd-1998	
RP03	REACTOR TRIP BYPASS BREAKER FAILS TO OPEN				3rd-1999
RP04	FAILURE OF PHASE A CNTM ISOLATION TO ACTUATE	3rd-1996			
RP05	FAILURE OF PHASE B CNTM ISOLATION TO ACTUATE		3rd-1997		
RP06	TURBINE TRIP INTERLOCK C-8 FAILS			3rd-1998	
RP07	UNDER-FREQUENCY ON RCP BUS				3rd-1999
RP08	UNDER-VOLTAGE ON RCP BUS	3rd-1996			
RP09	INADVERTANT FW ISOLATION		3rd-1997		
RP10	INADVERTANT PHASE A CNTM ISOLATION			3rd-1998	
RP11	INADVERTANT PHASE B CNTM ISOLATION				3rd-1999
RP12	INADVERTANT CONTROL ROOM VENT ISOLATION	3rd-1996			
RP13	REACTOR TRIP PERMISSIVE P-4 FAILS TO ACTUATE		3rd-1997		
RP14	FAILURE OF SAFETY INJECTION TO ACTUATE			3rd-1998	
RP15	SAFEGUARDS SEQUENCING FAILURE				3rd-1999
RP16	PERMISSIVE P-6 FAILS TO ACTUATE	3rd-1996			
RP17	PERMISSIVE P-7 FAILS TO ACTUATE		3rd-1997		
RP18	PERMISSIVE P-8 FAILS TO ACTUATE			3rd-1998	
RP19	PERMISSIVE P-10 FAILS TO ACTUATE				3rd-1999
RP20	PERMISSIVE P-11 FAILS TO ACTUATE	3rd-1996			
RP21	LO-LO TAVE PERMISSIVE P-12 FAILS TO ACTUATE		3rd-1997		
RP22	PERMISSIVE P-13 FAILS TO ACTUATE			3rd-1998	
RP23	PERMISSIVE P-14 FAILS TO ACTUATE				3rd-1999
RP24	INADVERTANT SAFETY INJECTION	3rd-1996			
RP25	SSPS BLOWN GROUND RETURN FUSE				3rd-1999
RX01	STEAM PRESSURE DETECTOR FAILURE	3rd-1996			
RX02	UNSTABLE S/G LEVEL CONTROLLER		3rd-1997		
RX03	STEAM FLOW DETECTOR FAILURE			3rd-1998	
RX04	FW FLOW TRANSMITTER FAILURE				3rd-1999
RX05	STEAM LINE PRESS DETECTOR FAILURE (PT-507)	3rd-1996			
RX06	NARROW RANGE S/G LEVEL FAILURE		3rd-1997		
RX07	WIDE RANGE S/G LEVEL FAILURE			3rd-1998	
RX08	STEAM DUMP COOLDOWN VLVS CONTROL FAILURE				3rd-1999
RX09	STEAM FLOW DETECTOR OSCILLATION - TIME	3rd-1996			

APPENDIX 6
SIMULATOR MALFUNCTION TESTING SCHEDULE

NUMBER	TITLE	TEST CYCLE (QUARTER-YEAR)			
RX10	FIRST STAGE PRESS TRANSMITTER FAILURE		3rd-1997		
RX11	STEAM FLOW DETECTOR OSCILLATION - MAGNITUDE			3rd-1998	
RX12	TREF FAILURE				3rd-1999
RX13	PZR LEVEL CHANNEL FAILURE	3rd-1996			
RX14	FW PUMP MASTER SPEED CONTROLLER FAILURE		3rd-1997		
RX15	PZR PRESS MASTER CONTROLLER FAILURE			3rd-1998	
RX16	PZR LEVEL MASTER CONTROLLER FAILURE				3rd-1999
RX17	ROD CONTROL SYSTEM FAILURE	3rd-1996			
RX18	FAULTY PRIMARY RTD (NARROW RANGE Tc & Th)		4th-1997		
RX19	LOSS OF LOAD INTERLOCK C-7 FAILS			4th-1998	
RX20	CONDENSER AVAILABLE INTERLOCK C-9 FAILS				3rd-1999
RX21	PZR PRESS CHANNEL FAILURE (455 & 456)	4th-1996			
RX22	PZR PRESS CHANNEL FAILURE (457 & 458)		4th-1997		
RX23	OVERPOWER DELTA T SETPOINT FAILURE			4th-1998	
RX24	OVERTEMPERATURE DELTA T SETPOINT FAILURE				4th-1999
RX25	RCS PRESS TRANSMITTER FAILURE (403 & 405)	4th-1996			
RX26	RCS PRESS TRANSMITTER FAILURE (406 & 407)		4th-1997		
RX27	RCS PRESS TRANSMITTER FAILURE (408 & 409)			4th-1998	
RX28	RCS LOOP FLOW TRANSMITTER FAILURE				4nd-1995
RX29	FW REG VALVE CONTROLLER FAILURE	4th-1996			
RX30	FW BYPASS VALVE CONTROLLER FAILURE				4th-1999
SI01	SAFETY INJECTION PUMP FAILS TO START/ TRIP	4th-1996			
SI02	SI ACCUMULATOR LEVEL XMITTER FAILURE		4th-1997		
SI03	COLD LEG INJECTION CHECK VLV LEAKAGE (SI8818)			4th-1998	
SI04	COLD LEG INJECTION CHECK VLV LEAKAGE (SI8819)				4th-1999
SI05	COLD LEG INJECTION CHECK VLV LEAKAGE (SI8948)	4th-1996			
SI06	COLD LEG INJECTION CHECK VLV LEAKAGE (SI8956)		4th-1997		
SI07	HOT LEG INJECTION CHECK VALVE LEAKAGE (SI8905)			4th-1998	
SI08	HOT LEG INJECTION CHECK VALVE LEAKAGE (SI8841)				4th-1999
SI09	HOT LEG INJECTION CHECK VALVE LEAKAGE (SI8949)	4th-1996			
SI10	HIGH HEAD SI LEAK INSIDE CNTM		4th-1997		
SI11	SI ACCUMULATOR TANK RUPTURE			4th-1998	
SW01	SX PUMP FAILS TO START/ TRIP				4th-1999
SW02	SX BREAK INSIDE CNTM	4th-1996			
SW03	LOSS OF SX COOLING TO D/G		4th-1997		
SW04	SX DISCHARGE HEADER BREAK			4th-1998	
SW05	WS HEADER BREAK				4th-1999
SW06	WS PUMP FAILS TO START/ TRIP	4th-1996			
TC01	INADVERTANT TURBINE RUNBACK	4th-1996			
TC02	TURBINE TRIP ON LOW LOAD (PDS-TO071)		4th-1997		
TC03	TURBINE AUTO TRIP FAILURE			4th-1998	
TC04	TURBINE AUTO RUNBACK FAILURE				4th-1999
TC05	OPC-LP TURB INLET PRESS SENSOR FAILURE	4th-1996			
TC06	DEHC- IMP PRESS XMITTER FAILURE (PT-MS002)		4th-1997		

APPENDIX 6
SIMULATOR MALFUNCTION TESTING SCHEDULE

NUMBER	TITLE	TEST CYCLE (QUARTER-YEAR)			
TC07	DEHC - MW TRANSDUCER FAILURE			4th-1998	
TC08	DEHC - GV/TV OSCILLATIONS - TIME				4th-1999
TC09	DEHC - GV/TV OSCILLATIONS - MAGNITUDE	4th-1996			
TC10	LOSS OF DEHC SPEED CONTROL CHANNEL(S)		4th-1997		
TC11	LOSS OF DEHC SUPERVISORY SPEED CHANNEL			4th-1998	
TC12	EHC PILOT OPERATED IA VALVE FAILS (1EH5042)				4th-1999
TC13	TV SERVO FAILURE - VALVE FAILS	4th-1996			
TC14	GV SERVO FAILURE - VALVE FAILS		4th-1997		
TC15	EH SYSTEM LEAK			4th-1998	
TC16	GOVERNOR VALVES NOT TRACKING AUTO				4th-1999
TC17	EH PUMP FAILS TO START/ TRIP	4th-1996			
TC18	INADVERTANT OTDT TURBINE RUNBACK				4th-1999
TH01	PZR STEAM SPACE LEAK		4th-1997		
TH02	PZR RELIEF TANK LEAK			4th-1998	
TH03	S/G TUBE LEAK				4th-1999
TH04	RCS LEAK, HOT LEG (HIGH)	4th-1996			
TH05	RCS LEAK, HOT LEG (MEDIUM)		4th-1997		
TH06	RCS LEAK, COLD LEG			4th-1998	
TH07	REACTOR VESSEL FLANGE LEAK				4th-1999
TH08	RCS FUEL ELEMENT FAILURE	4th-1996			
TH10	PZR SPRAY VALVE FAILURE			4th-1998	
TH11	PZR POWER OPERATED RELIEF VALVE FAILURE				4th-1999
TH12	PZR SAFETY VALVE FAILURE	4th-1996			
TH13	PZR LEVEL DETECTOR REF LEG LEAK		4th-1997		
TH14	PZR RELIEF LINE RTD FAILURE			4th-1998	
TH15	RCS WIDE RANGE RTD FAILURE				4th-1999
TH16	RCP FAILS TO START/ TRIP	4th-1996			
TH17	RCP DEGRADED PERFORMANCE/ LOCKED ROTOR		4th-1997		
TH18	RCP SHAFT BREAK			4th-1998	
TH19	REACTOR VESSEL BOTTOM CRACK				4th-1999
TP01	STATOR COOLING PUMP FAILS TO START/ TRIP				4th-1999
TP02	STATOR COOLING WATER HIGH CONDUCTIVITY	4th-1996			
TP03	SEAL OIL SYSTEM PUMP FAILS TO START/ TRIP		4th-1997		
TU01	TURBINE VIBRATION			4th-1998	
TU02	TURBINE BEARING OIL PUMP FAILS TO START/ TRIP				4th-1999
TU03	TRBN HP SEAL OIL B/U PUMP FAILS TO START/ TRIP	4th-1996			
TU04	TURBINE DC EMER OIL PUMP FAILS TO START/ TRIP			4th-1998	
TU05	TURBINE OIL SYSTEM LEAK		4th-1997		
TU06	BEARING LIFT PUMP SUCTION STRAINER CLOGS	4th-1996			
WD01	GAS DECAY TANK RUPTURE		4th-1997		

ATTACHMENT 1

REG. GUIDE 1.149 REQUIREMENTS FOR

DUAL PLANT SIMULATION FACILITY

Comparison of Braidwood Simulator to Braidwood Unit 2.

Attachment 1 shall demonstrate that the Braidwood Simulator meets the requirements and guidance of ANSI/ANS-3.5-1985 for Braidwood Unit 2.

The simulator design data base is maintained from Braidwood Unit 1 data. No data base is maintained for Braidwood Unit 2, however, LER's and modifications are reviewed by the Braidwood Training Staff. A summary of the Braidwood Unit 2 LER's that were determined to effect simulation follow:

LER	DESCRIPTION	COMMENTS
20-2-92-002	Rx trip due to water hammer prevention actuation.	LER tested satisfactorily.
20-2-92-004	Rx trip due to loss of both motor-generator sets.	LER tested satisfactorily.
20-2-92-006	Rx trip due to MFP trip on low vacuum.	LER tested satisfactorily.
20-2-93-002	Deenergizing K628 fills pressurizer.	LER tested satisfactorily.
20-2-93-007	Rx trip due to Feed Reg. Valve failing closed.	LER tested satisfactorily.
20-2-94-003	Rx trip due to Main Power Transformer failure.	LER tested satisfactorily.
20-2-94-005	Rx trip due to Feed Reg. Valve failing closed.	LER tested satisfactorily.

An analysis and summary of the differences between each plant and the Braidwood Simulator including facility design and systems relevant to control room personnel as well as control room design and instrument/control location are presented in sections A.1.2.2,3 & 4 of this report.

Major system differences between the simulator and Braidwood Unit 2 that affect simulator training are:

Braidwood Simulator	Braidwood Unit 2
1) Electrical distribution system and unit components are labeled Unit 1.	1) Electrical distribution system and unit components are labeled Unit 2.
2) The simulator has annunciators associated with loss of power to Radwaste and Turbine Building electrical loads, River Screen House power supply problems and Spent Fuel Pit Level and Temperature.	2) Unit 2 has no annunciators associated with these common systems.
3) S/G's are a D-4 S/G model.	3) S/G's are a D-5 S/G model.
a) Rx trip/Auxiliary Feedwater Pump auto-start setpoint is 33%.	a) Rx trip/Auxiliary Feedwater Pump auto-start setpoint is 36.3%.
b) P-14 setpoint is 81.4%.	b) P-14 setpoint is 80.8%.
c) Slightly smaller shrink/swell characteristics than the D-5 S/G model.	c) Slightly larger shrink/swell characteristics than the D-4 S/G model.
d) Normal operating level, high/low alarm setpoints are 66%, 92.4% and 38%.	d) Normal operating level, high/low alarm setpoints are 63.7%, 92.4%, and 41.3%.
e) ATWS Mitigation System actuation setpoint is 30%.	e) ATWS Mitigation System actuation setpoint is 33.3%.

We currently train the operators on Unit 1 and 2 differences in a classroom setting. This training incorporates the Unit 2 D-5 S/G alarm setpoints, ESF actuation setpoints and normal operating S/G level.

Since Unit 1 and Unit 2 are almost identical, except for the steam generator differences, adequate Unit 2 training is conducted by comparing Unit 1 vs. Unit 2 S/G response.

Since Unit 1 and Unit 2 operate in a similar manner, only Unit 1 procedures are maintained and used for simulator training. The Unit 2 abnormal and emergency procedures are developed from Unit 1 abnormal and emergency procedures and are almost identical. In addition, Braidwood Units 1 and 2 emergency procedures are validated on the simulator.

BRAIDWOOD SIMULATOR
ANSI/ANS-3.5-1985 CERTIFICATION REPORT
APRIL, 1996

ATTACHMENT 2

STEADY STATE/NORMAL OPERATIONS/

REAL TIME/VALVE STROKE TIME/TRANSIENT

TEST RESULTS

Test Number: ST-1
Revision #/Date: 4, 11/12/94
Frequency: Biennial

BRAIDWOOD SIMULATOR
VALVE STROKE TIME TEST

A. PURPOSE

The purpose of this procedure is to verify that the simulator's safety-related valves stroke within an acceptable time period as required by ANSI/ANS-3.5-1985.

B. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training
2. Inservice Testing Program: Valve Surveillance Cross-reference
3. Braidwood Simulator Certification Report
4. TDI 700-03: Simulator Testing Program

C. INITIAL CONDITIONS

1. Use the cold shutdown initial condition.

D. DATA COLLECTION

1. Attachment A, Valve Stroke Time Comparison Sheet, shall be used to document Braidwood Unit One and simulator valve stroke times.

E. TEST INSTRUCTIONS

1. Obtain the latest set of Braidwood Unit One average valve stroke times from Reference 2 and record the stroke times in Attachment A, Valve Stroke Time Comparison Sheet.

2. Stroke each simulator valve listed in Attachment A and record the stroke time to the nearest tenth of a second.

F. ACCEPTANCE CRITERIA

1. The simulator's valve stroke time shall be +/- 10% or +/- 2 seconds of the Braidwood Unit One stroke time, whichever is greater.

G. DOCUMENTATION

1. Retain Attachment A which will be used to document simulator compliance.

BRAIDWOOD SIMULATOR
SURVEILLANCE TESTING

A. PURPOSE

The purpose of this procedure is to:

1. Verify that operator conducted surveillance testing on safety-related equipment or systems can be conducted as required by ANSI/ANS-3.5-1985.

2. Verify that the simulator's computed values of selected surveillance parameters shall agree within $\pm$10% ($\pm$2 secs. for D/G starting time) of the Braidwood plant's surveillance parameters.

B. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training

2. Braidwood Unit One Surveillance Procedures

3. TDI 700-03: Simulator Testing Program

4. Simulator Test NO-1: Normal Operations Testing

C. SURVEILLANCE SELECTION CRITERIA

1. The selection criteria used to meet ANSI/ANS-3.5-1985, section 3.1.1(10) requirements (simulator surveillance testing) are:

   a. Surveillance is safety-related.
   b. Surveillance frequency is monthly or less.
   c. Surveillance contains control room indications or requires control board manipulations.

2. The surveillances selected for testing have been approved by the Braidwood Simulator Review Board (SRB# BW-89-04).

D. INITIAL CONDITIONS

1. Use the BOL, 100% power, equilibrium xenon initial condition (IC) unless lower power level is noted in the surveillance procedure.

BRAIDWOOD SIMULATOR
SURVEILLANCE TESTING

E. DATA COLLECTION

1. The Control Room data required by each Surveillance procedure shall be collected.

2. Data that is obtained from outside the Control Room shall be obtained, if available, from the simulator data pool variables. If the data is not available, mark that step N/A.

F. TEST INSTRUCTIONS

1. Ensure that the simulator meets the initial condition as specified in Section D.

> **NOTE**
>
> The simulator has the capability to conduct the shifty/daily surveillances, various channel check surveillances and the system lineup surveillances. These surveillances will not be performed.

> **NOTE**
>
> Plant surveillances requiring data comparison to the simulator are identified by an asterisk next to the surveillance number. Obtain a copy of the applicable plant surveillance data for comparison to the simulator data.

2. Using the latest revision of the Braidwood Unit One Surveillances (BwOS's), perform the following procedures: (conduct 1992-93 and every 4 years thereafter)

a.	1BwOS 1.1.1.1.e-1:	Shutdown Margin Surveillance
b.	1BwOS 1.1.4.a-1:	RCS Minimum Temperature for Criticality Surveillance
c.	1BwOS 1.3.1.2-1:	Movable Control Assemblies Monthly Surveillance
d.	1BwOS 1.3.5-1:	Shutdown Rod Insertion Limit During Approach to Criticality Surveillance
e.	1BwOS 2.4.1.a-1:	Quadrant Power Tilt Ratio Surveillance
f.	1BwOS 3.1.1-2:	Calorimetric Calculation Daily Surveillance
g.	1BwOS 3.4.2.a-1:	Turbine Overspeed Protection Systems Monthly Surveillance
* h.	1BwOS 4.6.2.1.c-1:	RCS Controlled Leakage Monthly Surveillance

BRAIDWOOD SIMULATOR
SURVEILLANCE TESTING

i.	1BwOS 4.6.2.1.d-1:	RCS Water Inventory Balance 72 Hour Surveillance
* j.	1BwOS 6.2.3.a-1:	Reactor Containment Fan Cooler Monthly Surveillance
* k.	1BwOS 7.3.1-1:	CC System Valve Lineup to Safety Related Equipment Monthly Surveillance
* l.	1BwOS 7.3.2.a-1:	CC Pump Operability Monthly Surveillance
* m.	1BwOS 8.1.1.2.a-1:	1A D/G Operability Monthly Surveillance
* n.	1BwOS 8.1.1.2 a-2:	1B D/G Operability Monthly Surveillance
* o.	1BwOS 8.2.1.1-1:	DC Bus Train Operability Weekly Surveillance

G. ACCEPTANCE CRITERIA

1. Each surveillance can be performed satisfactorily using installed control board instrumentation or variables available from the simulator data pool and meets the acceptance criteria given in the surveillance.

2. The observable change in the parameters correspond in direction to those expected from a best estimate for each surveillance test and do not violate the physical laws of nature.

3. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

4. The simulator's surveillance data shall not deviate from the Braidwood plant's surveillance data by more than ±10% for the following data:

a.	1BwOS 4.6.2.1.c-1:	RCP seal injection flows.
b.	1BwOS 6.2.3.a-1:	RCFC SX flows.
c.	1BwOS 7.3.1-1:	CC to RH HX flows.
d.	1BwOS 7.3.2.a-1:	CC pump current and discharge pressure.
e.	1BwOS 8.1.1.2.a-1:	1A D/G voltage, and frequency.
f.	1BwOS 8.1.1.2.a-2:	1B D/G voltage, and frequency.
g.	1BwOS 8.2.1.1-1:	DC bus 111 and 112 voltage.

5. The simulator's D/G's starting time shall not deviate from the Braidwood plant's surveillance data by more than ±2 seconds.

H. DOCUMENTATION

1. Retain the surveillance procedures along with the copies of the selected plant surveillance data used for comparison.

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: NO-1 Date Performed 12/28/95

Test Description: Normal Operations Testing

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date

Test Results

✓ 1. Test Completed Satisfactorily

___ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

___ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ______ Date ______

Test Complete K Tugfintert Date 12/28/95

SFCC Acceptance K Tugfintert Date 12/28/95

Test Number: NO-1

Revision Number/Date: 02, 11/09/93

BRAIDWOOD SIMULATOR
NORMAL OPERATIONS TESTING

A. PURPOSE

The purpose of this procedure is to verify that normal plant evolutions can be conducted on the simulator as required by ANSI/ANS-3.5-1985.

B. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training
2. BwGP 100-1 - 5: Braidwood General Procedures
3. TDI 700-03: Simulator Testing Program

C. INITIAL CONDITIONS

1. The Initial Conditions (IC's) will be specified under Section E, Test Instructions.

D. DATA COLLECTION

1. BwGP Flowcharts shall be used to verify and document simulator compliance with the normal operations testing.

E. TEST INSTRUCTIONS

1. Using the latest revision of the Braidwood Unit One General Procedures (BwGP's), perform the following evolutions:

   a. Plant startup from cold shutdown to hot standby and a reactor startup to 100% power. Use the cold S/D IC which enters BwGP 100-1 at Step 1. (conduct 1994-95 and every 4 years thereafter)

      1) This evolution includes turbine startup, generator synchronization and load changes.

   b. Reactor trip from full power followed by recovery to full power. Use the BOL, 100% power, equilibrium xenon IC to start the evolution. (conduct 1993-94 and every 4 years thereafter)

      1) This evolution includes operations at hot standby, turbine startup, generator synchronization, and load changes.

BRAIDWOOD SIMULATOR
NORMAL OPERATIONS TESTING

c. Plant shutdown from full power to hot standby and cooldown to cold shutdown. Use the BOL, 100% power, equilibrium xenon IC and enter BwGP 100-4 at Step 1. (conduct 1995-96 and every 4 years thereafter)

1) This evolution includes operations at hot standby, load changes, and shutdown operations with less than full reactor coolant flow.

****

NOTES

1. Startup and power operations with less than full reactor coolant flow are not performed since only full reactor flow critical operation is allowed at Braidwood Station.
2. Operator conducted surveillance testing on safety related equipment or systems, plant heat balance and shutdown margin determination is addressed in the Simulator Surveillance Testing Procedure (SV-1).
3. Measurements of reactivity coefficients and control rod worth will not be performed since these tests require the use of a reactivity computer (which is not a permanently installed instrument) and the operator is not involved in the reactivity calculation (System Engineering function).

****

F. ACCEPTANCE CRITERIA

1. Each evolution can be performed satisfactorily using Braidwood Unit One General Procedures.

2. The observable change in the parameters correspond in direction to those expected from a best estimate for each evolution and do not violate the physical laws of nature.

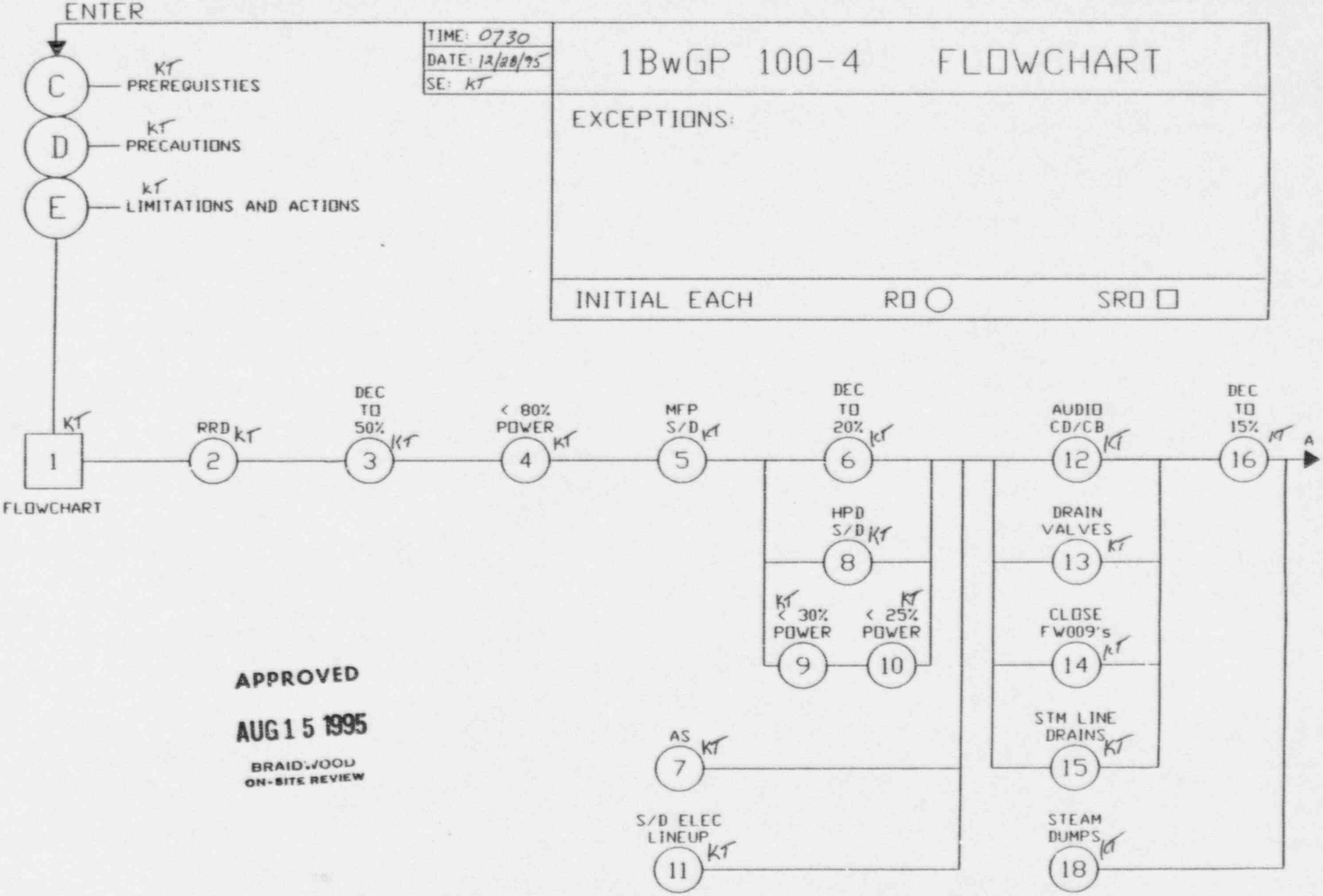
3. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

G. DOCUMENTATION

1. Retain the BwGP Flowcharts to document simulator compliance.

FOR INFORMATION ONLY

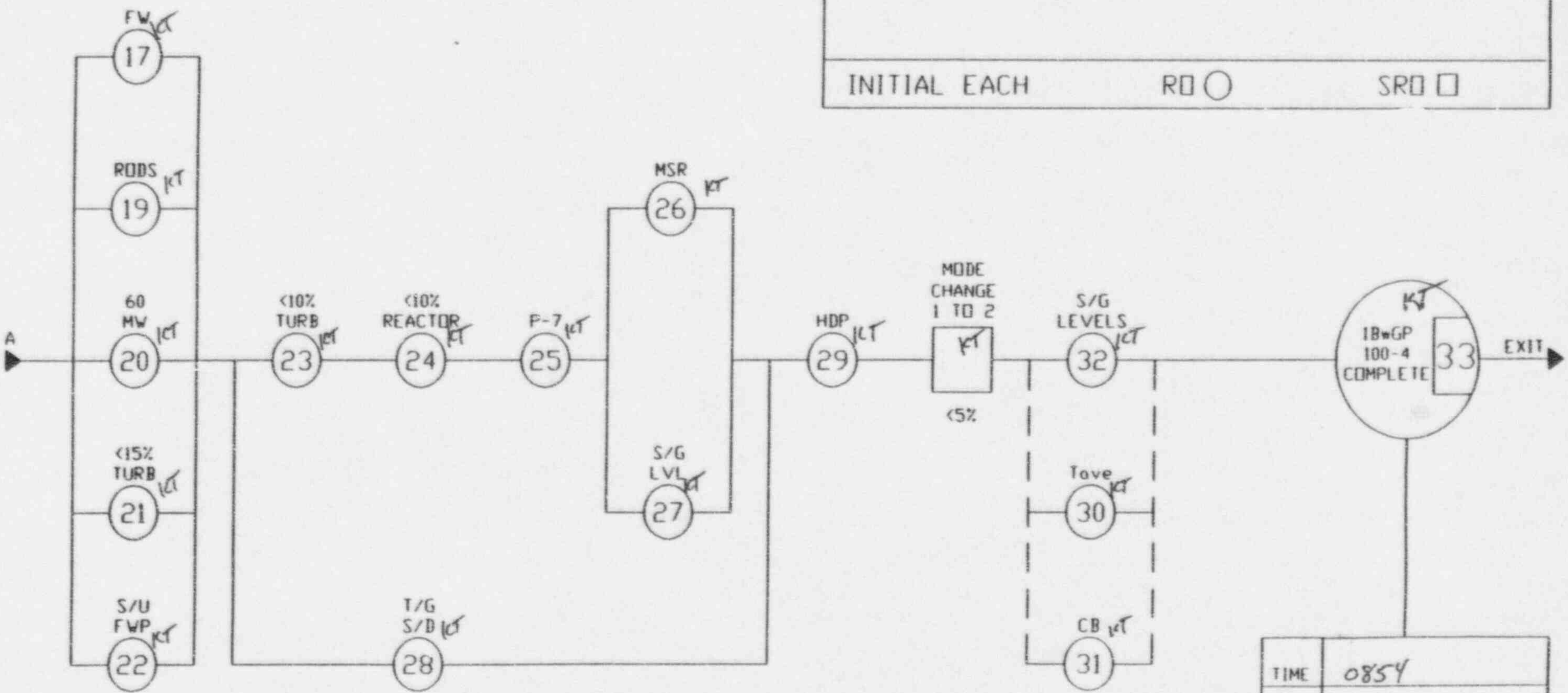
1BwGP 100-4T1
Revision 5
Continuous Use



APPROVED
AUG 15 1995
BRAIDWOOD
ON-SITE REVIEW

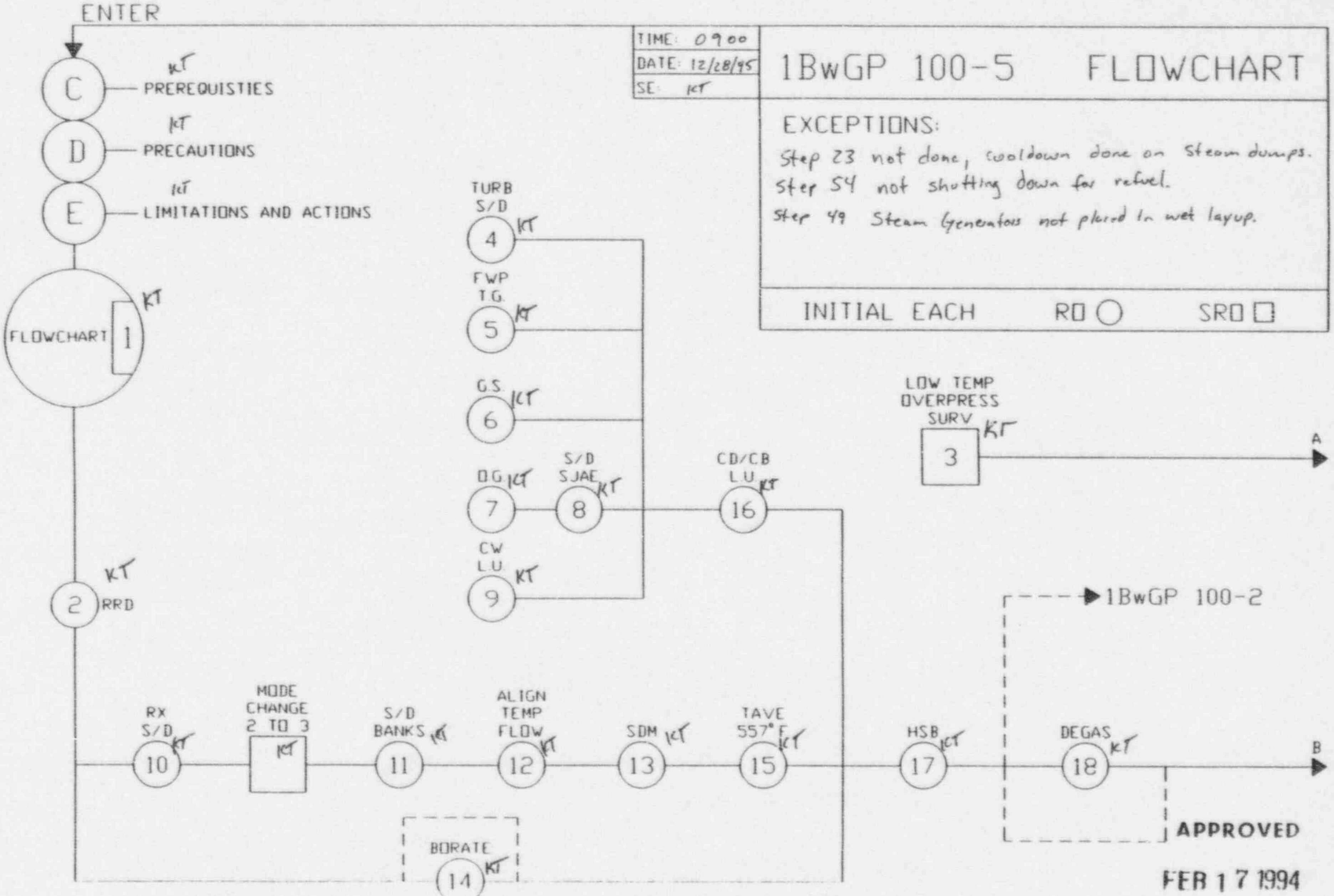
FOR INFORMATION ONLY

1BwGP 100-4 FLOWCHART
EXCEPTIONS:
INITIAL EACH RO ○ SRO □



TIME	0854
DATE	12/28/95
SE	KT

APPROVED
AUG 15 1995
BRAIDWOOD

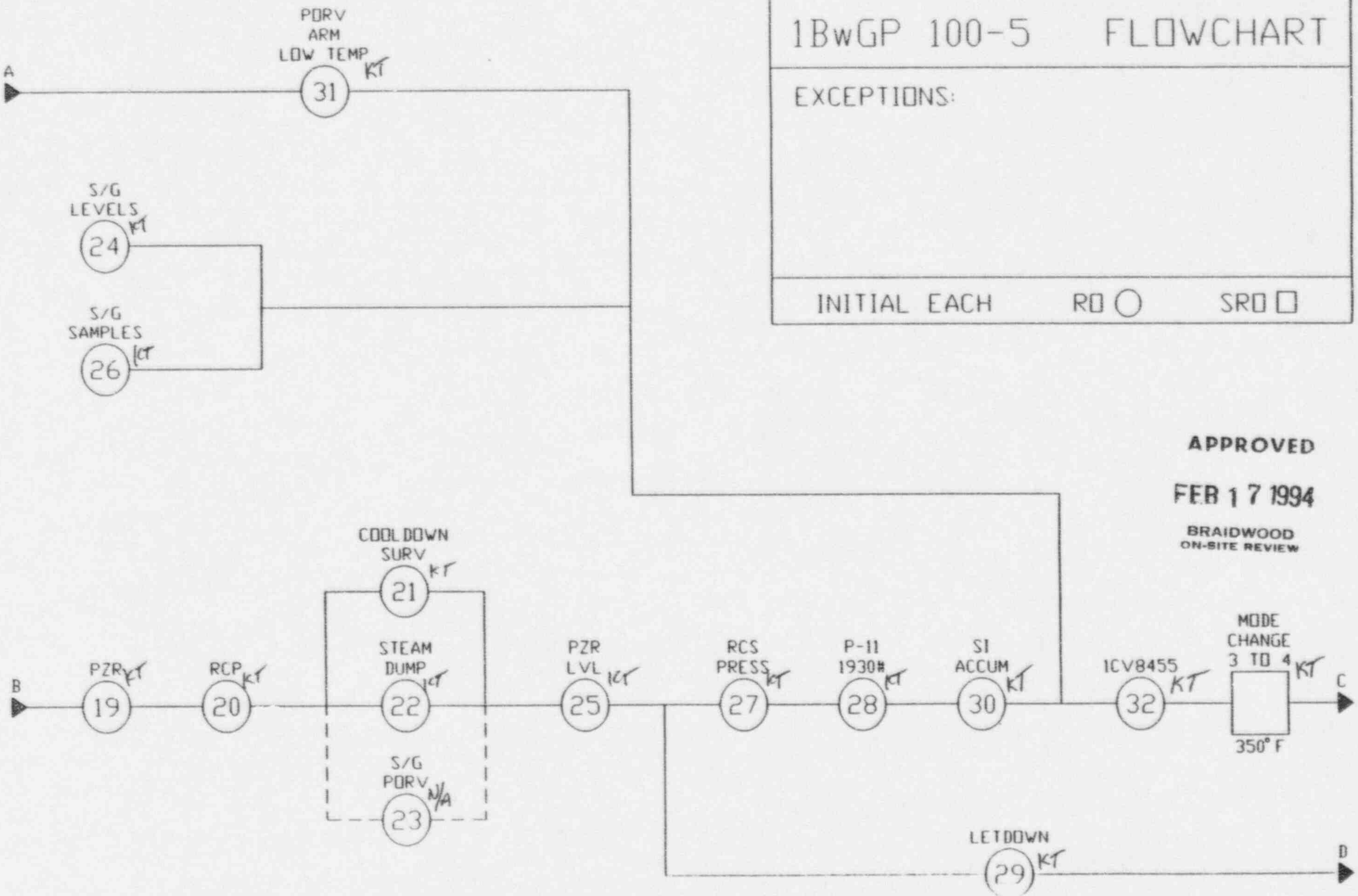


APPROVED

FEB 17 1994

BRAIDWOOD
ON SITE REVIEW

1BwGP 100-5 FLOWCHART		
EXCEPTIONS:		
INITIAL EACH	RO ○	SRO □

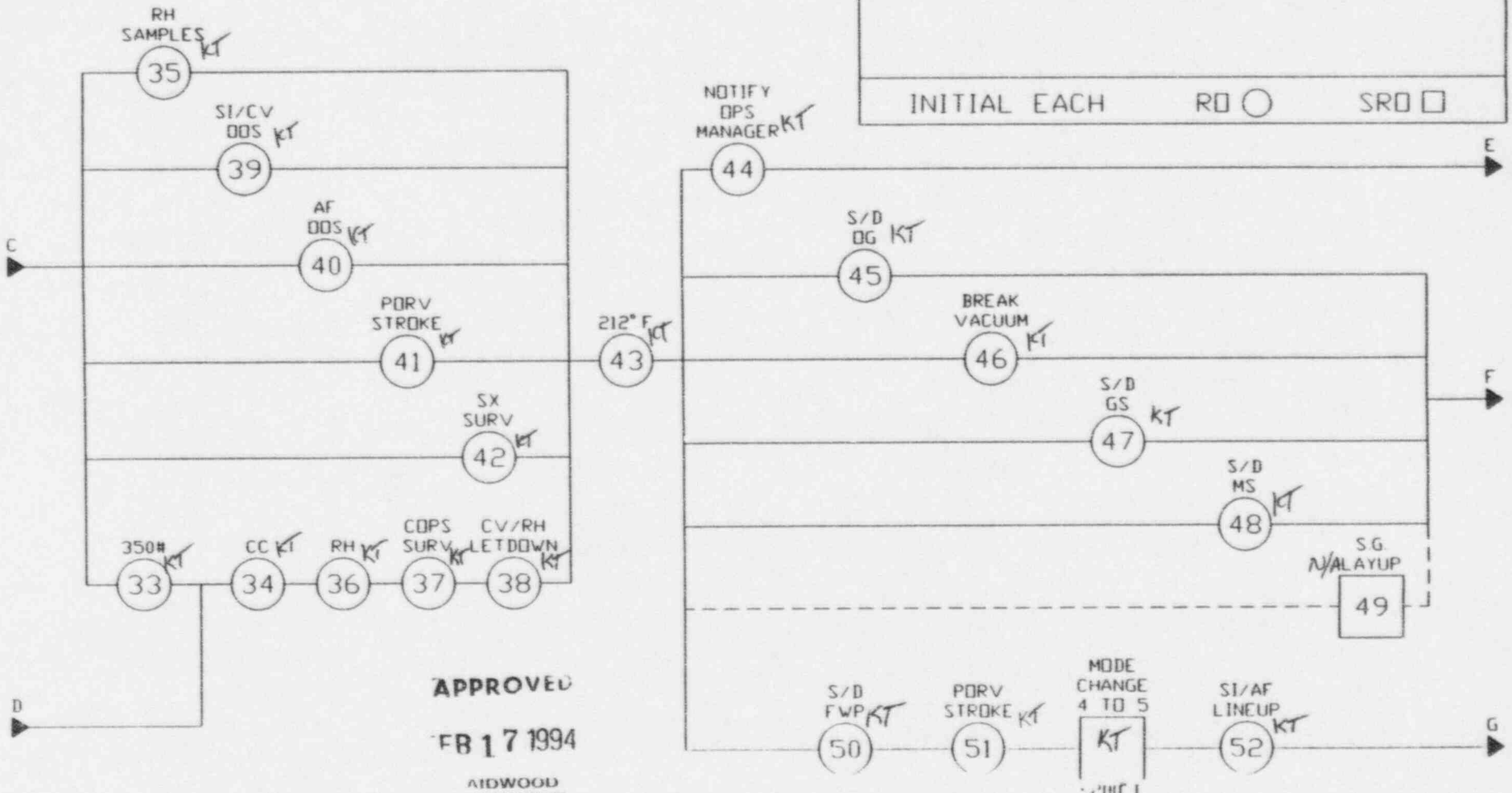


APPROVED
FEB 1 7 1994
BRAIDWOOD
ON-SITE REVIEW

1BwGP 100-5 FLOWCHART

EXCEPTIONS:

INITIAL EACH RO ◯ SRO □

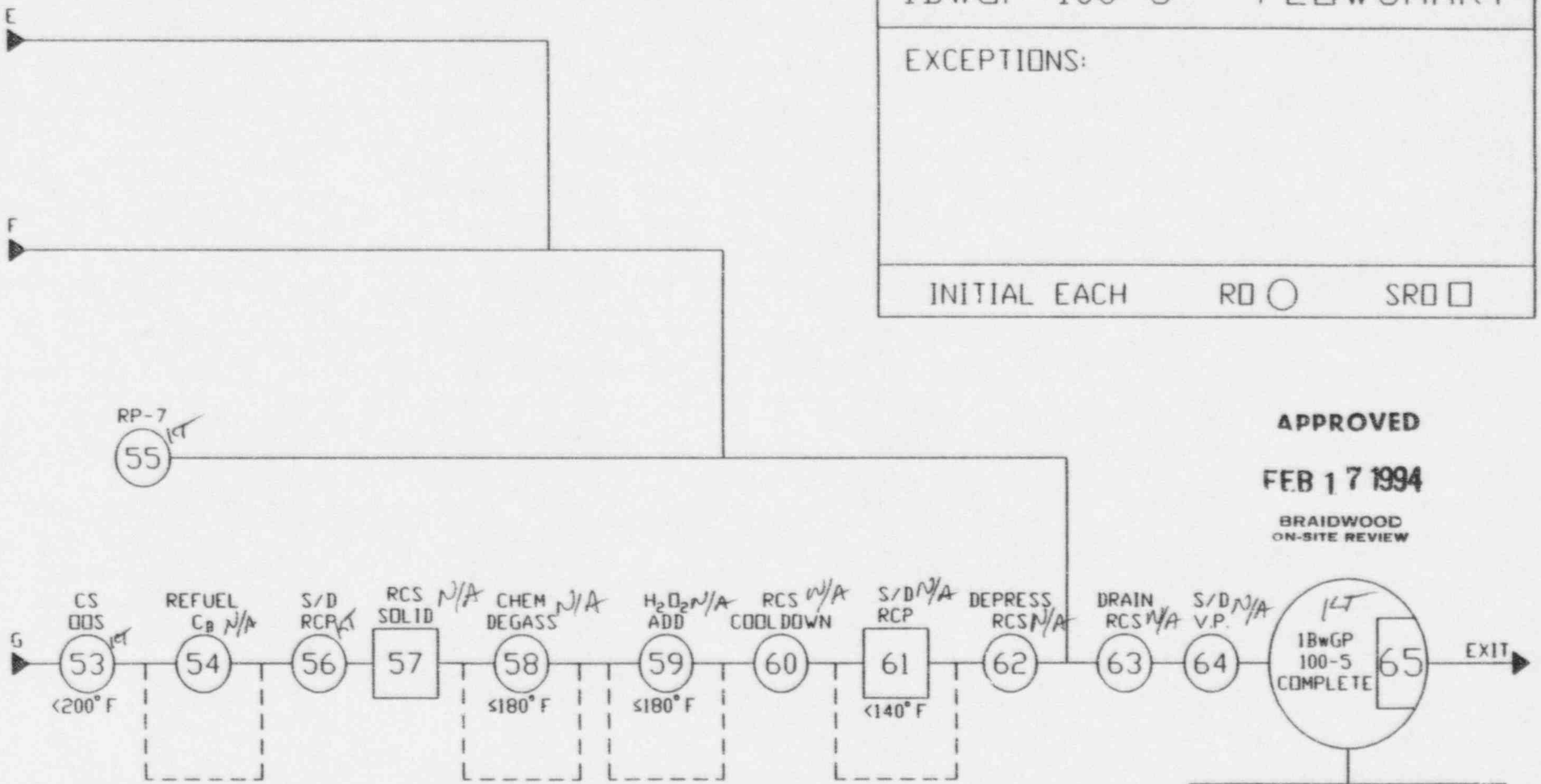


APPROVED
FEB 17 1994
BRAIDWOOD
OP REVIEW

1BwGP 100-5 FLOWCHART

EXCEPTIONS:

INITIAL EACH RO ○ SRO □



APPROVED

FEB 1 7 1994

BRAIDWOOD
ON-SITE REVIEW

TIME	1300
DATE	12/28/95
SE	KT

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: SS-1 Date Performed 1/25/96

Test Description: Steady state test at 100, 75 and 30%

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

___ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

___ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ________ ________ Date ________

Test Complete K Tegtmeier Date 1/26/96

SFCC Acceptance K Tegtmeier Date 1/26/96

Test Number: SS-1
Revision Number/Date: 10, 10/09/94
Frequency: ANNUAL

BRAIDWOOD SIMULATOR
STEADY STATE TESTING

I. PURPOSE

The purpose of this procedure is to:

1. Verify that the simulator values for 100% are stable and will not vary by more than ± 2% of the initial values over a 60 minute period.

2. Verify that the simulator values of critical parameters shall agree within ± 2% (plus instrument accuracy) of Braidwood Unit One critical parameters and shall not detract from training as required by ANSI/ANS-3.5 - 1985 "Nuclear Power Plant Simulators for Use in Operator Training".

3. Verify that the simulator values of non-critical parameters shall agree within ± 10% (plus instrument accuracy) of Braidwood Unit One non-critical parameters and shall not detract from training as required by ANSI/ANS-3.5 - 1985 "Nuclear Power Plant Simulators for Use in Operator Training".

II. REFERENCES

1. ANSI/ANS-3.5 - 1985: Nuclear Power Plant Simulators for Use in Operator Training

2. Reg Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations

3. TDI 700-03: Simulator Testing Program

4. Braidwood Computer Point Data (12/89)

BRAIDWOOD SIMULATOR
STEADY STATE TESTING

III. INITIAL CONDITIONS

1. The plant is at steady state power, BOL, equilibrium Xenon.

IV. DATA MONITORING

1. Monitor the following points by using the POWER program file SST.CRIA:

NOTE

Letters a-r denote critical parameters, letters s & t denote non-critical parameters.

a. Neutron Flux/Core Thermal Power (all channels)
b. T_c (all Loops)
c. T_h (all Loops)
d. Hi Auctioneered T_{ave}
e. RCS Boron Concentration
f. PZR Press
g. PZR Level
h. PZR Vapor Temp
i. PZR Liquid Temp
j. Bank D Control Rod Position
k. S/G Levels (all loops)
l. S/G Press (all loops)
m. S/G Steam Temp (all loops)
n. S/G FW Inlet Header Temp (all loops)
o. FW Flow (all loops)
p. S/G Blowdown Flow (all loops)
q. S/G Tempering Flow (all loops)
r. MW's Generated
s. RCS Loop Flow (all loops)
t. IR Channels (both channels)

BRAIDWOOD SIMULATOR
STEADY STATE TESTING

V. TEST INSTRUCTIONS

1. Initialize at approximately 100% Steady State (75% Steady State, 30% Steady State), BOL, Equilibrium Xenon, all systems in automatic control.

2. If necessary, perform a calorimetric and adjust PR gains.

3. Ensure stable plant conditions.

4. Record Simulator Values on the Data Summary Sheets for comparison to Braidwood Unit One data.

5. Run for a minimum of 3600 seconds with no operator action for the 100% test. Run for a minimum of 1800 seconds with no operator action for the 30% and 75% tests.

6. Repeat the test for 75% Steady State, and 30% Steady State conditions.

VI. ACCEPTANCE CRITERIA

1. The simulator computed full power, steady state values shall not change (drift) by more than +2% over a sixty minute period from the initial value and shall not detract from training.

2. The simulator steady state initial values shall not deviate from the Braidwood plant's measured values by more than ± 2%* for critical parameters or + 10%* for non-critical parameters and shall not detract from training.

****AN INSTRUMENT ACCURACY OF 3%, THE TECHNICAL SPECIFICATION CHANNEL CHECK ACCURACY, IS ADDED TO EACH PARAMETER, AS APPROPRIATE, AS INSTRUMENT ERROR.***

BRAIDWOOD SIMULATOR
STEADY STATE TESTING

NOTE

Any deviations from Acceptance Criteria #1 & #2 will be documented and assigned a Deviation Record number (DR #). The Braidwood Simulator Fidelity and Certification Coordinator shall determine the disposition of each DR.

VII. DOCUMENTATION

Retain the following documentation:

1. This procedure.
2. All Data Summary Sheets.
3. Test Cover Sheet.

VIII. DATA SUMMARY SHEETS

Attach the Steady State Performance Test Data Summary Sheets for the following conditions:

a. 30%.

b. 75%.

c. 100%.

Test Number: SS-1
Rev Number/Date: 10, 10/09/94
Frequency: Annual

100% Power
Steady State Test

Parameter		Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Description	Variable						
Power Range	N0049	100	95	105	99	TRUE	
	N0050	100	95	105	99	TRUE	
	N0051	100	95	105	99	TRUE	
	N0052	100	95	105	99	TRUE	
WR Tc	T0406	560	532	588	558	TRUE	
	T0426	565	536.75	593.25	558	TRUE	
	T0446	560	532	588	560	TRUE	
	T0479	565	536.75	593.25	560	TRUE	
WR Th	T0419	620	589	651	615	TRUE	
	T0439	620	589	651	615	TRUE	
	T0459	620	589	651	615	TRUE	
	T0479	620	589	651	615	TRUE	
Tave Auct. Hi	T0499	583	553.85	612.15	584	TRUE	
RCS Boron	CVBILTND	780	741	819	781	TRUE	
PZR Press	P0480	2235	2123.25	2346.75	2235	TRUE	
	P0481	2230	2118.5	2341.5	2245	TRUE	
	P0482	2235	2123.25	2346.75	2230	TRUE	
	P0483	2235	2123.25	2346.75	2235	TRUE	
PZR Level	L0480	61	57.95	64.05	60	TRUE	
	L0481	60	57	63	60	TRUE	
	L0482	60	57	63	60	TRUE	
PZR Temp (Vapor)	T0481	650	617.5	682.5	660	TRUE	
(Liquid)	T0480	650	617.5	682.5	655	TRUE	
Band D Rod Position	C0058	220	209	231	220	TRUE	

Test Number: SS-1
Rev Number/Date: 10, 10/09/94
Frequency: Annual

100% Power
Steady State Test

Parameter		Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Description	Variable						
S/G Level	L0400	67	63.65	70.35	65.5	TRUE	
	L0420	66	62.7	69.3	66	TRUE	
	L0443	66	62.7	69.3	67	TRUE	
	L0460	66	62.7	69.3	67	TRUE	
S/G Press	P0400	920	874	966	920	TRUE	
	P0422	925	878.75	971.25	910	TRUE	
	P0442	920	874	966	910	TRUE	
	P0460	920	874	966	920	TRUE	
S/G Temp	THTSG[1]	N/A	N/A	N/A	536.1	N/A	
	THTSG[2]	N/A	N/A	N/A	536.1	N/A	
	THTSG[3]	N/A	N/A	N/A	536.2	N/A	
	THTSG[4]	N/A	N/A	N/A	536.2	N/A	
FW Temp	T2381	436	414.2	457.8	437	TRUE	
	T2382	436	414.2	457.8	437	TRUE	
	T2383	435	413.25	456.75	437	TRUE	
	T2384	436	414.2	457.8	437	TRUE	
FW Flow	F0405	3808	3617.6	3998.4	3700	TRUE	
	F0424	3850	3657.5	4042.5	3715	TRUE	
	F0445	3698	3513.1	3882.9	3720	TRUE	
	F0465	3825	3633.75	4016.25	3717	TRUE	
Blowdown	F0407	27	25.65	28.35	25.9	TRUE	
	F0427	29	27.55	30.45	29.7	TRUE	
	F0447	28	26.6	29.4	27.2	TRUE	
	F0467	28	26.6	29.4	28	TRUE	

Test Number: SS-1
Rev Number/Date: 10, 10/09/94
Frequency: Annual

100% Power
Steady State Test

Parameter		Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Description	Variable						
Tempering Flow	F2239	96	91.2	100.8	98	TRUE	
	F2240	98	93.1	102.9	96	TRUE	
	F2241	96	91.2	100.8	97	TRUE	
	F2242	96	91.2	100.8	98	TRUE	
RCS Loop Flow	F0400	97	92.15	101.85	98	TRUE	
	F0420	99	94.05	103.95	98	TRUE	
	F0440	97	92.15	101.85	97.5	TRUE	
	F0460	97	92.15	101.85	98	TRUE	
MW	Q2800	1180	1121	1239	1183	TRUE	
IR	N0035	3.00E-04	3.00E-05	3.00E-03	4.00E-04	TRUE	
	N0036	3.00E-04	3.00E-05	3.00E-03	4.00E-04	TRUE	

Test Number:	SS-1
Rev Number/Date:	10, 10/09/94
Frequency:	Annual

75% Power
Steady State Test

Parameter							
Description	Variable	Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Power Range	N0049	75.5	71.725	79.275	77	TRUE	
	N0050	75.2	71.44	78.96	77	TRUE	
	N0051	75.58	71.801	79.359	77	TRUE	
	N0052	75.1	71.345	78.855	77	TRUE	
WR Tc	T0406	558	530.1	585.9	555	TRUE	
	T0426	552	524.4	579.6	556	TRUE	
	T0446	557	529.15	584.85	558	TRUE	
	T0479	554	526.3	581.7	555	TRUE	
WR Th	T0419	598	568.1	627.9	600	TRUE	
	T0439	598	568.1	627.9	600	TRUE	
	T0459	599	569.05	628.95	600	TRUE	
	T0479	598	568.1	627.9	600	TRUE	
Tave Auct. Hi	T0499	576	547.2	604.8	576	TRUE	
RCS Boron	CVBILTND	868	824.6	911.4	841	TRUE	
PZR Press	P0480	2238	2126.1	2349.9	2235	TRUE	
	P0481	2234	2122.3	2345.7	2240	TRUE	
	P0482	2238	2126.1	2349.9	2235	TRUE	
	P0483	2234	2122.3	2345.7	2240	TRUE	
PZR Level	L0480	51	48.45	53.55	50	TRUE	
	L0481	50	47.5	52.5	50	TRUE	
	L0482	50	47.5	52.5	50	TRUE	
PZR Temp (Vapor)	T0481	652	619.4	684.6	660	TRUE	
(Liquid)	T0480	648	615.6	680.4	650	TRUE	
Band D Rod Position	C0058	186	176.7	195.3	186	TRUE	

Test Number: SS-1
Rev Number/Date: 10, 10/09/94
Frequency: Annual

75% Power
Steady State Test

Parameter		Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Description	Variable						
S/G Level	L0400	66.5	63.175	69.825	66	TRUE	
	L0420	64.8	61.56	68.04	67	TRUE	
	L0443	66.1	62.795	69.405	65	TRUE	
	L0460	67.5	64.125	70.875	67	TRUE	
S/G Press	P0400	948	900.6	995.4	940	TRUE	
	P0422	947	899.65	994.35	940	TRUE	
	P0442	945	897.75	992.25	930	TRUE	
	P0460	952	904.4	999.6	945	TRUE	
S/G Temp	THTSG[1]	N/A	N/A	N/A	538.6	N/A	
	THTSG[2]	N/A	N/A	N/A	538.6	N/A	
	THTSG[3]	N/A	N/A	N/A	538.6	N/A	
	THTSG[4]	N/A	N/A	N/A	538.6	N/A	
FW Temp	T2381	411	390.45	431.55	410.2	TRUE	
	T2382	411	390.45	431.55	410.2	TRUE	
	T2383	410	389.5	430.5	410.2	TRUE	
	T2384	411	390.45	431.55	410.2	TRUE	
FW Flow	F0405	2720	2584	2856	2800	TRUE	
	F0424	2847	2704.65	2989.35	2810	TRUE	
	F0445	2685	2550.75	2819.25	2809	TRUE	
	F0465	2749	2611.55	2886.45	2815	TRUE	
Blowdown	F0407	63	59.85	66.15	63.6	TRUE	
	F0427	64	60.8	67.2	64.9	TRUE	
	F0447	67	63.65	70.35	66.2	TRUE	
	F0467	61	57.95	64.05	59.6	TRUE	

Test Number: SS-1
Rev Number/Date: 10, 10/09/94
Frequency: Annual

75% Power
Steady State Test

Parameter		Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Description	Variable						
Tempering Flow	F2239	97	92.15	101.85	98	TRUE	
	F2240	98	93.1	102.9	97	TRUE	
	F2241	97	92.15	101.85	97	TRUE	
	F2242	98	93.1	102.9	97	TRUE	
RCS Loop Flow	F0400	97	92.15	101.85	98	TRUE	
	F0420	99	94.05	103.95	98	TRUE	
	F0440	96	91.2	100.8	98	TRUE	
	F0460	98	93.1	102.9	98	TRUE	
MW	Q2800	897	852.15	941.85	892	TRUE	
IR	N0035	2.10E-04	2.10E-05	2.10E-03	2.80E-04	TRUE	
	N0036	2.10E-04	2.10E-05	2.10E-03	2.80E-04	TRUE	

Test Number: SS-1
Rev Number/Date: 10. 10/09/94
Frequency: Annual

30% Power
Steady State Test

Parameter							
Description	Variable	Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Power Range	N0049	28	26.6	29.4	29	TRUE	
	N0050	28	26.6	29.4	29	TRUE	
	N0051	27	25.65	28.35	28	TRUE	
	N0052	29	27.55	30.45	29	TRUE	
WR Tc	T0406	560	532	588	560	TRUE	
	T0426	560	532	588	560	TRUE	
	T0446	555	527.25	582.75	560	TRUE	
	T0479	555	527.25	582.75	555	TRUE	
WR Th	T0419	580	551	609	570	TRUE	
	T0439	575	546.25	603.75	575	TRUE	
	T0459	575	546.25	603.75	575	TRUE	
	T0479	580	551	609	570	TRUE	
Tave Auct. Hi	T0499	563	534.85	591.15	563	TRUE	
RCS Boron	CVBILTND	1090	1035.5	1144.5	1118	TRUE	
PZR Press	P0480	2235	2123.25	2346.75	2240	TRUE	
	P0481	2230	2118.5	2341.5	2245	TRUE	
	P0482	2230	2118.5	2341.5	2240	TRUE	
	P0483	2230	2118.5	2341.5	2245	TRUE	
PZR Level	L0480	35	33.25	36.75	35	TRUE	
	L0481	34	32.3	35.7	35	TRUE	
	L0482	36	34.2	37.8	35	TRUE	
PZR Temp (Vapor)	T0481	650	617.5	682.5	660	TRUE	
(Liquid)	T0480	655	622.25	687.75	650	TRUE	
Band D Rod Position	C0058	160	152	168	160	TRUE	

Test Number: SS-1
Rev Number/Date: 10. 10/09/94
Frequency: Annual

30% Power
Steady State Test

Parameter		Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Description	Variable						
S/G Level	L0400	67	63.65	70.35	66	TRUE	
	L0420	66	62.7	69.3	65.5	TRUE	
	L0443	66	62.7	69.3	66	TRUE	
	L0460	67	63.65	70.35	66	TRUE	
S/G Press	P0400	1030	978.5	1081.5	1030	TRUE	
	P0422	1030	978.5	1081.5	1025	TRUE	
	P0442	1025	973.75	1076.25	1020	TRUE	
	P0460	1035	983.25	1086.75	1025	TRUE	
S/G Temp	THTSG[1]	N/A	N/A	N/A	548.9	N/A	
	THTSG[2]	N/A	N/A	N/A	548.9	N/A	
	THTSG[3]	N/A	N/A	N/A	548.9	N/A	
	THTSG[4]	N/A	N/A	N/A	548.9	N/A	
FW Temp	T2381	326	309.7	342.3	310	TRUE	
	T2382	326	309.7	342.3	310	TRUE	
	T2383	325	308.75	341.25	310	TRUE	
	T2384	326	309.7	342.3	310	TRUE	
FW Flow	F0405	925	878.75	971.25	900	TRUE	
	F0424	940	893	987	895	TRUE	
	F0445	930	883.5	976.5	910	TRUE	
	F0465	925	878.75	971.25	890	TRUE	
Blowdown	F0407	25	23.75	26.25	25.9	TRUE	
	F0427	23	21.85	24.15	24.1	TRUE	
	F0447	25	23.75	26.25	25.9	TRUE	
	F0467	23	21.85	24.15	24.1	TRUE	

Test Number: SS-1
Rev Number/Date: 10. 10/09/94
Frequency: Annual

30% Power
Steady State Test

Parameter		Braidwood Unit 1 Value	Simulator Lowest Permissible Value (-5%)	Simulator Highest Permissible Value (+5%)	Simulator Value	Simulator Value Within 5% (TRUE/ FALSE)	Comments
Description	Variable						
Tempering Flow	F2239	90	85.5	94.5	90	TRUE	
	F2240	95	90.25	99.75	94	TRUE	
	F2241	90	85.5	94.5	92	TRUE	
	F2242	85	80.75	89.25	87	TRUE	
RCS Loop Flow	F0400	98	93.1	102.9	98	TRUE	
	F0420	99	94.05	103.95	98	TRUE	
	F0440	96	91.2	100.8	98	TRUE	
	F0460	97	92.15	101.85	98	TRUE	
MW	Q2800	280	266	294	269	TRUE	
IR	N0035	7.00E-05	7.00E-06	7.00E-04	9.00E-05	TRUE	
	N0036	7.00E-05	7.00E-06	7.00E-04	9.00E-05	TRUE	

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-1 Date Performed 1/4/96

Test Description: Manual Rx Trip test

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

____ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

____ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ________ Date ________

Test Complete [signature] Date 1/4/96

SFCC Acceptance [signature] Date 2/9/96

Test Number: TR-1
Revision Number/Date: 07, 11/08/93
Frequency: ANNUAL

BRAIDWOOD SIMULATOR TRANSIENT TEST
MANUAL REACTOR TRIP

I. OBJECTIVES

The purpose of this procedure is to:

1. Test the simulator response to a Manual Reactor Trip as required by ANSI/ANS-3.5-1985.

2. Verify the ability of the primary and secondary plant and the plant automatic control systems to sustain a trip from 100 percent power and to bring the plant to a stable condition following the transient.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.

