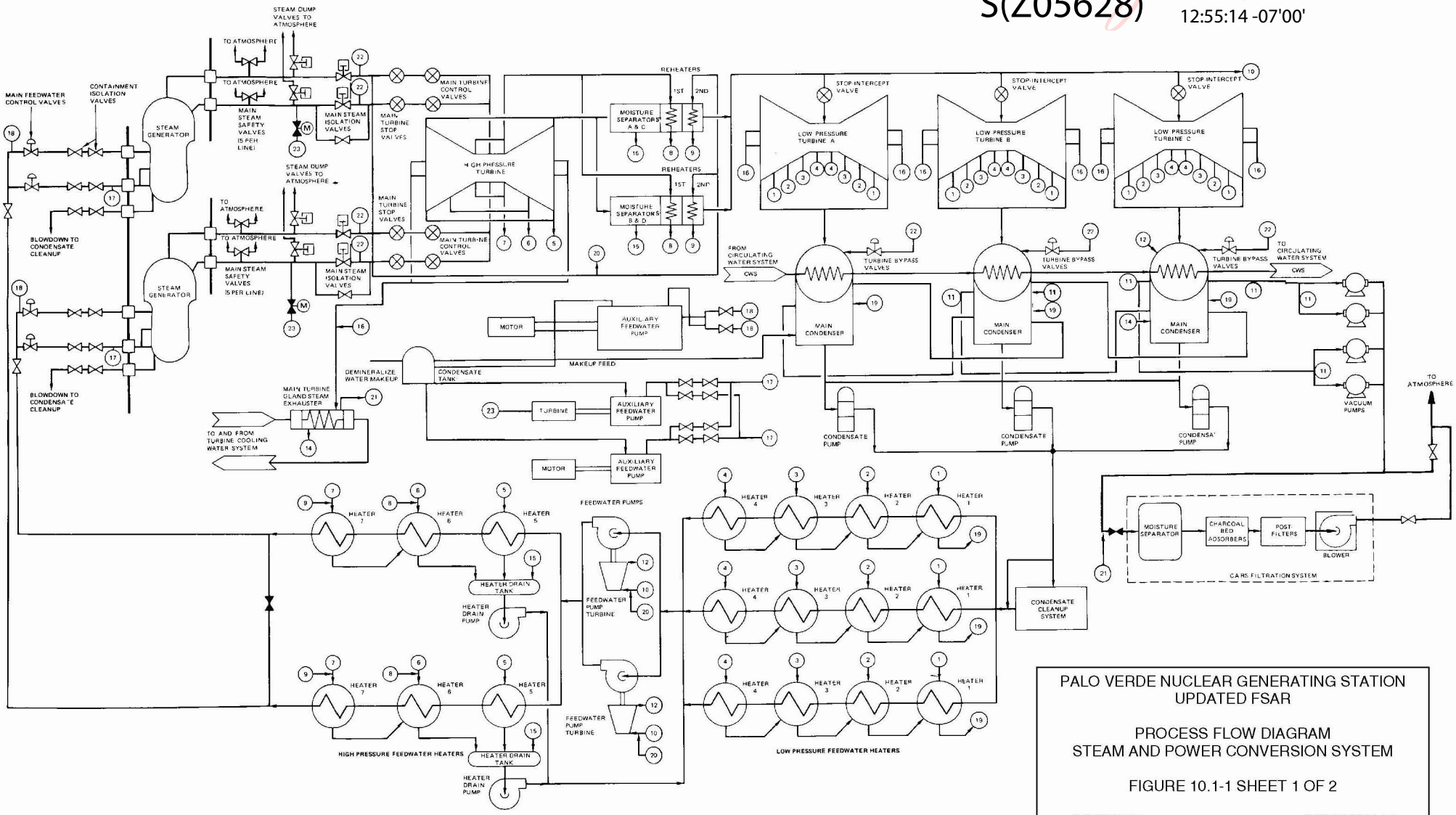


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PROCESS FLOW DIAGRAM
STEAM AND POWER CONVERSION SYSTEM

FIGURE 10.1-1 SHEET 1 OF 2

JUNE 2001 REVISION 11

PROCESS FLOW PATH NUMBER	DESCRIPTION
1 2 3 4	EXTRACTION STEAM FLOW FROM MAIN TURBINE TO LOW PRESSURE FEEDWATER HEATERS
5 6 7	EXTRACTION STEAM FLOW FROM MAIN TURBINE TO HIGH PRESSURE FEEDWATER HEATERS
8	STEAM FLOW FROM FIRST STAGE REHEATERS (TUBE SIDE) TO FEEDWATER HEATERS NO. 6
9	STEAM FLOW FROM SECOND STAGE REHEATERS (TUBE SIDE) TO FEEDWATER HEATERS NO. 7
10	STEAM FLOW FROM MOISTURE SEPARATORS AND REHEATERS (SHELL SIDE) TO STEAM GENERATOR FEEDWATER PUMP TURBINE INLET SECTIONS
11	SUCTION FROM MAIN CONDENSER TO VACUUM PUMPS
12	STEAM FLOW FROM STEAM GENERATOR FEEDWATER PUMP TURBINES TO MAIN CONDENSER
14	STEAM FLOW FROM MAIN TURBINE GLAND STEAM EXHAUSTER (SHELL SIDE) TO MAIN CONDENSER
15	FLOW FROM MOISTURE SEPARATORS TO HEATER DRAIN TANKS
16	STEAM FLOW FROM MAIN TURBINE SEALS TO MAIN TURBINE GLAND STEAM EXHAUSTER (SHELL SIDE)
17 18	AUXILIARY FEEDWATER FLOWS TO STEAM GENERATORS
19	FLOW FROM FEEDWATER HEATER NO. 1 DRAINS TO MAIN CONDENSER
20	MAIN STEAM FLOW TO STEAM GENERATOR FEEDWATER PUMP TURBINE INLET SECTIONS
21	MAIN TURBINE GLAND STEAM EXHAUSTER SHELL SIDE EVACUATION FLOW TO ATMOSPHERE
22	TURBINE BYPASS STEAM FLOW TO CONDENSERS AND TO ATMOSPHERE
23	STEAM FLOW TO TURBINE DRIVEN AUXILIARY FEEDWATER PUMP

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PROCESS FLOW DIAGRAM
STEAM AND POWER CONVERSION SYSTEM

FIGURE 10.1-1 SHEET 2 OF 2

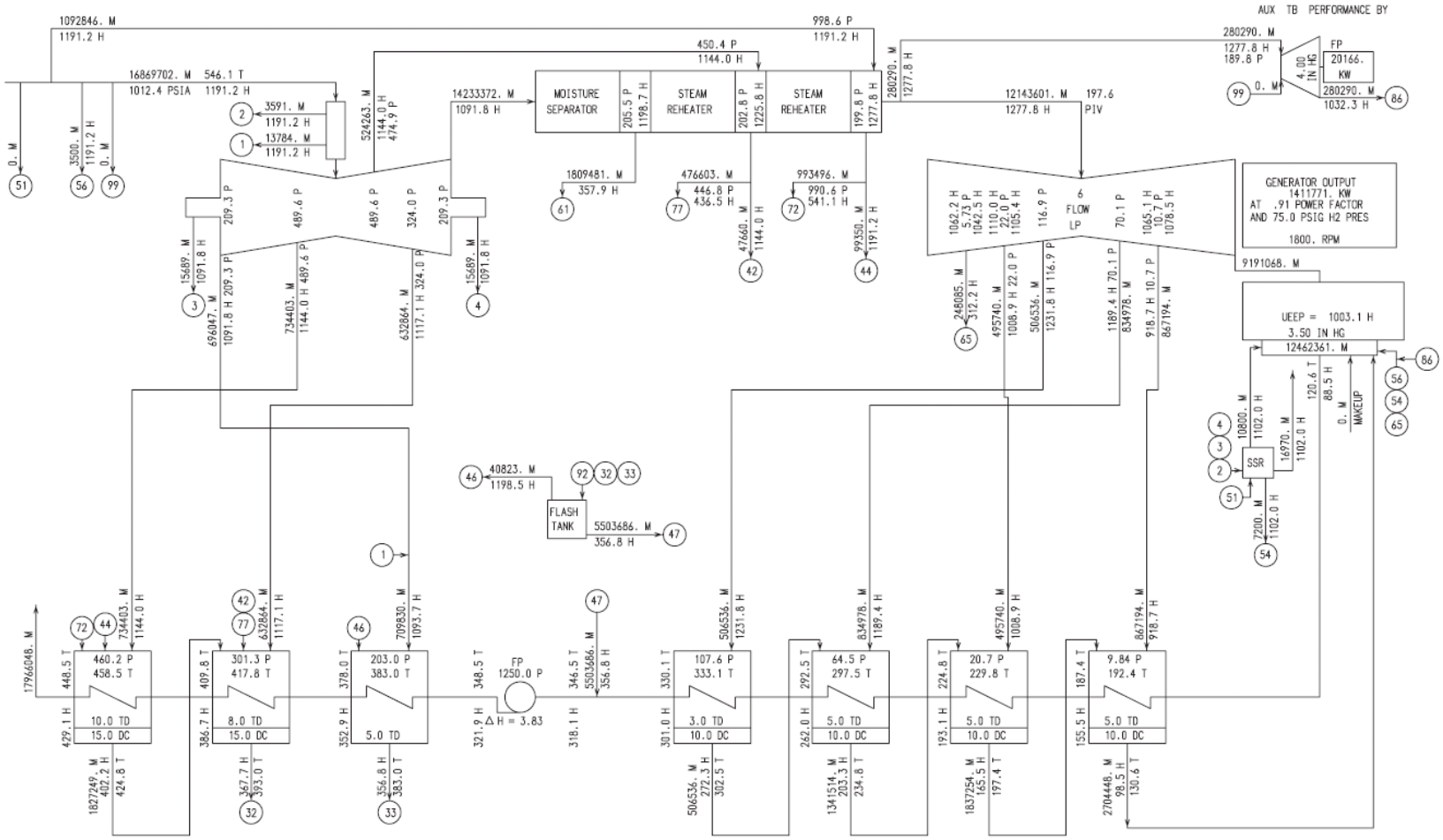
JUNE 2001 REVISION 11

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR
HEAT BALANCE AT GUARANTEED POWER

FIGURE 10.1-2

JUNE 2013 REVISION 17

RATING FLOW IS 16387972. M AT INLET STEAM CONDITIONS OF 1002.0 PSIA AND 1189.9 H
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC, WHICH MAY AFFECT THE FLOW, THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS 5.0 PERCENT) OF 17207371. M
THE EQUIVALENT DESIGN FLOW AT 1012.4 PSIA AND 1191.2 H IS 17374901. M .
THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR
EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED



VALVE BEST POINT NET HEAT RATE = $\frac{16869702.\ (1191.2 - 429.1) + 1092846.\ (1191.2 - 429.1)}{1411771.} = 9697$ BTU/KW-HR

LEGEND – CALCULATIONS BASED ON 1967 ASME STEAM TABLES
M – FLOW-LB/HR
P – PRESSURE-PSIA
H – ENTHALPY-BTU/LB
T – TEMPERATURE-F DEGREES

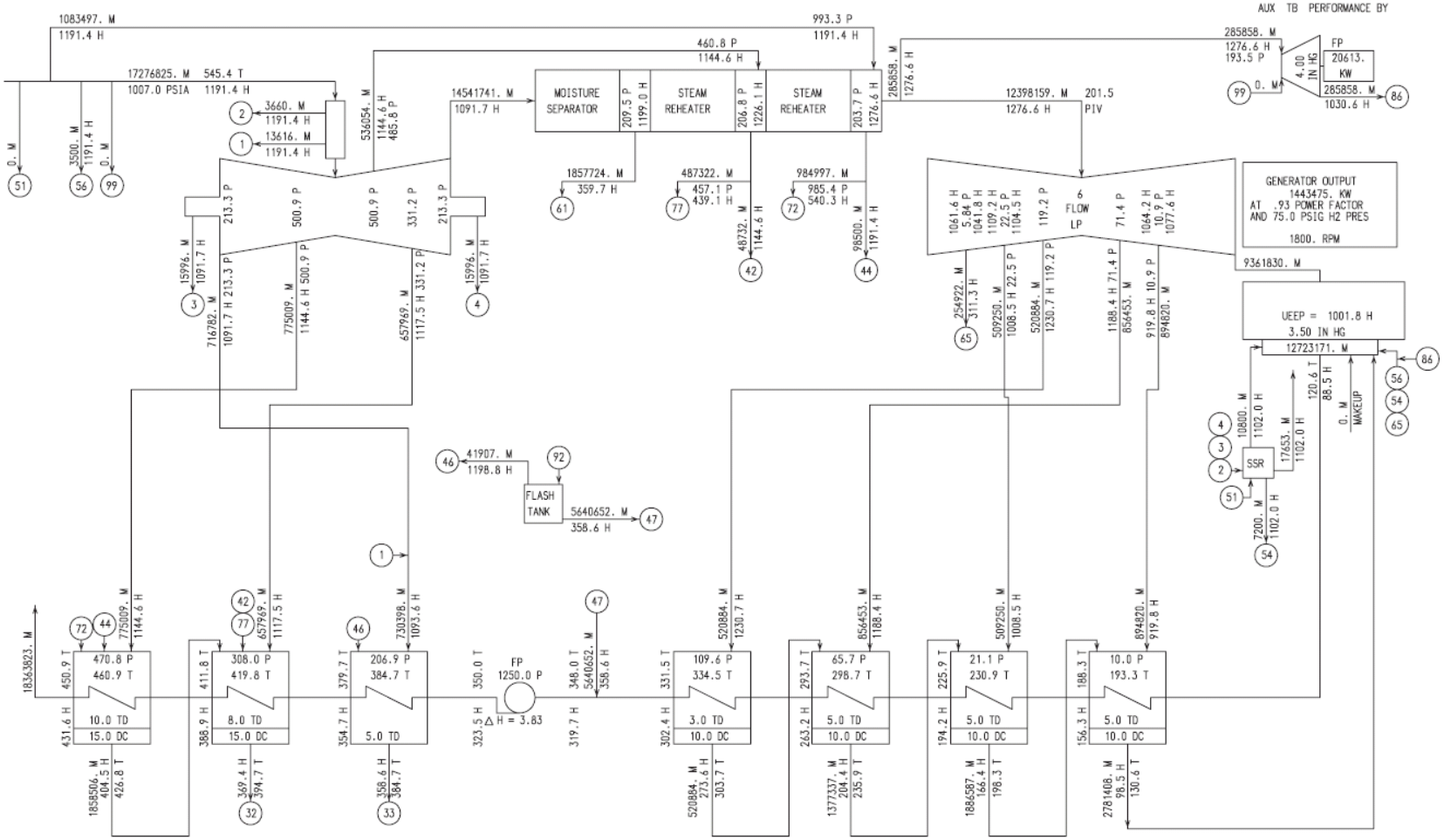
1411771. KW 3.50 IN HG ABS 0. PCT MU
TC6F 43.0 IN LSB 1800 RPM TWO STAGE REHEAT
1012.4 PSIA 1191.2 BTU / LB 75.0 PSIG H2 PRES
GEN- 1559100. KVA .90 PF LIQ

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR
HEAT BALANCE AT STRETCH (VWO) POWER

FIGURE 10.1-3

JUNE 2013 REVISION 17

RATING FLOW IS 16387972. M AT INLET STEAM CONDITIONS OF 1002.0 PSIA AND 1189.9 H
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC, WHICH MAY AFFECT THE FLOW, THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS 5.0 PERCENT) OF 17207371. M
THE EQUIVALENT DESIGN FLOW AT 1007.0 PSIA AND 1191.4 H IS 17276825. M .
THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR
EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED



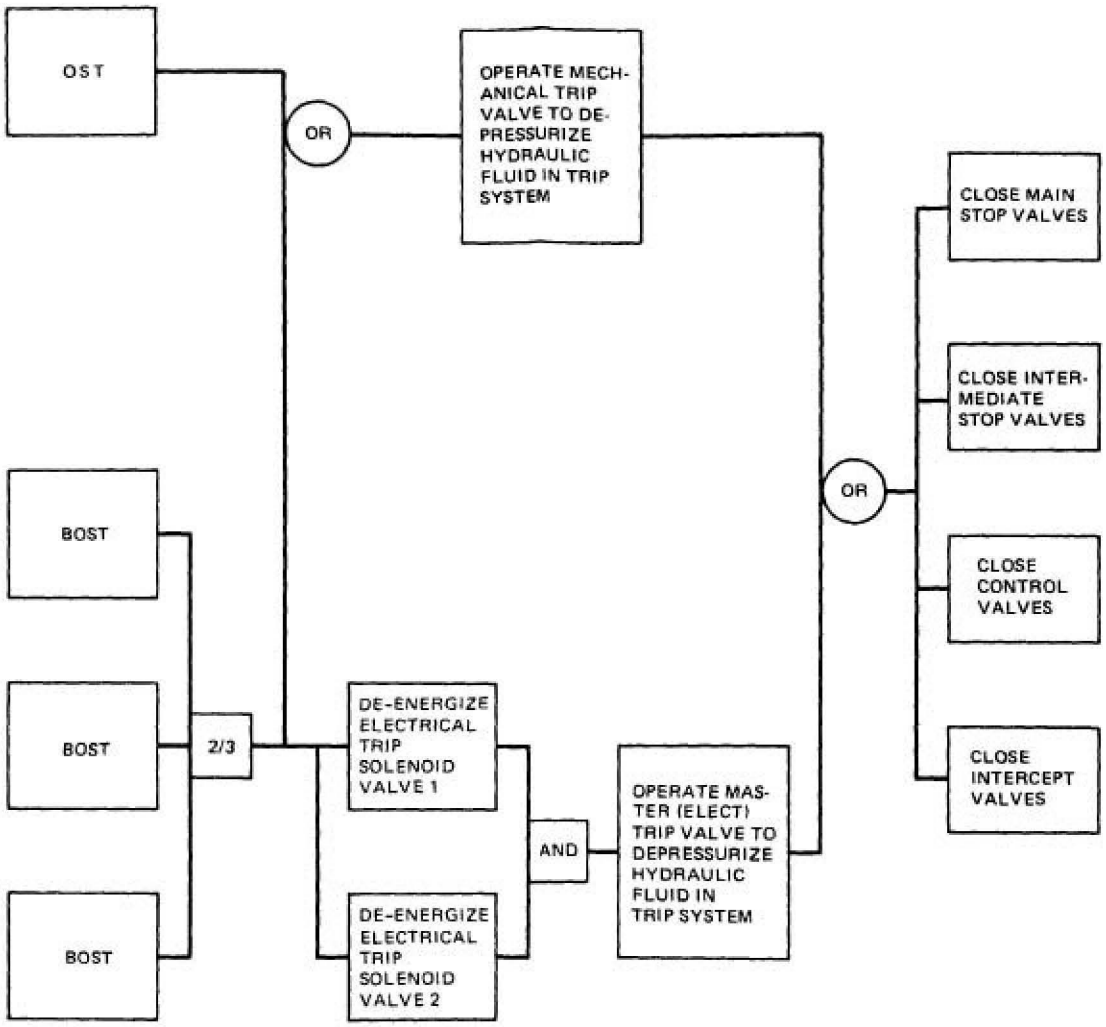
VALVE BEST POINT NET HEAT RATE = $\frac{17276825.\ (1191.4 - 431.6) + 1083497.\ (1191.4 - 431.6)}{1443475.} = 9664$ BTU / KW-HR

LEGEND - CALCULATIONS BASED
ON 1967 ASME STEAM TABLES
M - FLOW-LB/HR
P - PRESSURE-PSIA
H - ENTHALPY-BTU/LB
T - TEMPERATURE-F DEGREES

1411771. KW 3.50 IN HG ABS
TC6F 43.0 IN LSB 1800 RPM
1012.4 PSIA 1191.2 BTU / LB
GEN- 1559100. KVA .90 PF LIQ

0. PCT MU

TWO STAGE REHEAT
75.0 PSIG H2 PRES



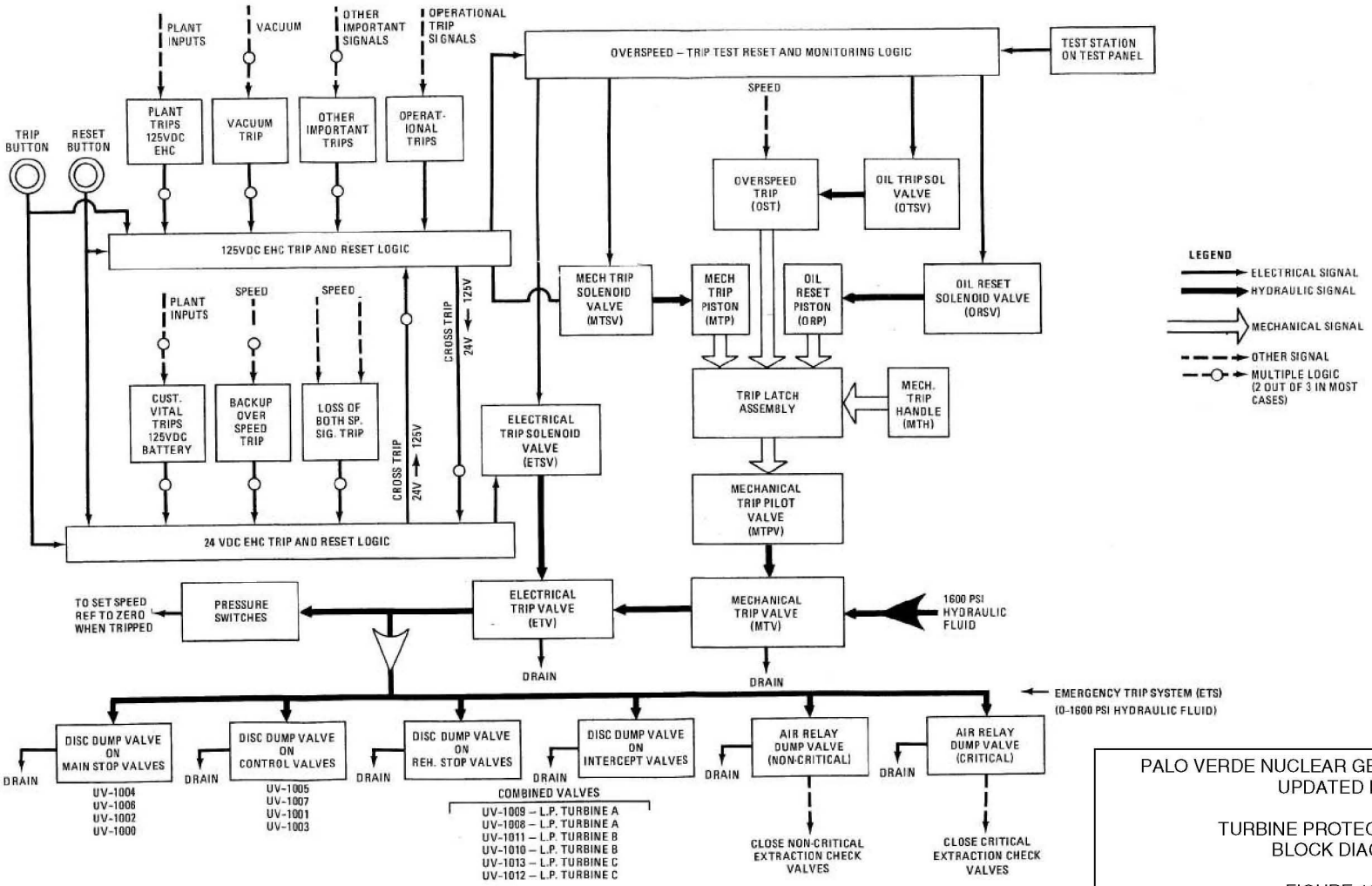
OST - MECHANICAL OVERSPEED TRIP
BOST - BACKUP OVERSPEED TRIP

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

OVERSPEED TRIP
SIMPLIFIED LOGIC DIAGRAM

FIGURE 10.2-1

JUNE 2003 REVISION 12

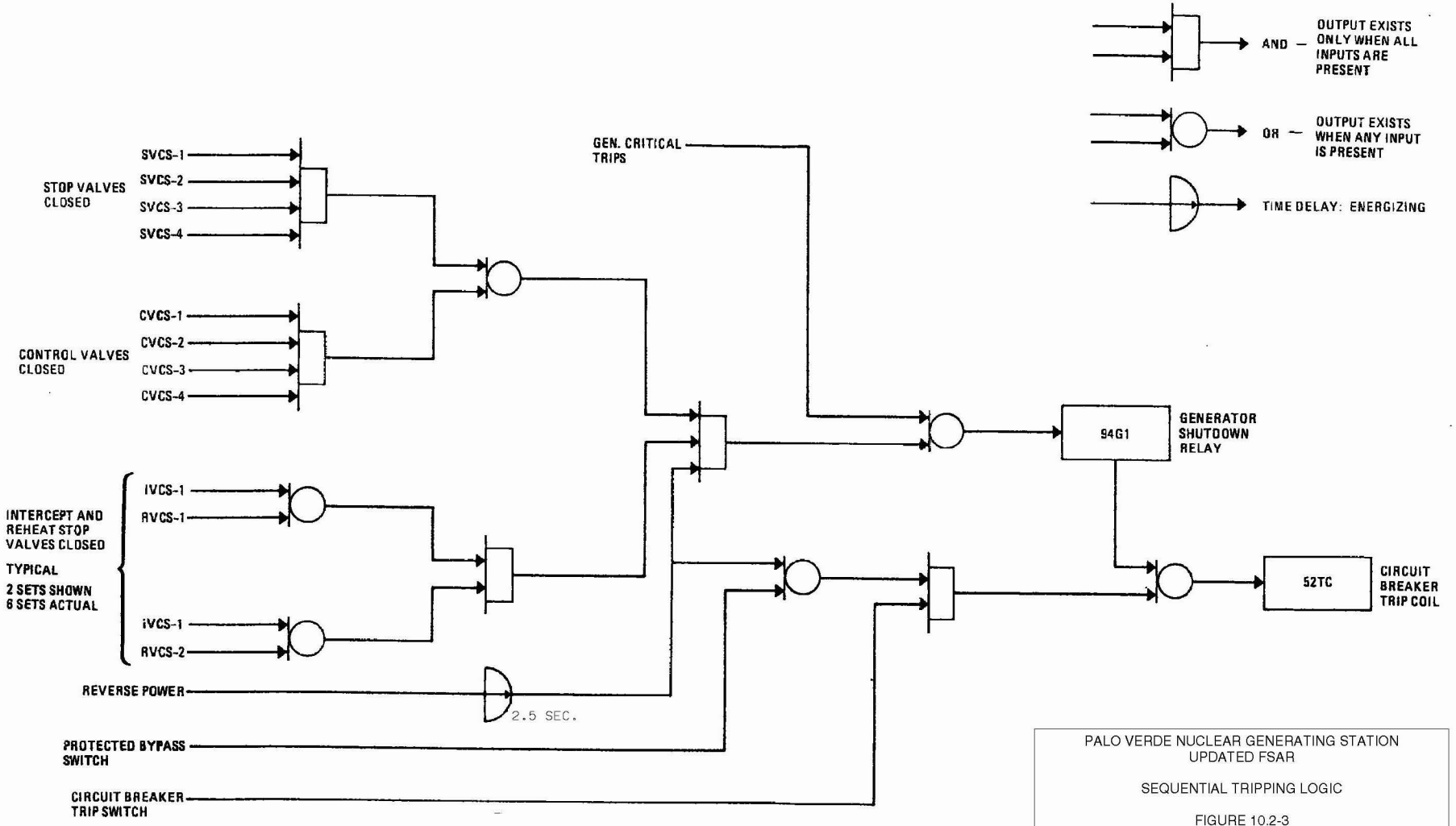


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TURBINE PROTECTIVE TRIPS
BLOCK DIAGRAM

FIGURE 10.2-2

REVISION 12 JUNE 2003

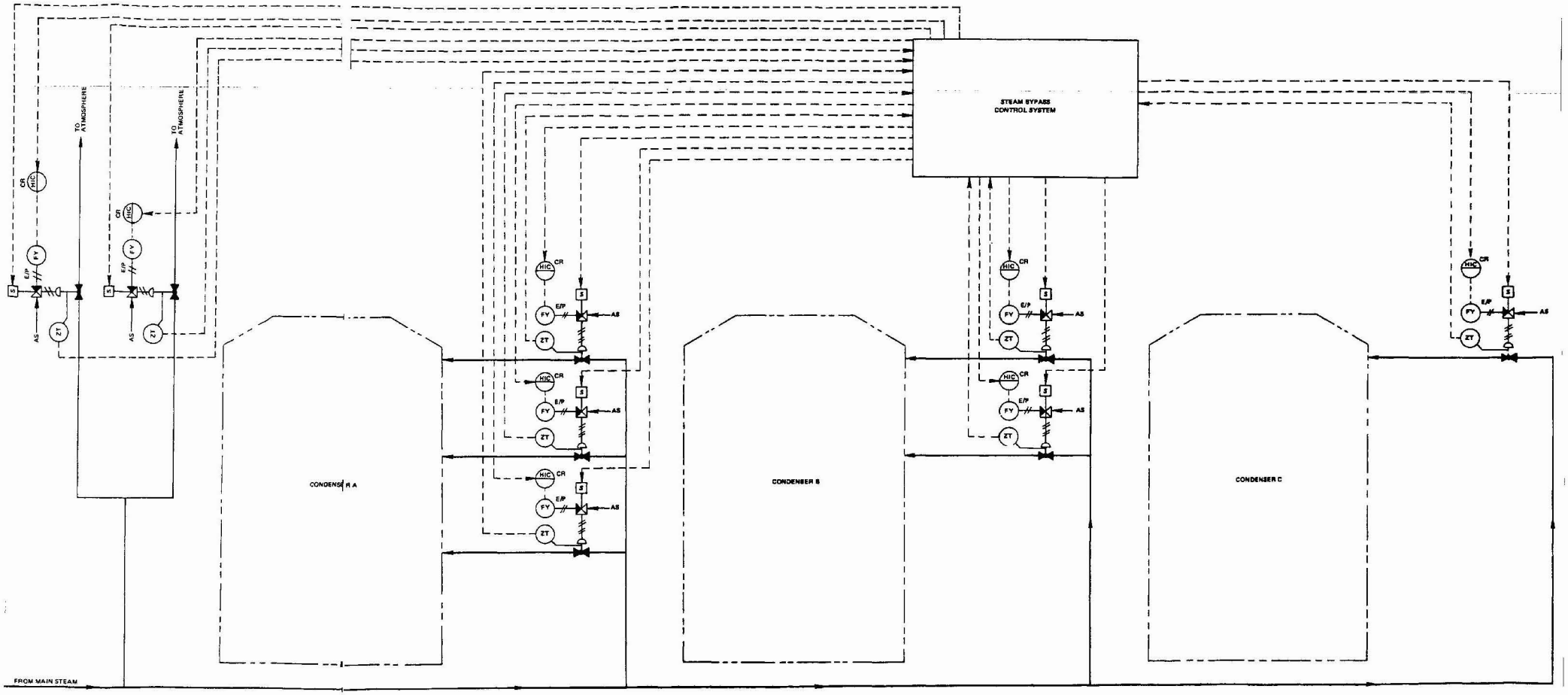


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SEQUENTIAL TRIPPING LOGIC

FIGURE 10.2-3

JUNE 2003 REVISION 12



NOTE:

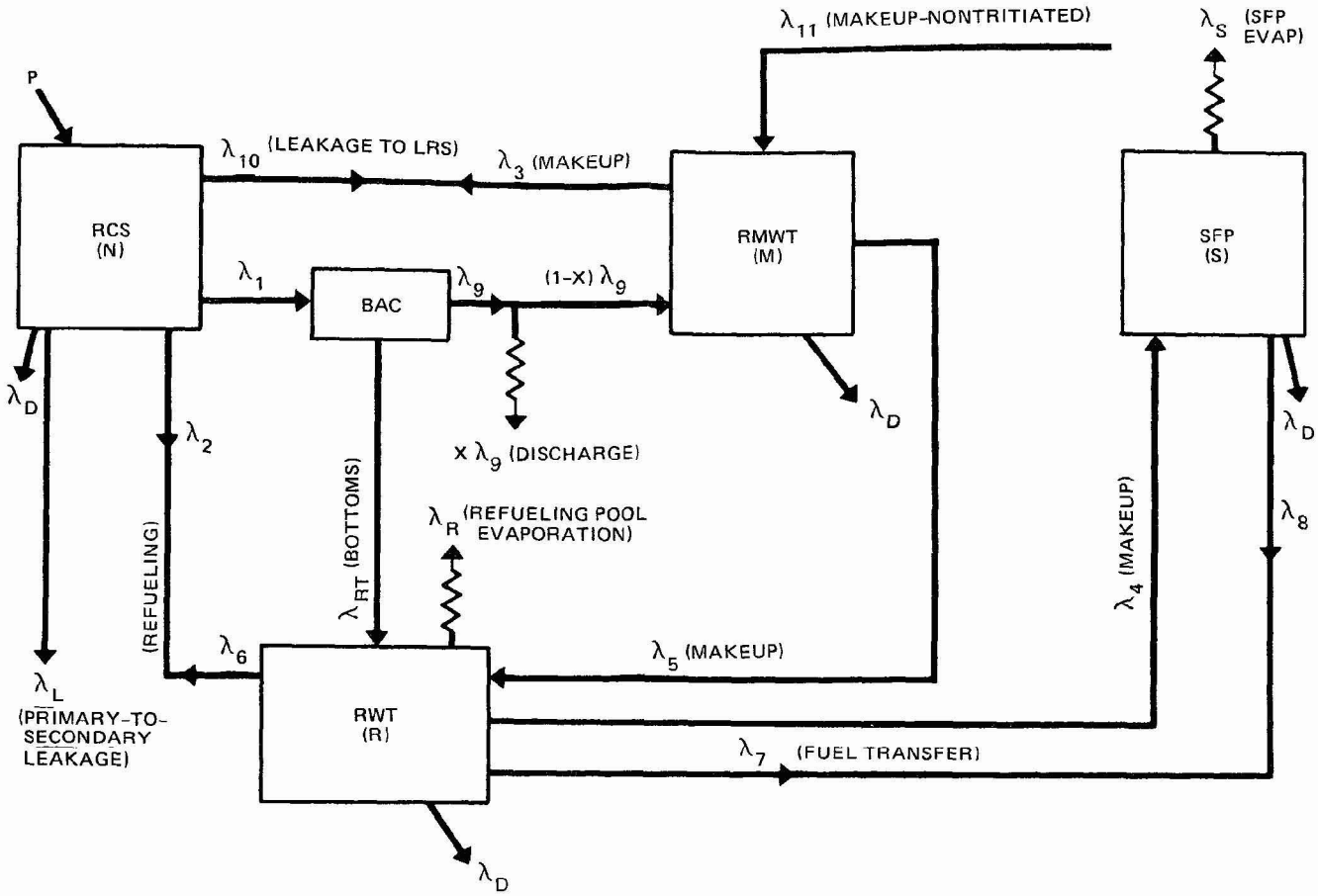
THIS SYSTEM IS NON-SEISMIC CATEGORY I

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TURBINE BYPASS SYSTEM

FIGURE 10.4-1

JUNE 2003 REVISION 12

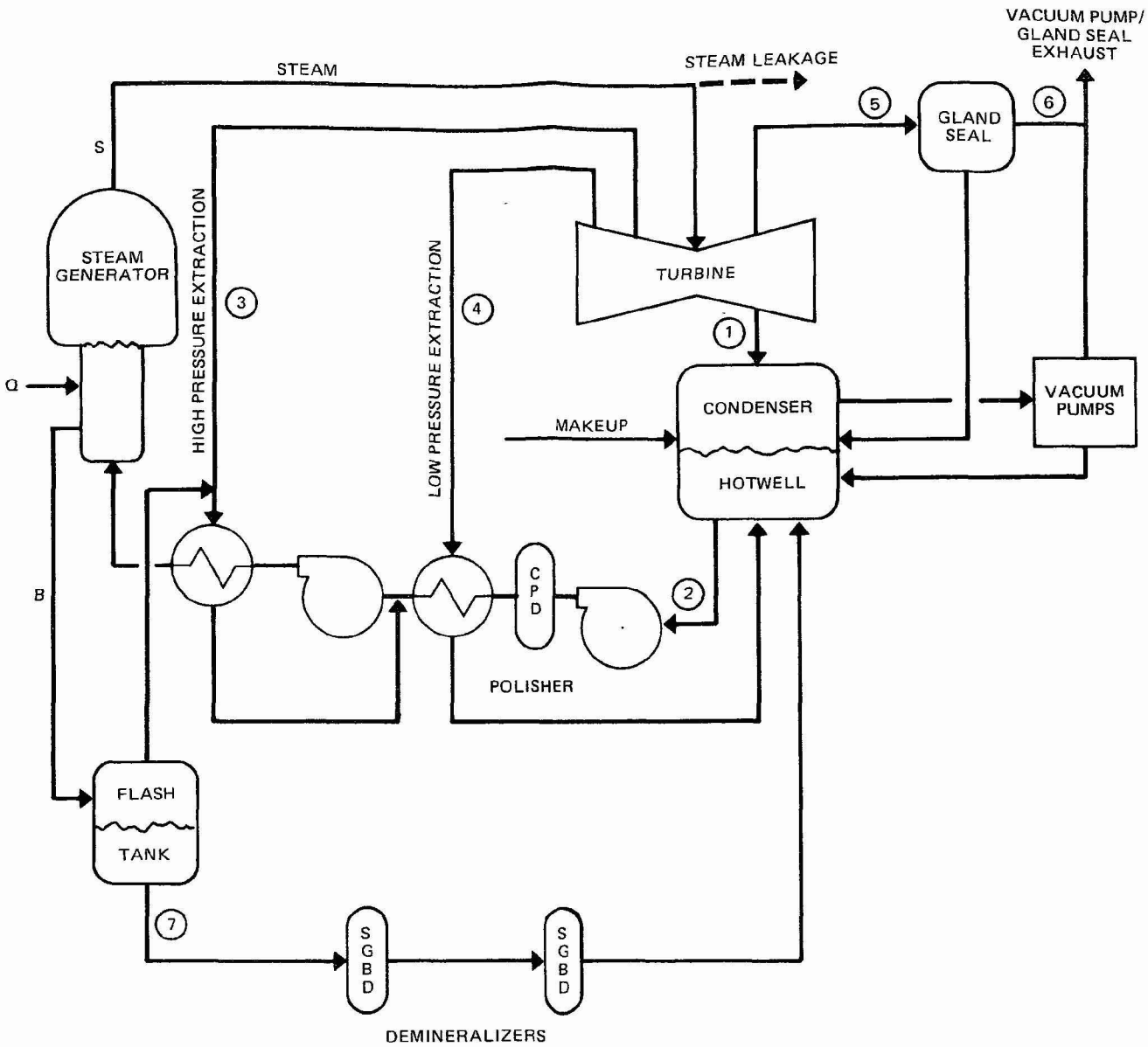


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TRITIUM BALANCE
FLOW DIAGRAM

FIGURE 11.1-1

JUNE 2001 REVISION 11



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SECONDARY SYSTEM ACTIVITIES
FLOW MODEL

FIGURE 11.1-2

JUNE 2001 REVISION 11

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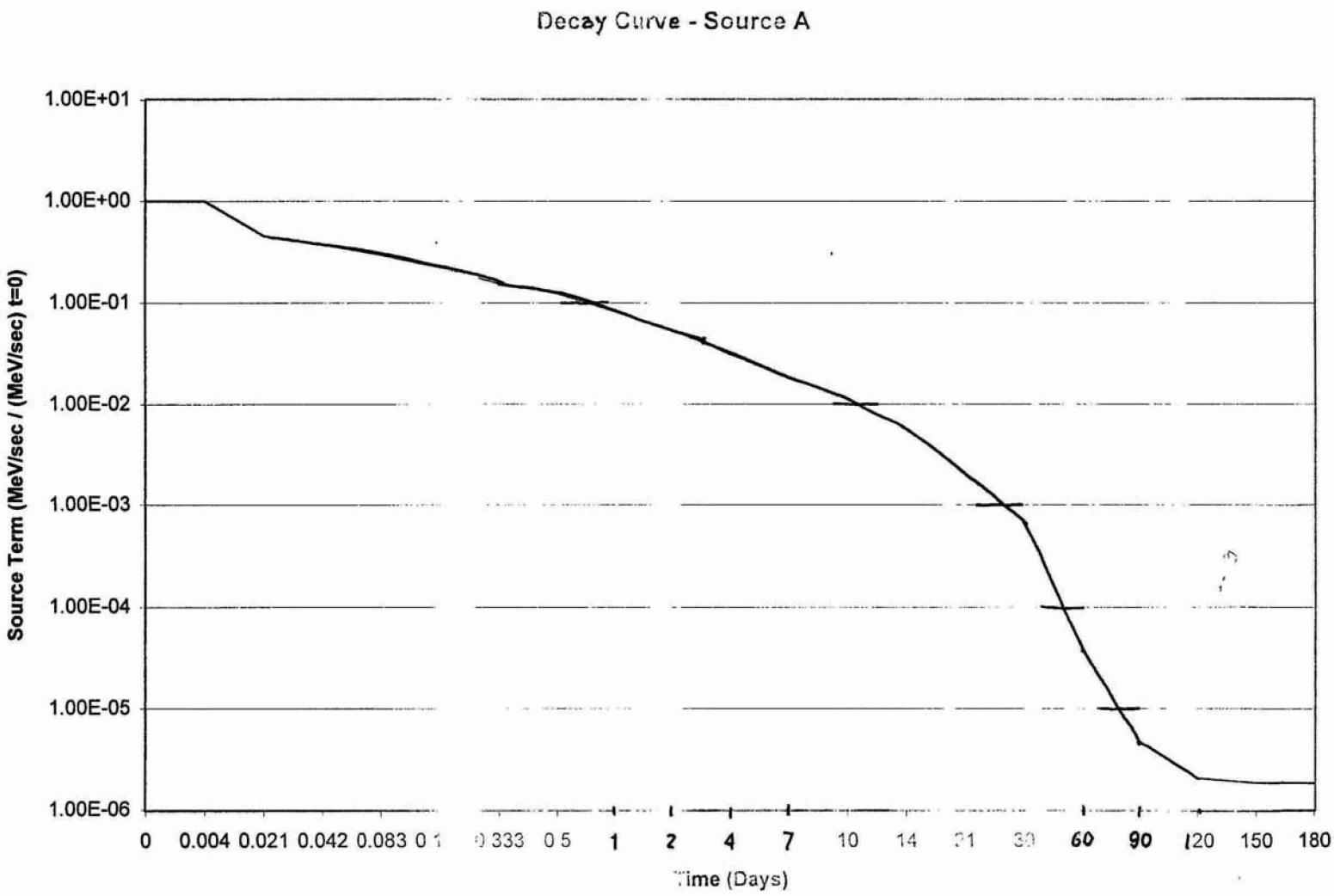
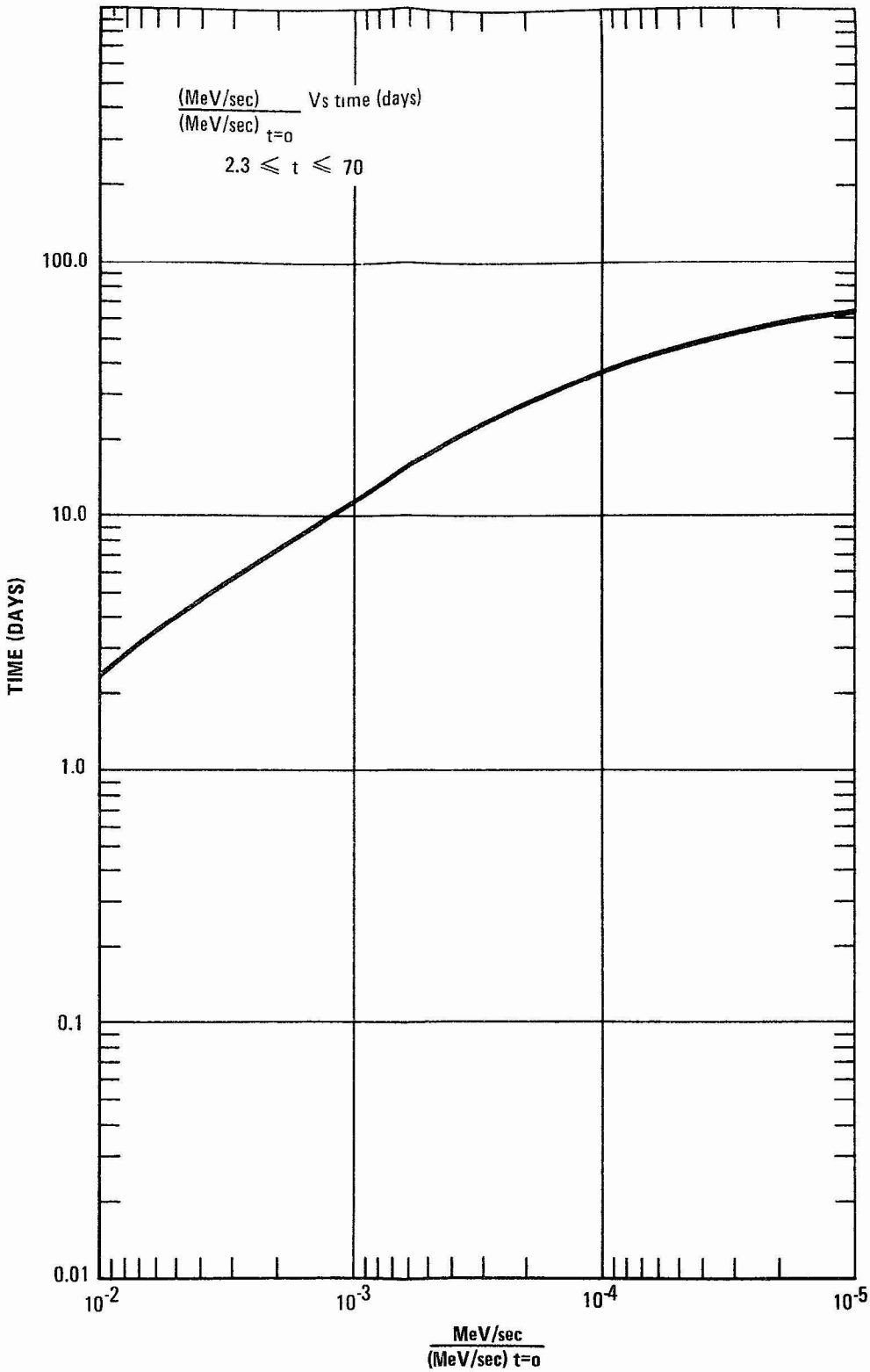


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

DECAY CURVE - SOURCE A

FIGURE 12.2-1 SHEET 1 OF 2

JUNE 2001 REVISION 11

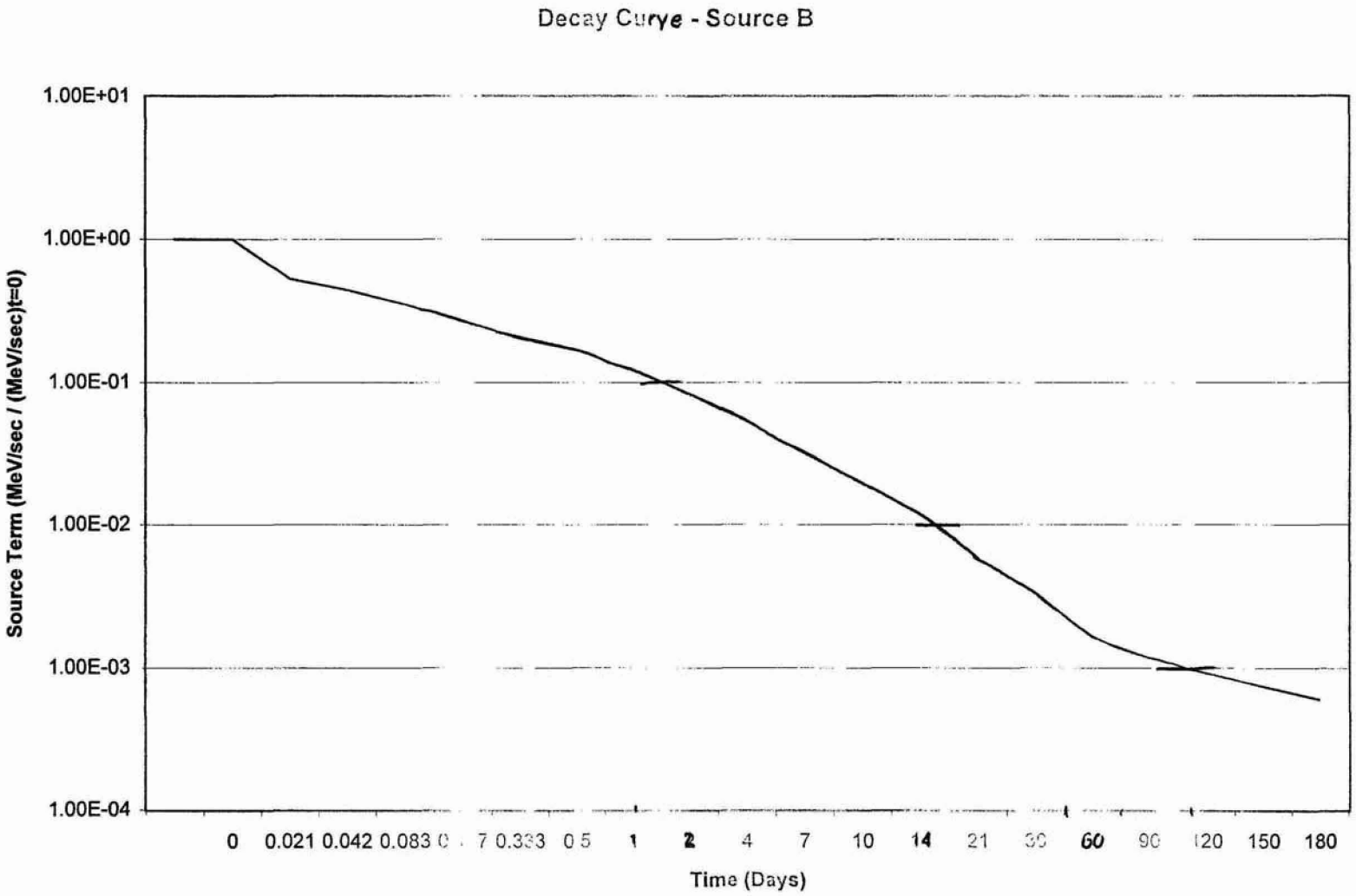


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

DECAY CURVE - SOURCE A

FIGURE 12.2-1 SHEET 2 OF 2

JUNE 2001 REVSION 11

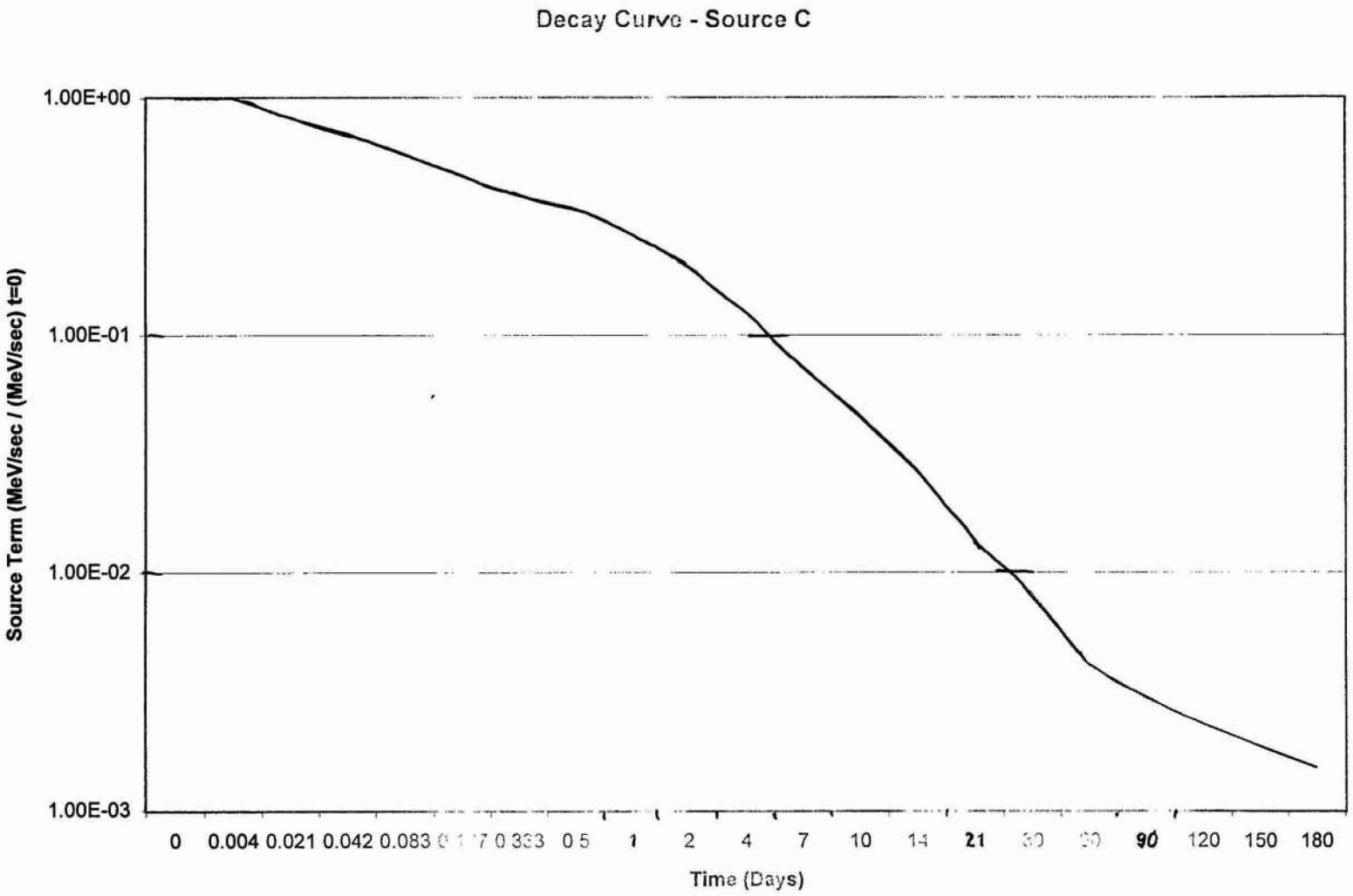


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

DECAY CURVE - SOURCE B

FIGURE 12.2-2

JUNE 2001 REVISION 11



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

DECAY CURVE - SOURCE C

FIGURE 12.2-3

JUNE 2001 REVISION 11

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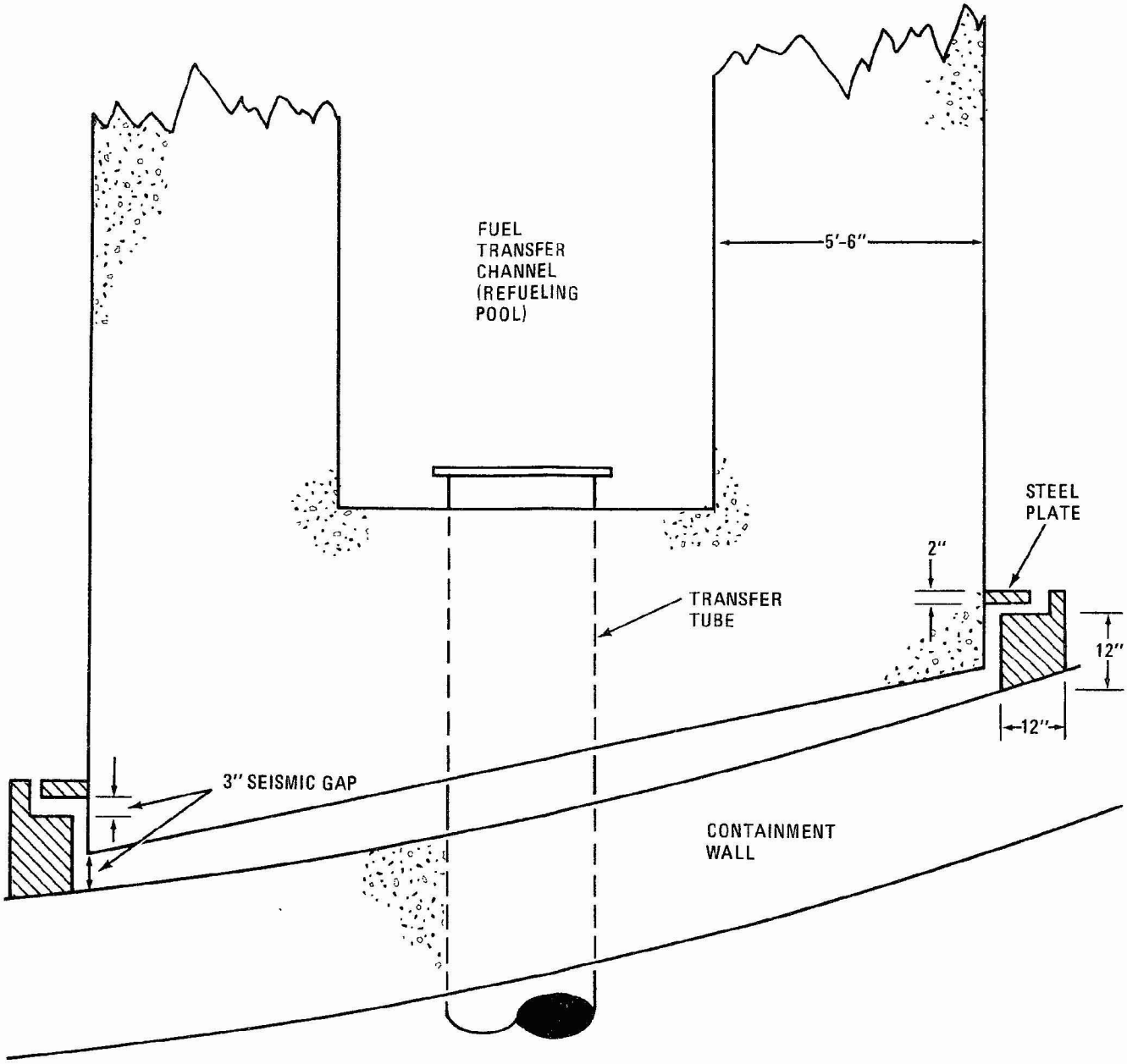
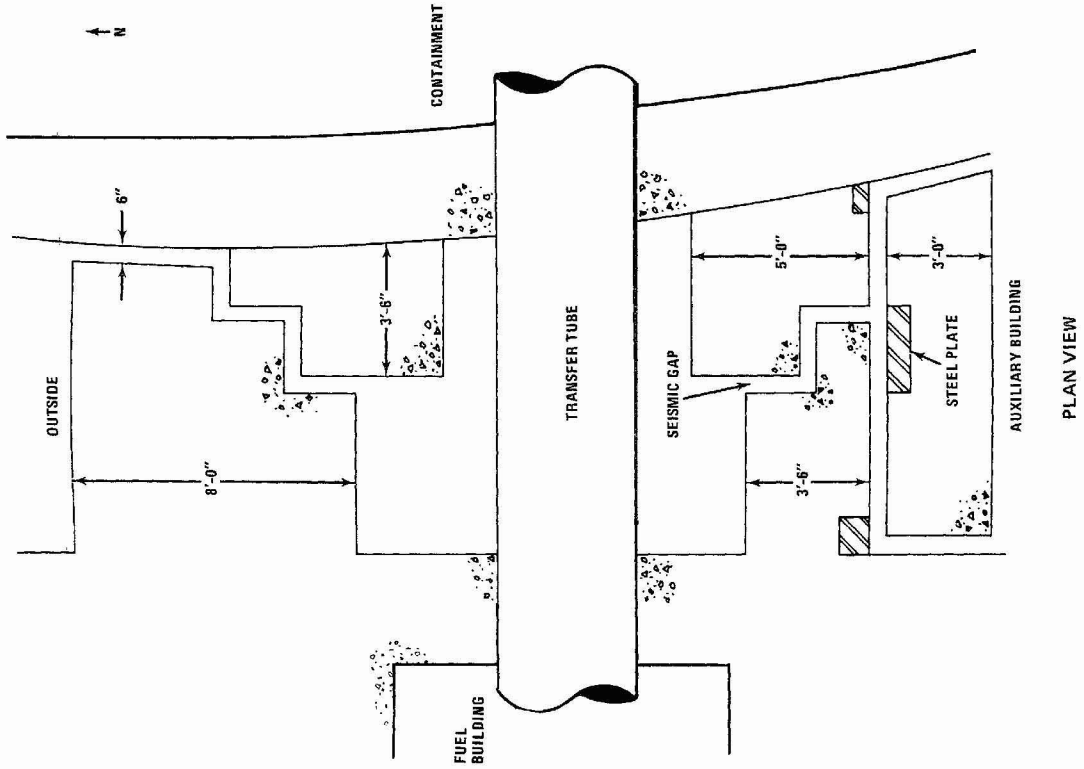


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

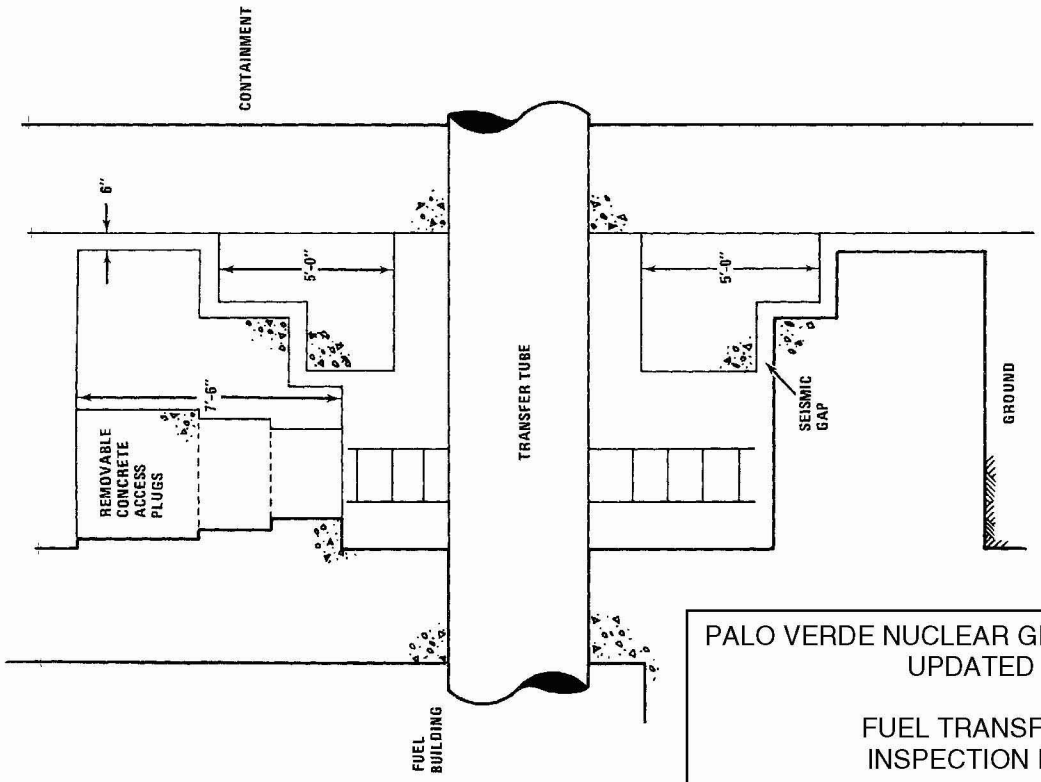
FUEL TRANSFER SHIELDING
(IN CONTAINMENT)

FIGURE 12.3-2

JUNE 2003 REVISION 12



PLAN VIEW



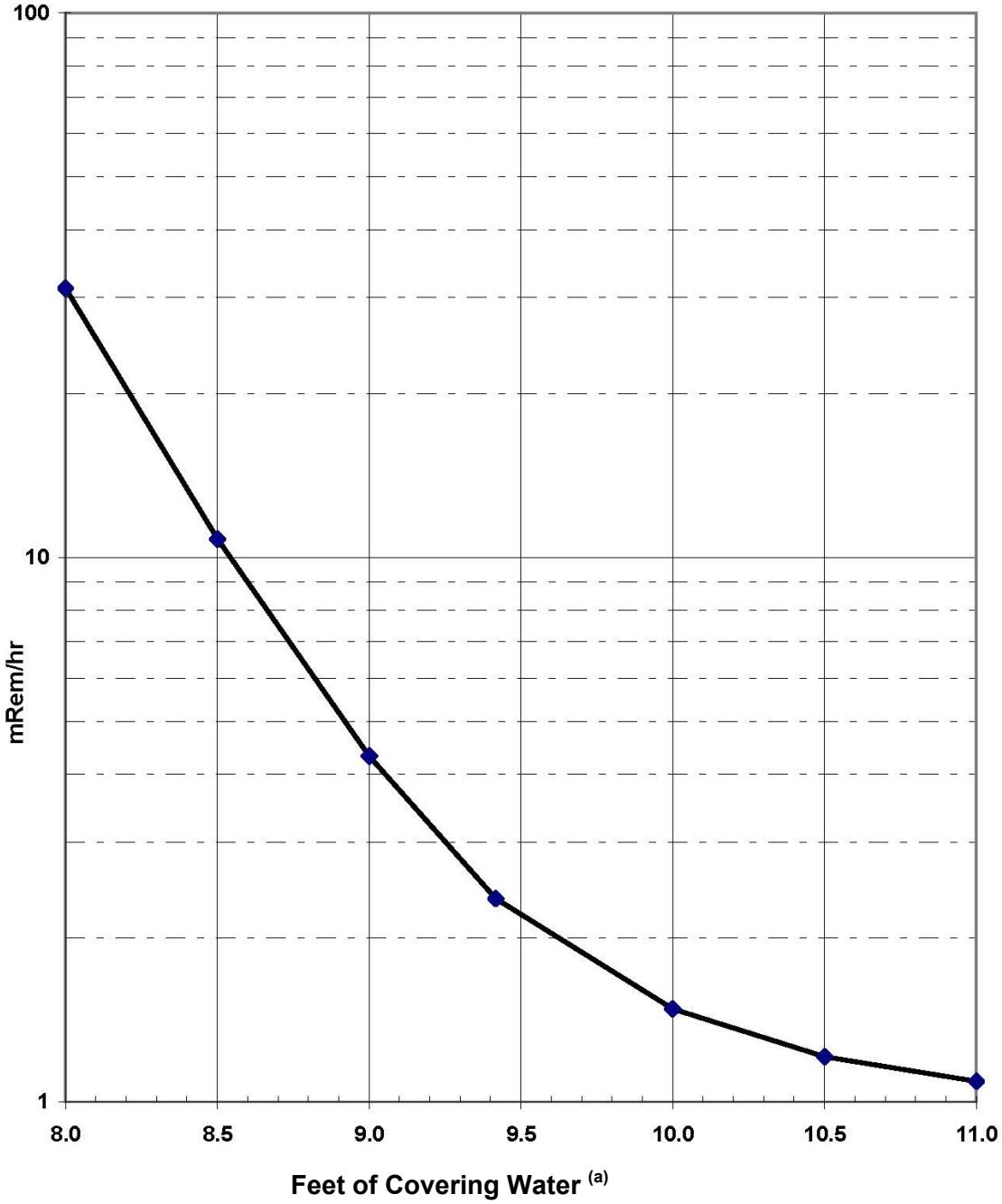
ELEVATION VIEW

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FUEL TRANSFER TUBE
INSPECTION FACILITY

FIGURE 12.3-3

JUNE 2003 REVISION 12



Notes:

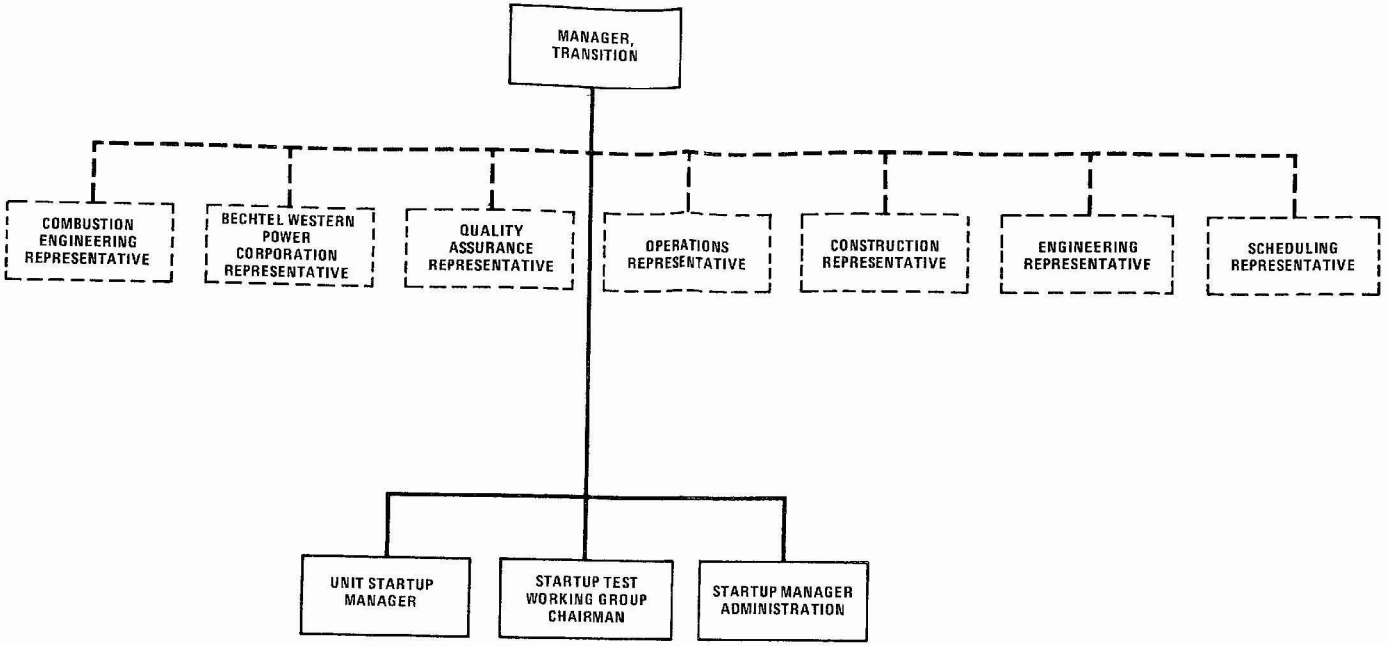
a. Feet above active portion of assembly

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

VERTICAL DOSE RATE FROM
ONE SPENT FUEL ELEMENT
(Includes Dose From Water)

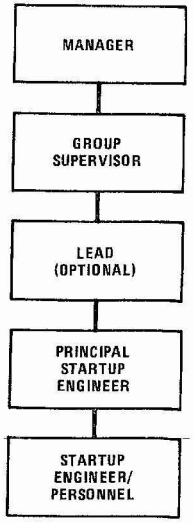
FIGURE 12.3-4

JUNE 2011 REVISION 16



TYPICAL ORGANIZATION FOR EACH STARTUP MANAGER

NOTE: THE PRINCIPAL STARTUP ENGINEER IS APPLICABLE ONLY TO THE UNIT STARTUP MANAGER ORGANIZATION.



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TRANSITION DEPARTMENT ORGANIZATION

FIGURE 14.2-1

JUNE 2001 REVISION 11

SEA SYMBOLS

IDENTIFIES EVENT GROUP TO BE EVALUATED.

IDENTIFIES SAFETY FUNCTION WHICH IS REQUIRED TO MITIGATE THE EFFECTS OF THE TRANSIENT.

IDENTIFIES A FUNCTION WHICH OCCURS BUT WHICH IS NOT REQUIRED TO MITIGATE THE EFFECTS OF THE TRANSIENT.

IDENTIFIES A SYSTEM OR COMPONENT

IDENTIFIES A SYSTEM HAVING TWO INDEPENDENT "TRAINS" OF EQUIPMENT OR CHANNELS.

P

INDICATES THAT THE SAFETY ACTION OF THE SYSTEM IS PASSIVE.

M

INDICATES THAT OPERATOR ACTION IS REQUIRED IN THE OPERATION OF THE SYSTEM.

NS

INDICATES THAT THE SYSTEM OR COMPONENTS OF THE SYSTEM PERFORMING THE SPECIFIED ACTION, IS NOT A SAFETY SYSTEM.

BRANCHED PATH INDICATING A DIFFERENT SUCCESS PATH FOR A GIVEN SET OF PLANT OR EVENT CONDITIONS.

CR or L

X

SINGLE SENSED VARIABLE "X" IS USED FOR AUTOMATIC ACTION, MANUAL ACTION OR POST-EVENT TRACKING. CR OR L INDICATE THE LOACTION (CR = CONTROL ROOM, L = LOCAL) OF THE SIGNAL OR INDICATION, FOR MANUAL ACTIONS ONLY.

X Y

ALL OF THE SENSED VARIABLES ARE REQUIRED TO INITIATE THE SYSTEM ACTION.

X Y

ANY ONE OF THE MULTIPLE SENSED VARIABLES IS REQUIRED TO INITIATE ACTION. THE SOLID LINE INDICATES THE FIRST OR MOST LIKELY METHOD OF INITIATING THE ACTION.

X Y

SENSED VARIABLE "Y" INITIATES AN ACTION, ONLY IF "X" IS NOT AT ITS SETPOINT.

IDENTIFIES THE SENSED VARIABLE INPUT, IF DIRECTED TOWARDS A SYSTEM, AND AN ACTION IF DIRECTED AWAY FROM A SYSTEM SYMBOL.

VERTICAL SOLID PATH INDICATES A SUCCESS PATH WHICH CONNECTS THE SAFETY ACTIONS REQUIRED IN ORDER TO ATTAIN EACH OF THE ACCEPTABLE INCIDENT TERMINATIONS.

A DOTTED VERTICAL LINE INDICATES AN ALTERNATIVE OR REDUNDANT PATH TO ATTAIN A SAFETY FUNCTION.

X Y Z

MULTIPLE SENSED VARIABLES ARE COMBINED TO PRODUCE AUTOMATIC ACTION, MANUAL ACTION OR POST EVENT TRACKING. USED PRIMARILY FOR CONTROL SYSTEMS.

INDICATES CONNECTION WITH ANOTHER DRAWING. ALLOWS TRANSFER BETWEEN SHEETS OF ONE DRAWING.

COMPONENT NUMBER.

S.F.

WHEN PLACED BENEATH A SYSTEM BLOCK, INDICATES THAT THE ASSOCIATED SYSTEM IS SINGLE ACTIVE FAILURE PROOF

WHEN PLACED BENEATH A MAIN PATH - ALTERNATE PATH COMBINATION, INDICATES THAT THE COMBINATION IS SINGLE ACTIVE FAILURE PROOF

B

IDENTIFIES SYSTEM AS A BALANCE-OF-PLANT (BOP) SYSTEM, NOT WITHIN THE DESIGN SCOPE OF COMBUSTION ENGINEERING.

INDICATES THE ACTUATION LOGIC OF A SYSTEM WHEN LOCATED NEAR THE INPUT SIGNAL:

X/Y

X-NO. OF INPUTS REQUIRED TO GENERATE AN OUTPUT
Y-TOTAL NO. OF INPUTS

OR

INDICATES THE REDUNDANCE OF A SYSTEM WHEN LOCATED BENEATH THE SYSTEM BOX:

X-NO. OF TRAINS OR COMPONENTS REQUIRED TO PERFORM THE FUNCTION
Y-TOTAL NO. OF TRAINS OR COMPONENTS AVAILABLE.

SENSED VARIABLES OR ENVIRONMENTAL CONDITIONS

SYMBOL	MEANING
C	CONCENTRATION
F	FLOW
ΔF	DIFFERENTIAL FLOW
V or FREQ	FREQUENCY
G	CEA POSITIONS
H	HUMIDITY
H_2	HYDROGEN
L	LEVEL
ϕ	NEUTRON FLUX
P	PRESSURE
ΔP	DIFFERENTIAL PRESSURE
PF	CEA GROUP DEVIATION PENALTY FACTOR
Z	VALVE OR DAMPER POSITION INDICATION
Q	POWER
RE	RADIATION
S	SPEED
T	TEMPERATURE
ΔT	TEMPERATURE DIFFERENCE
TD	TIME DELAY
V	VOLTAGE
VAC	VACUUM

POINT OF ACTUATION SYMBOLS

SYMBOL	MEANING
C	CLOSED
H	HIGH
HH	HIGH-HIGH
L	LOW
LL	LOW-LOW
N	NORMAL
O	OPEN

EXAMPLES:

SYMBOL	MEANING
$RE_{SGR}H$	HIGH STEAM GENERATOR SAMPLE LINE RADIATION
$P_{CP}HH$	HIGH-HIGH CONTAINMENT PRESSURE
$L_{SG}L$	STEAM GENERATOR LOW LEVEL

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SEQUENCE OF EVENTS -
SYMBOLS, ACRONYMS, AND DEFINITIONS

FIGURE 15.0-1 SHEET 1 OF 3

JUNE 2001 REVISION 11

SPECIAL SYMBOLS

SYMBOL	MEANING
DNBR	DEPARTURE FROM NUCLEATE BOILING RATIO
LOP	LOSS OF POWER
$\Delta P_{sg_{x-y}}$	DIFFERENTIAL PRESSURE (ACROSS A SINGLE SG)
ΔP_{sg}	DIFFERENTIAL PRESSURE (BETWEEN sgx & sgy, $\Delta P_{sg}^{1-2} = P_{sg1} - P_{sg2}$)
QD	LOCAL POWER DENSITY
QL	LOGARITHMIC POWER LEVEL
QO	OVER-POWER LEVEL
QS	STARTUP POWER LEVEL
RIA	ROD INSERTION ALARM
RIB	ROD INSERTION INHIBIT

	SYMBOL	MEANING
EXAMPLES:	$QL_{-}H$	HIGH REACTOR LOGARITHMIC POWER LEVEL

[ ] INDICATES A DELAY TIME, E.G. CLOSING TIME FOR TSV'S

SYSTEM OR SENSED POINT SYMBOLS

SYMBOL	MEANING
a	AREA
ae	AIR EJECTOR
b	BORON
cb	CONTAINMENT BUILDING
cd	CONDENSER
ch	CONDENSER HOTWELL
cl	COLD LEG (REACTOR COOLANT SYSTEM)
cst	CONDENSATE STORAGE TANK
dg	DIESEL GENERATOR
eb	ELECTRIC BUS
f	FEEDWATER (TOTAL)
fd	FEEDWATER (DOWNCOMER)
fe	FEEDWATER (ECONOMIZER)
h	HYDROGEN
hl	HOT LEG (REACTOR COOLANT SYSTEM)
s	SUMP
p	PRESSURIZER
pc	PRIMARY COOLANT
r	REACTOR
rcp	REACTOR COOLANT PUMP
rcs	REACTOR COOLANT SYSTEM
rwt	REFUELING WATER STORAGE TANK
s	STEAM
sct	SPRAY CHEMICAL STORAGE TANK (N_2H_4)
sfp	SPENT FUEL POOL
sg	STEAM GENERATOR
sgb	STEAM GENERATOR BLOWDOWN LINE
sg1	STEAM GENERATOR 1
sg2	STEAM GENERATOR 2
sh	STEAM HEADER
suc	SUCTION OF PUMP
t	TURBINE
tb	TURBINE BUILDING
teh	TURBINE EXHAUST HOOD
wgt	WASTE GAS TANK

ABBREVIATIONS

ASDS	ATMOSPHERIC STEAM DUMP SYSTEM
AFAS-1, -2	AUXILIARY FEEDWATER ACTUATION SIGNAL FOR EMERGENCY OPERATIONS, - SG-1, - SG-2
AFWS	AUXILIARY FEEDWATER SYSTEM (THIS SYSTEM INCLUDES COMPONENTS FOR BOTH NORMAL AND EMERGENCY OPERATION)
BAMT	BORIC ACID MAKE-UP TANK
BD	STEAM GENERATOR BLOWDOWN SYSTEM
BUVR	BUS UNDERVOLTAGE RELAYS
CB	CONTAINMENT BUILDING
CCGC	CONTAINMENT COMBUSTIBLE GAS CONTROL SYSTEM
CCW	COMPONENT COOLING WATER SYSTEM
CD	CONDENSER
CEA	CONTROL ELEMENT ASSEMBLIES
CEDM	CONTROL ELEMENT DRIVE MECHANISM
CEDMCS	CONTROL ELEMENT DRIVE MECHANISM CONTROL SYSTEM
CES	CONDENSER EVACUATION SYSTEM
CH	CONDENSER HOTWELLS
CHRS	CONTAINMENT HYDROGEN RECOMBINER SYSTEM
CIAS	CONTAINMENT ISOLATION ACTUATION SIGNAL
CIS	CONTAINMENT ISOLATION SYSTEM (COLLECTION OF COMPONENTS WHICH RECEIVE CIAS SIGNAL)
COLSS	CORE OPERATING LIMIT SUPERVISORY SYSTEM
CPC	CORE PROTECTION CALCULATOR
CS	CONTAINMENT SUMP
CSS	CONTAINMENT SPRAY SYSTEM
CSAS	CONTAINMENT SPRAY ACTUATION SIGNAL
CST	CONDENSATE STORAGE TANK
CVCS	CHEMICAL AND VOLUME CONTROL SYSTEM
CW	CIRCULATING WATER SYSTEM
CWP	CONTROL ROD WITHDRAWAL PROHIBIT SIGNAL
DFCV	DOWNCOMER FEEDWATER CONTROL VALVE
DFIV	DOWNCOMER FEEDWATER ISOLATION VALVE
DLCS	DNBR/LPD CALCULATOR SYSTEM
ECCS	EMERGENCY CORE COOLING SYSTEM
EFAS-1, -2	EMERGENCY FEEDWATER ACTUATION SIGNAL, SG1 - SG2 (C-E DESIGNATION, MAY BE USED INTERCHANGEABLY WITH AFAS-1, AFAS-2)
EFCV	ECONOMIZER FEEDWATER CONTROL VALVE
EFIV	ECONOMIZER FEEDWATER ISOLATION VALVE
EFWS	EMERGENCY FEEDWATER SYSTEM (C-E DESIGNATION FOR AFWS)
ESFAS	ENGINEERED SAFETY FEATURES ACTUATION SYSTEM
FTB	FAST TRANSFER BREAKER
FWCS	MAIN FEEDWATER CONTROL SYSTEM
HLO	HIGH LEVEL OVERRIDE
HPS	HYDROGEN PURGE SYSTEM
HPSI	HIGH PRESSURE SAFETY INJECTION PUMP
IRS	IODINE REMOVAL SYSTEM
LPSI	LOW PRESSURE SAFETY INJECTION PUMP
LS	STANDBY GENERATOR LOAD SEQUENCER
MFW	MAIN FEEDWATER SYSTEM
MFWBV	MAIN FEEDWATER BYPASS VALVE
MSBV	MAIN STEAM BYPASS VALVE
MSI	MAIN STEAM ISOLATION SYSTEM (COLLECTION OF COMPONENTS WHICH RECEIVE MSIS SIGNALS)
MSIS	MAIN STEAM ISOLATION SIGNAL
MSIV	MAIN STEAM ISOLATION VALVES
MSSV	MAIN STEAM SAFETY VALVES
PH	PRESSURIZER HEATERS
PLCS	PRESSURIZER LEVEL CONTROL SYSTEM
PPCS	PRESSURIZER PRESSURE CONTROL SYSTEM
PPS	PLANT PROTECTION SYSTEM
PSV	PRESSURIZER SAFETY VALVES
PZR	PRESSURIZER
RAS	RECIRCULATION ACTUATION SIGNAL
RC	REACTOR COOLANT SYSTEM
RCP	REACTOR COOLANT PUMP
RDT	REACTOR DRAIN TANK
RPCS	REACTOR POWER CUTBACK SYSTEM
RPS	REACTOR PROTECTION SYSTEM
RRS	REACTOR REGULATING SYSTEM
RTSS	REACTOR TRIP SWITCHGEAR SYSTEM
RTS	REACTOR TRIP SIGNAL
RTO	REACTOR TRIP OVERRIDE (MFWCS)
RWT	REFUELING WATER TANK
SBS	STEAM BYPASS SYSTEM
SBCS	STEAM BYPASS CONTROL SYSTEM
SBG	STANDBY GENERATOR
SCCS	SECONDARY CHEMISTRY CONTROL SYSTEM
SCST	SPRAY CHEMICAL STORAGE TANK (HYDRAZINE)
SCS	SHUTDOWN COOLING SYSTEM
SFPC	SPENT FUEL POOL COOLING SYSTEM
SFP	SPENT FUEL POOL
SG	STEAM GENERATOR
SGSS	STANDBY GENERATOR STARTING SYSTEM
SIS	SAFETY INJECTION SYSTEM
SIAS	SAFETY INJECTION ACTUATION SIGNAL
SIT	SAFETY INJECTION TANK
SPS	SUPPLEMENTARY PROTECTION SYSTEM
SSS	STANDBY GENERATOR STARTING SIGNAL
TCV	TURBINE CONTROL VALVE
TGCS	TURBINE-GENERATOR CONTROL SYSTEM
TSV	TURBINE STOP VALVES
TTS	TURBINE TRIP SIGNAL
VCT	VOLUME CONTROL TANK

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SEQUENCE OF EVENTS -
SYMBOLS, ACRONYMS, AND DEFINITIONS

FIGURE 15.0-1 SHEET 2 OF 3

JUNE 2001 REVISION 11

SAFETY FUNCTION DEFINITIONS

Safety Function	Function Description
1. REACTIVITY CONTROL	
Reactivity Control (Trip)	Rapid insertion of negative reactivity into the core to produce subcriticality immediately following an initiating event
Reactivity Control (Boron)	Establishment of sufficient boron concentration in the core to maintain subcriticality following the event using safety injection
Reactivity Control (Shutdown)	Establishment of cold shutdown boron concentration prior to cooldown of the plant. Appears and is necessary only if safety injection has not occurred
Reactivity Control (Long Term)	Switching of safety injection system from injection to recirculation mode
2. REACTOR HEAT REMOVAL	
Natural Convective Heat Removal	Maintenance of core cooling by natural circulation in the primary loop, including natural convection in the core sufficient to prevent violation of the fuel performance limits specified in Table 15.0-2
Non-4 Pump Heat Removal	Maintenance of core cooling by means of forced flow (other than normal four pump flow) sufficient to prevent violation of the fuel limits specified in Table 15.0-2. Specifically not considered as part of this safety function are those actions performed to accomplish the emergency core cooling safety functions
ECC Injection Phase	Provision of coolant to the RCS sufficient to maintain a coolable reactor geometry before low refueling water tank level signal
ECC Recirculation (Short Term)	Provision of adequate coolant to the RCS following low refueling water tank level signal and automatic switchover. Core coolant is recirculated back into the primary system after it leaks out
ECC Recirculation (Long Term)	Provision of coolant to the RCS to achieve cold shutdown conditions following safety injection. Establishment of hot & cold leg recirculation.
Reactor Heat Removal (Shutdown)	Provision of coolant to the RCS to achieve cold shutdown conditions, using the shutdown cooling system.

Safety Function	Function Description
3. SECONDARY SYSTEM INTEGRITY	
Secondary System Pressure/Level/Heat Sink Control	Maintenance of secondary system pressure and steam generator water level within limits such that the secondary system does not overpressurize and can be used to remove heat from the primary system.
Secondary System Pressure/Level/Heat Sink Control (Long Term)	Maintenance of secondary system pressure and steam generator water level within limits such that a heat sink is maintained for the primary system and is not overpressurized
4. PRIMARY SYSTEM INTEGRITY	
Primary System Pressure/Level Control	Maintenance of primary system pressure and level within limits such that the primary system pressure does not exceed the acceptance guidelines given in Table 15.0-2
Primary System Pressure/Level Control (Long Term)	Control of primary system pressure and level, and required associated actions, during cooldown from hot shutdown or standby to cold shutdown conditions to prevent exceeding pressure-temperature guidelines during the cooldown process
5. CONTAINMENT INTEGRITY	
Containment Pressure/Temperature Control	Maintenance of containment pressure and temperature within limits such that the containment integrity is maintained
Containment Pressure/Temperature Control (Recirculation)	Maintenance of containment pressure and temperature within limits following exhaustion of the RWT by switching the containment spray system to the recirculation mode following generation of a low refueling water tank level signal
6. COMBUSTIBLE GAS CONTROL	
Combustible Gas Control	Identification of, and conditioning of post-event containment atmosphere or treatment of event generated flammables, to prevent formation of flammable or explosive mixtures
7. CONTROL ROOM HABITABILITY	
Control Room Habitability	Conditioning of the post-event control room atmosphere to ensure habitability and control of personnel radiation exposure.