2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.

3. TDI 700-03: Simulator Testing Program.

4. Braidwood Unit 1 LER 90-08: Rx Trip from Full Power.

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state, full power conditions with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.

2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.

3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.

BRAIDWOOD SIMULATOR TRANSIENT TEST
MANUAL REACTOR TRIP

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables (T_c, T_h, S/G pressure and level shall be on loop 1):

   a. Neutron flux (Rx power)

   b. RCS average temperature

   c. Pressurizer pressure

   d. Pressurizer level

   e. Pressurizer steam temperature

   f. Steam flow

   g. Feed flow

   h. Hot leg temperature

   i. Cold leg temperature

   j. S/G pressure

   k. S/G level

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.

2. Enter the data collection points from Section IV into the ZETA Plotter program.

3. Initiate a plant trip by manually tripping the Reactor from 1PM05J.

4. Continue until stable plant conditions are established.

5. Graph the variables listed under Section IV.

BRAIDWOOD SIMULATOR TRANSIENT TEST
MANUAL REACTOR TRIP

VI. ACCEPTANCE CRITERIA

> **NOTE**
> The simulator response will be compared to baseline data by the Braidwood Simulator Transient Test Review Board. The Review Board will determine if the simulator has the capability to adequately reproduce the defined transient.

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer safety valves shall NOT lift.

2. Steam generator safety valves shall NOT lift.

3. Safety injection is NOT initiated.

4. All full length rods must release and drop.

5. Successful transfer of all loads from the Unit Auxiliary Transformers to the System Auxiliary Transformers.

6. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.

7. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

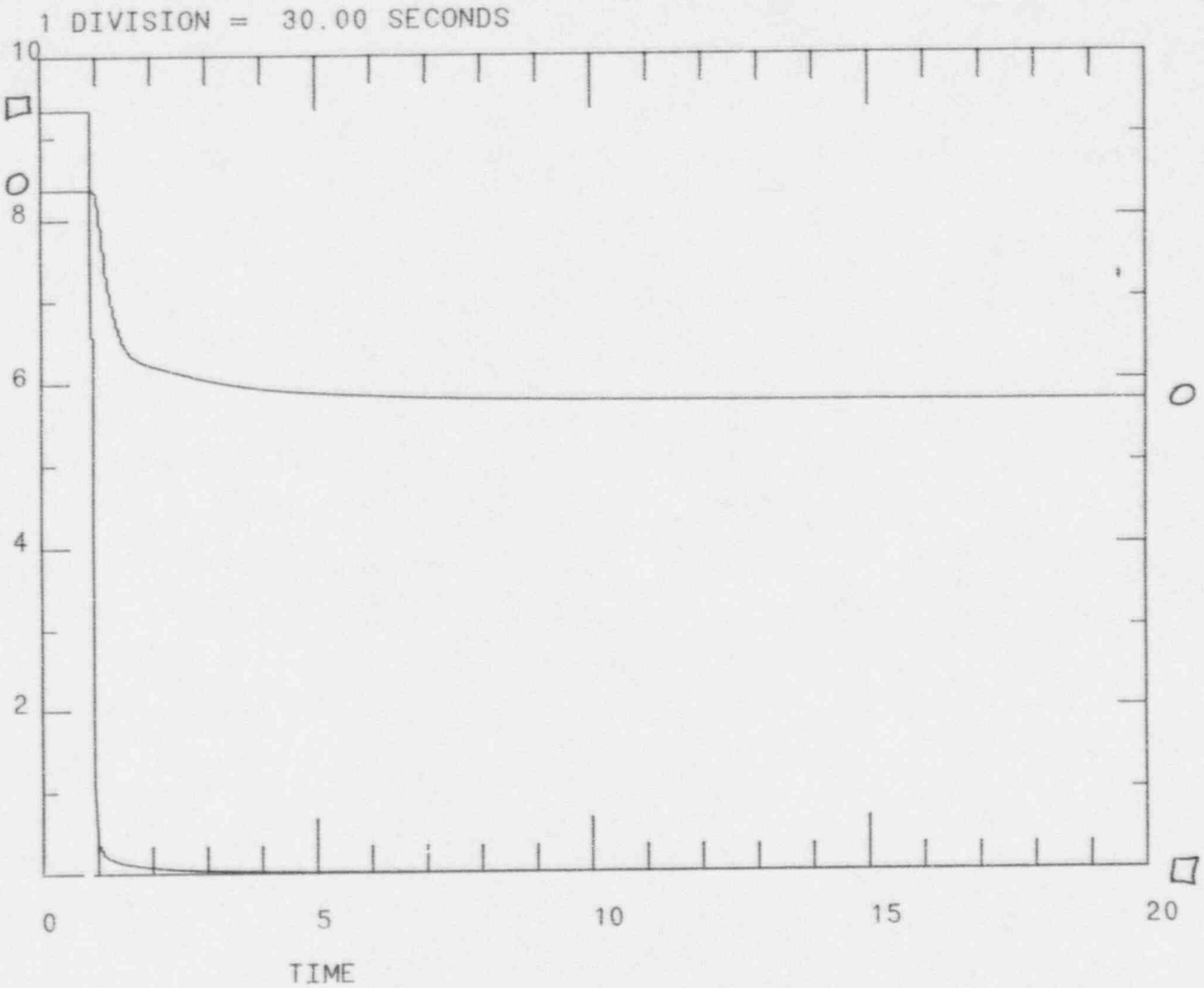
BRAIDWOOD SIMULATOR TRANSIENT TEST
MANUAL REACTOR TRIP

VII. LIST OF FIGURES

NOTE

Total steam flow and total feed flow were not available from Braidwood Unit One data. Loop 1 steam flow and feed flow were substituted to aid in data comparison.

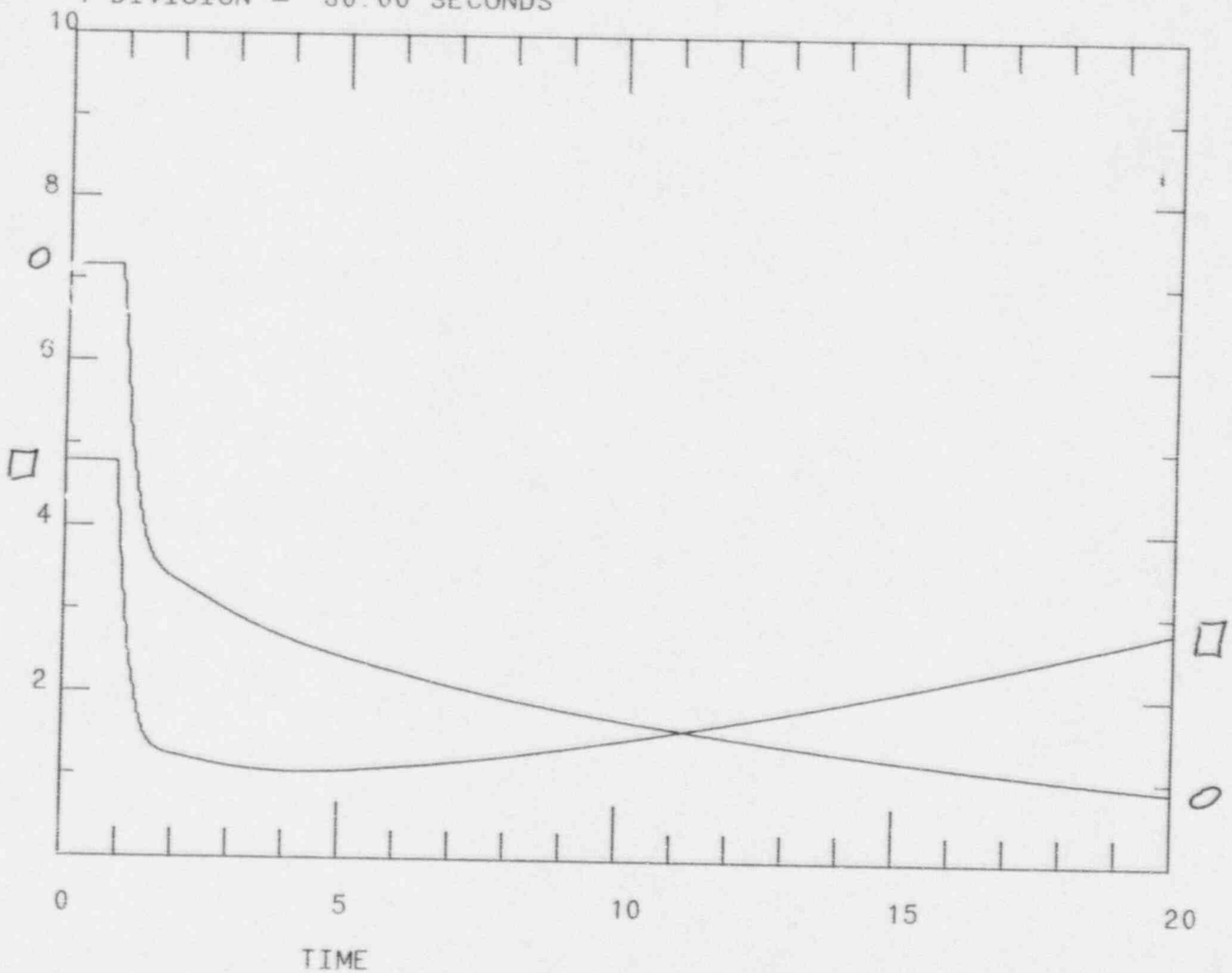
RX TRIP 01/04/96 14:02:00



☐ YCN0049	(.000 , 105.)	21090	PWR RNG CH 41 (QUAD 4) TOT
O RXTAVG	(500. , 600.)	01200	LOOP TABLE

RX TRIP

01/04/96 13:52:51



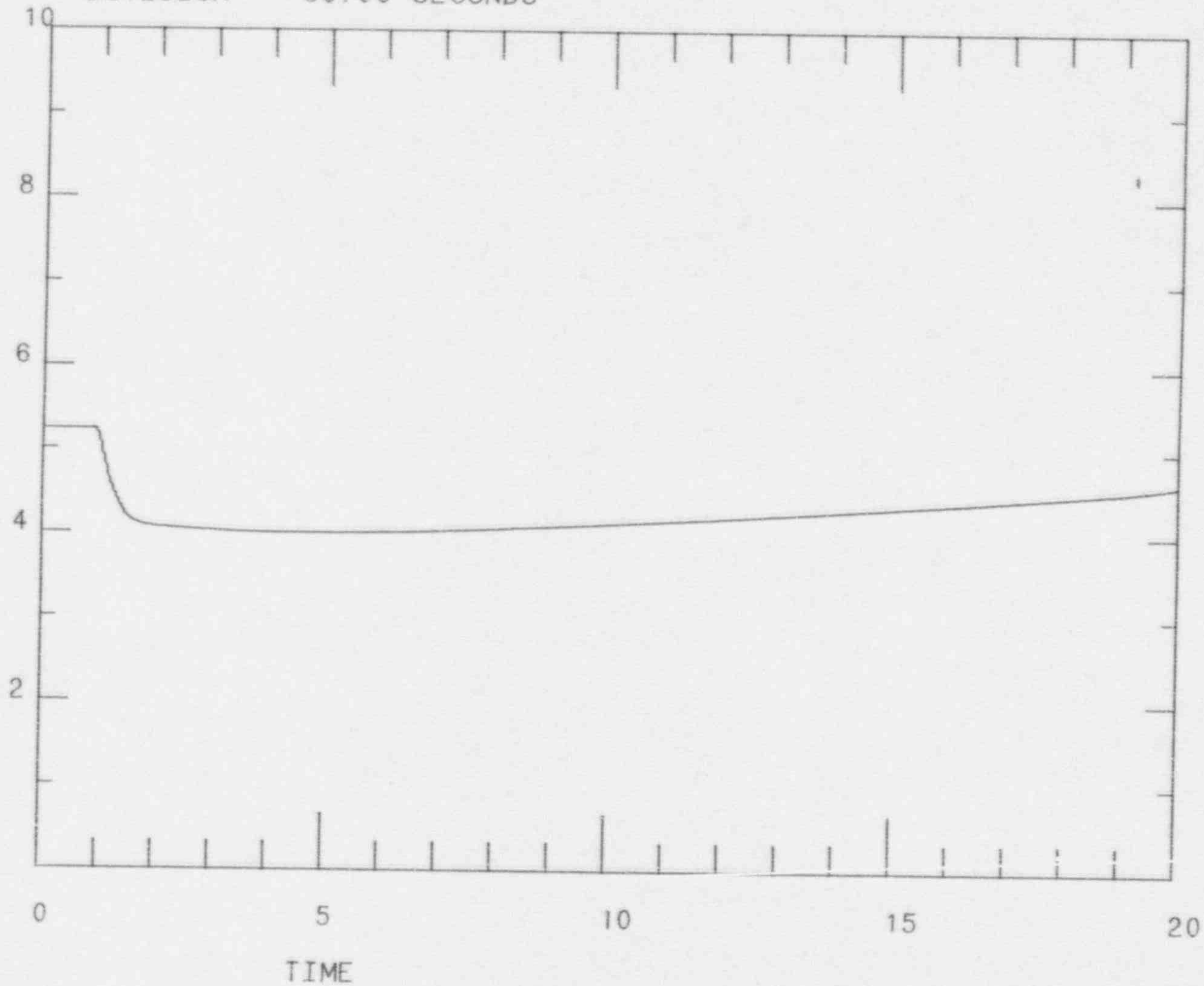
YCP0480 (.200E+04, .250E+04) 06720 PRESSURIZER PRESS PT-455

YCL0480 (20.0 , 75.0) 06550 PRESSURIZER LEVEL LT-459

RX TRIP

01/04/96 14:08:40

1 DIVISION = 30.00 SECONDS

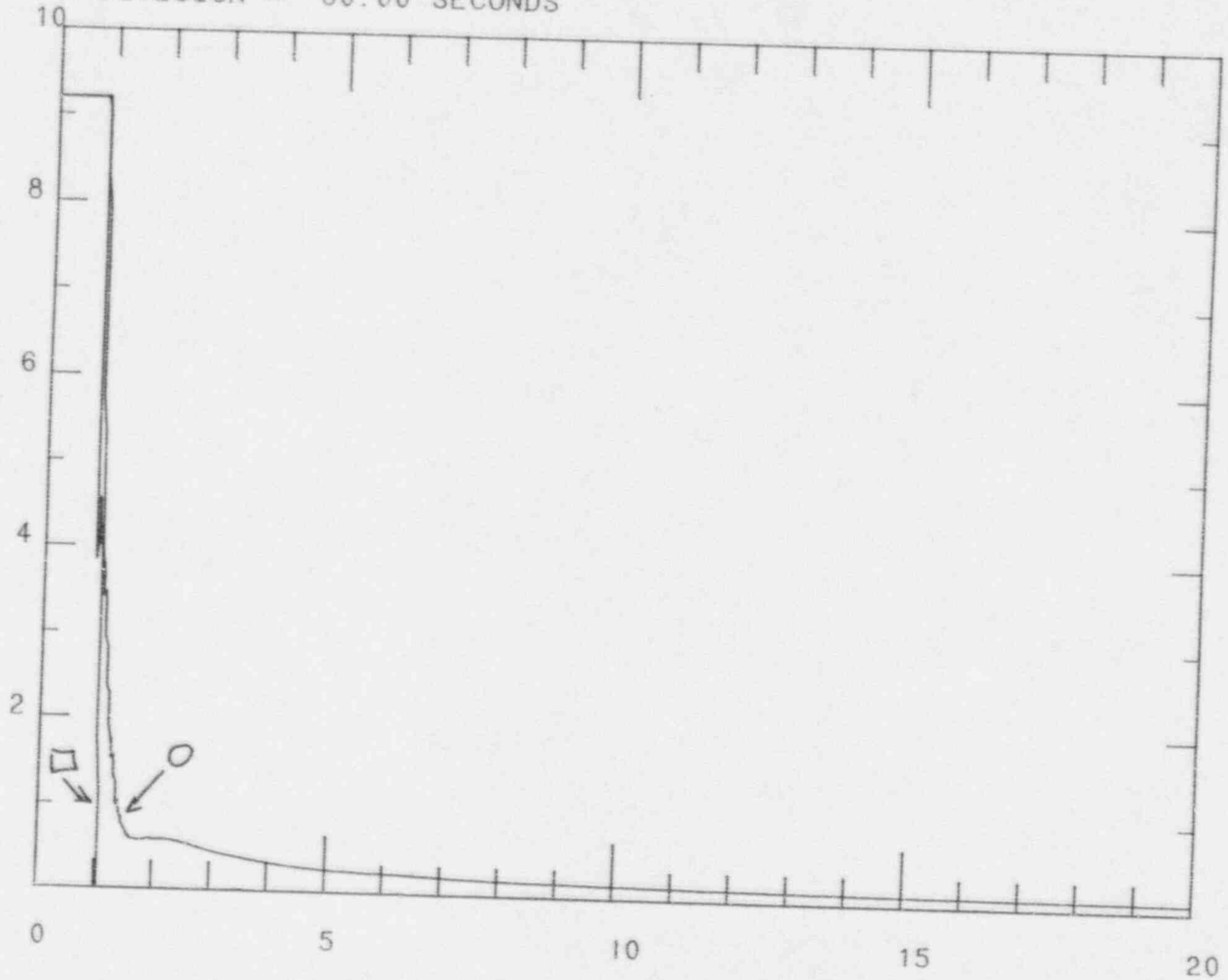


YCT0481 (600. , 700.) 91250 PRESSURIZER STM T

RX TRIP

01/04/96 14:14:35

1 DIVISION = 30.00 SECONDS

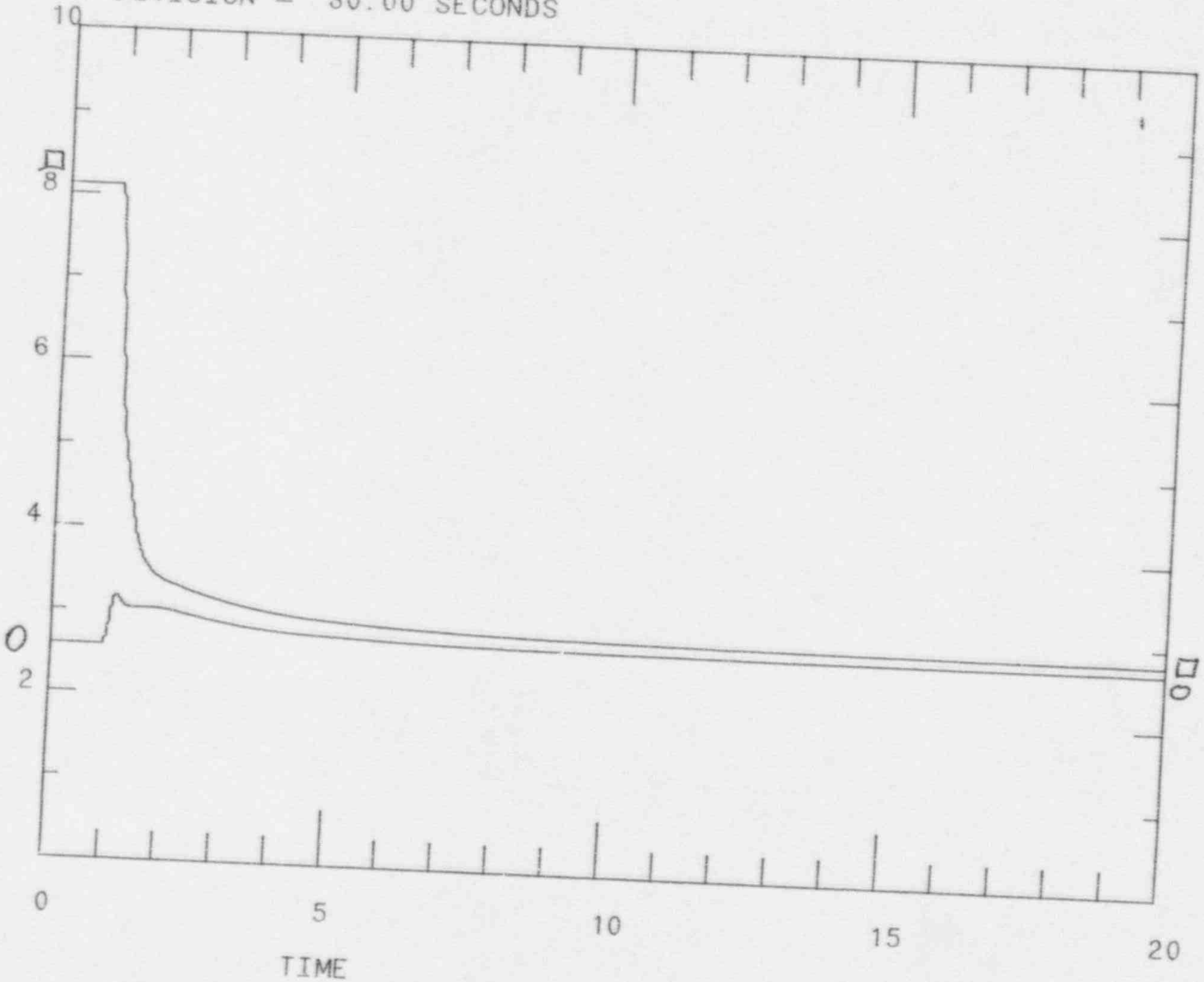


☐ YCF0403	(.000 , .400E+04)	06040 SG 1A FW F FT-510
O YCF0405	(.000 , .400E+04)	06060 S/G 1A STEAM F FT-512

RX TRIP

01/04/96 14:21:46

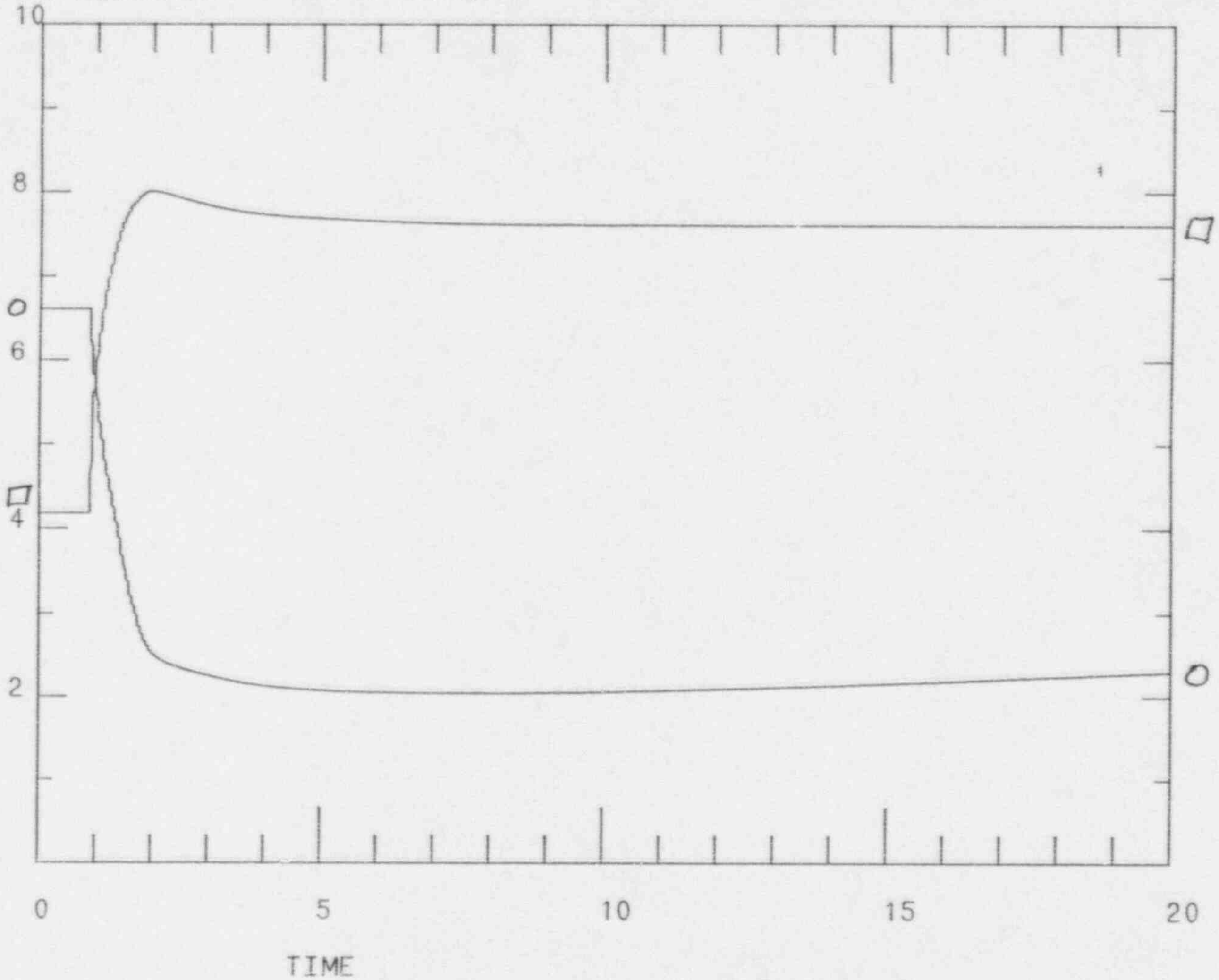
1 DIVISION = 30.00 SECONDS



□ YCT0419	(530.	, 630.	)	06830 RC LOOP 1A WR HOT LEG T
○ YCT0406	(530.	, 630.	)	06825 RC LOOP 1A WR COLD LEG T

RX TRIP 01/04/96 14:29:02

1 DIVISION = 30.00 SECONDS



□ YCP0400 (700. , .120E+04) 06590 S/G 1A STMLINE PRESS PT-5

○ YCL0400 (.000 , 100.) 06350 S/G 1A NAR RNG LEVEL LT-51

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-1 / Rx trip DATE: 1/4/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data EVENT: Braidwood U-1 LER 90-008
b. Analytical or design data DATA:
c. Transient data from similar plant PLANT:
d. Panel of experts (best estimate)

COMMENTS: None

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Rx Power	None	Accepted
Tave		
S/G level		
S/G Press		
PZR Press		
PZR level		
T_h		
T_c		
PZR Temp		

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
Feed Flow	None	Accepted
Steam Flow	↓	↓

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

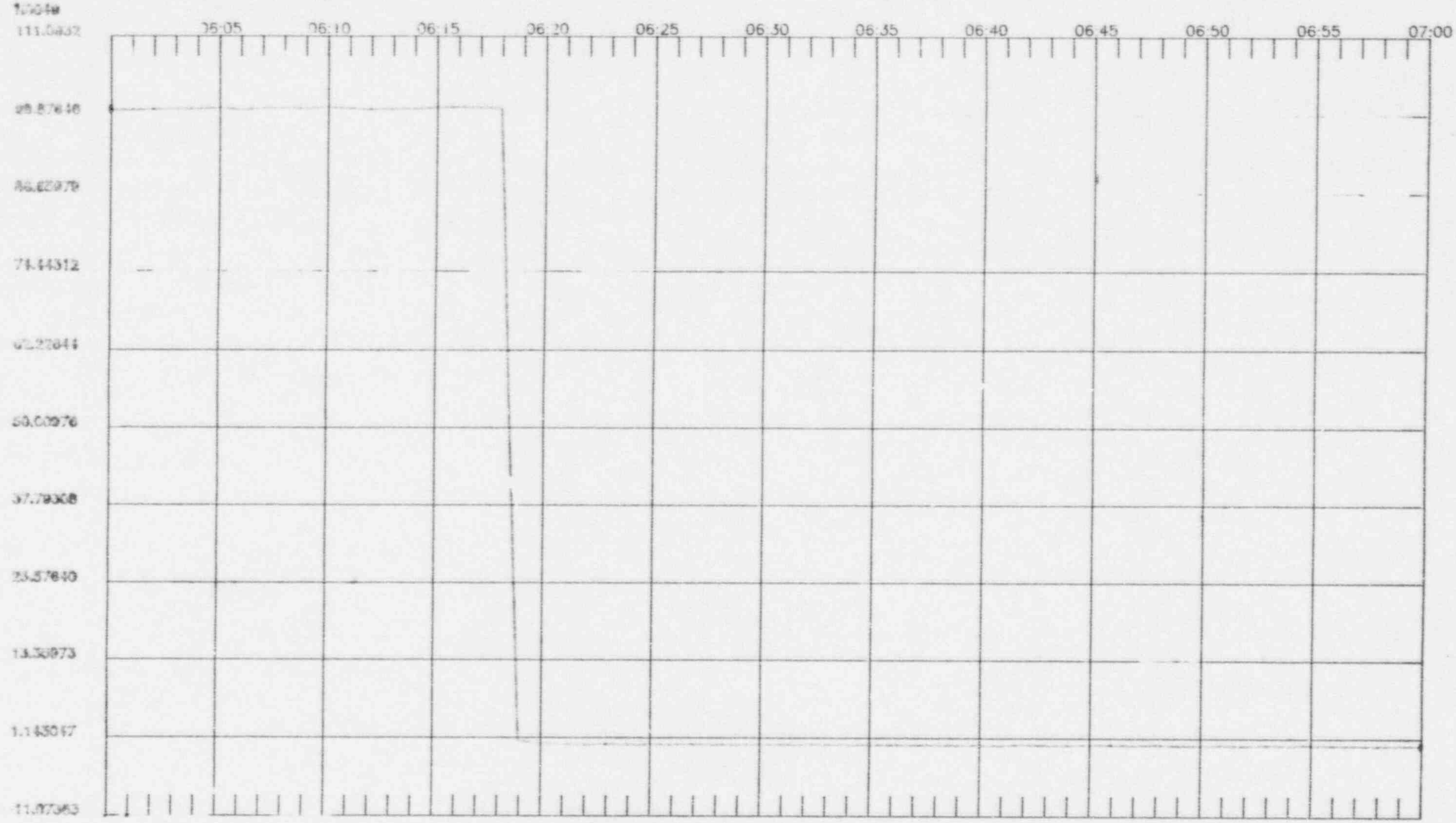
a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

COMMENTS:

Point Plot – Braidwood Station, Unit 1 [GN01014 Rev. 0.1]
Data from 06:00 to 07:00 on 06/08/90
Time Interval : 1 Minute(s)



POINT ID	DESCRIPTION	UNITS	SYMBOL
N0040	PWR RNG CH 41 (QUAD 4) DET Q	PC	•

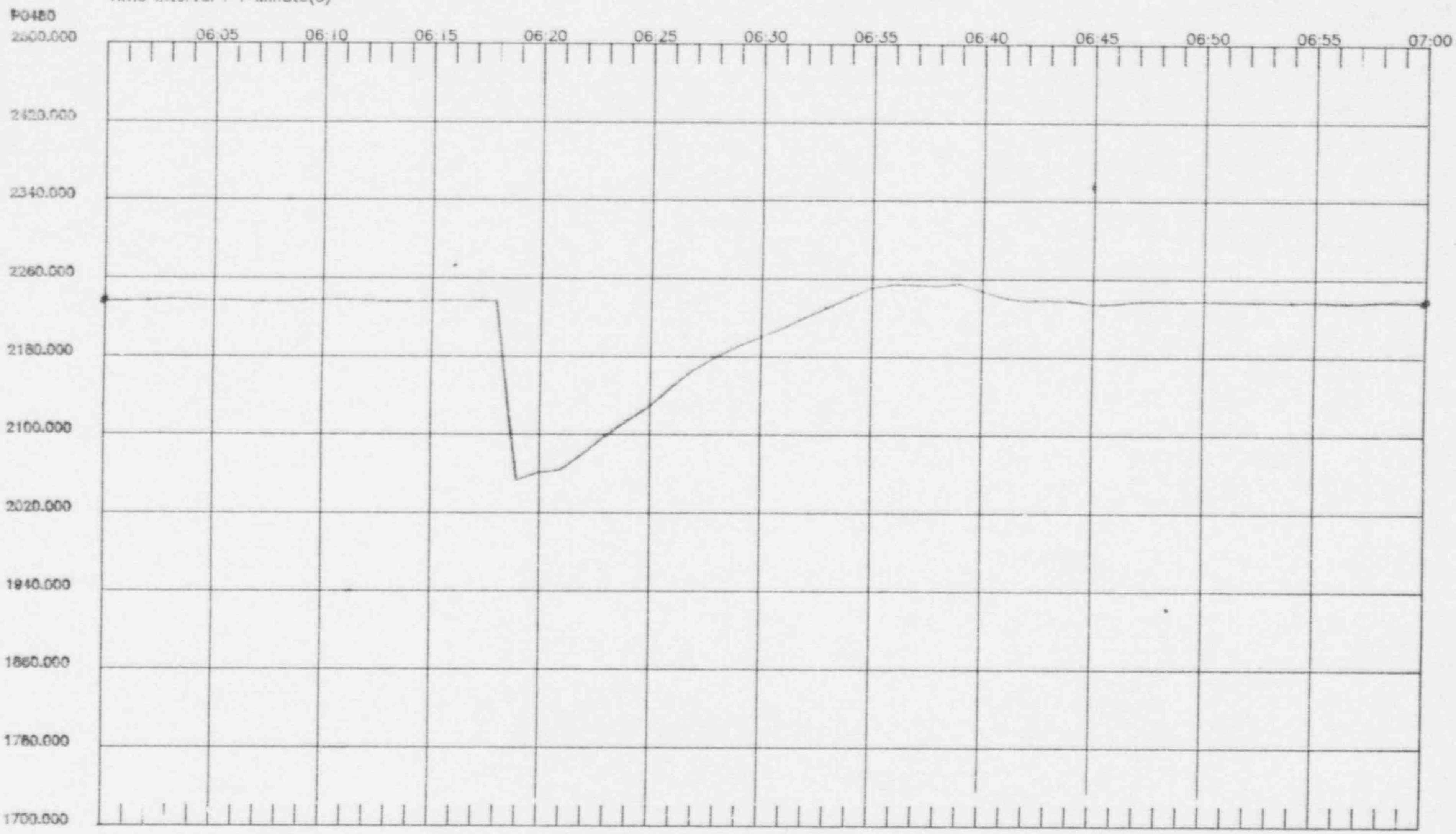
Point Plot – Braidwood Station, Unit 1
Data from 06:00 to 07:00 on 06/08/90
'ime interval : 1 Minute(s)

[GN01014 Rev. 0.1]

POINT ID	DESCRIPTION	UNITS	SYMBOL
T0499	RCL HIGHEST TAVG (AUCTIONEERED)	DEGF	#

Point Plot – Braidwood Station, Unit 1
Data from 06:00 to 07:00 on 06/08/90
Time Interval : 1 Minute(s)

[GN01014 Rev. 0.1]



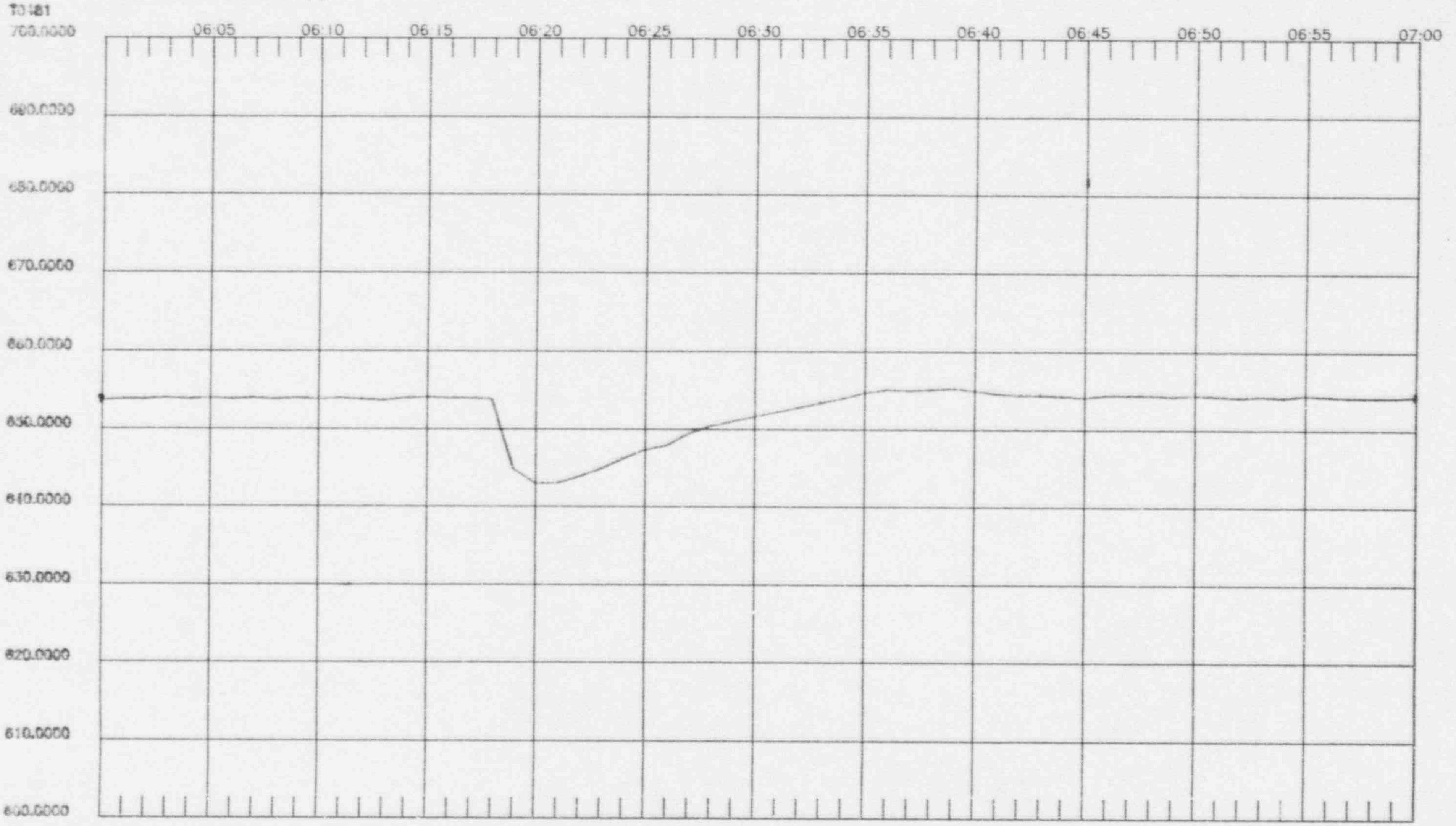
POINT ID	DESCRIPTION	UNITS	SYMBOL
P0480	PRESSURIZER 1 P	PSIG	•

Point Plot – Braidwood Station, Unit 1
Data from 06:00 to 07:00 on 06/08/90
Time interval : 1 Minute(s)

[GN01014 Rev. 0.1]

POINT ID	DESCRIPTION	UNITS	SYMBOL
L0480	PRESSURIZER 1 L	PC	*

Point Plot – Braidwood Station, Unit 1 [GN01014 Rev. 0.1]
Data from 06:00 to 07:00 on 06/08/90
Time interval : 1 Minute(s)



POINT ID	DESCRIPTION	UNITS	SYMBOL
T0481	PRESSURIZER STM T	DEGF	'

Point Plot – Braidwood Station, Unit 1 [GN01014 Rev. 0.1]
Data from 06:00 to 07:00 on 06/08/90
Time Interval : 1 Minute(s)

POINT ID	DESCRIPTION	UNITS	SYMBOL
F0405	STM GEN 1 STM OUT 1 F	KBH	♦

Point Plot – Braidwood Station, Unit 1
Data from 06:00 to 07:00 on 06/08/90
Time Interval : 1 Minute(s)

[GN01014 Rev. 0.1]

POINT ID	DESCRIPTION	UNITS	SYMBOL
F0403	STM GEN 1 FEED WTR IN 1 F	KBH	•

Point Plot – Braidwood Station, Unit 1
Data from 06:00 to 07:00 on 06/08/90
Time Interval : 1 Minute(s)

[GN01014 Rev. 0.1]

POINT ID	DESCRIPTION	UNITS	SYMBOL
T0419	RCL1 WIDE RNG HOT LEG T	DEGF	,

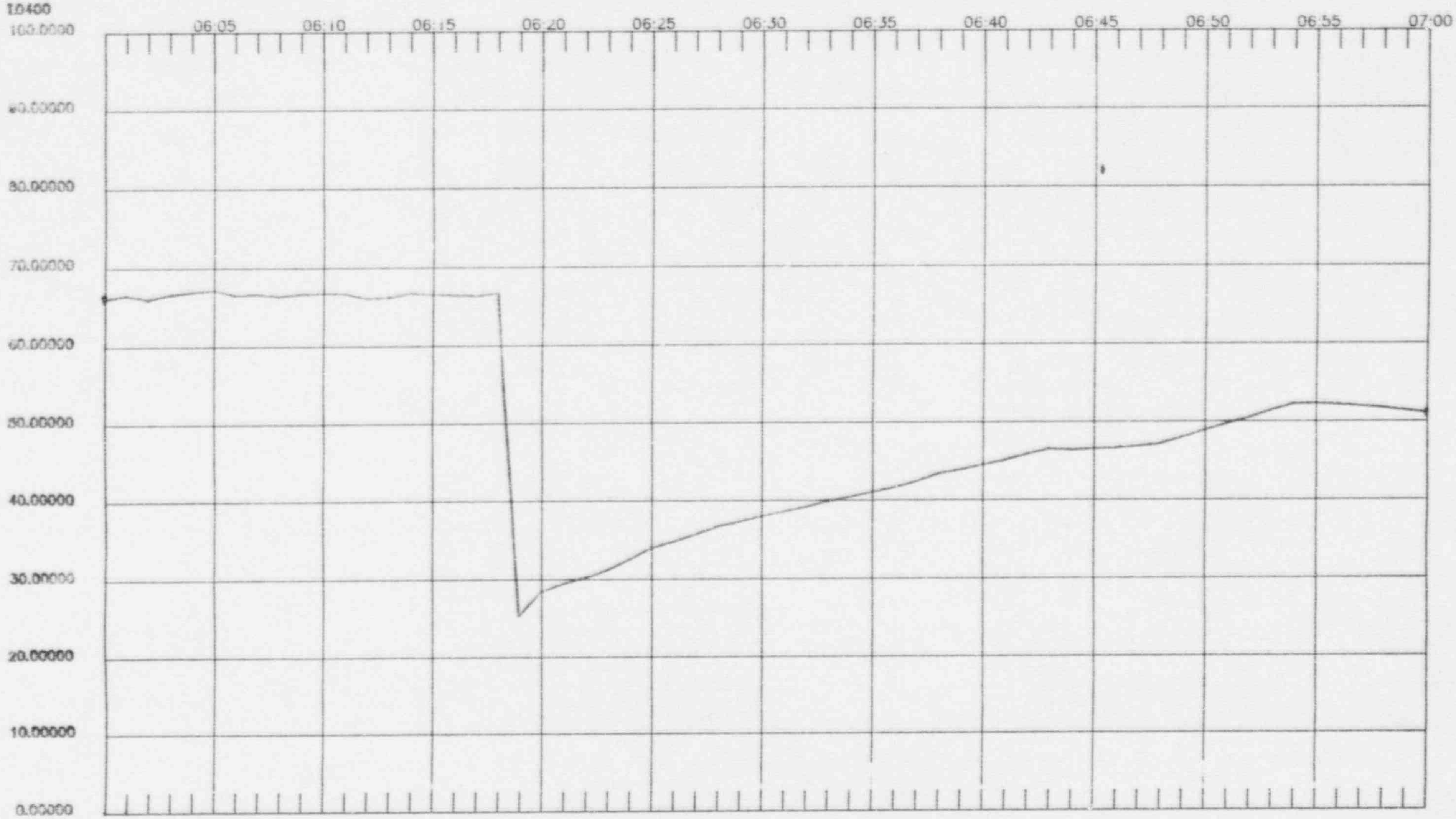
Point Plot – Braidwood Station, Unit 1
Data from 06:00 to 07:00 on 06/08/90
Time Interval : 1 Minute(s)

[GN01014 Rev. 0.1]

POINT ID	DESCRIPTION	UNITS	SYMBOL
T0406	RCL1 WIDE RNG COLD LEG T	DEGF	

Point Plot – Braidwood Station, Unit 1
Data from 06:00 to 07:00 on 06/08/90
Time Interval : 1 Minute(s)

[GN01014 Rev. 0.1]



POINT ID	DESCRIPTION	UNITS	SYMBOL
I.0400	STM GEN 1 NAR RNG 1 L	PC	#

Point Plot – Braidwood Station, Unit 1

Data from 06:00 to 07:00 on 06/08/90

Time interval : 1 Minute(s)

[GN01014 Rev. 0.1]

POINT ID	DESCRIPTION	UNITS	SYMBOL
P0400	STM GEN 1 STM OUT 1 P	PSIG	♦

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-2 Date Performed 1/5/96

Test Description: Simultaneous trip of all MFP's test

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

____ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

____ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ________ Date ________

Test Complete [signature] Date 1/5/96

SFCC Acceptance [signature] Date 2/9/96

Test Number: TR-2
Revision Number/Date: 08, 11/08/93
Frequency: ANNUAL

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS TRIP OF ALL MAIN FEEDWATER PUMPS

I. OBJECTIVES

The purpose of this procedure is to:

1. Test the simulator response to a Simultaneous Trip of All Main Feedwater Pumps as required by ANSI/ANS-3.5-1985.

2. Ensure that the simulator's Auxiliary Feedwater System functions properly to restore steam generator level after a reactor trip.

NOTE

ANSI/ANS-3.5-1985, Section 5.4.2, Simulator Operability Testing, (footnote 3) recommends substitution of Appendix B transient tests if these tests provide a more representative comparison to actual or predicted reference plant performance. In accordance with this recommendation, Byron Unit 2 LER 90-01 was substituted for the Appendix B, Section B.2.2(2), Simultaneous Trip of All Feedwater Pumps test.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.

2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.

3. TDI 700-03: Simulator Testing Program.

4. Byron Unit 2 LER 90-01: Rx Trip/SI on Low Steamline Pressure/Simultaneous Trip of All Main Feedwater Pumps.

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS TRIP OF ALL MAIN FEEDWATER PUMPS

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state, full power conditions with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.

2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.

3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.

4. The Auxiliary Feedwater flow control valve (AF005A-H) potentiometers are set at 6.5.

5. Steam pressure transmitter, PT-526, bistables are tripped per BwOA INST-2.

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables (T_c, T_h, S/G pressure and level shall be on loop 1):

   a. Neutron flux (Rx power)

   b. RCS average temperature

   c. Pressurizer pressure

   d. Pressurizer level

   e. Pressurizer steam temperature

   f. Steam flow

   g. Feed flow

   h. Hot leg temperature

   i. Cold leg temperature

   j. S/G pressure

   k. S/G level

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS TRIP OF ALL MAIN FEEDWATER PUMPS

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.
2. Enter the data collection points from Section IV into the ZETA Plotter program.
3. Spike steam pressure transmitter, PT-525, low momentarily and then restore PT-525 to normal.

   a. At 300 seconds into the transient, restore instrument air to the containment.
4. Continue until stable plant conditions are established.
5. Graph the variables listed under Section IV.

VI. ACCEPTANCE CRITERIA

****
NOTE
The simulator response will be compared to baseline data by the Braidwood Simulator Transient Test Review Board. The Review Board will determine if the simulator has the capability to adequately reproduce the defined transient.
****

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer safety valves shall NOT lift.
2. Safety injection is initiated.
3. Auxiliary feedwater flow initiates and restores S/G level.
4. Both running feedwater pumps trip on the SI actuation.
5. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.
6. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS TRIP OF ALL MAIN FEEDWATER PUMPS

VII. LIST OF FIGURES

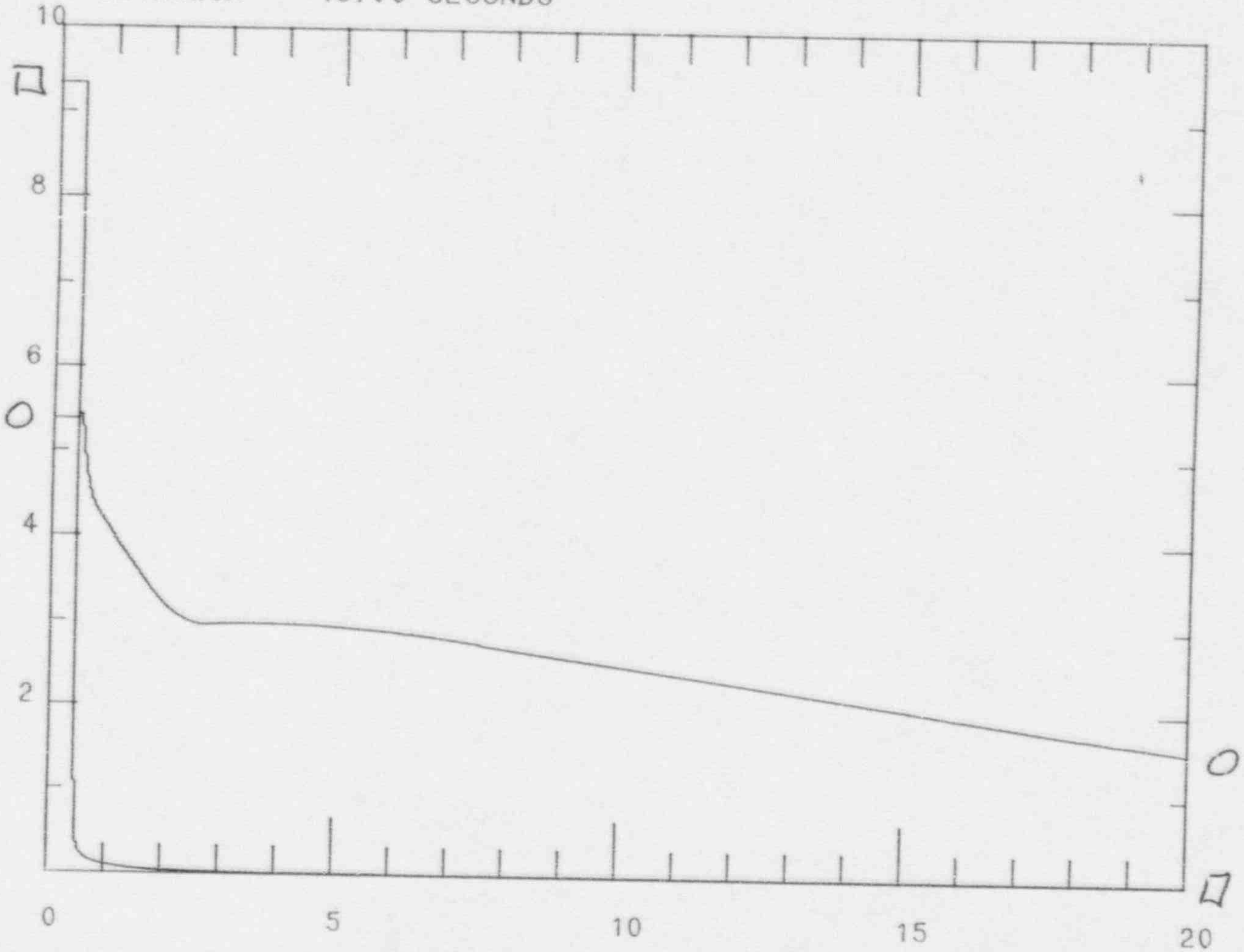
NOTE

Total steam flow and total feed flow were not available from Byron Unit Two data. Loop 1 steam flow and feed flow were substituted to aid in data comparison.

MFP TRIP

01/05/96 09:38:27

1 DIVISION = 45.00 SECONDS

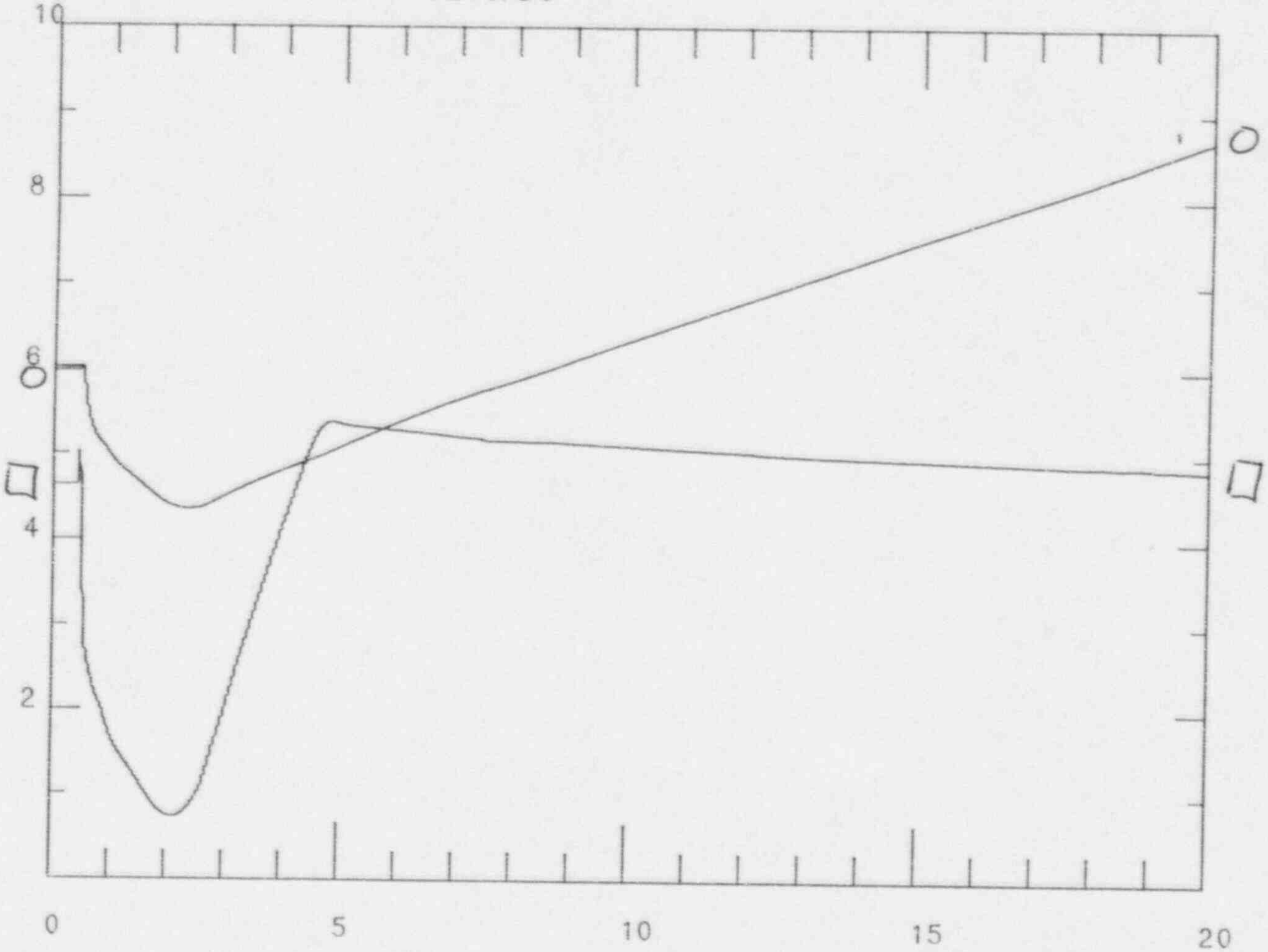


YCN0049 (.000 , 105.) 21090 PWR RNG CH 41 (QUAD 4) TOT
RXTAVG (530. , 630.) 01200 LOOP TABLE

MFP TRIP

01/05/96 09:31:33

1 DIVISION = 45.00 SECONDS

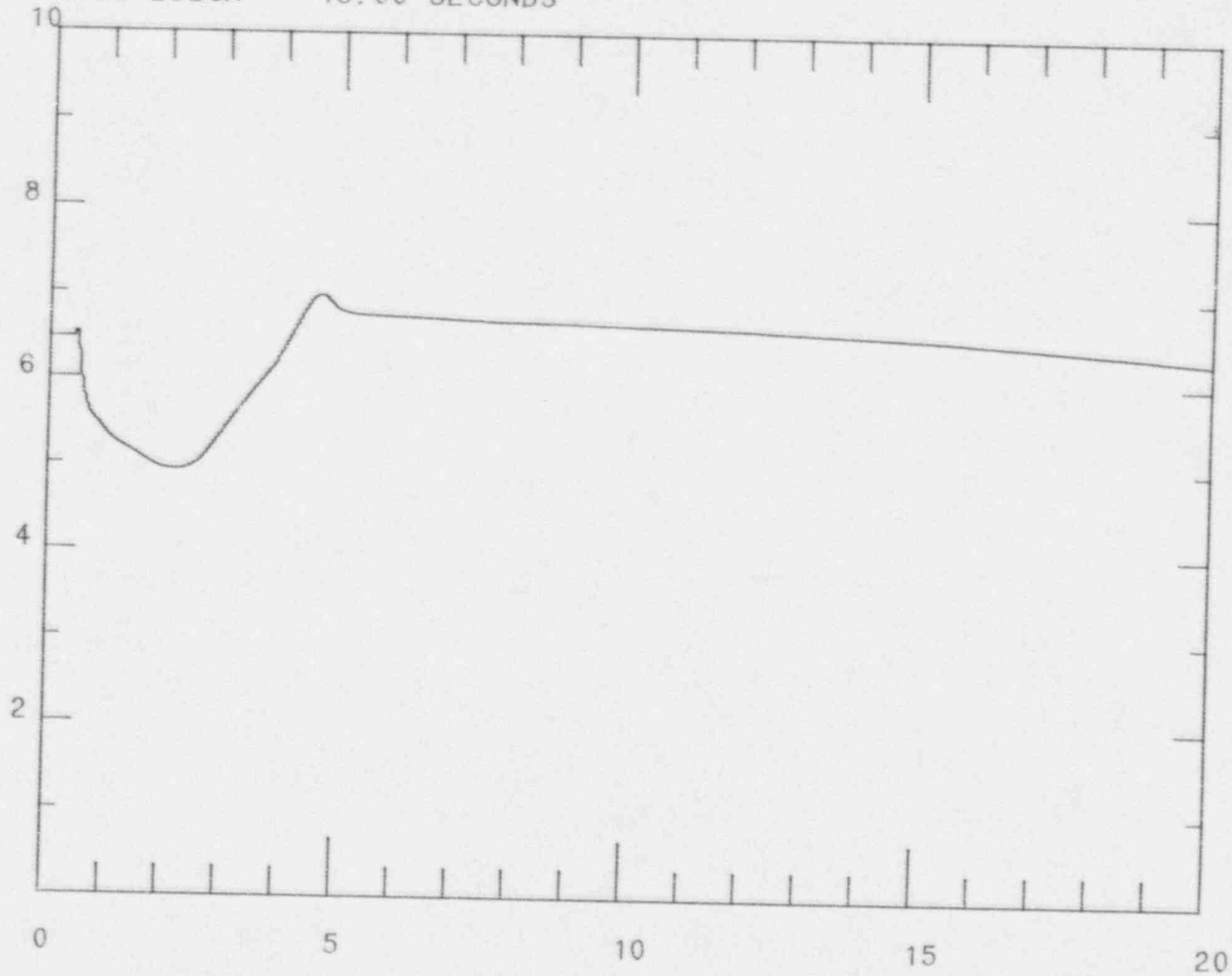


□	YCP0480	(.210E+04, .240E+04)	06720 PRESSURIZER PRESS PT-455
O	YCL0480	(.000 , 100.)	06550 PRESSURIZER LEVEL LT-459

MFP TRIP

01/05/96 09:44:08

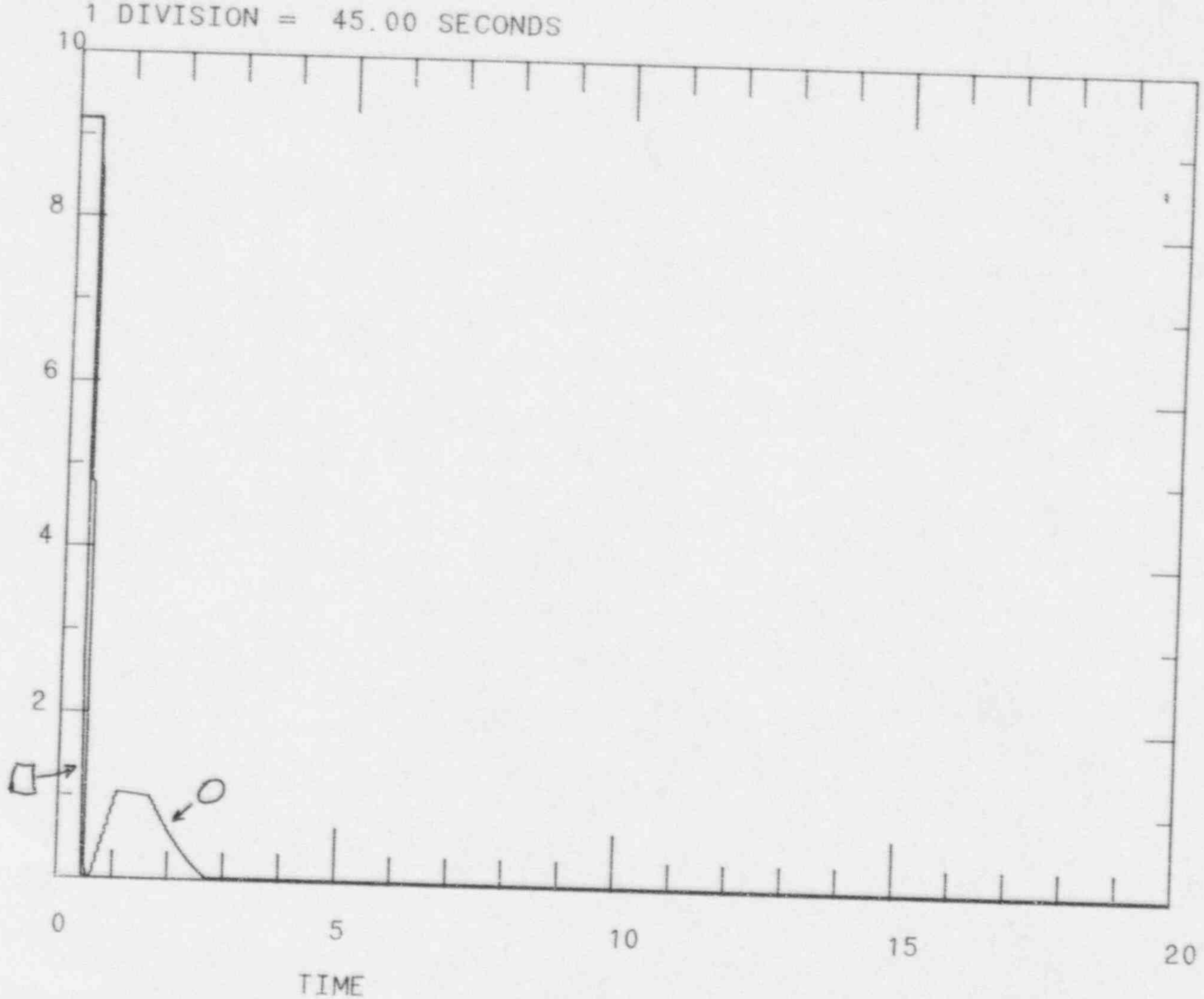
1 DIVISION = 45.00 SECONDS



YCT0481 (620. , 670.) 91250 PRESSURIZER STM T

MFP TRIP

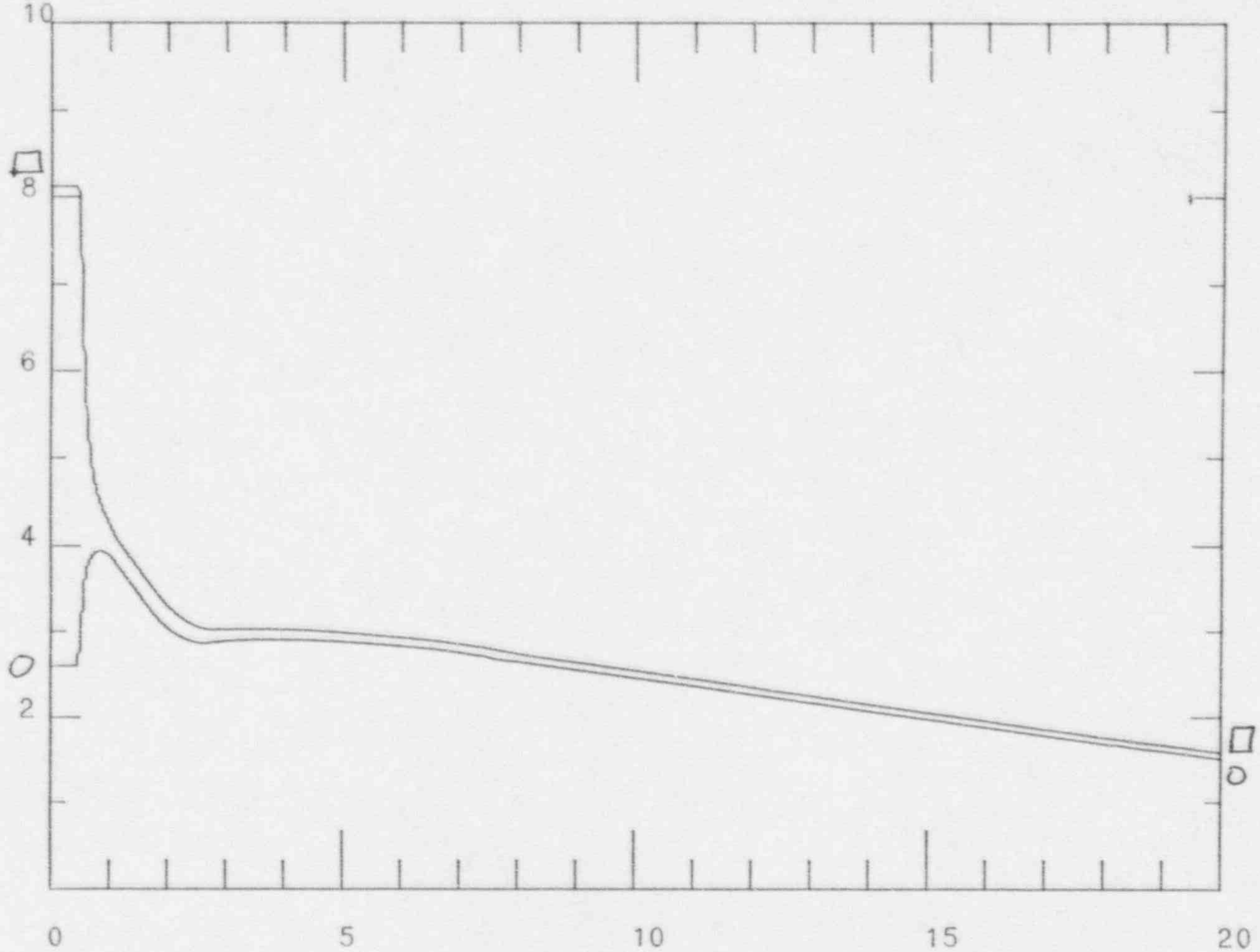
01/05/96 09:48:40



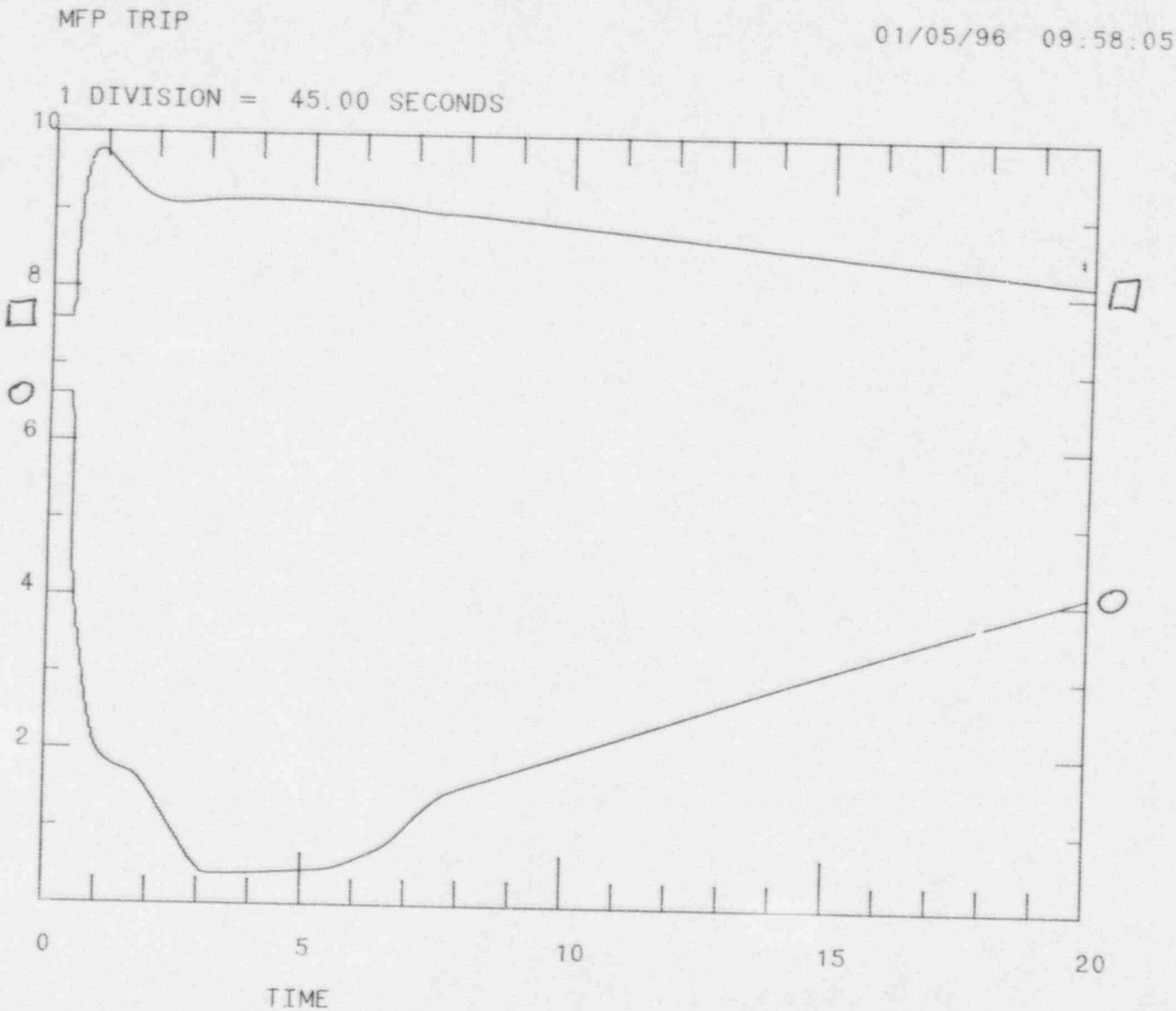
☐ YCF0403 (.000 , .400E+04) 06040 SG 1A FW F FT-510
○ YCF0405 (.000 , .400E+04) 06060 S/G 1A STEAM F FT-512

MFP TRIP 01/05/96 09:53:31

1 DIVISION = 45.00 SECONDS



□	YCT0419	(530. , 630.)	06830	RC LOOP 1A WR HOT LEG T
O	YCT0406	(530. , 630.)	06825	RC LOOP 1A WR COLD LEG T



□ YCP0400 (.000 , .120E+04) 06590 S/G 1A STMLINE PRESS PT-5
○ YCL0400 (.000 , 100.) 06350 S/G 1A NAR RNG LEVEL LT-51

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-2/ MFP's trip DATE: 1/5/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: U-2 LER 90-001
DATA:
PLANT: Byron

COMMENTS: Panel of experts for S/G level.
The Simulator didn't terminate SI or throttle AF flow which led to a greater cooldown than the station.