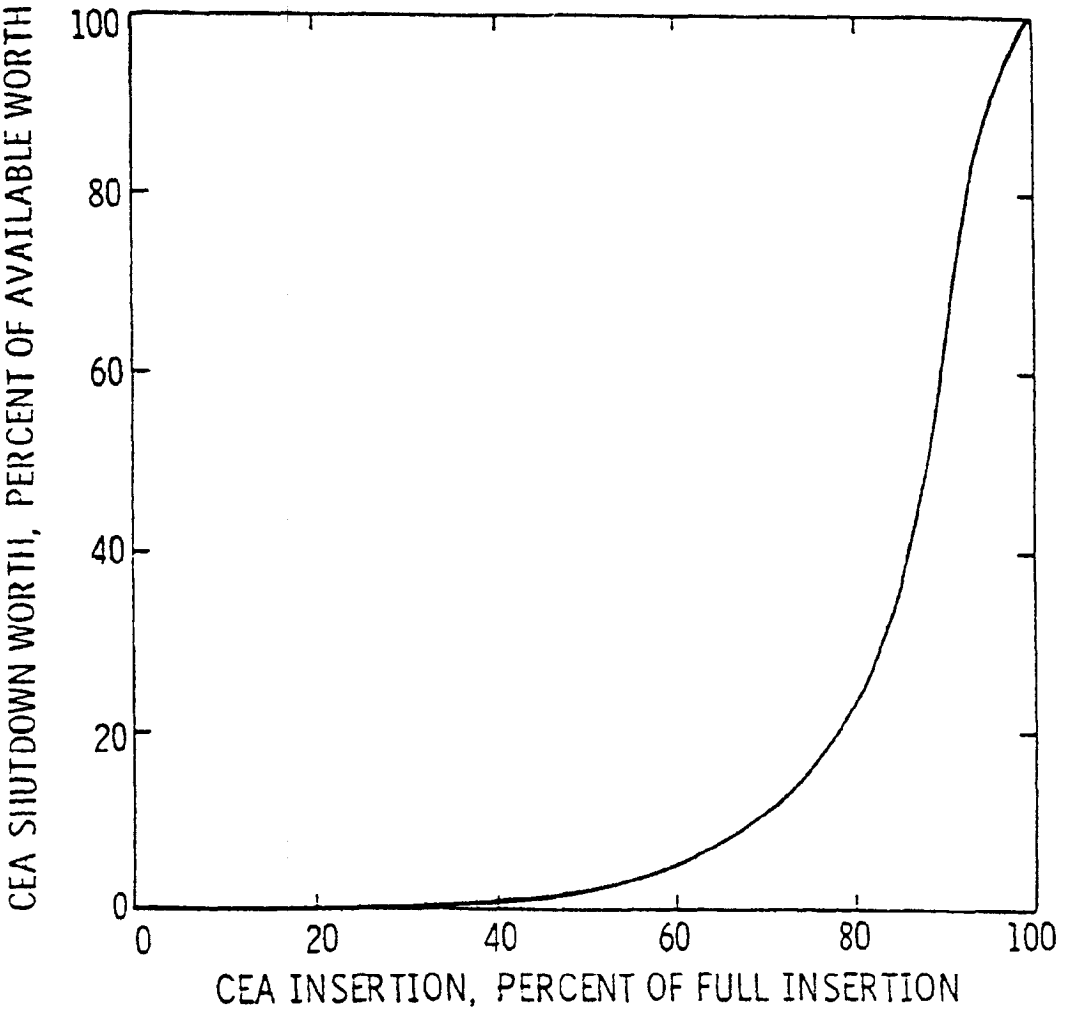
Safety Function	Function Description
8. FUEL HANDLING BUILDING HABITABILITY	
Fuel Handling Building Habitability	Conditioning of the post-event fuel handling building atmosphere to ensure habitability and control of personnel radiation exposure
9. RADIOACTIVE EFFLUENT CONTROL	
Containment Isolation	Isolation of containment building to prevent escape of radioactivity to the environs.
Primary System Isolation	Isolation of primary system to prevent coolant loss or escape of radioactivity to the environs.
Secondary System Isolation	Isolation of all or part of the secondary system to prevent coolant loss or escape of radioactivity to the environs.
Radioactive Material Treatment	Mechanical and/or chemical treatment of radioactive materials to reduce the quantity that escapes or is discharged to the environs
Radioactive Material Treatment (Long Term)	See above - and add switching to recirculation mode
10. RESTORATION OF A.C. POWER	
Restoration of ESF Power	Starting and loading of on-site, standby A.C. power supply.
Restoration of Non-ESF Power	Transfer of loads from auxiliary transformer to the start-up transformer, either automatically or as a manual operator action
11. SPENT FUEL POOL HEAT REMOVAL	
Spent Fuel Pool Heat Removal	Cooling of the spent fuel pool following a loss of A.C. power

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SEQUENCE OF EVENTS -
SYMBOLS, ACRONYMS, AND DEFINITIONS

FIGURE 15.0-1 SHEET 3 OF 3

JUNE 2001 REVISION 11

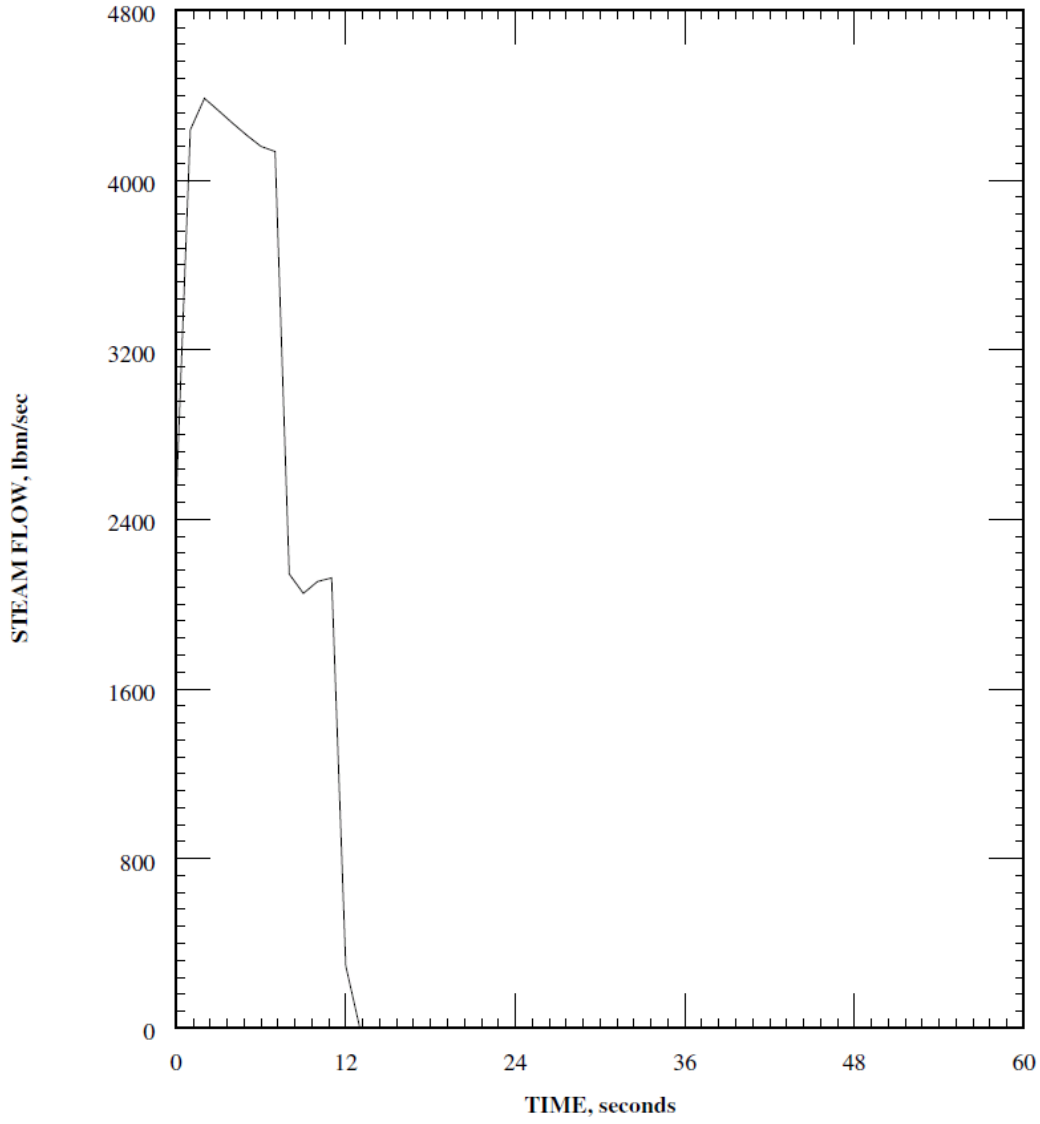


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA SHUTDOWN WORTH VS POSITION

FIGURE 15.0-2

JUNE 2001 REVISION 11

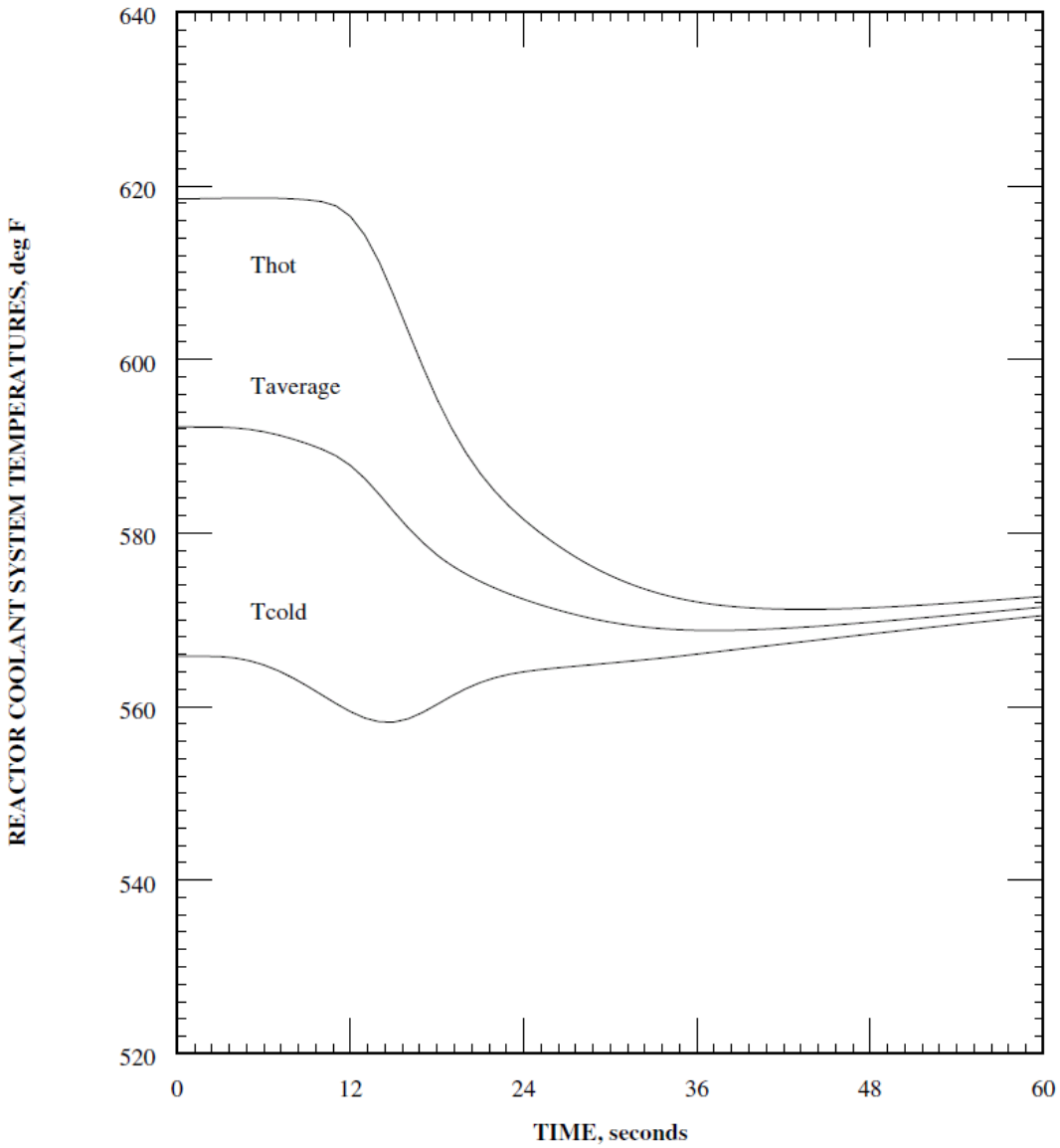


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
STEAM FLOW vs. TIME

Figure 15.1.3-1

JUNE 2011 REVISION 16

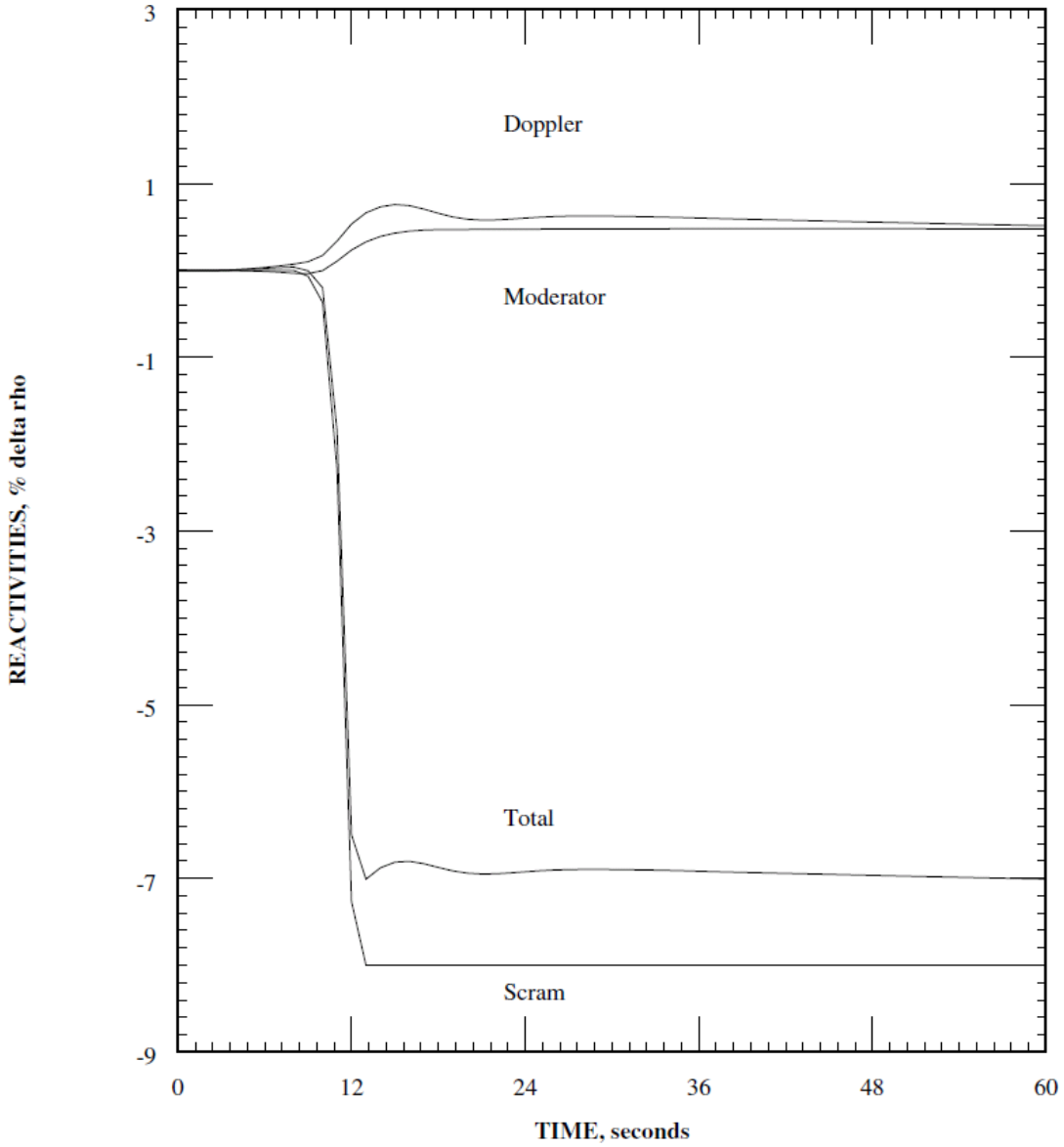


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
RCS TEMPERATURE vs. TIME

Figure 15.1.3-2

JUNE 2011 REVISION 16

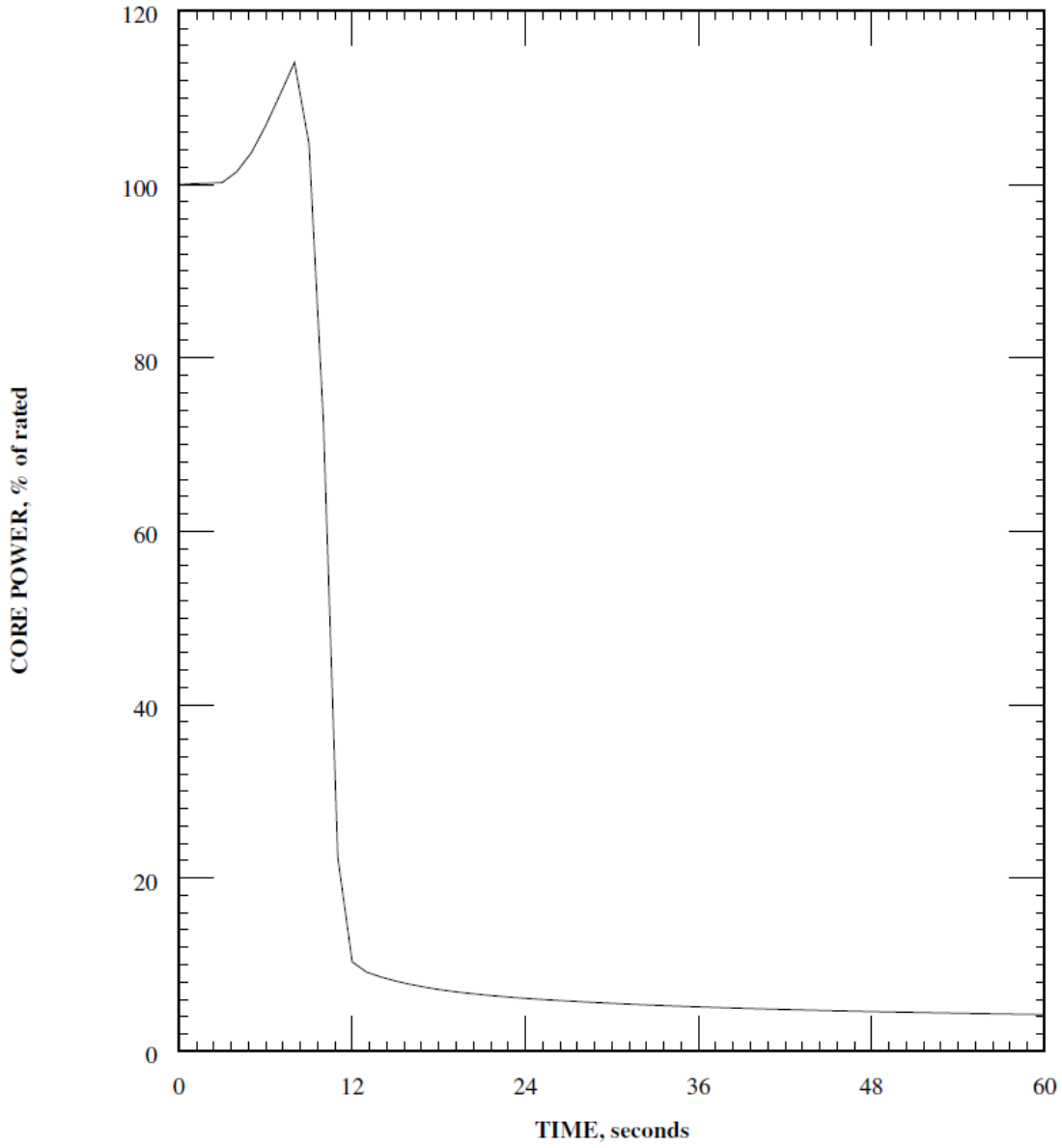


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
REACTIVITIES vs. TIME

Figure 15.1.3-3

JUNE 2011 REVISION 16

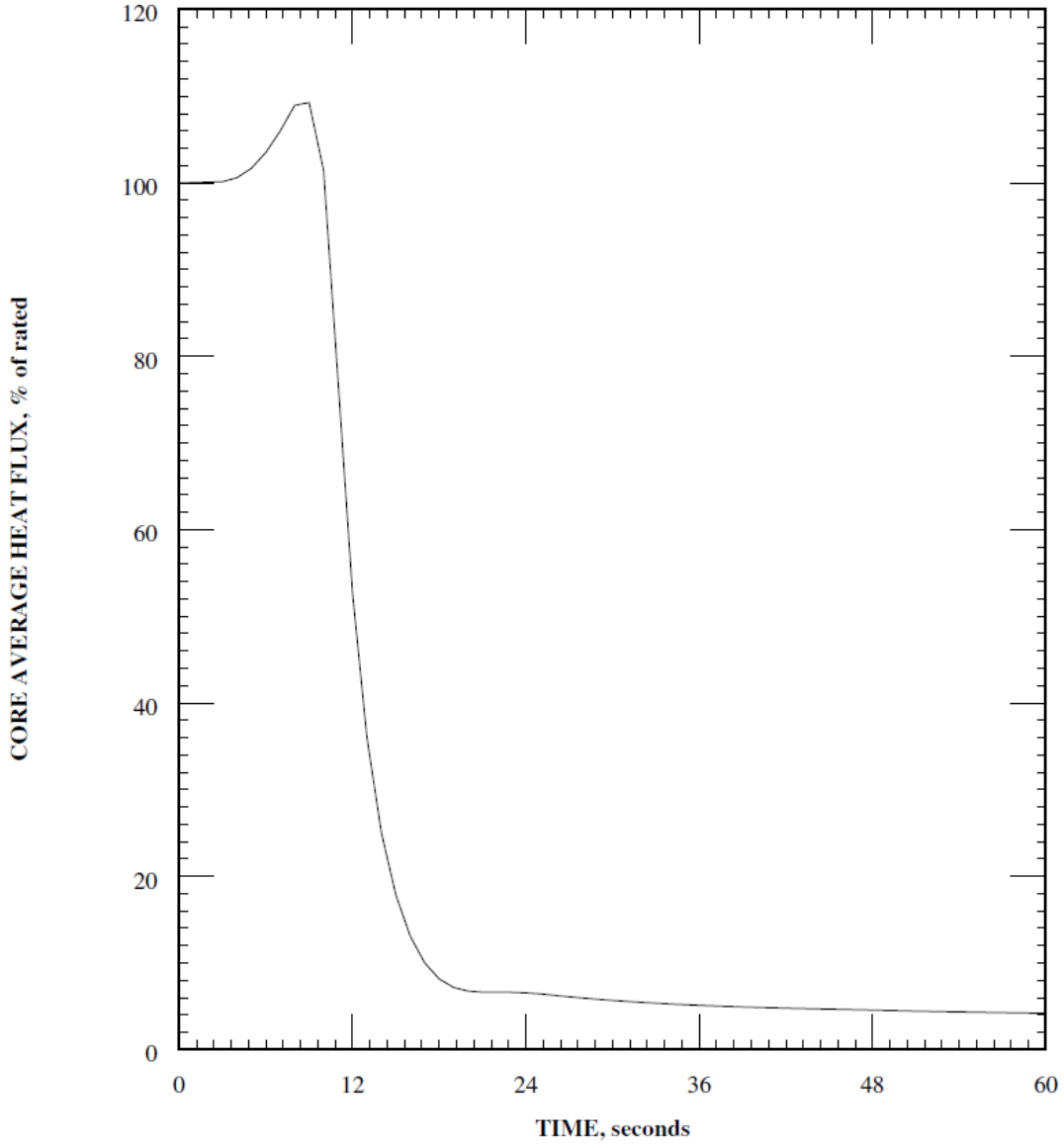


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
CORE POWER vs. TIME

Figure 15.1.3-4

JUNE 2011 REVISION 16

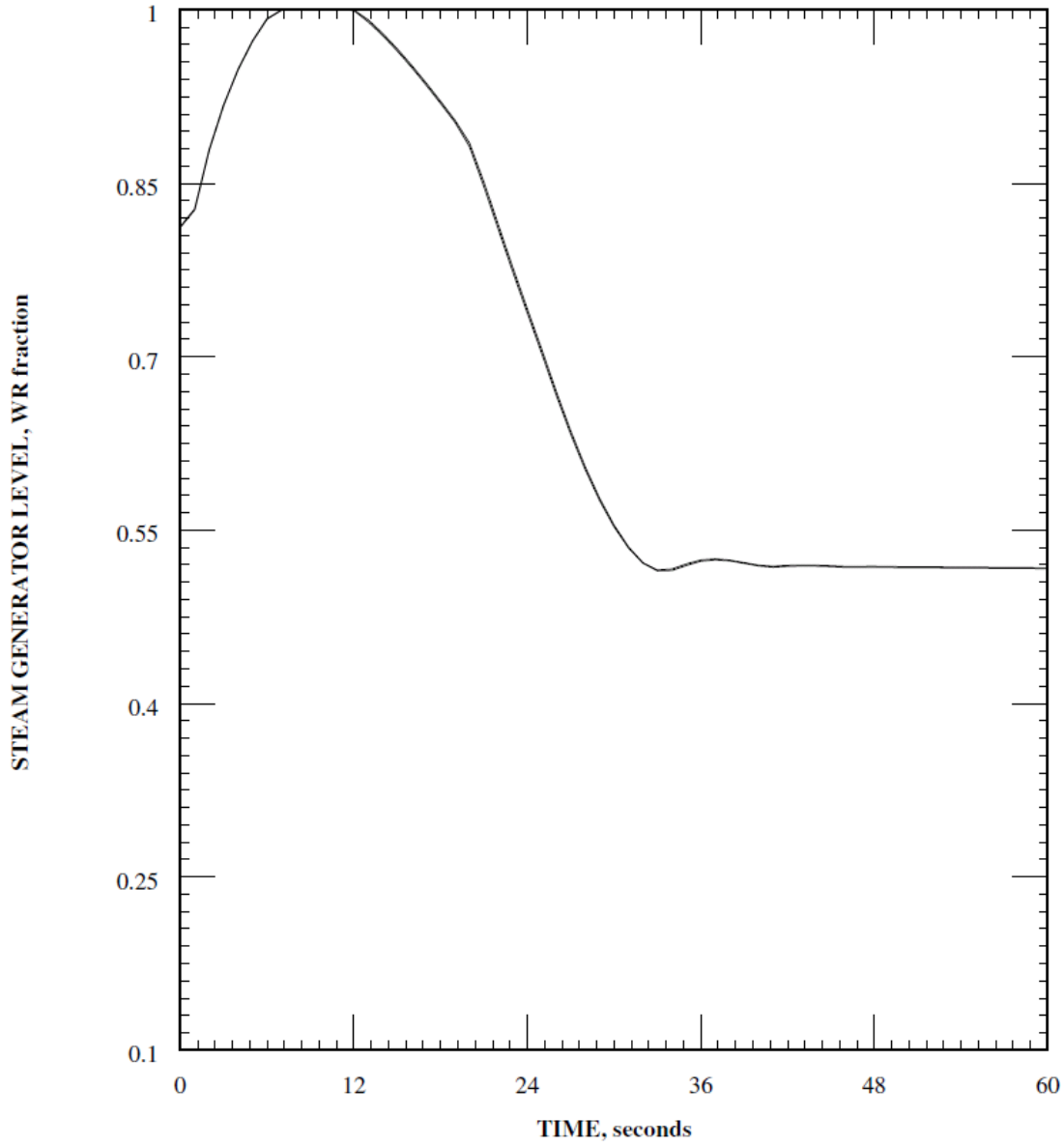


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
CORE AVERAGE HEAT FLUX vs. TIME

Figure 15.1.3-5

JUNE 2011 REVISION 16

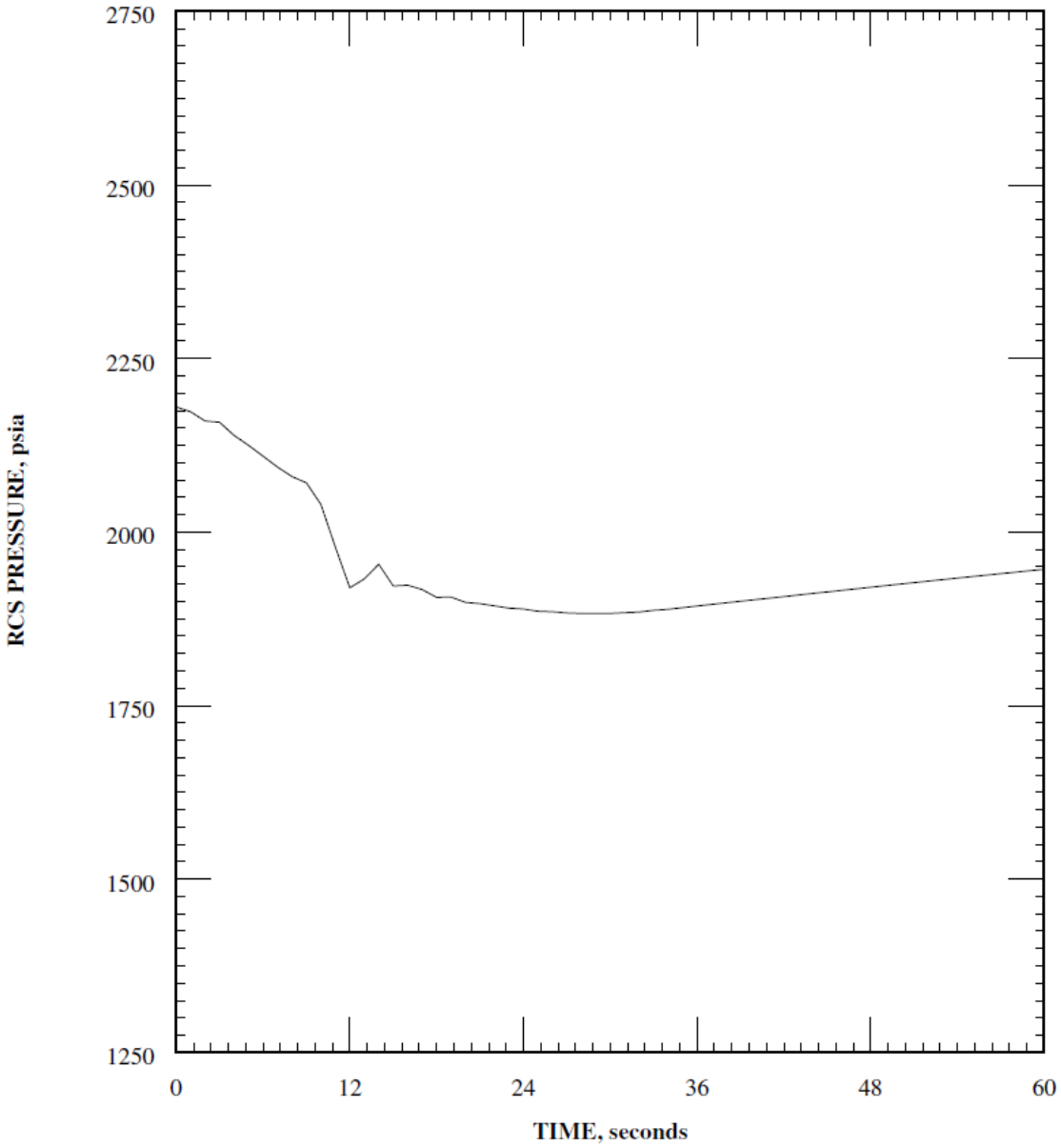


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
WIDE RANGE SG LEVEL vs. TIME

FIGURE 15.1.3-6

JUNE 2017 REVISION 19



PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
RCS PRESSURE vs. TIME

Figure 15.1.3-7

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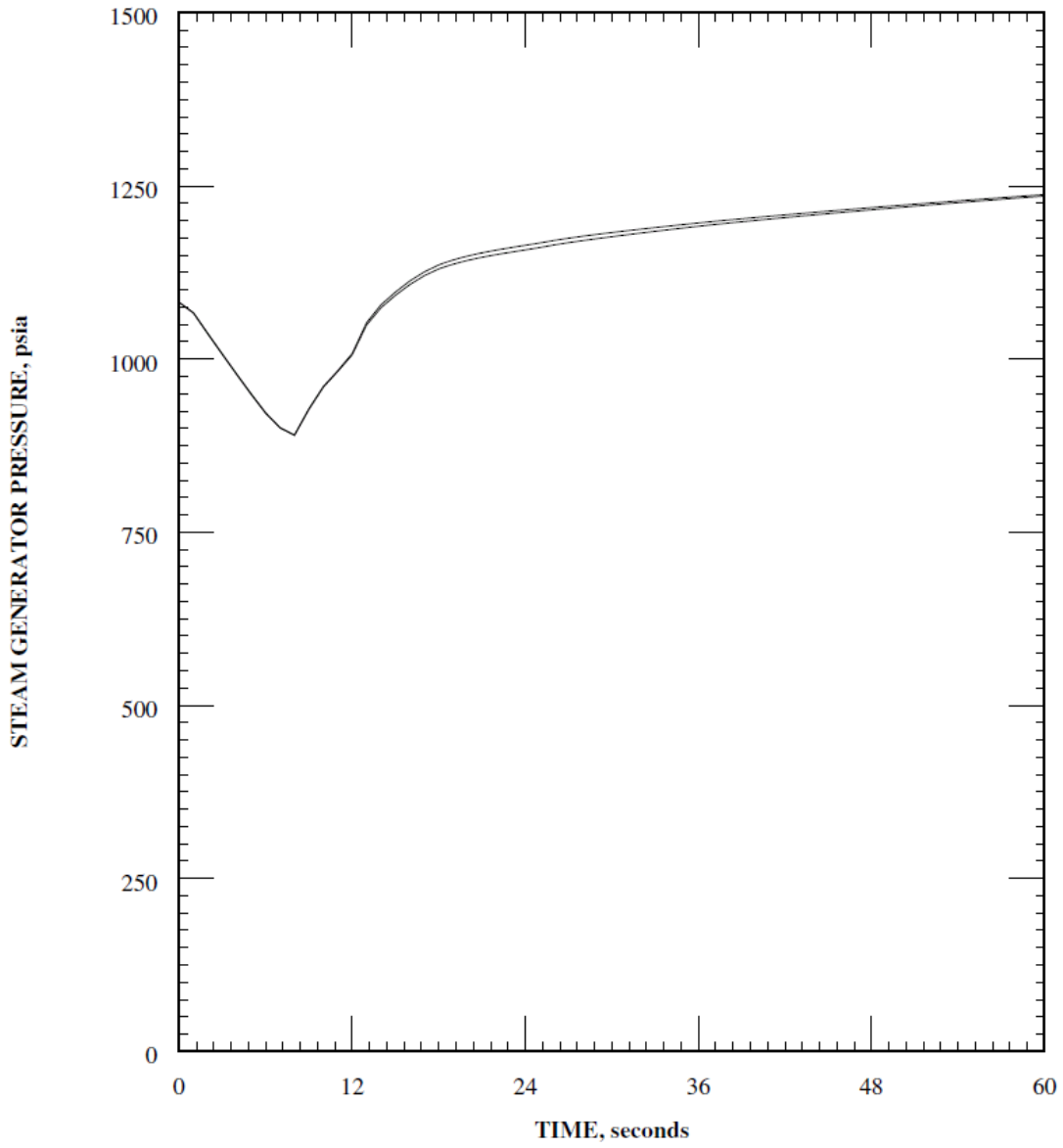
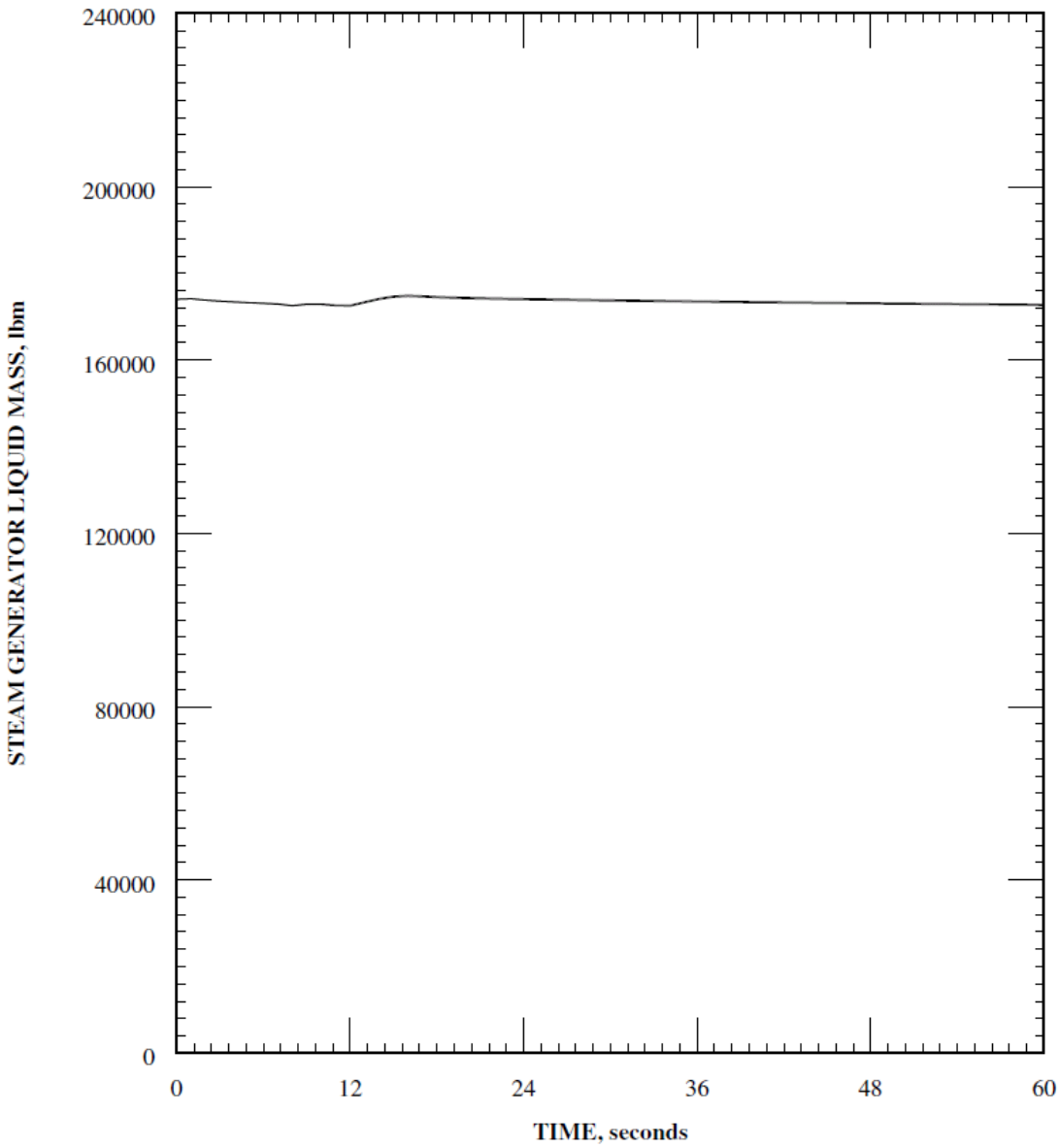


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
STEAM GENERATOR PRESSURE vs. TIME

Figure 15.1.3-8

JUNE 2011 REVISION 16



PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
STEAM GENERATOR LIQUID MASS vs. TIME

Figure 15.1.3-9

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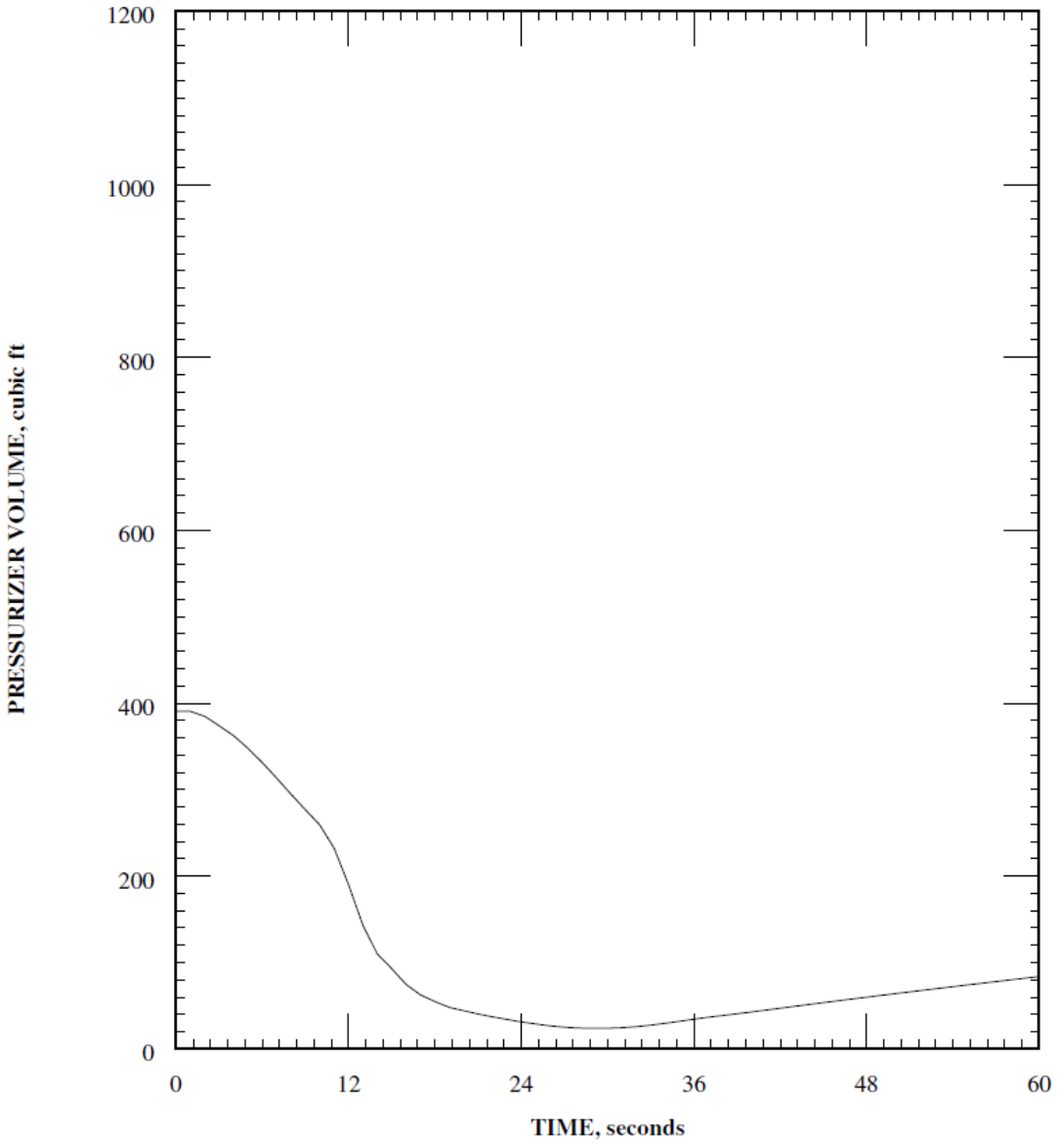
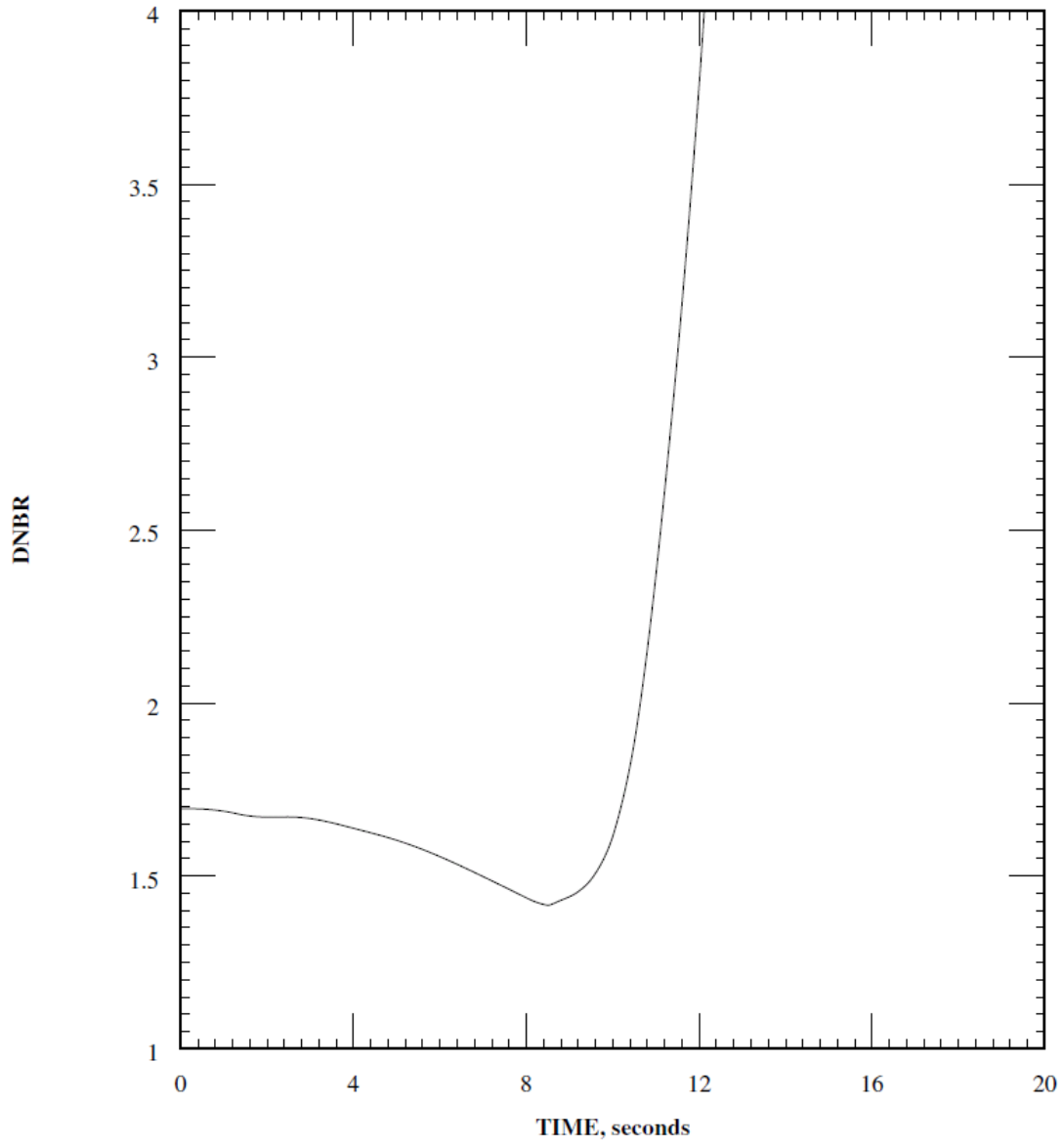


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
PRESSURIZER WATER VOLUME vs. TIME

Figure 15.1.3-10

JUNE 2011 REVISION 16

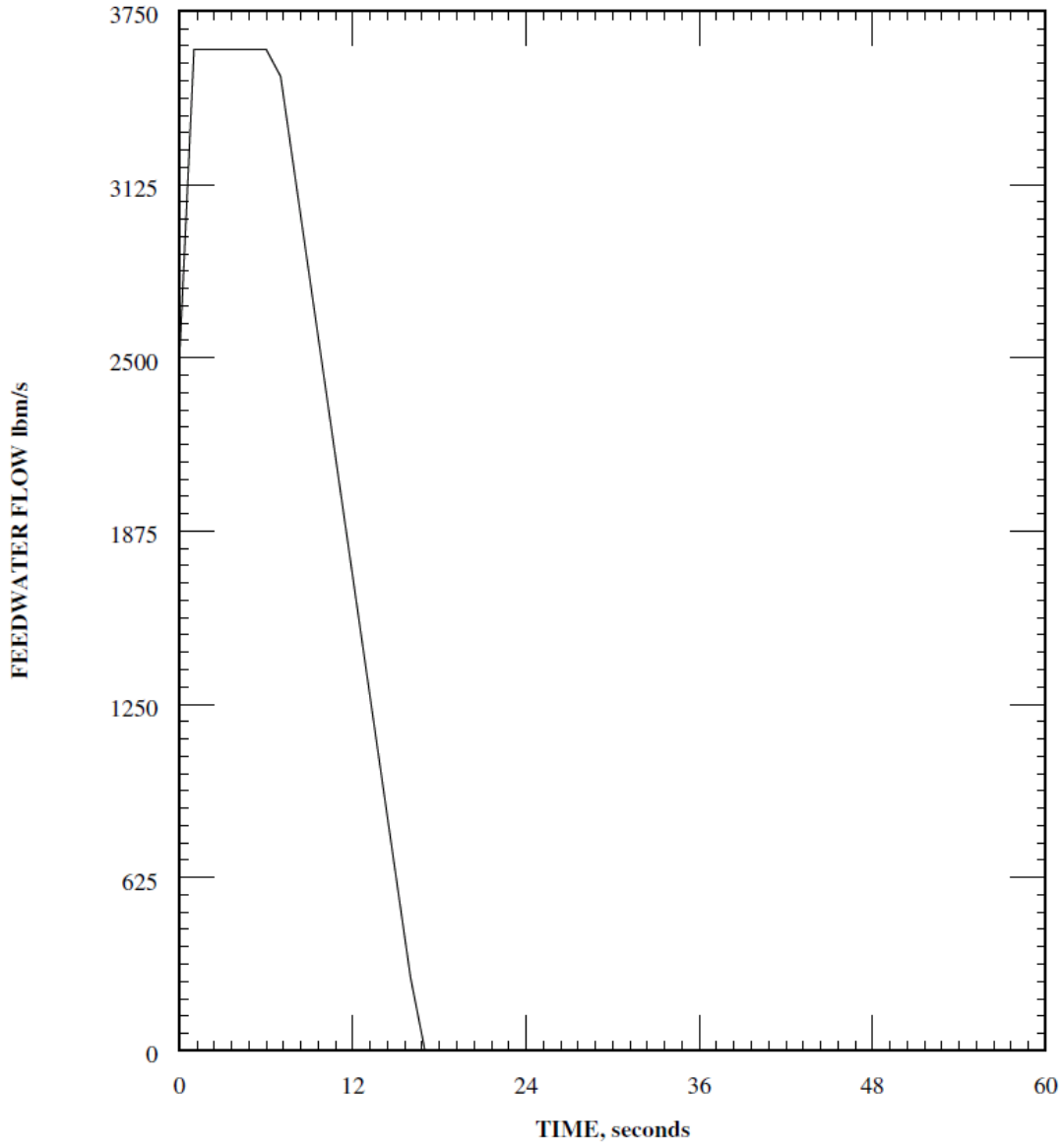


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
DNBR vs. TIME

Figure 15.1.3-11

JUNE 2011 REVISION 16

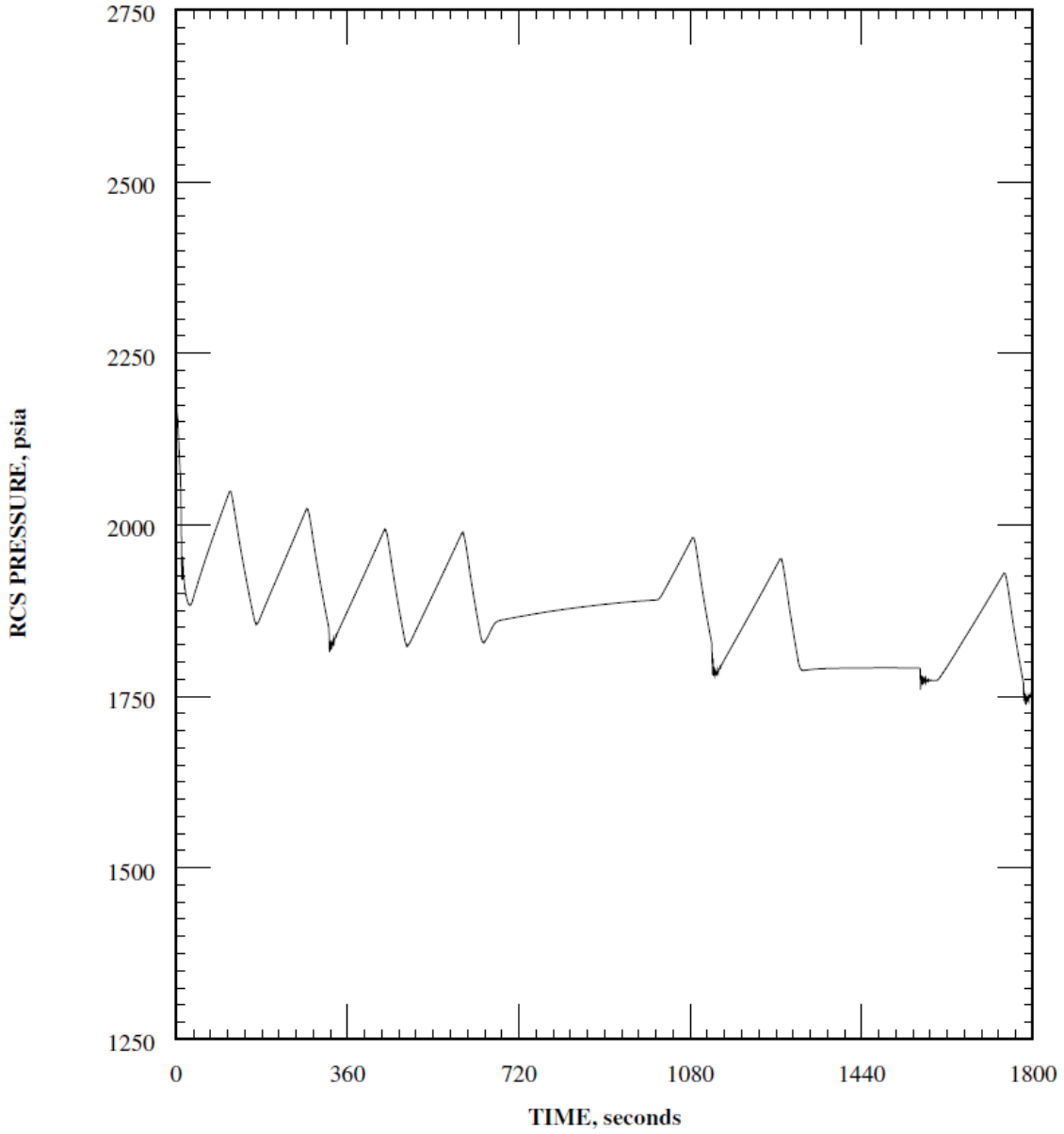


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
MAIN FEEDWATER FLOW vs. TIME