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Rx Power	None	Accepted
Tave		
PZR Temp		
PZR Press		
PZR level		
T_h		
T_c		
Steam Press		
S/G level		

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
Feed Flow	None	Accepted
Steam Flow	↓	↓

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

COMMENTS:

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-3 Date Performed 1/5/96

Test Description: Simultaneous closure of all MSIV's

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

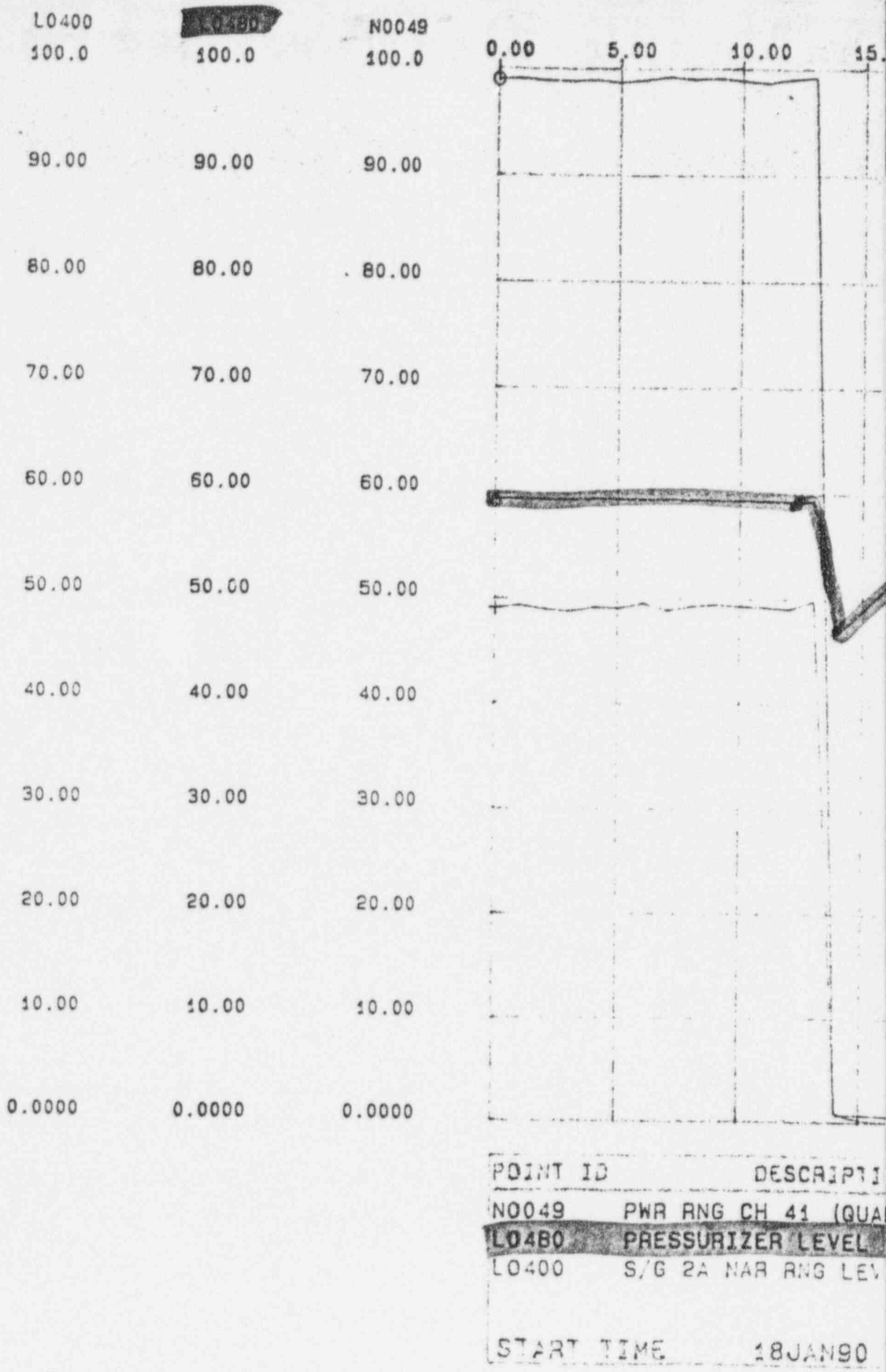
___ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

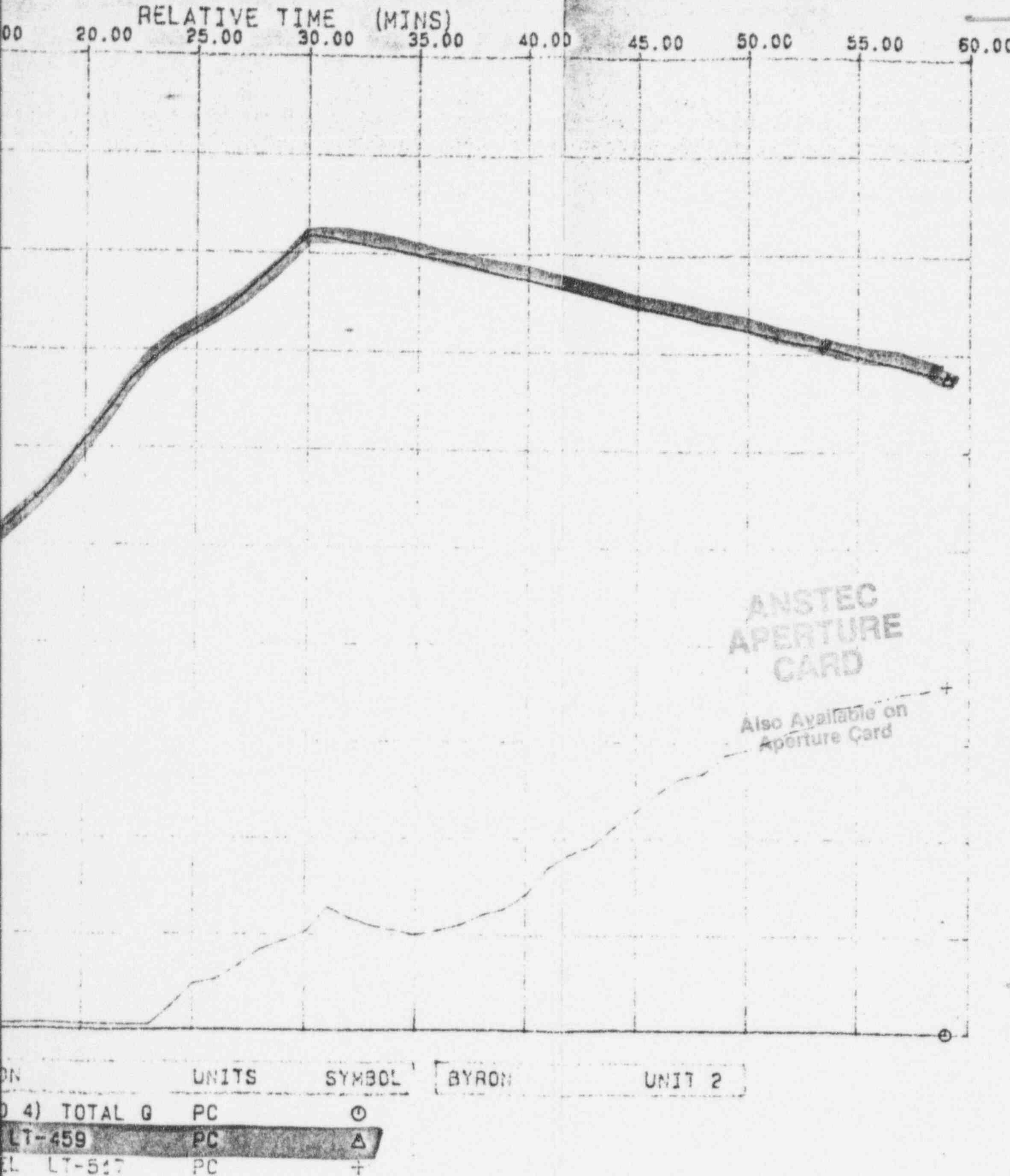
___ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ________ Date ________

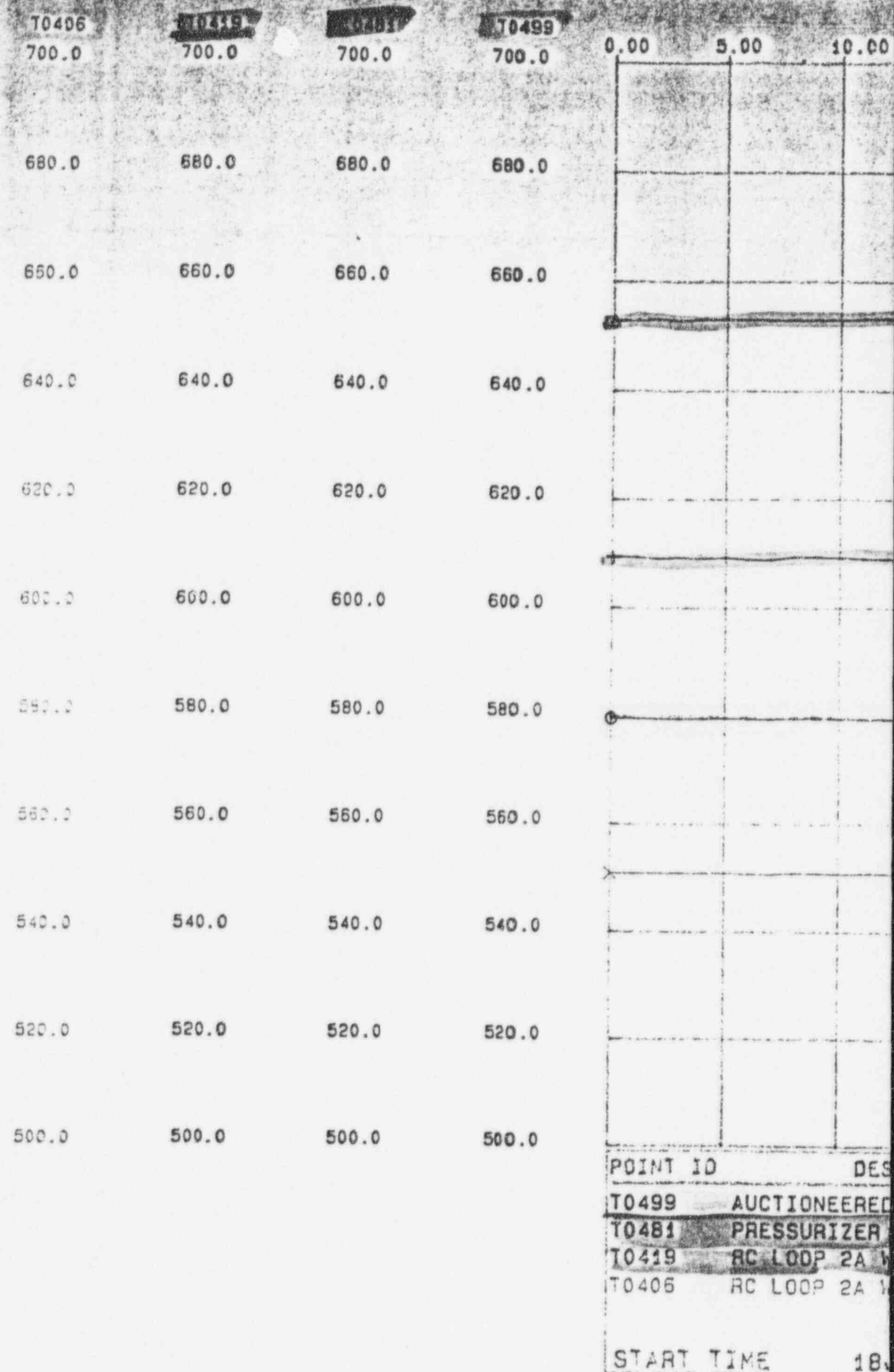
Test Complete [signature] Date 1/5/96

SFCC Acceptance [signature] Date 2/9/96

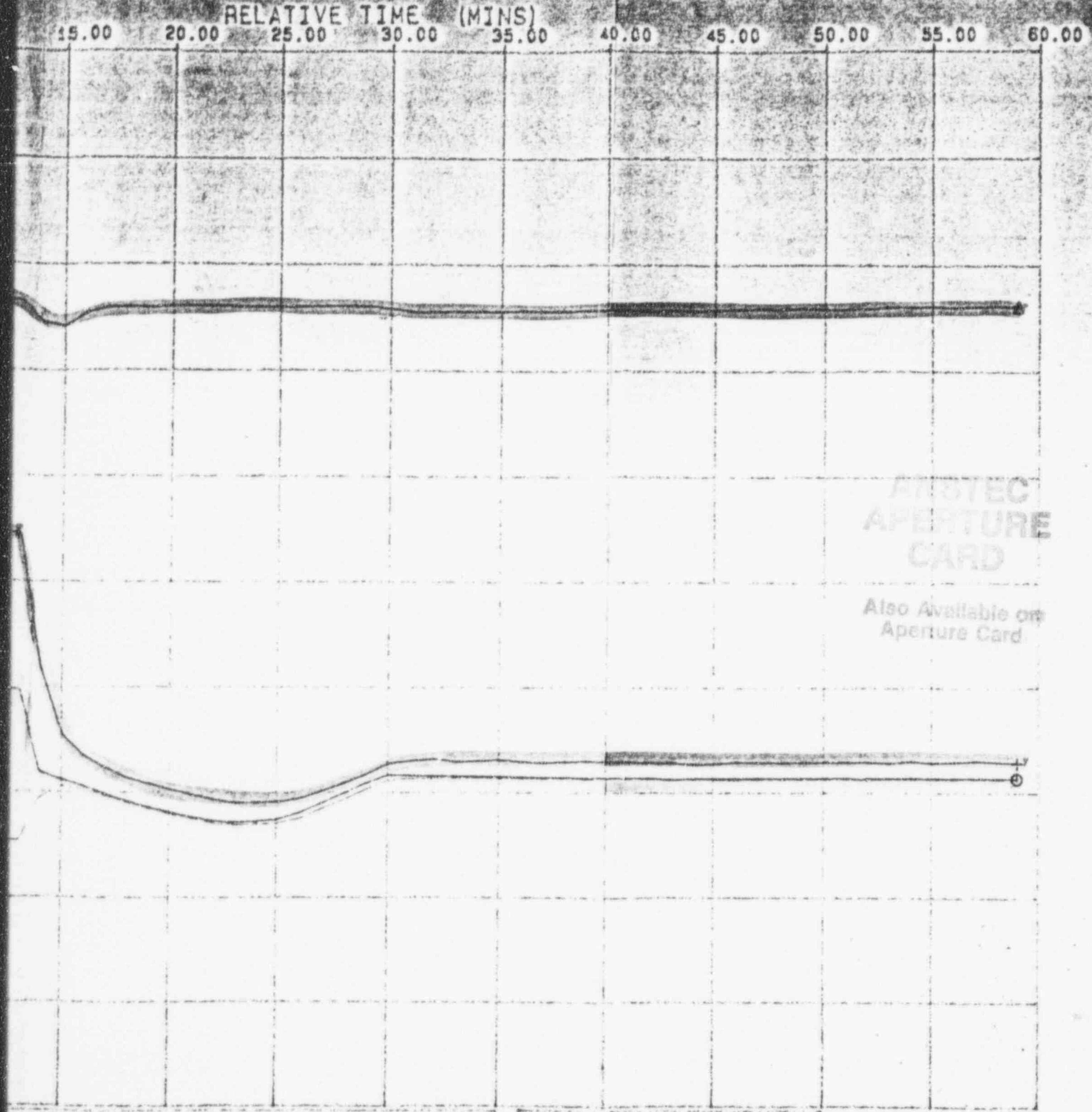

L0400
[redacted]
N0049
100.0
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.0000
0.00
5.00
10.00
15.
POINT ID
DESCRIPTI
N0049 PWR RNG CH 41 (QUA
L0480 PRESSURIZER LEVEL
L0400 S/G 2A NAR RNG LEV
START TIME 18JAN90



9603140208-01



T0406
T0499
700.0 700.0 700.0 700.0
680.0 680.0 680.0 680.0
660.0 660.0 660.0 660.0
640.0 640.0 640.0 640.0
620.0 620.0 620.0 620.0
600.0 600.0 600.0 600.0
580.0 580.0 580.0 580.0
560.0 560.0 560.0 560.0
540.0 540.0 540.0 540.0
520.0 520.0 520.0 520.0
500.0 500.0 500.0 500.0
0.00
5.00
10.00
POINT ID DES
T0499 AUCTIONEERED
T0481 PRESSURIZER
T0419 RC LOOP 2A
T0406 RC LOOP 2A
START TIME 18



CRIPTION	UNITS	SYMBOL
HIGH TAVE	DEGF	⊙
STM T	DEGF	△
R HOT LEG T	DEGF	+
R COLD LEG T	DEGF	×

AN90 00:30:00

BYRON UNIT 2

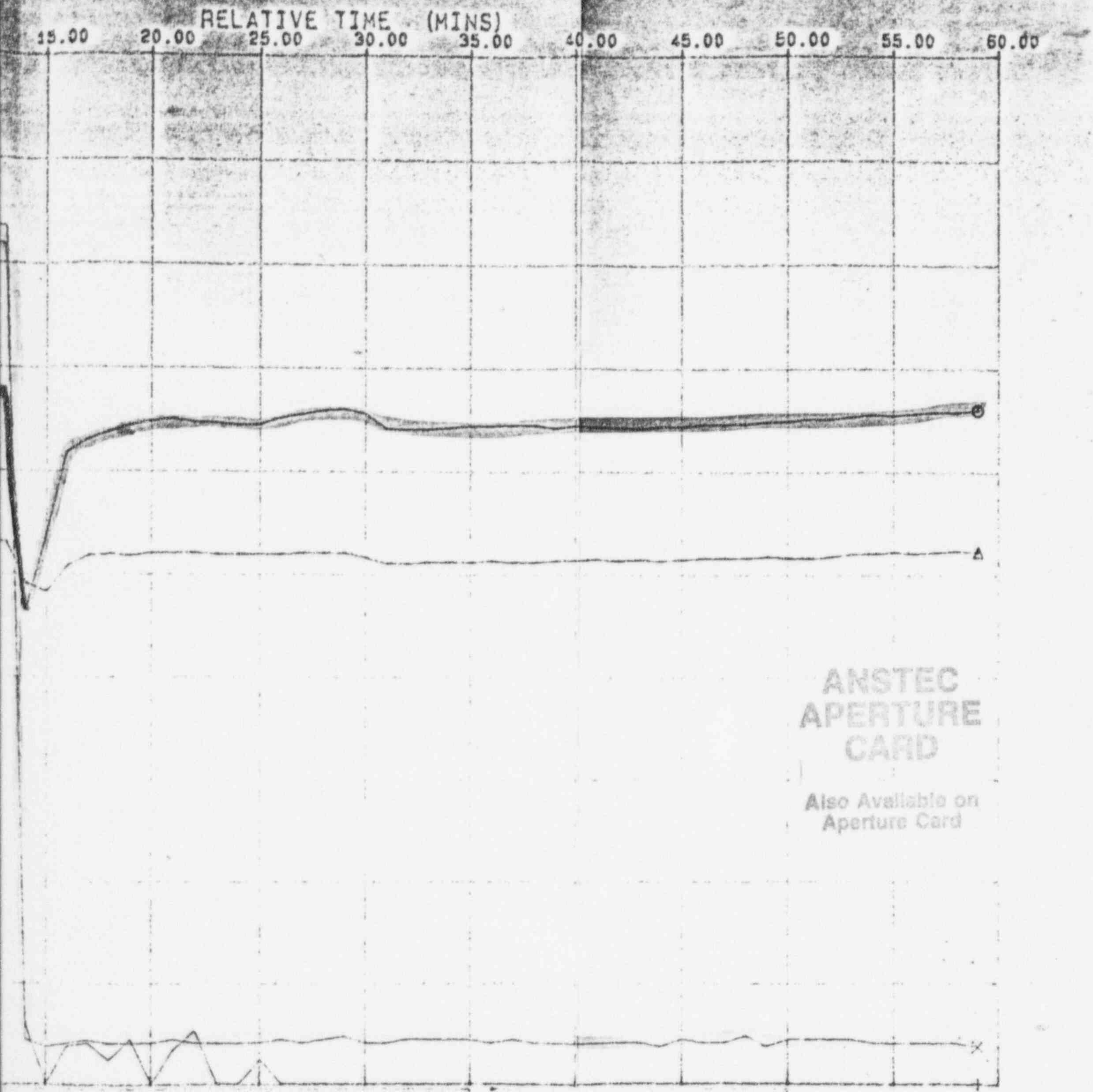
9603140208-02

F0403	F0405	T0481	[redacted]
4500.	4500.	700.0	2400.
4050.	4050.	690.0	2350.
3600.	3600.	680.0	2300.
3150.	3150.	670.0	2250.
2700.	2700.	660.0	2200.
2250.	2250.	650.0	2150.
1800.	1800.	640.0	2100.
1350.	1350.	630.0	2050.
900.0	900.0	620.0	2000.
450.0	450.0	610.0	1950.
0.0000	0.0000	600.0	1900.

POINT ID DES

P0480 PRESSURIZER
T0481 PRESSURIZER
F0405 S/G 2A STEAM
F0403 S/G 2A FW F

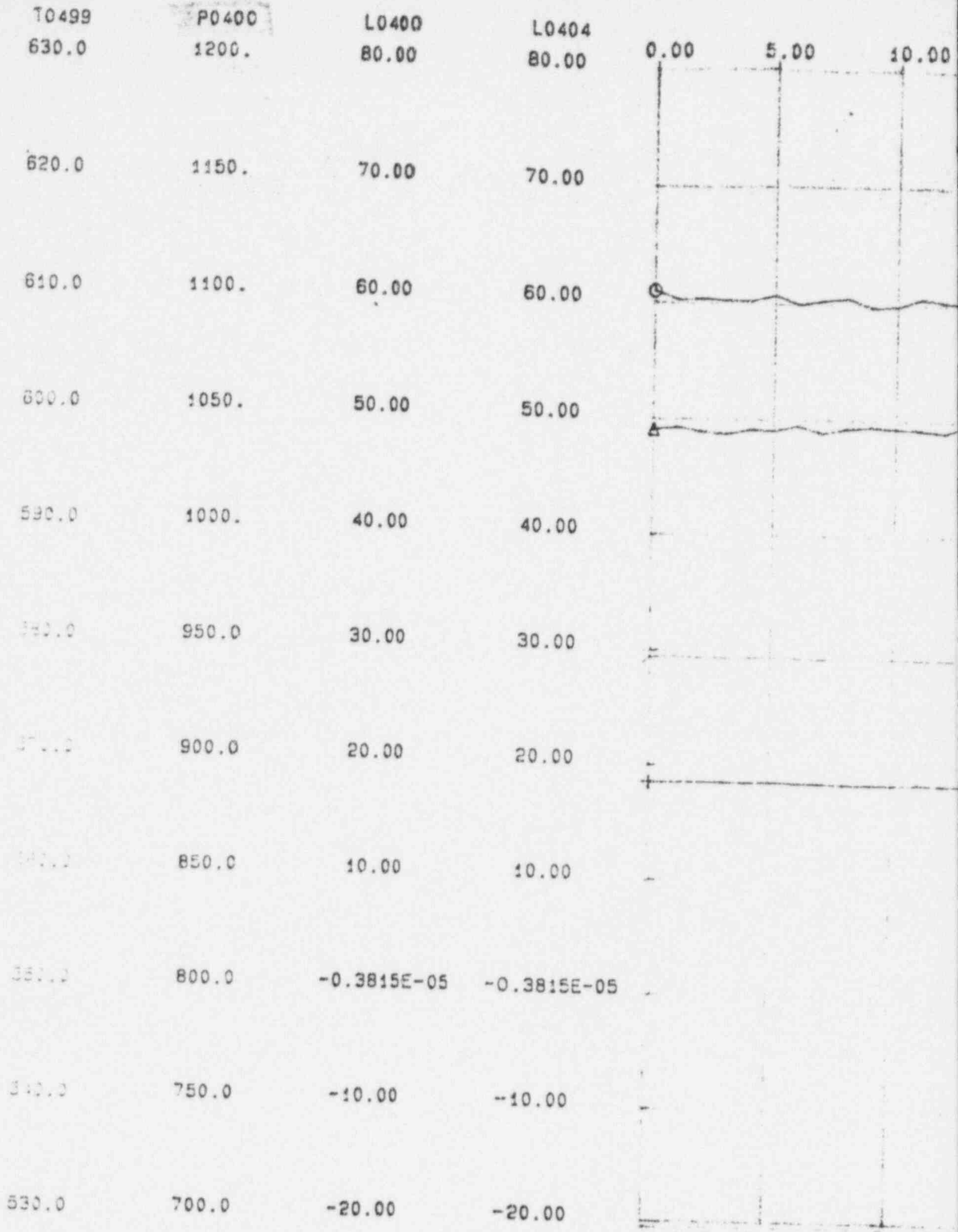
START TIME 18.



CRIPTION	UNITS	SYMBOL	SYRO.	UNIT 2
PRESS PT-455	PSIG	⊙		
STM T	DEGF	Δ		
F FT-512	KBH	+		
FT-510	KBH	X		

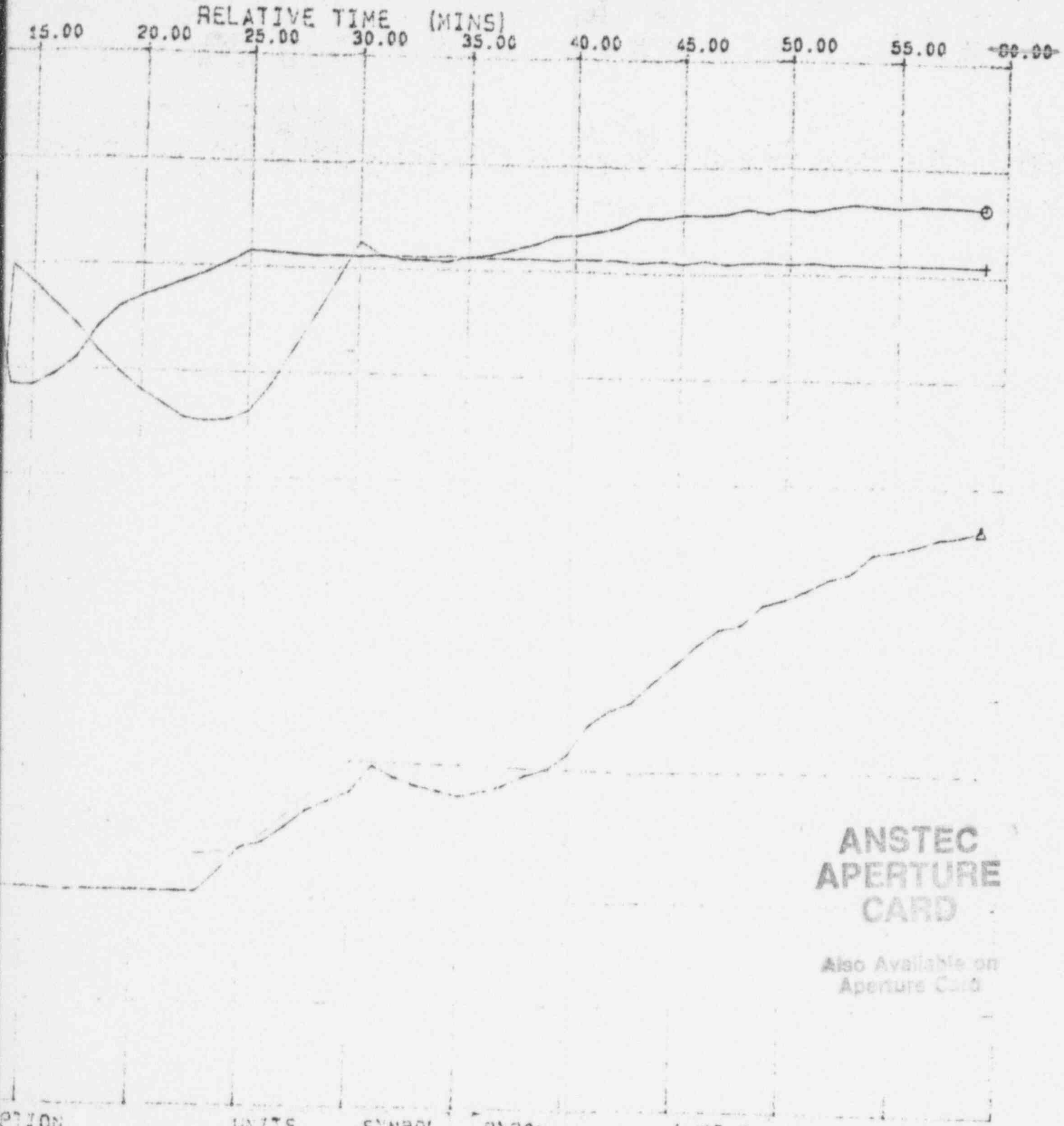
AN90 00:30:00

9603140208-03



POINT ID	DESC
L0404	S/G 2A WIDE R
L0400	S/G 2A NAR RN
P0400	S/G 2A STMLIN
T0499	AUCTIONEERED

START TIME 18JA



PTION UNITS SYMBOL BYRON UNIT 2

LEVEL	LT-501	PC	⊙
LEVEL	LT-517	PC	△
PRESS	PT-514	PSIG	+
GH TAVE		DEGF	>

90 00:30:00

9603140208-04

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-3 Date Performed 1/5/96

Test Description: Simultaneous closure of all MSIV's

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

___ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

___ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ______ Date ______

Test Complete [signature] Date 1/5/96

SFCC Acceptance [signature] Date 2/9/96

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS CLOSURE OF ALL MAIN STEAM ISOLATION VALVES

I. OBJECTIVES

The purpose of this procedure is to test the simulator response to a Simultaneous Closure of All Main Steam Isolation Valves as required by ANSI/ANS-3.5-1985.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.
2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.
3. TDI 700-03: Simulator Testing Program.
4. Braidwood Unit 1 LER 94-012: Simultaneous Closure of All Main Steam Isolation Valves.

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state, full power conditions with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.
2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.
3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.
4. The Main Steam Isolation Valves are open.

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS CLOSURE OF ALL MAIN STEAM ISOLATION VALVES

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables (T_c, T_h, S/G pressure and level shall be on loop 1):

   a. Neutron flux (Rx power)

   b. RCS average temperature

   c. Pressurizer pressure

   d. Pressurizer level

   e. Pressurizer steam temperature

   f. Steam flow

   g. Feed flow

   h. Hot leg temperature

   i. Cold leg temperature

   j. S/G pressure

   k. S/G level

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.
2. Enter the data collection points from Section IV into the ZETA Plotter program.
3. Simultaneously close all MSIV's.
4. Continue until stable plant conditions are established.
5. Graph the variables listed under Section IV.

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS CLOSURE OF ALL MAIN STEAM ISOLATION VALVES

VI. ACCEPTANCE CRITERIA

****
* NOTE *
* The simulator response will be compared to baseline data *
* by the Braidwood Simulator Transient Test Review Board. *
* The Review Board will determine if the simulator has the *
* capability to adequately reproduce the defined transient. *
****

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer safety valves shall NOT lift.

2. All Main Steam Isolation Valves close.

3. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.

4. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

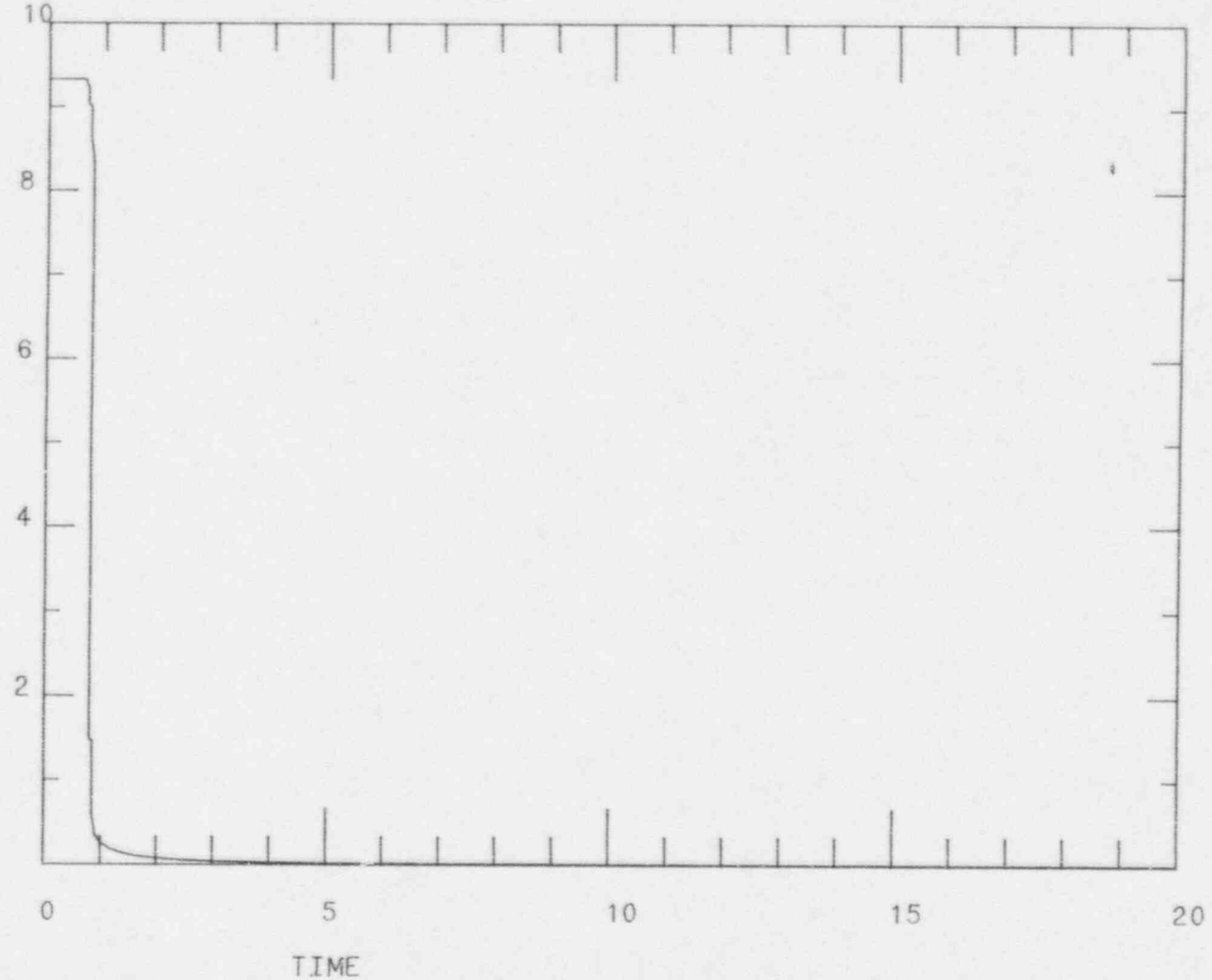
BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS CLOSURE OF ALL MAIN STEAM ISOLATION VALVES

VII. LIST OF FIGURES

****
* NOTE *
* Total steam flow and total feed flow were not available from *
* Braidwood Unit One data. Loop 1 steam flow and feed flow *
* were substituted to aid in data comparison. *
****

MSIV'S CLOSED 01/05/96 10:32:55

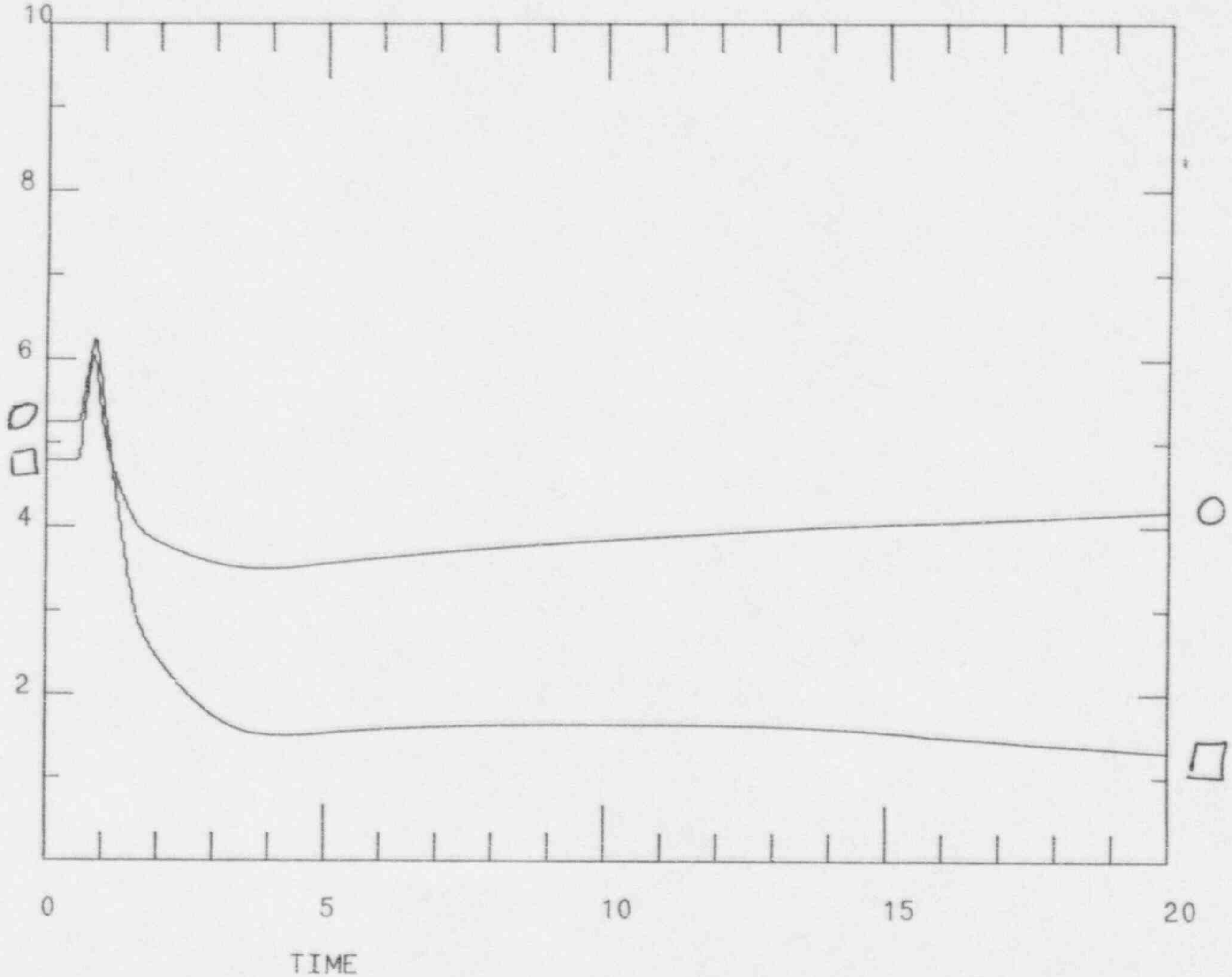
1 DIVISION = 30.00 SECONDS



YCN0049 (.000 , 105.) 21090 PWR RNG CH 41 (QUAD 4) TOT

MSIV'S CLOSED 01/05/96 10:29:16

1 DIVISION = 30.00 SECONDS

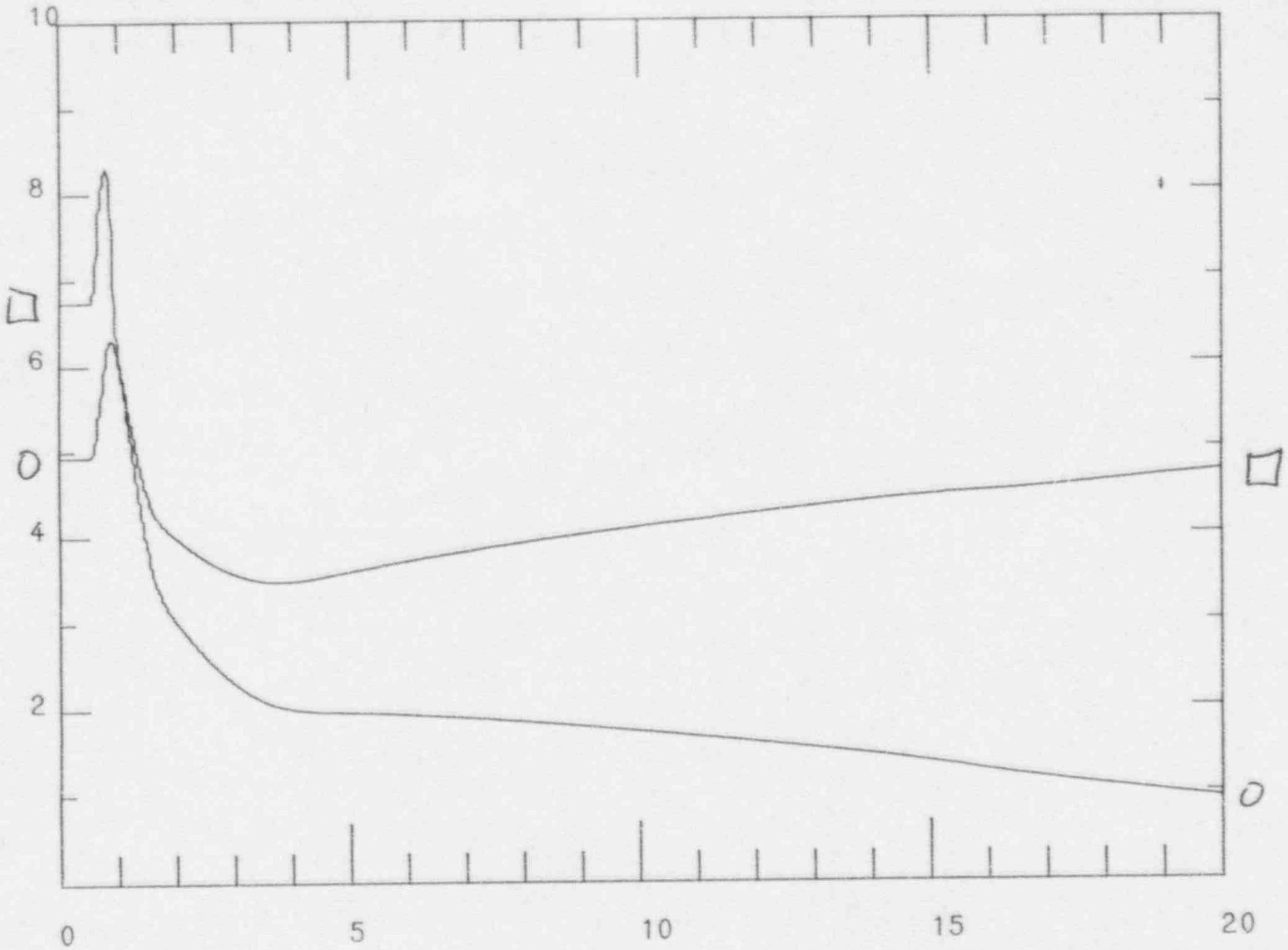


RXTAVG (550. , 620.) 01200 LOOP TABLE
YCT0481 (600. , 700.) 91250 PRESSURIZER STM T

MSIV'S CLOSED

01/05/96 10:36:03

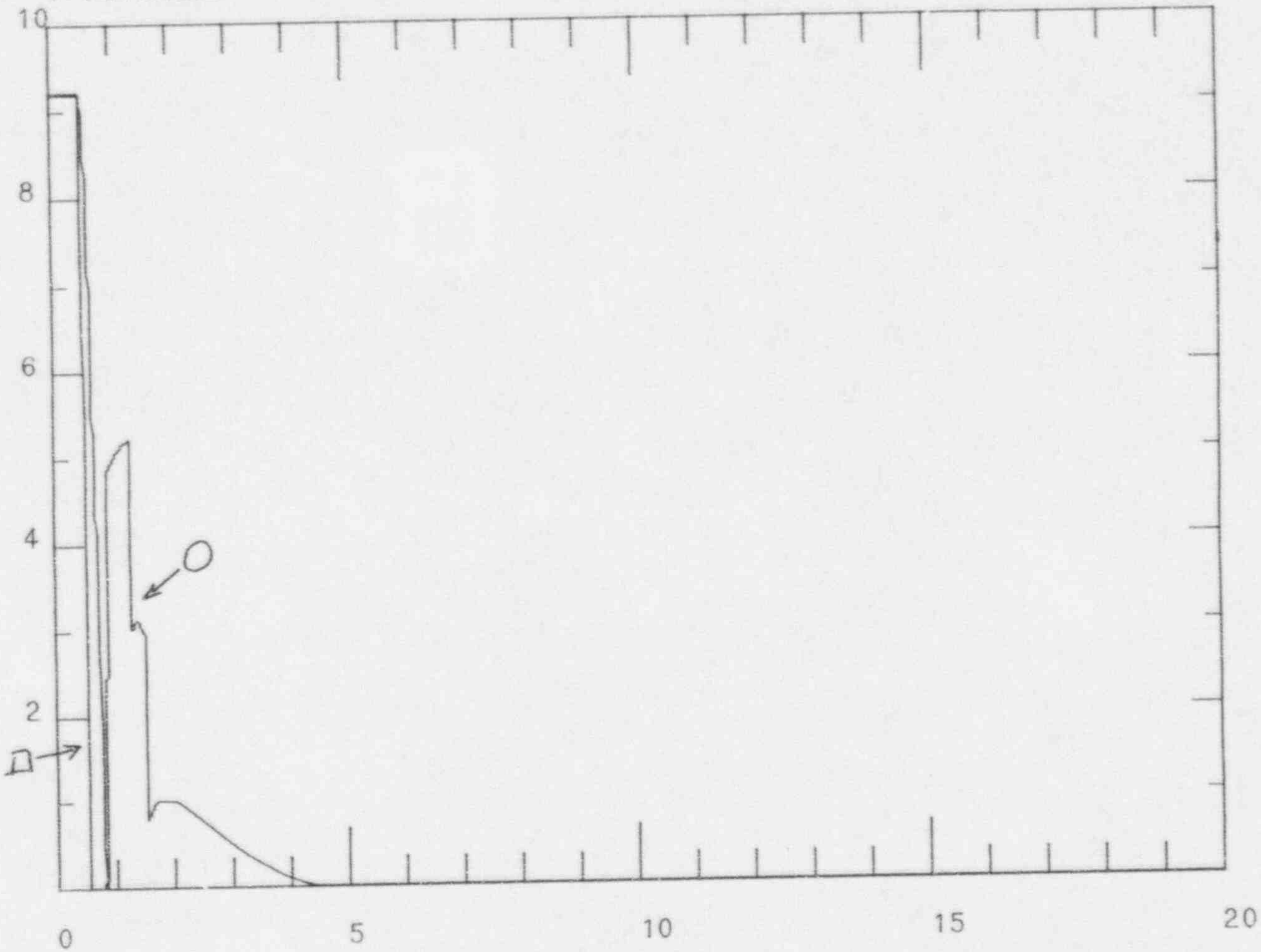
1 DIVISION = 30.00 SECONDS



□ YCP0480	(.170E+04, .250E+04)	06720	PRESSURIZER PRESS PT-455
O YCL0480	(20.0 , 100.)	06550	PRESSURIZER LEVEL LT-459

MSIV'S CLOSED

01/05/96 10:39:45

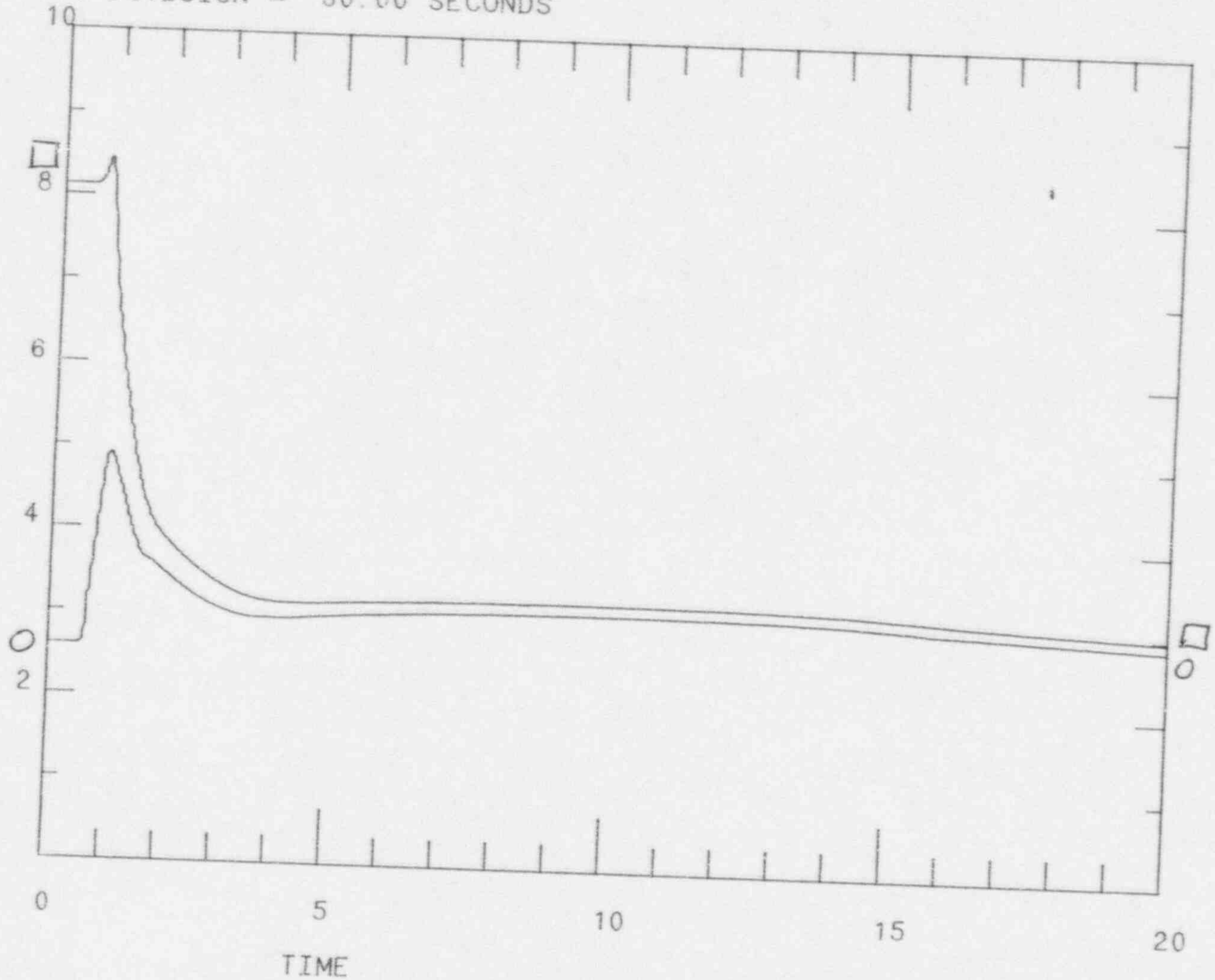


☐ YCF0403 (.000 , .400E+04) 06040 SG 1A FW F FT-510
O YCF0405 (.000 , .400E+04) 06060 S/G 1A STEAM F FT-512

MSIV'S CLOSED

01/05/96 10:43:12

1 DIVISION = 30.00 SECONDS

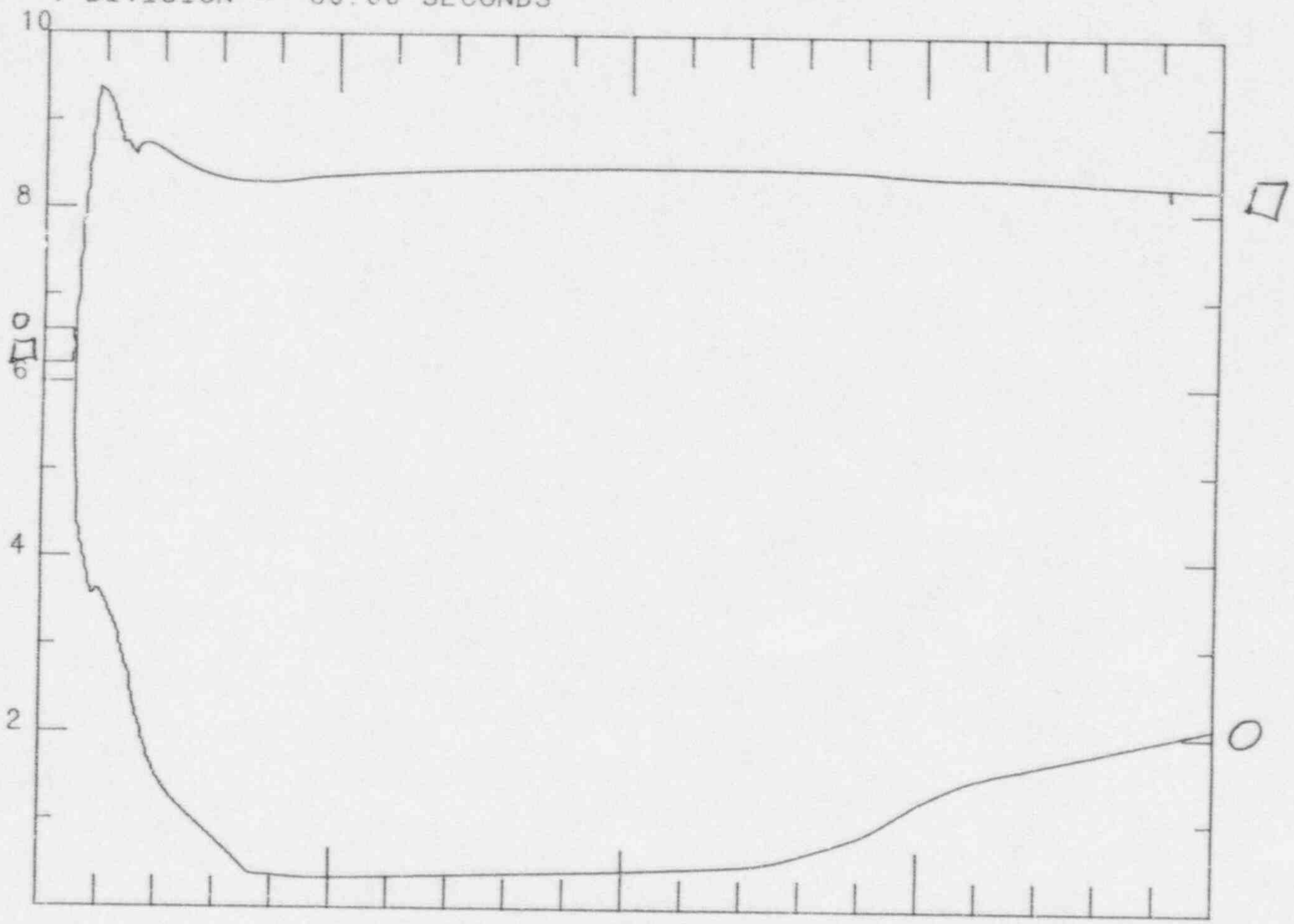


□ YCT0419	(530. , 630.)	06830 RC LOOP 1A WR HOT LEG T
○ YCT0406	(530. , 630.)	06825 RC LOOP 1A WR COLD LEG T

MSIV'S CLOSED

01/05/96 10:46:48

1 DIVISION = 30.00 SECONDS



TIME

☐ YCP0400	(350.	, .125E+04)	06590 S/G 1A STMLINE PRESS PT-5
O YCL0400	(.000	, 100.	06350 S/G 1A NAR RNG LEVEL LT-51

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-3 / MSIU's Closed DATE: 1/5/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: U-1 LER 94-012
DATA:
PLANT: Braidwood

COMMENTS: None

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Rx Power	None	Acceptable
Tave	↓	↓
PZR Temp		
PZR Press		
PZR level		
T_h		
T_c		
Steam Press		
S/G level	↓	↓

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
Feed Flow	None	Acceptable
Steam Flow	↓	

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

COMMENTS:

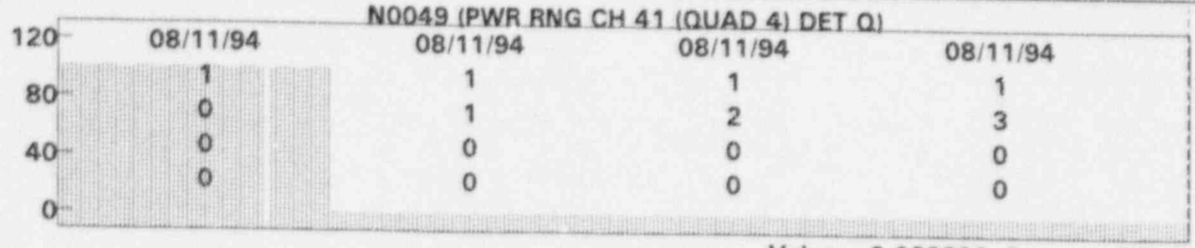
Plant = BRAIDWOOD 1 | Mode = REAL | Interval = 1 MINUTE | Points 1-7 of 11

Closure of ALL MSIV's

Thursday August 11, 1994 01:43:00 PM

Type = ANALOG
Set = N.A.
its = PC
Valid = 736
Math = GOOD

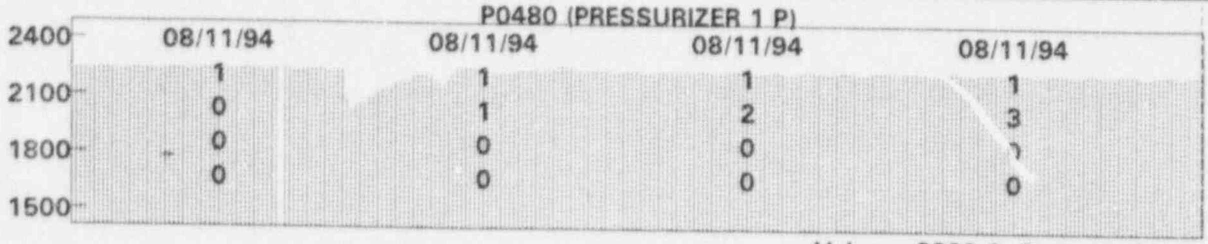
N0049 (PWR RNG CH 41 (QUAD 4) DET Q)



Value = 0.029996, Status = GOOD

Type = ANALOG
Set = N.A.
Units = PSIG
Valid = 736
Math = 0x0003

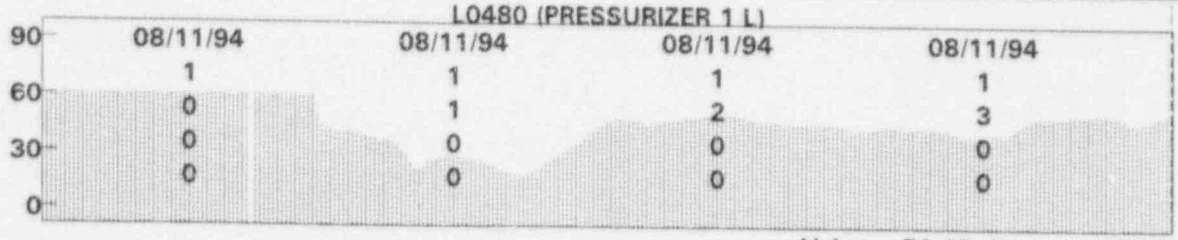
P0480 (PRESSURIZER 1 P)



Value = 2239.6, Status = GOOD

Type = ANALOG
Set = N.A.
Units = PC
Valid = 736
Math = 0x000c

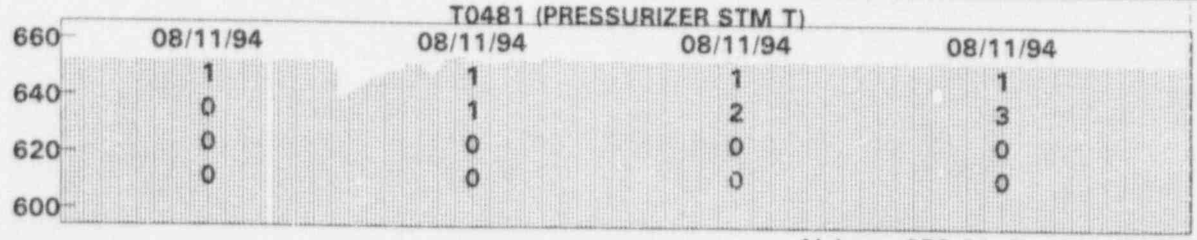
L0480 (PRESSURIZER 1 L)



Value = 51.45, Status = GOOD

Type = ANALOG
Set = N.A.
its = DEGF
Valid = 736
Math = GOOD

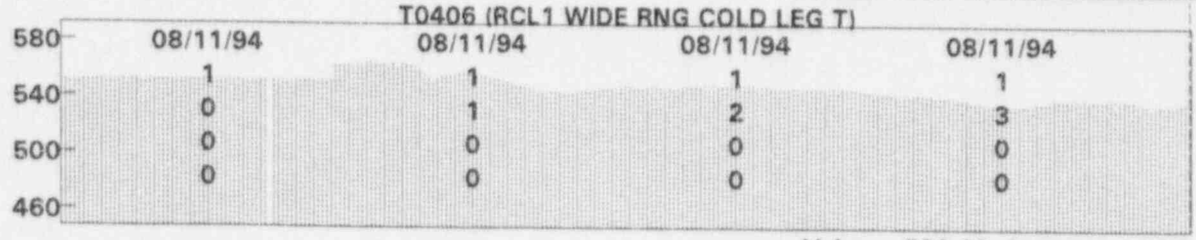
T0481 (PRESSURIZER STM T)



Value = 652.44, Status = GOOD

Type = ANALOG
Set = N.A.
Units = DEGF
Valid = 736
Math = GOOD

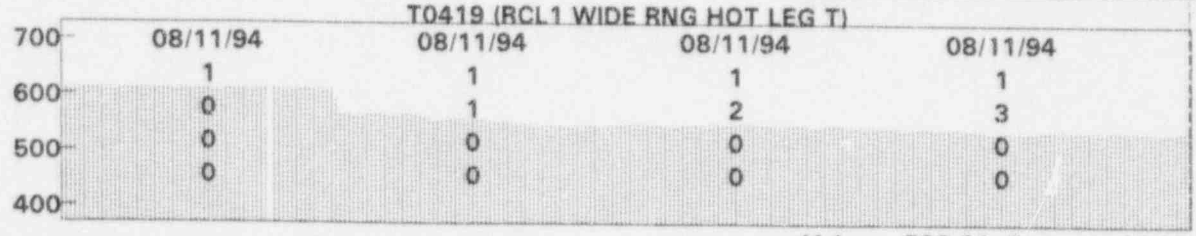
T0406 (RCL1 WIDE RNG COLD LEG T)



Value = 538.25, Status = GOOD

Type = ANALOG
Set = N.A.
Units = DEGF
Valid = 736
Math = GOOD

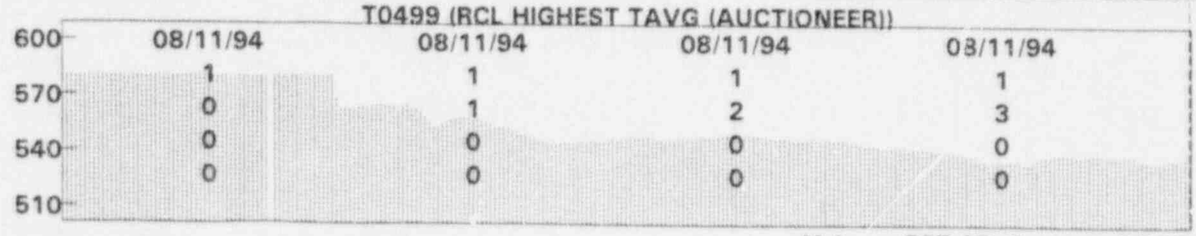
T0419 (RCL1 WIDE RNG HOT LEG T)



Value = 538.21, Status = GOOD

Type = ANALOG
Set = N.A.
ts = DEGF
Valid = 613
Math = GOOD

T0499 (RCL HIGHEST TAVG (AUCTIONEER))



Value = 537.67, Status = GOOD

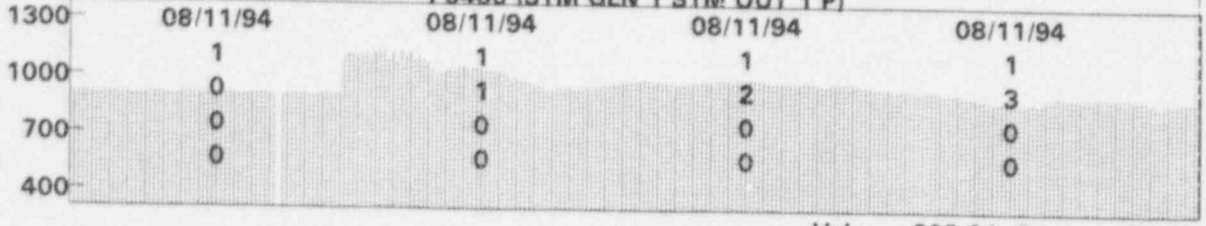
Plant = BRAIDWOOD 1 | Mode = REAL | Interval = 1 MINUTE | Points 8-11 of 11

Closure of All MSIV:

Thursday August 11, 1994 01:43:00 PM

P0400 (STM GEN 1 STM OUT 1 P)

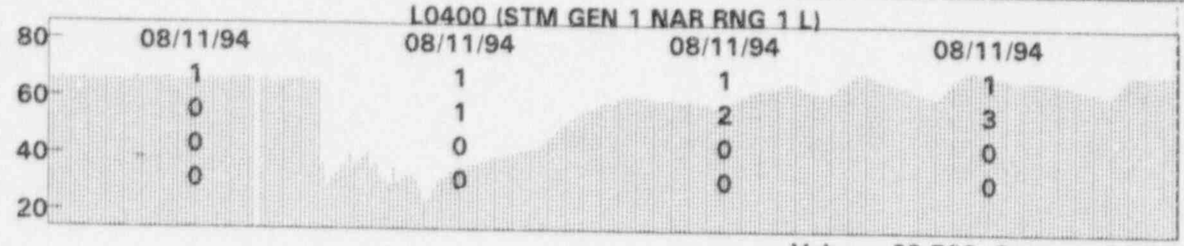
Type = ANALOG
Set = N.A.
Units = PSIG
Valid = 736
Math = 0x0003



Value = 908.91, Status = GOOD

L0400 (STM GEN 1 NAR RNG 1 L)

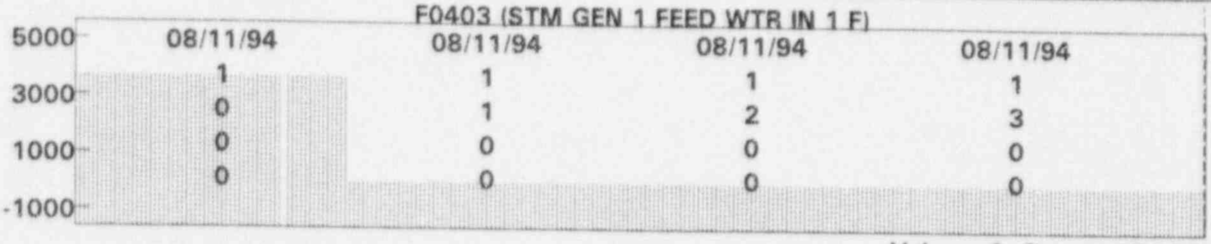
Type = ANALOG
Set = N.A.
Units = PC
Valid = 736
Math = 0x0003



Value = 69.722, Status = GOOD

F0403 (STM GEN 1 FEED WTR IN 1 F)

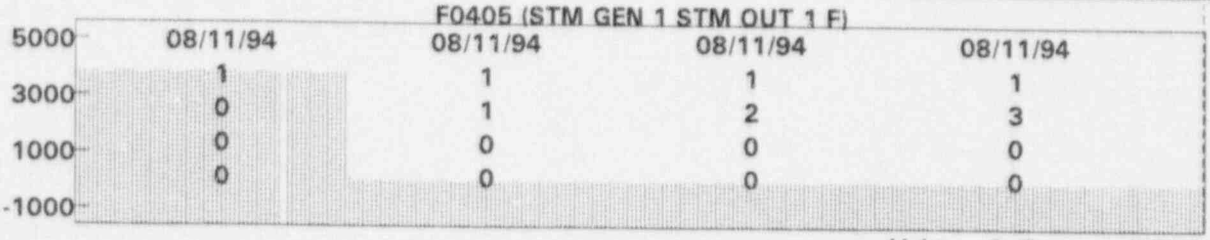
Type = ANALOG
Set = N.A.
Units = KBH
Valid = 736
Math = GOOD



Value = 0, Status = GOOD

F0405 (STM GEN 1 STM OUT 1 F)

Type = ANALOG
Set = N.A.
Units = KBH
Valid = 736
Math = GOOD



Value = 0, Status = GOOD

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-4 Date Performed 1/5/96

Test Description: Simultaneous trip of all RCP's test

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

___ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

___ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ______ Date ______

Test Complete [signature] Date 1/5/96

SFCC Acceptance [signature] Date 2/9/96

Test Number: TR-4
Revision Number/Date: 06, 11/08/93
Frequency: ANNUAL

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS TRIP OF ALL REACTOR COOLANT PUMPS

I. OBJECTIVES

The purpose of this procedure is to test the simulator response to a Simultaneous Trip of All Reactor Coolant Pumps as required by ANSI/ANS-3.5-1985.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.

2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.

3. TDI 700-03: Simulator Testing Program.

4. Braidwood Unit 1 LER 93-01: Simultaneous Trip of All RCP's Due to Inadvertent RCP UF Trip.

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state, full power conditions with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.

2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.

3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS TRIP OF ALL REACTOR COOLANT PUMPS

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables (T_c, T_h, S/G pressure and level shall be on loop 1):

    a. Neutron flux (Rx power)

    b. RCS average temperature

    c. Pressurizer pressure

    d. Pressurizer level

    e. Pressurizer steam temperature

    f. Steam flow

    g. Feed flow

    h. Hot leg temperature

    i. Cold leg temperature

    j. S/G pressure

    k. S/G level

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS TRIP OF ALL REACTOR COOLANT PUMPS

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.
2. Enter the data collection points from Section IV into the ZETA Plotter program.
3. Trip the UF relays via malfunctions RP07C & D.
4. At 1950 psig, place the Steam Dumps to the STEAM PRESSURE mode.
5. Continue until stable plant conditions are established.
6. Graph the variables listed under Section IV.

VI. ACCEPTANCE CRITERIA

****
NOTE
The simulator response will be compared to baseline data by the Braidwood Simulator Transient Test Review Board. The Review Board will determine if the simulator has the capability to adequately reproduce the defined transient.
****

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer safety valves shall NOT lift.
2. All RCP's trip.
3. RCS loop flow decreases to natural circulation values.
4. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.
5. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

BRAIDWOOD SIMULATOR TRANSIENT TEST
SIMULTANEOUS TRIP OF ALL REACTOR COOLANT PUMPS

VII. LIST OF FIGURES

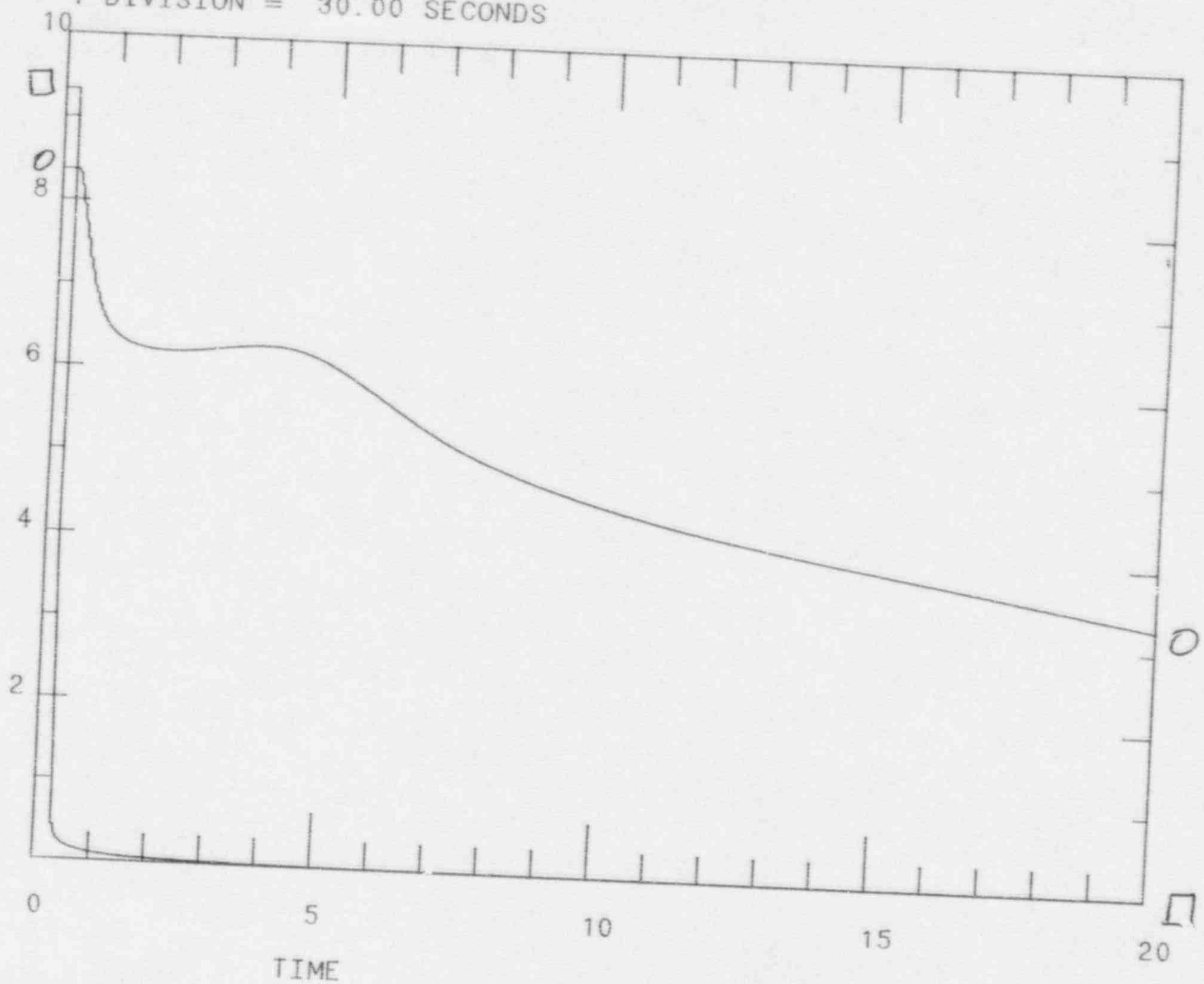
NOTE

Total steam flow and total feed flow were not available from Braidwood Unit One data. Loop 1 steam flow and feed flow were substituted to aid in data comparison.

ALL RCP'S TRIP

01/05/96 12:20:28

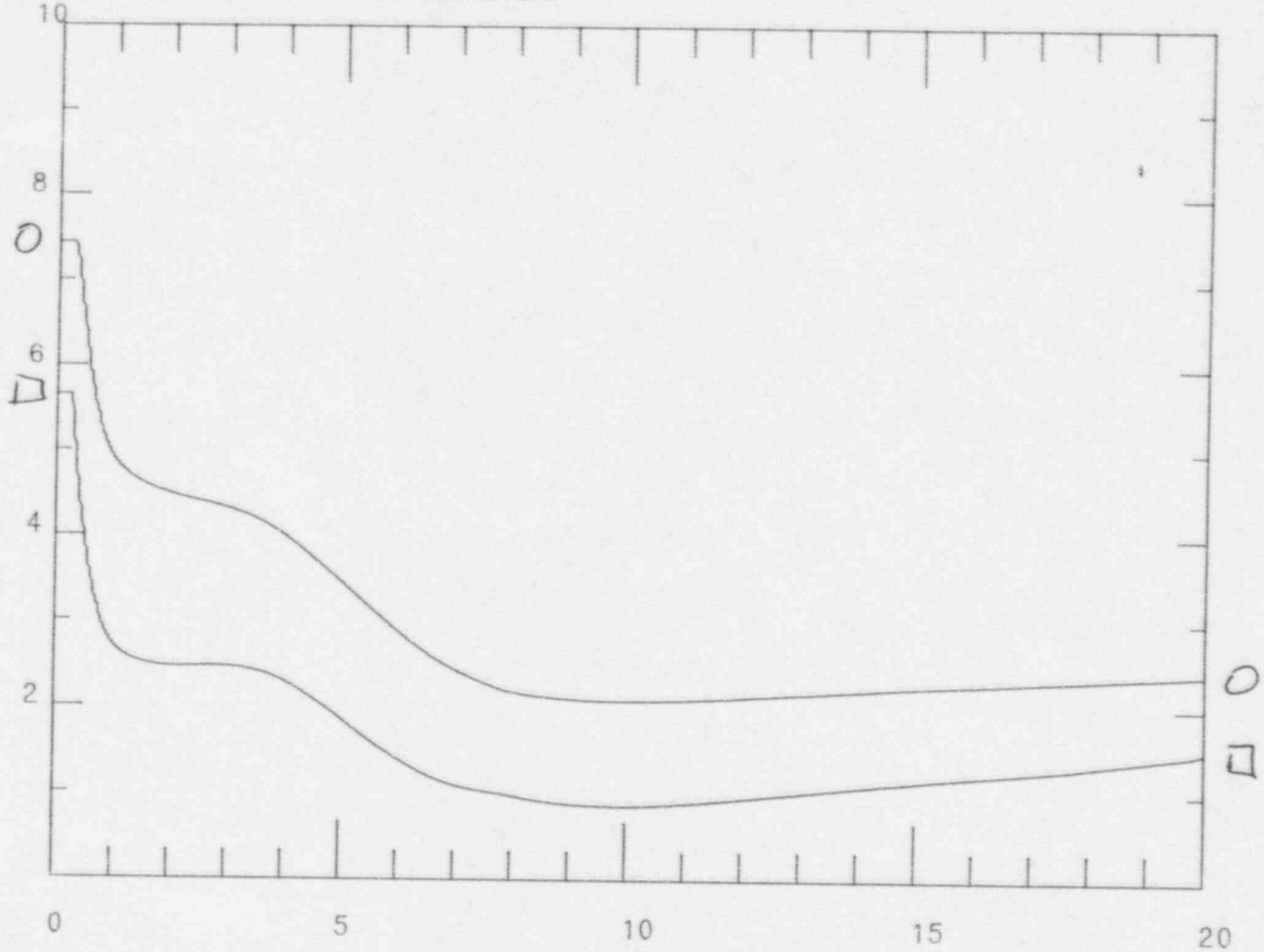
1 DIVISION = 30.00 SECONDS



☐ YCN0049	(.000	, 105.	)	21090 PWR RNG CH 41 (QUAD 4) TOT
O RXTAVG	(500.	, 600.	)	01200 LOOP TABLE

ALL RCP'S TRIP 01/05/96 12:27:13

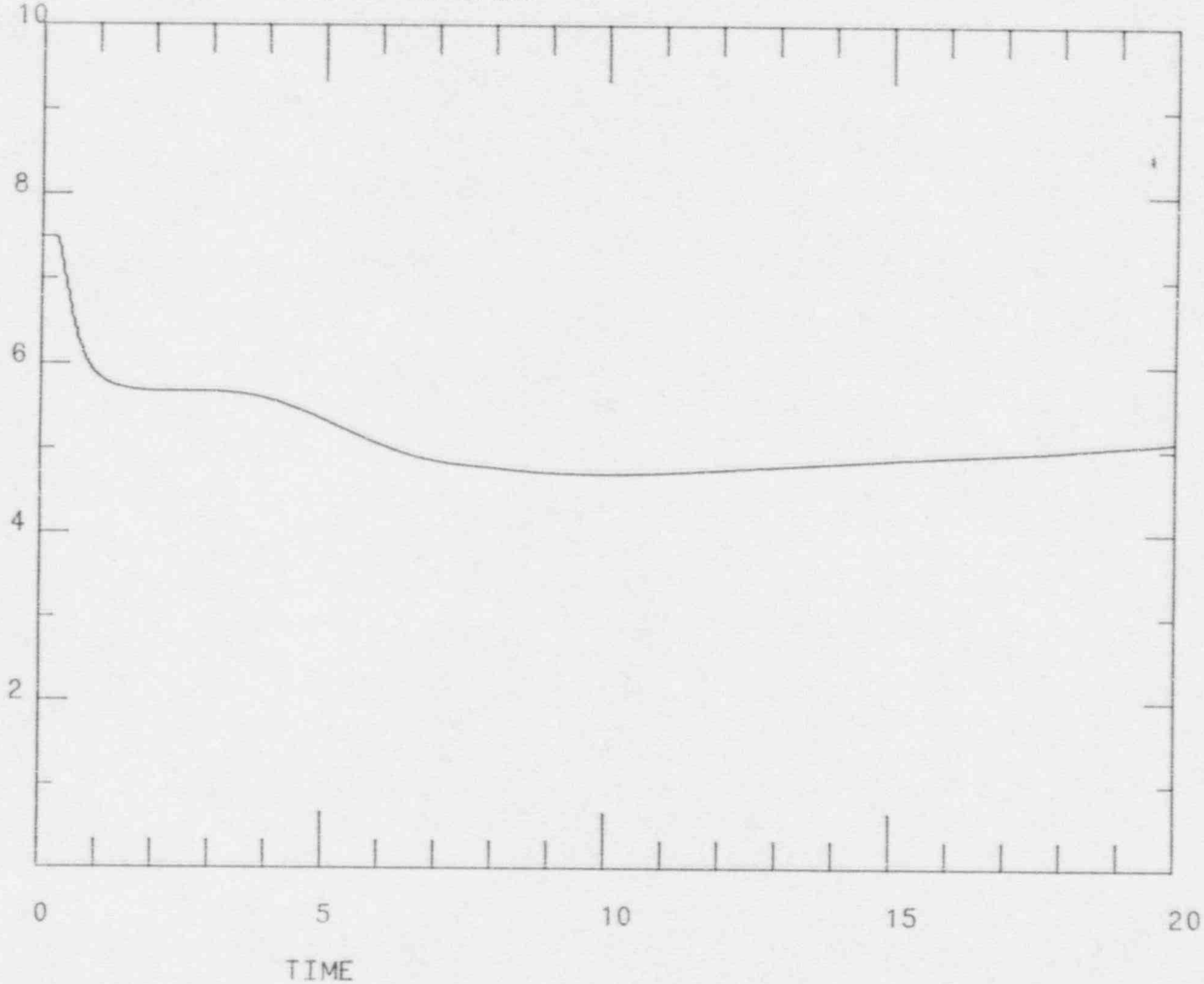
1 DIVISION = 30.00 SECONDS



□	YCP0480	(.190E+04, .250E+04)	06720 PRESSURIZER PRESS PT-455
○	YCL0480	(.000 , 80.0)	06550 PRESSURIZER LEVEL LT-459

ALL RCP'S TRIP 01/05/96 12:23:55

1 DIVISION = 30.00 SECONDS

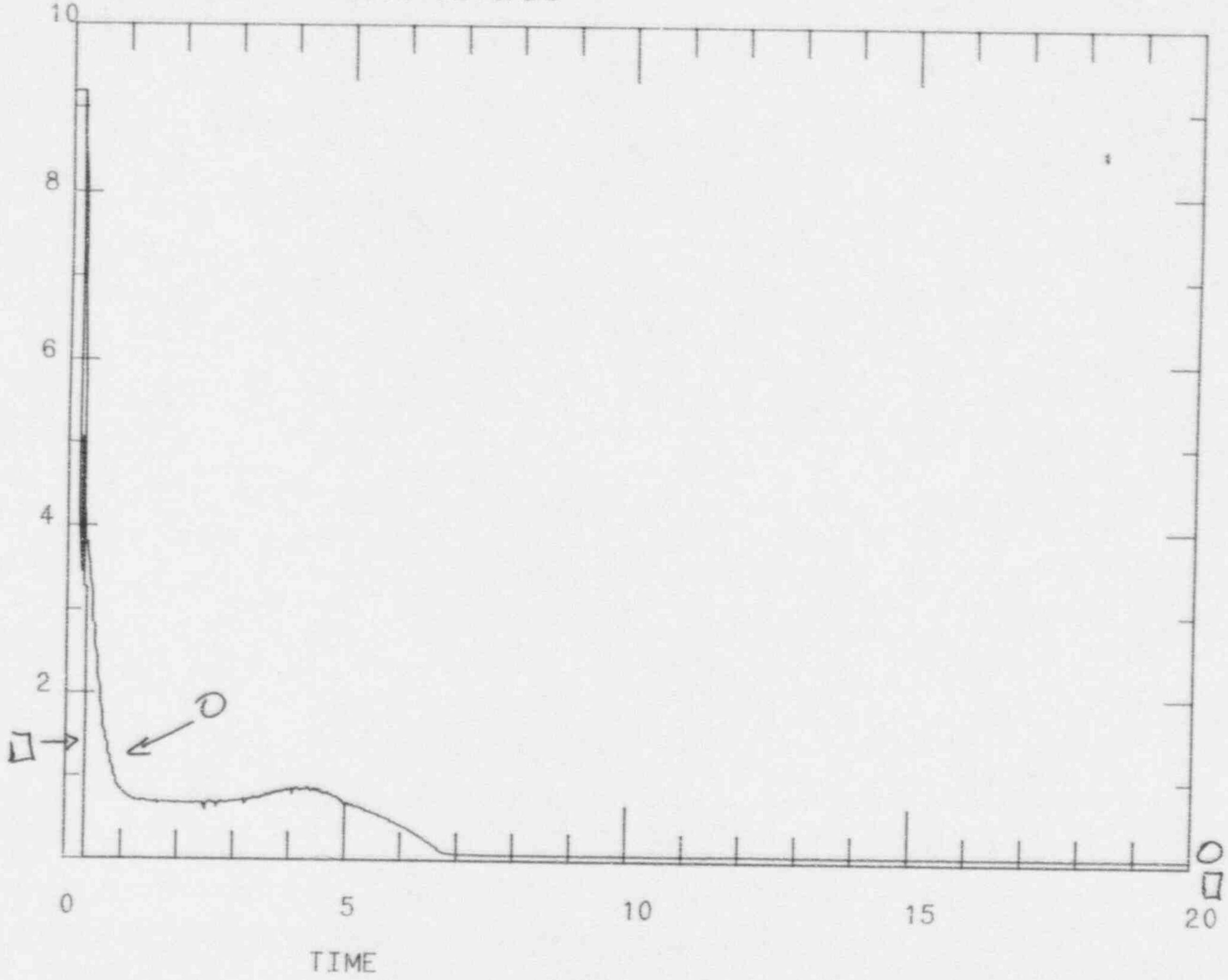


YCT0481 (600. , 670.) 91250 PRESSURIZER STM T

ALL RCP'S TRIP

01/05/96 12:30:50

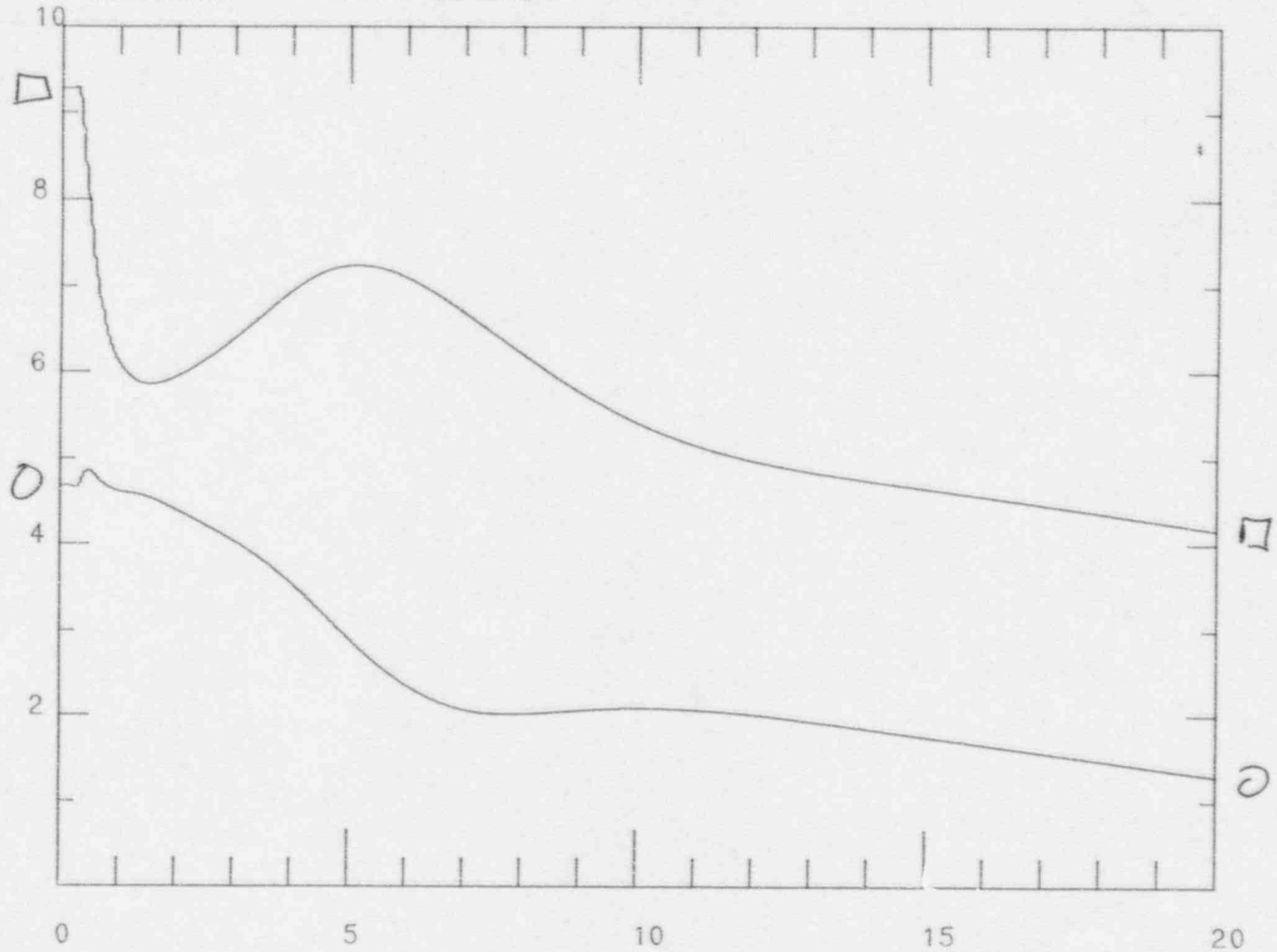
1 DIVISION = 30.00 SECONDS



YCF0403	(.000	, .400E+04)	06040 SG 1A FW F FT-510
YCF0405	(.000	, .400E+04)	06060 S/G 1A STEAM F FT-512

ALL RCP'S TRIP 01/05/96 12:34:41

1 DIVISION = 30.00 SECONDS

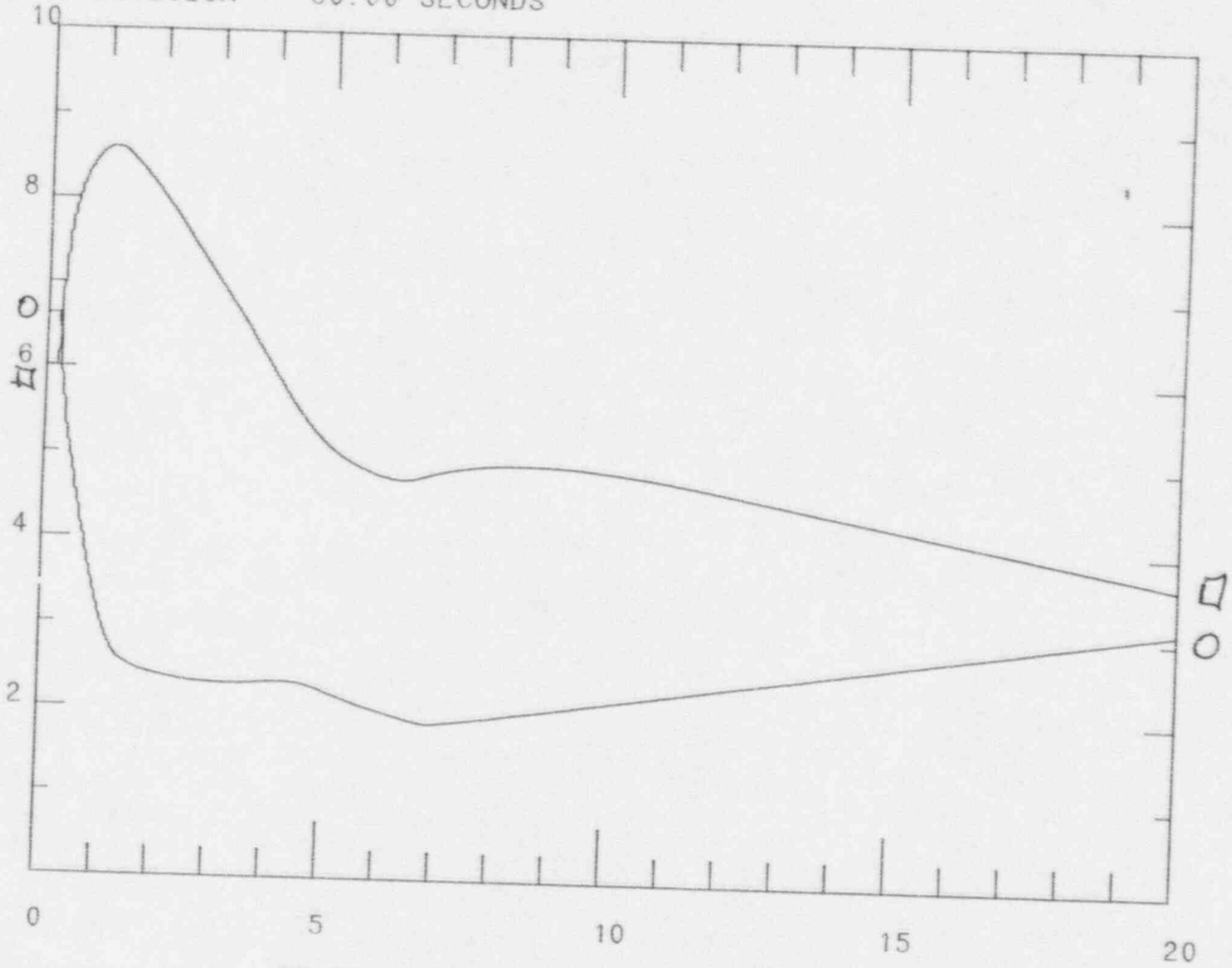


YCT0419	(500.	, 620.)	06830 RC LOOP 1A WR HOT LEG T
YCT0406	(500.	, 620.)	06825 RC LOOP 1A WR COLD LEG T

ALL RCP'S TRIP

01/05/96 12:38.17

1 DIVISION = 30.00 SECONDS



□ YCP0400 (550. , .115E+04) 06590 S/G 1A STMLINE PRESS PT-5
○ YCL0400 (.000 , 100.) 06350 S/G 1A NAR RNG LEVEL LT-51

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-4 / Trip of all RCP's DATE: 1/5/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: U-1 LER 93-01
DATA:
PLANT: Braidwood

COMMENTS: ① Tave difference due to placement of RTD's in the loop (mod# M20-1-93-002)

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Rx Power	None	Acceptable
Tave	see comment ① above	↓
PZR Temp	None	↓
PZR Press	↓	↓
PZR level	↓	↓
T_h	↓	↓
T_c	↓	↓
Steam Press	↓	↓
S/G level	↓	↓

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
Feed Flow	None	Acceptable
Steam Flow	↓	↓

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

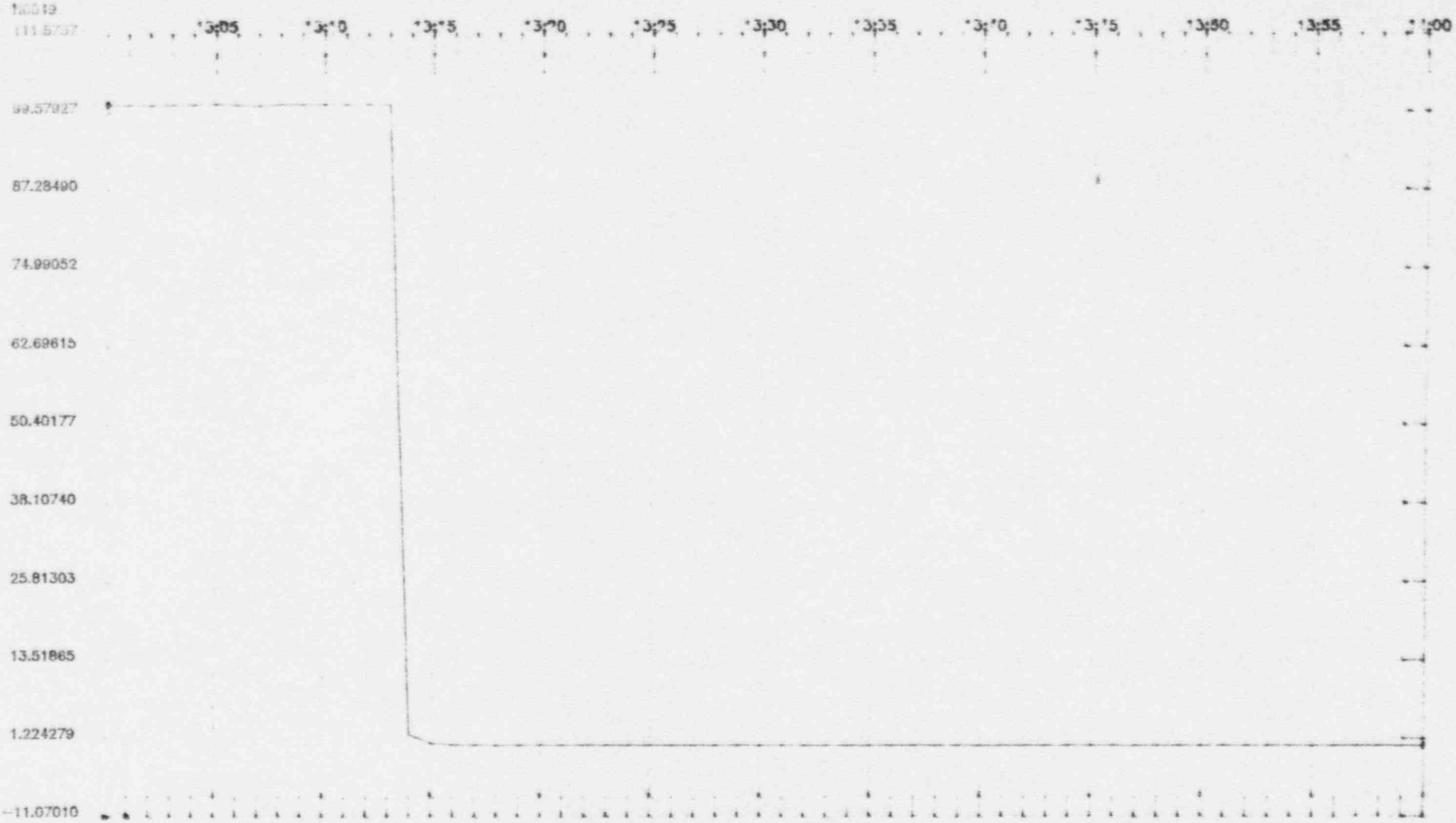
b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

COMMENTS:

Point Plot - Braidwood Station, Unit 1
Data from 13:00 to 14:00 on 01/01/93
Time Interval : 1 Minute(s)

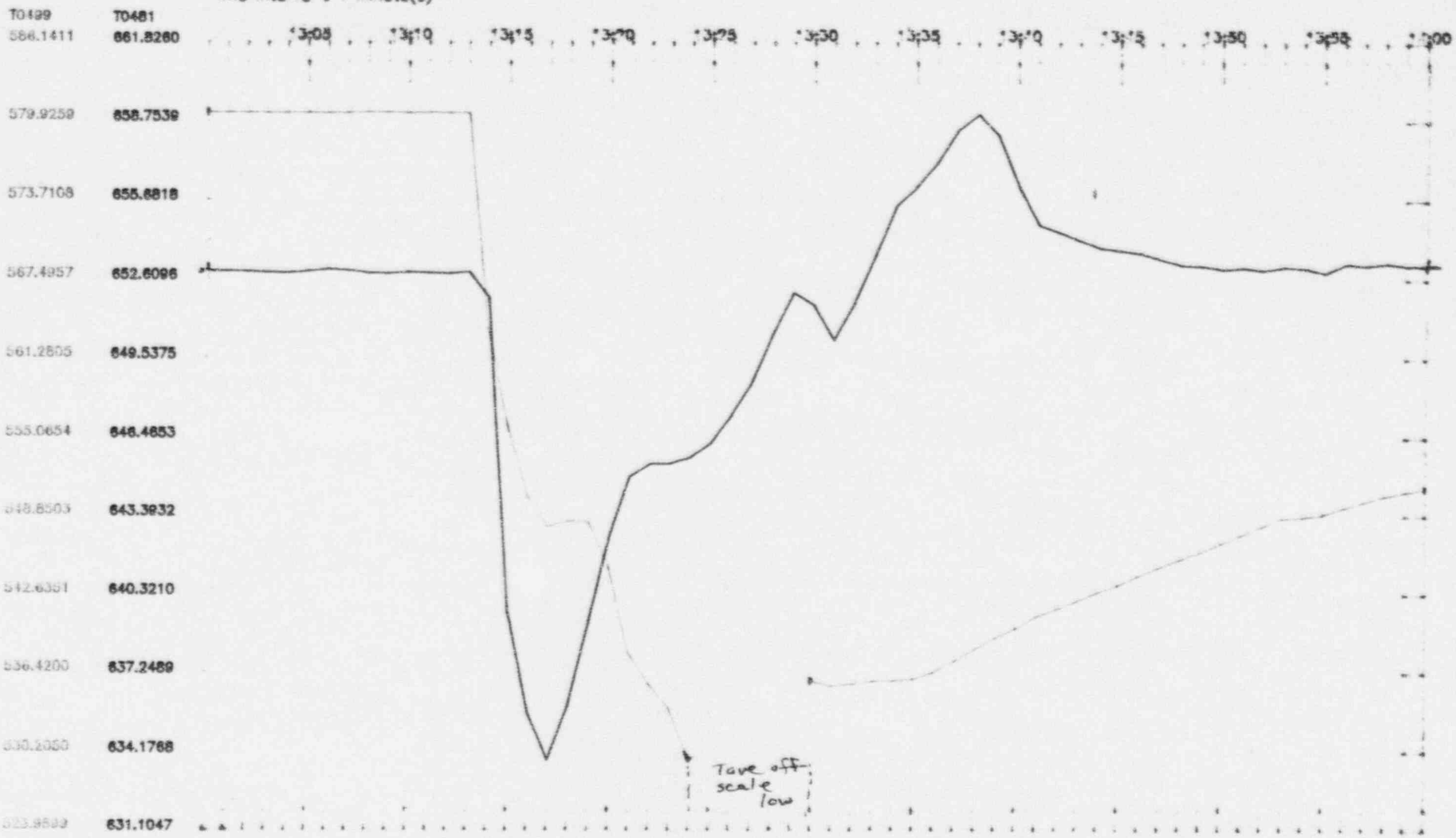
[G' 0'0' ' Rev. 0.1]



POINT ID	DESCRIPTION	UNITS	SYMBOL
N0049	PWR RNG CH 41 (QUAD 4) DET Q	PC	'

Point Plot - Braidwood Station, Unit 1
Data from 13:00 to 14:00 on 01/07/93
Time Interval : 1 Minute(s)

[G"0"0"4 Rev. 0.4]



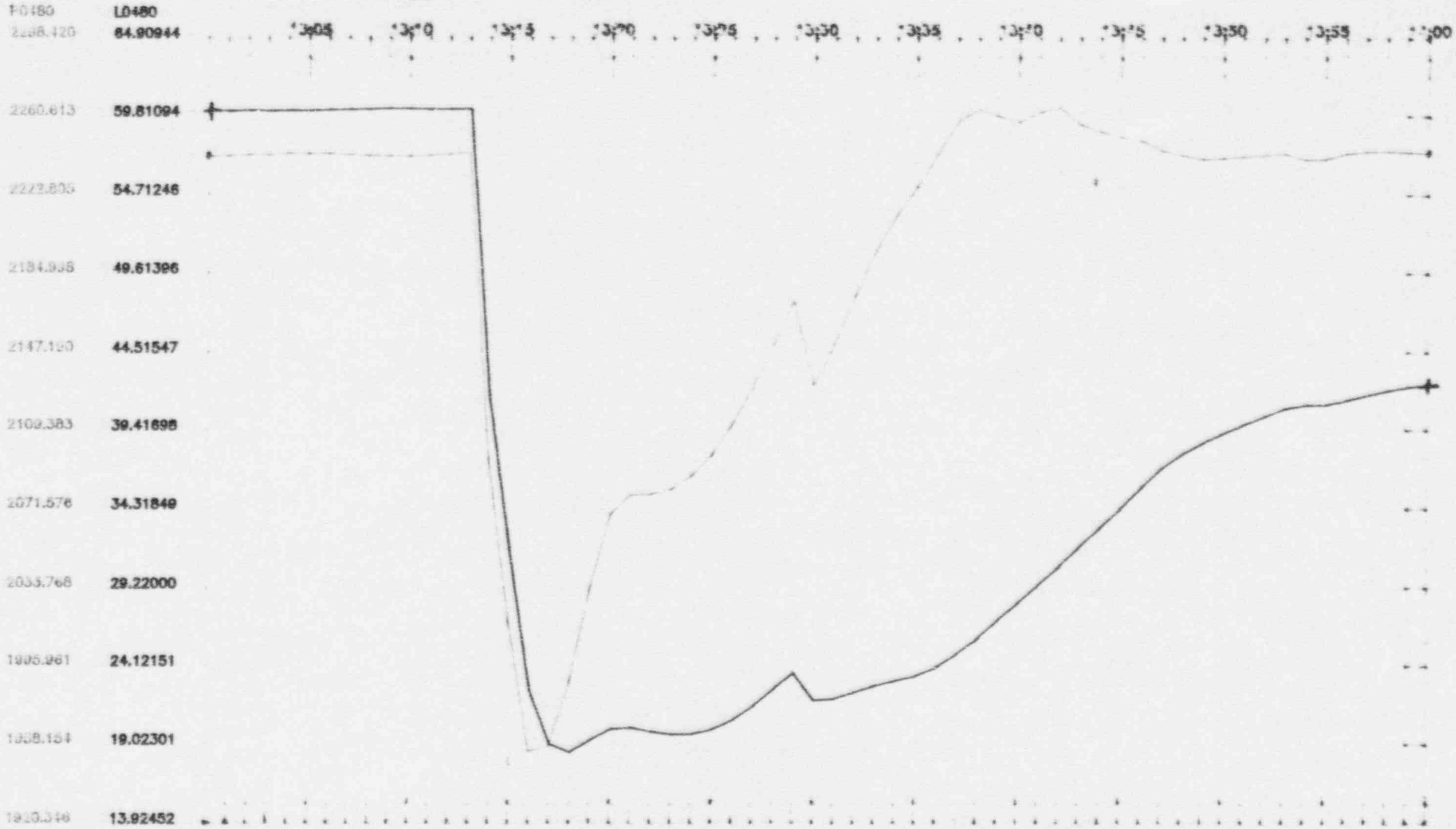
POINT ID	DESCRIPTION	UNITS	SYMBOL
T0481	PRESSURIZER STM T	DEGF	+
T0499	[illegible]	DEGF	'

Point Plot - Braidwood Station, Unit [illegible]

Data from 13:00 to 14:00 on 0[illegible] '93

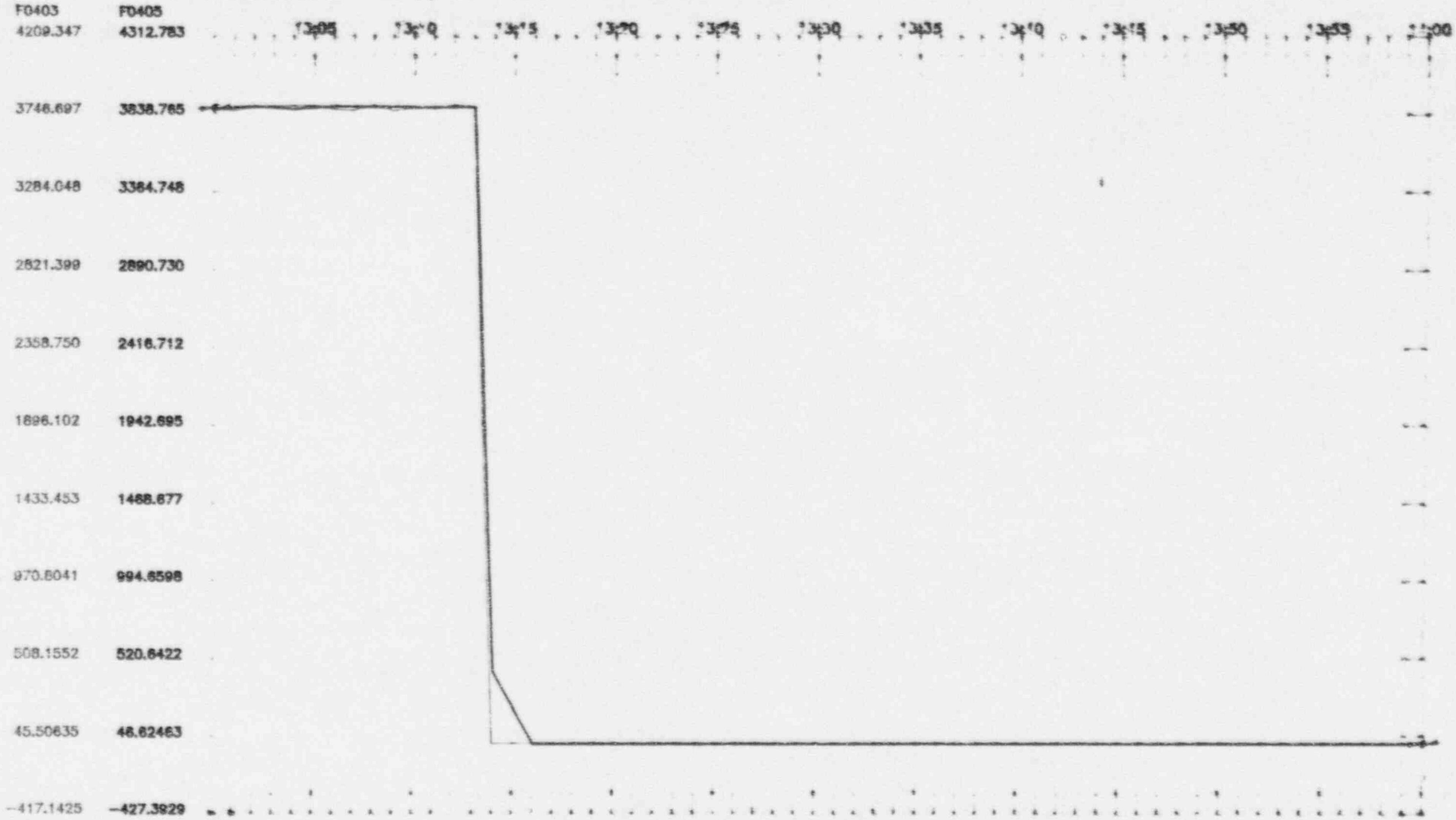
Time Interval : 1 Minute(s)

[G[illegible] Rev. 0.1]



POINT ID	DESCRIPTION	UNITS	SYMBOL
L0480	PRESSURIZER 1 L	PC	+
P0480	PRESSURIZER 1 P	PSIG	!

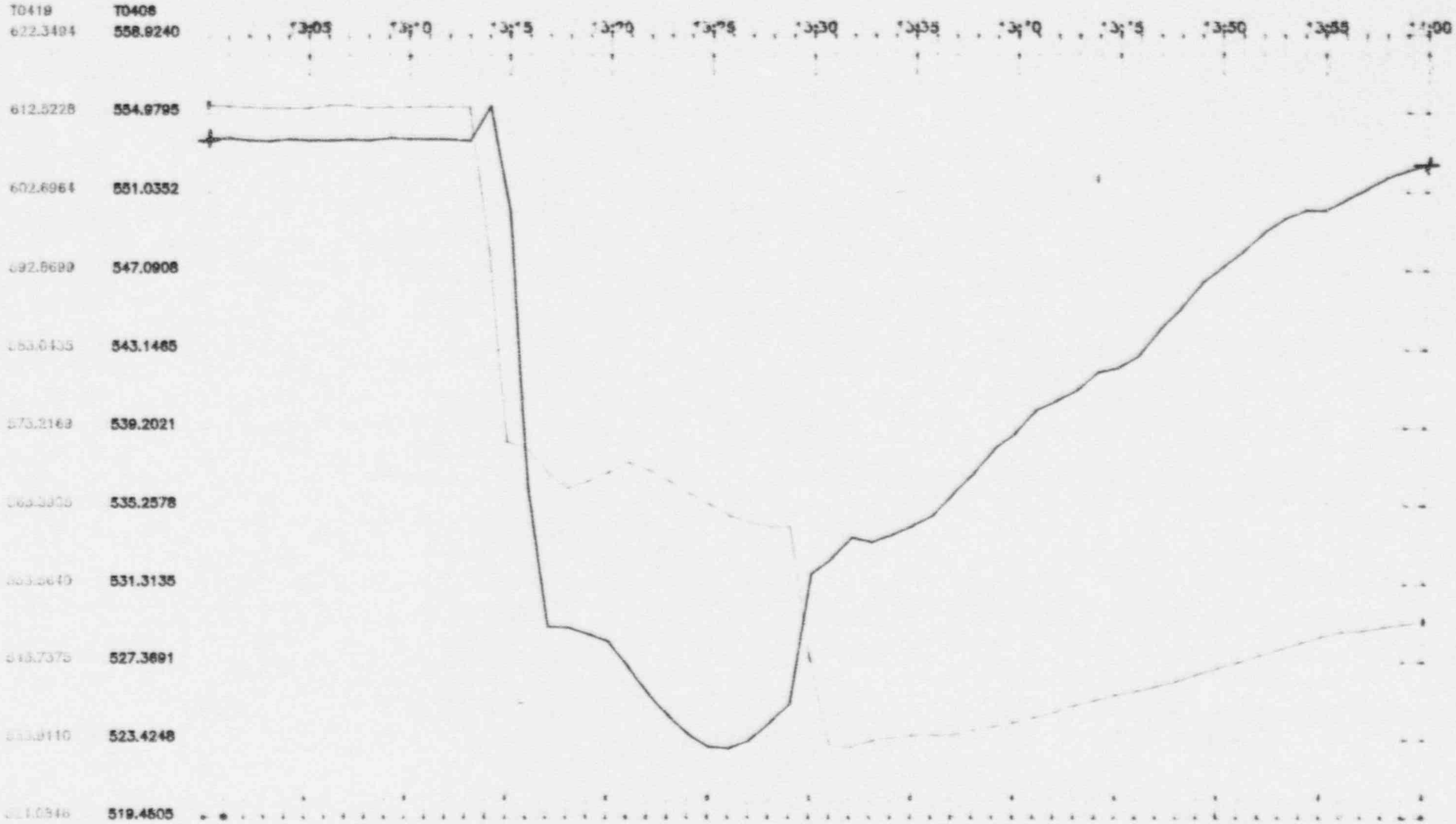
Point Plot - Braidwood Station, Unit 1 [GH0101? Rev. 0.4]
Data from 13:00 to 14:00 on 0? '0?' '93
Time interval : 1 Minute(s)



POINT ID	DESCRIPTION	UNITS	SYMBOL
F0405	STM GEN 1 STM OUT 1 F	KBH	+
F0403	STM GEN 1 FEED WTR IN 1 F	KBH	!

Point Plot - Braidwood Station, Unit 1
Data from 13:00 to 14:00 on 01/07/93
Time Interval : 1 Minute(s)

[G101014 Rev. 0.4]

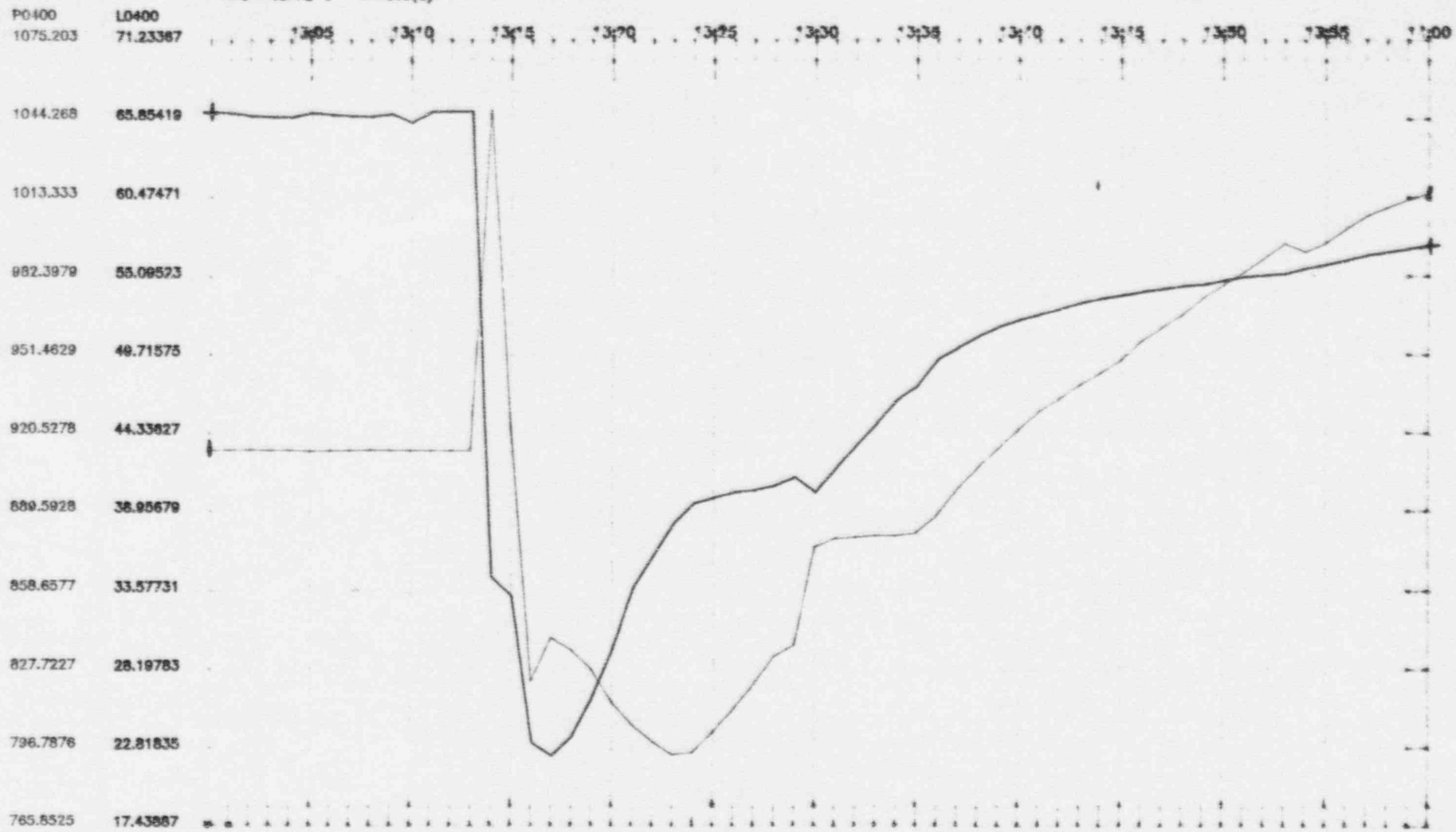


POINT ID	DESCRIPTION	UNITS	SYMBOL
T0406	RCL1 WIDE RNG COLD LEG T	DEGF	+
T0419	RCL1 WIDE RNG HOT LEG T	DEGF	+

Point Plot - Braidwood Station, Unit 1 [GM01014 Rev. 0.4]

Date from 13:00 to 14:00 on 01/07/93

Time Interval = 1 Minute(s)



POINT ID	DESCRIPTION	UNITS	SYMBOL
L0400	STM GEN 1 NAR RNG 1 L	PC	+
P0400	STM GEN 1 STM OUT 1 P	PSIG	ǂ

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-5 Date Performed 1/5/96

Test Description: Trip of Single RCP test

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

____ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

____ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ________ Date ________

Test Complete [signature] Date 1/5/96

SFCC Acceptance [signature] Date 2/9/96

Test Number: TR-5
Revision Number/Date: 06, 11/08/93
Frequency: ANNUAL

BRAIDWOOD SIMULATOR TRANSIENT TEST
TRIP OF ANY SINGLE REACTOR COOLANT PUMP

I. OBJECTIVES

The purpose of this procedure is to test the simulator response to a Trip of any Single Reactor Coolant Pump as required by ANSI/ANS-3.5-1985.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.