Figure 15.1.3-12

JUNE 2011 REVISION 16

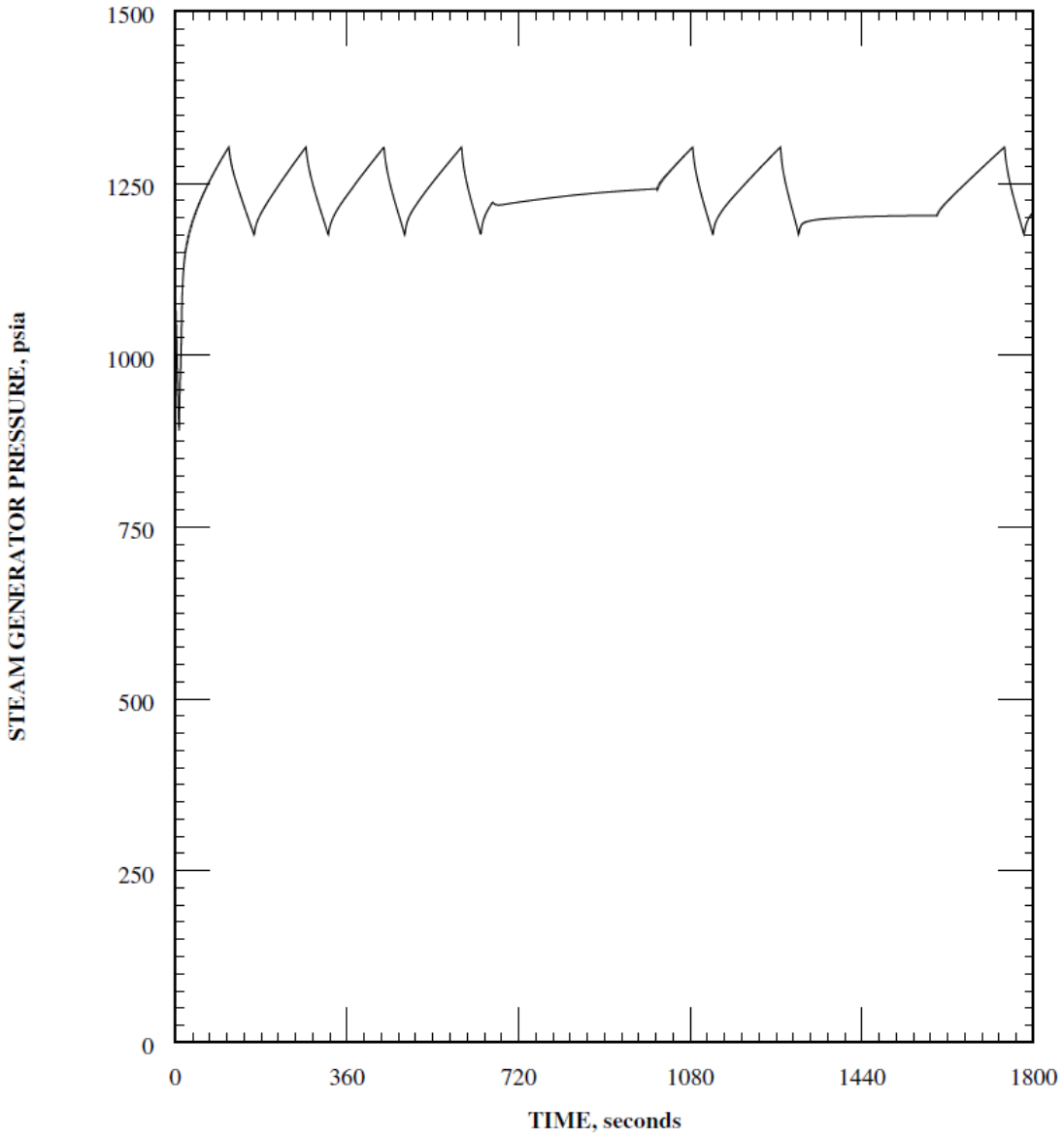


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
LONG-TERM RCS PRESSURE vs. TIME

Figure 15.1.3-13

JUNE 2011 REVISION 16

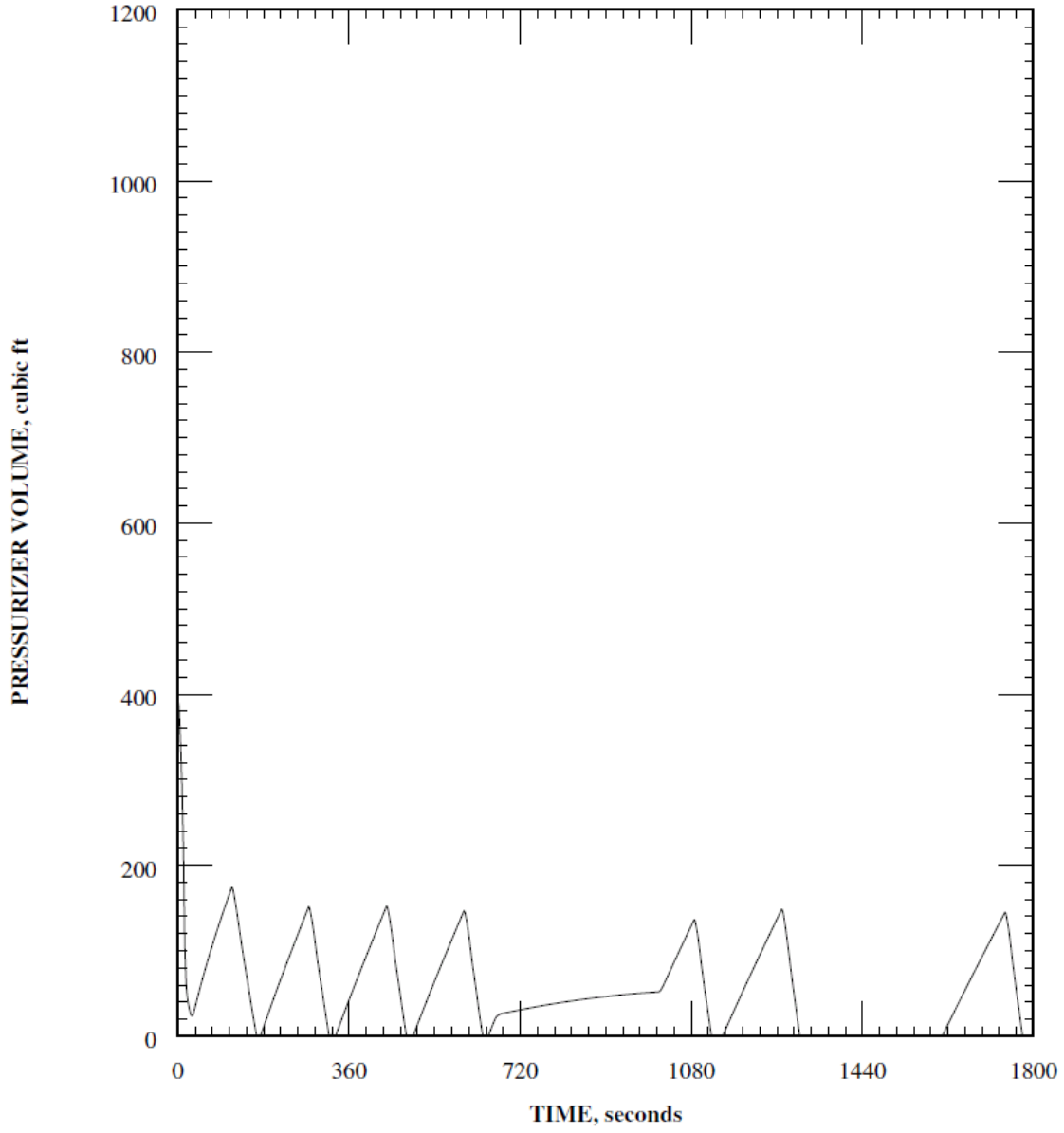


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
LONG-TERM SG PRESSURE vs. TIME

Figure 15.1.3-14

JUNE 2011 REVISION 16

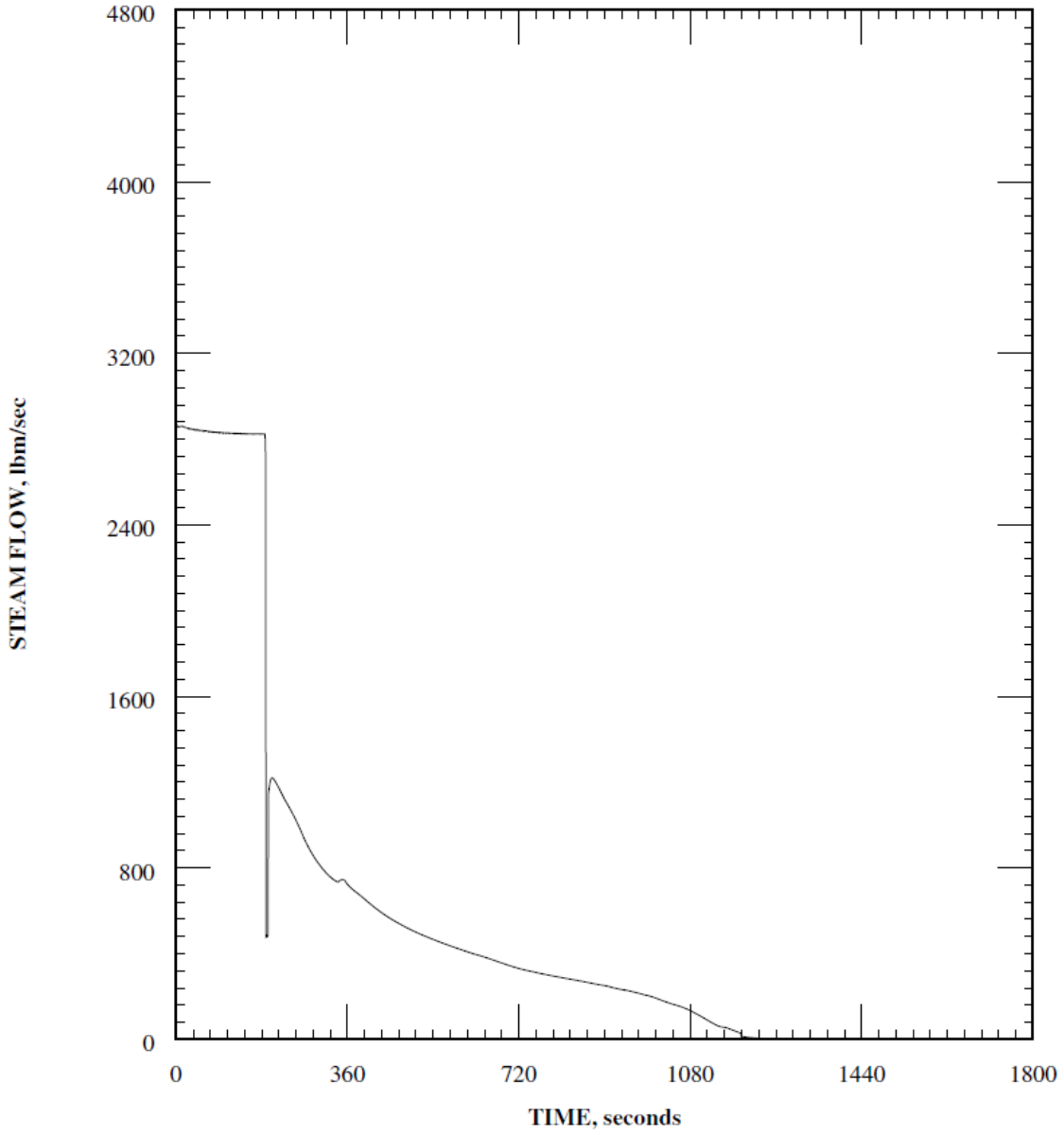


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SBCS MALFUNCTION EVENT
LONG-TERM PRESSURIZER VOLUME vs. TIME

Figure 15.1.3-15

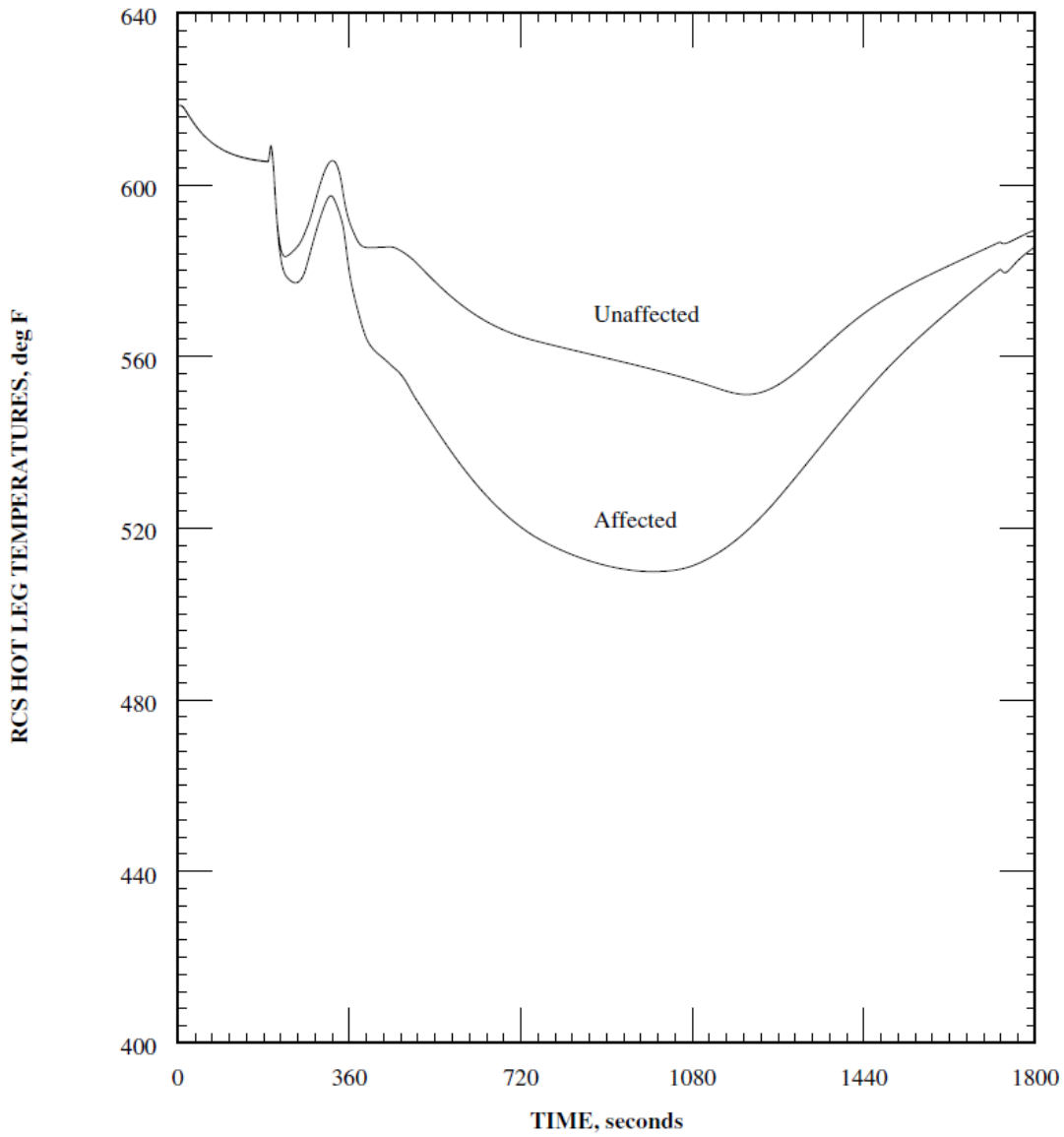
JUNE 2011 REVISION 16



PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
STEAM FLOW vs. TIME

Figure 15.1.4-1

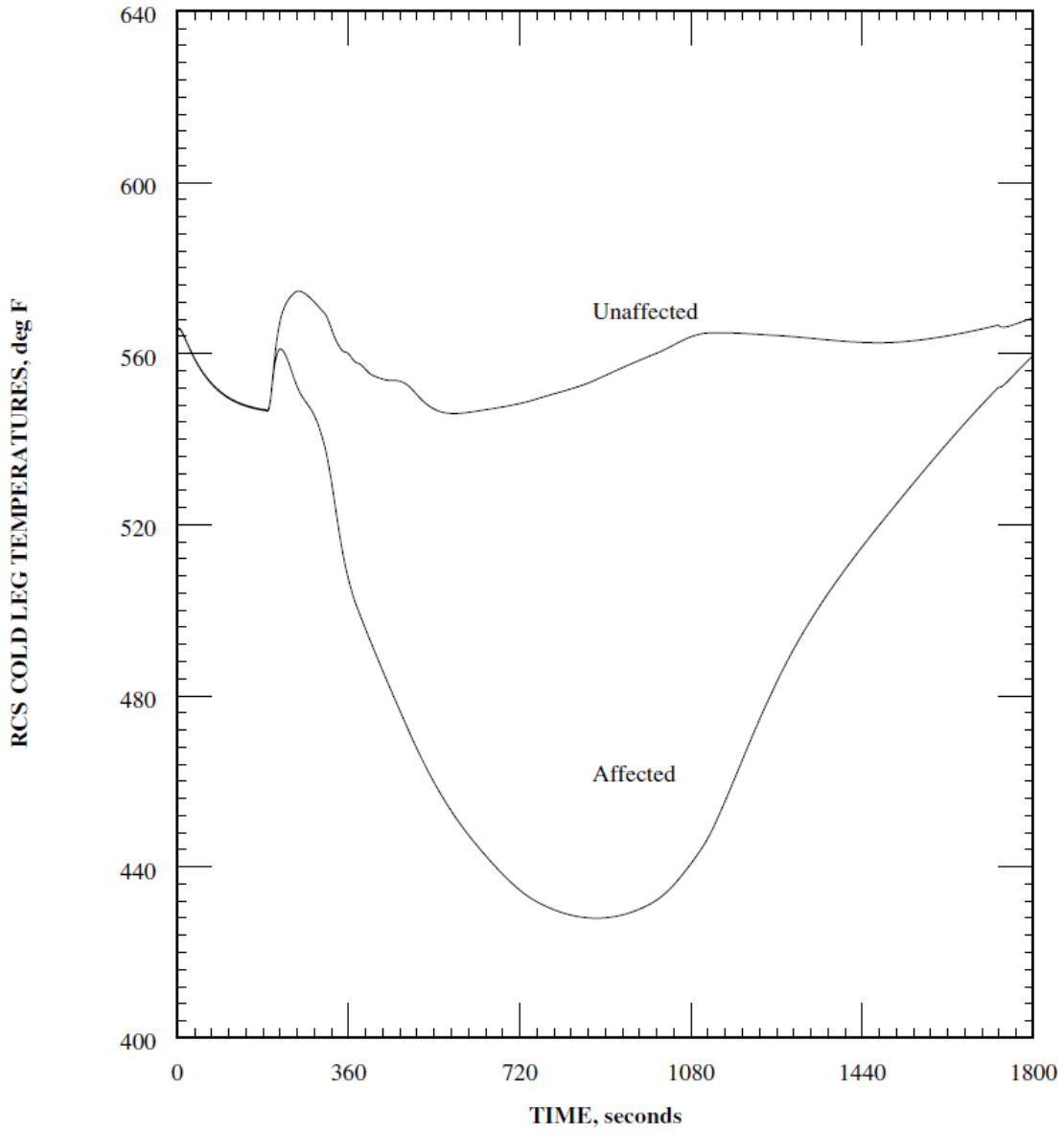


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
RCS HOT LEG TEMPERATURE vs. TIME

Figure 15.1.4-2

JUNE 2011 REVISION 16

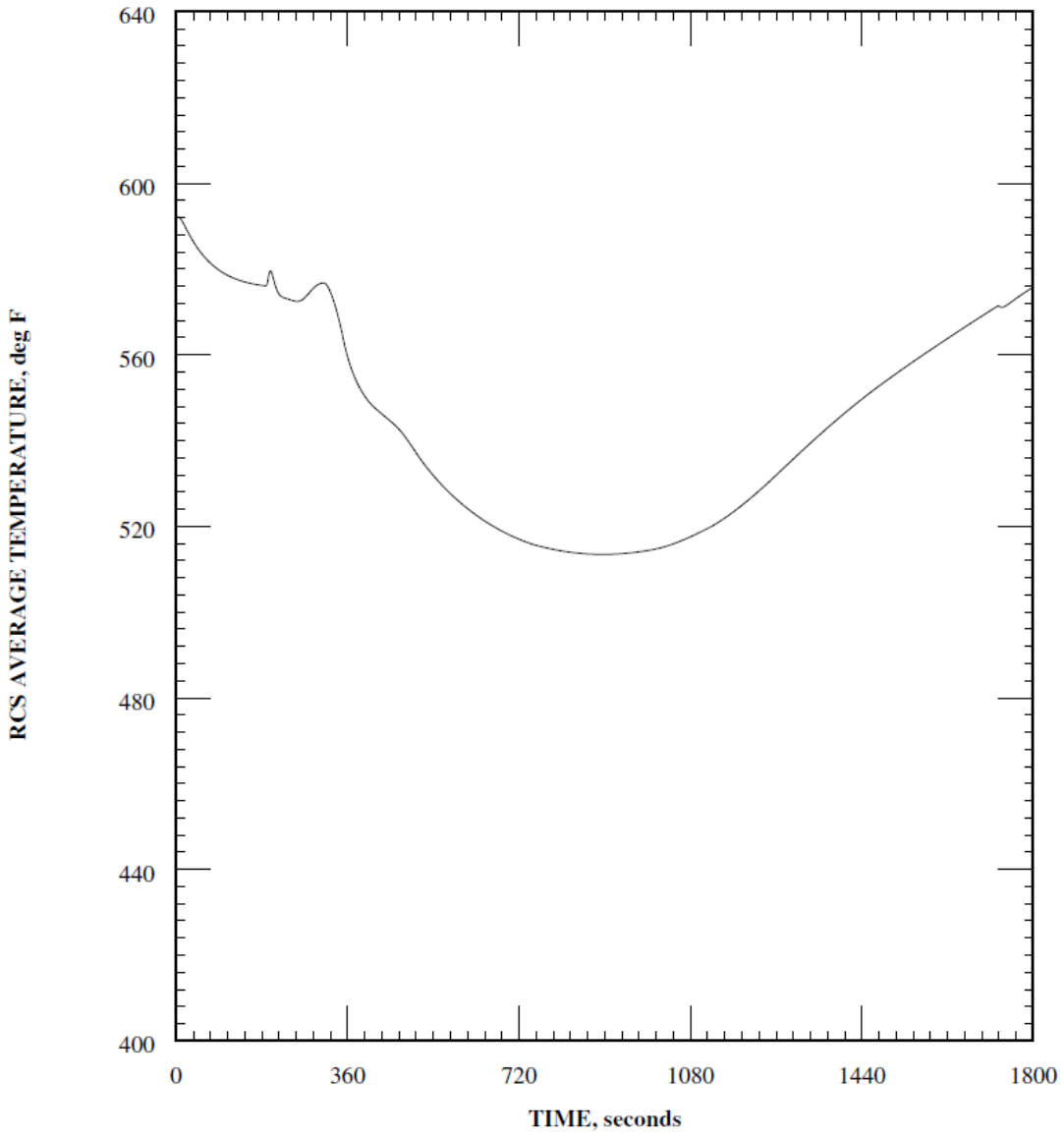


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
RCS COLD LEG TEMPERATURE vs. TIME

Figure 15.1.4-3

JUNE 2011 REVISION 16

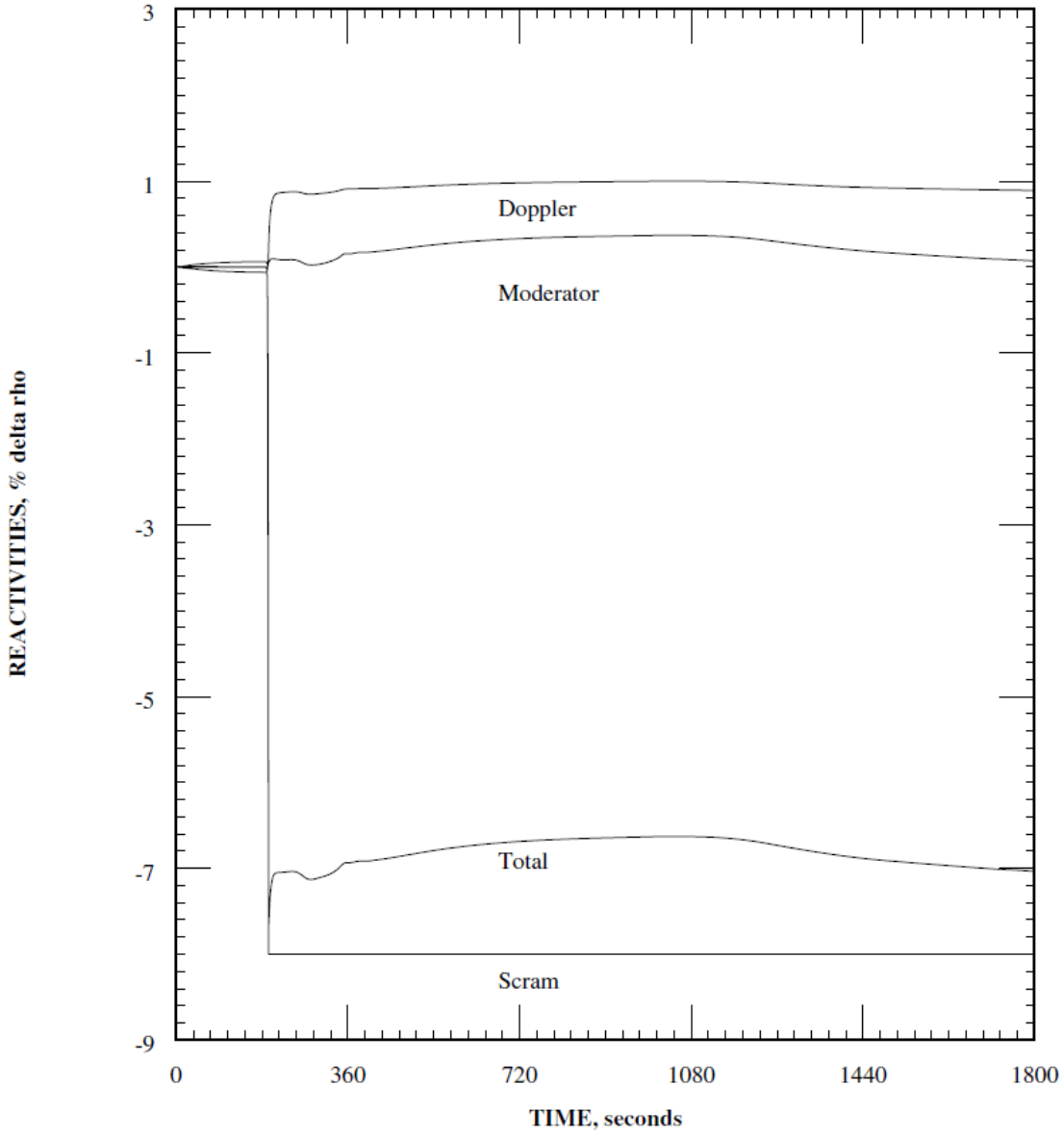


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
RCS AVERAGE TEMPERATURE vs. TIME

Figure 15.1.4-4

JUNE 2011 REVISION 16

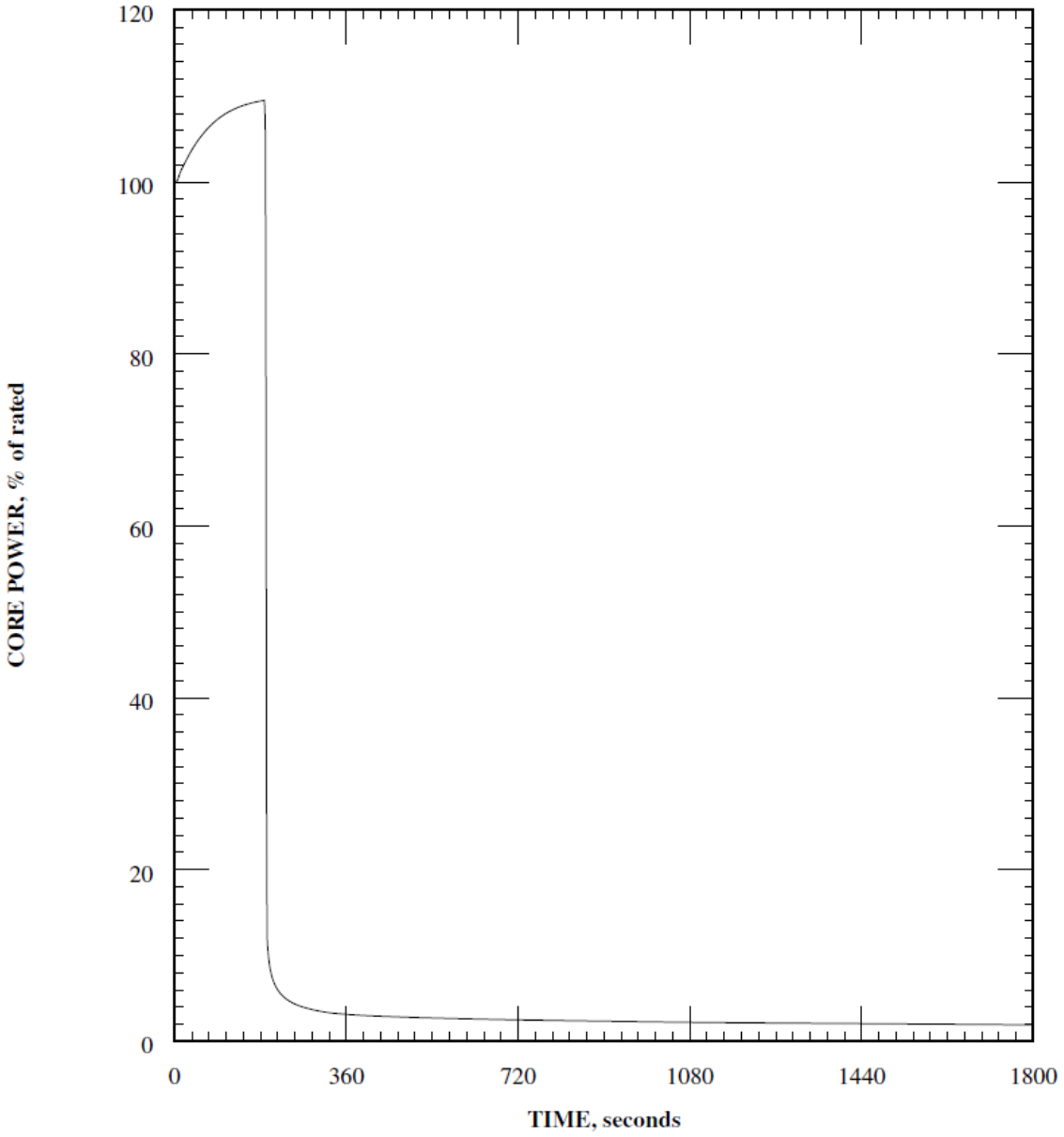


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
REACTIVITIES vs. TIME

Figure 15.1.4-5

JUNE 2011 REVISION 16

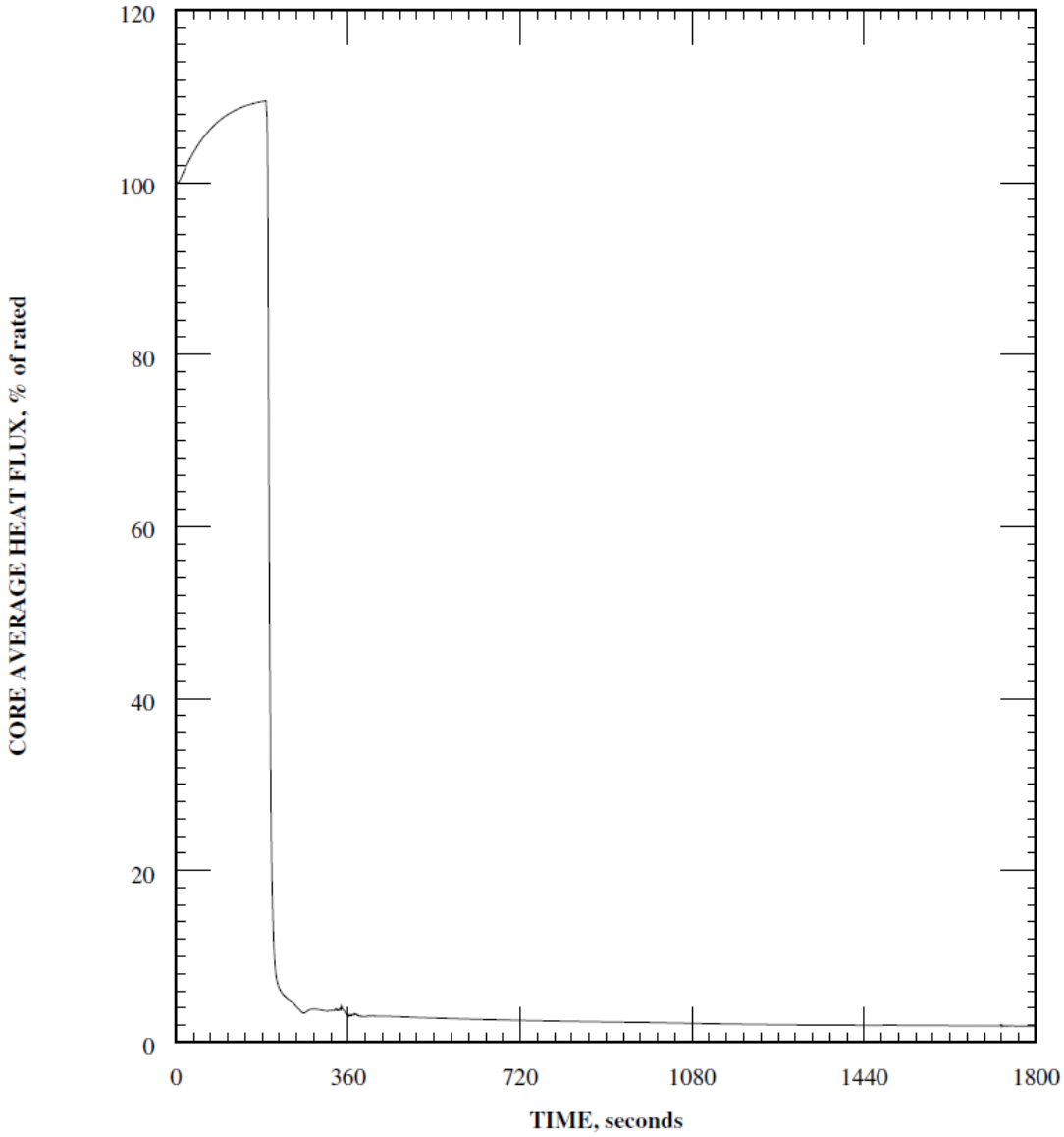


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
CORE POWER vs. TIME

Figure 15.1.4-6

JUNE 2011 REVISION 16

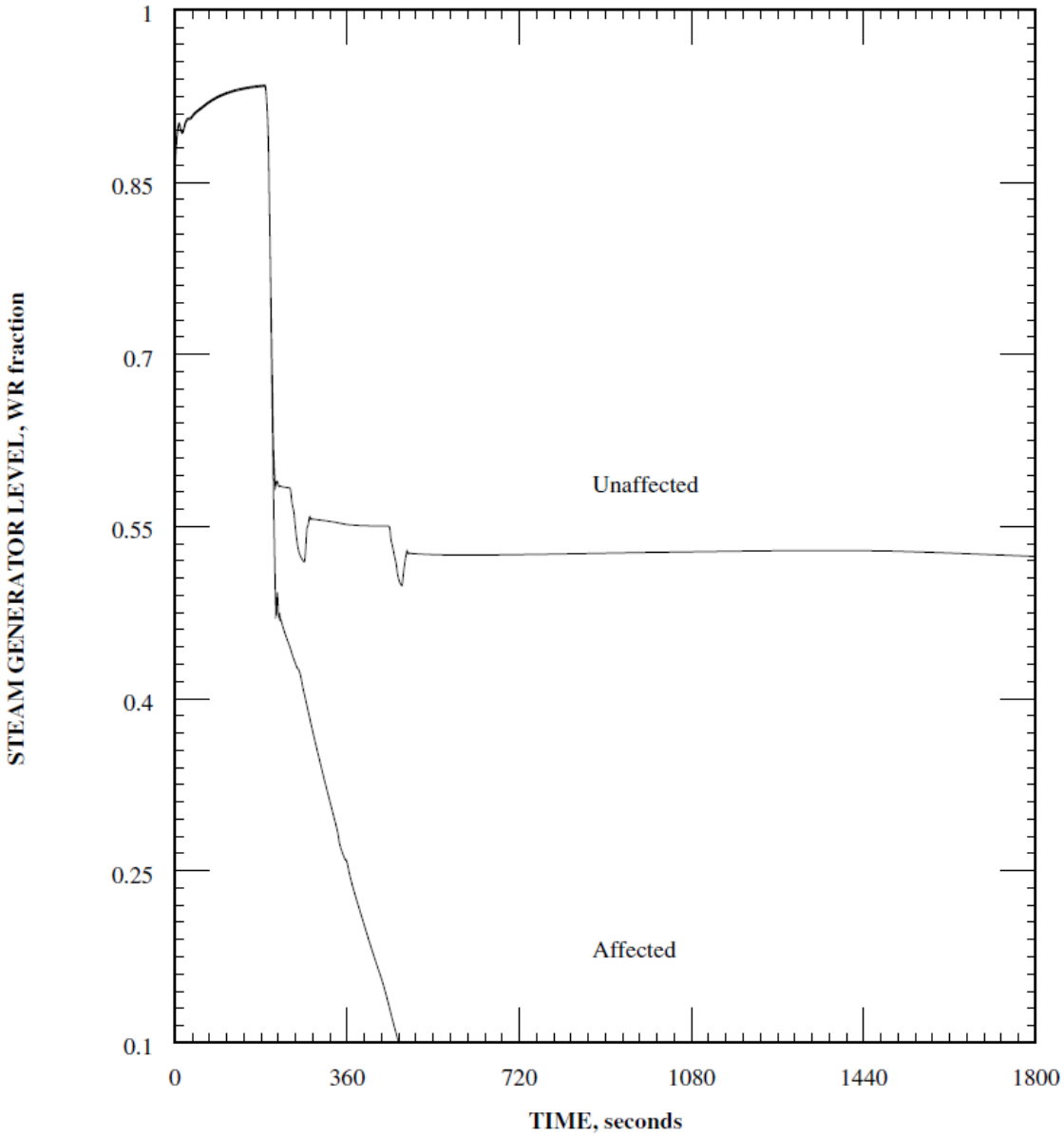


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
CORE AVERAGE HEAT FLUX vs. TIME

Figure 15.1.4-7

JUNE 2011 REVISION 16

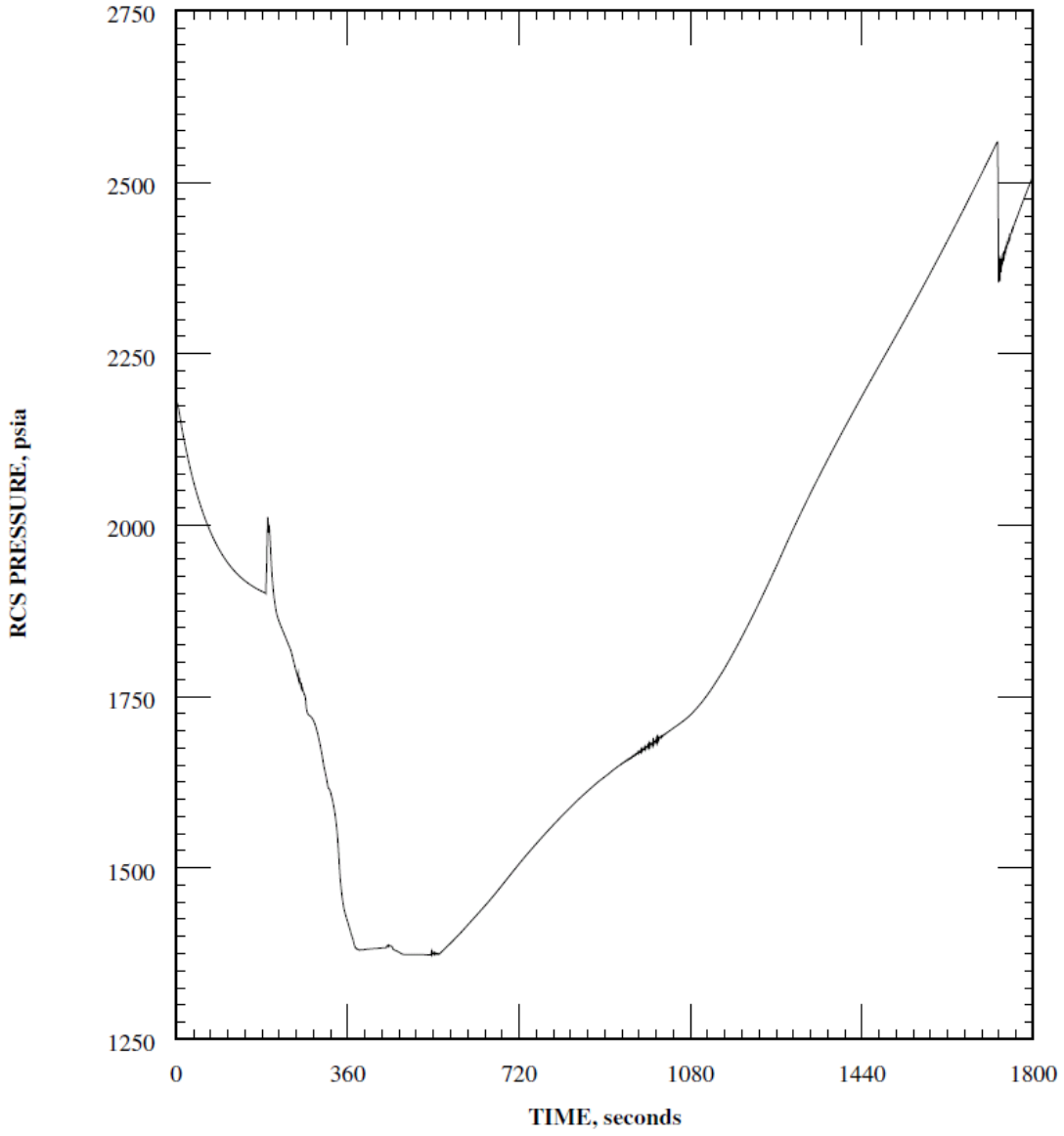


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
WIDE RANGE SG LEVEL vs. TIME

Figure 15.1.4-8

JUNE 2011 REVISION 16

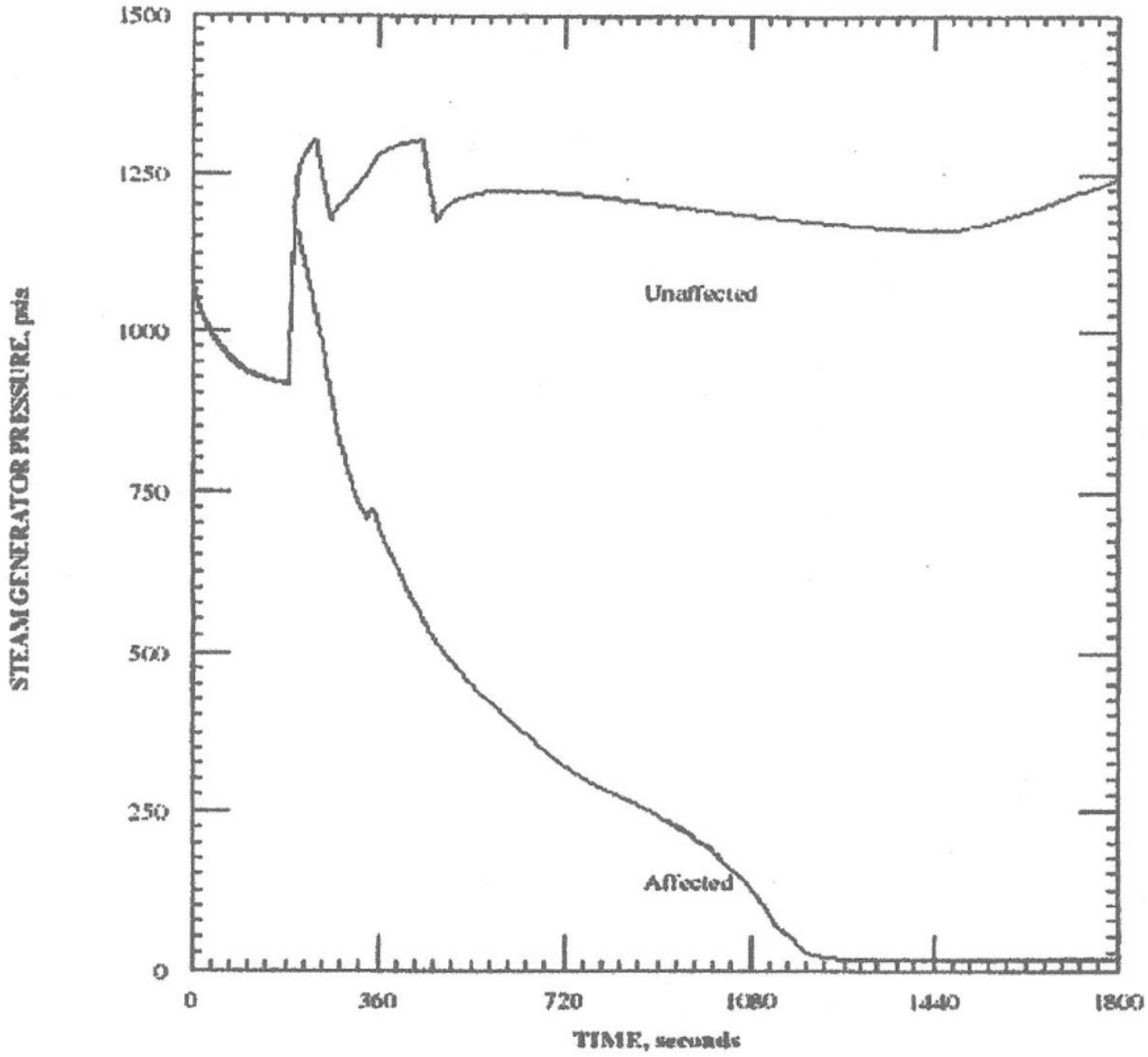


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
RCS PRESSURE vs. TIME

Figure 15.1.4-9

JUNE 2011 REVISION 16

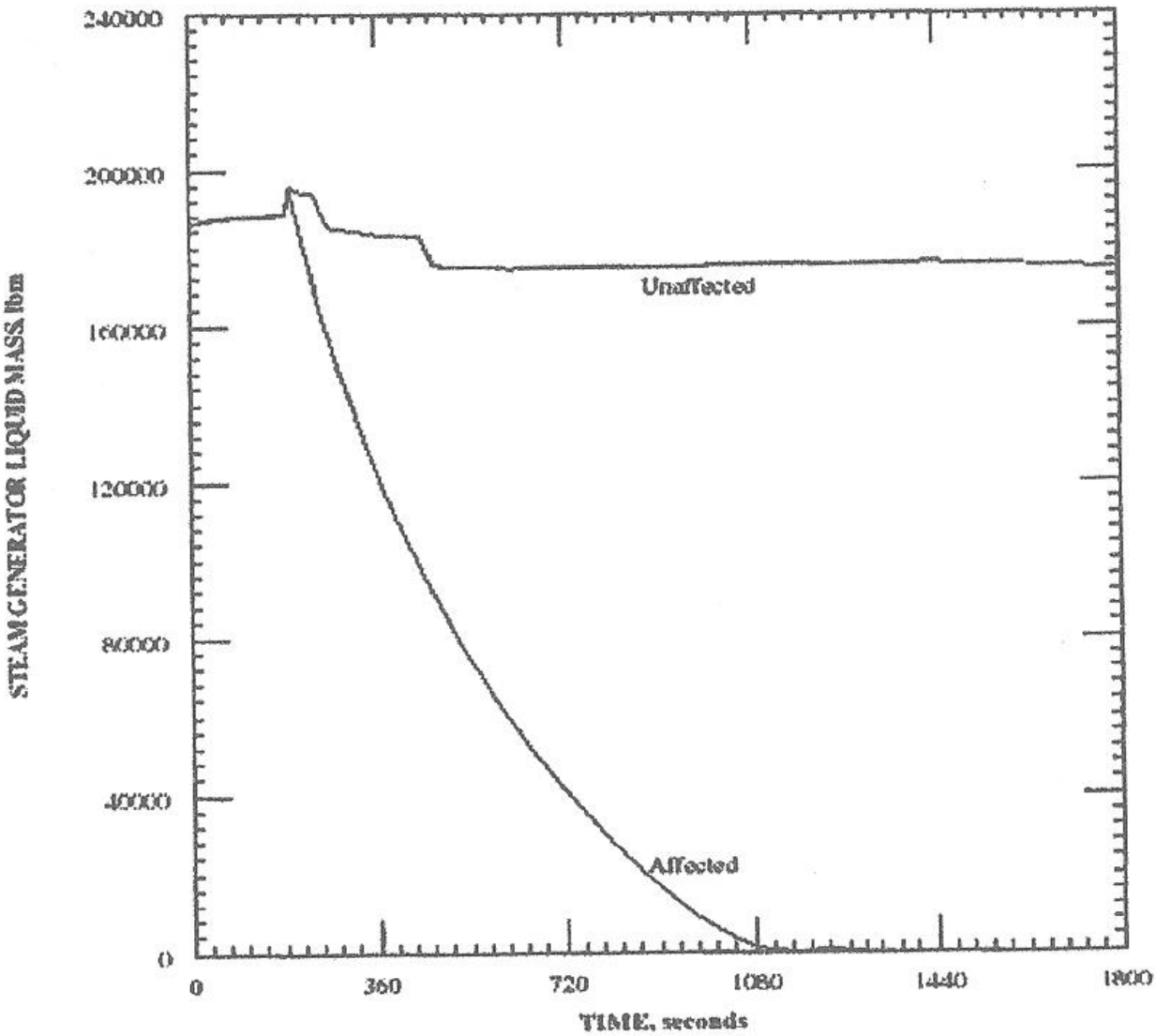


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
STEAM GENERATOR PRESSURE vs. TIME

FIGURE 15.1.4-10

JUNE 2017 REVISION 19

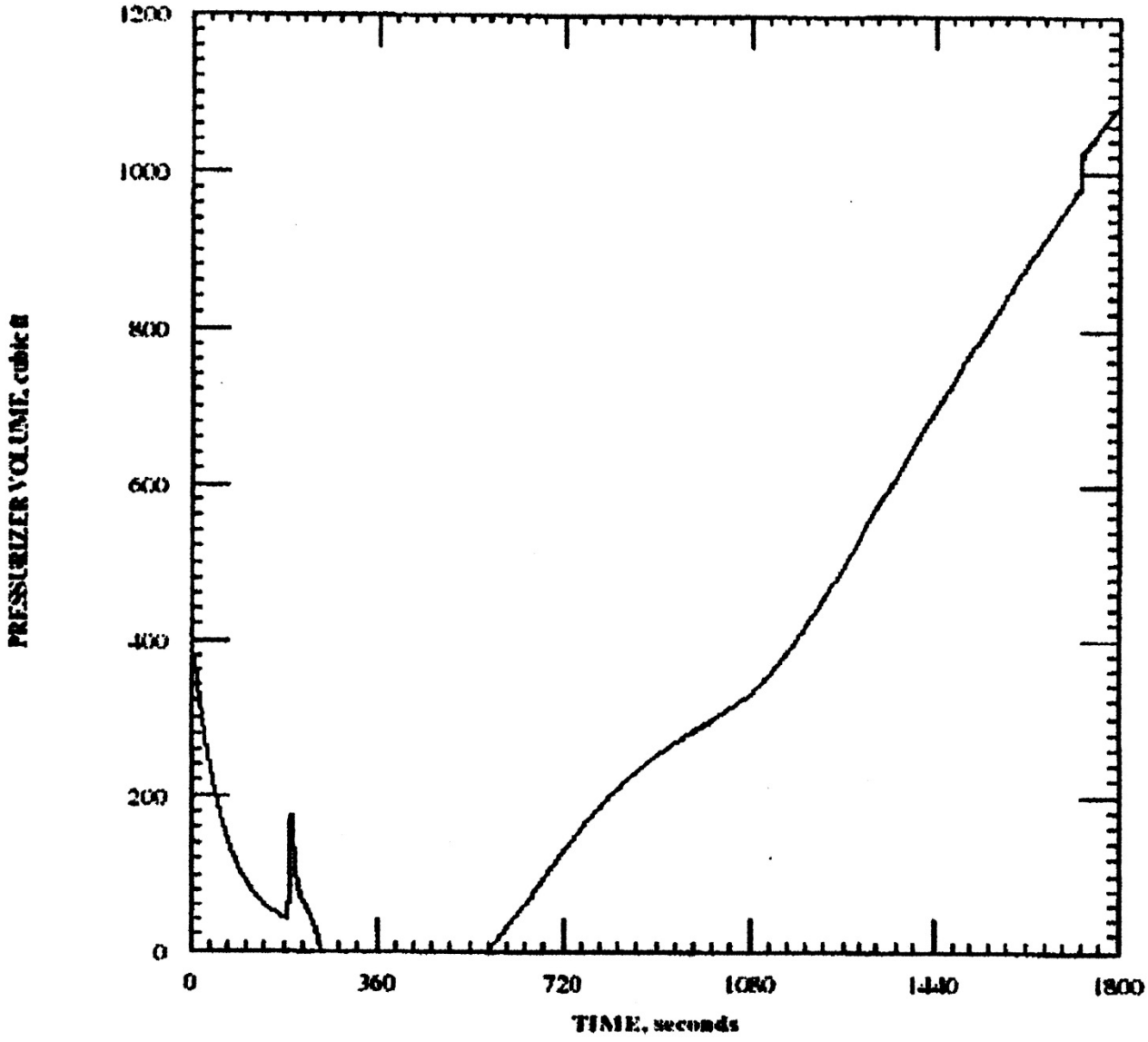


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
STEAM GENERATOR LIQUID vs. TIME

FIGURE 15.1.4-11

JUNE 2017 REVISION 19

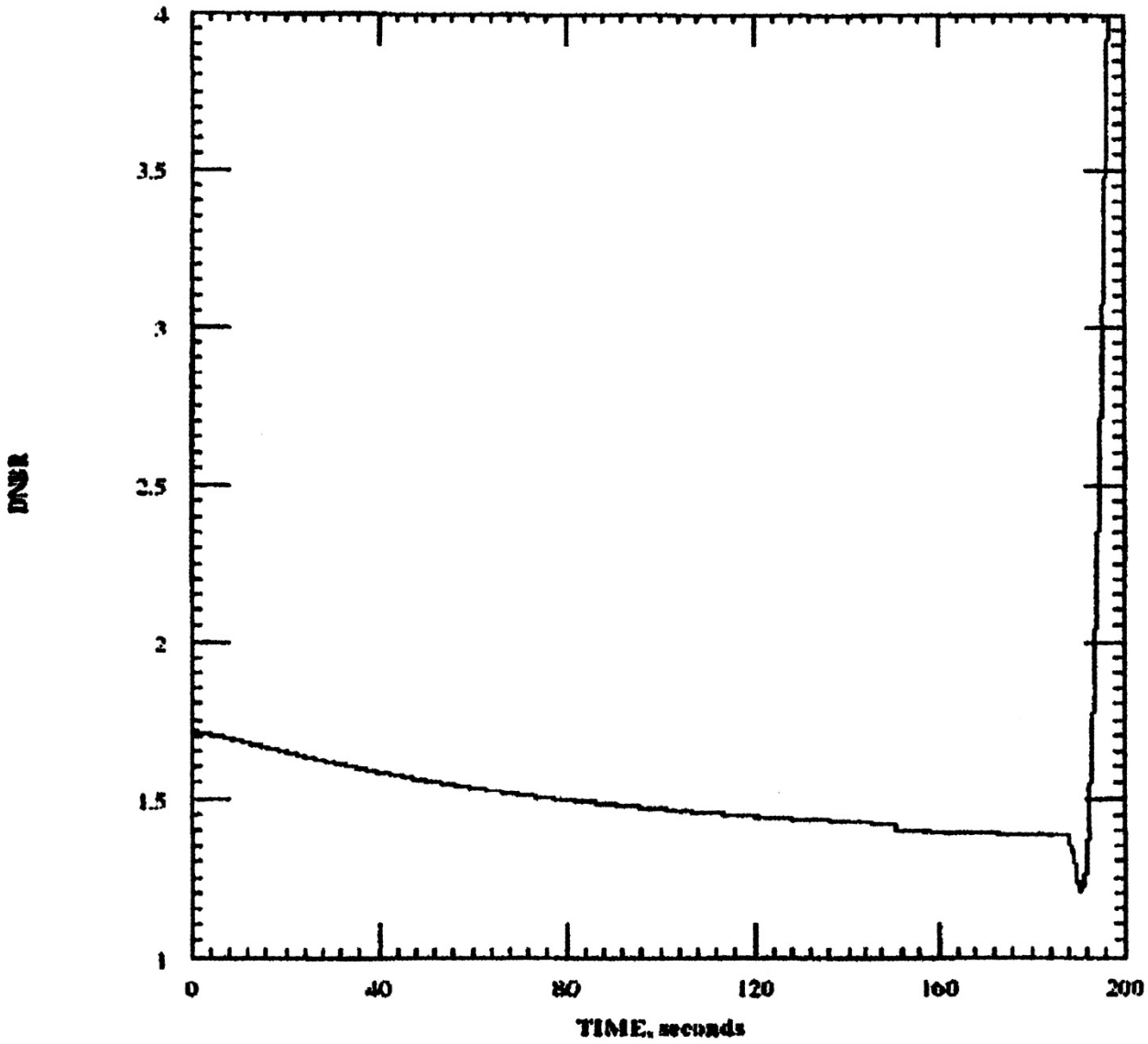


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
PRESSURIZER WATER VOLUME vs. TIME

FIGURE 15.1.4-12

JUNE 2017 REVISION 19

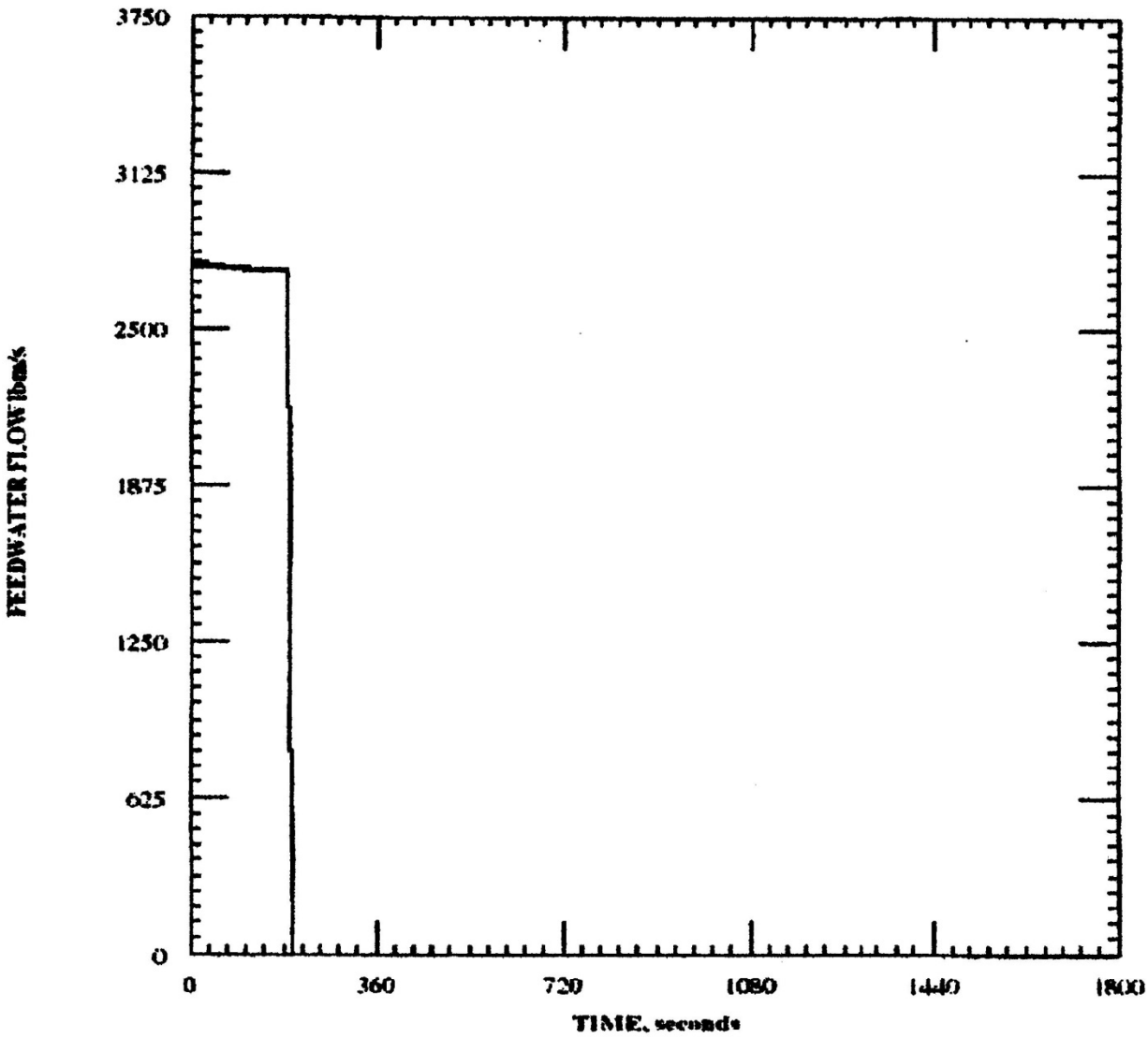


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
DNBR vs. TIME

FIGURE 15.1.4-13

JUNE 2017 REVISION 19

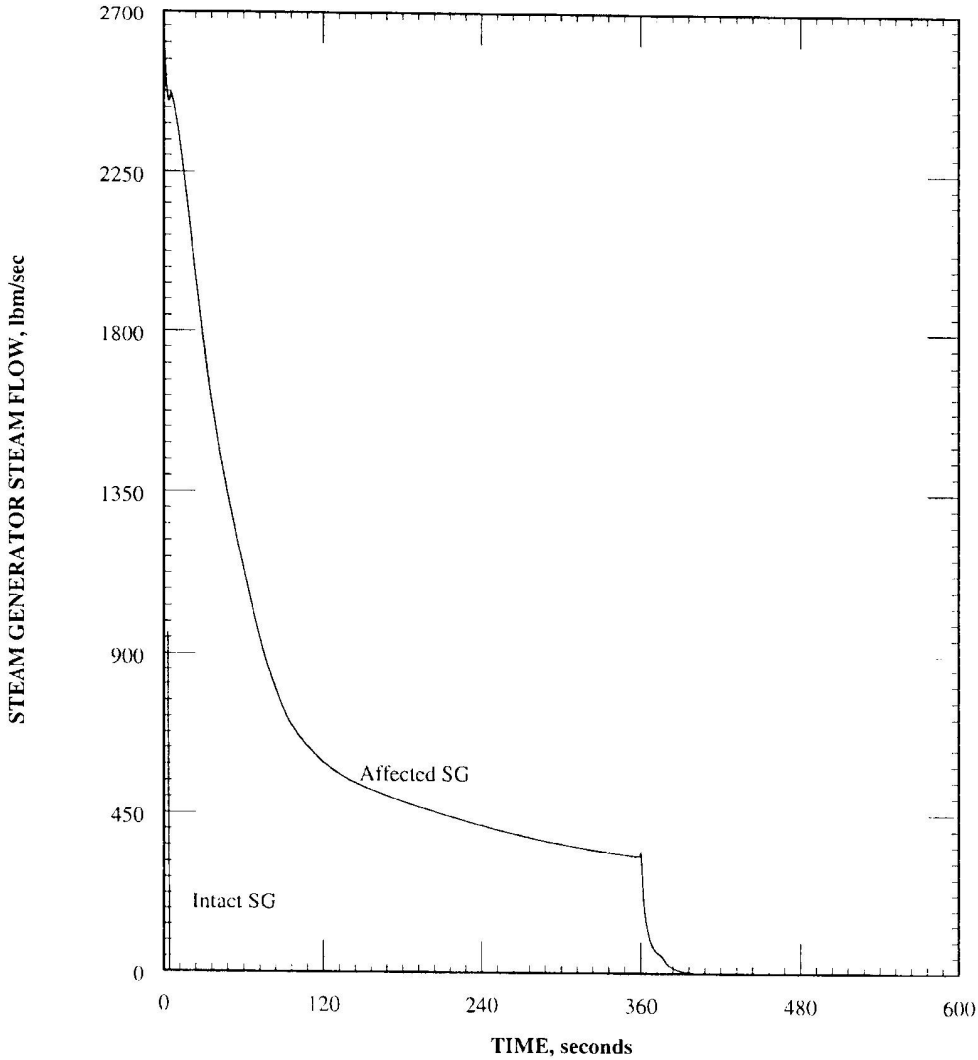


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

IOSGADVLOP EVENT
MAIN FEEDWATER FLOW vs. TIME

FIGURE 15.1.4-14

JUNE 2017 REVISION 19

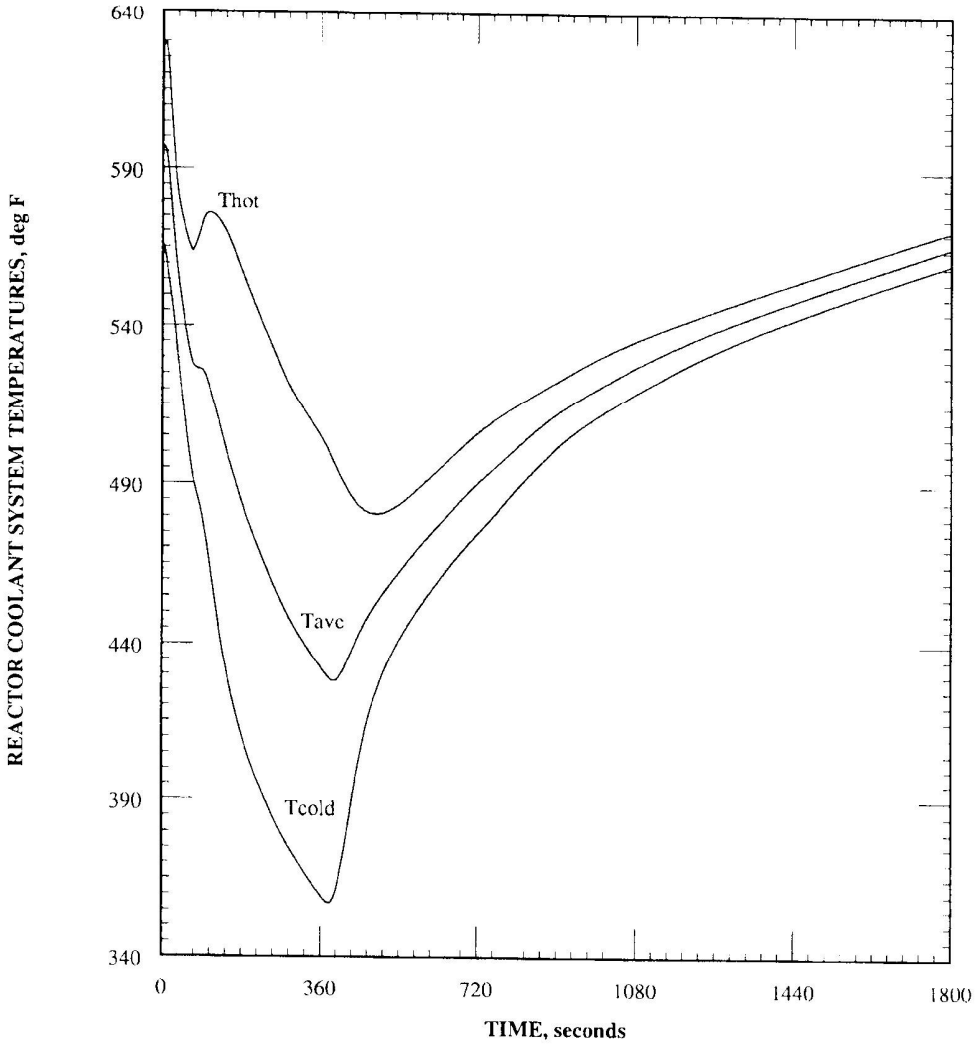


PALO VERDE NUCELAR GENERATING STATION
UPDATED FSAR

POST TRIP MSLB EVENT (SLBFPLOP CASE)
STEAM FLOW vs. TIME

FIGURE 15.1.5-1

JUNE 2009 REVISION 15

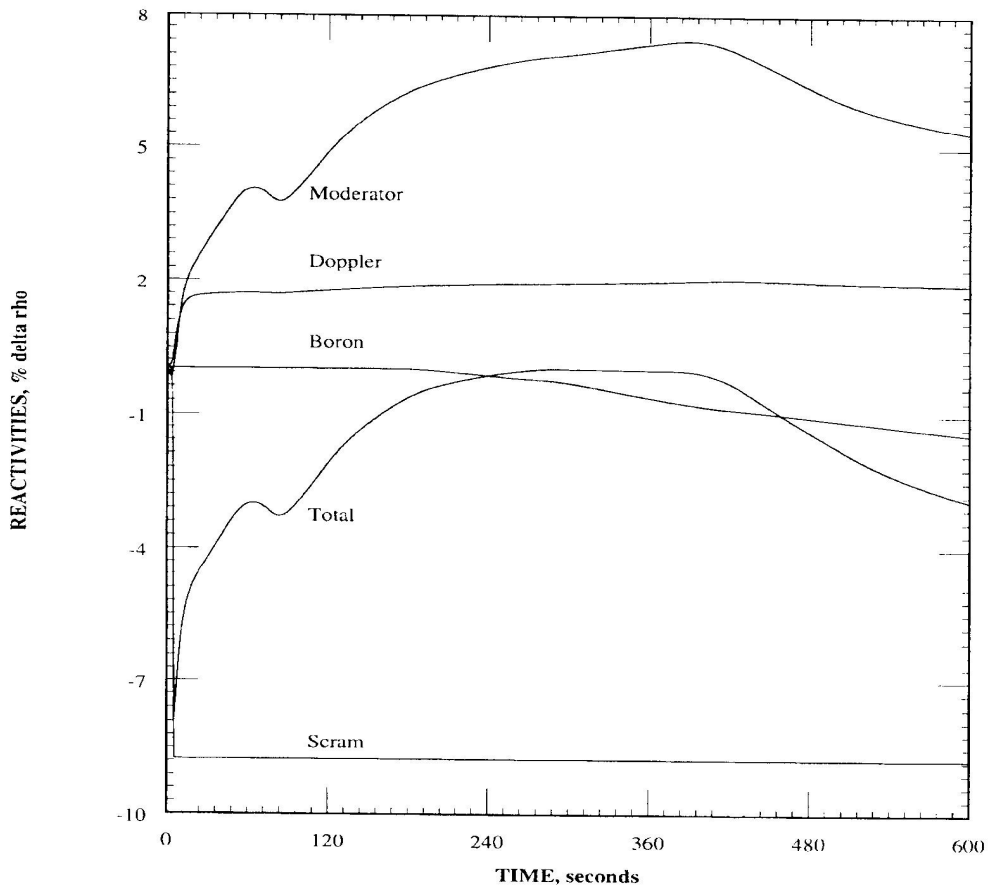


PALO VERDE NUCELAR GENERATING STATION
UPDATED FSAR

POST TRIP MSLB EVENT (SLBFPLOP CASE)
RCS TEMPERATURE vs. TIME

FIGURE 15.1.5-2

JUNE 2009 REVISION 15

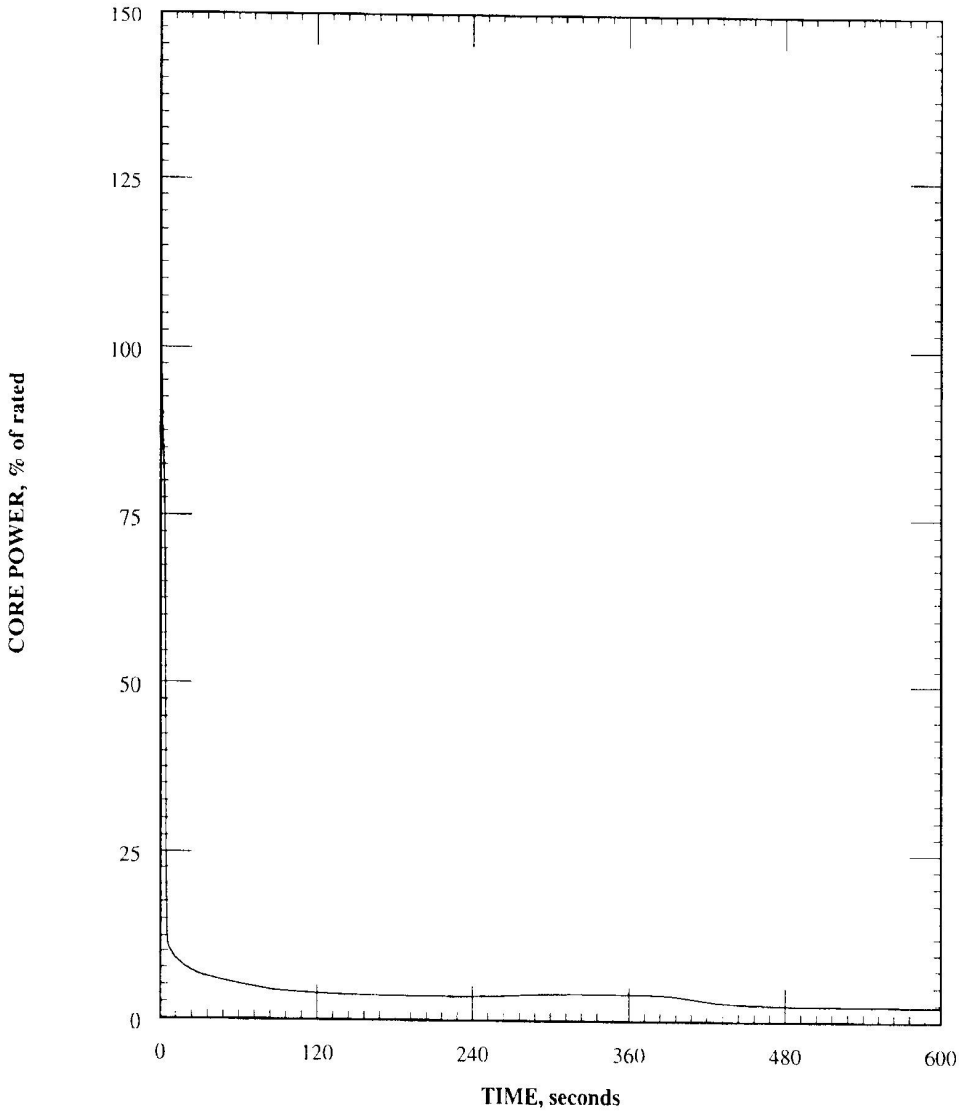


PALO VERDE NUCELAR GENERATING STATION
UPDATED FSAR

POST TRIP MSLB EVENT (SLBFPLOP CASE)
REACTIVITIES vs. TIME

FIGURE 15.1.5-3

JUNE 2009 REVISION 15

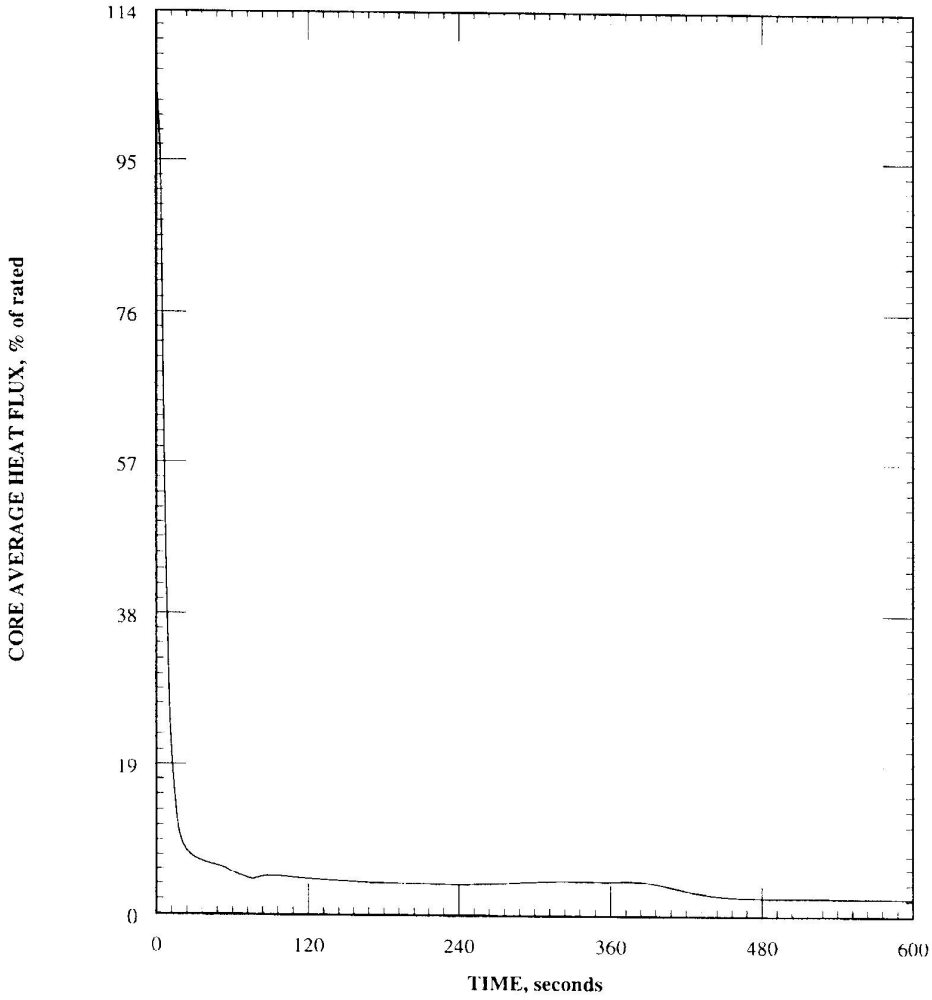


PALO VERDE NUCELAR GENERATING STATION
UPDATED FSAR

POST-TRIP MSLB EVENT (SLBFPLOP CASE)
CORE POWER vs. TIME

FIGURE 15.1.5-4

JUNE 2009 REVISION 15

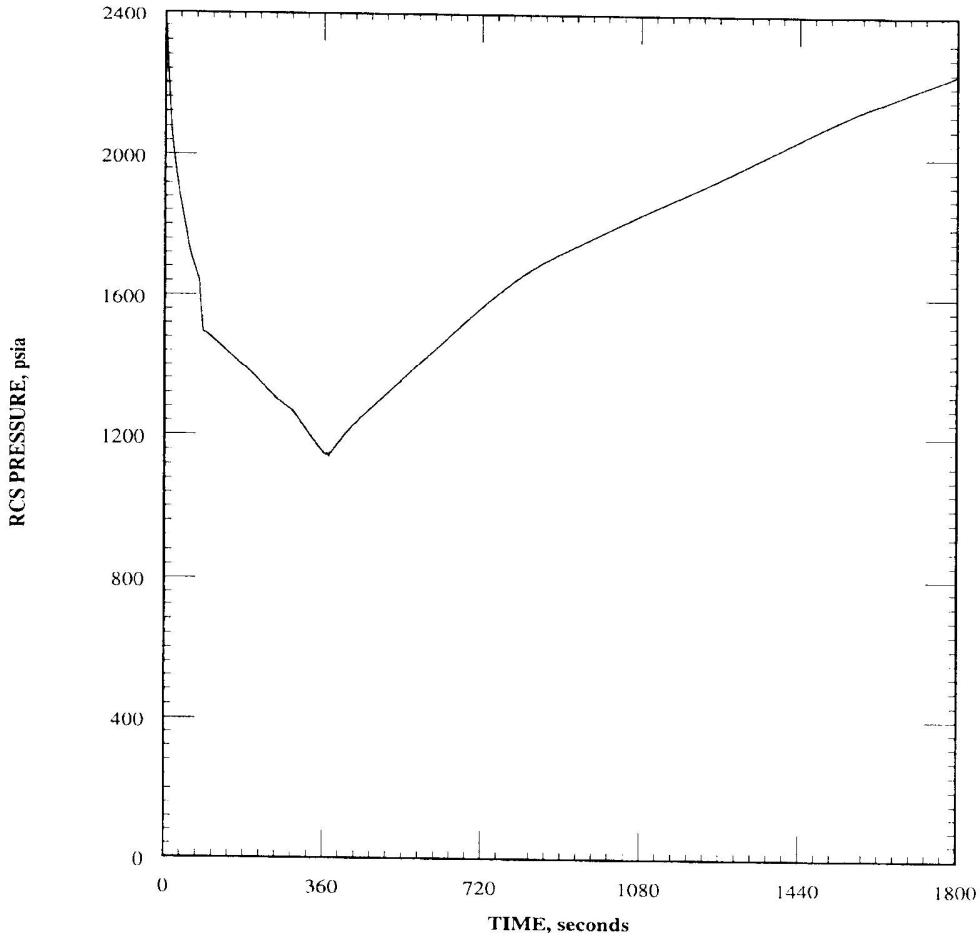


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST-TRIP MSLB EVENT (SLBFPLOP CASE)
CORE AVERAGE HEAT FLUX vs. TIME

FIGURE 15.1.5-5

JUNE 2009 REVISION 15

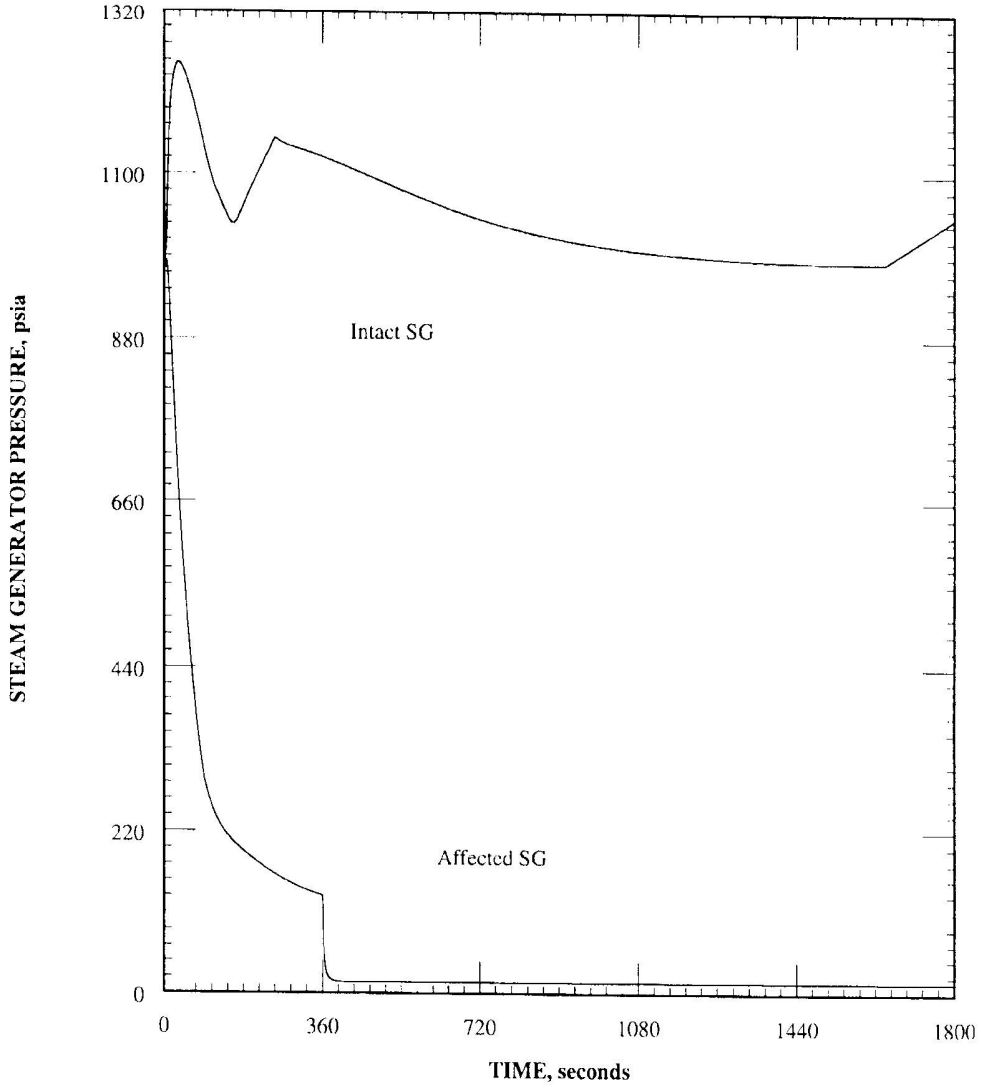


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST-TRIP MSLB EVENT (SLBFPLOP CASE)
RCS PRESSURE vs. TIME

FIGURE 15.1.5-6

JUNE 2009 REVISION 15

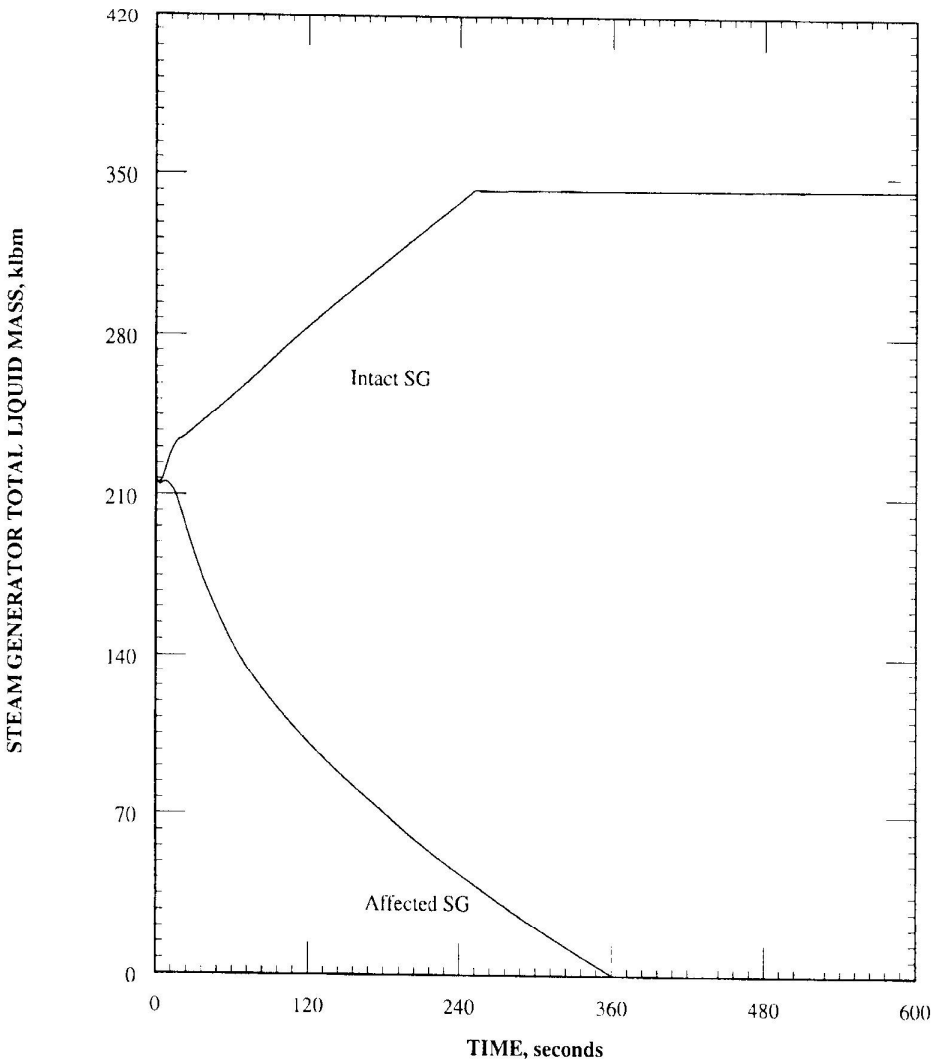


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST-TRIP MSLB EVENT (SLBFPLOP CASE)
STEAM GENERATOR PRESSURE vs. TIME

FIGURE 15.1.5-7

JUNE 2009 REVISION 15

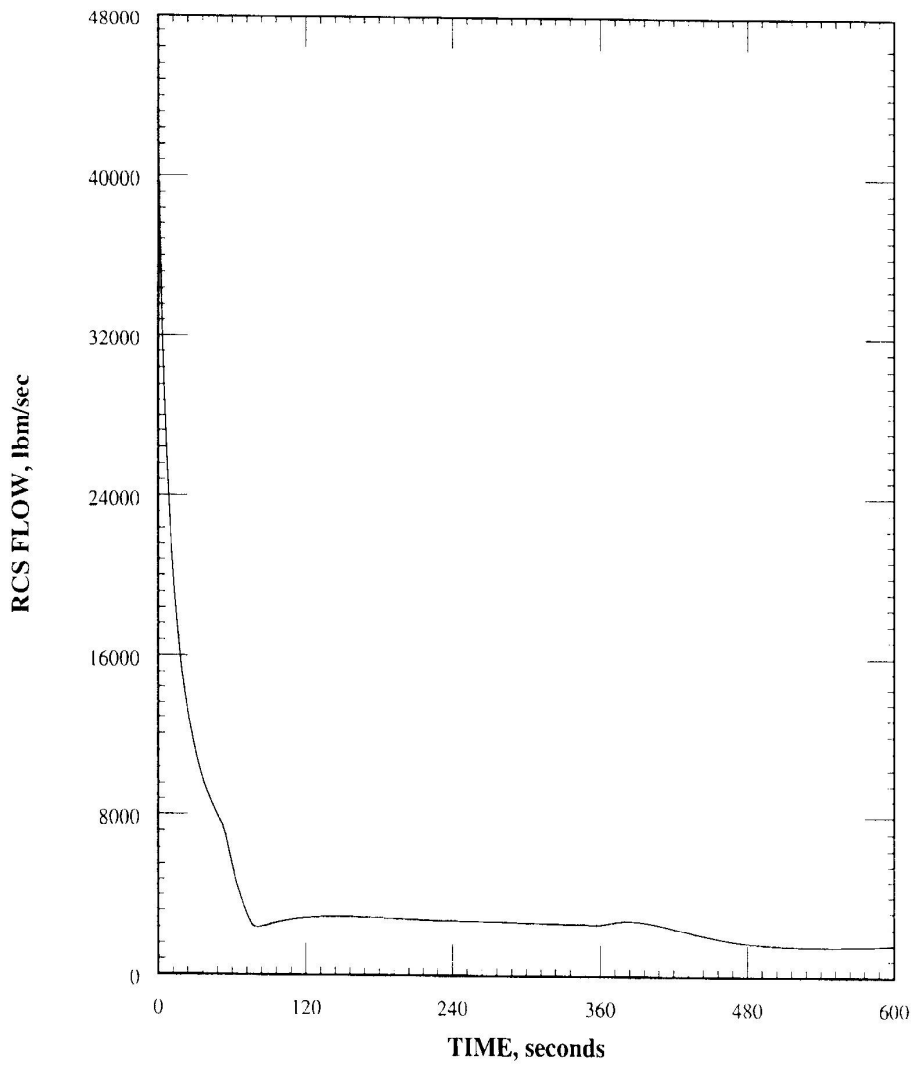


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST-TRIP MSLB EVENT (SLBFPLOP CASE)
STEAM GENERATOR LIQUID MASS vs. TIME

FIGURE 15.1.5-8

JUNE 2009 REVISION 15

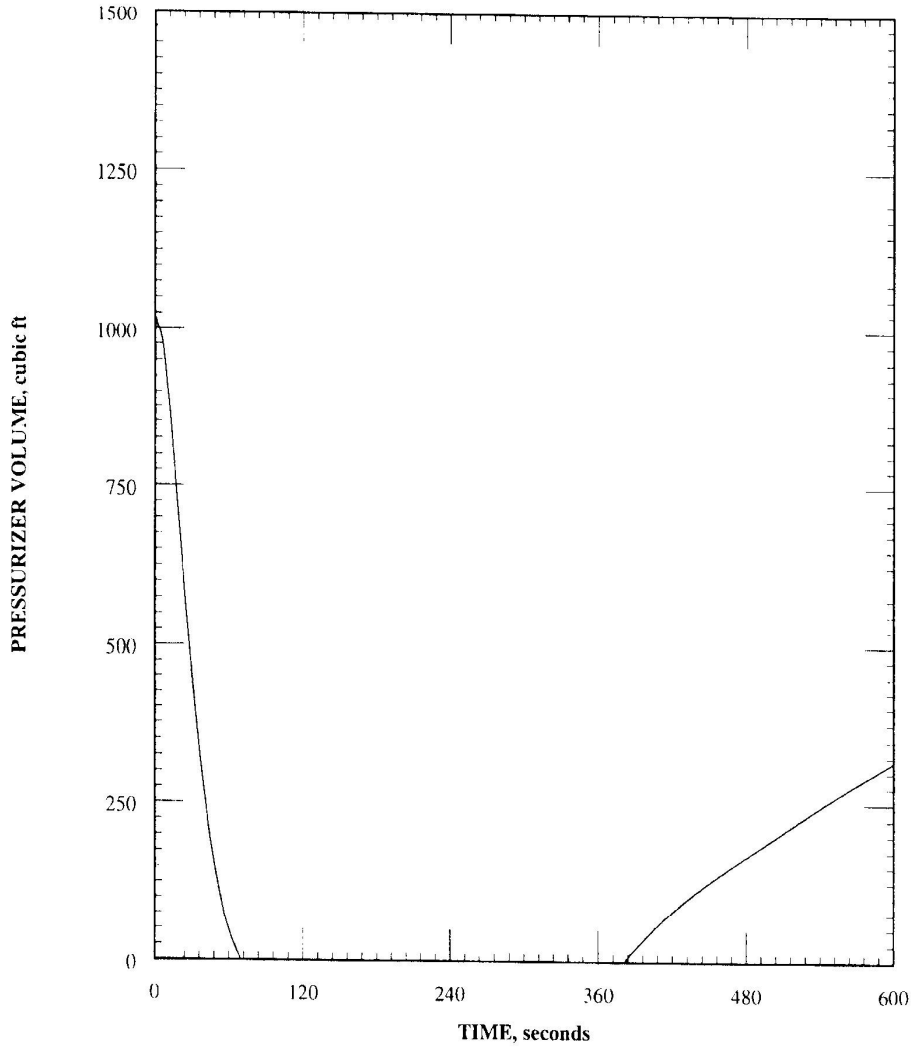


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST-TRIP MSLB EVENT (SLBFPLOP CASE)
RCS FLOW RATE vs. TIME