2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.

3. TDI 700-03: Simulator Testing Program

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state, full power conditions with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.

2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.

3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.

BRAIDWOOD SIMULATOR TRANSIENT TEST
TRIP OF ANY SINGLE REACTOR COOLANT PUMP

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables (the loop/ S/G variables shall be on loops 1-4):

   a. Neutron flux (Rx power)

   b. Hot leg temperature

   c. Cold leg temperature

   d. S/G pressure

   e. S/G level

   f. Steam flow

   g. Feed flow

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.
2. Enter the data collection points from Section IV into the ZETA Plotter program.
3. Trip 1A Reactor Coolant Pump.
4. Continue until stable plant conditions are established.
5. Graph the variables listed under Section IV.

BRAIDWOOD SIMULATOR TRANSIENT TEST
TRIP OF ANY SINGLE REACTOR COOLANT PUMP

VI. ACCEPTANCE CRITERIA

****
*   NOTE   *
*   The simulator response will be compared to baseline data   *
*   by the Braidwood Simulator Transient Test Review Board.   *
*   The Review Board will determine if the simulator has the   *
*   capability to adequately reproduce the defined transient.   *
****

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer safety valves shall NOT lift.
2. Steam generator safety valves shall NOT lift.
3. Safety injection is NOT initiated.
4. Only 1A RCP trips.
5. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.
6. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

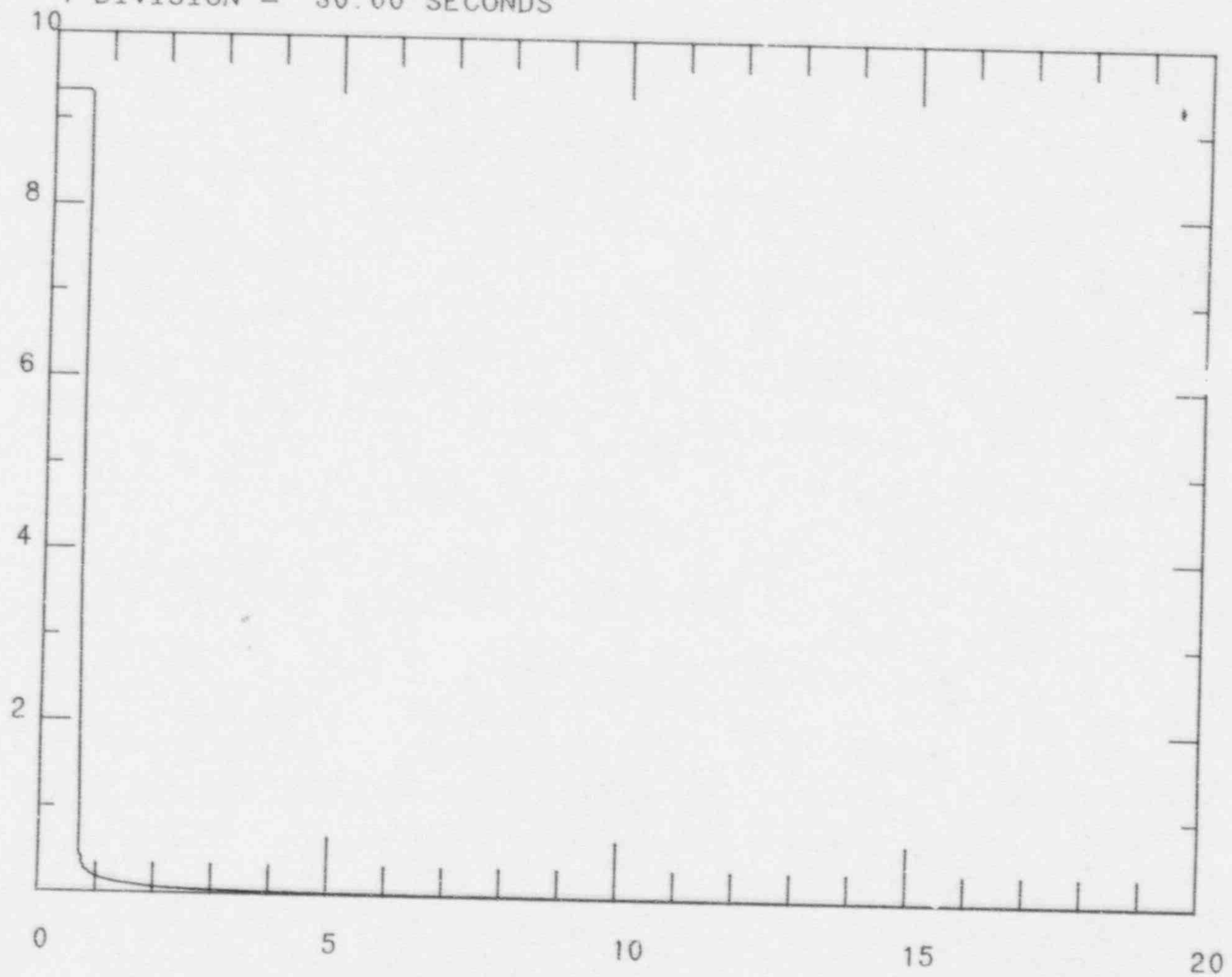
BRAIDWOOD SIMULATOR TRANSIENT TEST
TRIP OF ANY SINGLE REACTOR COOLANT PUMP

VII. LIST OF FIGURES

1A RCP TRIP

01/05/96 12:53:30

1 DIVISION = 30.00 SECONDS

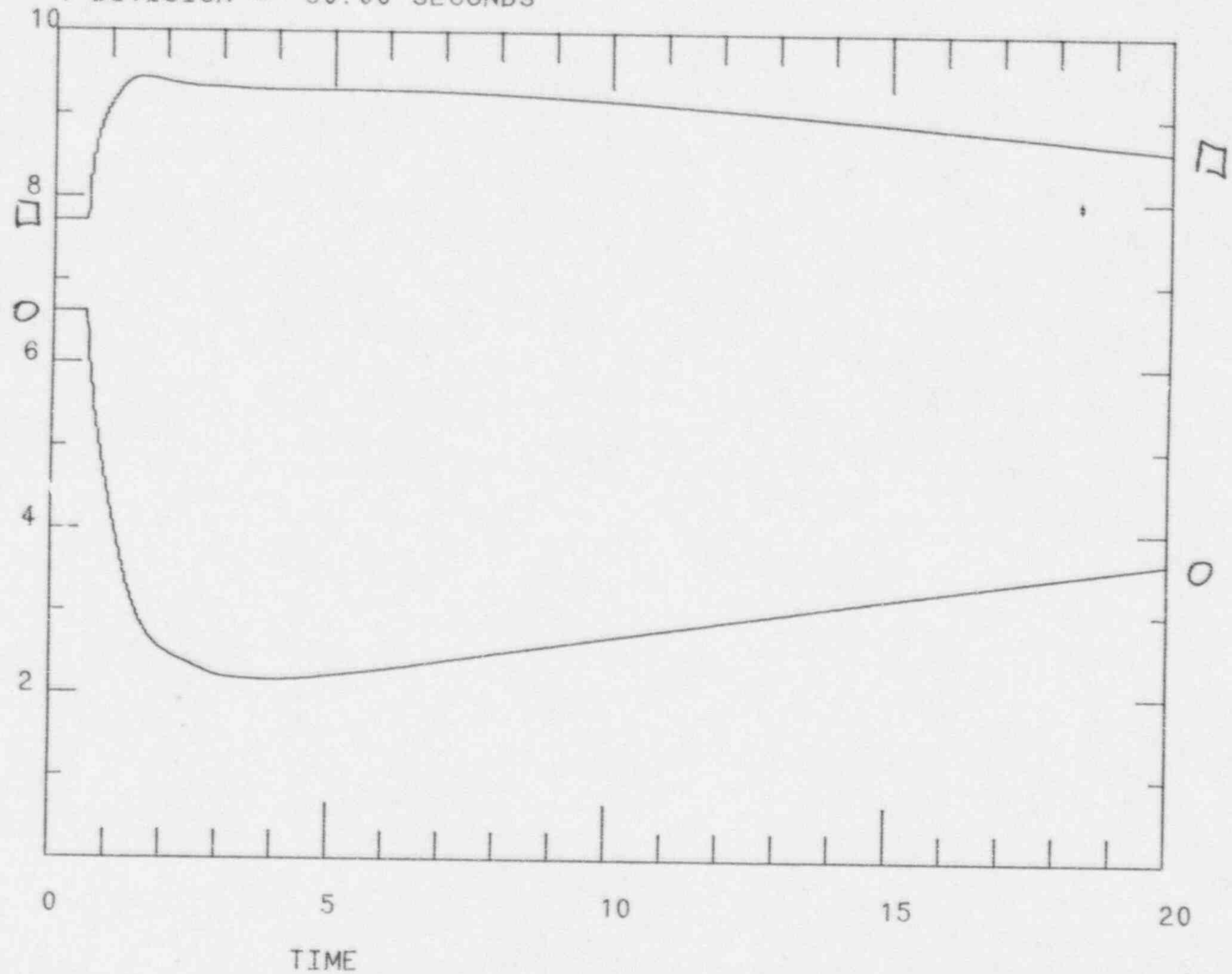


YCN0049 (.000 , 105.) 21090 PWR RNG CH 41 (QUAD 4) TOT

1A RCP TRIP

01/05/96 13:23:09

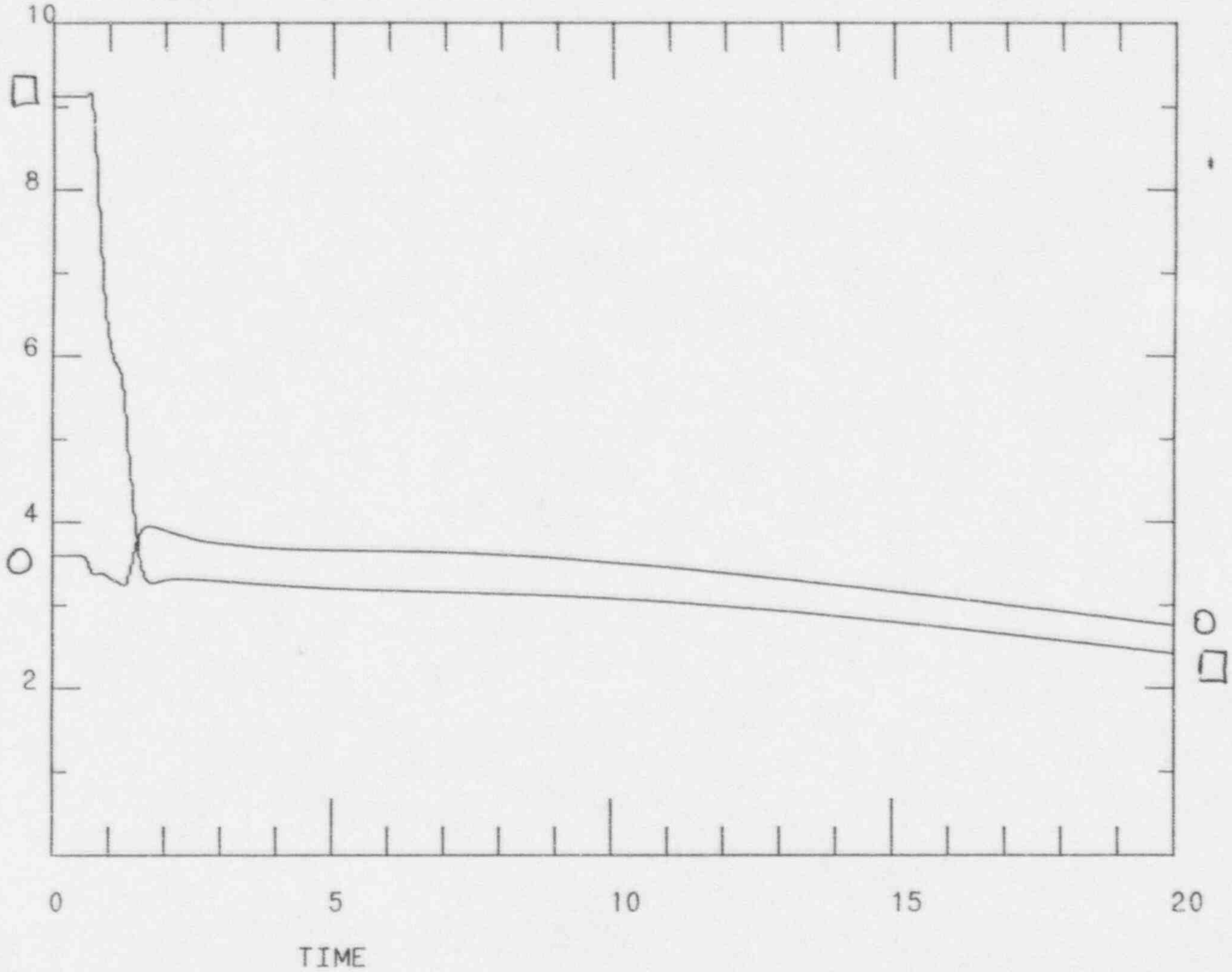
1 DIVISION = 30.00 SECONDS



□	YCP0420	(100.	, .115E+04)	06620	S/G 1B STMLINE PRESS PT-5
O	YCL0420	(.000	, 100.)	06400	S/G 1B NAR RNG LEVEL LT-52

1A RCP TRIP 01/05/96 12:58:39

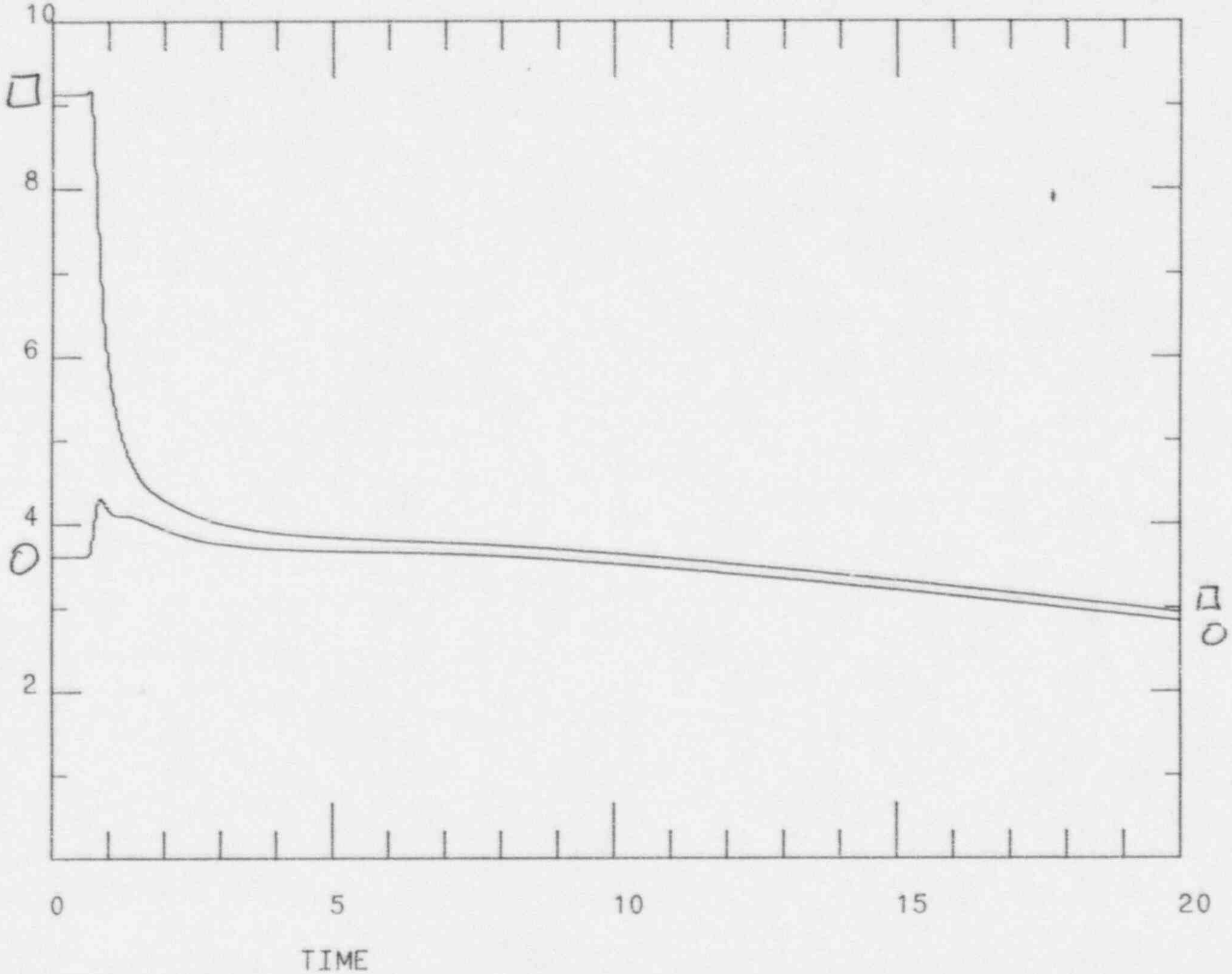
1 DIVISION = 30.00 SECONDS



□ YCT0419 (520. , 620.) 06830 RC LOOP 1A WR HOT LEG T
O YCT0406 (520. , 620.) 06825 RC LOOP 1A WR COLD LEG T

1A RCP TRIP 01/05/96 13:07:58

1 DIVISION = 30.00 SECONDS



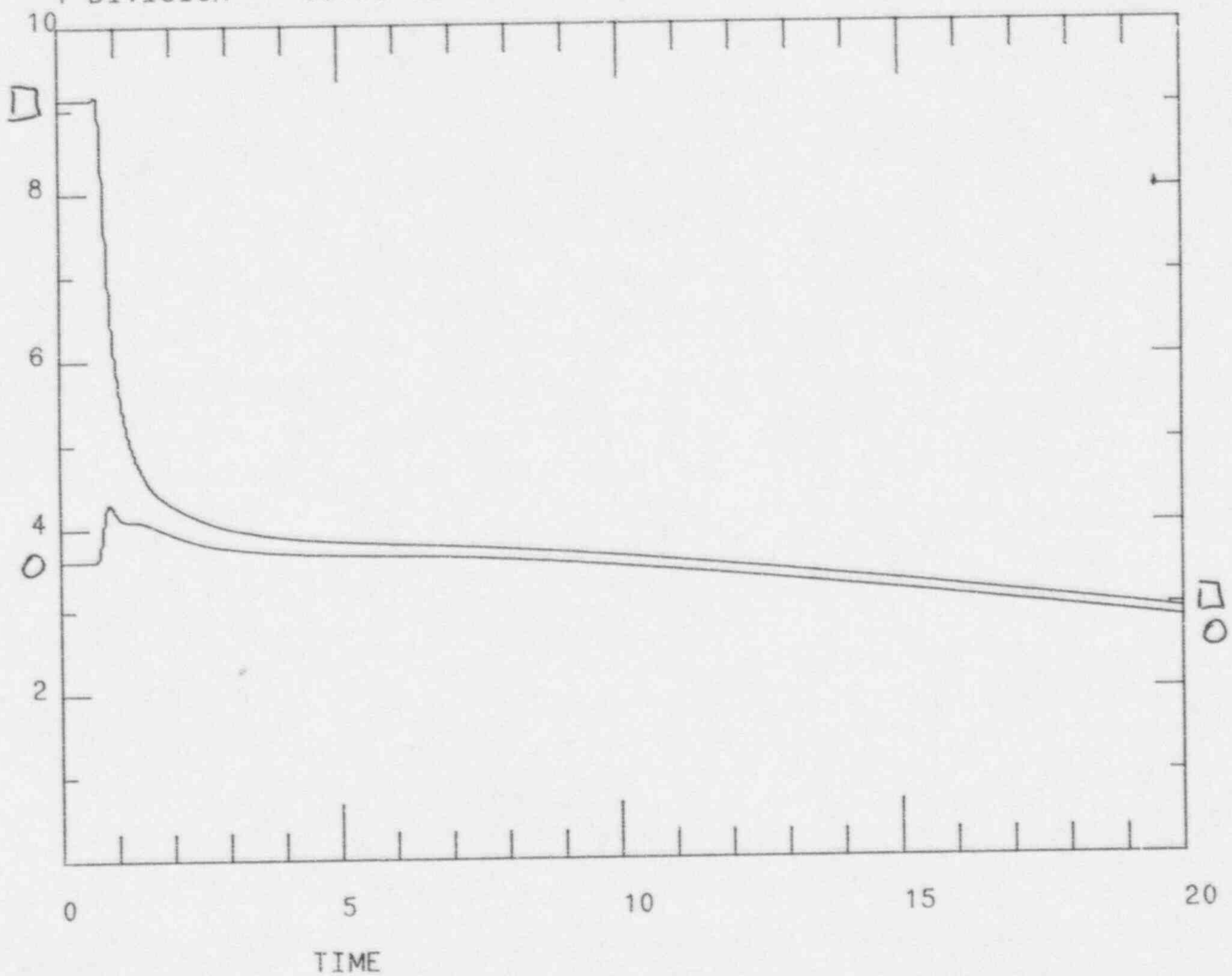
□ YCT0459 (520. , 620.) 06990 RC LOOP 1C WR HOT LEG T

O YCT044 (520. , 620.) 06950 RC LOOP 1C WR COLD LEG T

1A RCP TRIP

01/05/96 13:04:27

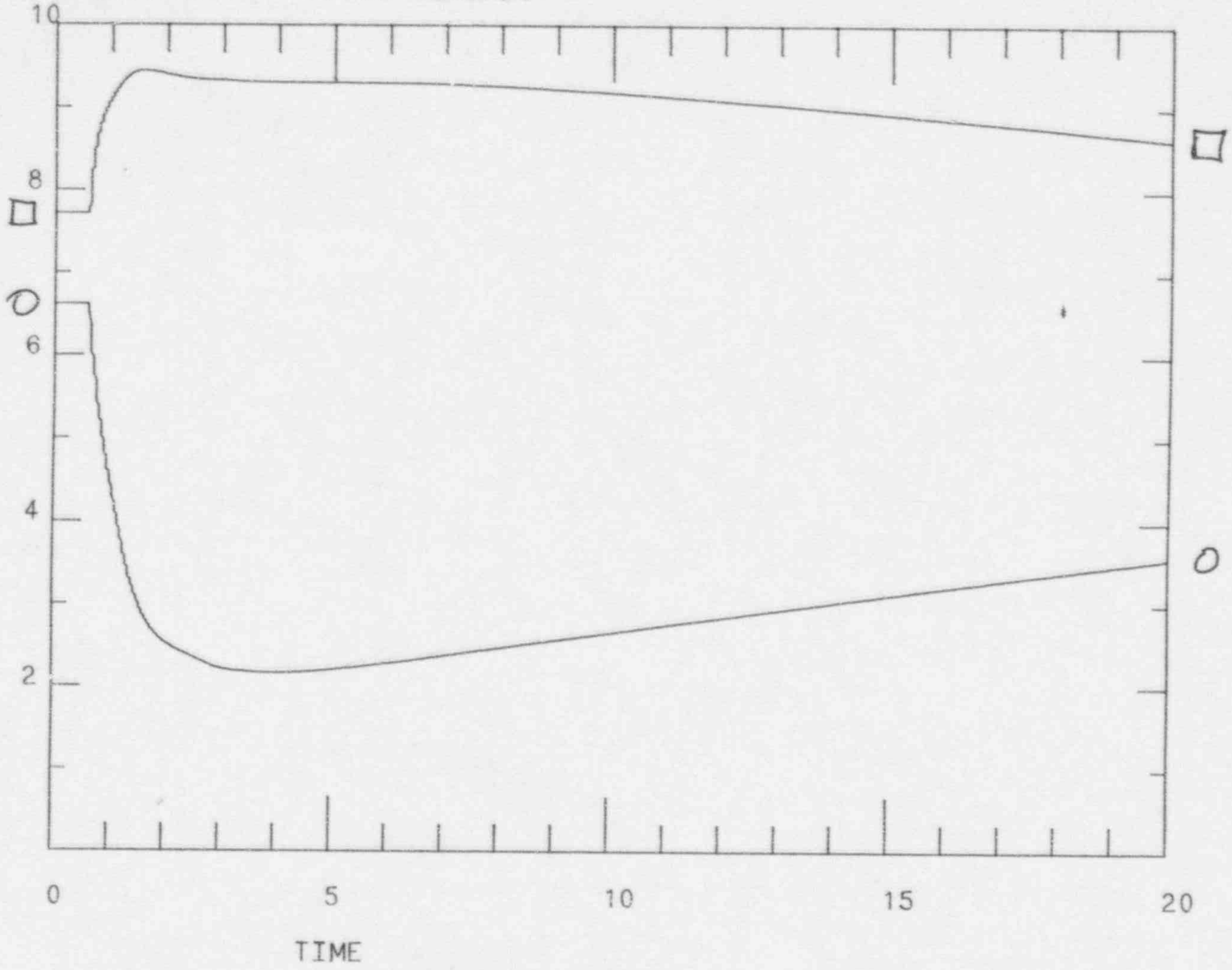
1 DIVISION = 30.00 SECONDS



YCT0439	(520.	, 620.)	06910 RC LOOP 1B WR HOT LEG T
YCT0426	(520.	, 620.)	06870 RC LOOP 1B WR COLD LEG T

1A RCP TRIP 01/05/96 13:26:37

1 DIVISION = 30.00 SECONDS

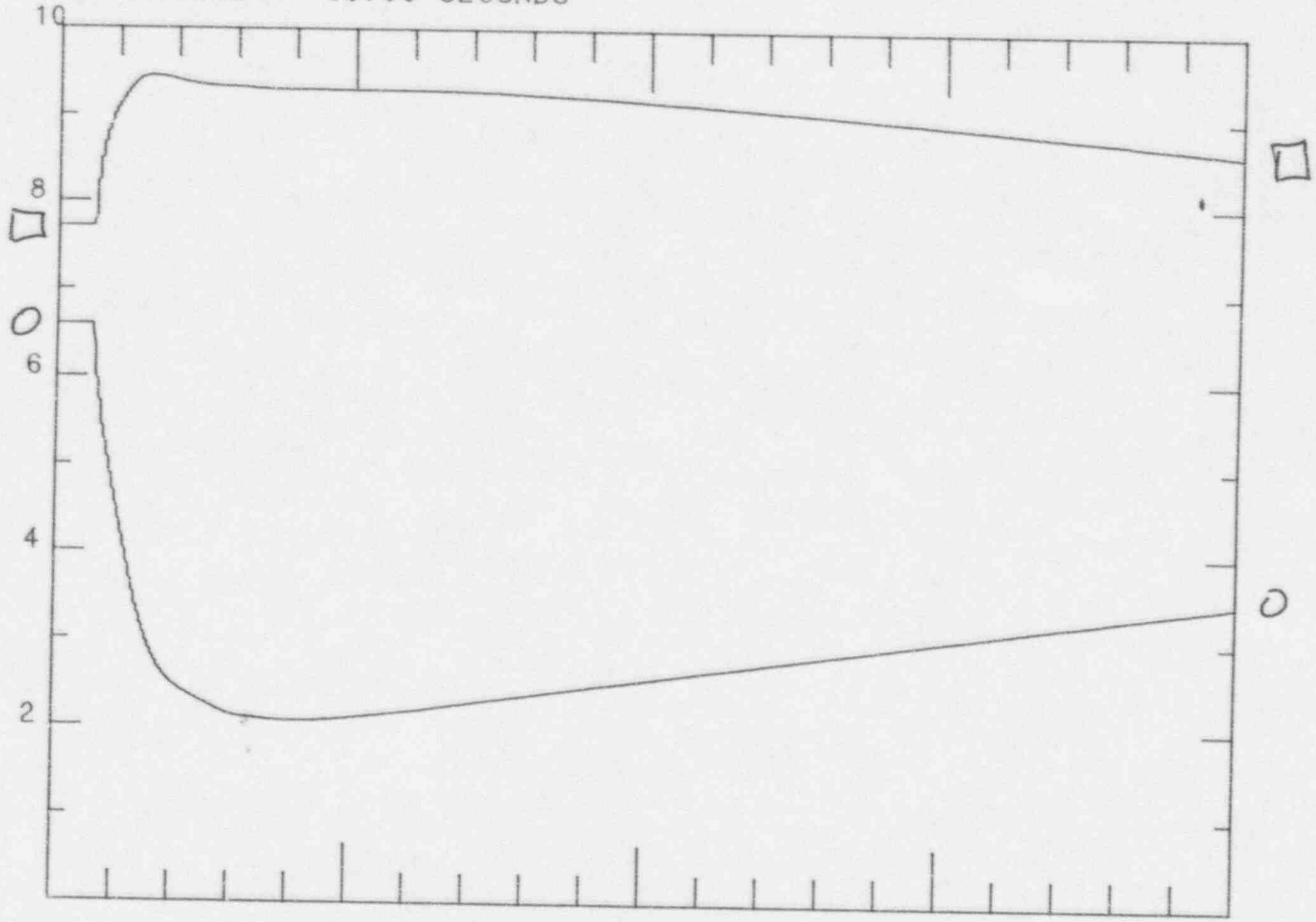


□	YCP0440	(100. , .115E+04)	06650 S/G 1C STMLINE PRESS PT-5
O	YCL0440	(.000 , 100.)	06450 S/G 1C NAR RNG LEVEL LT-53

1A RCP TRIP

01/05/96 13:30:19

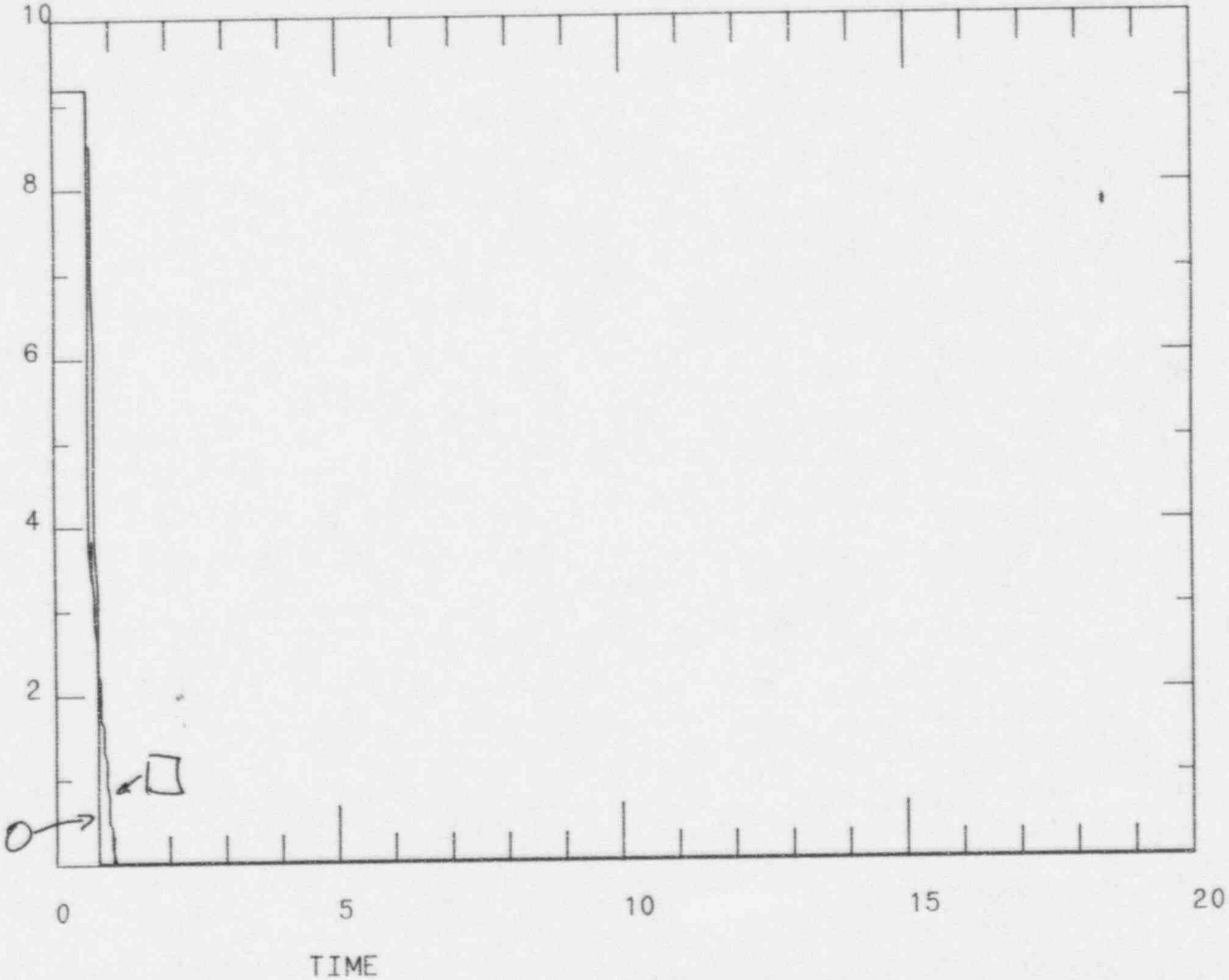
1 DIVISION = 30.00 SECONDS



□ YCP0460 (100. , .115E+04) 06680 S/G 1D STMLINE PRESS PT-5
O YCL0460 (.000 , 100.) 06500 S/G 1D NAR RNG LEVEL LT-54

1A RCP TRIP 01/05/96 13:33:57

1 DIVISION = 30.00 SECONDS

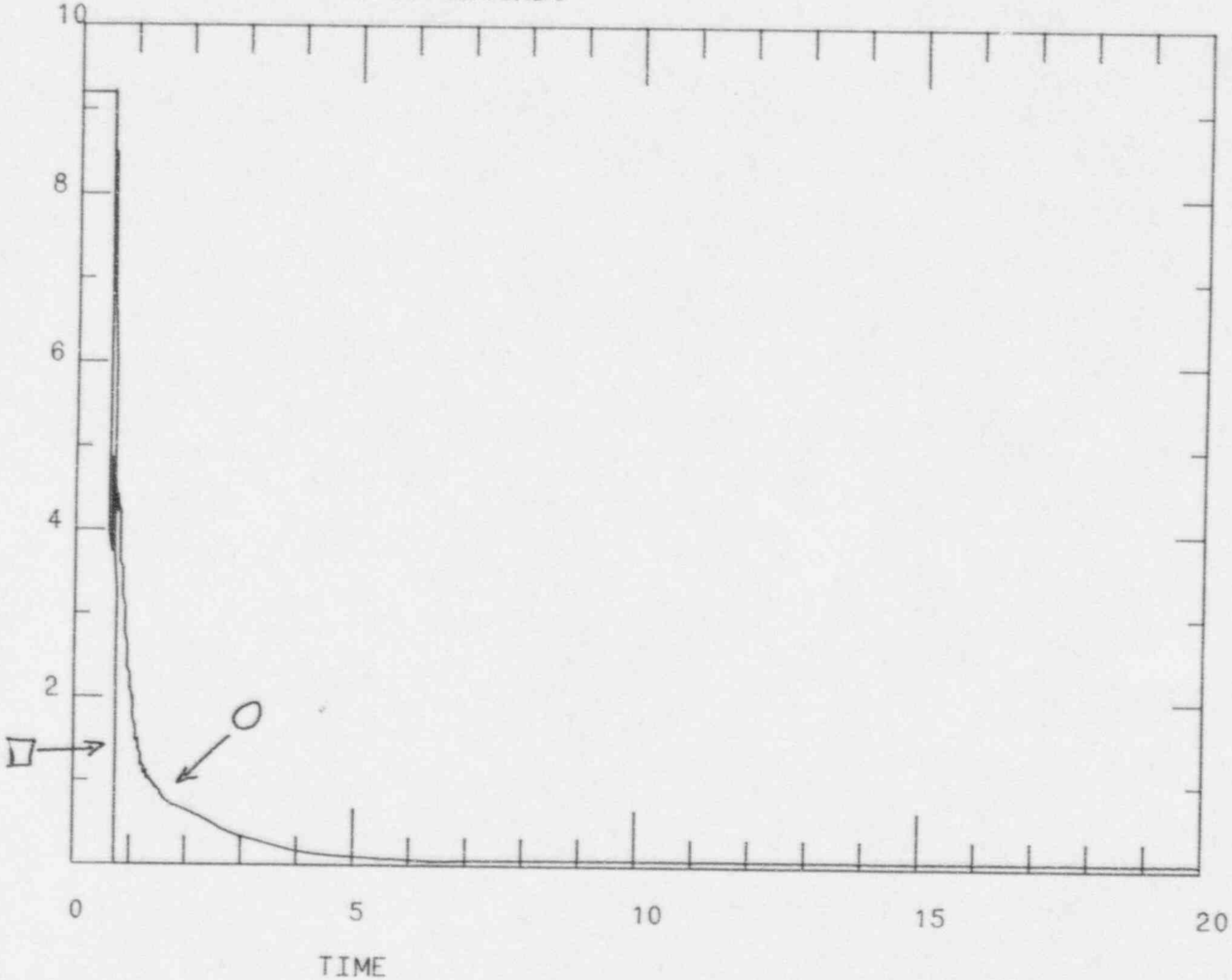


□	YCF0405	(.000 , .400E+04)	06060 S/G 1A STEAM F FT-512
O	YCF0403	(.000 , .400E+04)	06040 SG 1A FW F FT-510

1A RCP TRIP

01/05/96 13:37:30

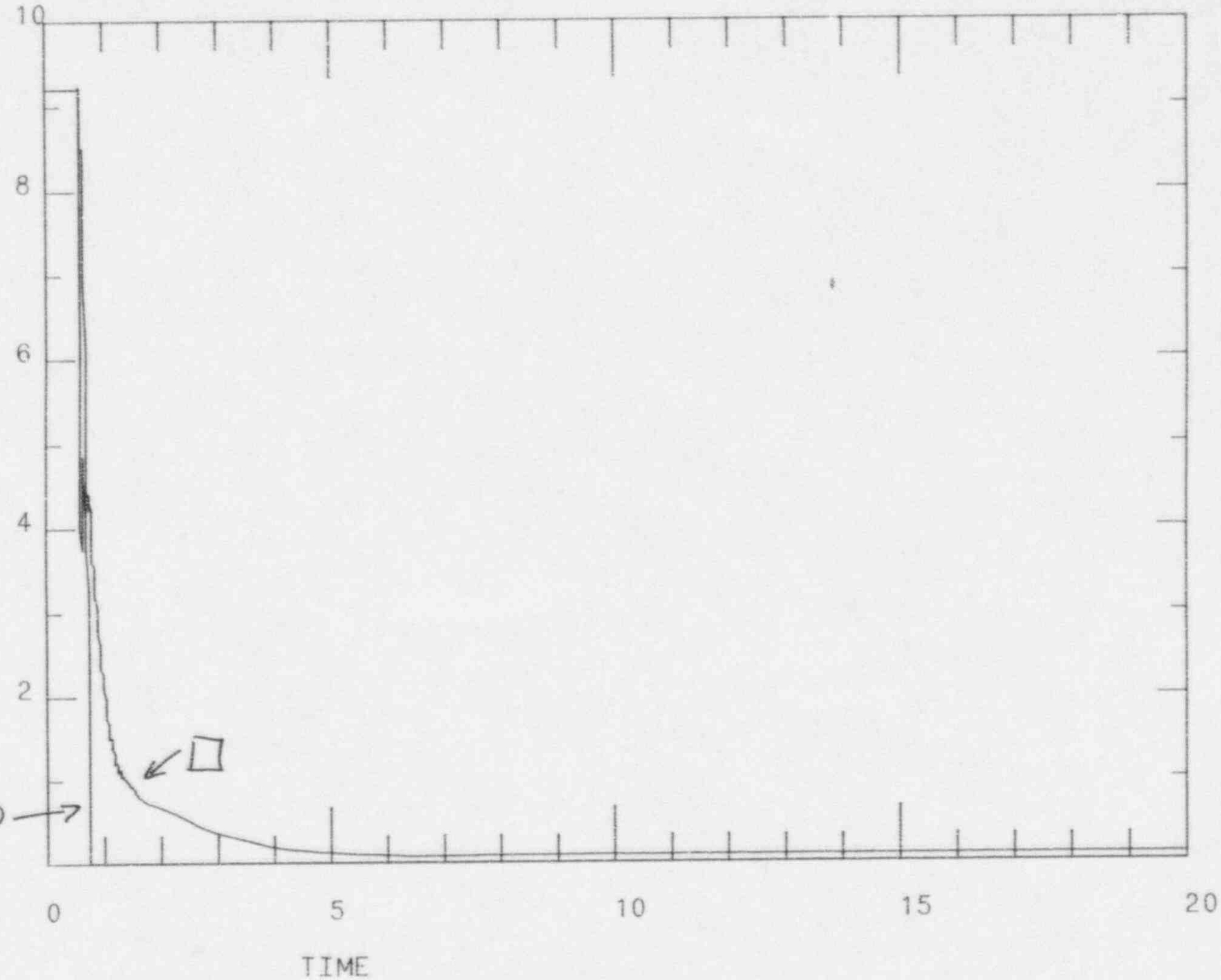
1 DIVISION = 30.00 SECONDS



□ YCF0423	(.000	, .400E+04)	06120 SG 1B FW F FT-520
O YCF0425	(.000	, .400E+04)	06140 S/G 1B STEAM F FT-522

1A RCP TRIP

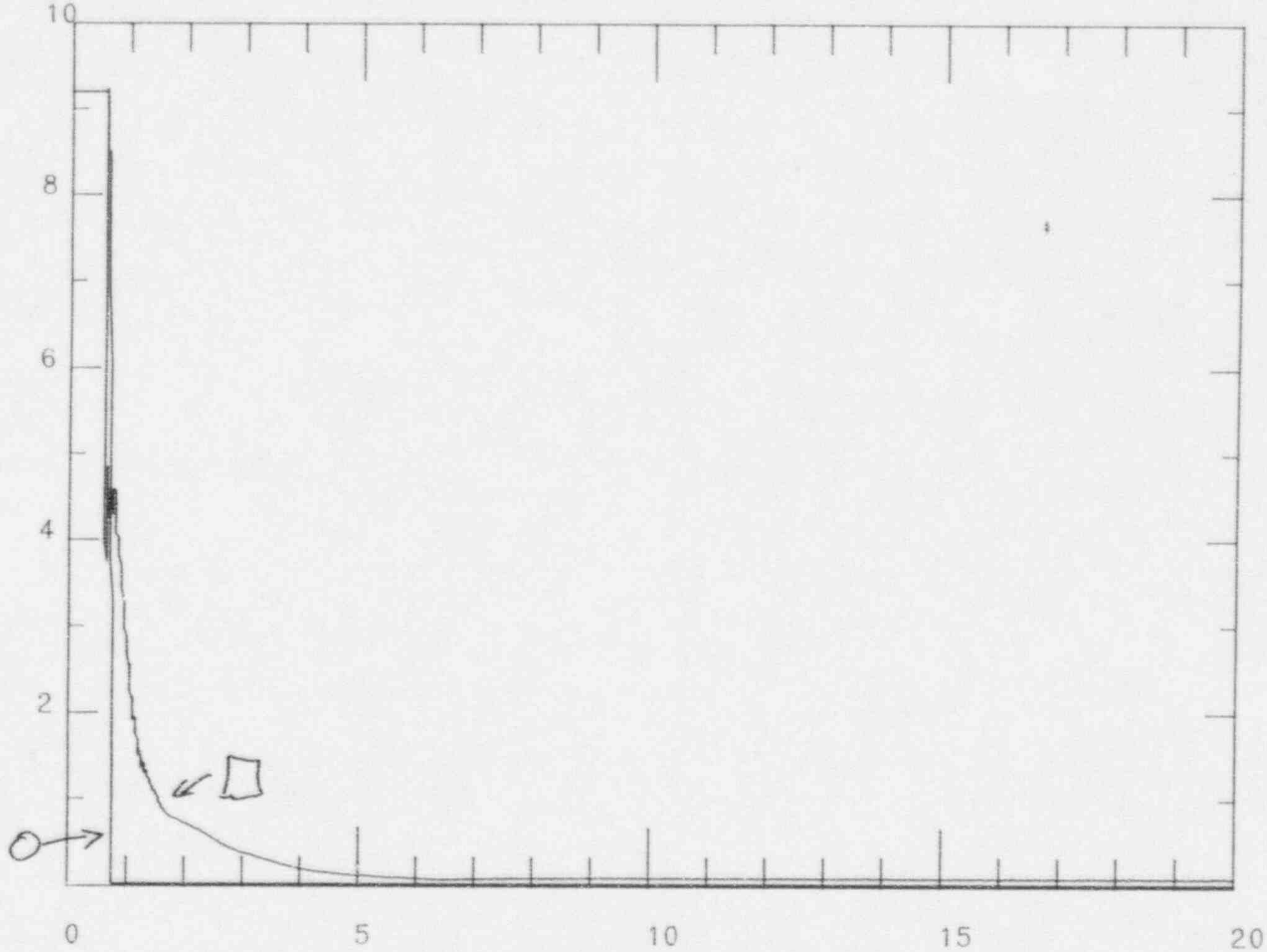
01/05/96 13:41:04



□	YCF0445	(.000 , .400E+04)	06220 S/G 1C STEAM F FT-532
O	YCF0443	(.000 , .400E+04)	06200 S/G 1C FW F FT-530

1A RCP TRIP 01/05/96 13:46:11

1 DIVISION = 30.00 SECONDS

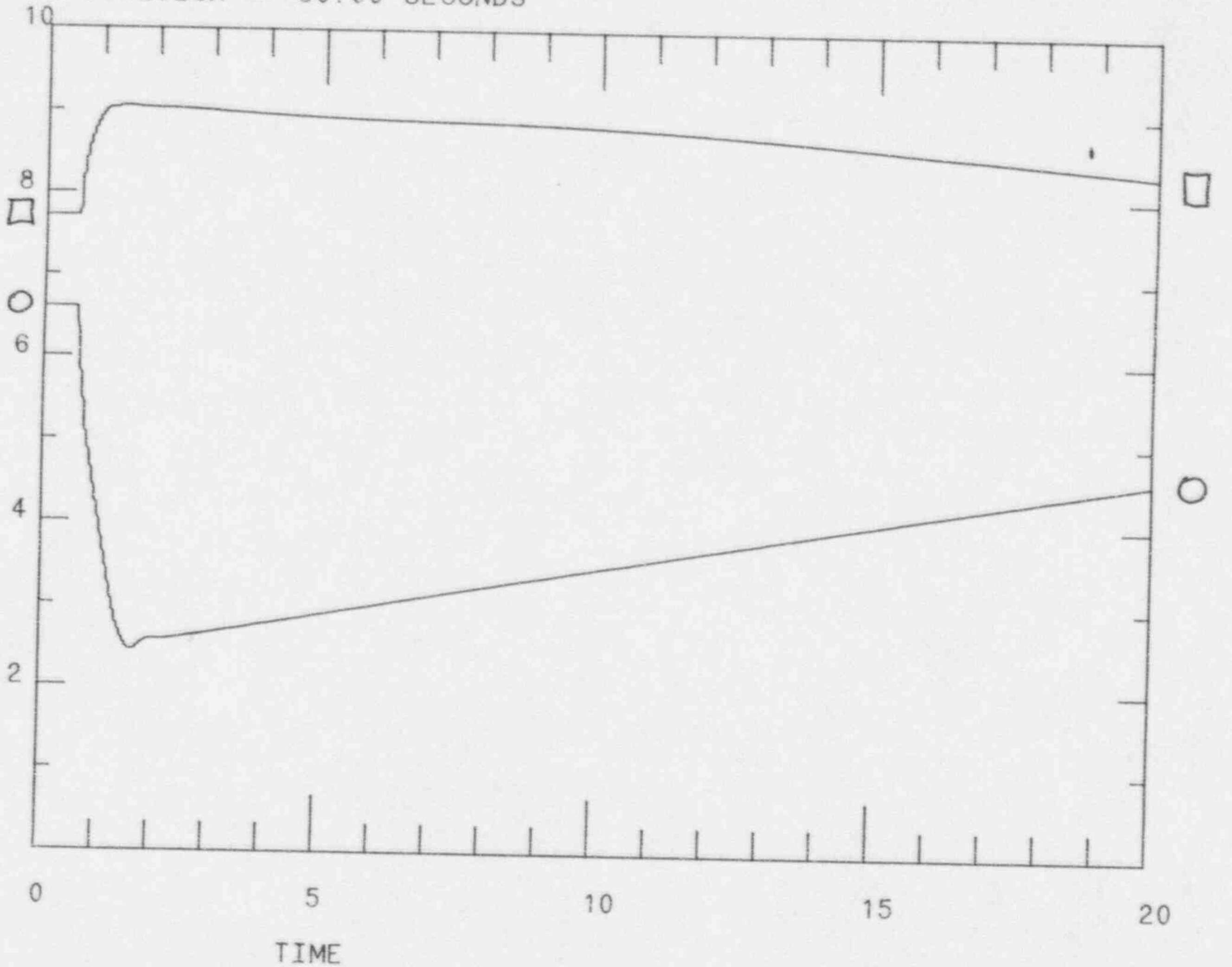


□ YCF0465 (.000 , .400E+04) 06290 S/G 1D STEAM F FT-542
O YCF0463 (.000 , .400E+04) 06280 SG 1D FW F FT-540

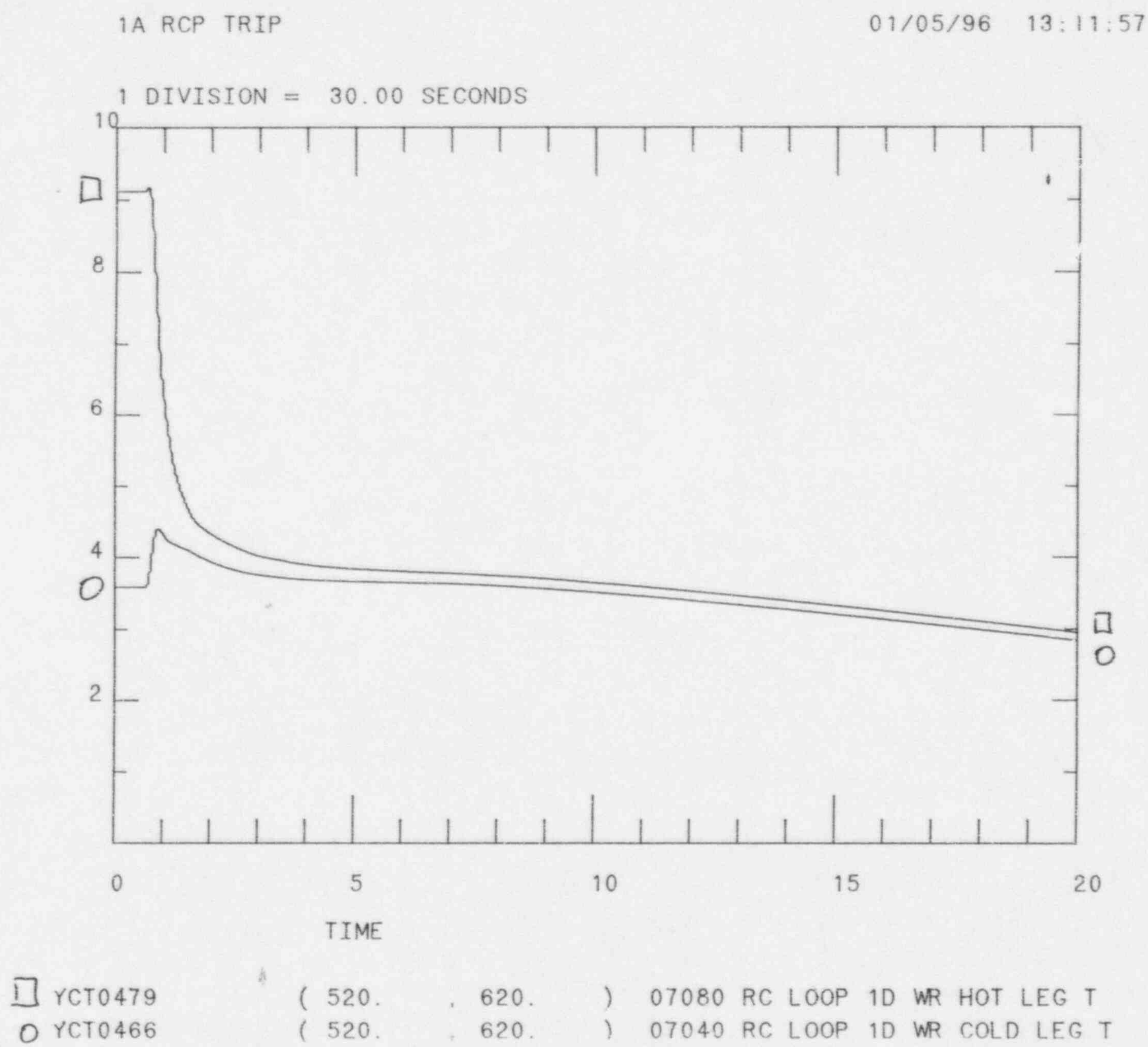
1A RCP TRIP

01/05/96 13:19:28

1 DIVISION = 30.00 SECONDS



□	YCP0400	(100.	, .115E+04)	06590 S/G 1A STMLINE PRESS PT-5
○	YCL0400	(.000	, 100.)	06350 S/G 1A NAR RNG LEVEL LT-51



1A RCP TRIP
01/05/96 13:11:57
1 DIVISION = 30.00 SECONDS
10
8
6
4
2
0
5
10
15
20
TIME
YCT0479 (520. , 620.) 07080 RC LOOP 1D WR HOT LEG T
YCT0466 (520. , 620.) 07040 RC LOOP 1D WR COLD LEG T

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-5 / Trip of 1A RCP DATE: 1/5/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: ____________
DATA: ____________
PLANT: ____________

COMMENTS: None

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Rx Power	None	Acceptable
loop 1 Th	↓	↓
loop 1 Tc		
loop 2-4 Th		
loop 2-4 Tc		
loop 1 Steam Press		
loop 1 S/G level		
loop 2-4 Steam Press		
loop 2-4 S/G level		

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
loop 1 Feed Flow	None	Acceptable
loop 1 Steam Flow	↓	↓
loop 2-4 Feed Flow	↓	↓
loop 2-4 Steam Flow	↓	↓

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

K. Tifenthal ____________ D. Bruter ____________

____________ ____________

____________ ____________

COMMENTS: ____________

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-6 Date Performed 1/11/96

Test Description: Turbine trip < P-8 test

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

____ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

____ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ________ Date ________

Test Complete K Tufentet Date 1/11/96

SFCC Acceptance K Tufentet Date 2/9/96

Test Number: TR-6
Revision Number/Date: 06, 11/08/93
Frequency: ANNUAL

BRAIDWOOD SIMULATOR TRANSIENT TEST

TURBINE TRIP (MAXIMUM POWER LEVEL WHICH DOES NOT RESULT IN IMMEDIATE REACTOR TRIP: <P-8)

I. OBJECTIVES

The purpose of this procedure is to test the simulator response to a Main Turbine Trip (maximum power level which does not result in immediate reactor trip: < P-8) as required by ANSI/ANS-3.5-1985.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.
2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.
3. TDI 700-03: Simulator Testing Program.

III. INITIAL CONDITIONS

1. The turbine is synchronized to the grid with Reactor Power ≈ 28% with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.
2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.
3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.
4. P-8 bypass permissive light is lit.
5. Steam dumps are in the T_{ave} mode and are available.

BRAIDWOOD SIMULATOR TRANSIENT TEST

TURBINE TRIP (MAXIMUM POWER LEVEL WHICH DOES NOT RESULT IN IMMEDIATE REACTOR TRIP: <P-8)

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables (T_c, T_h, S/G pressure and level shall be on loop 1):

   a. Neutron flux (Rx power)

   b. RCS average temperature

   c. Pressurizer pressure

   d. Pressurizer level

   e. Pressurizer steam temperature

   f. Steam flow

   g. Feed flow

   h. Hot leg temperature

   i. Cold leg temperature

   j. S/G pressure

   k. S/G level

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.

2. Enter the data collection points from Section IV into the ZETA Plotter program.

3. Trip the main turbine.

4. Continue until stable plant conditions are established.

5. Graph the variables listed under Section IV.

BRAIDWOOD SIMULATOR TRANSIENT TEST

TURBINE TRIP (MAXIMUM POWER LEVEL
WHICH DOES NOT RESULT IN IMMEDIATE REACTOR TRIP: <P-8)

VI. ACCEPTANCE CRITERIA

****
NOTE
The simulator response will be compared to baseline data by the Braidwood Simulator Transient Test Review Board. The Review Board will determine if the simulator has the capability to adequately reproduce the defined transient.
****

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer safety valves shall NOT lift.

2. Steam generator safety valves shall NOT lift.

3. Safety injection is NOT initiated.

4. The reactor does NOT trip.

5. All turbine throttle and governor valves close and remain closed.

6. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.

7. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

BRAIDWOOD SIMULATOR TRANSIENT TEST

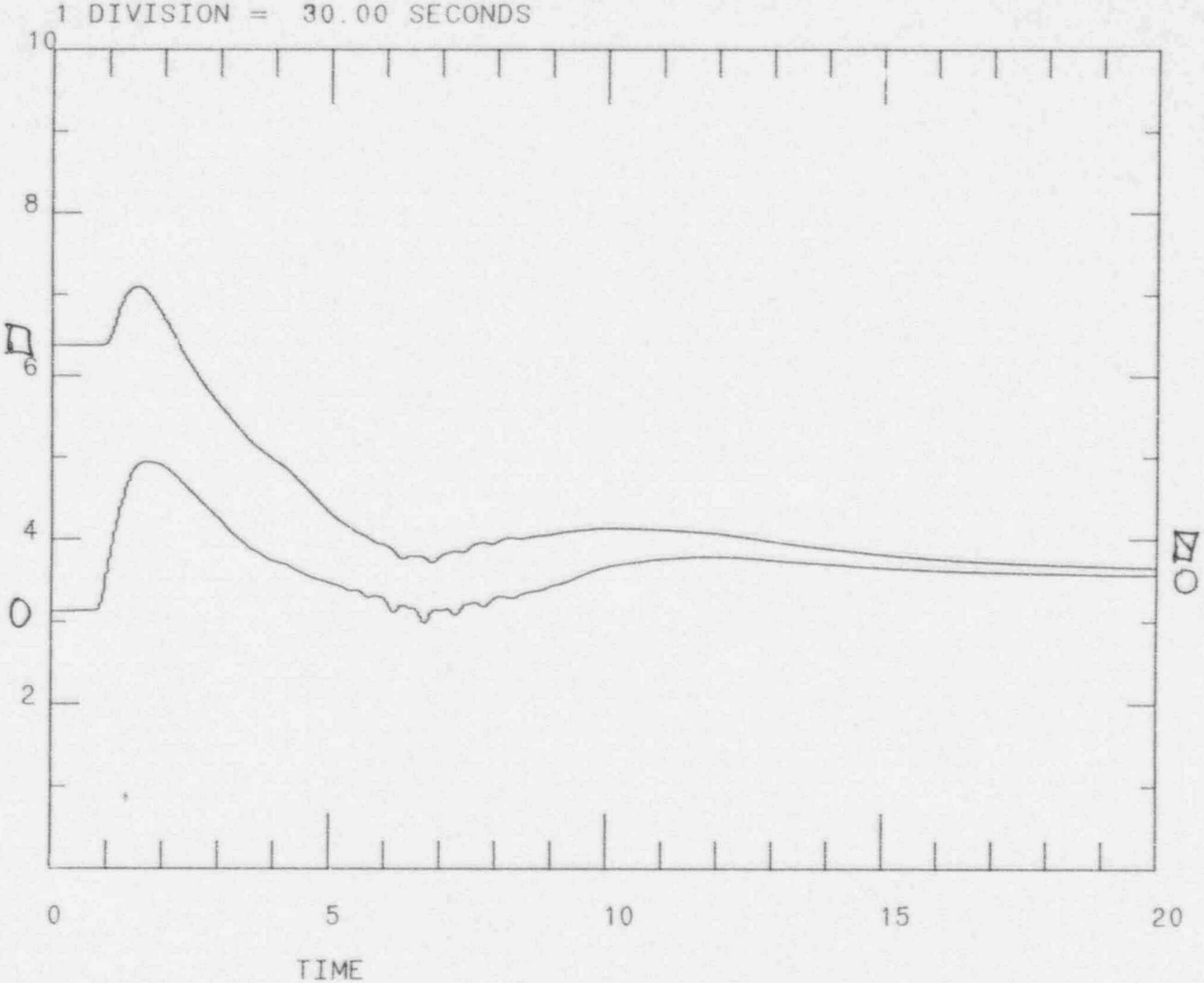
TURBINE TRIP (MAXIMUM POWER LEVEL
WHICH DOES NOT RESULT IN IMMEDIATE REACTOR TRIP: <P-8)

VII. LIST OF FIGURES

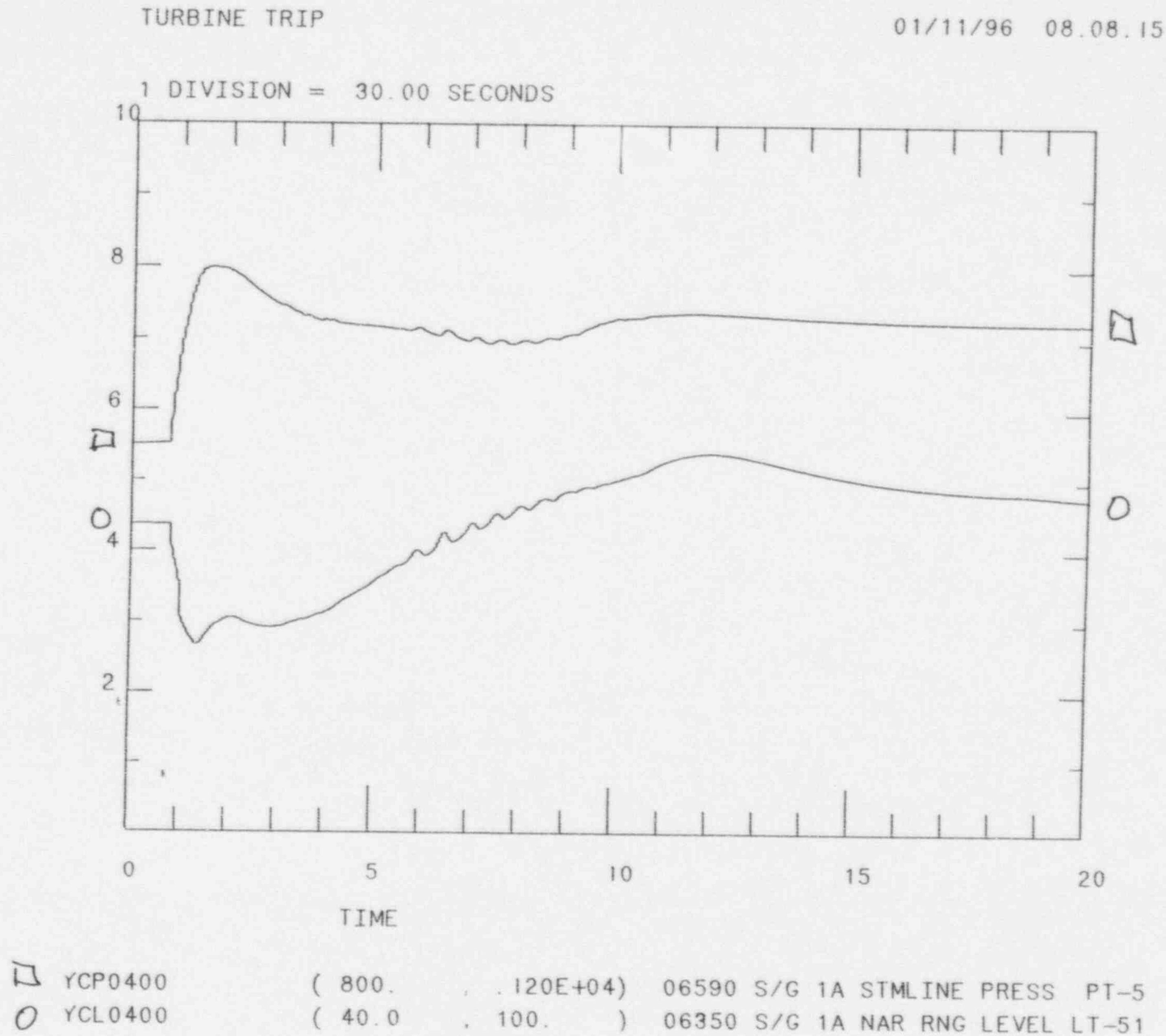
NOTE

Total steam flow and total feed flow were not available from Braidwood Unit One data. Loop 1 steam flow and feed flow were substituted to aid in data comparison.