FIGURE 15.1.5-9

JUNE 2009 REVISION 15

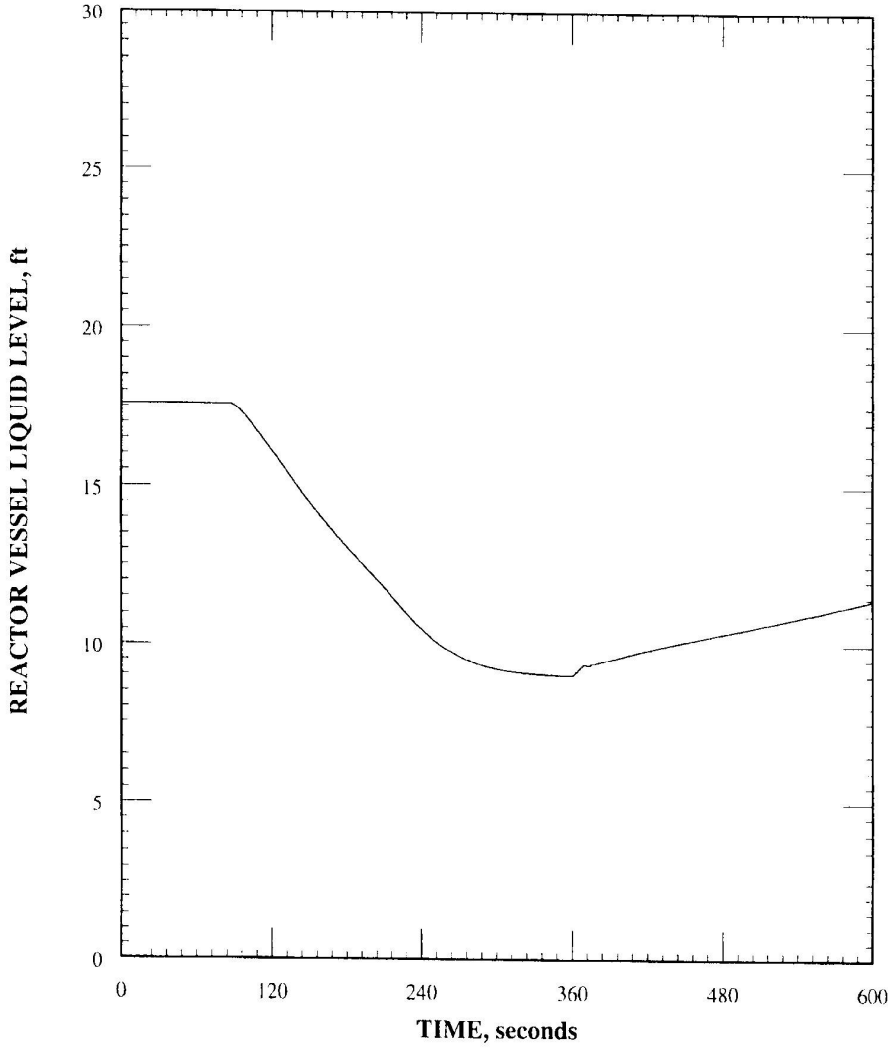


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST TRIP MSLB EVENT (SLBFPLOP)
PRESSURIZER WATER VOLUME vs. TIME

FIGURE 15.1.5-10

JUNE 2009 REVISION 15

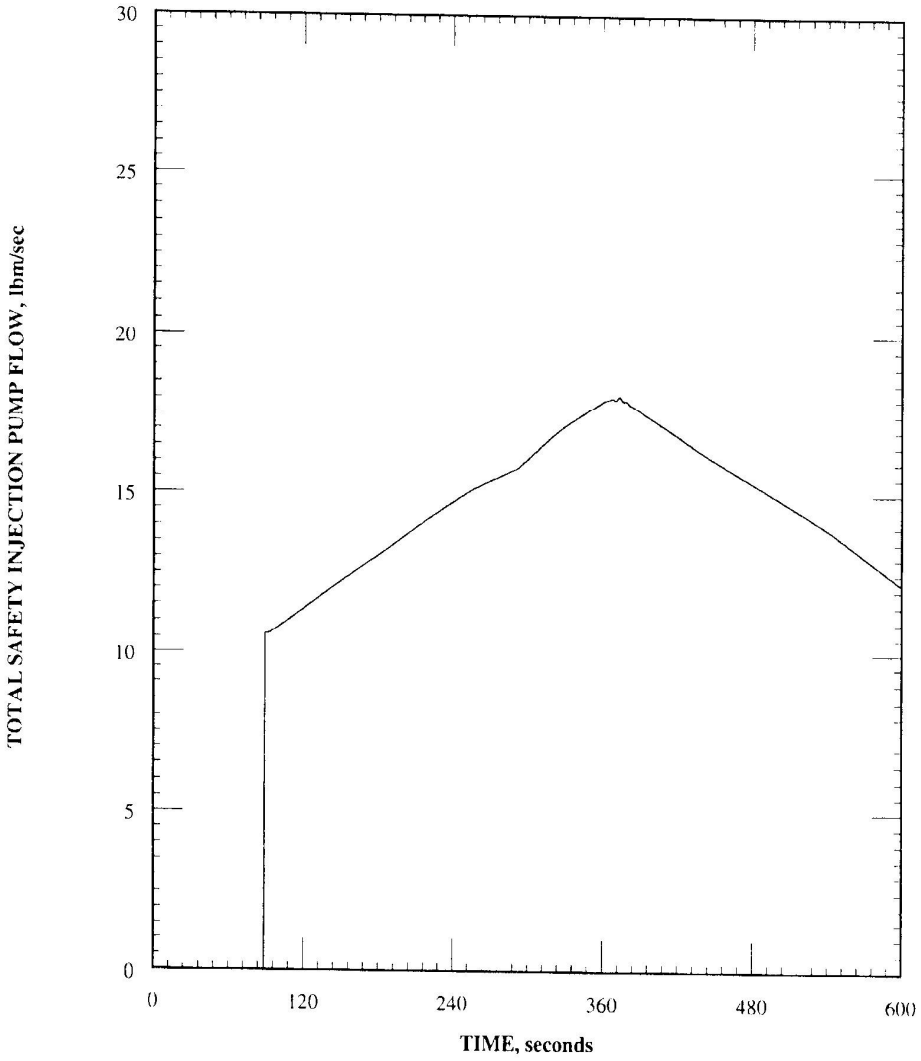


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST-TRIP MSLB EVENT (SLBFPLOP CASE)
REACTOR VESSEL LIQUID LEVEL vs. TIME

FIGURE 15.1.5-11

JUNE 2009 REVISION 15

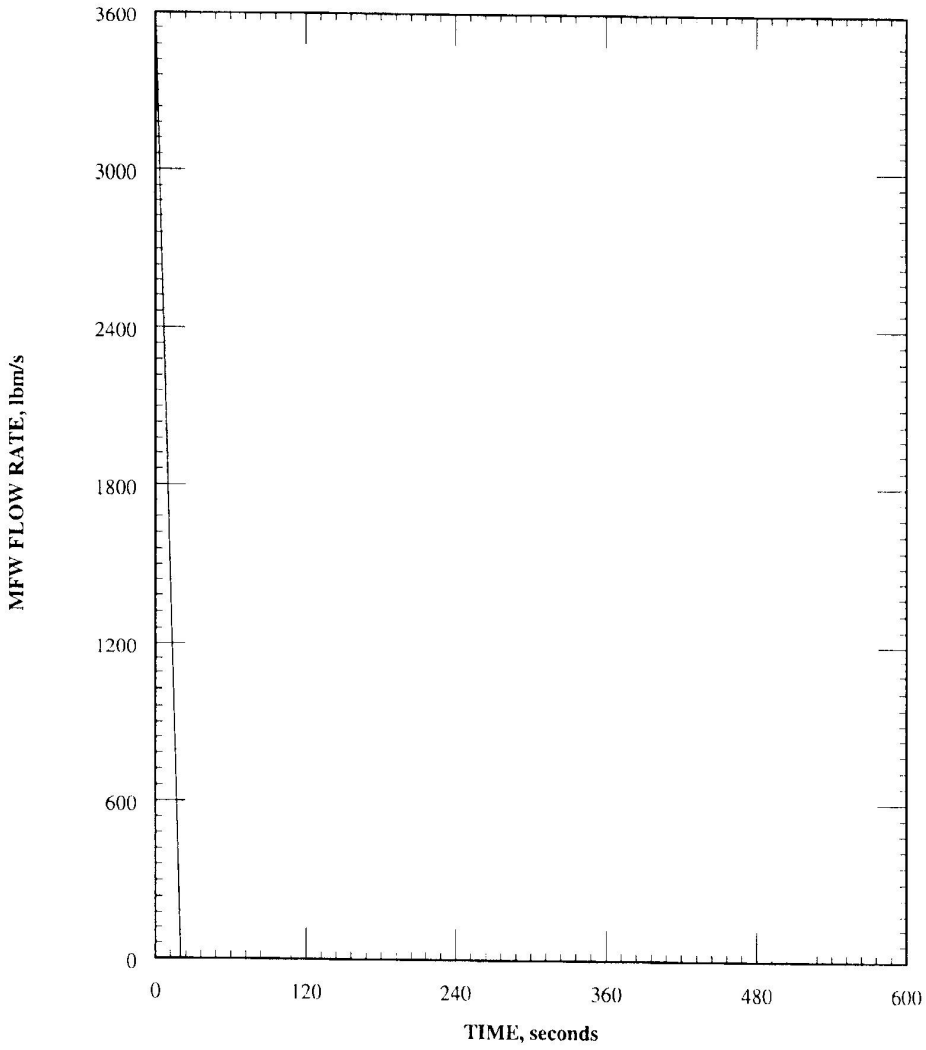


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST TRIP MSLB EVENT (SLBFPLOP CASE)
SAFETY INJECTION FLOW RATE vs. TIME

FIGURE 15.1.5-12

JUNE 2009 REVISION 15

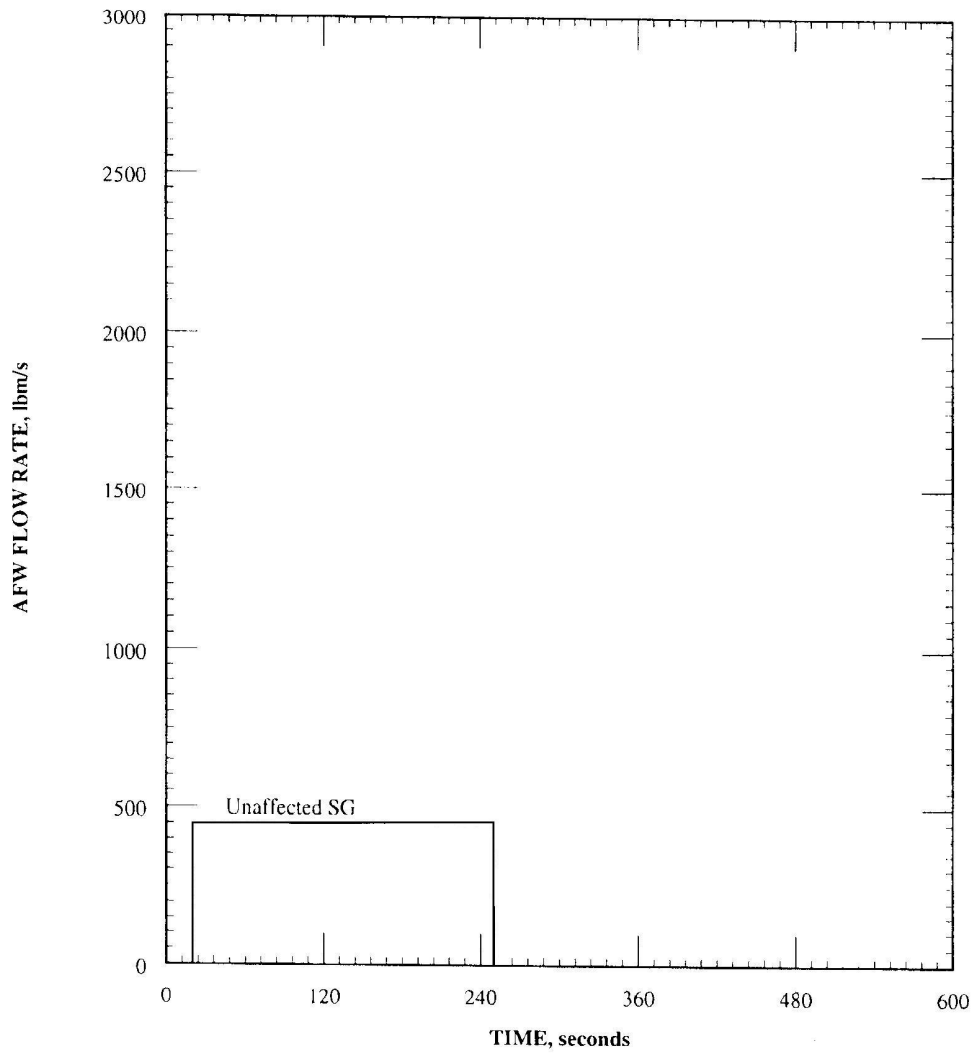


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST TRIP MSLB EVENT (SLBFPLOP CASE)
MAIN FEEDWATER FLOW RATE vs. TIME

FIGURE 15.1.5-13

DECEMBER 2010 REVISION 15A

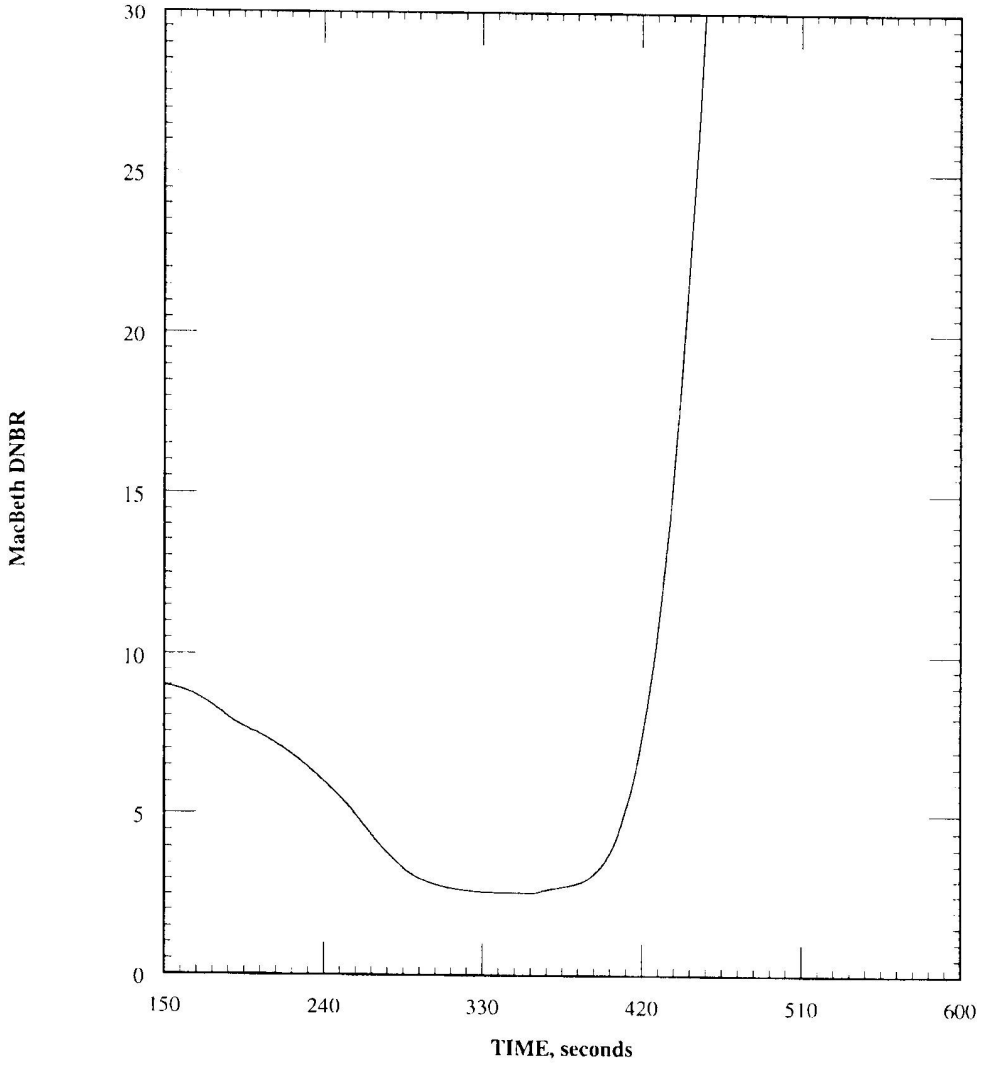


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST TRIP MSLB EVENT (SLBFPLOP CASE)
AUXILIARY FEEDWATER FLOW RATE vs. TIME

FIGURE 15.1.5-14

JUNE 2009 REVISION 15

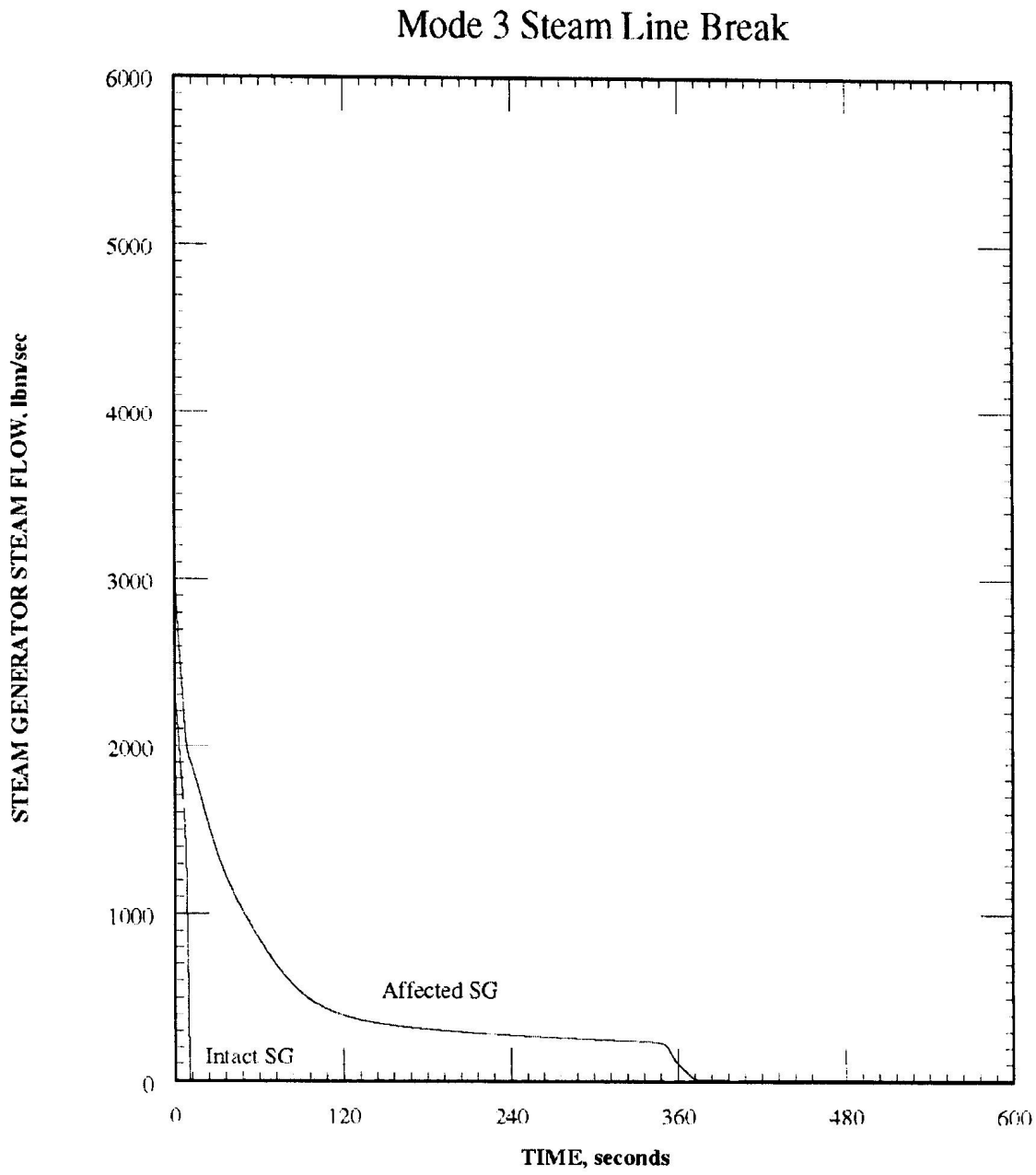


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

POST TRIP MSLB EVENT (SLBFPLOP CASE)
MACBETH DNBR vs. TIME

FIGURE 15.1.5-15

JUNE 2009 REVISION 15

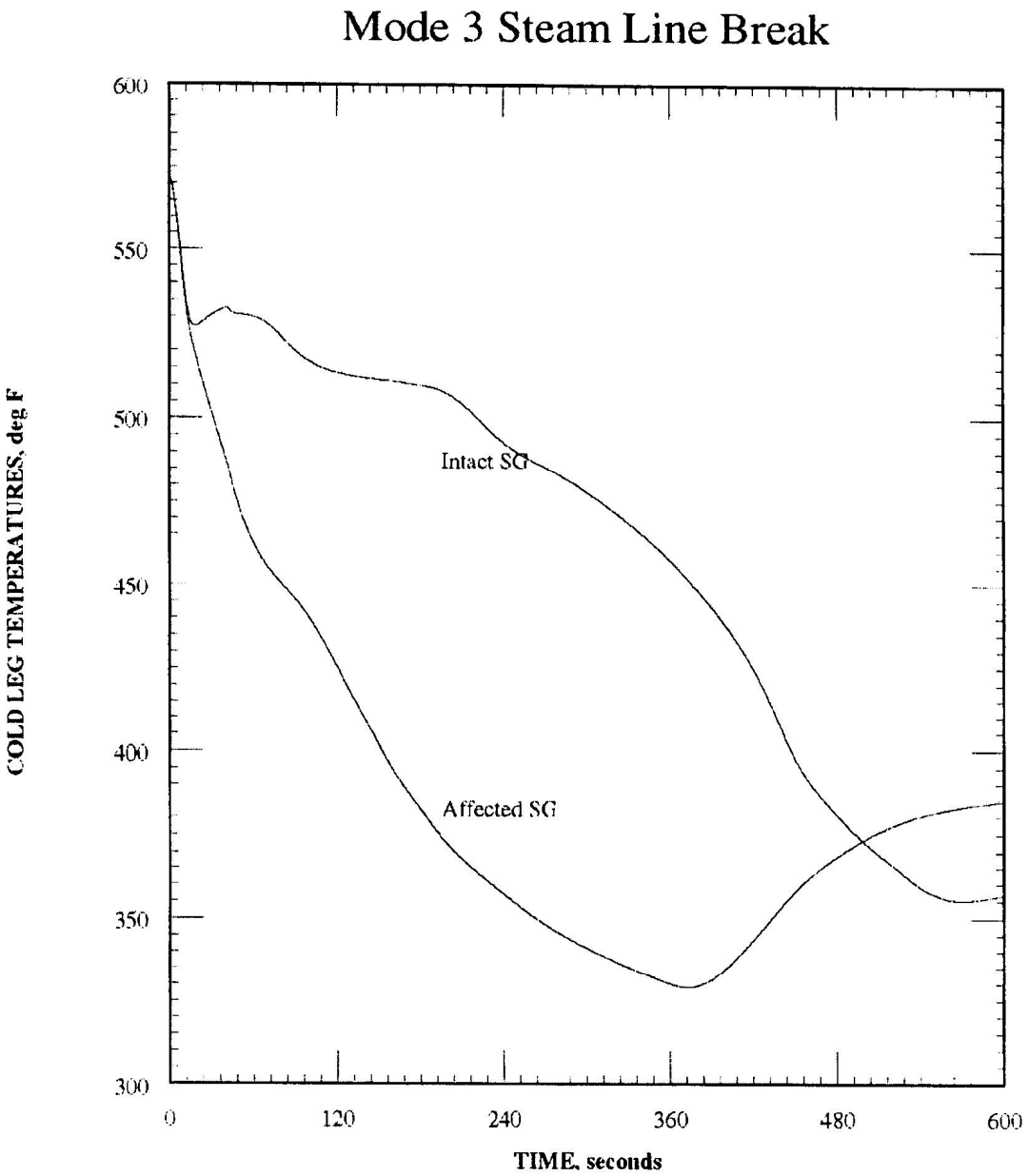


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} =572 ºF)
STEAM FLOW vs. TIME

FIGURE 15.1.6-1

JUNE 2009 REVISION 15

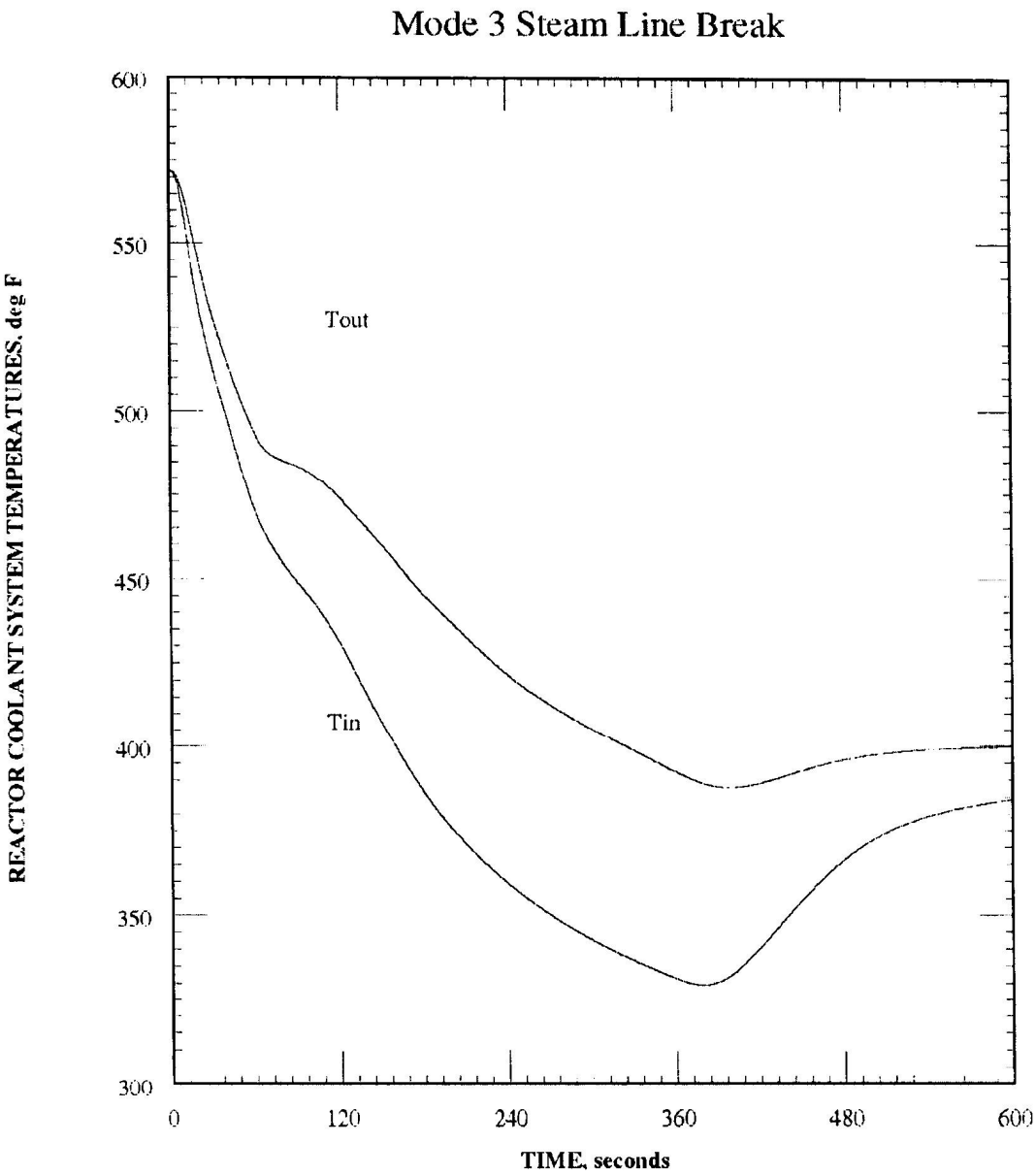


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} =572 ºF)
COLD LEG TEMPERATURES vs. TIME

FIGURE 15.1.6-2

JUNE 2009 REVISION 15

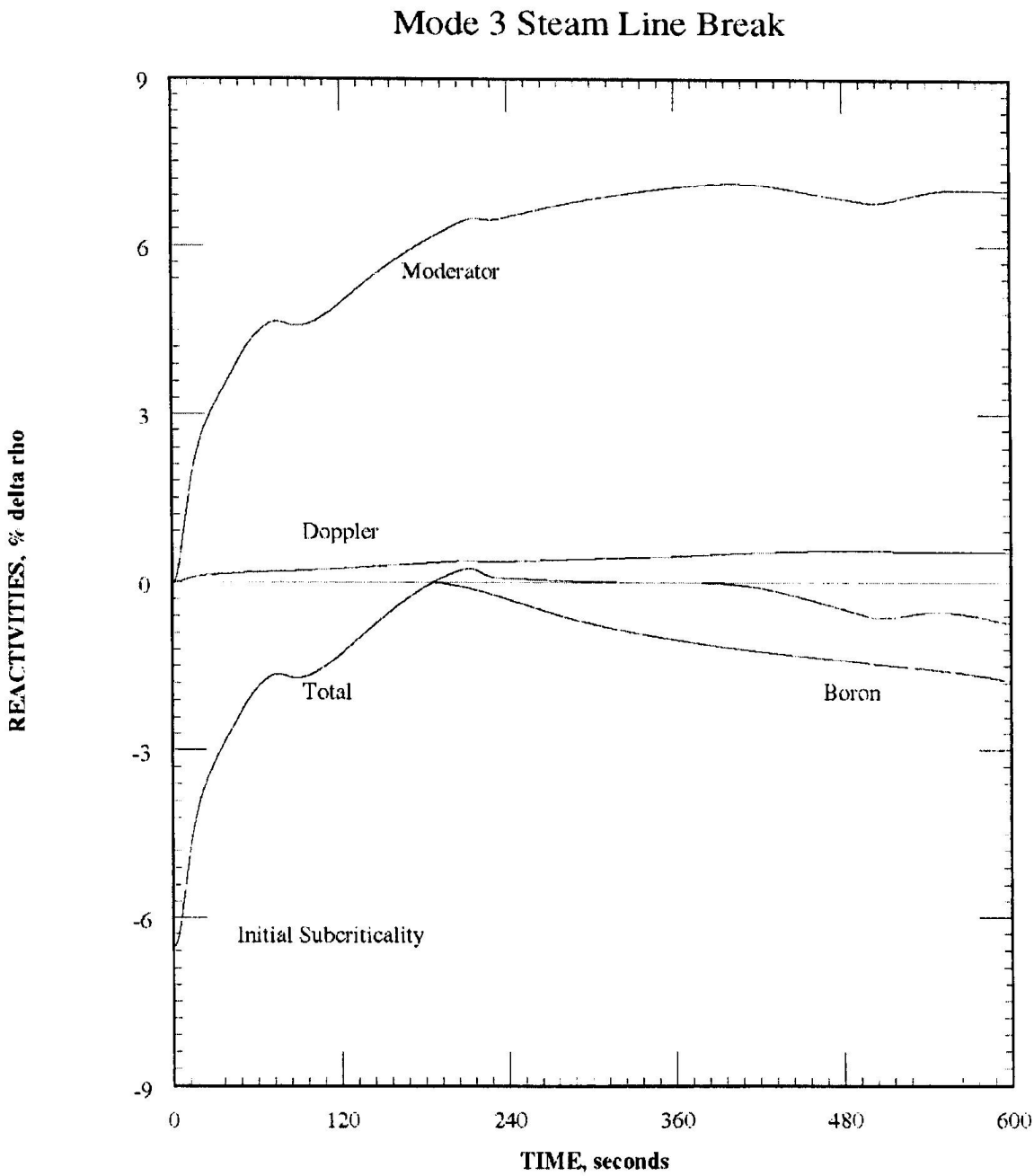


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 ºF) RCS TEMPERATURE vs. TIME

FIGURE 15.1.6-3

JUNE 2009 REVISION 15

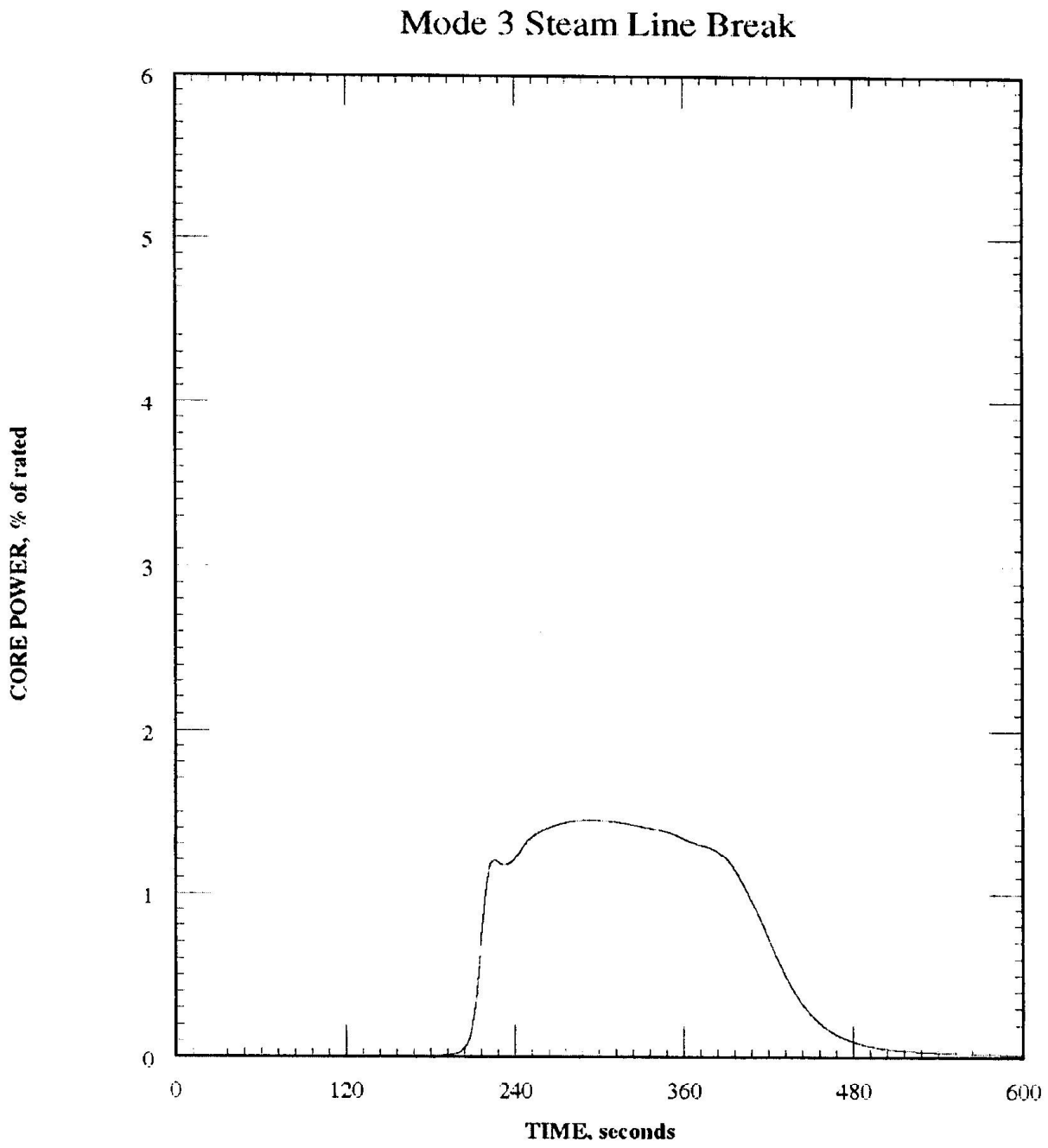


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 °F) REACTIVITIES vs. TIME

FIGURE 15.1.6-4

JUNE 2009 REVISION 15

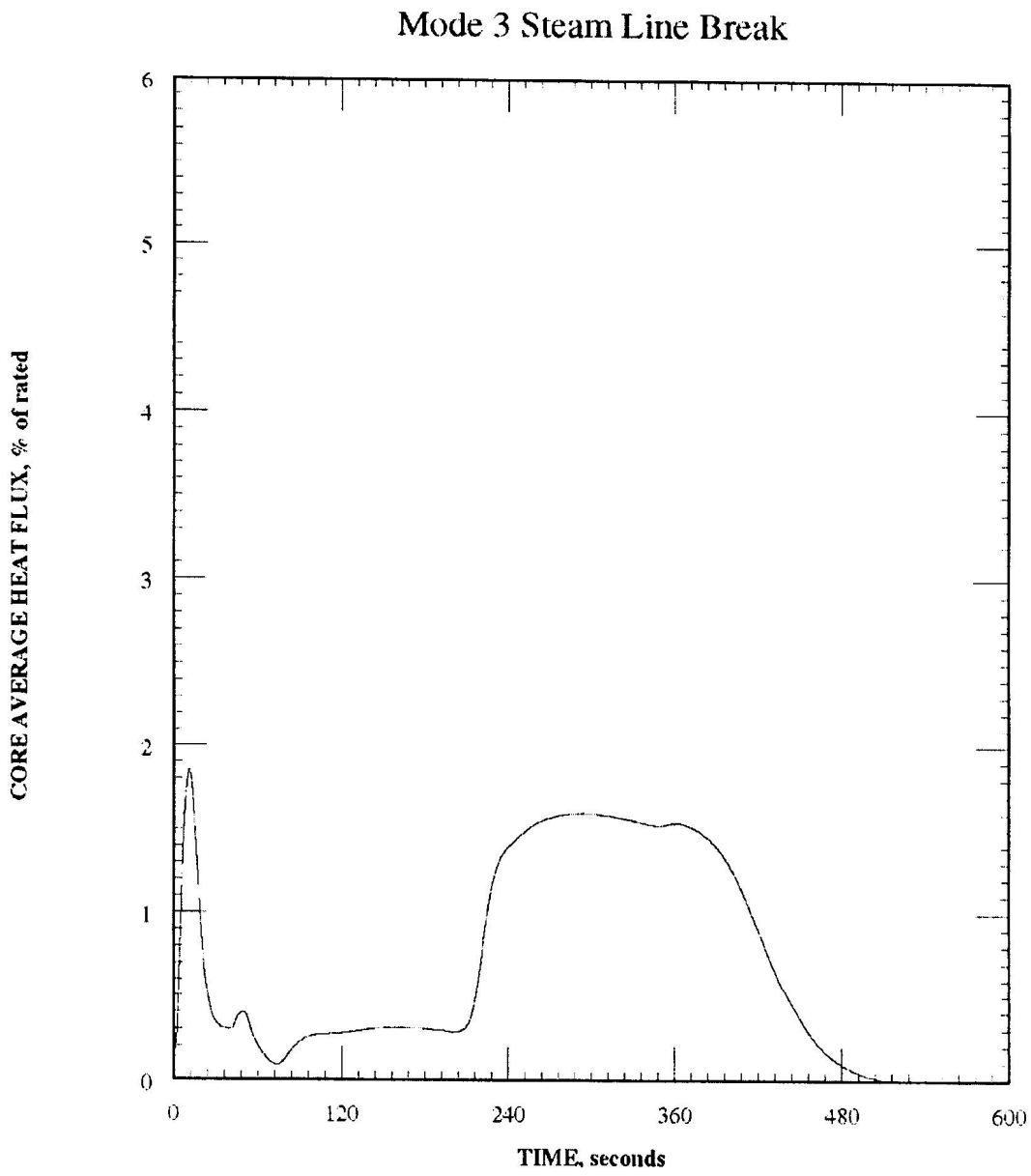


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 ºF) CORE POWER FRACTION vs. TIME

FIGURE 15.1.6-5

JUNE 2009 REVISION 15

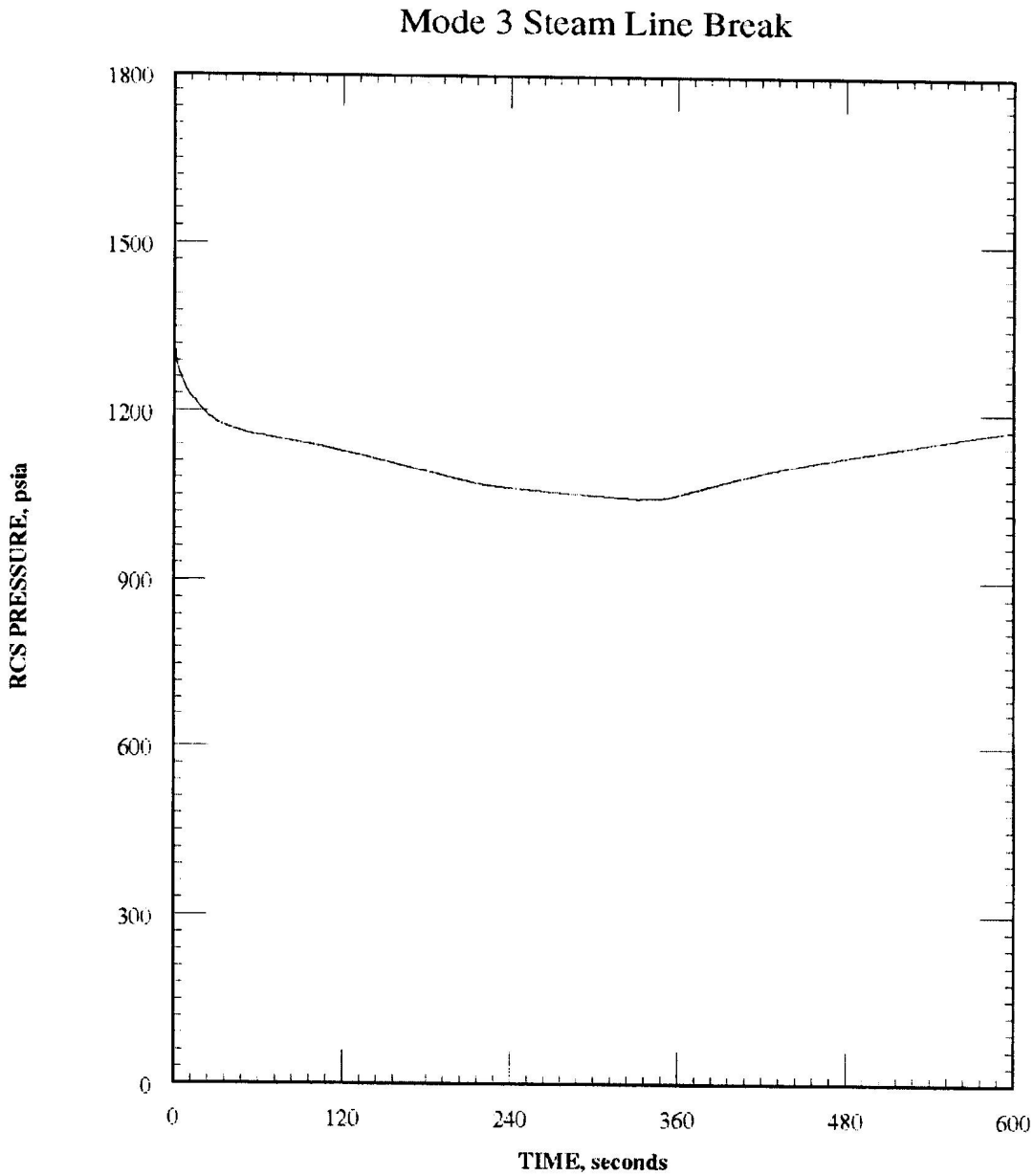


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 ºF) HEAT FLUX FRACTION vs. TIME