TURBINE TRIP 01/11/96 08:01:19



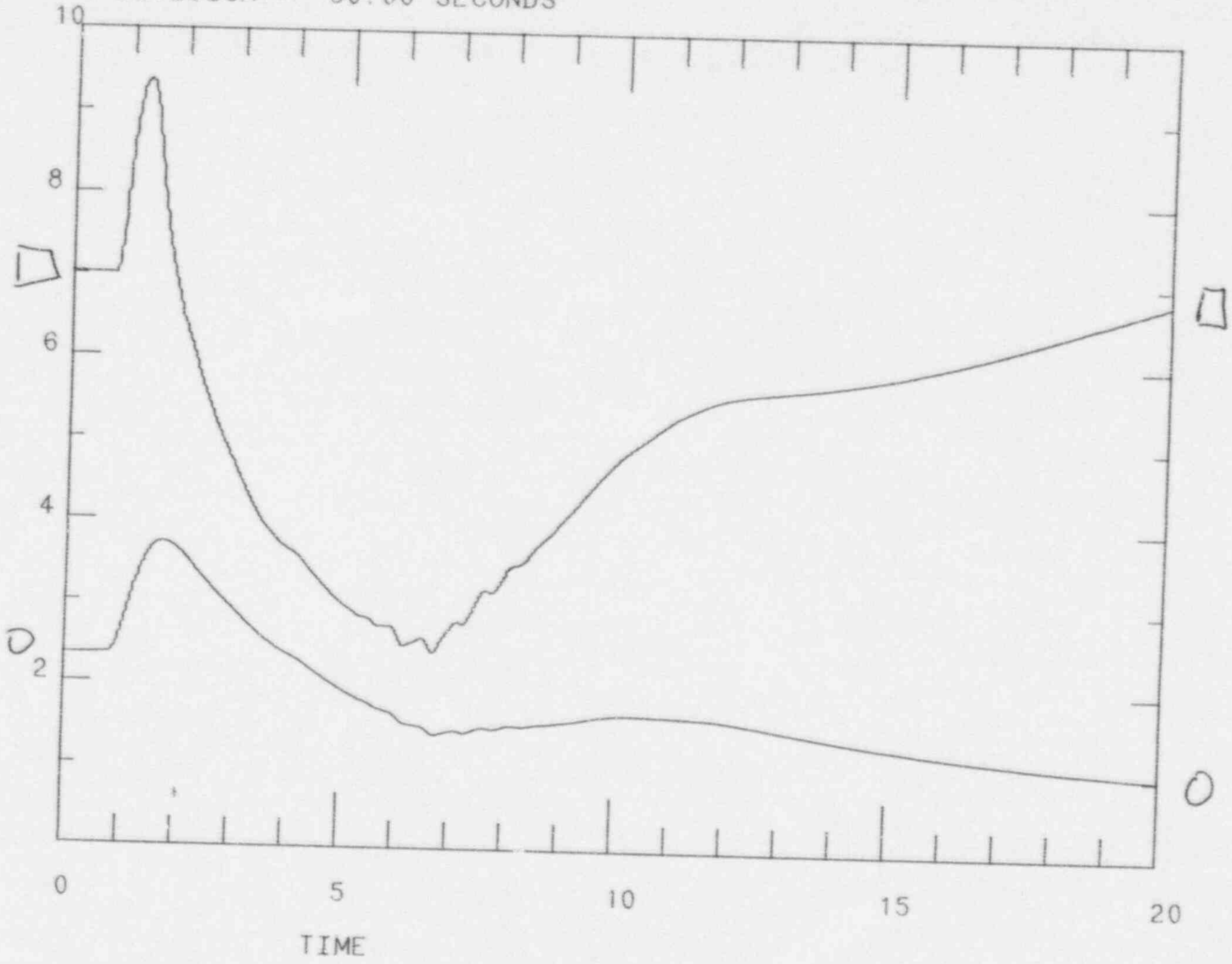
YCT0419	(540.	, 590.	)	06830 RC LOOP 1A WR HOT LEG T
YCT0406	(540.	, 590.	)	06825 RC LOOP 1A WR COLD LEG T


TURBINE TRIP
01/11/96 08.08.15
1 DIVISION = 30.00 SECONDS
10
8
6
4
2
0
5
10
15
20
TIME
YCP0400 (800. . .120E+04) 06590 S/G 1A STMLINE PRESS PT-5
YCL0400 (40.0 . 100.) 06350 S/G 1A NAR RNG LEVEL LT-51

TURBINE TRIP

01/11/96 07:50:43

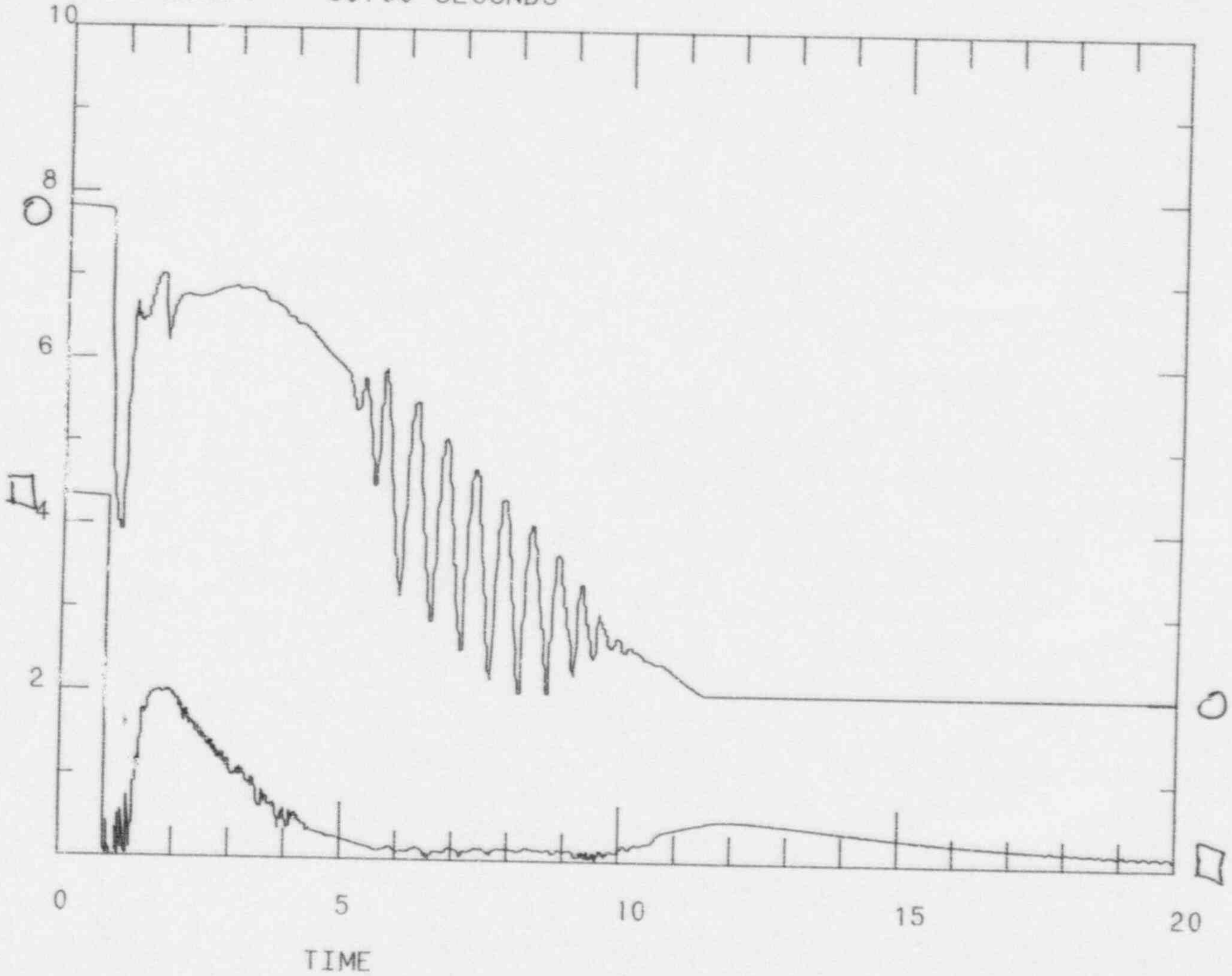
1 DIVISION = 30.00 SECONDS



YCP0480	(.210E+04, .230E+04)	06720	PRESSURIZER PRESS PT-455
YCL0480	(20.0 , 80.0)	06550	PRESSURIZER LEVEL LT-459

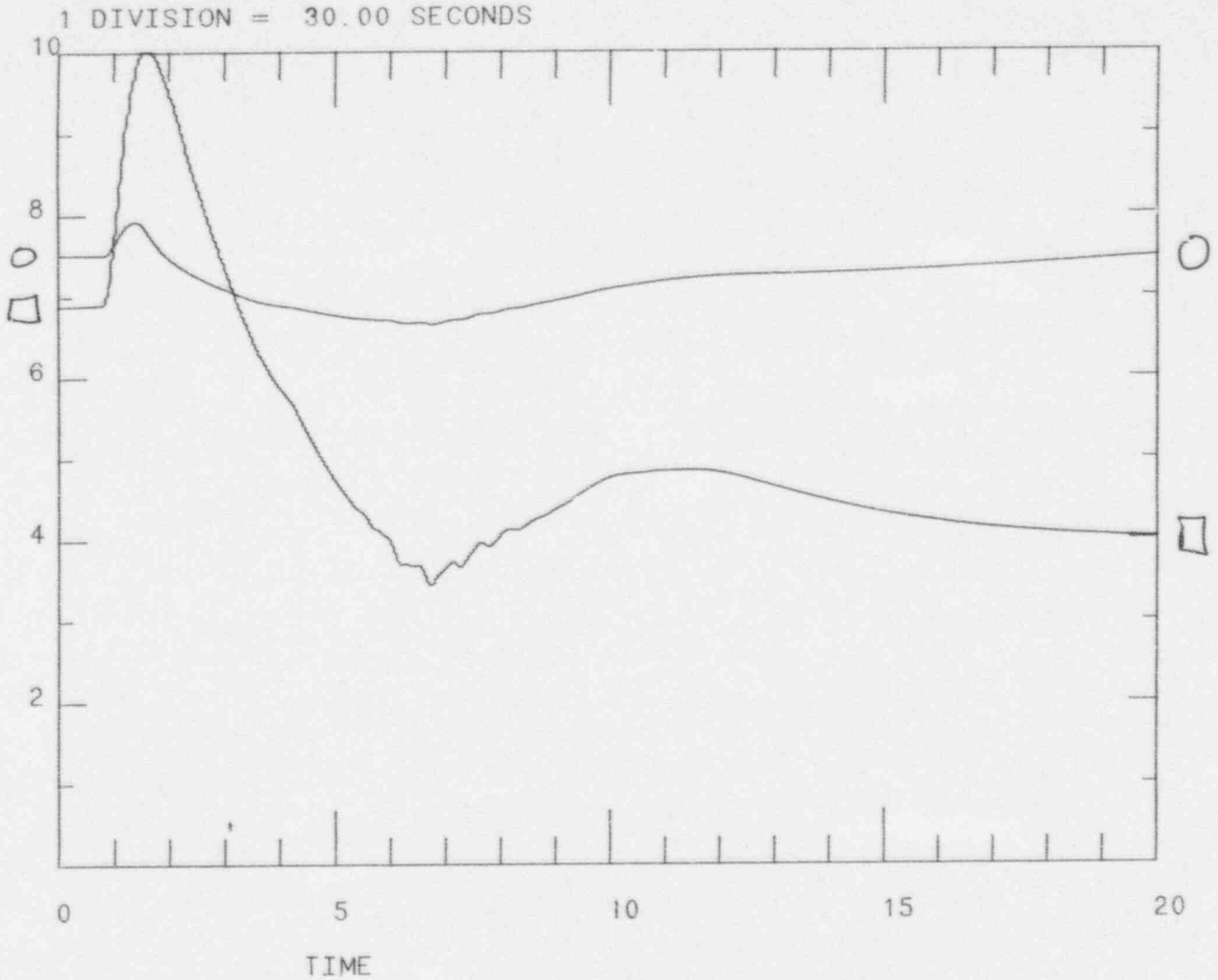
TURBINE TRIP 01/11/96 07:56:03

1 DIVISION = 30.00 SECONDS



YCF0405	(.000	, .200E+04)	06060 S/G 1A STEAM F FT-512
YCF0403	(-300.	, .120E+04)	06040 SG 1A FW F FT-510

TURBINE TRIP 01/11/96 07:45:33



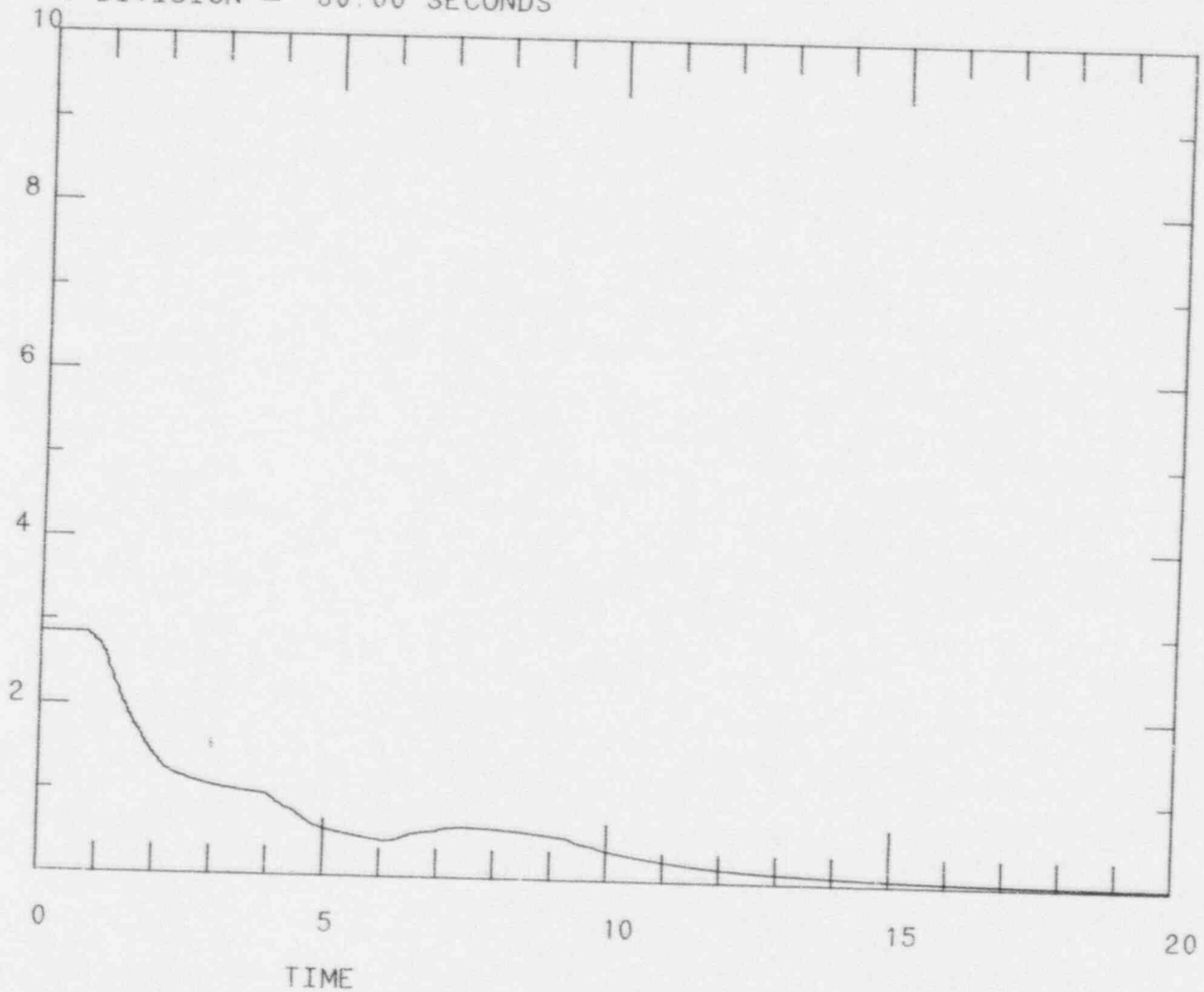
RXTAVG (550. , 570.) 01200 LOOP TABLE

YCT0481 (600. , 670.) 91250 PRESSURIZER STM T

TURBINE TRIP

01/11/96 07:41:31

1 DIVISION = 30.00 SECONDS



YCN0049 (.000 , 105.) 21090 PWR RNG CH 41 (QUAD 4) TOT

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-6 Turbine trip w/o Rx trip DATE: 1/11/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: ______
DATA: ______
PLANT: ______

COMMENTS: Rods will automatically insert and Shutdown the reactor

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Rx Power	None	Acceptable
Tave		
PZR Temp		
PZR level		
PZR Press		
Feed Flow		
Steam Flow		
Th		
Tc		

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
Steam Press	None	Acceptable
S/G level	↓	↓

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

COMMENTS:

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-7 Date Performed 1/11/96

Test Description: Max rate power ramp test

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

___ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

___ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ______ Date ______

Test Complete [signature] Date 1/11/96

SFCC Acceptance [signature] Date 2/9/96

Test Number: TR-7
Revision Number/Date: 07, 11/08/93
Frequency: ANNUAL

BRAIDWOOD SIMULATOR TRANSIENT TEST
MAXIMUM RATE POWER RAMP

I. OBJECTIVES

The purpose of this procedure is to:

1. Test the simulator response to a Maximum Rate Power Ramp as required by ANSI/ANS-3.5-1985.

2. Verify proper nuclear plant transient response, including automatic control system performance, when 10% step load changes are introduced at the turbine generator.

****

NOTE

ANSI/ANS-3.5-1985, Section 5.4.2, Simulator Operability Testing, (footnote 3) recommends substitution of Appendix B transient tests if these tests provide a more representative comparison to actual or predicted reference plant performance. In accordance with this recommendation, Braidwood Startup Test (BWSU NR-36), was substituted for the Appendix B, Section B.2.2(7), maximum rate power ramp test.

****

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.

2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.

3. TDI 700-03: Simulator Testing Program.

4. Braidwood Startup Test (BWSU NR-36): 10% Turbine Load Change.

BRAIDWOOD SIMULATOR TRANSIENT TEST
MAXIMUM RATE POWER RAMP

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state conditions at approximatly 98% with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.

2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.

3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.

4. The following control systems are in automatic:

   a. Rod Control.

   b. Steam Generator Level.

   c. Pressurizer Pressure.

   d. Pressurizer Level.

   e. Steam Dump Control (T_{ave} Mode).

   f. Feedwater Pump Speed.

   g. DEHC.

BRAIDWOOD SIMULATOR TRANSIENT TEST
MAXIMUM RATE POWER RAMP

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables (T_c, T_h, S/G pressure and level shall be on loop 1):

   a. Neutron flux (Rx power)

   b. RCS average temperature

   c. Pressurizer pressure

   d. Pressurizer level

   e. Pressurizer steam temperature

   f. Steam flow

   g. Feed flow

   h. Hot leg temperature

   i. Cold leg temperature

   j. S/G pressure

   k. S/G level

V. TEST INSTRUCTIONS

1. Ensure the plant me·· the initial conditions as specified in Section III.

2. Enter the data collection points from Section IV into the ZETA Plotter program.

3. Initiate a 10% load swing from 98% to ≈ 88%.

   a. Reduce turbine load by 118 MW at 2350 MW/Min.

   b. Allow plant conditions to stabilize.

4. Graph the variables listed under Section IV.

BRAIDWOOD SIMULATOR TRANSIENT TEST
MAXIMUM RATE POWER RAMP

V. TEST INSTRUCTIONS (Cont.)

5. Initiate a 10% load swing from 88% to ≈ 98%.

   a. Increase turbine load by 118 MW at 2350 MW/Min.

   b. Allow plant conditions to stabilize.

6. Graph the variables listed under Section IV.

VI. ACCEPTANCE CRITERIA

NOTE

The simulator response will be compared to baseline data by the Braidwood Simulator Transient Test Review Board. The Review Board will determine if the simulator has the capability to adequately reproduce the defined transient.

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer relief or safety valves shall NOT lift.

2. Steam generator relief or safety valves shall NOT lift.

3. Safety injection is NOT initiated.

4. The reactor and turbine shall NOT trip.

5. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.

6. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

7. Manual intervention will not be required to bring plant conditions to steady state.

BRAIDWOOD SIMULATOR TRANSIENT TEST
MAXIMUM RATE POWER RAMP

VI. ACCEPTANCE CRITERIA (Cont.)

8. Plant variables (T_{ave}, Pzr Pressure, Feed Flow, Steam Flow, Steam Generator Level, Pzr Level) will not incur sustained or diverging oscillations.

9. Nuclear power overshoot (undershoot) will be less than 3% for turbine load increases (decreases).

VII. LIST OF FIGURES (downpower and uppower transient)

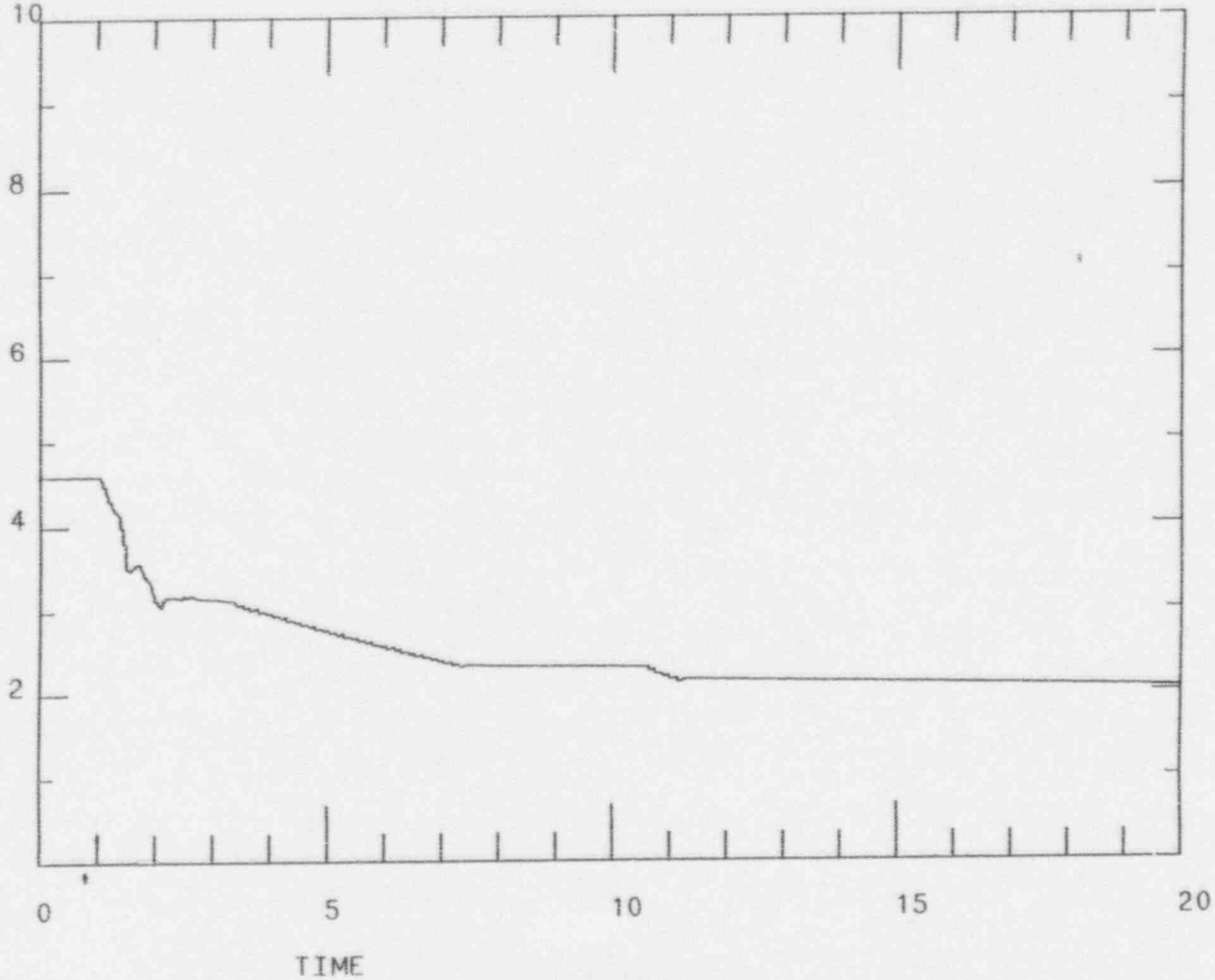
1. Rx Power
2. RCS Average Temperature
3. Pressurizer Pressure
4. Pressurizer Level
5. Pressurizer Steam Temperature
6. Steam Flow - Loop 1
7. Feed Flow - Loop 1
8. Hot Leg Temperature - Loop 1
9. Cold Leg Temperature - Loop 1
10. S/G Pressure - Loop 1
11. S/G Level - Loop 1

NOTE

Total steam flow and total feed flow were not available from Braidwood Unit One data. Loop 1 steam flow and feed flow were substituted to aid in data comparison.

DOWNPOWER 01/11/96 10:16:21

1 DIVISION = 30.00 SECONDS

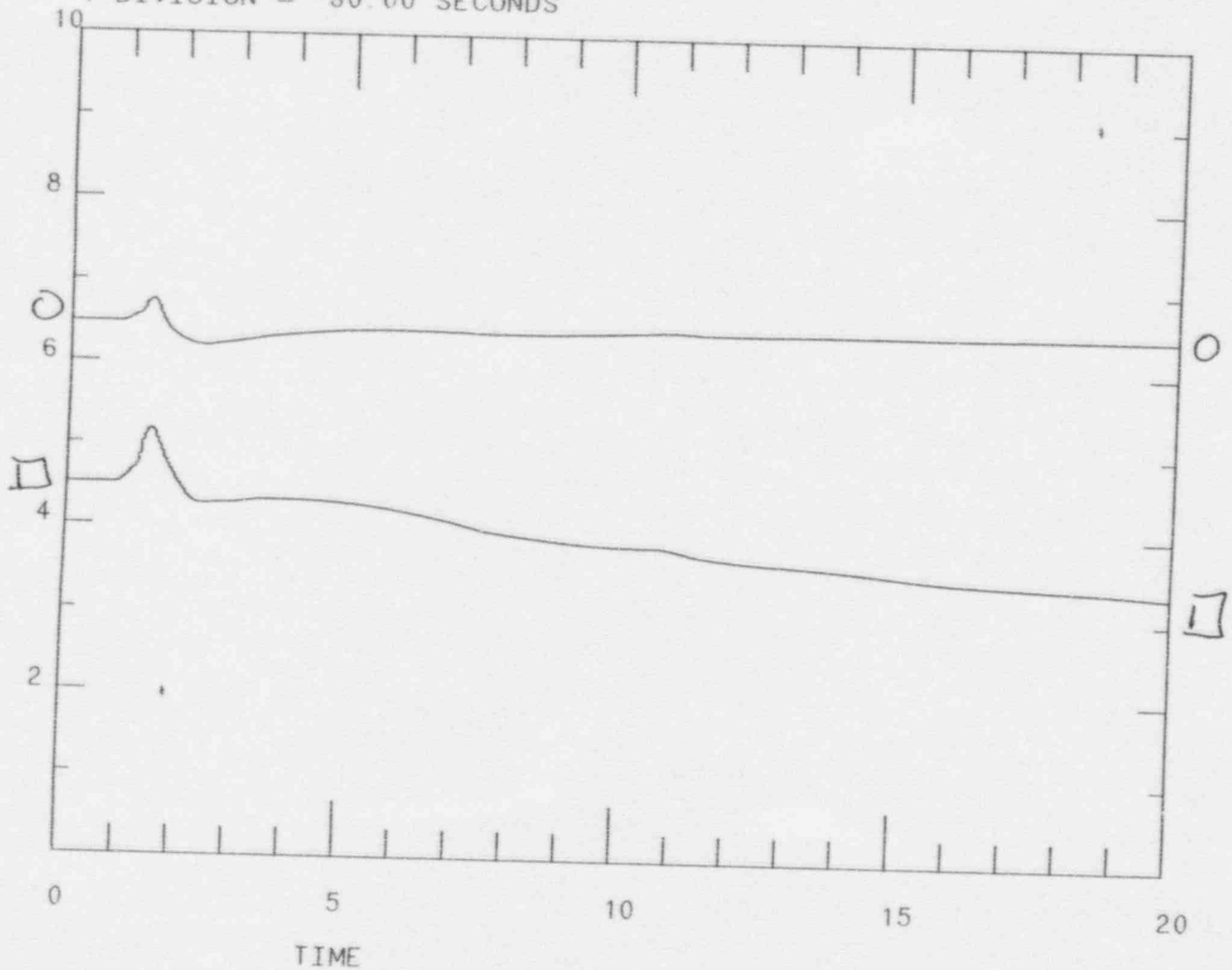


YCN0049 (75.0 , 125.) 21090 PWR RNG CH 41 (QUAD 4) TOT

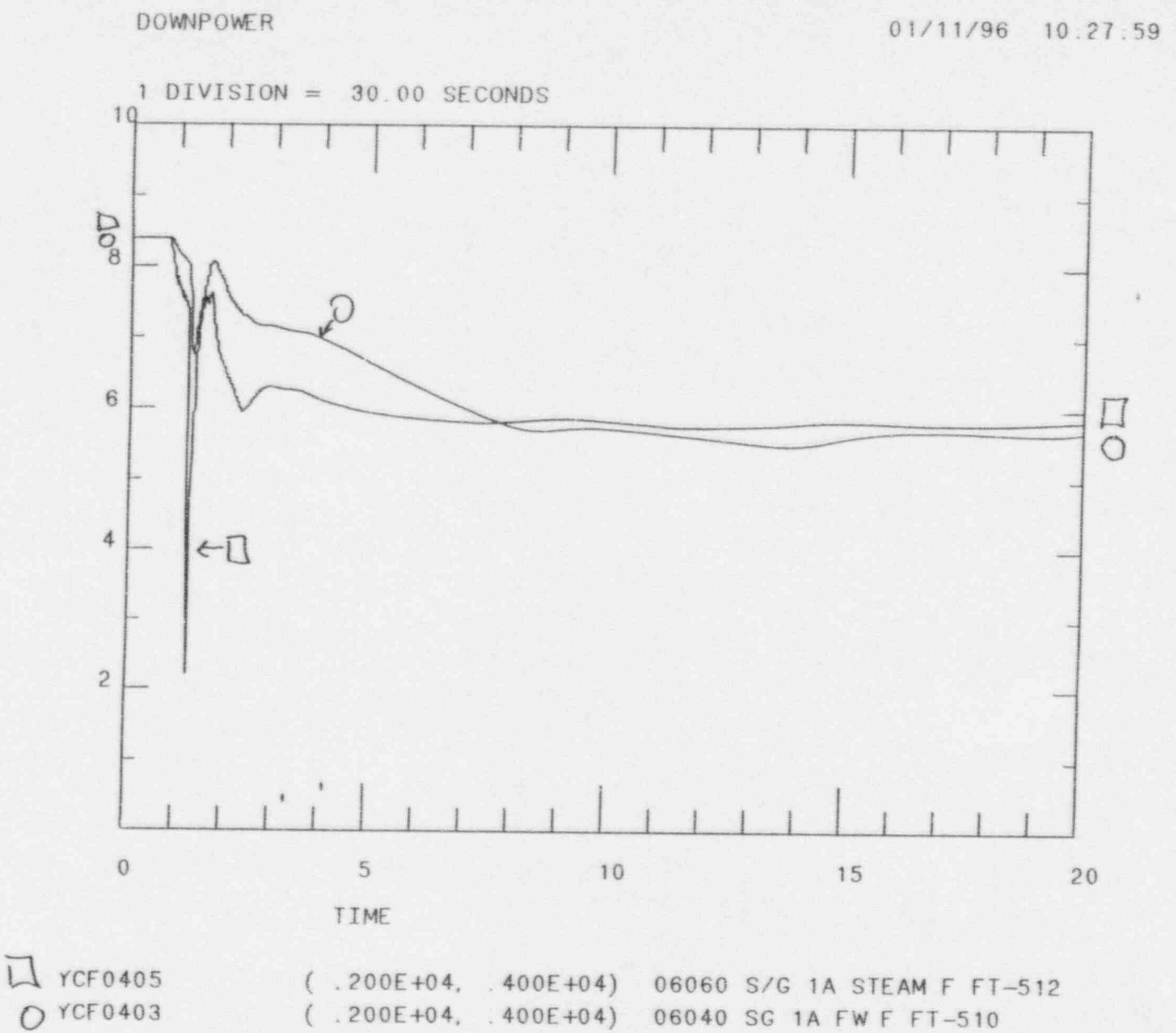
DOWNPOWER

01/11/96 10:20:58

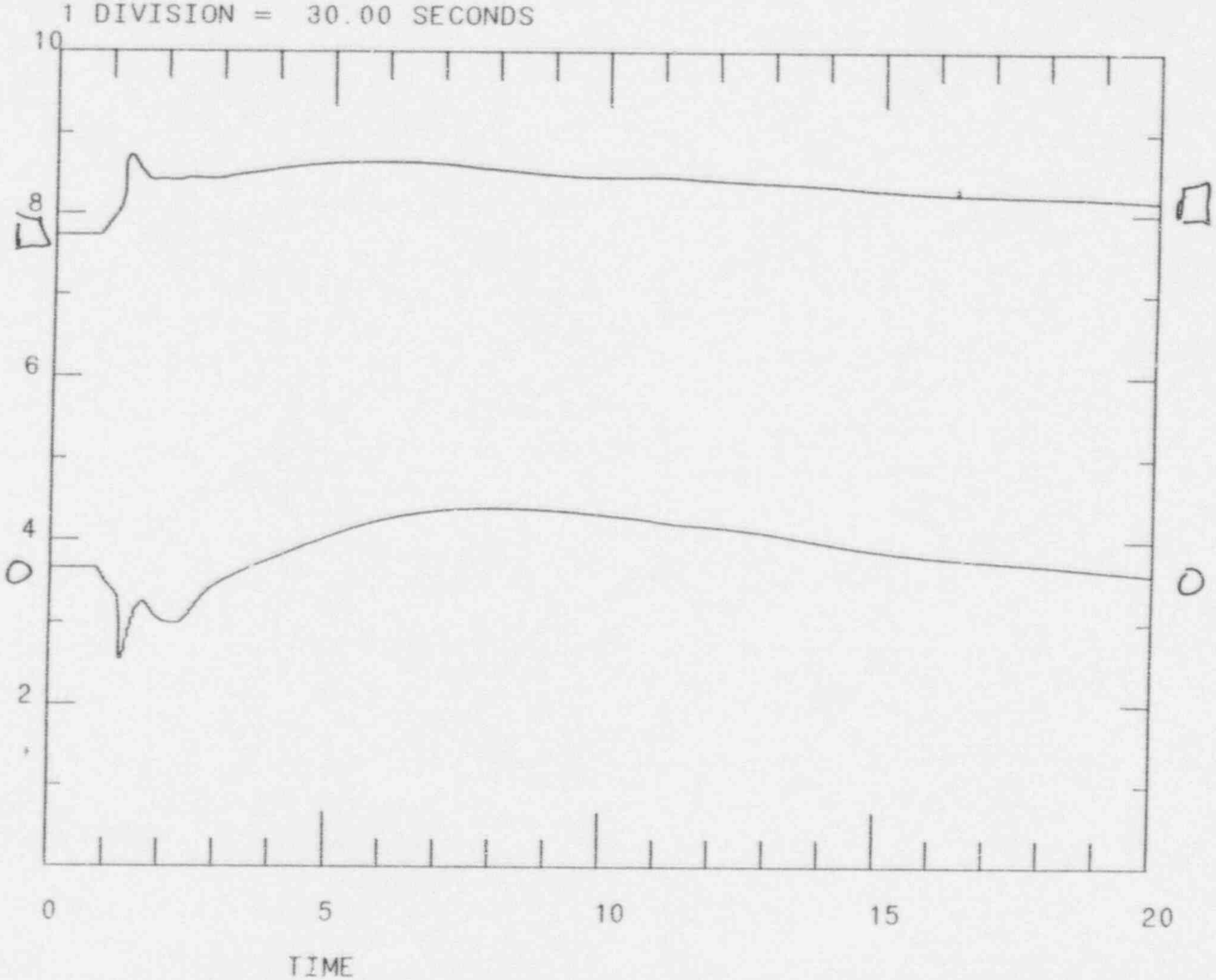
1 DIVISION = 30.00 SECONDS



RXTAVG	(570.	, 600.	)	01200 LOOP TABLE
YCT0481	(620.	, 670.	)	91250 PRESSURIZER STM T


DOWNPOWER
01/11/96 10:27:59
1 DIVISION = 30.00 SECONDS
10
8
6
4
2
0
5
10
15
20
TIME
YCF0405 (.200E+04, .400E+04) 06060 S/G 1A STEAM F FT-512
YCF0403 (.200E+04, .400E+04) 06040 SG 1A FW F FT-510

DOWNPOWER 01/11/96 10.35.03



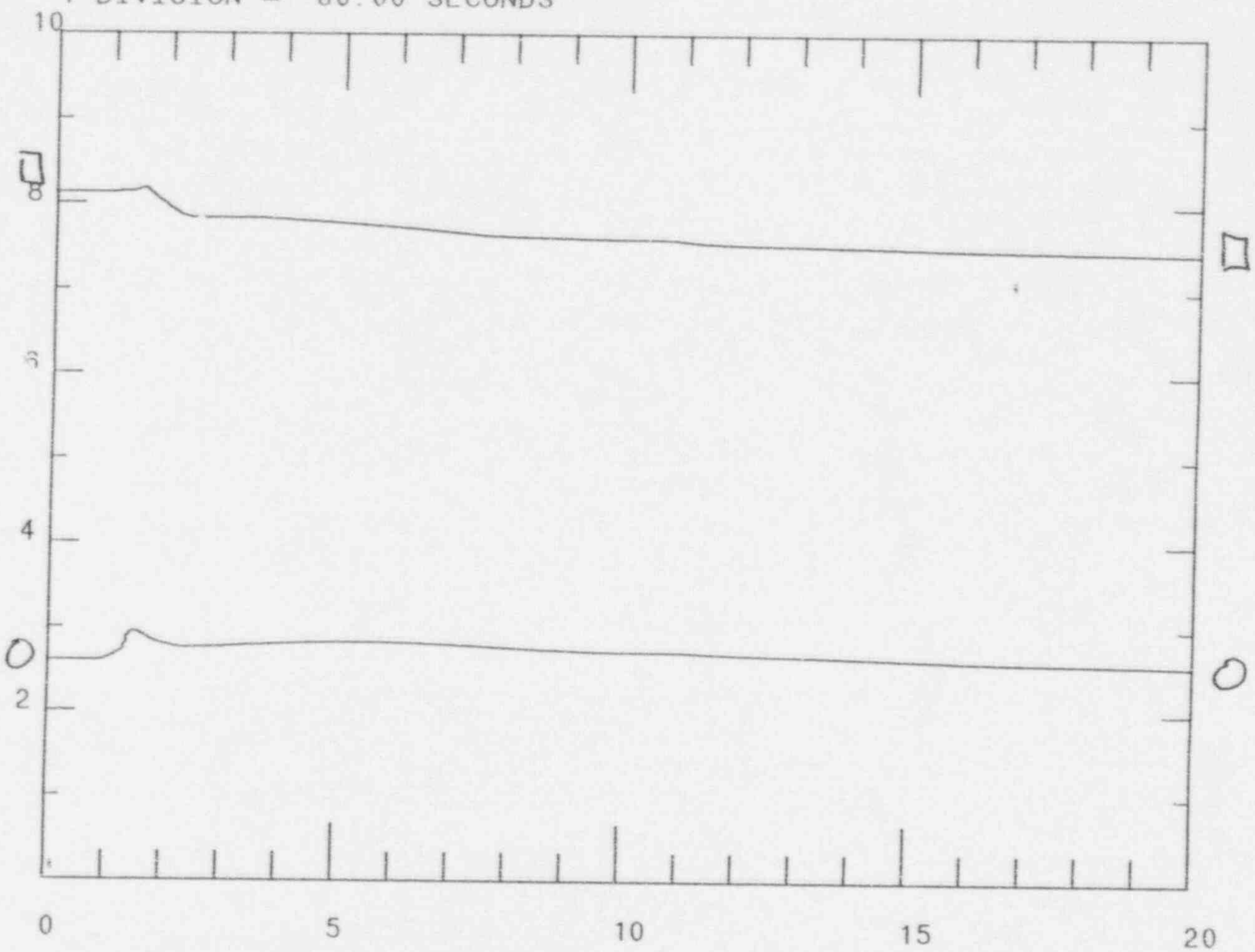
YCP0400 (600. , .100E+04) 06590 S/G 1A STMLINE PRESS PT-5

YCL0400 (55.0 , 85.0) 06350 S/G 1A NAR RNG LEVEL LT-51

DOWNPOWER

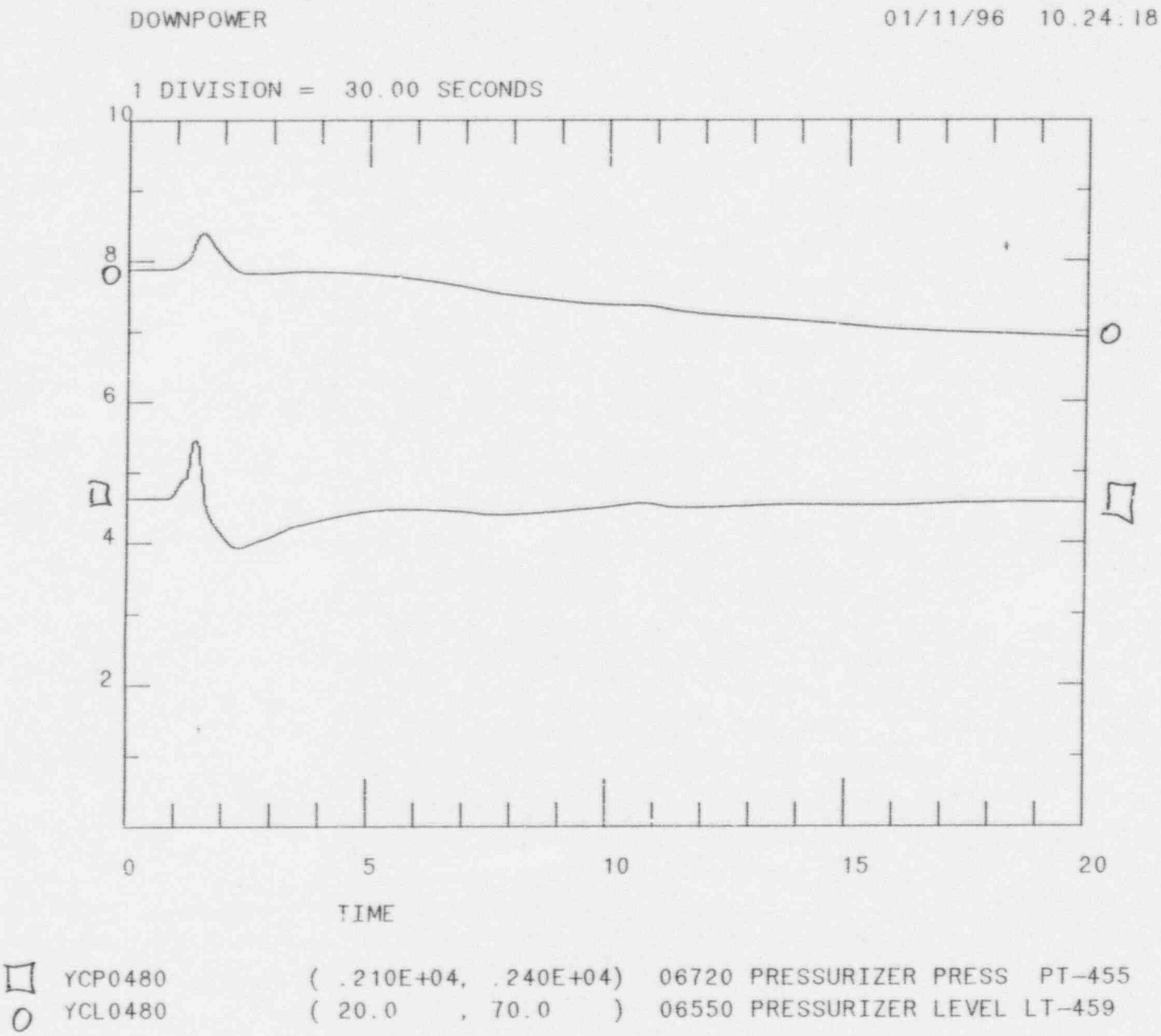
01/11/96 10.31.31

1 DIVISION = 30.00 SECONDS



TIME

□ YCT0419	(530.	, 630.	)	06830 RC LOOP 1A WR HOT LEG T
O YCT0406	(530.	, 630.	)	06825 RC LOOP 1A WR COLD LEG T



DOWNPOWER
01/11/96 10.24.18
1 DIVISION = 30.00 SECONDS
10
8
6
4
2
0
5
10
15
20
TIME
YCP0480 (.210E+04, .240E+04) 06720 PRESSURIZER PRESS PT-455
YCL0480 (20.0 , 70.0) 06550 PRESSURIZER LEVEL LT-459

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-7 Downpower DATE: 1/11/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: BwSU NR36
DATA:
PLANT: Braidwood Unit 1

COMMENTS: Utilized this data as similar plant data since BwSU NR-36 contains Cycle 1 Tave, Th, Tc, PZR level, S/G Press.

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Rx Power	None	Acceptable
Tave	↓	↓
PZR Temp		
PZR Press		
PZR Level		
Steam Flow		
Feed Flow		
Th		
Tc	↓	↓

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
Steam Press	None	Acceptable
S/G Level	↓	↓

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

COMMENTS:

TR-7

AUTHORIZED FOR TESTING

1.0 DATA SHEETS TO BE USED WITH THE APPROPRIATE SEQUENCE DOCUMENT

11.1 10% LOAD DECREASE FROM SPECIFIED POWER (TABLE 1)

(Expected values are indicated in 13.0, Appendix C)

PLANT PARAMETER		EPN	~~10.1~~ INITIAL CONDITION	~~10.1~~ DURING TRANSIENT MINIMUM	~~10.1~~ DURING TRANSIENT MAXIMUM	~~10.1~~ FINAL CONDITION
Plant Operating Level (MWe-Gross)		1JR-MP003	1150	XXX	XXX	1000
Power - Nuclear	(%)	1NR-45	98	~~86~~ 85	87	87
Tave (Auctioneered High)	(°F)	1TR-412	584	580	584	581
Tave - Loop A	(°F)	Recorder 2 Pen 1	583.2	580.1	584.5	580.1
Tave - Loop B	(°F)	Recorder 2 Pen 2	583.2	580.1	584.5	580.1
Tave - Loop C	(°F)	Recorder 2 Pen 3	583.0	580.1	584.3	580.1
Tave - Loop D	(°F)	Recorder 2 Pen 4	582.7	579.7	584	579.7
Tref	(°F)	1TR-412	584	XXX	XXX	591
DELTA T - Loop A	(%)	1TR-411	98	86	~~78~~ 88	88
OPΔT Setpoint - Loop A	(%)	1TR-411	107	XXX	XXX	107
OTΔT Setpoint - Loop A	(%)	1TR-411	125	XXX	XXX	125
Pressurizer Pressure	(psig)	1PR-455	2235	2205	2235	2235
Pressurizer Level	(%)	1LR-459	55	49	55	55
Steam Header Pressure	(psig)	Recorder 4 Pen 2	956	970	1016	970
Steam Flow - Loop A	(10^6 LB/HR)	1FR-510	3.5	XXX	XXX	3.2
Steam Flow - Loop B	(10^6 LB/HR)	1FR-520	3.6	XXX	XXX	~~3.6~~ 3.2
Steam Flow - Loop C	(10^6 LB/HR)	1FR-530	3.6	XXX	XXX	3.2
Steam Flow - Loop D	(10^6 LB/HR)	1FR-540	3.55	XXX	XXX	3.2
Steam Generator Level-Loop A	(%)	1FR-510	~~66~~ 64	60	66	64
Steam Generator Level-Loop B	(%)	1FR-520	65	62	67	65
Steam Generator Level-Loop C	(%)	1FR-530	65	60	66	65
Steam Generator Level-Loop D	(%)	1FR-540	65	62	~~[illegible]~~ 67	65
Feedwater Temperature-Loop A	(°F)	T0418A	TCR #5 434.6	XXX	XXX	426.0
Feedwater Temperature-Loop B	(°F)	T0438A	JWL 433.9	XXX	XXX	425.3
Feedwater Temperature-Loop C	(°F)	T0458A	11/19/87 434.3	XXX	XXX	425.8
Feedwater Temperature-Loop D	(°F)	T0478A	434.2	XXX	XXX	425.5
Feedwater Flow - Loop A	(10^6 LB/HR)	1FR-510	3.6	XXX	XXX	3.25
Feedwater Flow - Loop B	(10^6 LB/HR)	1FR-520	3.6	XXX	XXX	~~3.6~~ 3.2
Feedwater Flow - Loop C	(10^6 LB/HR)	1FR-530	3.7	XXX	XXX	3.3
Feedwater Flow - Loop D	(10^6 LB/HR)	1FR-540	3.65	XXX	XXX	3.2
Feed Pump Disch. Hdr. Pres.	(psig)	Recorder 5 Pen 6	1155	1150	1205	1150
Feed Pump B Speed	(RPM)	Recorder 5 Pen 5	5250	4970	5390	4970
Control Rod Pos. - Bank C	(Steps)	U0051	228	XXX	XXX	228
Control Rod Pos. - Bank D	(Steps)	U0052	203	XXX	XXX	170
Boron Concentration	(PPM)	Log Book	650	XXX	XXX	650
AUCT. HI RX POWER	(%)	RECORDER 1 PEN 4	96.5	84.5	85.0	85.0

~~11.1.15~~

~~Time to reach equilibrium T_{avg}, based on the 4 Tave's recorded, following load change: ______ minutes~~

11.1.15 13 minutes for Tave stability

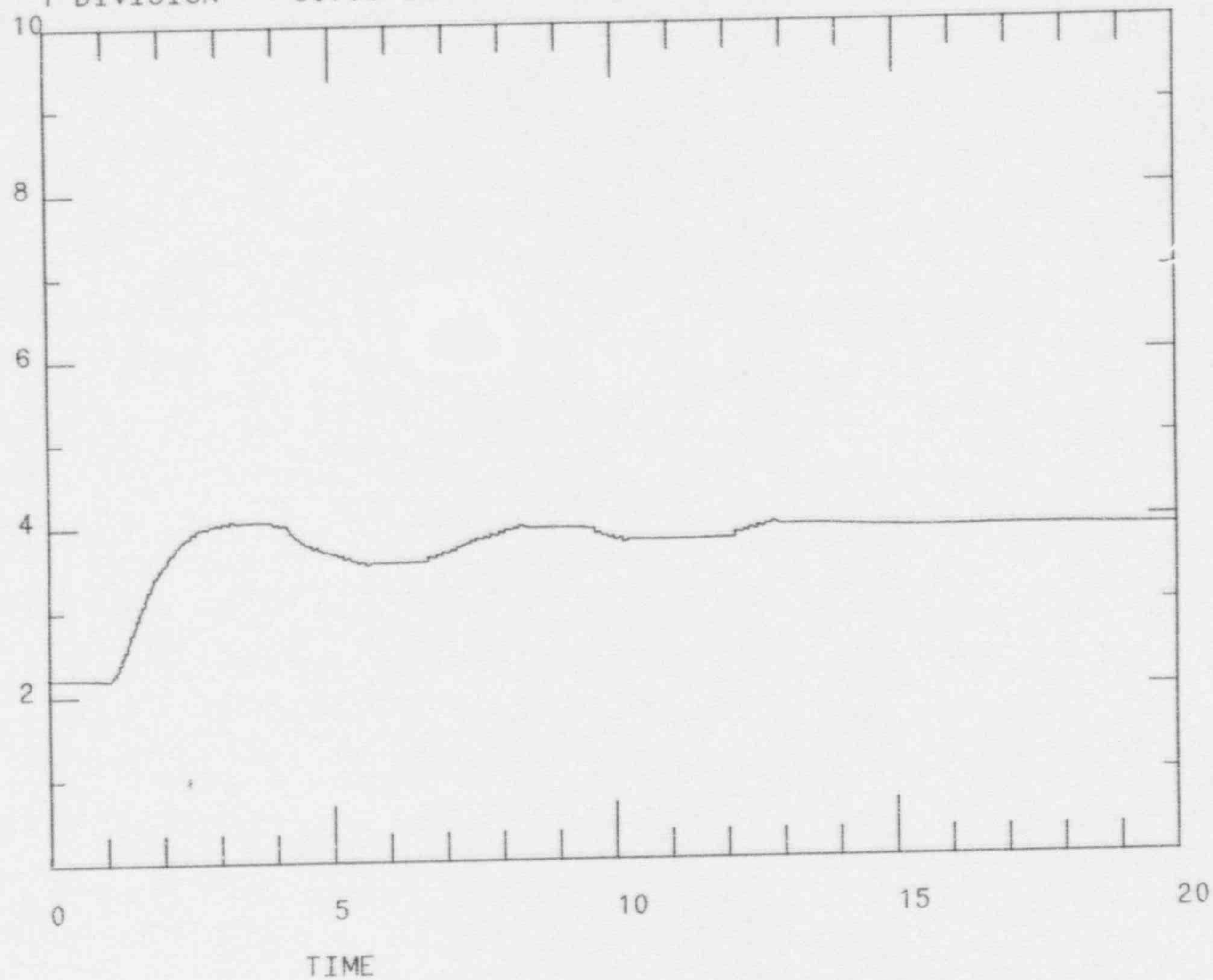
RW 12/21/87

0055N(081286)/0391A

UPPOWER

01/10/96 13:26.41

1 DIVISION = 30.00 SECONDS

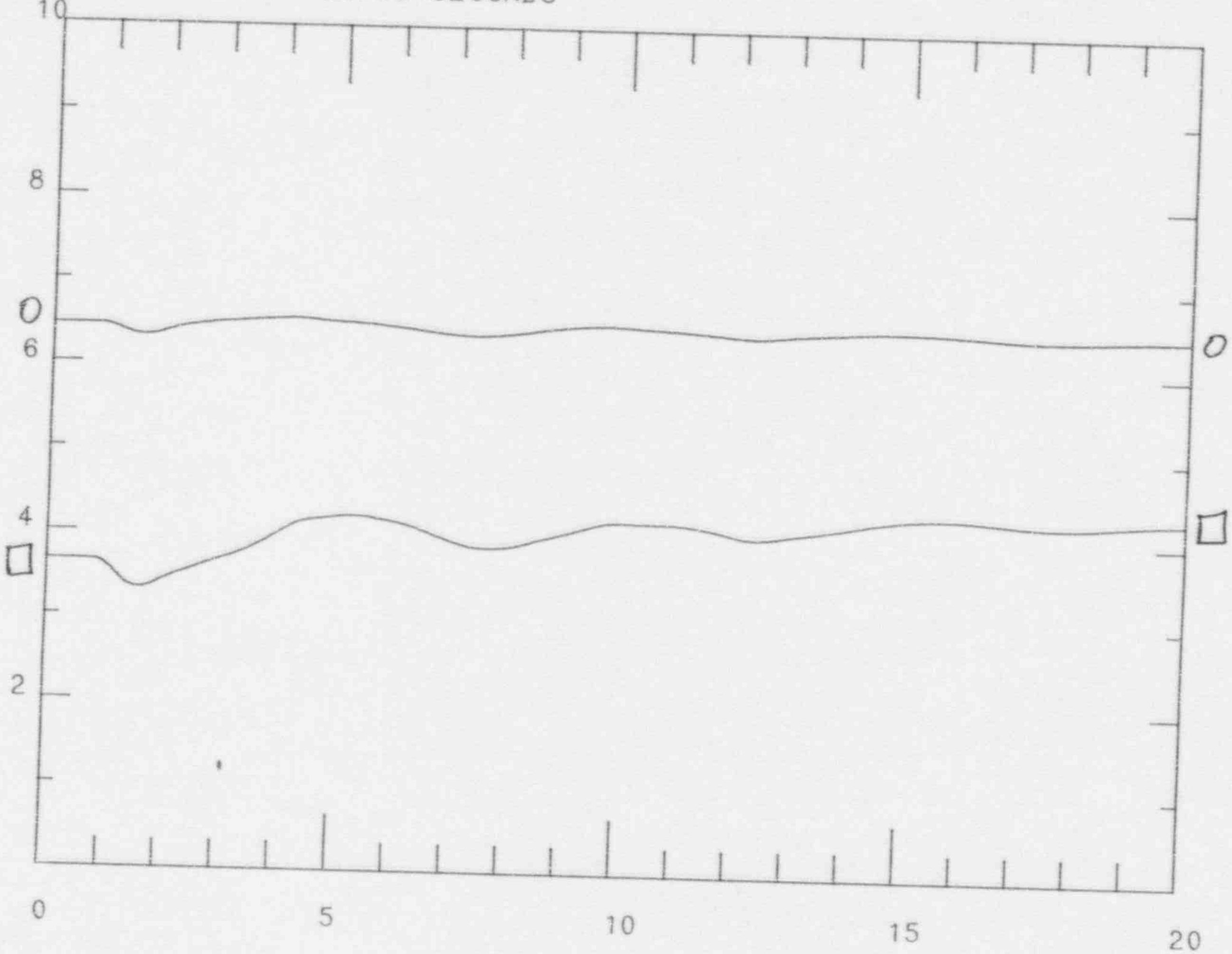


YCN0049 (75.0 , 125.) 21090 PWR RNG CH 41 (QUAD 4) TOT

UPPOWER

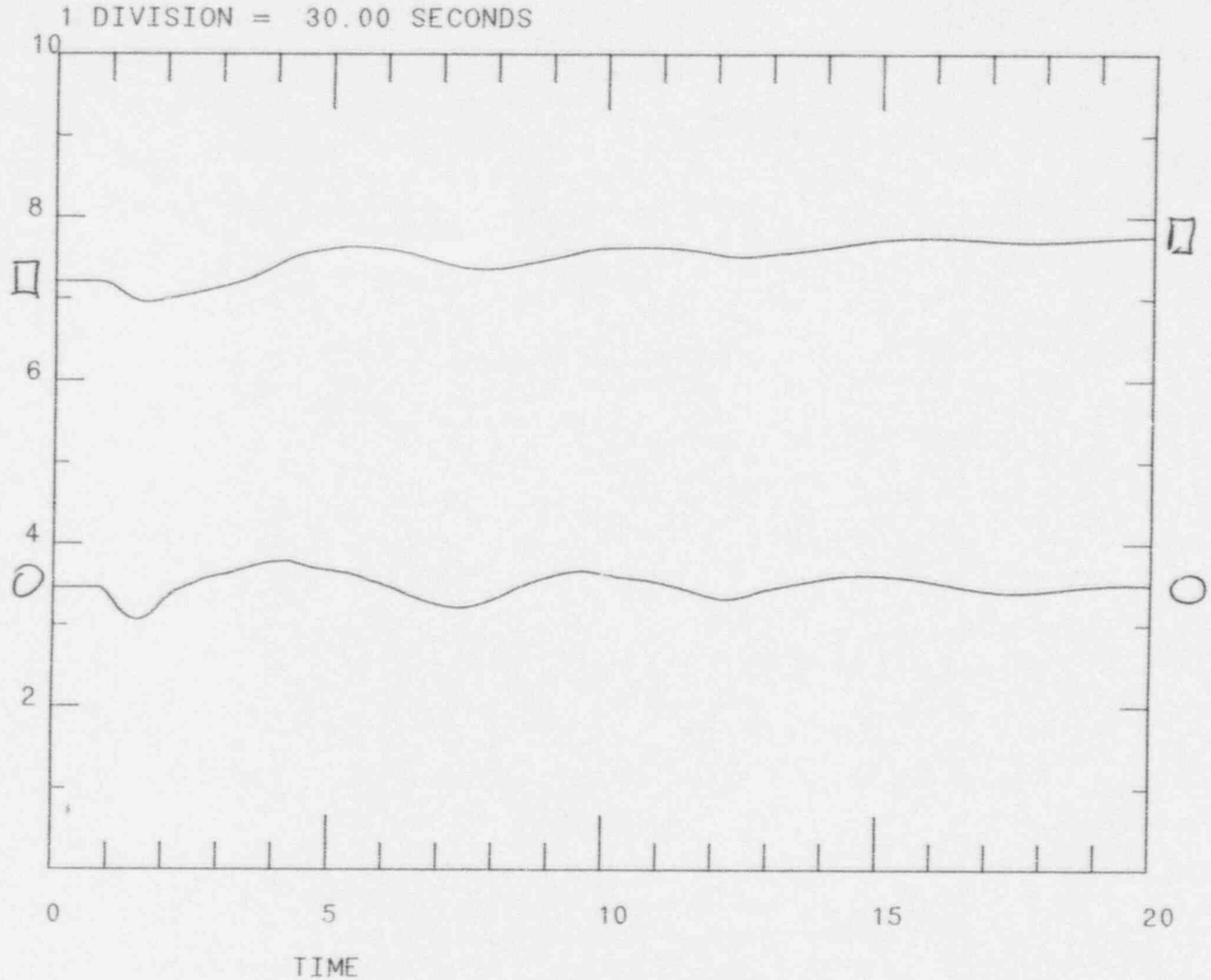
01/10/96 13:29:40

1 DIVISION = 30.00 SECONDS



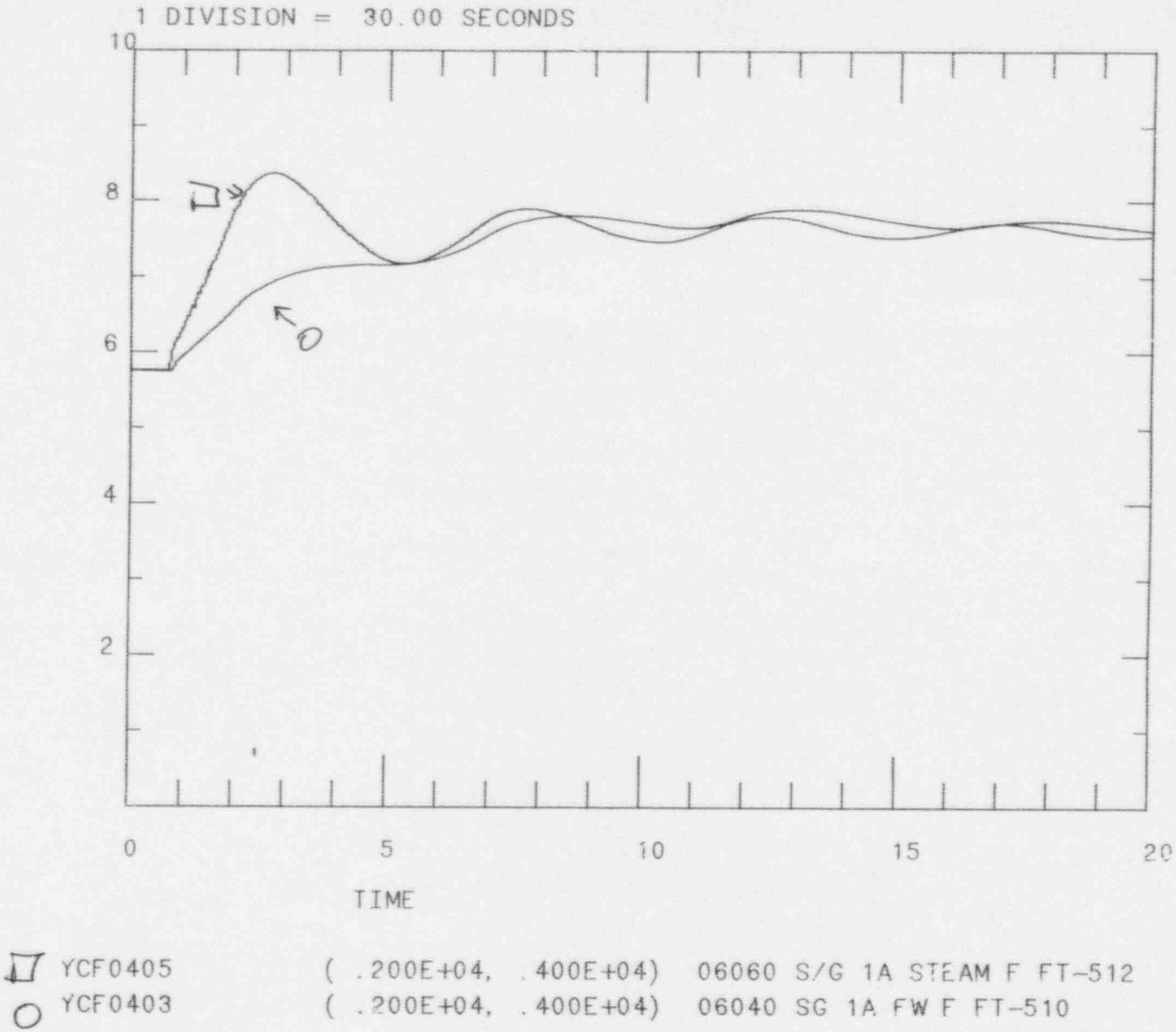
□ RXTAVG	(570.	, 600.)	01200 LOOP TABLE
O YCT0481	(620.	, 670.)	91250 PRESSURIZER STM T

UPPOWER 01/10/96 13:33:10



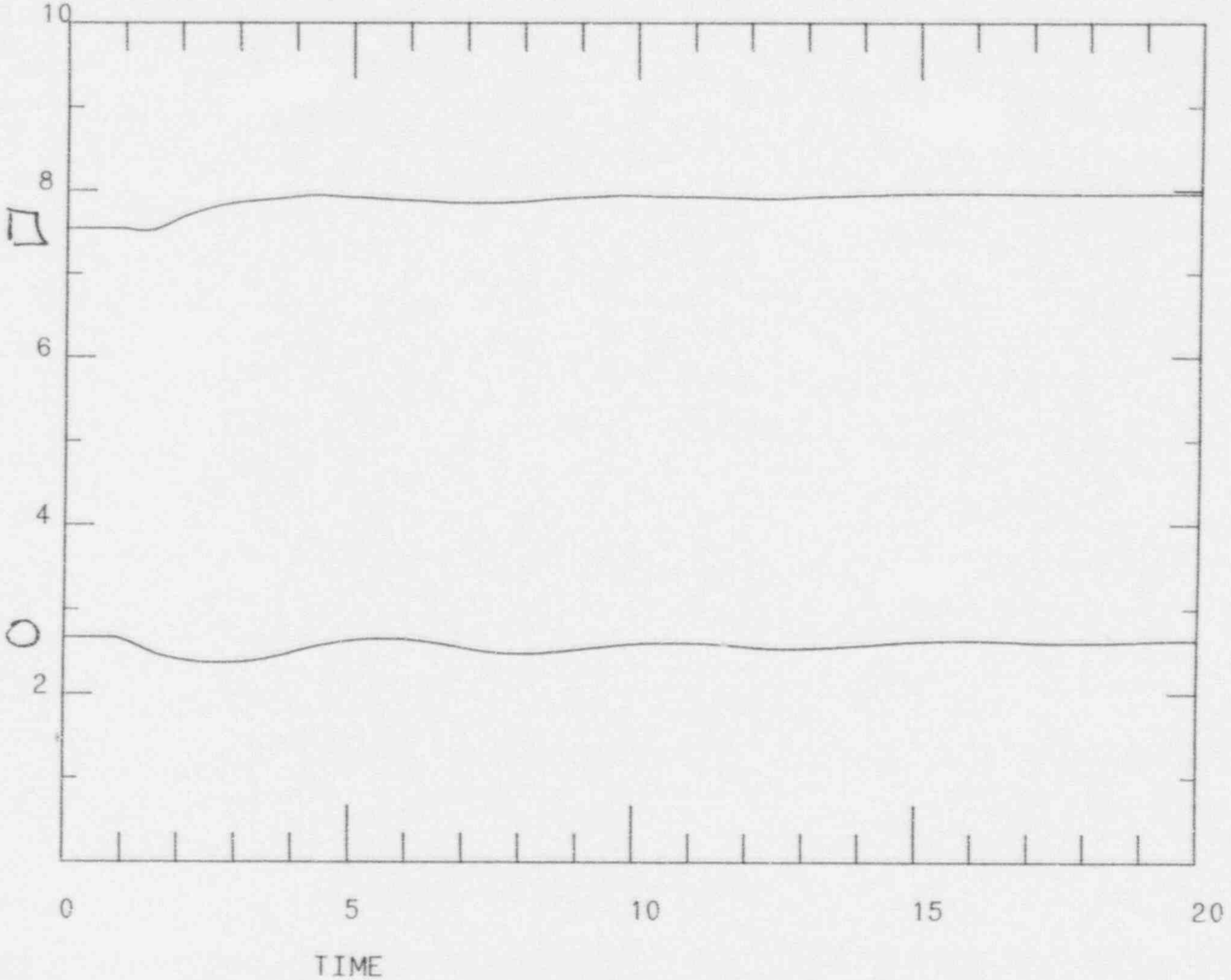
YCL0480	(20.0 , 70.0)	06550 PRESSURIZER LEVEL LT-459
YCP0480	(.215E+04, .240E+04)	06720 PRESSURIZER PRESS PT-455

UPPOWER 01/10/96 13.36.43



UPPOWER 01/10/96 13:40:20

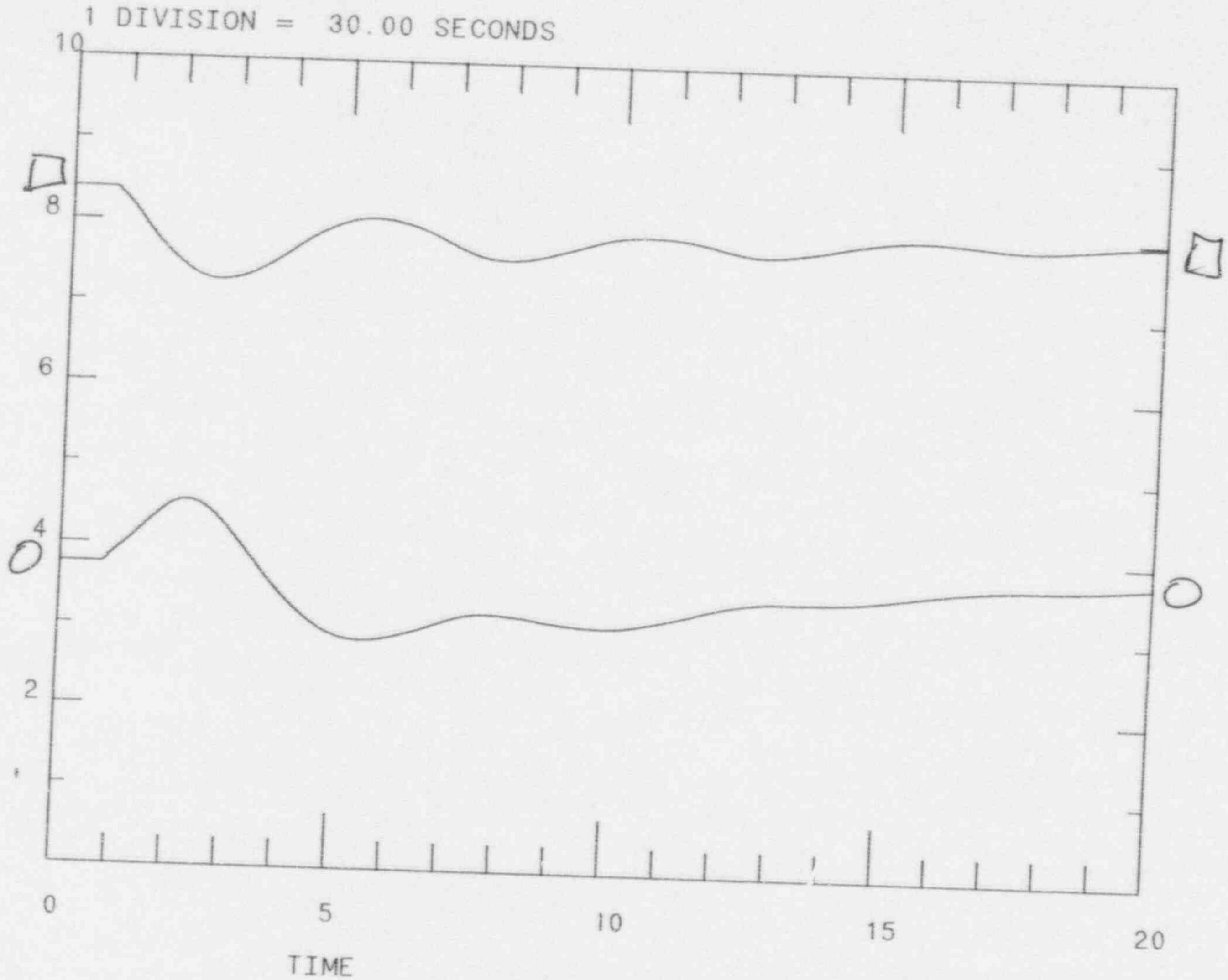
1 DIVISION = 30.00 SECONDS



□ YCT0419	(530.	, 630.)	06830 RC LOOP 1A WR HOT LEG T
○ YCT0406	(530.	, 630.)	06825 RC LOOP 1A WR COLD LEG T

UPPOWER

01/10/96 13.45:51



YCP0400	(600. , .100E+04)	06590	S/G 1A STMLINE PRESS PT-5
YCL0400	(55.0 , 85.0)	06350	S/G 1A NAR RNG LEVEL LT-51

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-7 Uppower DATE: 1/10/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: BwSU NR-36
DATA:
PLANT: Braidwood Unit 1

COMMENTS: Utilized this data as similar plant data since BwSU NR-36 contains Cycle 1 Tave, Th, Tc, PZR level, and S/G Press.

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Rx Power	None	Acceptable
Tave		
PZR Temp		
PZR level		
PZR Press		
Steam Flow		
Feed Flow		
Tc		
Th		

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
Steam Press	None	Acceptable
S/G Level	↓	↓

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

[signatures]

COMMENTS: ______________________________

AUTHORIZED FOR TESTING TR-7

11.0 DATA SHEETS TO BE USED WITH THE APPROPRIATE SEQUENCE DOCUMENT

11.1 10% LOAD INCREASE FROM SPECIFIED POWER (TABLE 2)

(Expected values are indicated in 13.0, Appendix C)

PLANT PARAMETER		EPN	~~10.1~~ INITIAL CONDITION	~~10.1~~ DURING TRANSIENT MINIMUM	~~10.1~~ DURING TRANSIENT MAXIMUM	~~10.1~~ FINAL CONDITION
Plant Operating Level (MWe-Gross)		1JR-MP003	1000	XXX	XXX	1150
Power - Nuclear	(%)	1NR-45	87	87	98.5	98.2
Tave (Auctioneered High)	(°F)	1TR-412	580	578	583	583
Tave - Loop A	(°F)	Recorder 2 Pen 1	580.0	578.9	582.7	582.7
Tave - Loop B	(°F)	Recorder 2 Pen 2	580.0	578.8	582.7	582.7
Tave - Loop C	(°F)	Recorder 2 Pen 3	579.7	578.8	582.7	582.7
Tave - Loop D	(°F)	Recorder 2 Pen 4	579.6	578.5	582.5	582.5
Tref	(°F)	1TR-412	581	XXX	XXX	584
DELTA T - Loop A	(%)	1TR-411	90	90	100	98
OPΔT Setpoint - Loop A	(%)	1TR-411	106	XXX	XXX	106
OTΔT Setpoint - Loop A	(%)	1TR-411	126	XXX	XXX	126
Pressurizer Pressure	(psig)	1PR-455	2240	2230	2240	2230
Pressurizer Level	(%)	1LR-459	52	49	57	57
Steam Header Pressure	(psig)	Recorder 4 Pen 2	968	912	956	956
Steam Flow - Loop A	(10^6 LB/HR)	1FR-510	3.2	XXX	XXX	3.6
Steam Flow - Loop B	(10^6 LB/HR)	1FR-520	3.2	XXX	XXX	3.6
Steam Flow - Loop C	(10^6 LB/HR)	1FR-530	3.25	XXX	XXX	3.65
Steam Flow - Loop D	(10^6 LB/HR)	1FR-540	3.25	XXX	XXX	3.65
Steam Generator Level-Loop A	(%)	1FR-510	64	58	67	64
Steam Generator Level-Loop B	(%)	1FR-520	65	61	68	65
Steam Generator Level-Loop C	(%)	1FR-530	65	62	68	65
Steam Generator Level-Loop D	(%)	1FR-540	64.5	62	69	64.5
Feedwater Temperature-Loop A	(°F)	T0418X	TCR #5 426.0	XXX	XXX	434.1
Feedwater Temperature-Loop B	(°F)	T0438X	JWL 425.3	XXX	XXX	433.4
Feedwater Temperature-Loop C	(°F)	T0458X	11/19/87 425.8	XXX	XXX	434.0
Feedwater Temperature-Loop D	(°F)	T0478X	425.5	XXX	XXX	433.6
Feedwater Flow - Loop A	(10^6 LB/HR)	1FR-510	3.3	XXX	XXX	3.65
Feedwater Flow - Loop B	(10^6 LB/HR)	1FR-520	3.2	XXX	XXX	3.6
Feedwater Flow - Loop C	(10^6 LB/HR)	1FR-530	3.3	XXX	XXX	3.7
Feedwater Flow - Loop D	(10^6 LB/HR)	1FR-540	3.2	XXX	XXX	3.6
Feed Pump Disch. Hdr. Pres.	(psig)	Recorder 5 Pen 6	1150	1110	1155	1155
Feed Pump B Speed	(RPM)	Recorder 5 Pen 5	4970	4930	5320	5320
Control Rod Pos. - Bank C	(Steps)	U0051	228	XXX	XXX	228
Control Rod Pos. - Bank D	(Steps)	U0052	170	XXX	XXX	223
Boron Concentration	(PPM)	Log Book	650	XXX	XXX	650
AUCT. HI Rx POWER	(%)	RECORDER 1 PEN 4	85.0	85.0	97.0	96.5

~~11.1.28~~

~~Time to reach equilibrium T_{avg}, based on the 4 Tave's recorded, following load change: __________ minutes~~

TCR # RM # 12/11/87

11.1.28 9 minutes for Tave stability

12/21/88

0055N(081286)/0591A

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-8 Date Performed 1/10/96

Test Description: Max Size LOCA with loss of off-site power test.

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

___ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

___ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ______ Date ______

Test Complete K Tripathi Date 1/10/96

SFCC Acceptance K Tripathi Date 2/9/96

BRAIDWOOD SIMULATOR TRANSIENT TEST

MAXMIUM SIZE REACTOR COOLANT SYSTEM RUPTURE COMBINED WITH A LOSS OF ALL OFFSITE POWER

I. OBJECTIVES

The purpose of this procedure is to:

1. Test the simulator response to a Maxmium Size Reactor Coolant System Rupture Combined with a Loss of All Offsite Power as required by ANSI/ANS-3.5-1985.

2. Ensure that the simulator's Diesel Generators function properly to power the ESF loads on a SI concurrent with a loss of offsite power.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.

2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.

3. TDI 700-03: Simulator Testing Program.

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state, full power conditions with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.

2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.

3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.

BRAIDWOOD SIMULATOR TRANSIENT TEST

MAXMIUM SIZE REACTOR COOLANT SYSTEM RUPTURE
COMBINED WITH A LOSS OF ALL OFFSITE POWER

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables :

   a. Pressurizer pressure

   b. NR Pressurizer pressure

   c. Pressurizer level

   d. Containment pressure

   e. Containment temperature

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.
2. Enter the data collection points from Section IV into the ZETA Plotter program.
3. Simultaneously run a DBA LOCA concurrent with a loss of offsite power.
4. Continue until stable plant conditions are established.
5. Graph the variables listed under Section IV.

BRAIDWOOD SIMULATOR TRANSIENT TEST

MAXMIUM SIZE REACTOR COOLANT SYSTEM RUPTURE
COMBINED WITH A LOSS OF ALL OFFSITE POWER

VI. ACCEPTANCE CRITERIA

NOTE

The simulator response will be compared to baseline data by the Braidwood Simulator Transient Test Review Board. The Review Board will determine if the simulator has the capability to adequately reproduce the defined transient.

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer safety valves shall NOT lift.
2. Steam generator safety valves shall NOT lift.
3. Safety injection is initiated.
4. Both diesel generators start and load their respective ESF bus.
5. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.
6. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

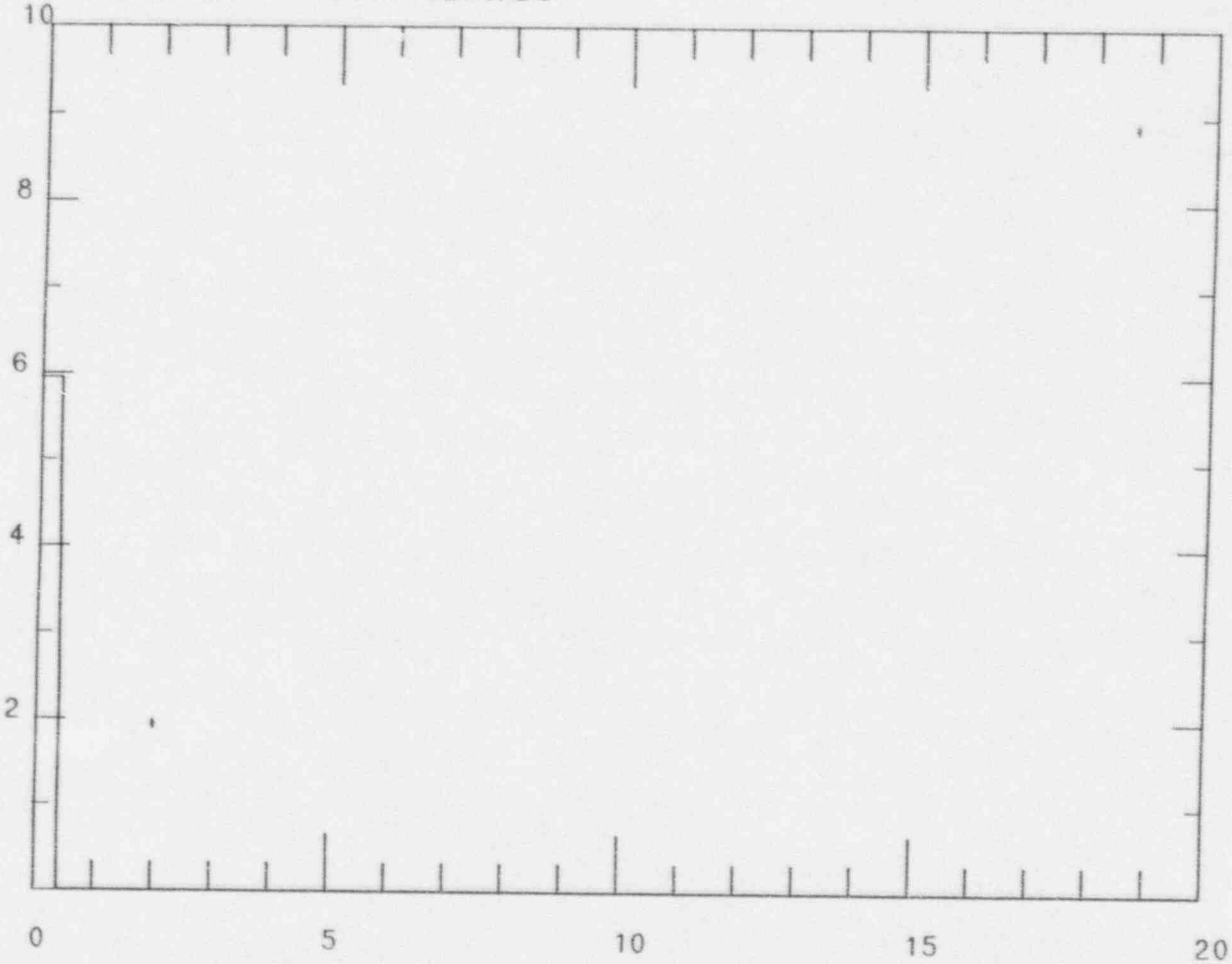
BRAIDWOOD SIMULATOR TRANSIENT TEST

MAXMIUM SIZE REACTOR COOLANT SYSTEM RUPTURE
COMBINED WITH A LOSS OF ALL OFFSITE POWER

VII. LIST OF FIGURES

DBA LOCA W/LOSS OF OFFSITE POWER 01/10/96 14:16:54

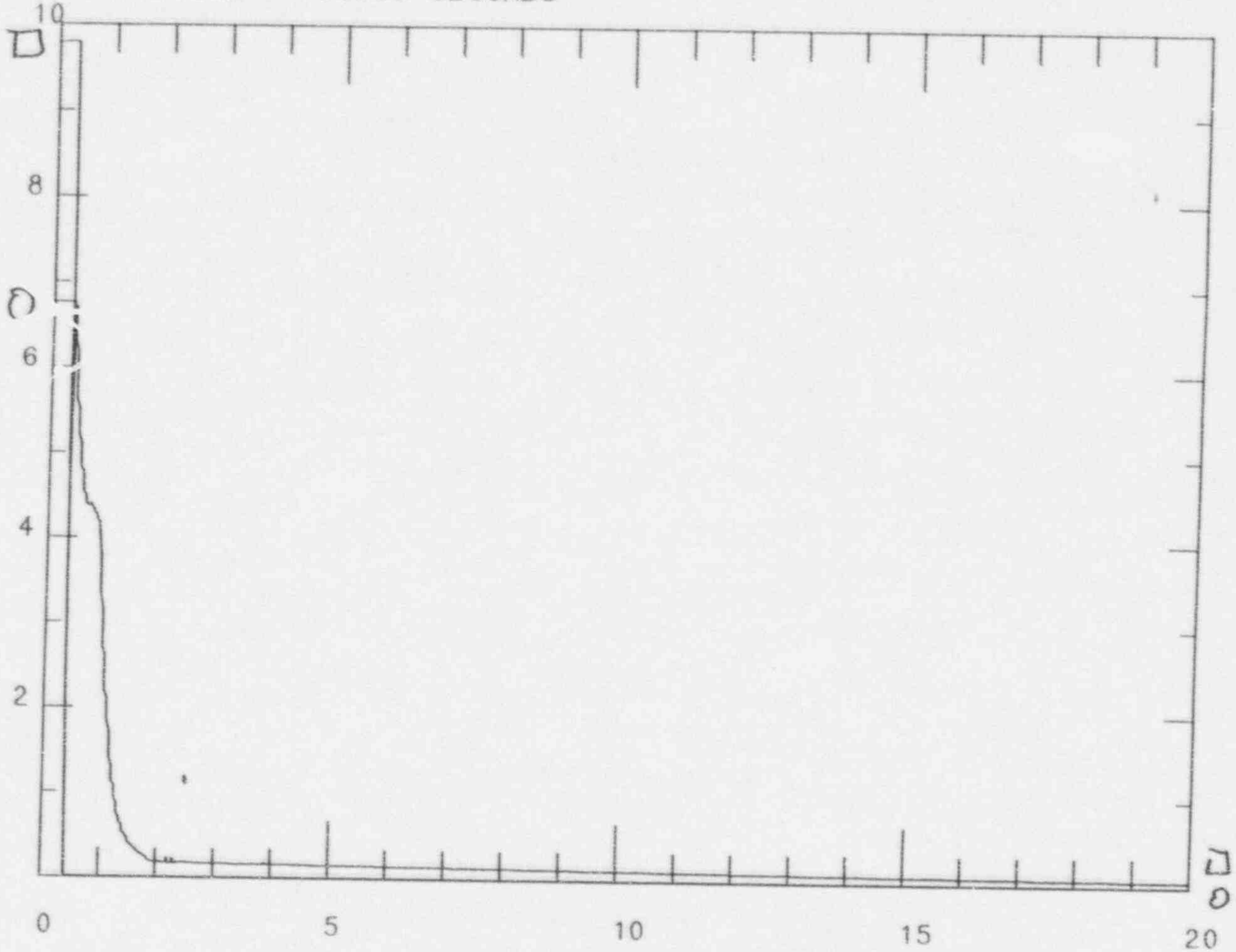
1 DIVISION = 30.00 SECONDS



YCL0480 (.000 , 100.) 06550 PRESSURIZER LEVEL LT-459

DBA LOCA W/LOSS OF OFFSITE POWER 01/10/96 14:13:21

1 DIVISION = 30.00 SECONDS

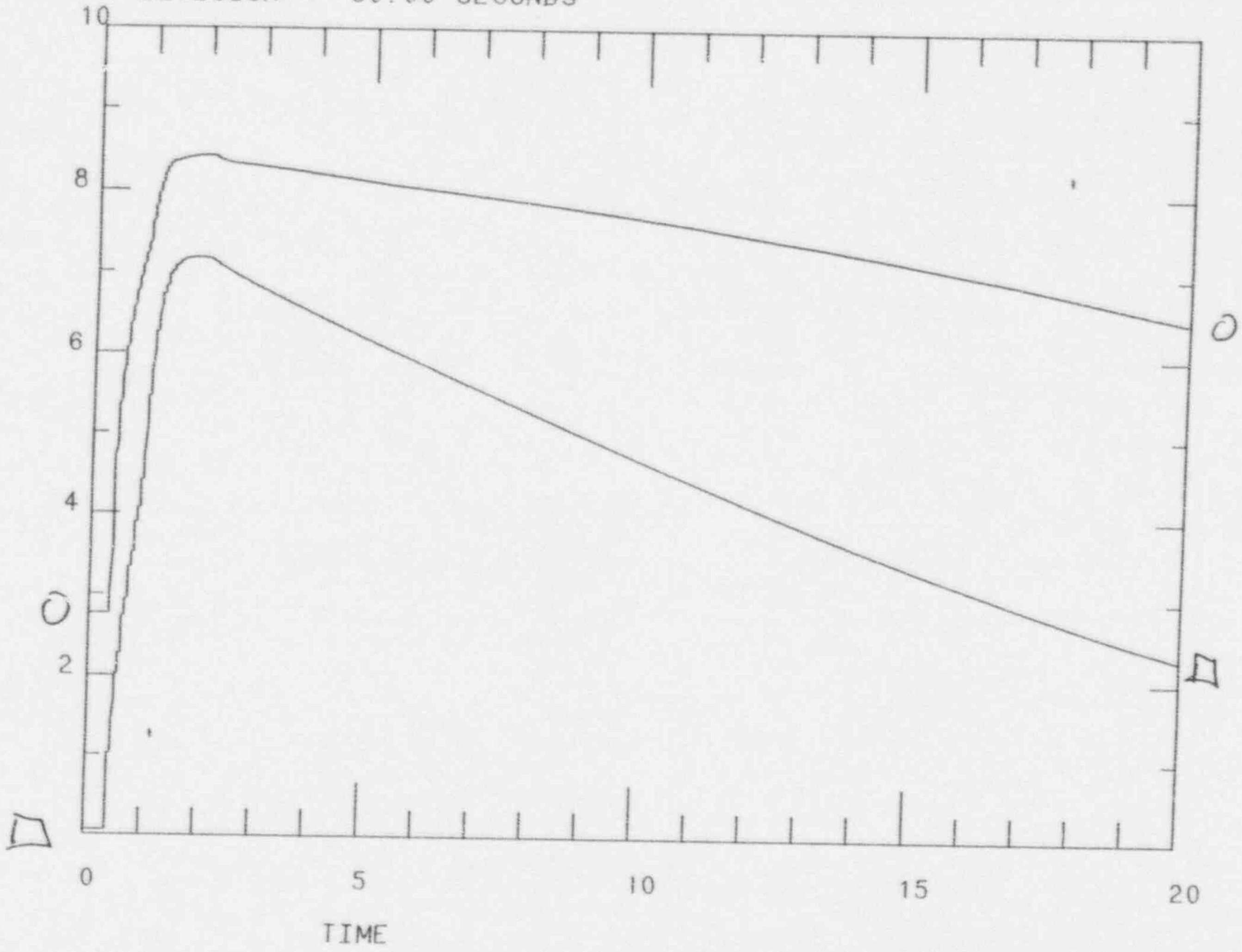


YCP0491 (.000 , .230E+04) 06760 RCS WIDE RNG CH IV LP 1 P

YCP0480 (.170E+04, .250E+04) 06720 PRESSURIZER PRESS PT-455

DBA LOCA W/LOSS OF OFFSITE POWER 01/10/96 14:20:27

1 DIVISION = 30.00 SECONDS



□	YCP1000	(.000 , 50.0)	09080 CONTAINMENT PRESS PT-936
O	CHTAVGCM	(.000 , 300.)	06180 AVE CNMT TEMPERATURE

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-8 LOCA w/ LOOP test DATE: 4/0/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: ______
DATA: ______
PLANT: ______

COMMENTS: None

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
NR Press	None	Acceptable
WR Press		
PZR level		
CNTM Press		
CNTM Temp		

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

B. Tylutki ____________ [signature] ____________

Paul J. Hippel ____________ ____________

D. Basnik ____________ ____________

COMMENTS: ____________

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-10 Date Performed 1/11/96

Test Description: PZR PORV stuck open without CV pumps test

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

____ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

____ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ________ Date ________

Test Complete K [signature] Date 1/11/96

SFCC Acceptance K [signature] Date 2/9/96

BRAIDWOOD SIMULATOR TRANSIENT TEST

SLOW PRIMARY SYSTEM DEPRESSURIZATION TO SATURATED CONDITION USING PRESSURIZER RELIEF STUCK OPEN. (INHIBITED ACTUATION OF CENTRIFUGAL CHARGING PUMPS)

I. OBJECTIVES

The purpose of this procedure is to test the simulator response to a Slow Primary Plant Depressurization to Saturated Condition as required by ANSI/ANS-3.5-1985.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.

2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.

3. TDI 700-03: Simulator Testing Program.

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state, full power conditions with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.

2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.

3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.

BRAIDWOOD SIMULATOR TRANSIENT TEST

SLOW PRIMARY SYSTEM DEPRESSURIZATION TO SATURATED CONDITION USING PRESSURIZER RELIEF STUCK OPEN. (INHIBITED ACTUATION OF CENTRIFUGAL CHARGING PUMPS)

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables :

   a. Relief valve flow

   b. Pressurizer pressure

   c. Pressurizer steam temperature

   d. Pressurizer level

   e. RCS loop flow rate (loops 1-4)

   f. Surge line temperature

   g. Loop 4 hot leg temperature

   h. Source range

   i. Rx vessel level

   j. Core exit temperature (for subcooling determination)

   k. WR RCS pressure (for subcooling determination)

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.

2. Enter the data collection points from Section IV into the ZETA Plotter program.

3. Place both CV pumps in PTL.

4. Fail open pressurizer relief valve 455A.

5. Continue until stable plant conditions are established.

6. Graph the variables listed under Section IV.

BRAIDWOOD SIMULATOR TRANSIENT TEST

SLOW PRIMARY SYSTEM DEPRESSURIZATION TO SATURATED CONDITION USING PRESSURIZER RELIEF STUCK OPEN. (INHIBITED ACTUATION OF CENTRIFUGAL CHARGING PUMPS)

VI. ACCEPTANCE CRITERIA

****
* NOTE *
* The simulator response will be compared to baseline data *
* by the Braidwood Simulator Transient Test Review Board. *
* The Review Board will determine if the simulator has the *
* capability to adequately reproduce the defined transient. *
****

The following acceptance criteria are to be used to determine successful test completion:

1. Steam generator safety valves shall NOT lift.

2. Safety injection is initiated.

3. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.

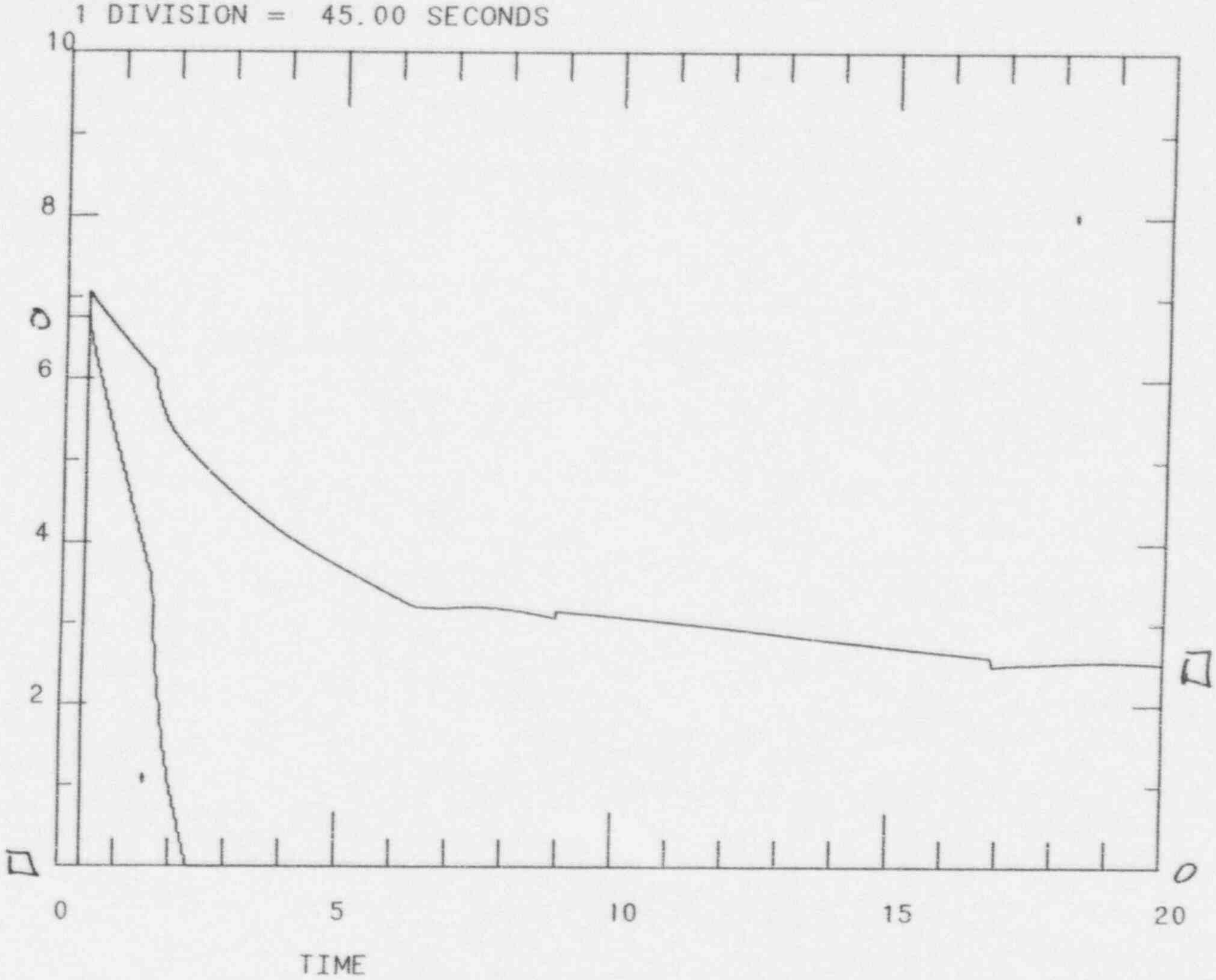
4. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

BRAIDWOOD SIMULATOR TRANSIENT TEST

SLOW PRIMARY SYSTEM DEPRESSURIZATION TO SATURATED CONDITION USING PRESSURIZER RELIEF STUCK OPEN. (INHIBITED ACTUATION OF CENTRIFUGAL CHARGING PUMPS)

VII. LIST OF FIGURES

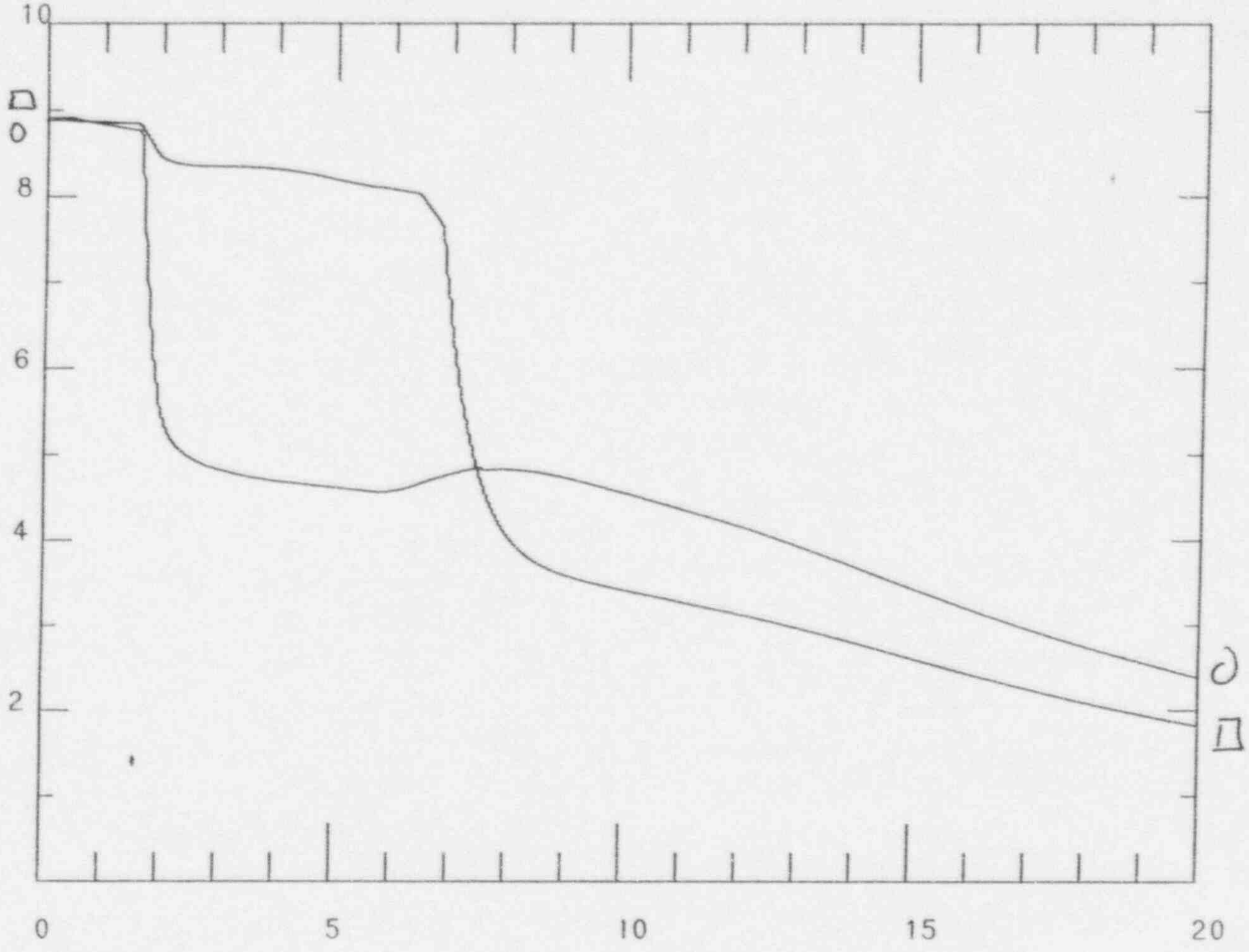
RCS DEPRESS 01/11/96 08.32.43



THFPRZRPRT	(.000 , 75.0)	60100 PRZR TO PRT MIXTURE FLOW
YCP0480	(.170E+04, .250E+04)	06720 PRESSURIZER PRESS PT-455

RCS DEPRESS 01/11/96 09:22:10

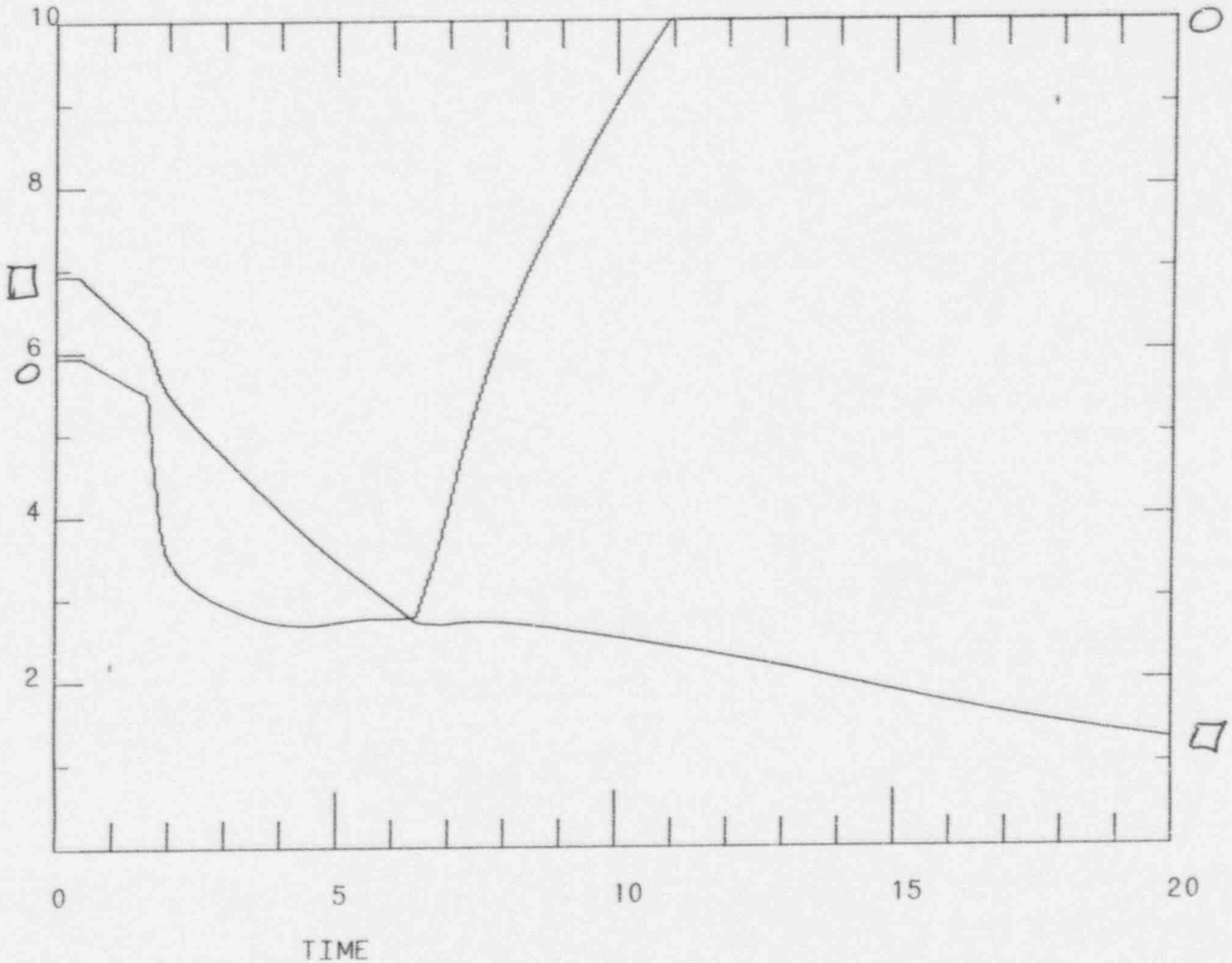
1 DIVISION = 45.00 SECONDS



YCT0482 (500. , 670.) 91255 PRESSURIZER SURGE LINE T
YCT0479 (500. , 625.) 07080 RC LOOP 1D WR HOT LEG T

RCS DEPRESS 01/11/96 08:44:56

1 DIVISION = 45.00 SECONDS

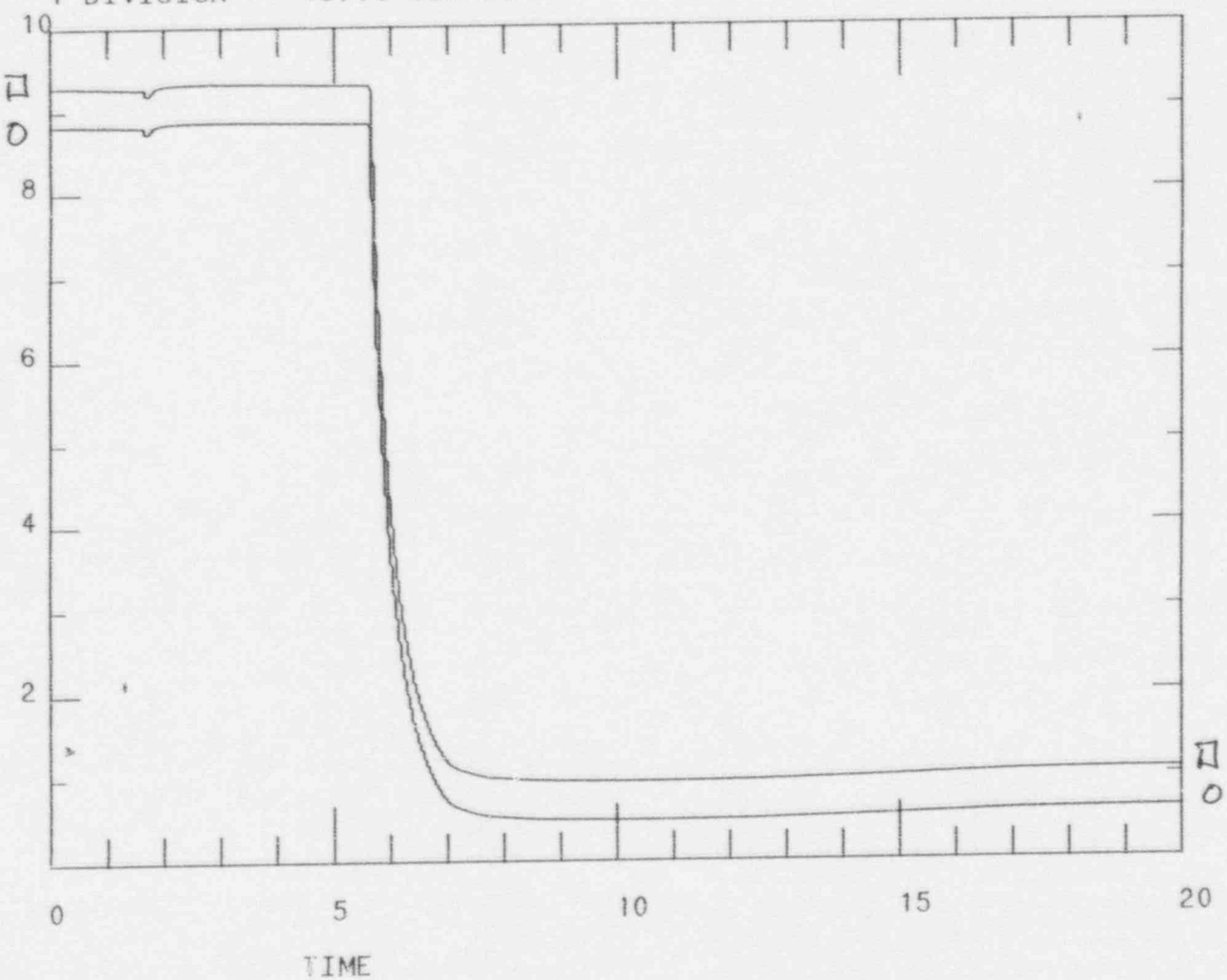


YCT0481	(500.	, 720.)	91250 PRESSURIZER STM T
YCL0480	(.000	, 100.)	06550 PRESSURIZER LEVEL LT-459

RCS DEPRESS

01/11/96 08.58.50

1 DIVISION = 45.00 SECONDS

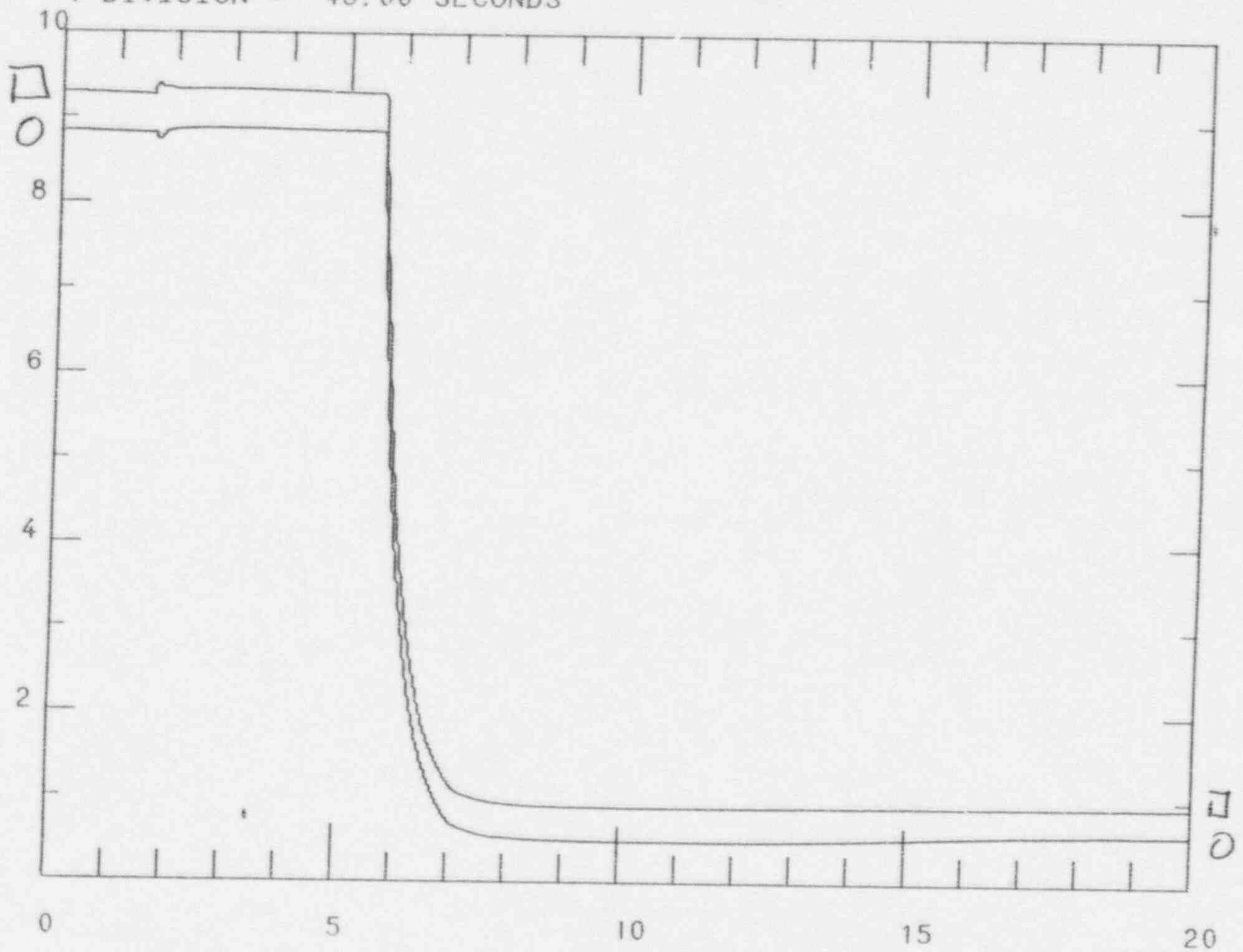


□ YCF0400	(.000	, 110.	)	06010 RC LOOP 1A F FT-414
O YCF0420	(-5.00	, 105.	)	06090 RC LOOP 1B F FT-424

RCS DEPRESS

01/11/96 09:10:33

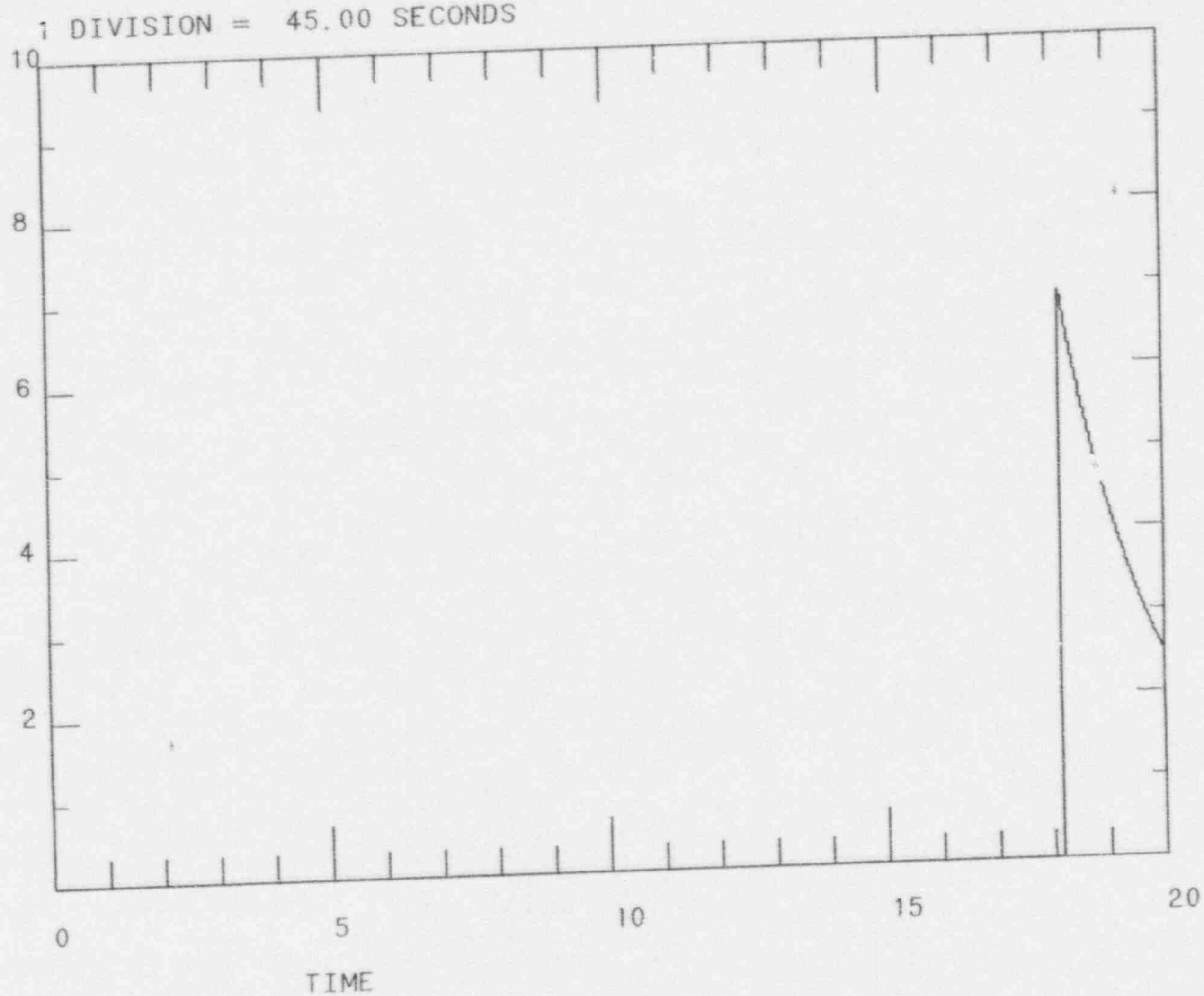
1 DIVISION = 45.00 SECONDS



◻	YCF0440	(.000	, 110.	) 06170 RC LOOP 1C F FT-434
O	YCF0460	(-5.00	, 105.	) 06250 RC LOOP 1D F FT-444

RCS DEPRESS

01/11/96 09.36.21

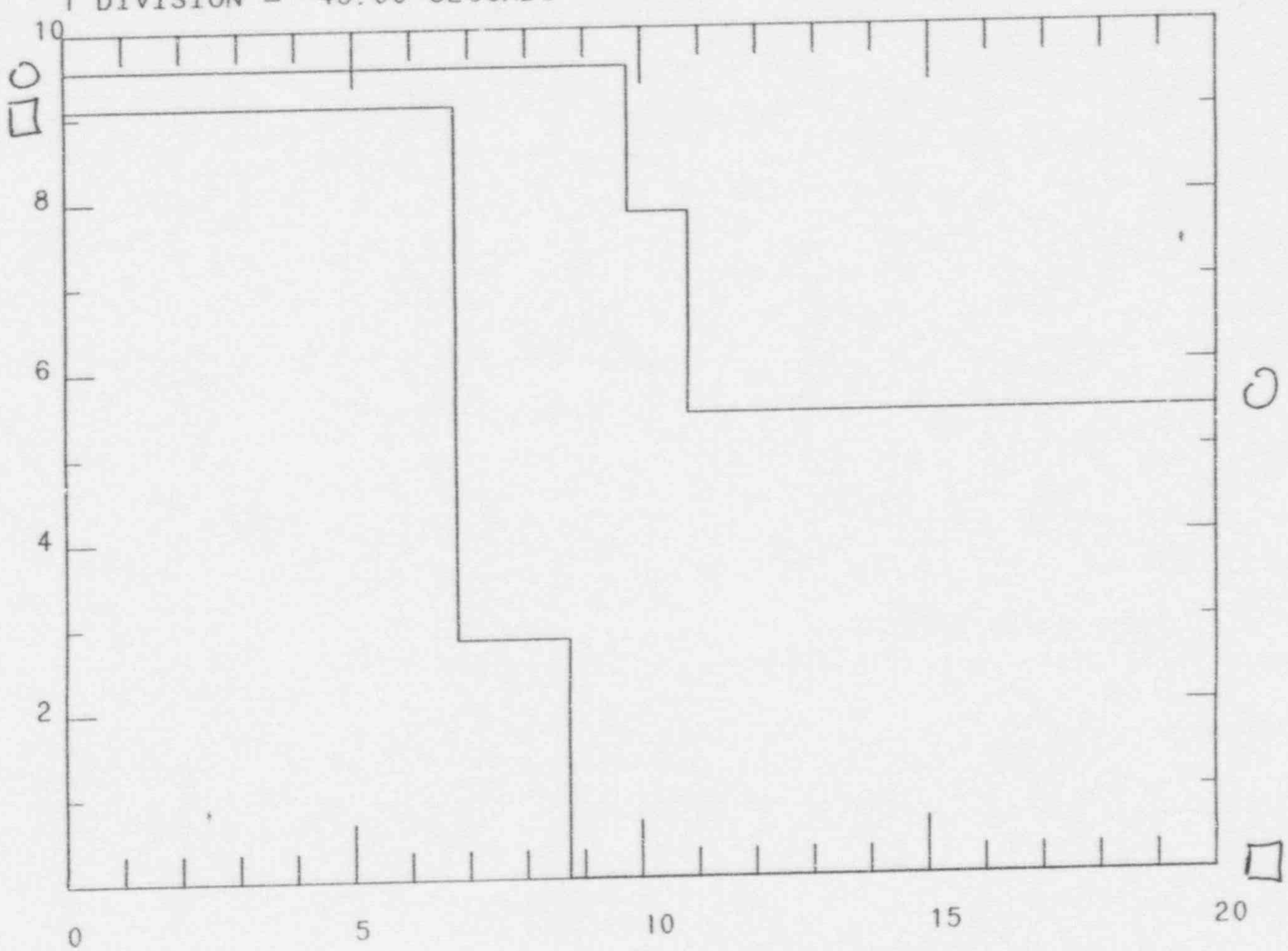


NILDTOU(1) (.000 , .200E+05) 01040 SR DETECTOR OUTPUT

RCS DEPRESS

01/11/96 09:50.08

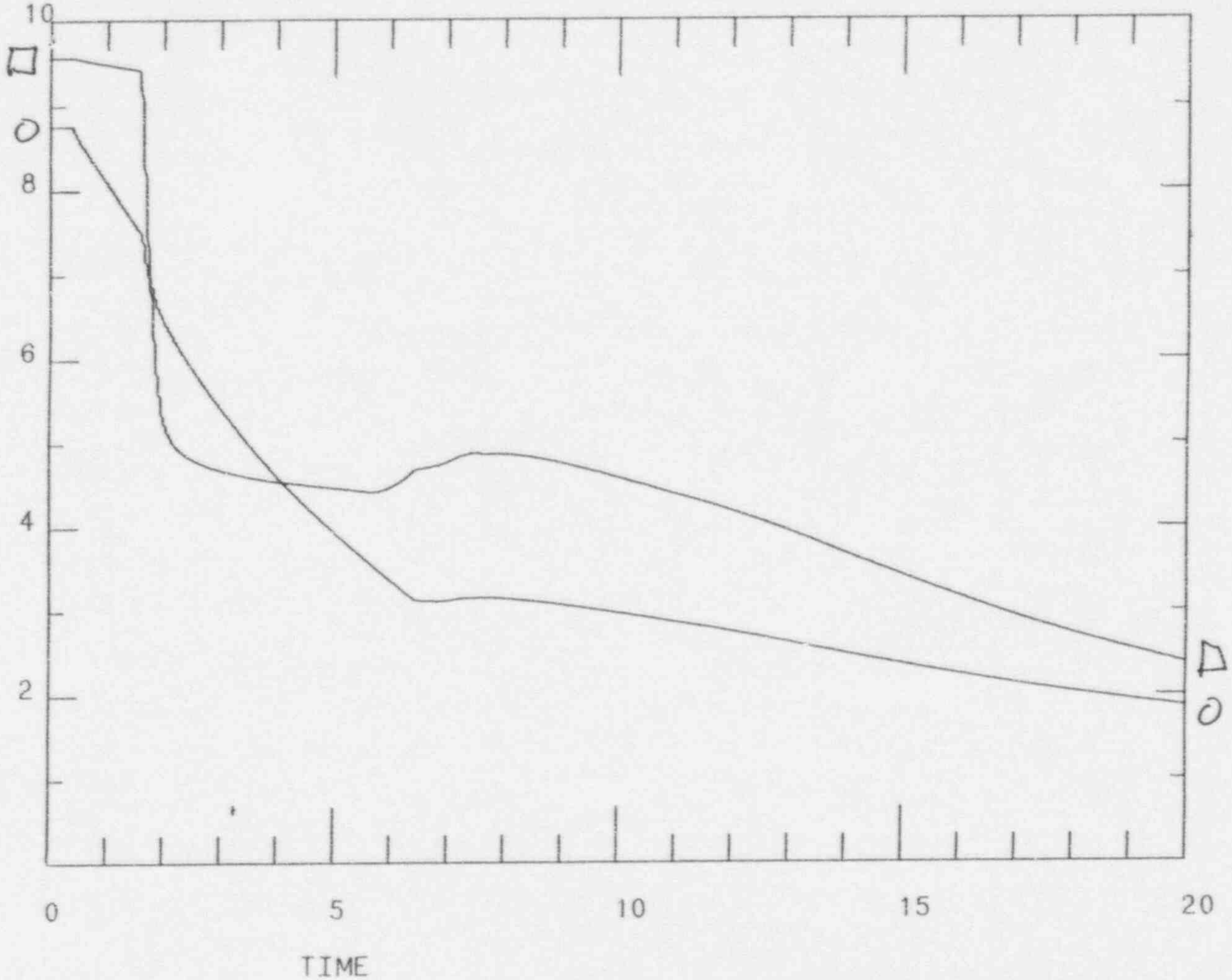
1 DIVISION = 45.00 SECONDS



THLRVHEAD	(.000	, 110.	)	88030 RX HEAD LEVEL
THLRVPLENUM	(-5.00	, 105.	)	88040 RX PLENUM LEVEL

RCS DEPRESS 01/11/96 10:11:08

1 DIVISION = 45.00 SECONDS



CRTTCEXIT(14) (500. , 630.) 06030 INCORE TC READING

YCP0491 (500. , .250E+04) 06760 RCS WIDE RNG CH IV LP 1 P

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-10 PZR PORV open w/o CV pumps DATE: 1/11/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: ____________
DATA: WCAP-9601
PLANT: ____________

COMMENTS: WCAP-9601 was used for PZR Press, RCS Press, and PZR Temp only.