FIGURE 15.1.6-6

JUNE 2009 REVISION 15

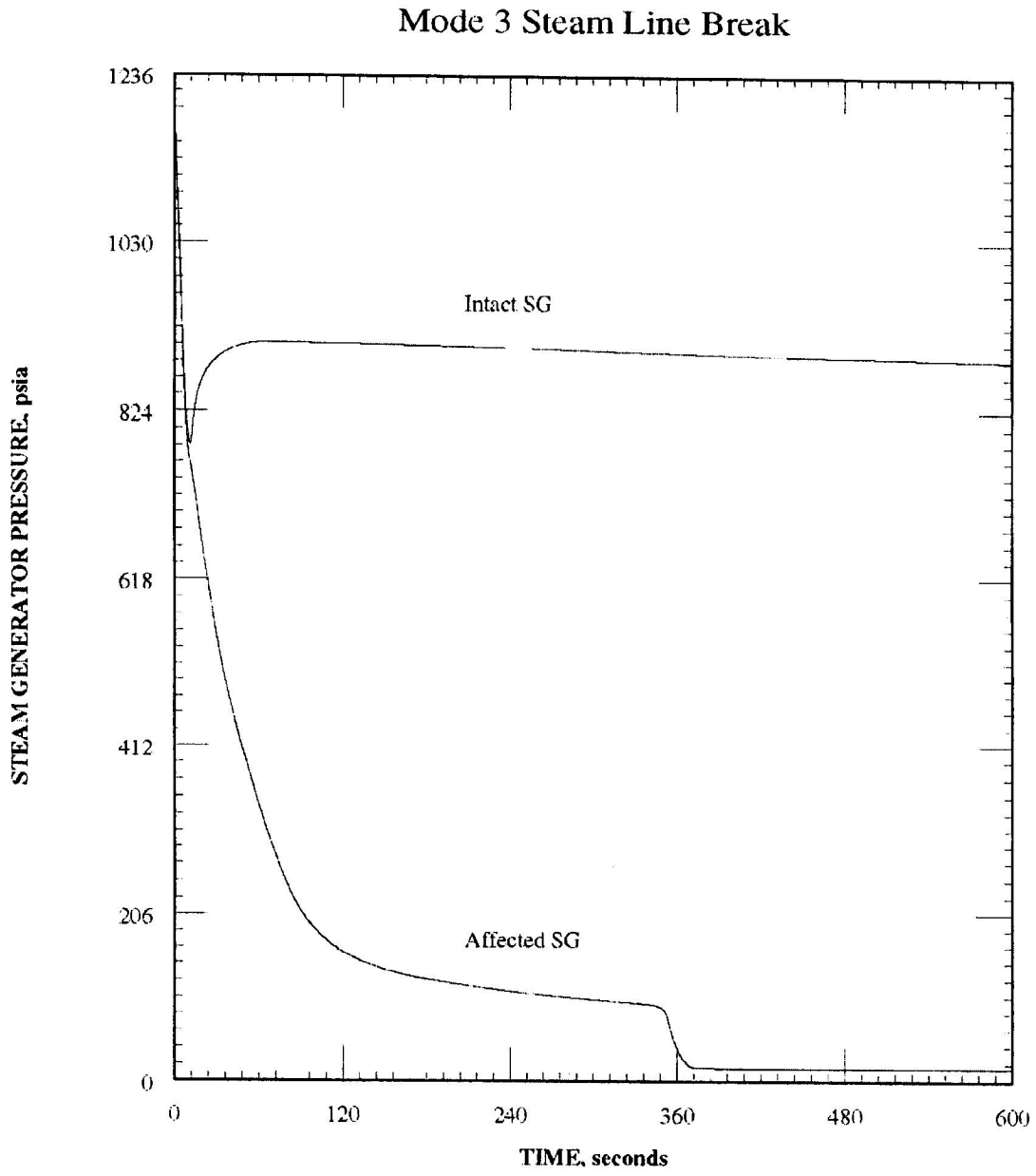


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 ºF) RCS PRESSURE vs. TIME

FIGURE 15.1.6-7

JUNE 2009 REVISION 15

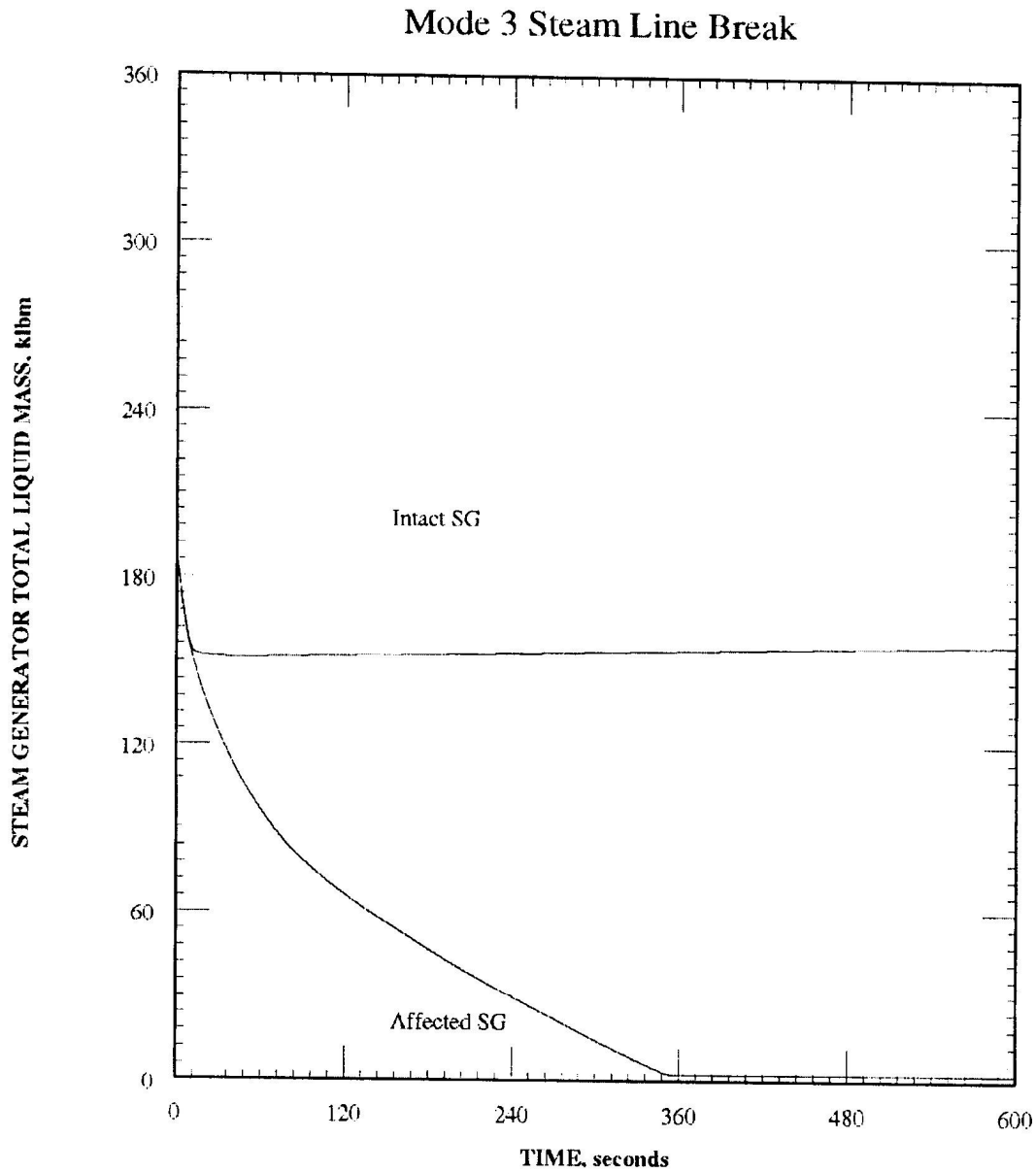


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 ºF) STEAM GENERATOR PRESSURE
vs. TIME

FIGURE 15.1.6-8

JUNE 2009 REVISION 15

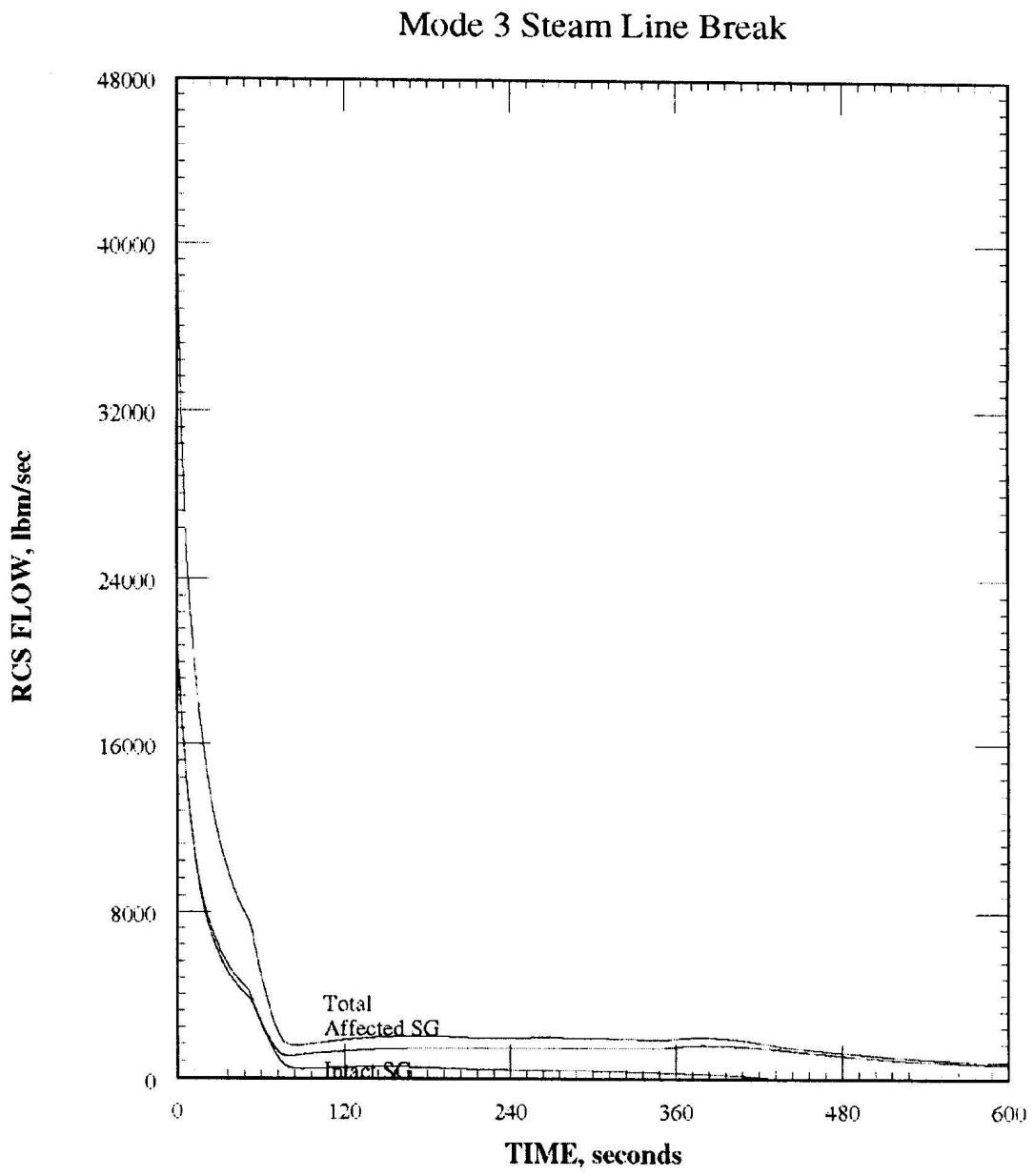


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 °F) STEAM GENERATOR LIQUID
MASS vs. TIME

FIGURE 15.1.6-9

JUNE 2009 REVISION 15

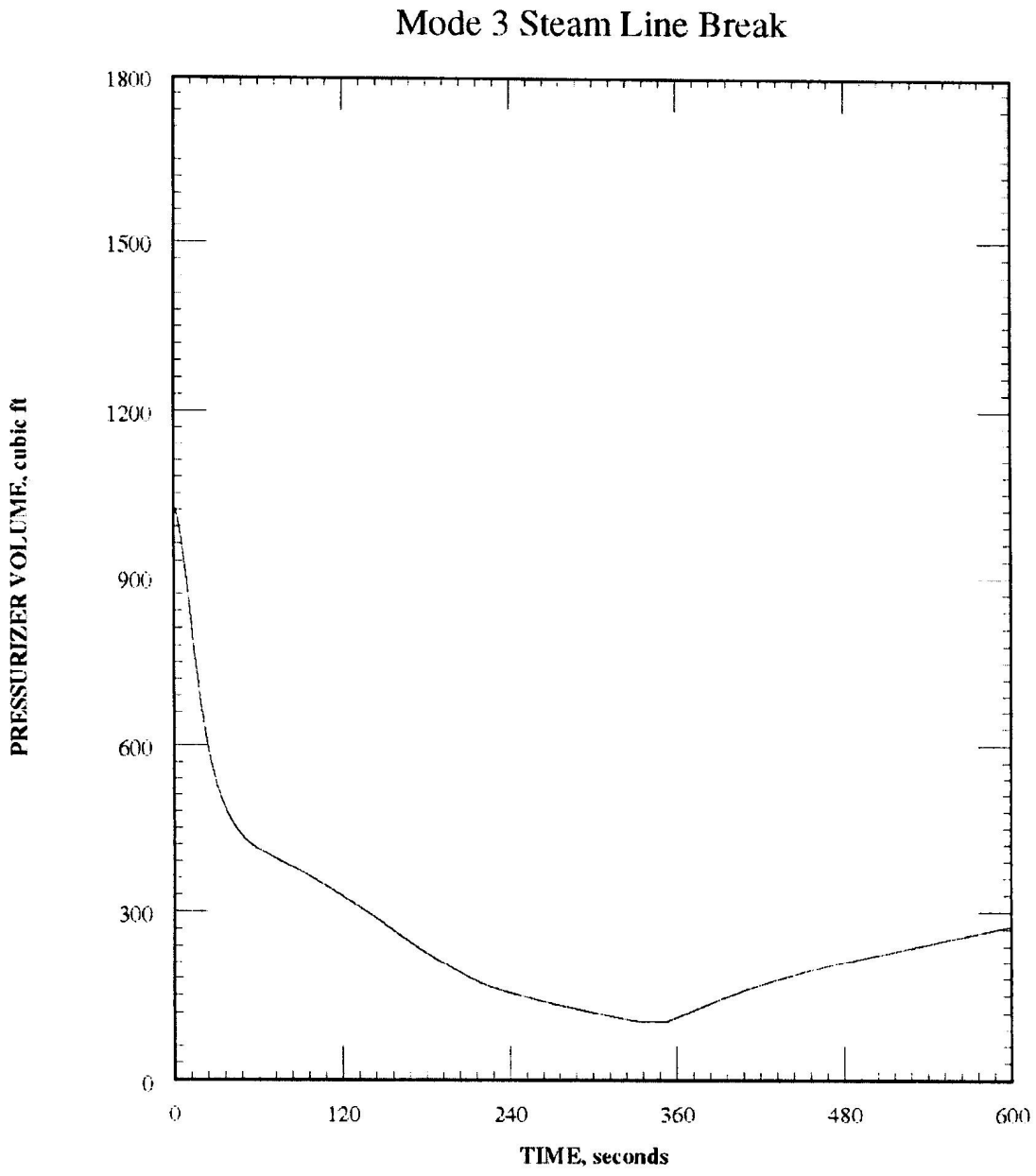


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 ºF) RCS FLOW RATE vs. TIME

FIGURE 15.1.6-10

JUNE 2009 REVISION 15

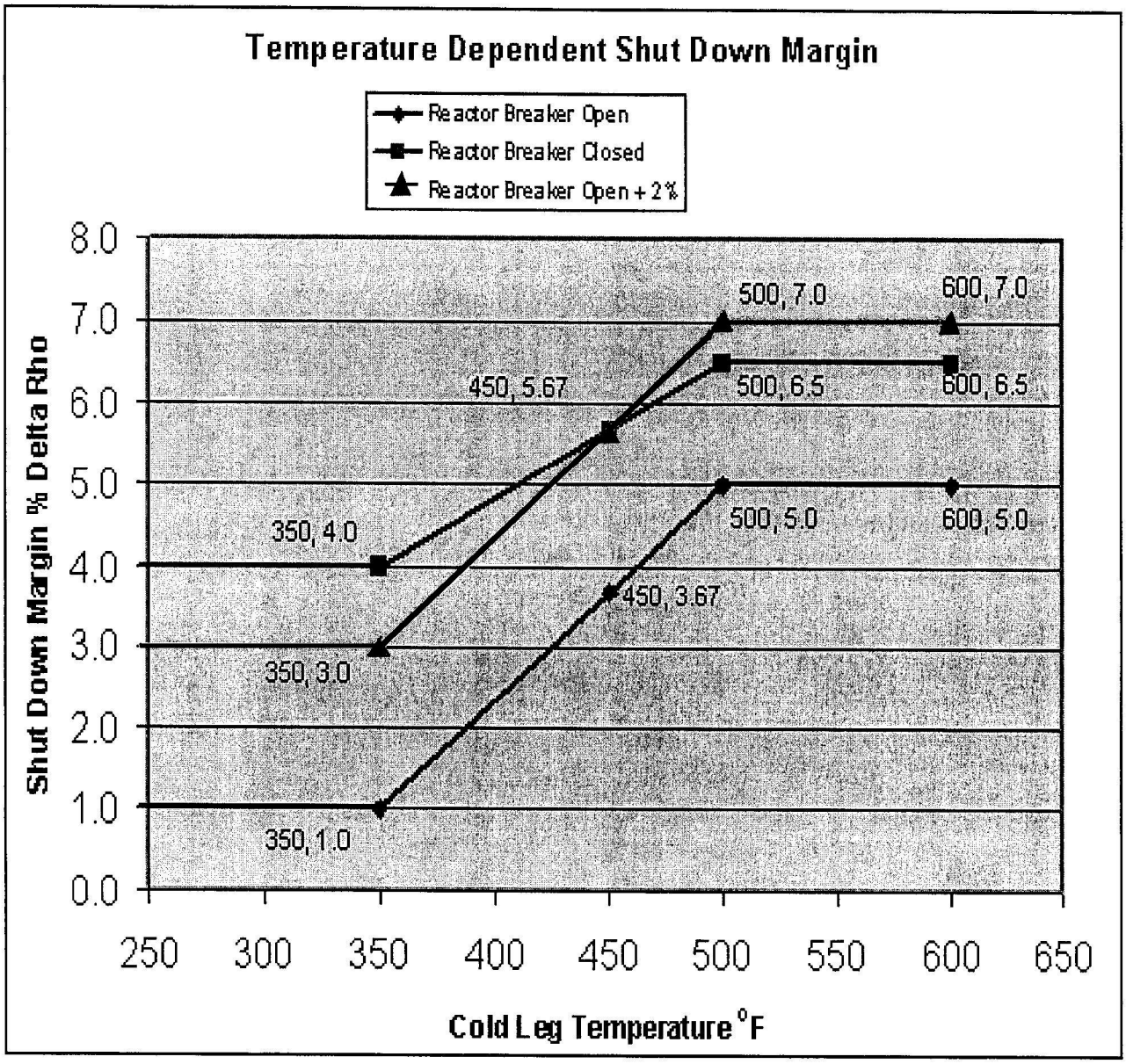


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB WITH LOP EVENT
(T_{COLD} = 572 ºF) PRESSURIZER LIQUID
VOLUME vs. TIME

FIGURE 15.1.6-11

JUNE 2009 REVISION 15



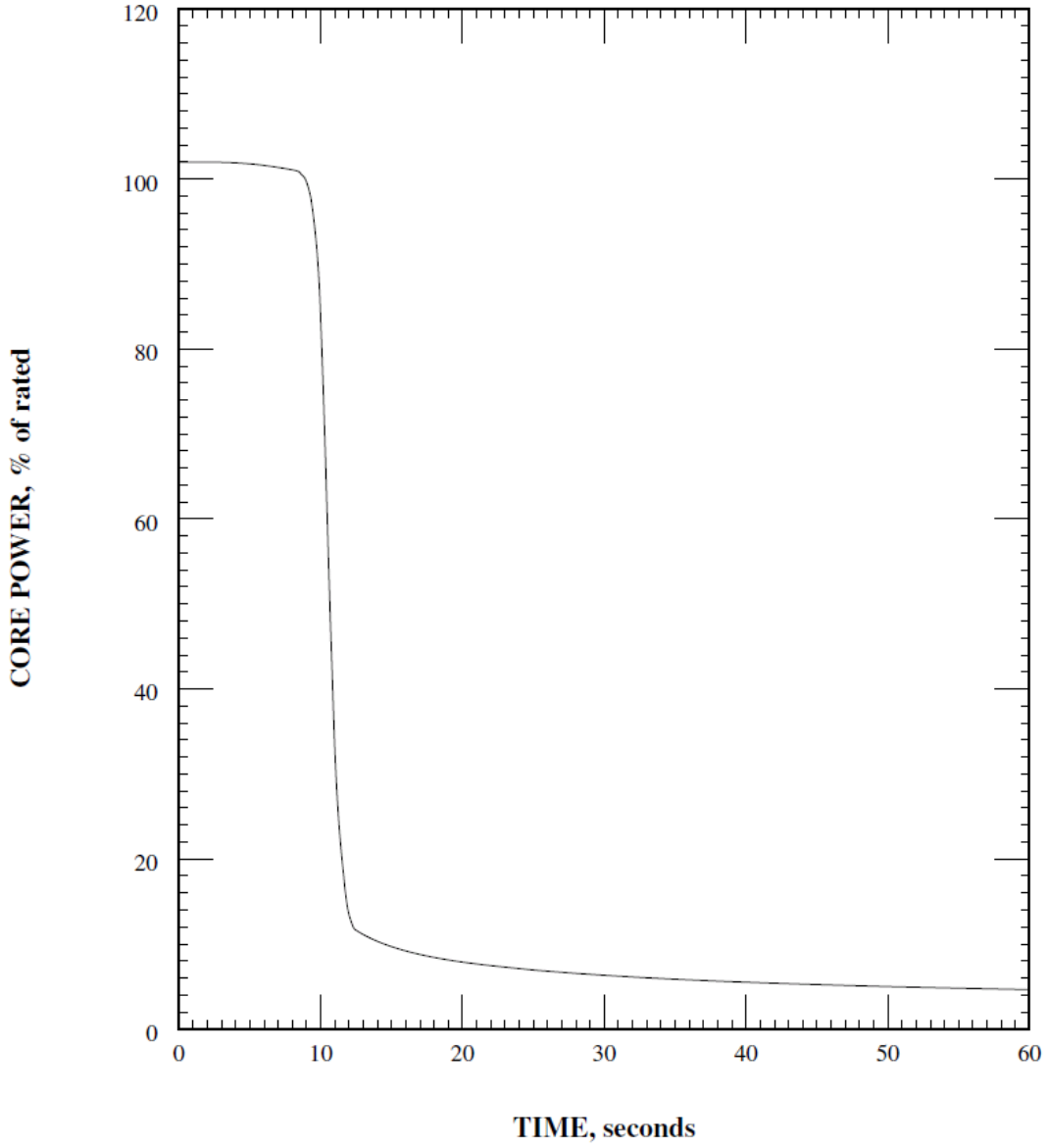
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUBCRITICAL MSLB EVENTS
SHUTDOWN MARGIN CURVES vs. TIME

FIGURE 15.1.6-12

JUNE 2009 REVISION 15

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



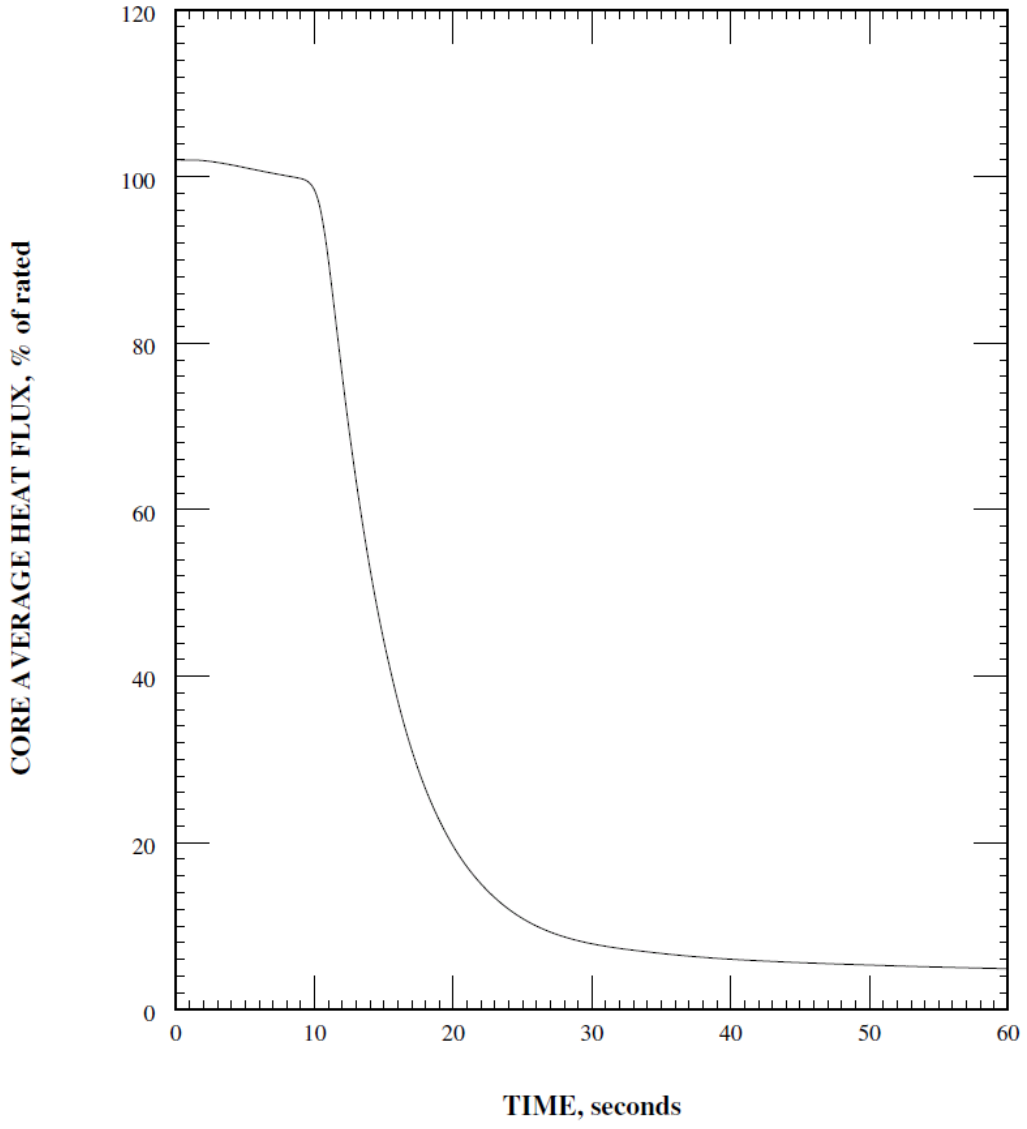
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

CORE POWER vs. TIME

FIGURE 15.2.3-1

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



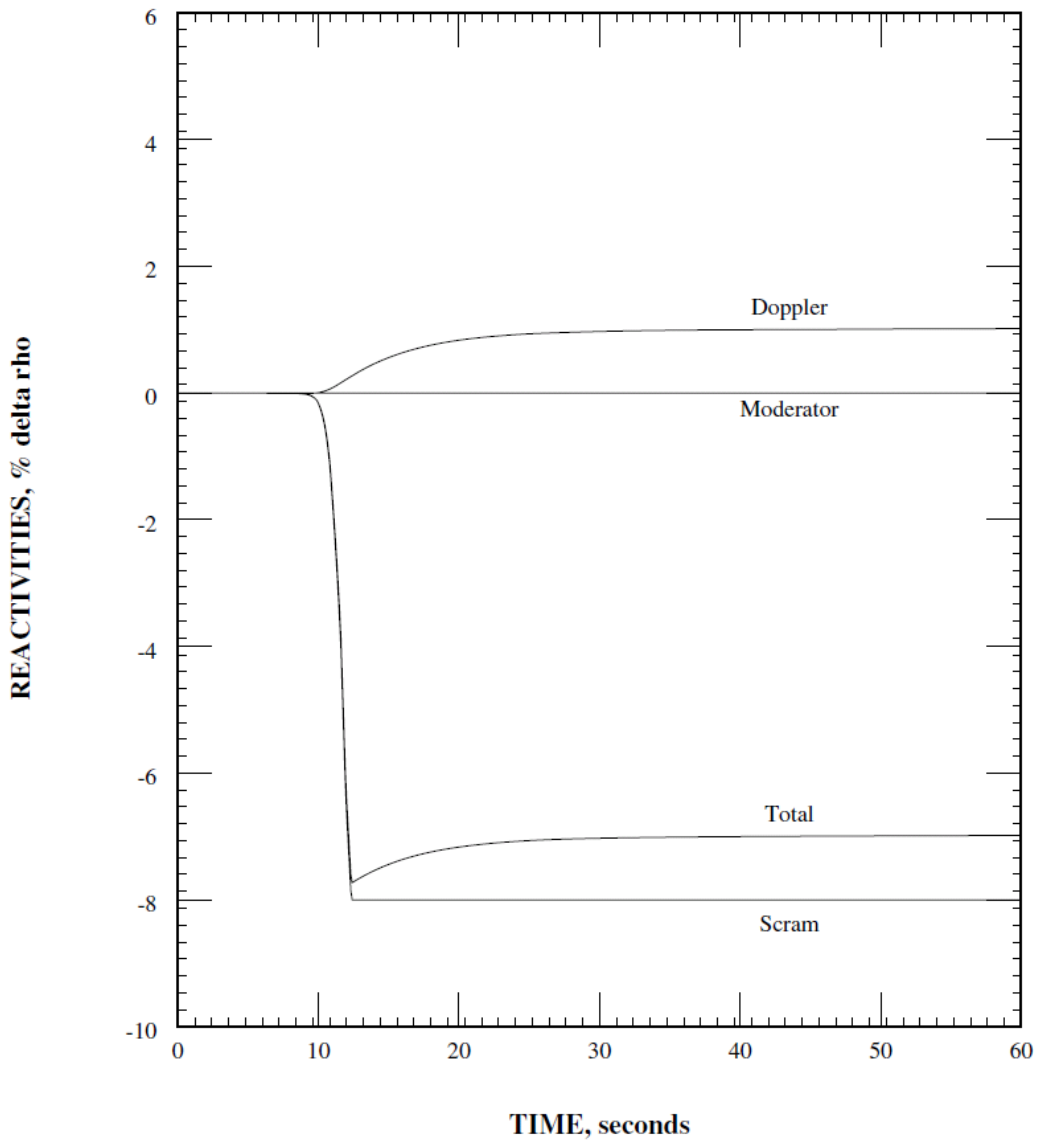
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

CORE HEAT FLUX vs. TIME

FIGURE 15.2.3-2

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



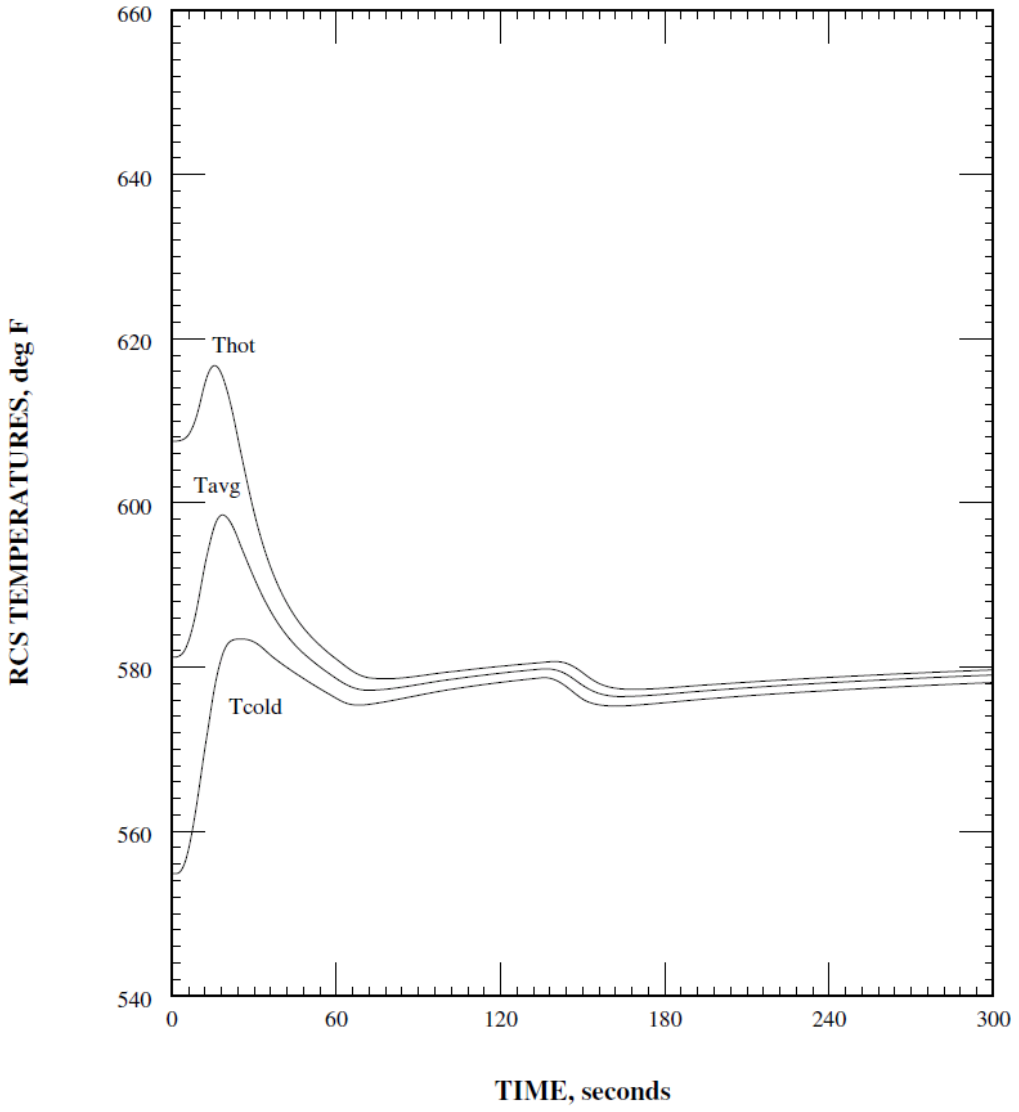
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

CORE REACTIVITIES vs. TIME

FIGURE 15.2.3-3

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



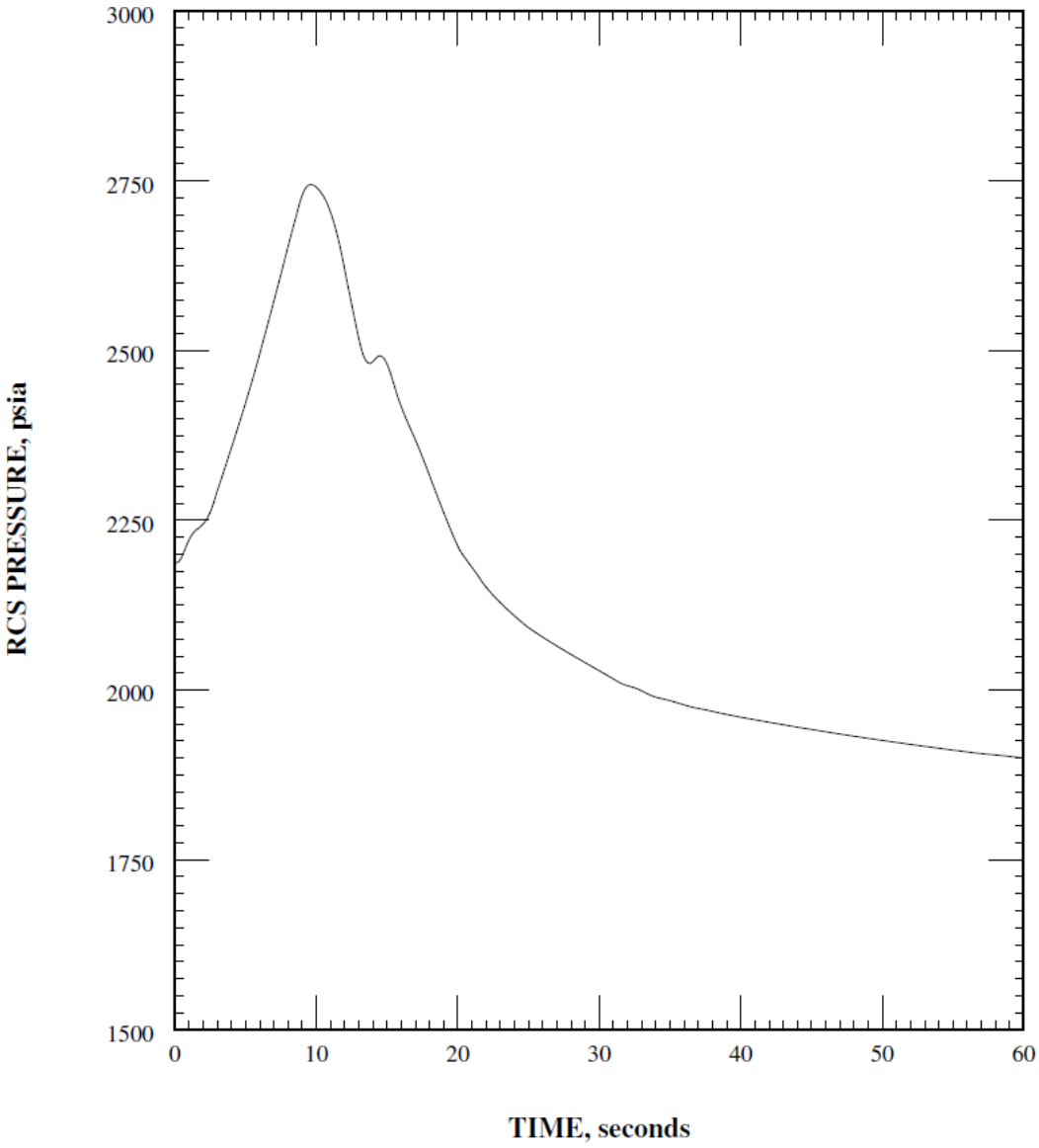
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

RCS TEMPERATURES vs. TIME

FIGURE 15.2.3-4

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



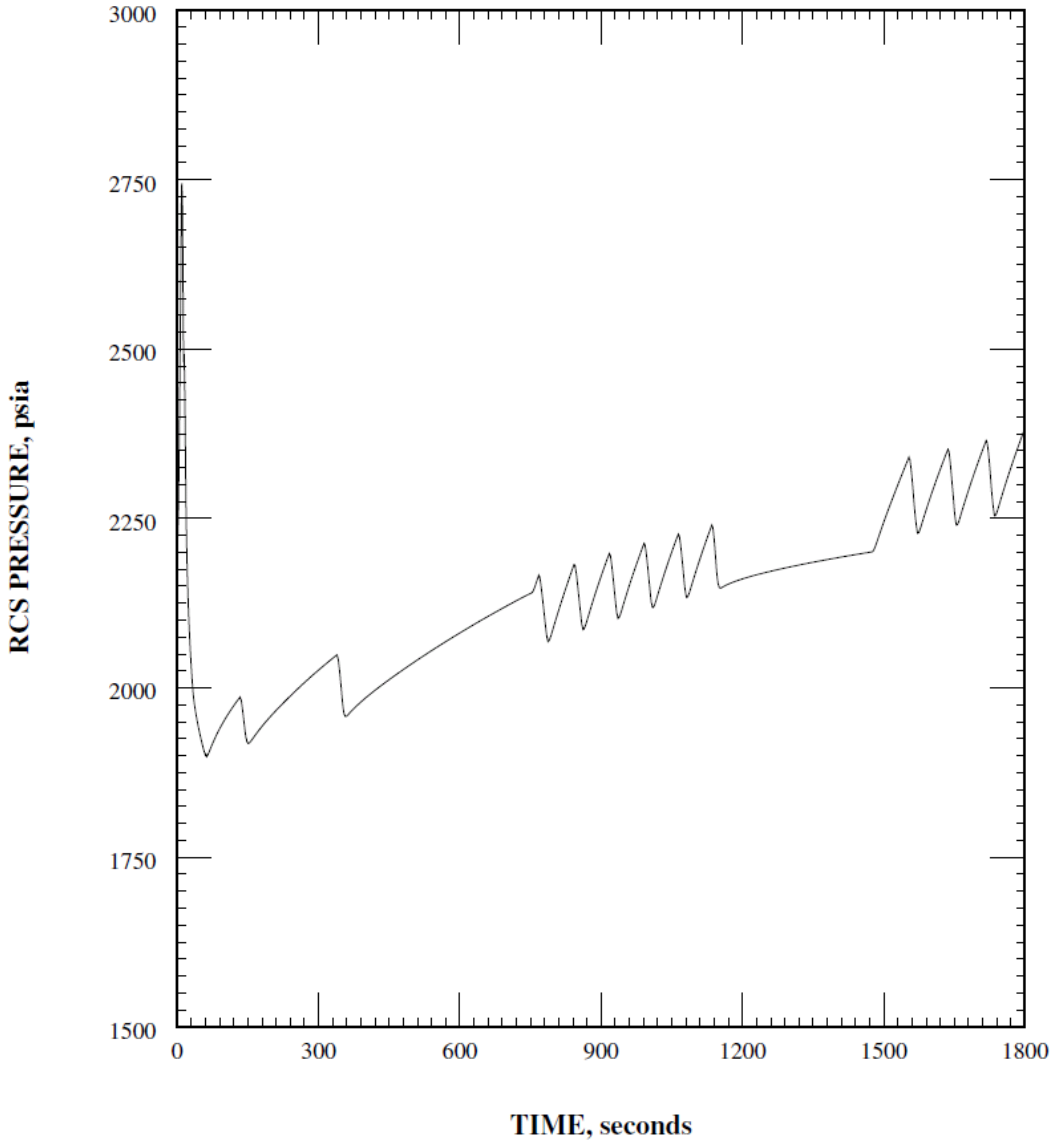
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

RCS PRESSURE vs. TIME

FIGURE 15.2.3-5

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE

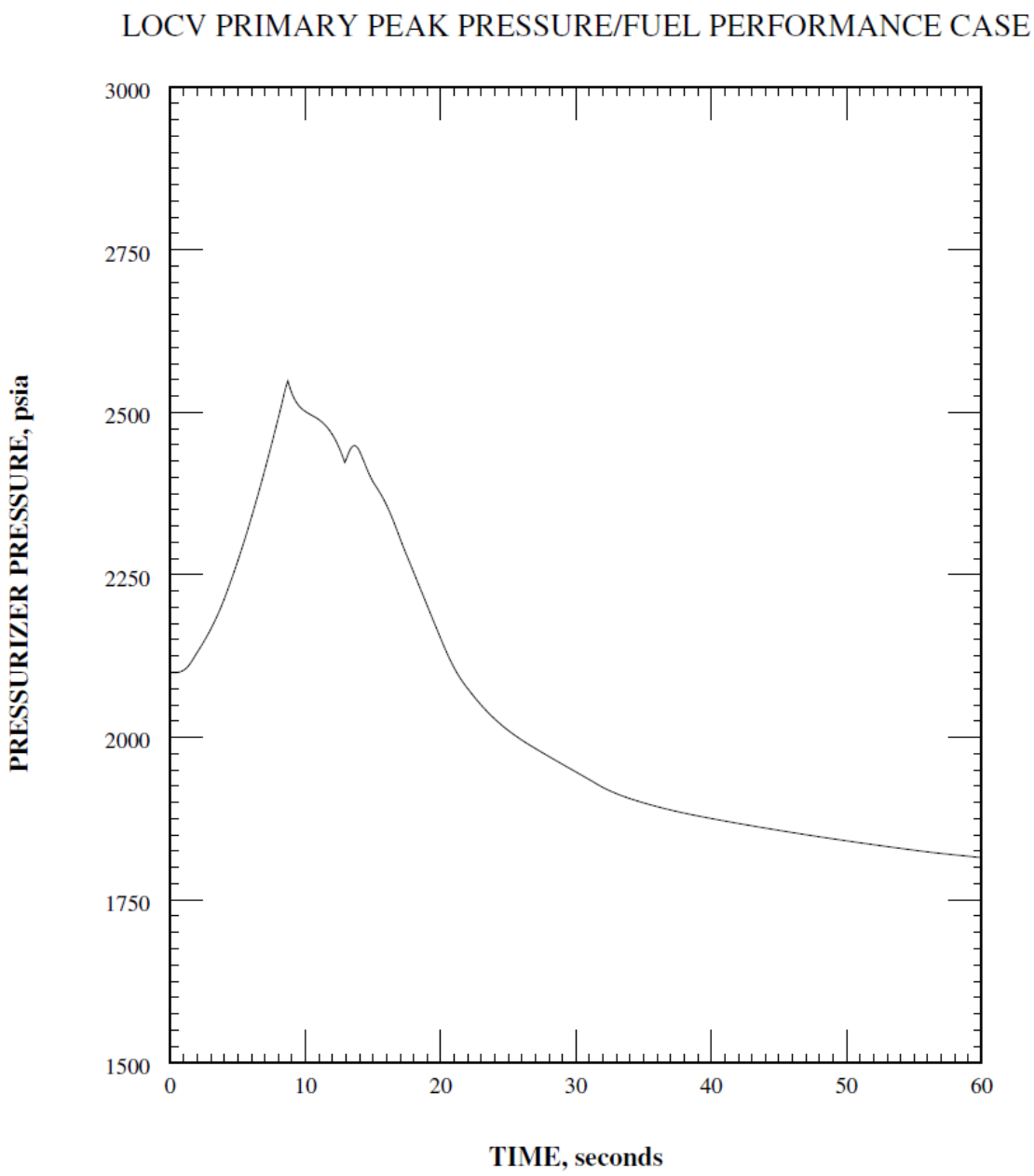


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

RCS PRESSURE vs. TIME

FIGURE 15.2.3-6

JUNE 2011 REVISION 16



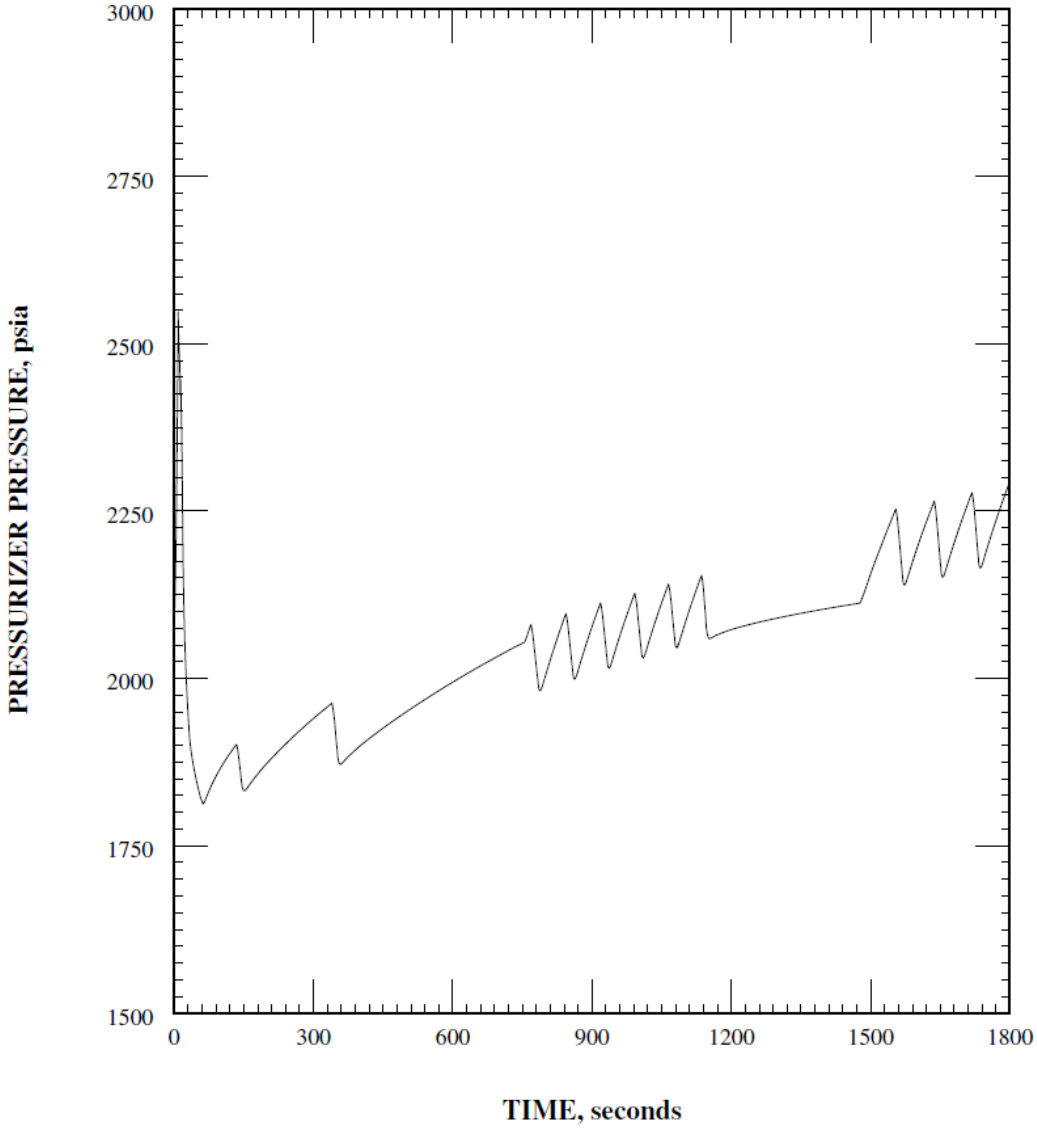
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