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
Relief Valve Flow	None	Acceptable
PZR Press		
PZR level		
PZR Temp		
RCS loop Flows 1-4		
PZR Surge line Temp		
Th		
SR level		
Head level		

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION
Plenum level	None	Acceptable
CETC Temp	↓	↓
WR Press		

3. Comparison Results

Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

4. Review Board Signatures (differing opinions must be documented)

K [signature]　　[signature]

Paul [signature]

[signature]

COMMENTS:

ATTACHMENT A

BRAIDWOOD SIMULATOR TEST PROCEDURE COVER SHEET

Test Number: TR-9 Date Performed 1/10/96

Test Description: Max size unisolable MS line rupture test

Discrepancies

Step #	Comments	Step # for retest	WR #	Corrected (initials) and Date
None				

Test Results

✓ 1. Test Completed Satisfactorily

___ 2. After correction of the above discrepancies test results are satisfactory. Only a partial RETEST is necessary.

___ 3. Test results UNSATISFACTORY. Complete RETEST after correction of above discrepancies is required.

Retest Complete ________ Date ________

Test Complete K Tufentst Date 1/10/96

SFCC Acceptance K Tufentst Date 2/9/96

Test Number: TR-9
Revision Number/Date: 06, 11/08/93
Frequency: ANNUAL

BRAIDWOOD SIMULATOR TRANSIENT TEST
MAXMIUM SIZE UNISOLABLE MAIN STEAM LINE RUPTURE

I. OBJECTIVES

The purpose of this procedure is to test the simulator response to a Maxmium Size Unisolable Main Line Rupture as required by ANSI/ANS-3.5-1985.

II. REFERENCES

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training.
2. Reg. Guide 1.149: Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.
3. TDI 700-03: Simulator Testing Program.

III. INITIAL CONDITIONS

1. The plant is operating at normal steady state, full power conditions with control rod bank D positioned to maintain the Indicated Axial Flux Difference within limits.
2. Boric acid of the proper concentration is available in sufficient quantity to bring the boron concentration of the Reactor Coolant System to the hot shutdown value.
3. The boron concentration of the Reactor Coolant System is adjusted to maintain control rod bank D at the proper position.

IV. DATA COLLECTION

1. Setup the ZETA Plotter to graph the following variables :

   a. Pressurizer pressure

   b. NR Pressurizer pressure

   c. Pressurizer level

   d. Containment pressure

   e. Containment temperature

BRAIDWOOD SIMULATOR TRANSIENT TEST
MAXMIUM SIZE UNISOLABLE MAIN STEAM LINE RUPTURE

V. TEST INSTRUCTIONS

1. Ensure the plant meets the initial conditions as specified in Section III.

2. Enter the data collection points from Section IV into the ZETA Plotter program.

3. Initiate a maxmium size unisolable steam line break inside containment.

4. Continue until stable plant conditions are established.

5. Graph the variables listed under Section IV.

VI. ACCEPTANCE CRITERIA

****

NOTE

The simulator response will be compared to baseline data by the Braidwood Simulator Transient Test Review Board. The Review Board will determine if the simulator has the capability to adequately reproduce the defined transient.

****

The following acceptance criteria are to be used to determine successful test completion:

1. Pressurizer safety valves shall NOT lift.

2. Steam generator safety valves shall NOT lift.

3. Safety injection is initiated.

4. The observable change in the parameters correspond in direction to those expected from a best estimate for the simulated transient and do not violate the physical laws of nature.

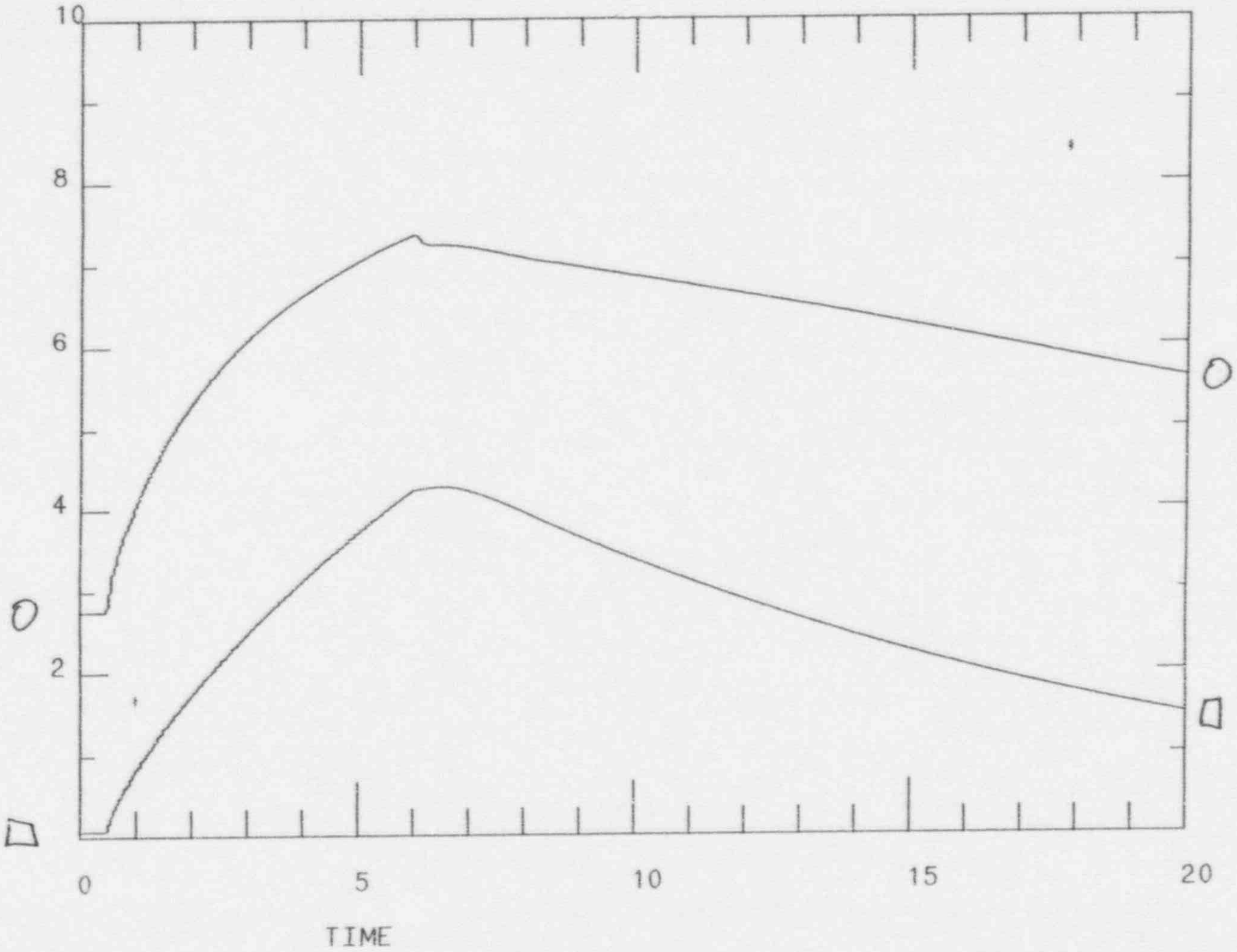
5. The simulator shall not fail to cause an alarm or automatic action if Braidwood Unit One would have caused an alarm or automatic action, and conversely, the simulator shall not cause an alarm or automatic action if Braidwood Unit One would not cause an alarm or automatic action.

BRAIDWOOD SIMULATOR TRANSIENT TEST
MAXMIUM SIZE UNISOLABLE MAIN STEAM LINE RUPTURE

VII. LIST OF FIGURES

MS LINE RUPTURE 01/10/96 14:41:08

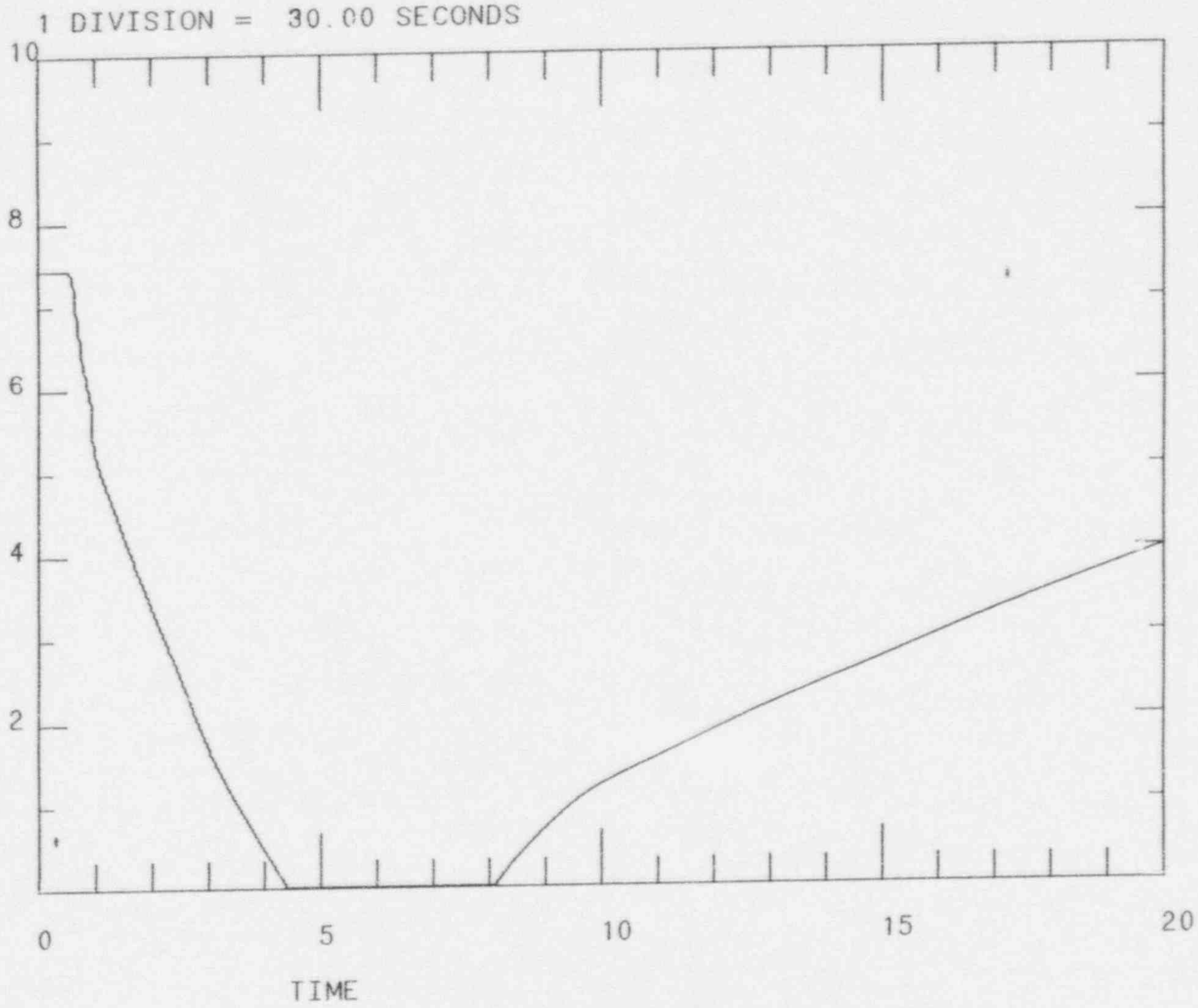
1 DIVISION = 30.00 SECONDS



YCP1000	(.000	, 50.0	)	09080 CONTAINMENT PRESS PT-936
CHTAVGCM	(.000	, 300.	)	06180 AVE CNMT TEMPERATURE

MS LINE RUPTURE

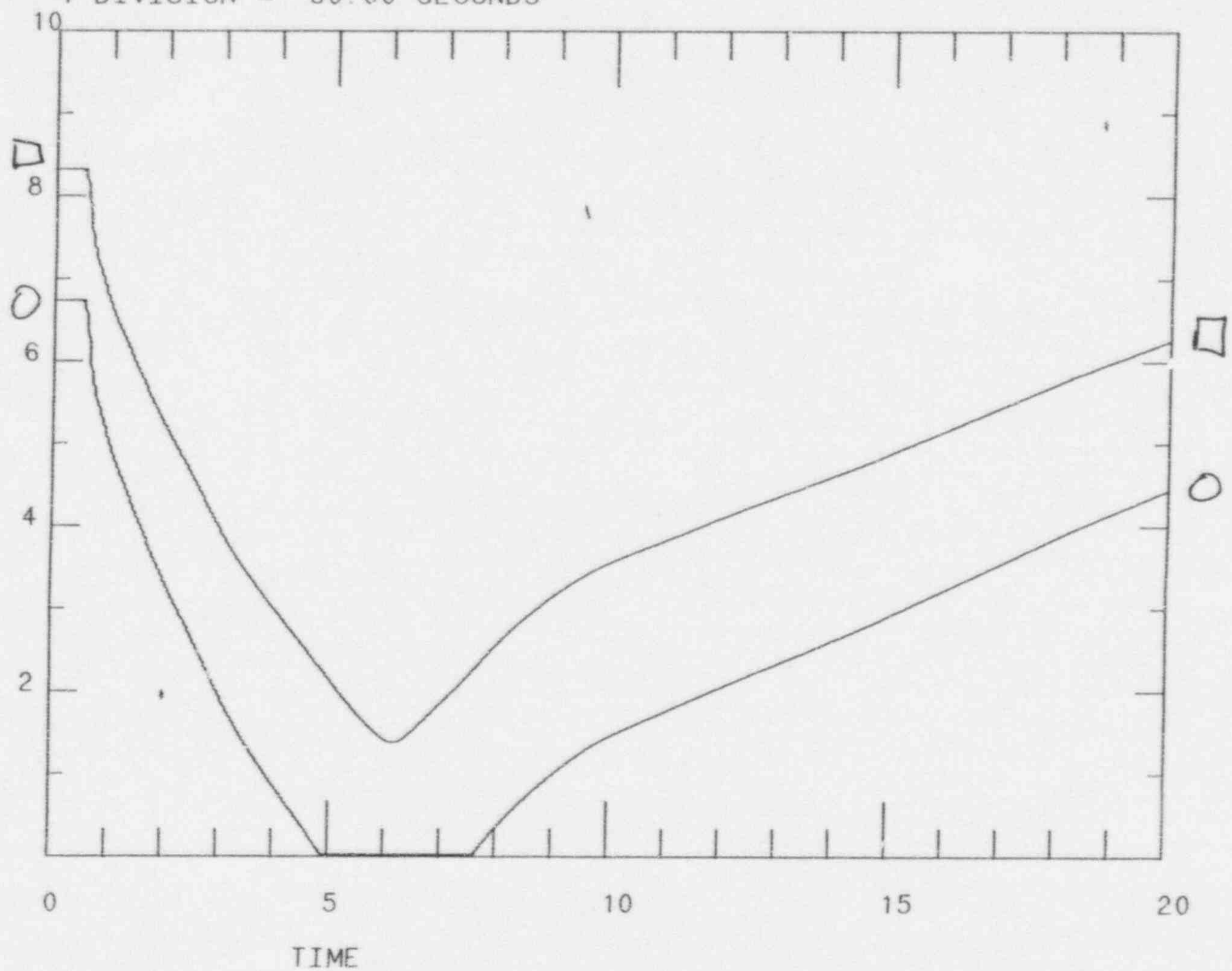
01/10/96 14:44:06



YCL0480 (.000 , 80.0) 06550 PRESSURIZER LEVEL LT-459

MS LINE RUPTURE 01/10/96 14:32:57

1 DIVISION = 30.00 SECONDS



□	YCP0491	(.150E+04, .240E+04)	06760 RCS WIDE RNG CH IV LP 1 P
O	YCP0480	(.170E+04, .250E+04)	06720 PRESSURIZER PRESS PT-455

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

TRANSIENT TEST #/ TITLE: TR-9 max size ms rupture DATE: 1/10/96

1. Baseline data utilized for test comparison in order of preference (circle appropriate choices)

a. Actual plant transient data
b. Analytical or design data
c. Transient data from similar plant
d. Panel of experts (best estimate)

EVENT: ______
DATA: ______
PLANT: ______

COMMENTS: None

2. Data Comparison Summary

VARIABLE	COMMENTS	RESOLUTION
WR Press	None	Acceptable
NR Press		
PZR level		
CNTM Press		
CNTM Temp		

ATTACHMENT D

SIMULATOR TRANSIENT TEST REVIEW

VARIABLE	COMMENTS	RESOLUTION

3. Comparison Results

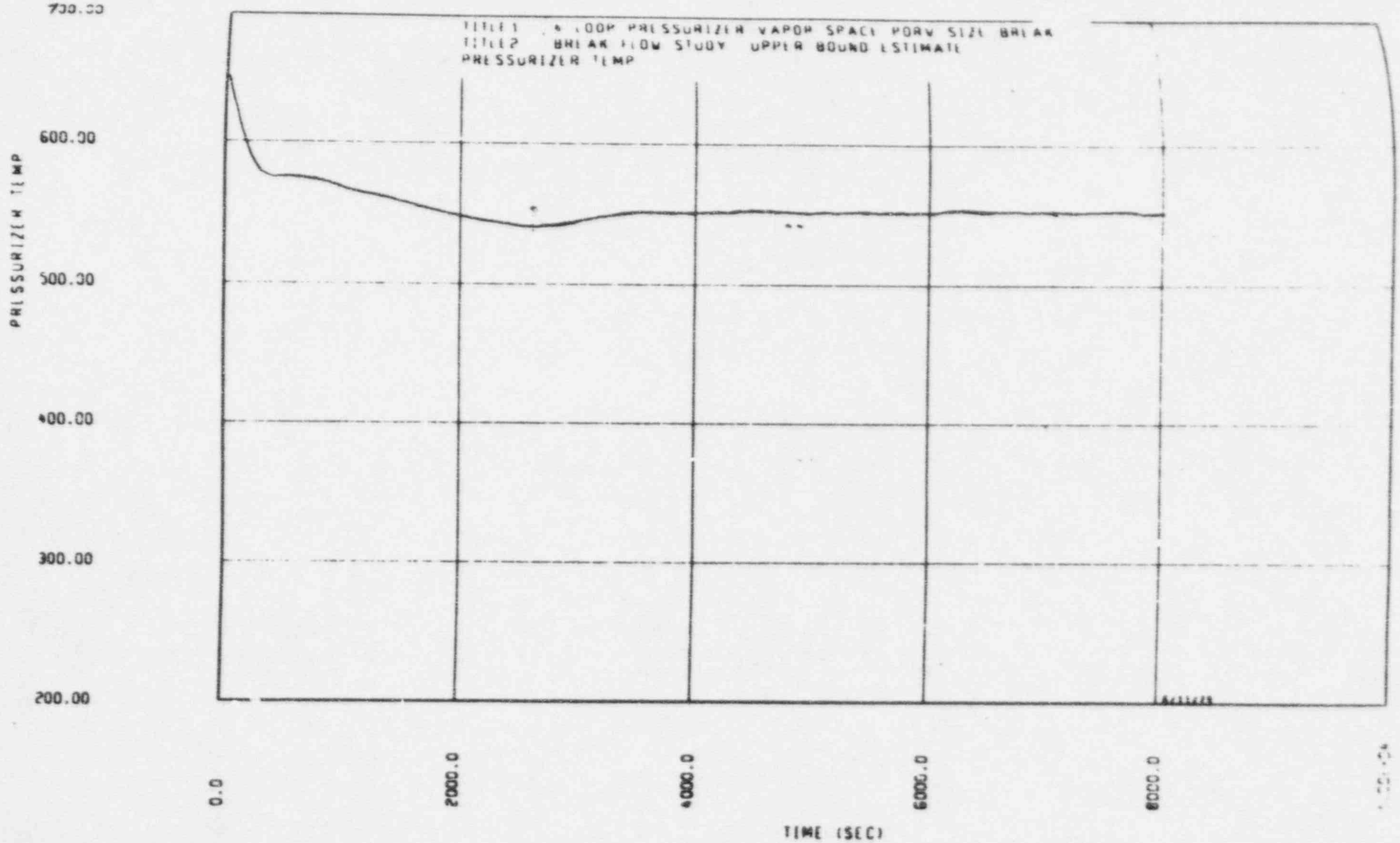
Simulator capability to reproduce the defined transient: (circle one)

a. ACCEPTABLE

b. UNACCEPTABLE

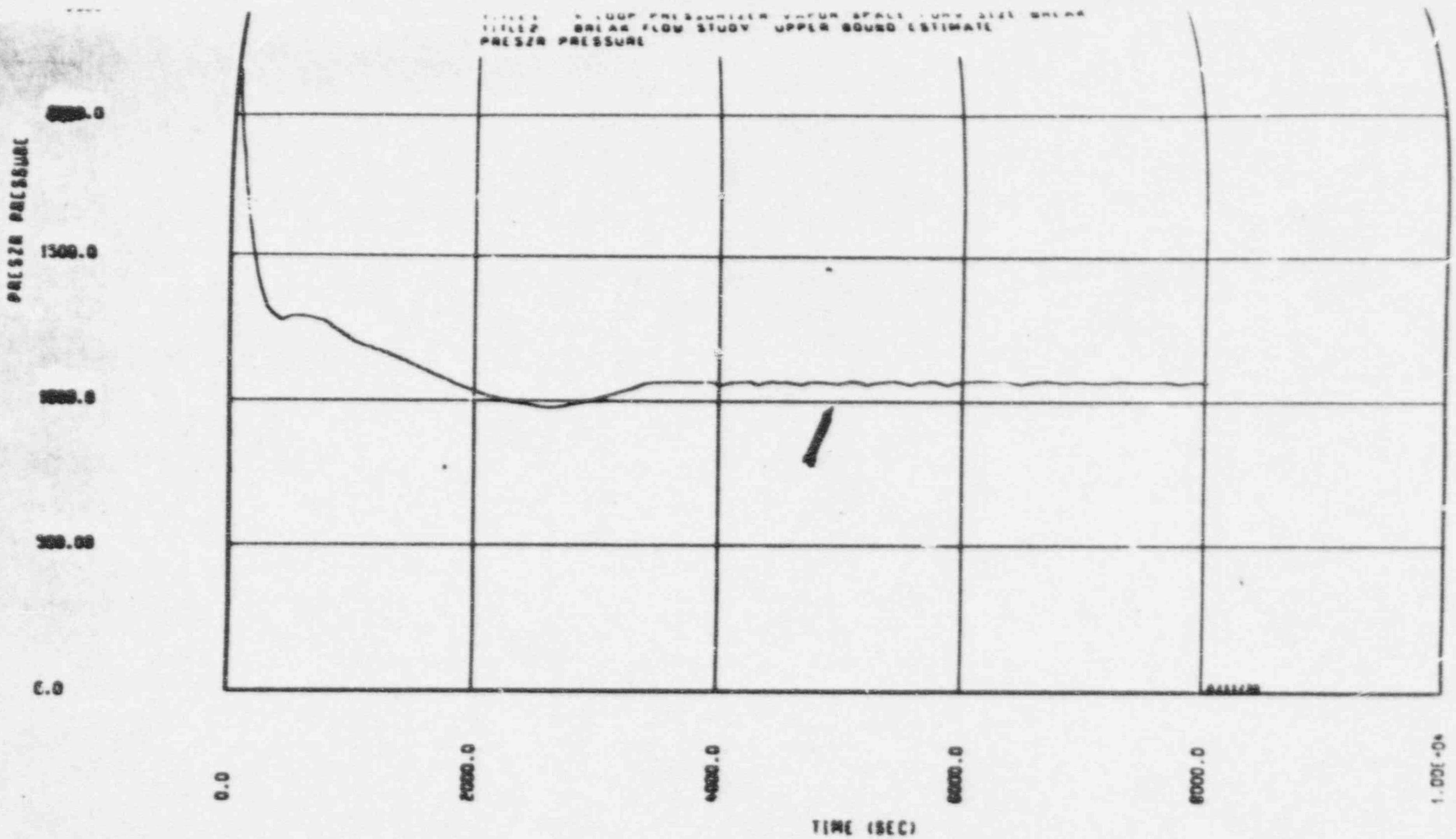
4. Review Board Signatures (differing opinions must be documented)

COMMENTS:



WCAP - 9601

PZR PORV STUCK OPEN



WCAP - 9601

PZR PORV STUCK OPEN

ATTACHMENT 3

SIMULATOR WORK

REQUEST PROCEDURE

Braidwood Station

Training Department Instruction

SIMULATOR WORK REQUEST PROCEDURE

A. Purpose

1. The purpose of this procedure is to delineate the method used to track, review, approve, implement, and test hardware and software work on the Braidwood Simulator.

B. References

1. INPO TQ-504: Simulator Configuration Management - Good Practices

2. TDI 700-01: Simulator Review Board Procedure

C. Instruction

1. Definitions:

   a. Computer based tracking system - A CECO computer system used for controlling and tracking simulator maintenance.

   b. Minor Hardware Maintenance - items associated only with hardware aspects of the simulator. Maintenance items that do NOT require parts to be withdrawn from the storeroom except as outlined below. Examples of minor maintenance:

      1) Recorders

         a) Repair/replacement of broken strings.

b) Correction of inking problems.

c) Repair/replacement of broken spring clips.

2) Lights

a) Replacement of broken light bulbs in sockets.

b) Removal of stuck light bulbs from sockets.

3) Miscellaneous

a) Cleaning of printers.

b) Cleaning of spilled ink on main control panels, etc.

c) Rehanging of existing labels and name tags that have become loose or fallen off.

d) Cleaning sticky and dirty switches.

e) Calibrating meters

2. Procedure

a. Work Request Initiation

1) A work request may be initiated by any staff member discovering a need for change or repair to simulator equipment or software. Trainees should be encouraged to bring potential simulator problems to the attention of their instructor through the use of verbal and written feedback.

2) The originator shall write the following information on the Simulator Work Request (Attachment A):

a) Equipment Name.

b) EID (Equipment Identification) Number. This number can be obtained from the EID printout located at the instructor station.

c) Location. The location can also be obtained from the EID printout. It is normally the panel on which the device in question is located.

d) Work Requested/Problem. Provide a full description of the requested work or problem encountered. Be as specific as possible. Include LOAD #, IC #, and % PWR in the spaces provided. Sign and date in the space provided.

e) Route the work request to the Simulator Fidelity/Certification Coordinator (SFCC).

3) The SFCC shall perform the following on both the WR and in the computer based tracking system:

a) Review the work request for applicability, clarity, accuracy, and legibility. If the work request is cancelled, mark it as such and return it to the originator along with the reason for its cancellation. Since no work request number has been assigned, the work request may be disposed of.

b) Enter the work request into the tracking system and obtain the assigned work request number and write the assigned number in the space provided.

c) Enter the work request description.

d) Enter the appropriate lead work group in the Dept. block. If more than one work group is needed then an additional work group may be designated in the SUPP DEPT block.

e) Assign a SME (Subject Matter Expert) by entering his/her initials in the SME block. SME review may not be required for every work request. If the SME review is not required, mark the SME Approved/Date block N/A and continue with this procedure at section C.2.b.2).

f) Complete the Test Required block by circling Y or N to indicate whether testing will be required upon completion of the maintenance.

g) If testing is required complete the Testing By block by circling the appropriate department to conduct the testing.

h) Route the work request to the assigned SME.

b. Work Request Approval

1) The SME shall perform the following:

a) Review the work request.

b) Provide additional information to the description of the problem. Attach Simulator Work Request - Sheet 2 (Attachment B) as necessary.

c) Attach a hard copy of drawings and data required to support the work requested.

d) If so indicated, write a test procedure using Attachment C that will determine if the maintenance has been successfully completed.

e) Sign and date the work request in the SME Approved/Date block.

f) Route the work request to the SFCC.

2) The SFCC shall perform the following:

a) Assign a Priority to the work request using Attachment E as a guide.

1)) Assignment of a priority above B22 requires the notification of the appropriate simulator maintenance group. This notification is required so that, if necessary, additional resources can be assigned to accomplish high priority items in a timely manner. Notification can be made via telephone.

2)) Lower priority items (below B23) may have their priority raised based on the length of time since the work request was initiated. The priority of an item may be increased in single step increments for every 30 days a work request remains open.

3)) In no case will a priority of a work request be elevated past B23 solely based on the length of time a work request has remained open.

4)) Priority increases should be made as a joint decision by the SFCC and appropriate personnel from the Simulator Support Group. The option to raise the priority of a work request should be used prudently.

b) Assign an Availability to the work request.

c) Complete the ANSI Certification block by circling Y or N to indicate if the work request is a simulator certification item. This field is intended to be used to identify those items directly related to the simulator certification report, yearly update to the certification report and certification testing.

d) Complete the Modification block by circling Y or N to indicate if the work request is associated with a modification at Braidwood Station. If the work request is associated with a modification, enter the modification number in the MOD # block, and enter the Mod. Implementation Date in the space provided. The modification implementation date is the date Braidwood Station declared the modification operational. If the work request is not associated with a modification, enter N/A in the MOD # block and Mod. Implementation Date field.

e) Review the work request to determine if it will require/cause the simulator design database to change. Indicate if the design database will be affected by circling Y or N in the Database Change block.

f) If the simulator design database is affected, assign an SRB # per Simulator Review Board Procedure (TDI 700-01) and enter that number in the SRB # block.

g) If the simulator design database is not affected enter N/A in the SRB Approved/Date block.

h) There may be times when the training staff identifies a simulator function (such as a malfunction or an initial condition) which no longer appears to be responding properly. At this time, in addition to the issuing of a work request to repair the problem, the SFCC shall add the simulator function in question to the Simulator NOT AUTHORIZED FOR USE letter. When the simulator function has been repaired, tested and determined to be valid again, the SFCC shall clear the item from the letter.

i) Review the work request, sign and date the SFCC Approved/Date block.

j) If the work request involves a design database change, submit it to the SRB (Simulator Review Board) for approval per Simulator Review Board Procedure (TDI 700-01).

k) If the work request does not involve a design database change, route the work request to the section clerk.

l) The section clerk shall copy the work request and route the copies as follows:

1)) Original copy of the work request - filed in the work request master file/work request log.

2)) One copy of the work request - routed to the appropriate work group leader along with supporting documentation.

3)) One copy of the work request - route to the SFCC.

4)) One copy of the work request - route to the Training Supervisor.

c. Conduct of Simulator Maintenance

1) The actual performance of simulator mair nce shall be controlled and performed in accordance with Conduct of Maintenance (SIMULATOR SUPPORT GUIDELINE - 1).

d. Work Request Testing - The SFCC shall perform the following:

1) If testing is not required, verify that the required work has been completed and continue with this procedure at section C.2.e.

2) Ensure that the necessary testing is performed to verify that the simulator maintenance has been completed satisfactory.

3) Indicate the results of the testing by checking the appropriate block in the Pass/Fail block.

4) Write in any pertinent comments in the Remarks block and sign and date the Remarks block in the space provided.

5) If the testing passed then proceed as follows:

a) If the work request has Y circled in the Database Change block verify that the design database has been updated by reviewing the Simulator Database Update Checklist (CONDUCT OF MAINTENANCE SIMULATOR SUPPORT GUIDELINE - 1). Indicate the status of the database change by circling Y or N in the Conf. Database Updated block and complete the VERIFIED BY: SFCC Init & Date block.

b) If the work request has N circled in the Database Change block write N/A in the VERIFIED BY: SFCC Init & Date block.

6) If the testing fails then proceed as follows:

a) Document the problems/discrepancies found in the Remarks block.

b) Report the work request as having failed testing.

c) Route the work request package to the appropriate work group for rework/discrepancy correction.

e. Work Request Completion

1) The SFCC shall perform the following:

a) Verify that the work request is completed.

b) Obtain the original copy of the work request, sign and date the SFCC ACCEPTANCE/DATE block.

c) Route the completed work request package to the Data Processing clerk.

2) The Data Processing clerk shall complete the WR closeout.

3) The Data Processing clerk shall route the work request package to the section clerk.

4) The section clerk shall file the completed work request package in General File #SIM-BW-6.

f. Work Request Cancellation (Design database related work requests)

1) Design database related work requests can only be cancelled by the Simulator Review Board in accordance with the Simulator Review Board Procedure (TDI 700-01).

2) The Simulator Review Board Chairman shall perform the following:

   a) Mark the work request cancelled in the Work Performed block along with the reason for cancellation.

   b) Circle CANCELLED in the SRB APPROVED/CANCELLED block.

   c) Sign and date the SRB Approved/Date block.

   d) Route the work request to the SFCC for cancellation.

3) The SFCC shall perform the following:

   a) Report the work request as cancelled using the computer based system.

   b) Forward one copy of the cancelled work request to the originator.

   c) Route the work request to the section clerk for filing in General File # SIM-BW-6.

g. Maintenance That Must be Performed Immediately - Outside of Normal Working Hours

1) This method of routing work requests is for special cases and should only be used in situations where a simulator failure (usually hardware orientated) inhibits the effective use of the simulator. Work requests requiring Simulator Review Board approval shall not be accomplished until SRB approval has been granted.

2) The work request routing and data entry will follow the normal procedure except that the SFCC approval along with computer data entry shall take place during the next regular work day.

3) If the work request has been completed prior to the final approval, the work request should be annotated to show that the work has been accomplished, and that the work request is in routing for approval and data entry only.

h. Change in Scope - during the performance of maintenance or testing situations will arise where the scope of the requested work may change or expand beyond the area originally requested and approved. Should a situation arise where there is a change in scope, a new work request should be initiated in accordance with section C.2.a. of this procedure to cover the increased/changed scope.

i. Minor Hardware Maintenance

1) Upon identification of a minor hardware problem the originator shall fill out the following sections of the Minor Hardware Maintenance Log (Attachment D) - Originator's Section:

a) Originator's Name

b) Date

c) EID # of item needing maintenance. This number can be obtained from the EID printout located at the instructor station. If the EPN # is available on the equipment name tag it may be used in place of the EID #.

d) Panel #.

e) Problem - provide a description of the problem in sufficient detail for the HW Technician to correct the problem.

2) The SFCC shall perform the following:

a) Review the Minor Hardware Maintenance Log (Attachment D) periodically to ensure needed maintenance is being accomplished.

b) Make arrangements to have a HW Technician complete needed maintenance.

c) If a Minor Hardware Maintenance Log (Attachment D) item requires work not considered routine or minor, place an X over the Problem block and write the Simulator Work Request number assigned to the problem in the Work Performed block.

3) Hardware Technician

a) Upon receiving a work assignment from the Minor Hardware Maintenance Log (Attachment D), the HW Technician shall:

1)) Review the problem description and location.

2)) Obtain authorization to correct the problem.

3)) Perform the appropriate repairs/maintenance requested.

4)) Complete the following sections of the Minor Hardware Maintenance Log (Attachment D) - HW Technician Section:

- HW Technician's Name
- Work Performed - provides a brief description of the work performed.

b) The HW Technician should request, when necessary, that the repaired item be functionally tested.

c) If the HW Technician determines that the maintenance required is beyond the scope allowed by the section, he/she shall notify the SFCC to determine of a Simulator Work Request should be written.

Approved By: Thomas N. Chwensky **Date:** Aug 5, 1993
Training Supervisor

ATTACHMENT A

No. U

BRAIDWOOD SIMULATOR WORK REQUEST

Equipment Name

EID

Location

WORK REQUESTED/PROBLEM

LOAD# | IC# | %PWR

Requested By/Date

DEPT | SME | SME Approved/Date | TEST REQ Y N | BY OPS HW SW | PRIORITY | AVAIL

ANSI CERT Y N | MOD Y N | MOD# | MOD IMPL Date | SUPP DEPT | DATABASE CHANGE Y N | SRB#

SRB Approved/Date | SRB APPROVED/ CANCELLED | SFCC Approved/Date | Assigned To | Group/Area

WORK PERFORMED

Work Comp Date

Parts/Tools

Est Hrs | Act Hrs | Maint Code | Maint Cause | PM Y N | CM Y N | Conf Database Updated Y N

VERIFIED BY:
SFCC Init & Date

TEST #1

PASS

FAIL

REMARKS

Signature/Date

TEST #2

PASS

FAIL

REMARKS

Signature/Date

SFCC ACCEPTANCE/DATE

ATTACHMENT B

BRAIDWOOD SIMULATOR WORK REQUEST SHEET 2

Page ___ of ___

No. U

WORK REQUESTED/PROBLEM (CONT)

WORK PERFORMED (CONT)	Parts/Tools (CONT)

TEST#____ PASS ☐ FAIL ☐	REMARKS Signature/Date

TEST#____ PASS ☐ FAIL ☐	REMARKS Signature/Date

ATTACHMENT C

WORK REQUEST TEST PROCEDURE

WR No. U________

STEP	RESULTS
1.	SAT/UNSAT
2.	SAT/UNSAT
3.	SAT/UNSAT
4.	SAT/UNSAT

References ________________ ________________

________________ ________________

________________ ________________

ATTACHMENT D

MINOR HARDWARE MAINTENANCE LOG

ORIGINATOR		HW TECHNICIAN
NAME:	DATE:	NAME:
EID#:	PANEL:	WORK PERFORMED:
PROBLEM:		
ORIGINATOR		**HW TECHNICIAN**
NAME:	DATE:	NAME:
EID#:	PANEL:	WORK PERFORMED:
PROBLEM:		
ORIGINATOR		**HW TECHNICIAN**
NAME:	DATE:	NAME:
EID#:	PANEL:	WORK PERFORMED:
PROBLEM:		
ORIGINATOR		**HW TECHNICIAN**
NAME:	DATE:	NAME:
EID#:	PANEL:	WORK PERFORMED:
PROBLEM:		

ATTACHMENT E

SIMULATOR WORK REQUEST PRIORITY CODES

A00 - SIMULATOR IS SHUTDOWN AND PROHIBITS TRAINING IN PROGRESS. TRAINING CANNOT CONTINUE AND SIMULATOR MUST BE MADE AVAILABLE FOR MAINTENANCE.

- SAFETY HAZARD.

B10 - SIMULATOR OR EQUIPMENT PROBLEM PROHIBITS MEETING TRAINING OBJECTIVES SCHEDULED IN THE NEXT 8 HOURS.

B20 - SIMULATOR OR EQUIPMENT PROBLEM PROHIBITS MEETING TRAINING OBJECTIVES SCHEDULED IN THE NEXT 24 HOURS.

B21 - SIMULATOR OR EQUIPMENT PROBLEM PROHIBITS MEETING TRAINING OBJECTIVES SCHEDULED IN THE NEXT 7 DAYS.

B22 - SIMULATOR OR EQUIPMENT PROBLEM IDENTIFIED AS A RESULT OF A REGULATORY AUDIT (I.E.: NRC, INPO, ETC.).

B23 - SIMULATOR OR EQUIPMENT PROBLEM PROHIBITS MEETING TRAINING OBJECTIVES SCHEDULED IN THE NEXT 30 DAYS.

B30 - SIMULATOR OR EQUIPMENT PROBLEM IDENTIFIED AS A RESULT OF A OR RELATED TO AN ANS 3.5 PERFORMANCE TEST ITEM, SIMULATOR FIDELITY, OR SIMULATOR CERTIFICATION.

B31 SIMULATOR OR EQUIPMENT PROBLEM RESULTS IN SOME DEGRADATION OF TRAINING EFFECTIVENESS. THE PROBLEM DOES NOT, HOWEVER, RENDER THE TRAINING FEATURE UNUSABLE.

B32 - SIMULATOR OR EQUIPMENT PROBLEM CAUSES NO SPECIFIC DEGRADATION IN TRAINING EFFECTIVENESS. THE PROBLEM MAY BE AN IRRITATION TO TRAINEES OR INSTRUCTORS IN THE CONDUCT OF SIMULATOR EXERCISES.THIS ITEM SHOULD BE RESOLVED TO ENSURE TECHNICAL ACCURACY.

B33 - ROUTINE AND COSMETIC SIMULATOR ITEMS THAT HAVE NO IMPACT ON TRAINING.

C00 - ROUTINE ITEMS NOT RELATED SPECIFICALLY TO THE SIMULATOR.

ATTACHMENT 4

SIMULATOR REVIEW BOARD PROCEDURE

Braidwood Station

Training Department Instruction

SIMULATOR REVIEW BOARD

A. Purpose

1. The purpose of this procedure is to establish a consistent process for reviewing changes to the simulator design database and reviewing other items concerning simulator certification.

B. References

1. ANSI/ANS-3.5-1985: Nuclear Power Plant Simulators for Use in Operator Training

2. INPO TQ-504: Simulator Configuration Management System-Good Practices

3. TDI 700-02: Simulator Work Request Procedure

C. Instruction

1. Definitions

   a. Design Database - A collection of material which documents the current performance and appearance status of the simulator hardware and software. It is further defined as the contents of the General Files Pattern Simulator (SIM) file. Any document that is NOT in the General Files Pattern Simulator (SIM) file is NOT considered part of the Simulator Design Database.

2. Procedure

a. Scope

1) The Simulator Review Board functions as a management team to:

a) approve changes to the simulator design database.

b) authorize and document deviations between the simulator and reference plant.

c) approve Simulator Certification Reports.

b. Simulator Review Board Composition

1) The Simulator Review Board will consist of the following members:

a) Senior operating representative (Operating Engineer or above).

b) Training Supervisor.

c) Licensed or certified SRO (Training).

d) Licensed SRO (Operating).

d) Simulator Fidelity and Certification Coordinator (SFCC).

2) A minimum of three members must be present to conduct a Simulator Review Board Meeting. Every effort should be made to include a senior operating representative.

3) Other personnel may be invited to the Simulator Review Board Meeting to observe or serve as subject matter experts.

c. Determination of Simulator Review Board Discussion Items

1) The SFCC determines which items require review by the Simulator Review Board. Required review items are:

a) Modifications which affect the simulator design database.

b) Other changes which affect the simulator design database.

c) Simulator Certification Report (prior to submittal to the NRC and annual updates).

d) Other items designated by the SFCC.

2) When it has been determined that an item requires a review, the SFCC assigns a Simulator Review Board number (SRB #) on the Simulator Review Board Approval Sheet.(Attachment A)

a) The SRB # will be logged as BW-YY-ZZ where:

YY = year

ZZ = sequential SRB # for that year

b) In addition, the following information will also be recorded on Attachment A:

1)) Work Request number (WR #), if applicable.

2)) Modification number (MOD #), if applicable.

3)) Brief description of the discussion item.

4)) Assign the file pattern number with the appropriate year (YR) for FILE: SIM-BW-5-YR.

3) The Simulator Review Board Log Sheet (Attachment B) is used for assigning SRB numbers and tracking the status of each SRB discussion item.

4) The SFCC maintains the Simulator Review Board Log Book.

d. Simulator Review Board Meeting Preparation

1) The SFCC submits the package of Simulator Review Board Approval Sheets (Attachment A's) to the Simulator Review Board Members when a Simulator Review Board Meeting is warranted.

a) The Simulator Review Board should meet at a minimum of at least once every three months and each meeting should have no more than two hours of discussion items scheduled.

b) The SFCC gathers the necessary data to discuss each item. This data should be recorded on the Simulator Review Board Approval Sheet (Attachment A). This data may include: cost, manpower (hardware and/or software), lead time for obtaining parts, simulator availability, and regulatory commitments.

e. Review Process

1) The Training Supervisor normally serves as the Simulator Review Board Chairman.

2) The Simulator Review Board Chairman addresses each discussion item (new business) and leads a discussion concerning each item.

3) The SFCC addresses all open discussion items (old business).

4) The Simulator Review Board members should consider the following prior to voting on each item:

   a) training value/impact.

   b) resource requirements.

   c) priority relative to other changes.

   d) cost/benefit.

   e) regulatory commitments.

5) A majority of the members present must agree on the disposition of each SRB discussion item. The appropriate members will sign Attachment A signifying agreement with the disposition. In addition, any dissenting members will sign Attachment A signifying disagreement with the disposition.

6) Discussion items requiring further clarification (items that were not APPROVED or DISAPPROVED) are placed on HOLD until the next Simulator Review Board Meeting.

7) The Simulator Review Board Chairman may use the comments section of Attachment A to document questions or comments concerning the discussion item.

8) Each discussion item is addressed to determine if a Simulator vs. Station Difference exists based on the disposition. The results of this determination are documented in the comments section of Attachment A.

9) Discussion items involving work requests:

a) If APPROVED, circle APPROVED on the SRB APPROVED/CANCELLED block of the work request. In addition, the work request is signed by the Simulator Review Board Chairman in the SRB Approved/Date block.

b) If DISAPPROVED, circle CANCELLED on the SRB APPROVED/CANCELLED block of the work request. In addition, the work request is cancelled by the Simulator Review Board Chairman and the reason for the cancellation is documented on the work request and Attachment A.

10) The SFCC updates the Simulator Review Board Log Sheet (Attachment B) after each Simulator Review Board Meeting.

Approved By: Thomas Chasek **Date:** Aug 5, 1993
Training Supervisor

ATTACHMENT A

BRAIDWOOD SIMULATOR REVIEW BOARD APPROVAL SHEET

SRB # BW - ____________ MOD# ____________ WR# ____________

DISCUSSION ITEM

COST MANPOWER HW- SW- LEAD TIME (PARTS) SIMULATOR AVAILABILITY REGULATORY COMMITMENTS WILL BE DOCUMENTED AS A SIM VS. STATION DIFFERENCE IN CERTIFICATION REPORT ☐ YES ☐ NO	COMMENTS

DISPOSITION		CONSENTING SIGNATURES
☐ Approved ☐ Disapproved ☐ Hold ______ Date	____________ Chairman/Date	____________ ____________ ____________ ____________

FILE: SIM - BW - 5 - ____ DISSENTING SIGNATURES ____________

____

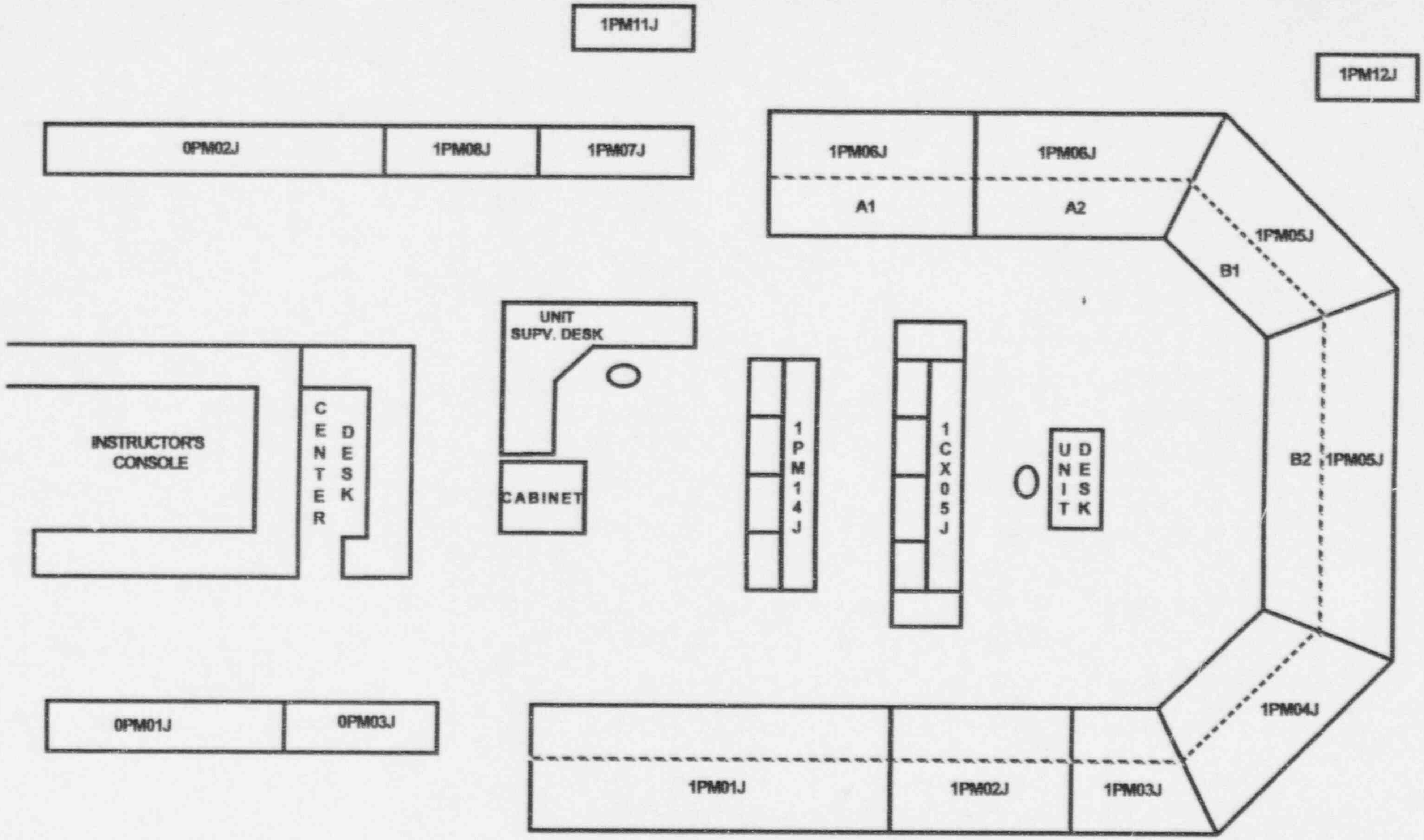
ATTACHMENT B

BRAIDWOOD SIMULATOR REVIEW BOARD LOGSHEET

SRB #	ITEM CLOSED (DATE)	DESCRIPTION OF SRB ITEM	WR #	DISPOSITION		
				APPROVED	DISAPPROVED	HOLD

ATTACHMENT 5

SIMULATOR AND CONTROL ROOM LAYOUTS



UNIT 1 PANELS

1CX05J - OPERATOR CONSOLE
1PM01J - GENERATOR & AUXILIARY POWER
1PM02J - TURBINE
1PM03J - CONDENSATE
1PM04J - FEEDWATER

UNIT 1 PANELS

1PM05J - REACTOR & CHEM. VOL. CONT.
1PM06J - ENG. SAFETY FEATURES
1PM07J - NUCLEAR INSTRUMENTATION
1PM08J - INCORE INSTRUMENTATION

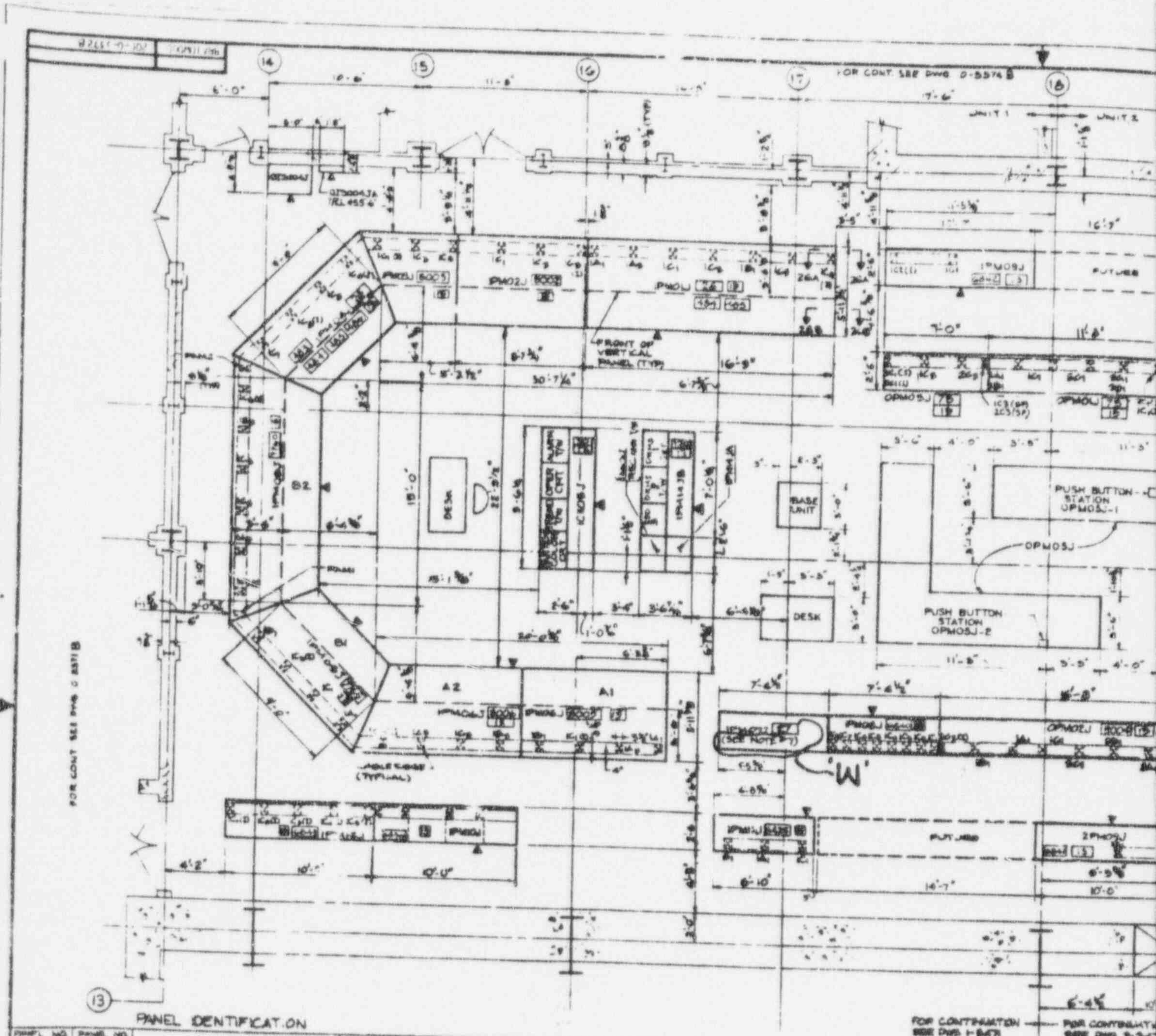
UNIT 1 PANELS

1PM11J - CONTAINMENT ISOLATION
1PM12J - MISC. INSTRUMENTATION
1PM14J - ALARM PRINTER CONSOLE

COMMON PANELS (UNITS 1 & 2)

0PM01J - GENERAL SERVICES
0PM02J - HVAC
0PM03J - SWITCHYARD

ATTACHMENT 5 : BRAIDWOOD SIMULATOR CONTROL ROOM LAYOUT



PANEL IDENTIFICATION

PANEL NO. UNIT 1 & COMMON	PANEL NO. UNIT 2	TITLE	SPEC. NO.	EQUIPMENT DRAWING NO.
OPM01J	—	MAIN CONTROL BOARD GEN. SERVICES	L2788	20275-M51
OPM01J	—	MAIN CONTROL BOARD - HVAC	L2788	20275-M61
OPM03J	—	MAIN CONTROL BOARD - SWITCHYARD	L2788	20275-M71
OPM05J	—	STATION CONSOLE	L2722	A-455
1CX05J	2CX05J	COMPUTER OPERATOR'S CONSOLE	L2706	8588002
1PM01J	2PM01J	MAIN CONTROL BOARD - GEN. & AUX. POWER	L2788	20275-M1
1PM02J	2PM02J	MAIN CONTROL BOARD - TURBINE	L2788	20275-M11
1PM03J	2PM03J	MAIN CONTROL BOARD - CONDENSATE	L2788	20275-M11
1PM04J	2PM04J	MAIN CONTROL BOARD - FEED WATER	L2788	20275-M21
1PM05J	2PM05J	MAIN CONTROL BOARD - REACT. & CHEM. VOL. CONTROL	L2712	1D10E76
1PM06J	2PM06J	MAIN CONTROL BOARD ENG. SAFETY FEATURES	L2712	1150E76
1PM07J	2PM07J	NUCLEAR INSTRUMENTATION PANEL	L2712	6058064
1PM08J	2PM08J	INCORE INSTRUMENTATION PANEL	[illegible]	6068045
1PM09J	2PM09J	[illegible] PANEL	[illegible]	20216-M181
1PM10J	2PM10J	RADIATION MONITORING PANEL	L2727	
1PM11J	2PM11J	CONTAINMENT ISOLATION PANEL	L2788	20275-M9
1PM12J	2PM12J	MISC. INSTRUMENTATION PANEL	L2788	20275-M41
1PM14J	2PM14J	ALARM PRINTER CONSOLE	L2818	80011
1PM14JB	2PM14JB	ALARM CONSOLE	[illegible]	20216-M181

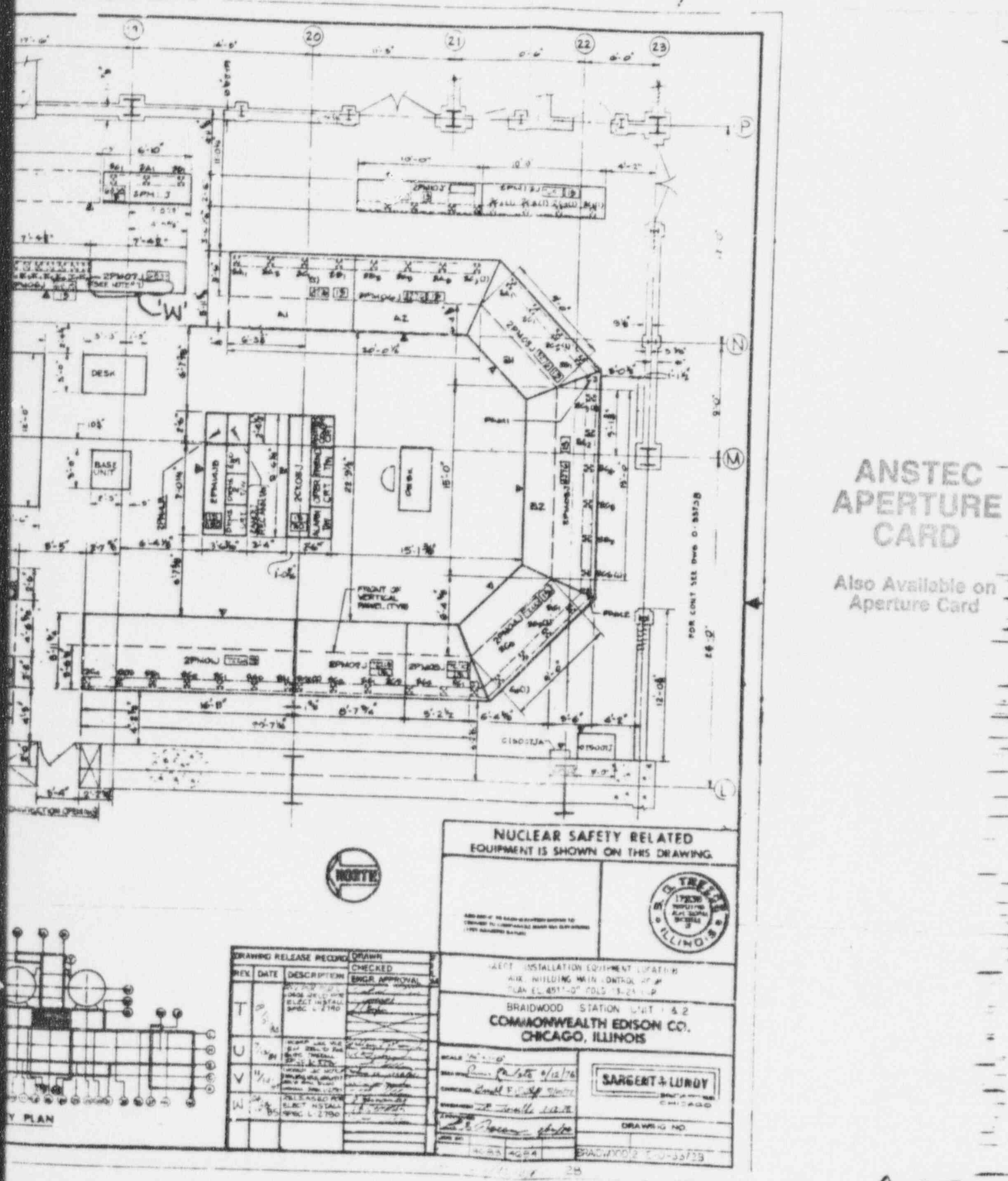
NOTES

NO.	NOTE
1.	FOR GENERAL NOTES AND SYMBOLS SEE DWG 0-5550.
2.	FOR CONDUIT LAYOUT SEE DWG. 0-5572 & 0-8382
3.	WIREWAYS INSIDE THE PANELS ARE IDENTIFIED AS FOLLOWS: 1A1, 1A2, ETC = ESF DIVISION 11 (CONTROL) 1B1, 1B2, ETC = ESF DIVISION 12 (CONTROL) 1C1, 1C2, ETC = NSR DIVISION 11 & 12 (CONTROL) 1C1(I) 1C2(I) ETC = NSR DIVISION 11 & 12 (INSTR.) 2A, 2A2, ETC = ESF DIVISION 21 (CONTROL) 2B, 2B2, ETC = ESF DIVISION 22 (CONTROL) 2C1, 2C2, ETC = NSR DIVISION 21 & 22 (CONTROL) 2C1(I), 2C2(I), ETC = NSR DIVISION 21 & 22 (INSTR.)
4.	ALL DEPTH DIMENSIONS FOR PANELS OF CONTROL BOARDS INCLUDES DOORS.
5.	FOR CABLE OPENING & CONDUIT SLEEVE LAYOUT IN CONTROL ROOM SEE DWG. 0-8889 B.
6.	FOR CABLE PAN LAYOUT ABOVE CONTROL ROOM SEE DWG. 0-5072. FOR PAN LAYOUT BELOW CONTROL ROOM SEE DWG. 0-5062
7	CONTRACTOR TO INSTALL 1-1/C #1/0 INSULATED GROUND CABLE FOR EACH SECTION OF 1PM07J & 2PM07J. CABLE SHALL CONNECT GROUND BUS WITHIN EACH SECTION TO A CABLE TRAY USING DETAIL A WITH INSULATED GROUND CABLE IN THE LOWER CABLE SPREADING ROOM DIRECTLY BELOW 1PM07J & 2PM07J

'W'

REFERENCE DRAWINGS

DWG NO.	DESCRIPTION
A-267	AUX. BLDG. MAIN FLOOR PLAN EL. 451'-0" AREA 2
A-268	AUX. BLDG. MAIN FLOOR PLAN EL. 451'-0" AREA 3
S-1608	AUX. BLDG. MAIN FLOOR PLAN EL. 451'-0" AREA 2
S-1609	AUX. BLDG. MAIN FLOOR PLAN EL. 451'-0" AREA 3
A-455	CONTROL RM. CENTER DESK AREA PLANS ELEVATIONS, SECTIONS & DETAILS



9603140208-05