PRESSURIZER PRESSURE vs. TIME

FIGURE 15.2.3-7

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



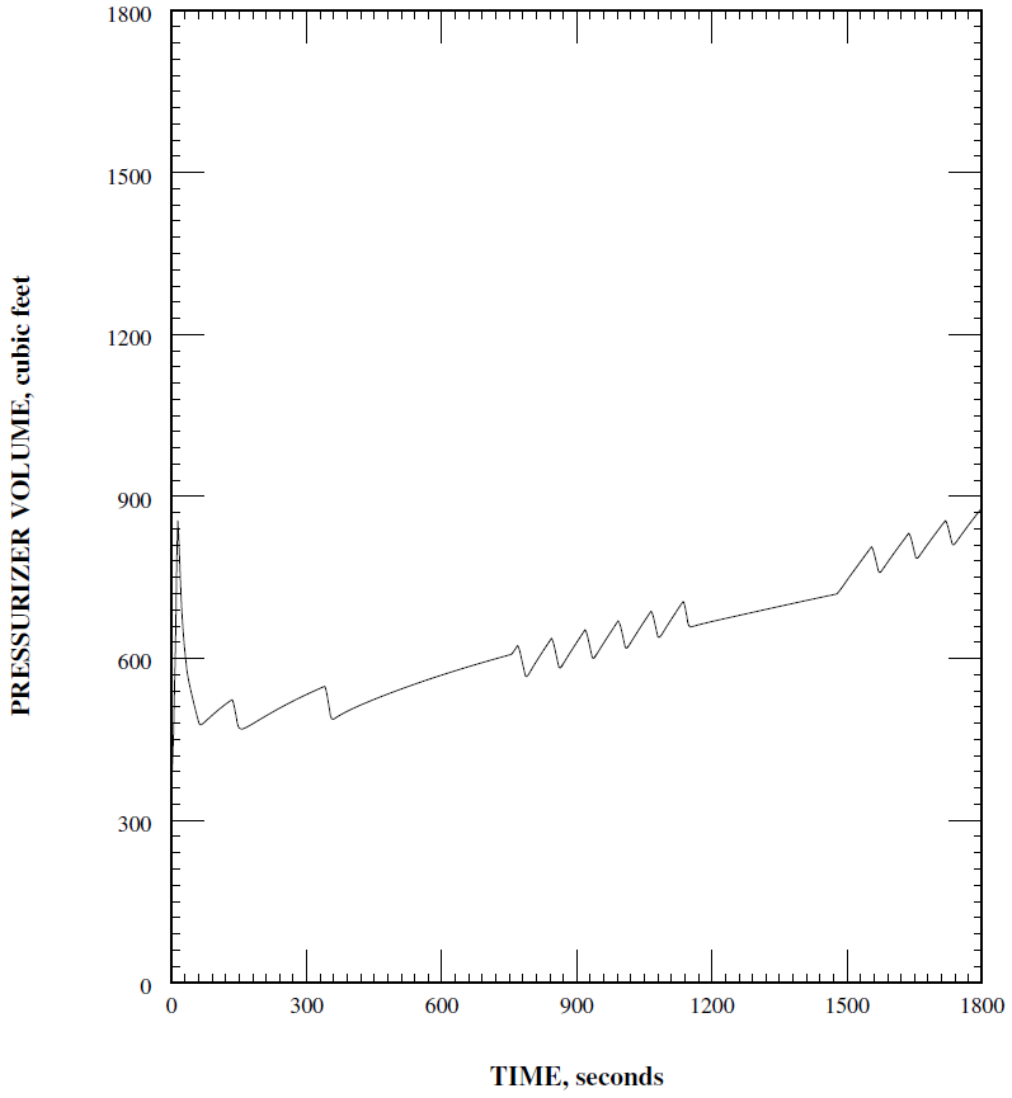
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

PRESSURIZER PRESSURE vs. TIME

FIGURE 15.2.3-8

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



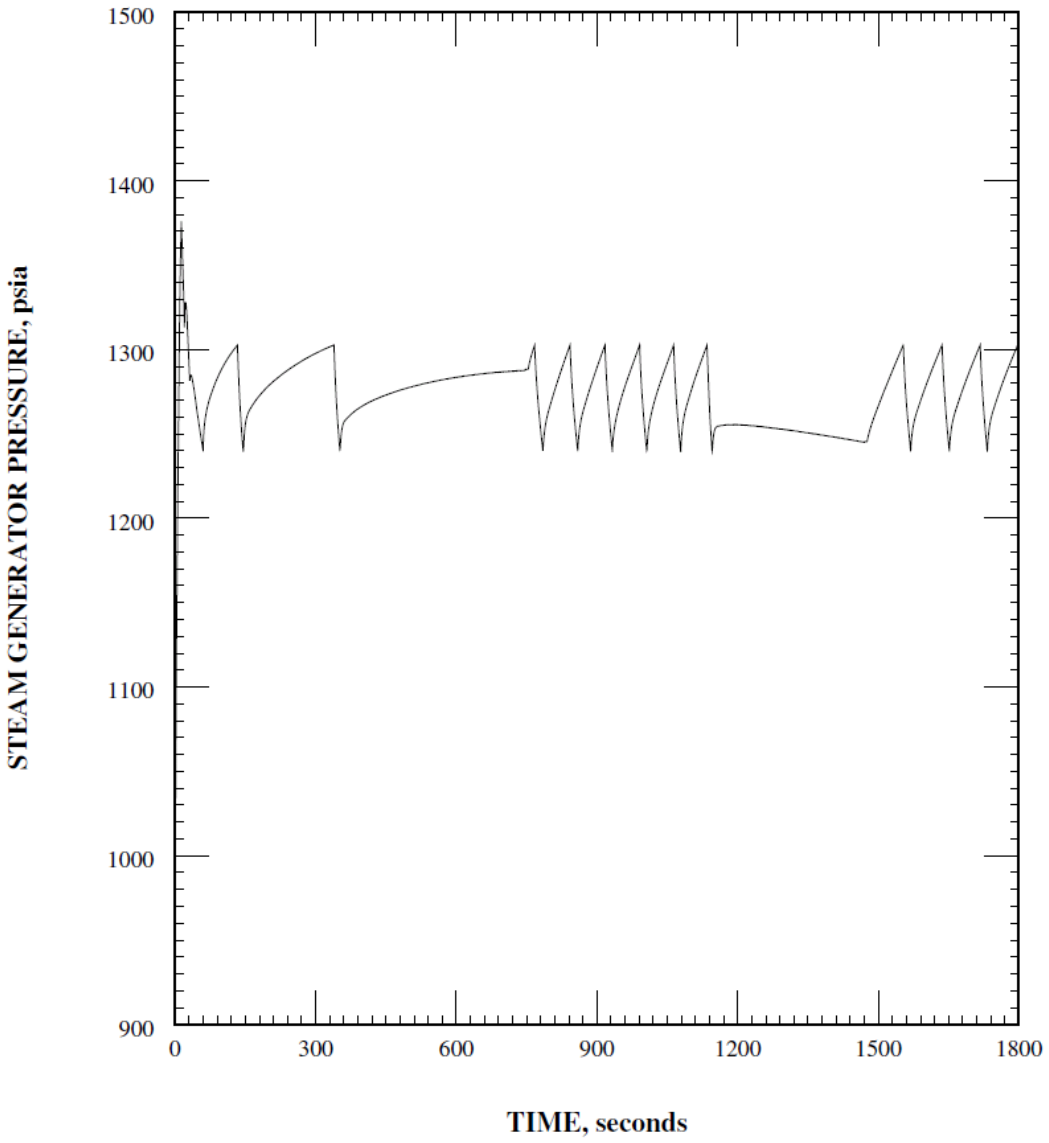
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

PRESSURIZER WATER VOLUME vs. TIME

FIGURE 15.2.3-9

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



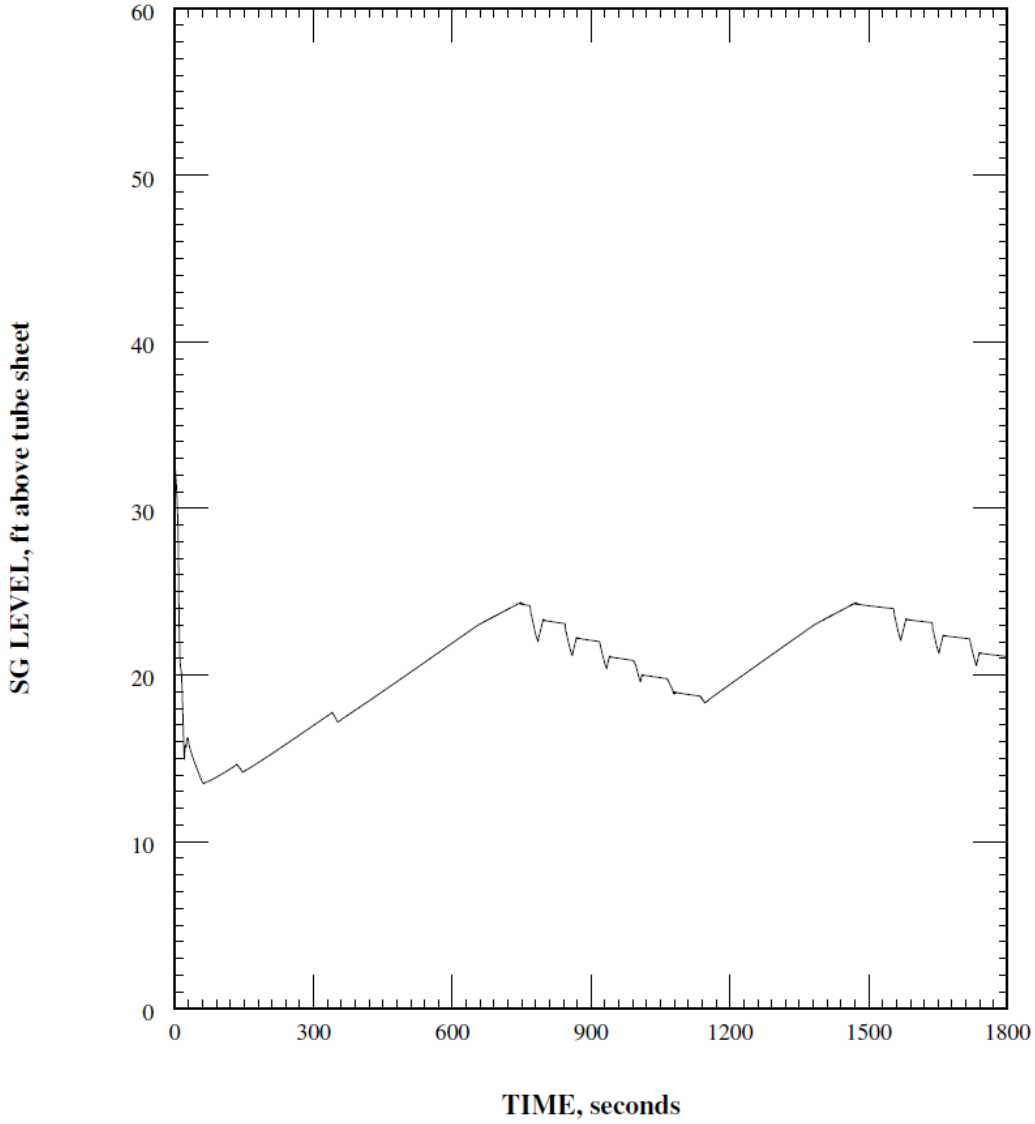
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG PRESSURE vs. TIME

FIGURE 15.2.3-10

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE



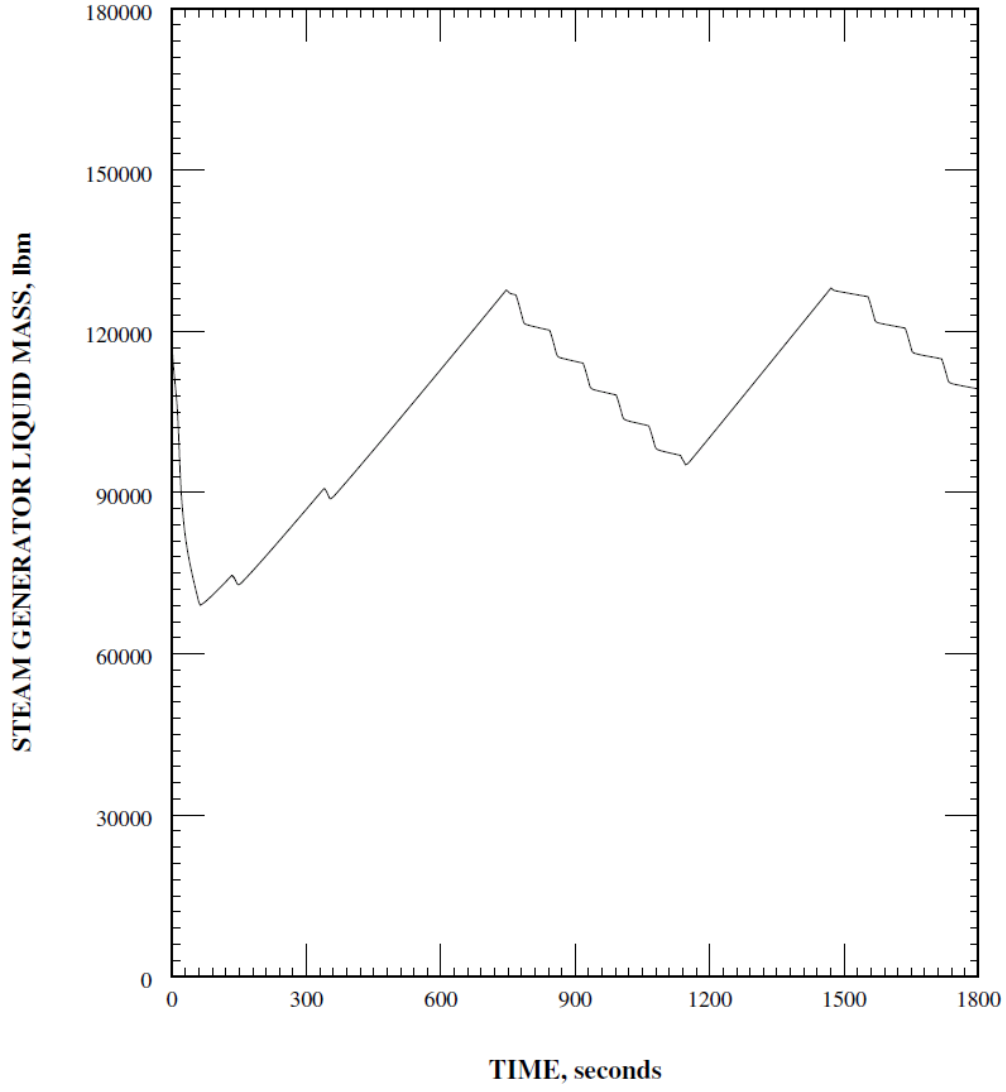
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG LEVEL vs. TIME

FIGURE 15.2.3-11

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE

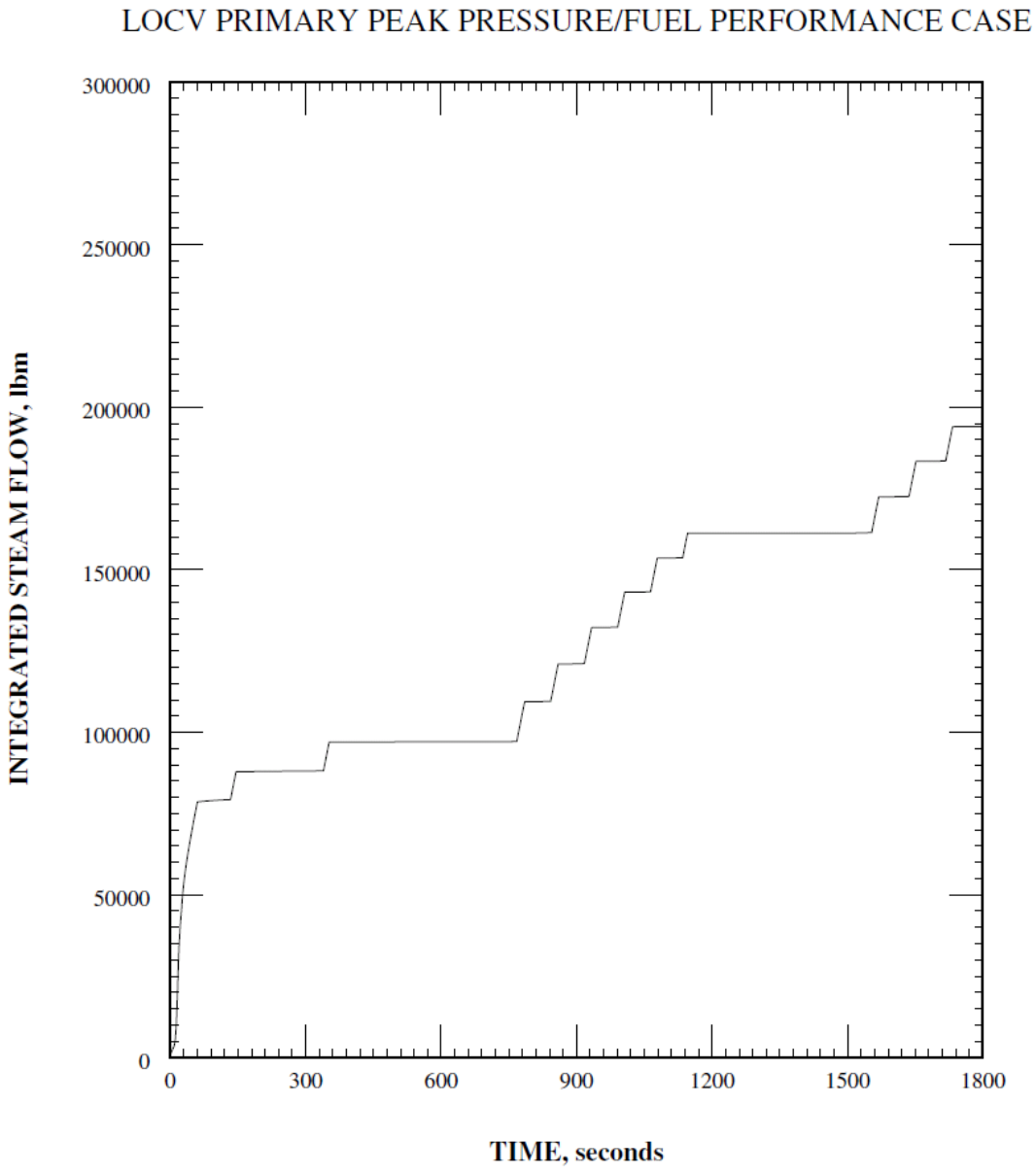


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG LIQUID INVENTORY vs. TIME

FIGURE 15.2.3-12

JUNE 2011 REVISION 16



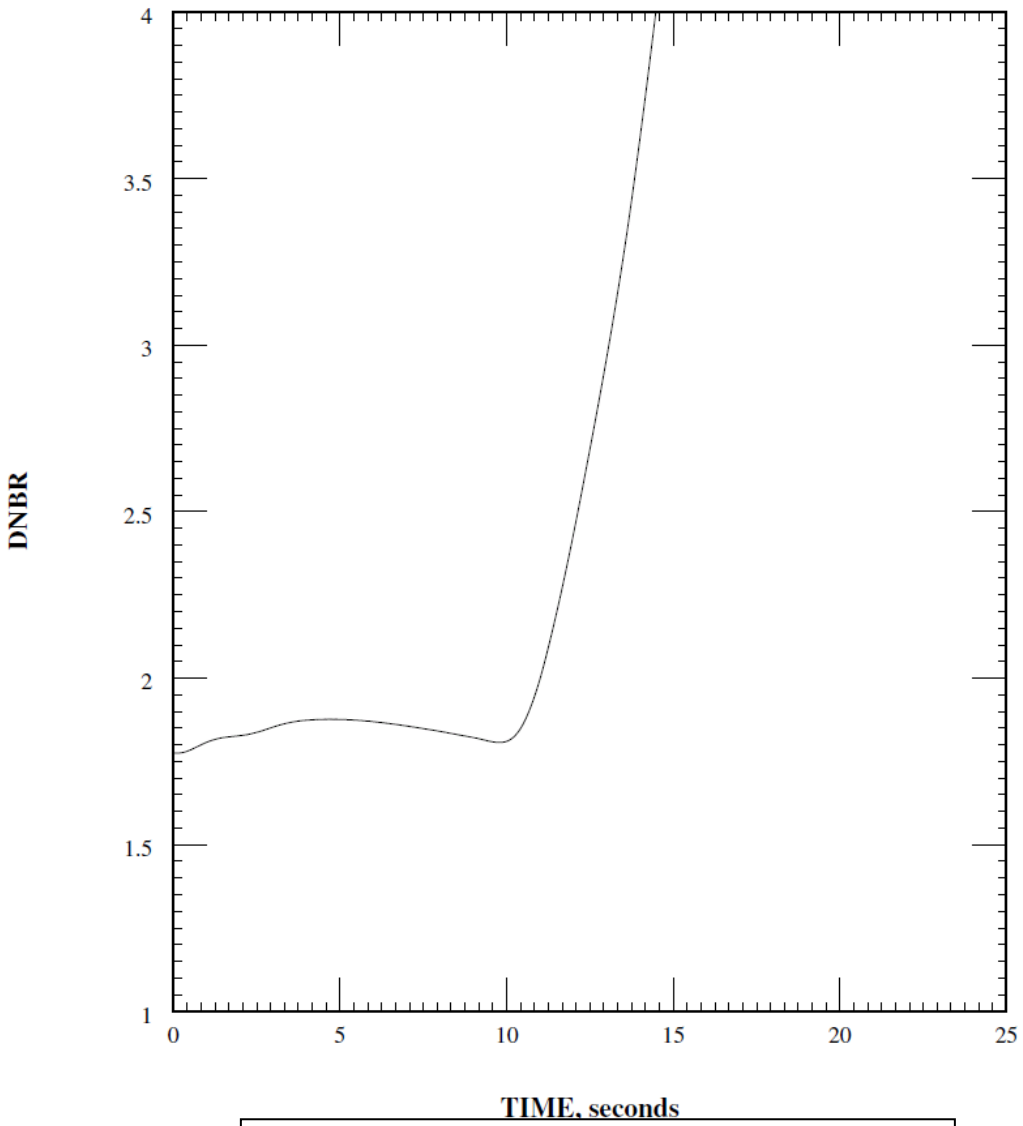
PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

INTEGRATED STEAM FLOW vs. TIME

FIGURE 15.2.3-13

JUNE 2011 REVISION 16

LOCV PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE

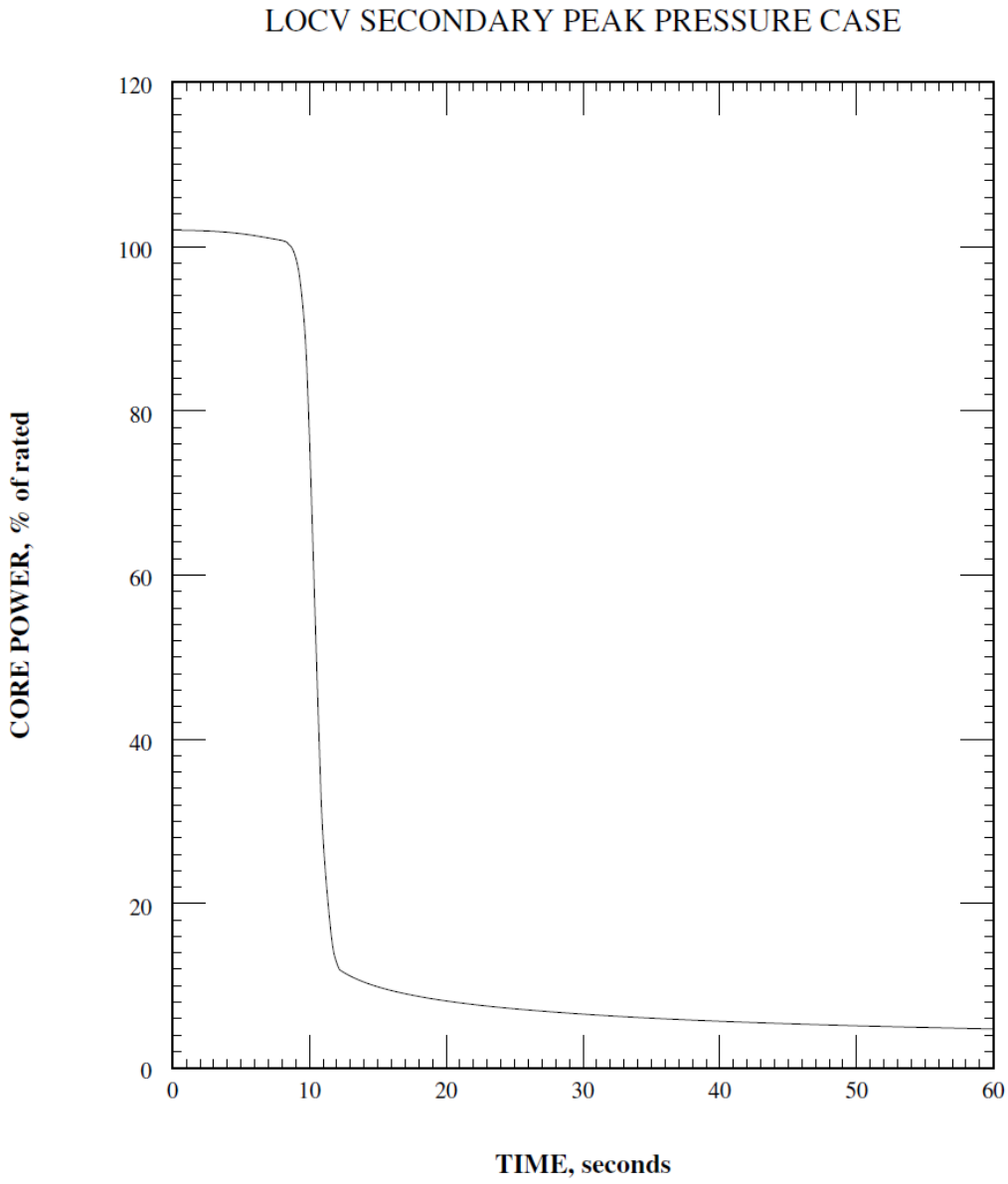


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

DNBR vs. TIME

FIGURE 15.2.3-14

JUNE 2011 REVISION 16

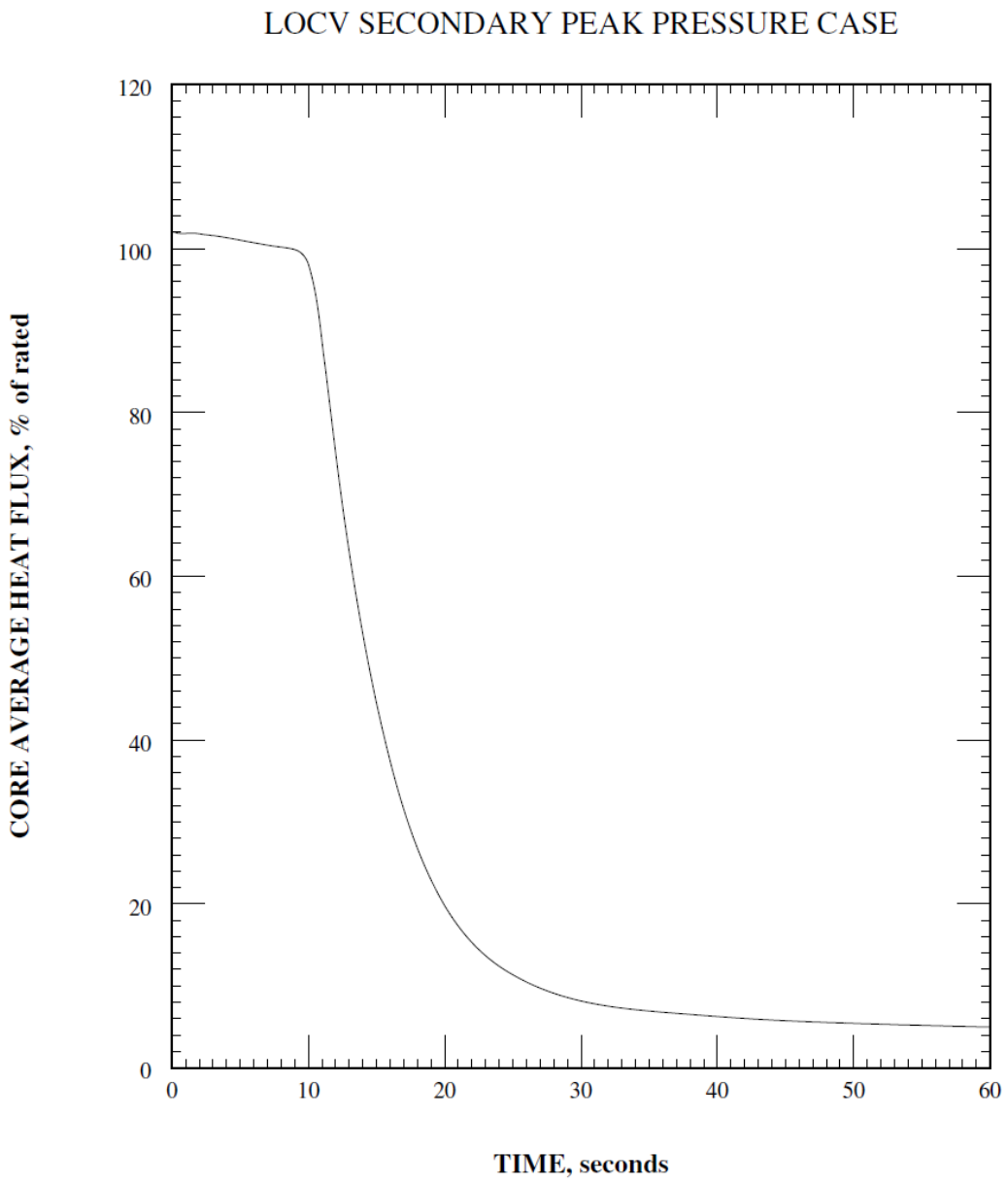


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

CORE POWER vs. TIME

FIGURE 15.2.3-15

JUNE 2011 REVISION 16

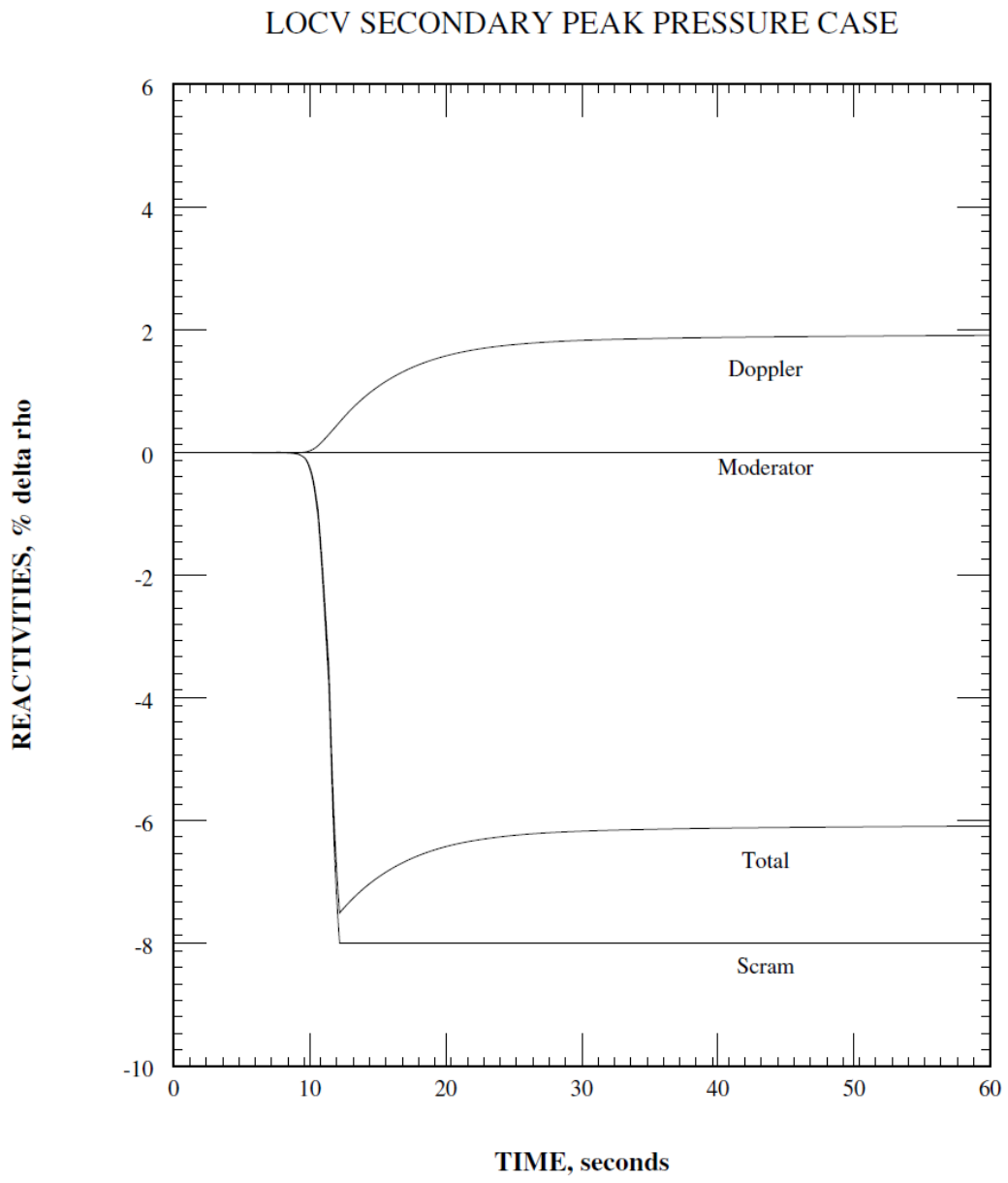


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

CORE HEAT FLUX vs. TIME

FIGURE 15.2.3-16

JUNE 2011 REVISION 16

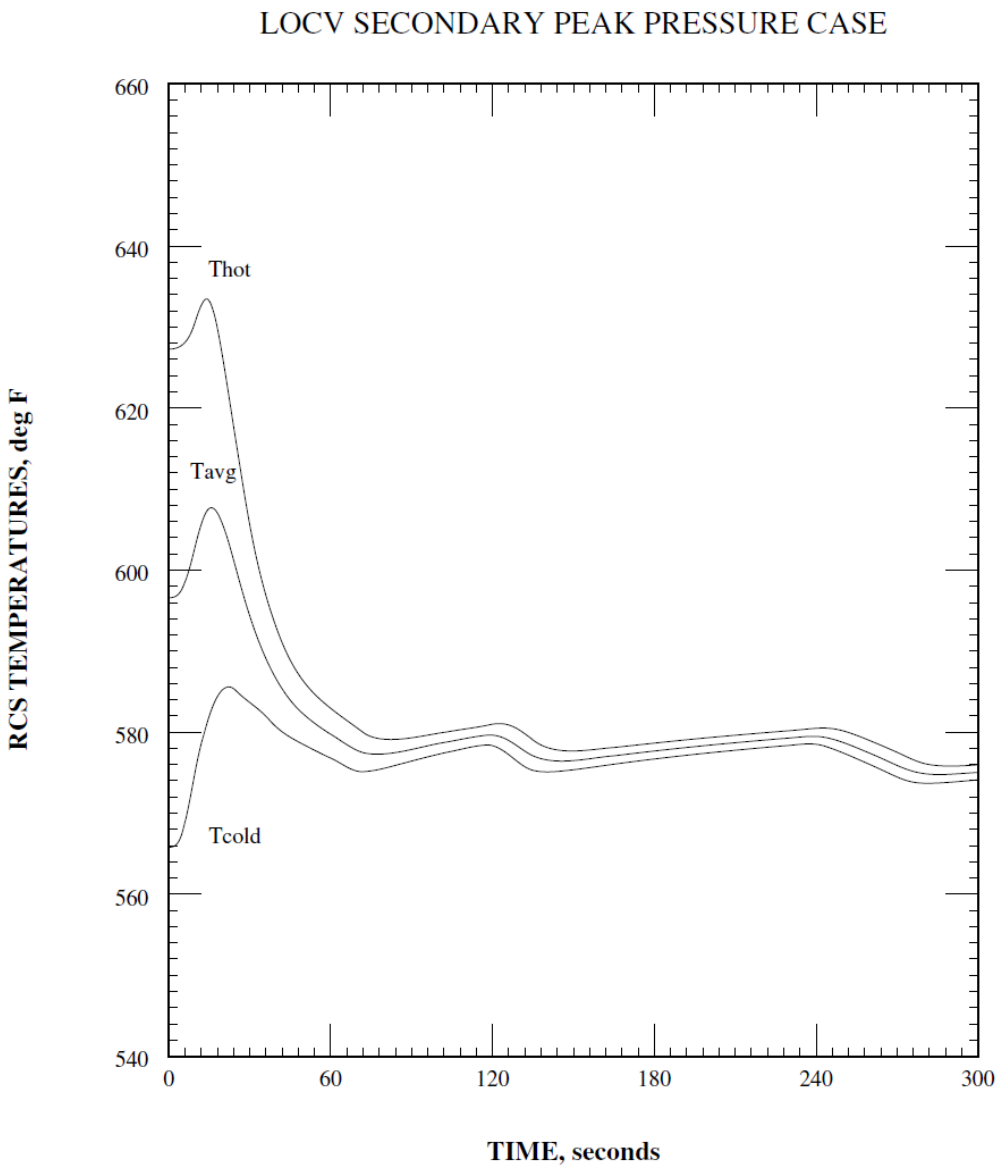


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

CORE REACTIVITIES vs. TIME

FIGURE 15.2.3-17

JUNE 2011 REVISION 16

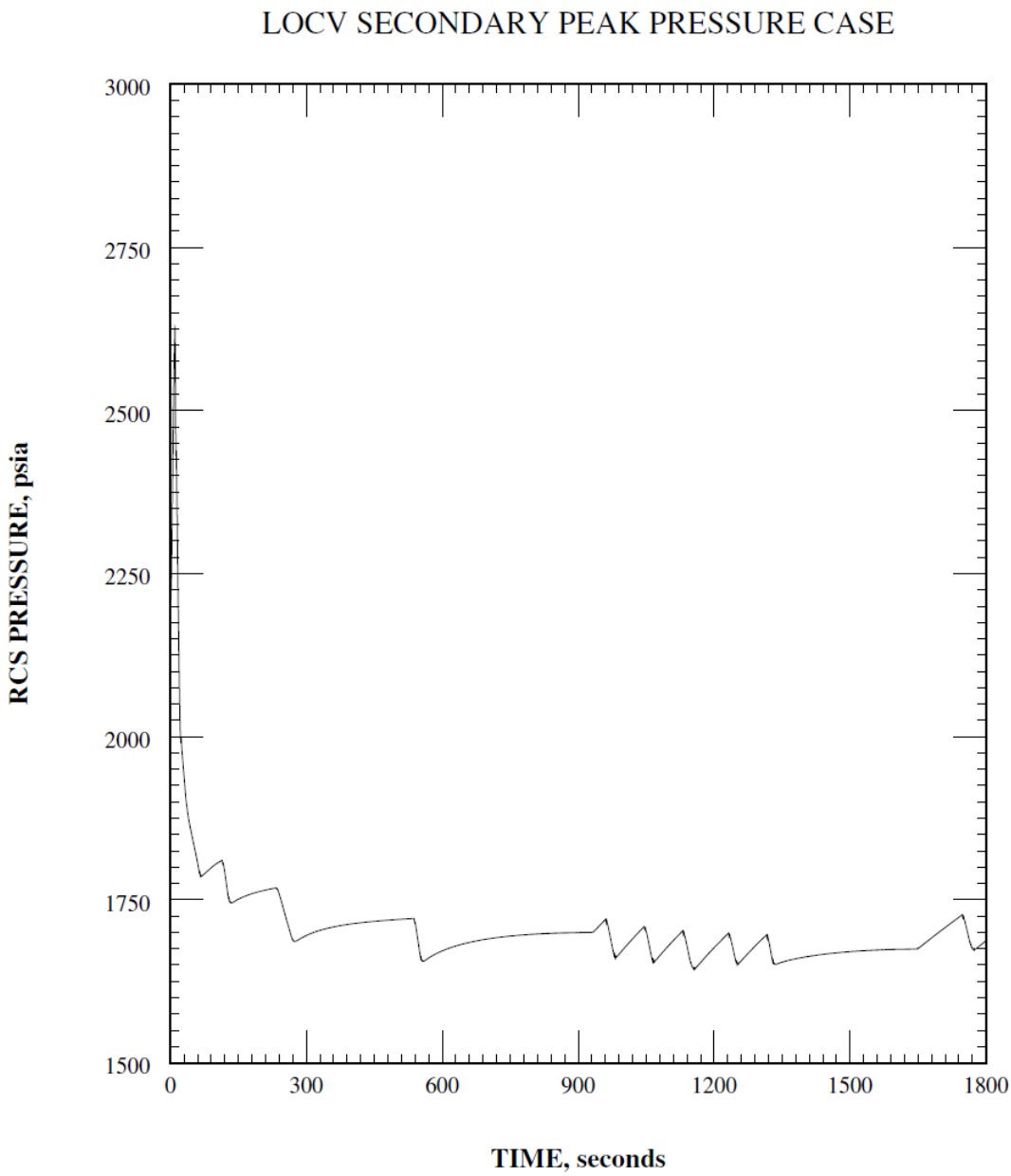


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

RCS TEMPERATURES vs. TIME

FIGURE 15.2.3-18

JUNE 2011 REVISION 16

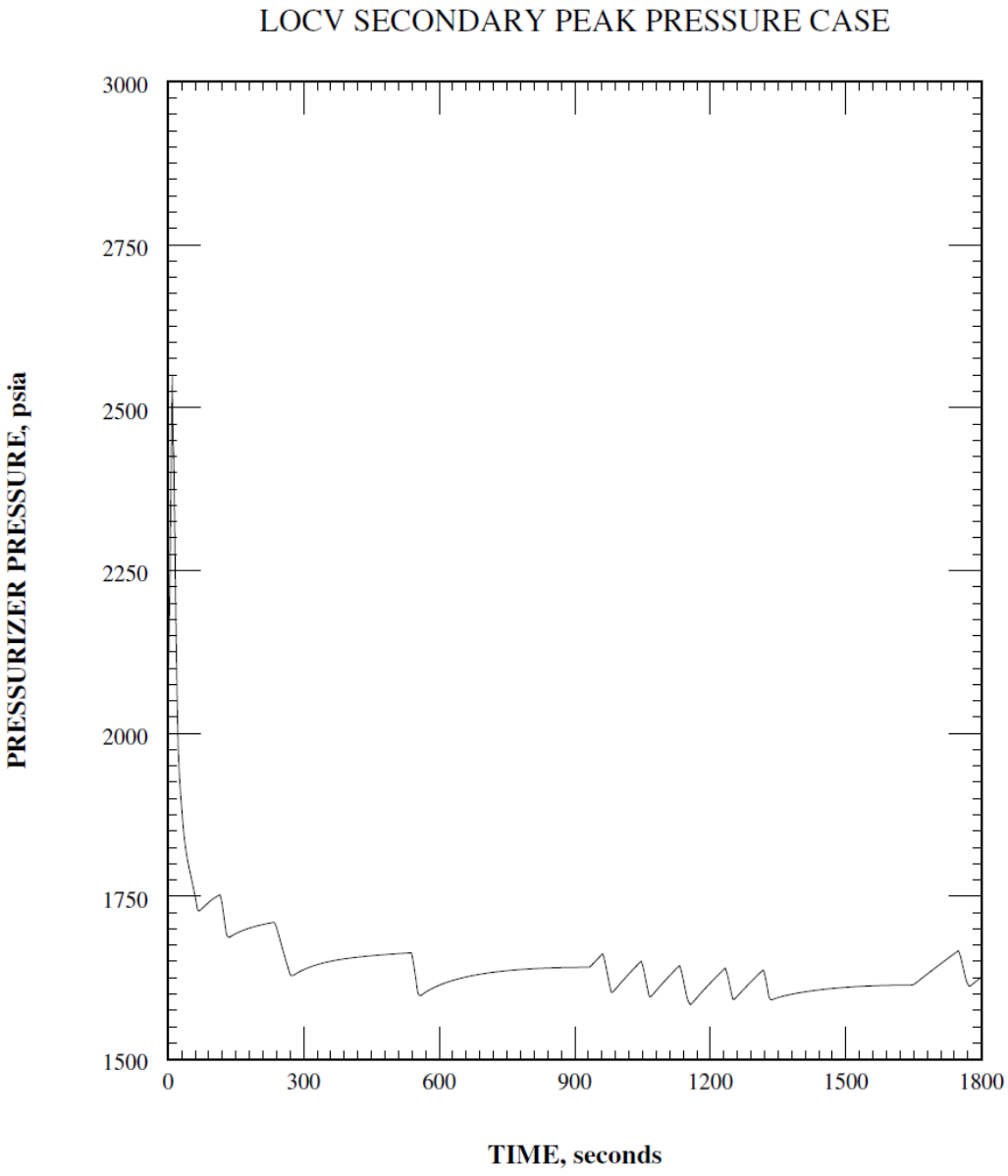


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

RCS PRESSURE vs. TIME

FIGURE 15.2.3-19

JUNE 2011 REVISION 16

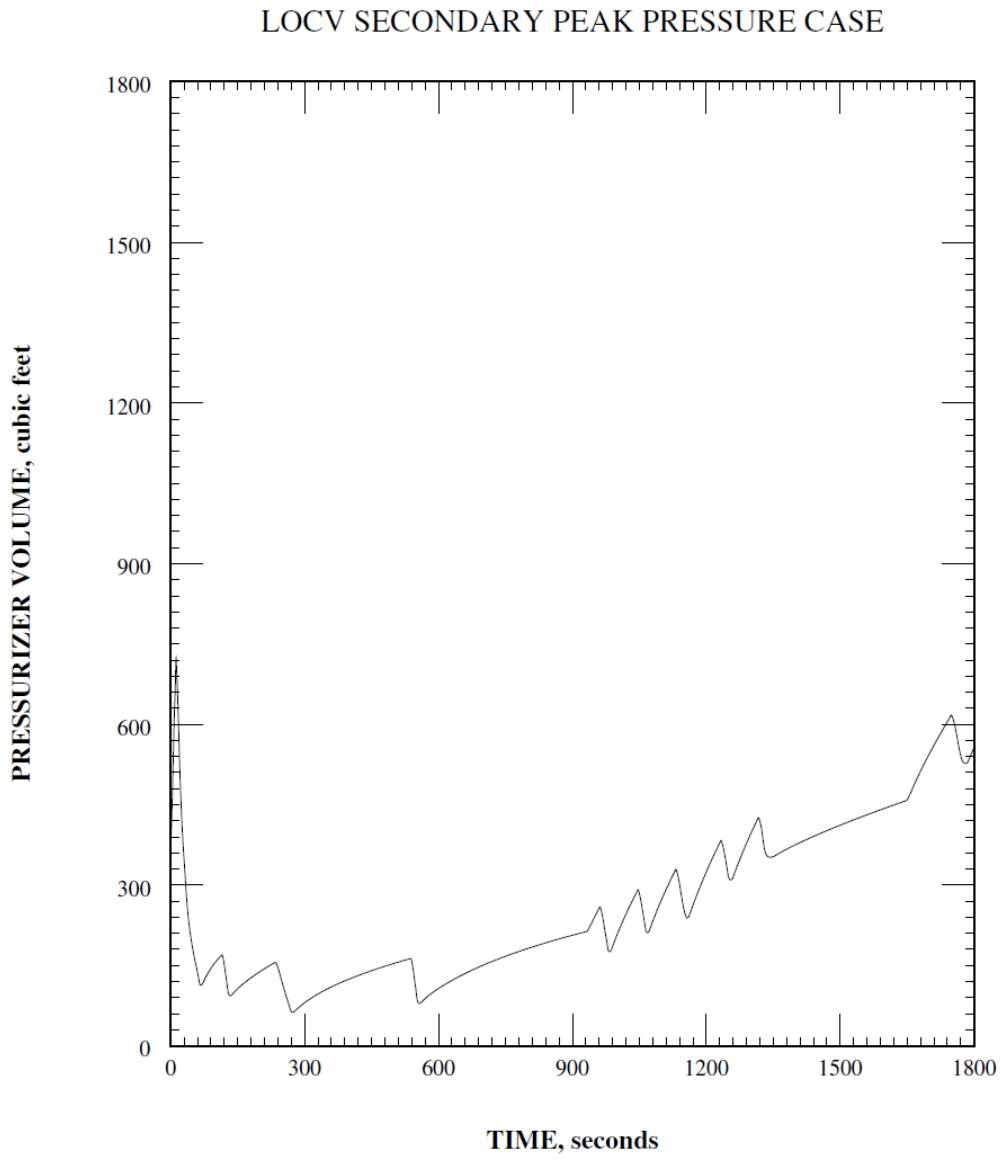


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

PRESSURIZER PRESSURE vs. TIME

FIGURE 15.2.3-20

JUNE 2011 REVISION 16

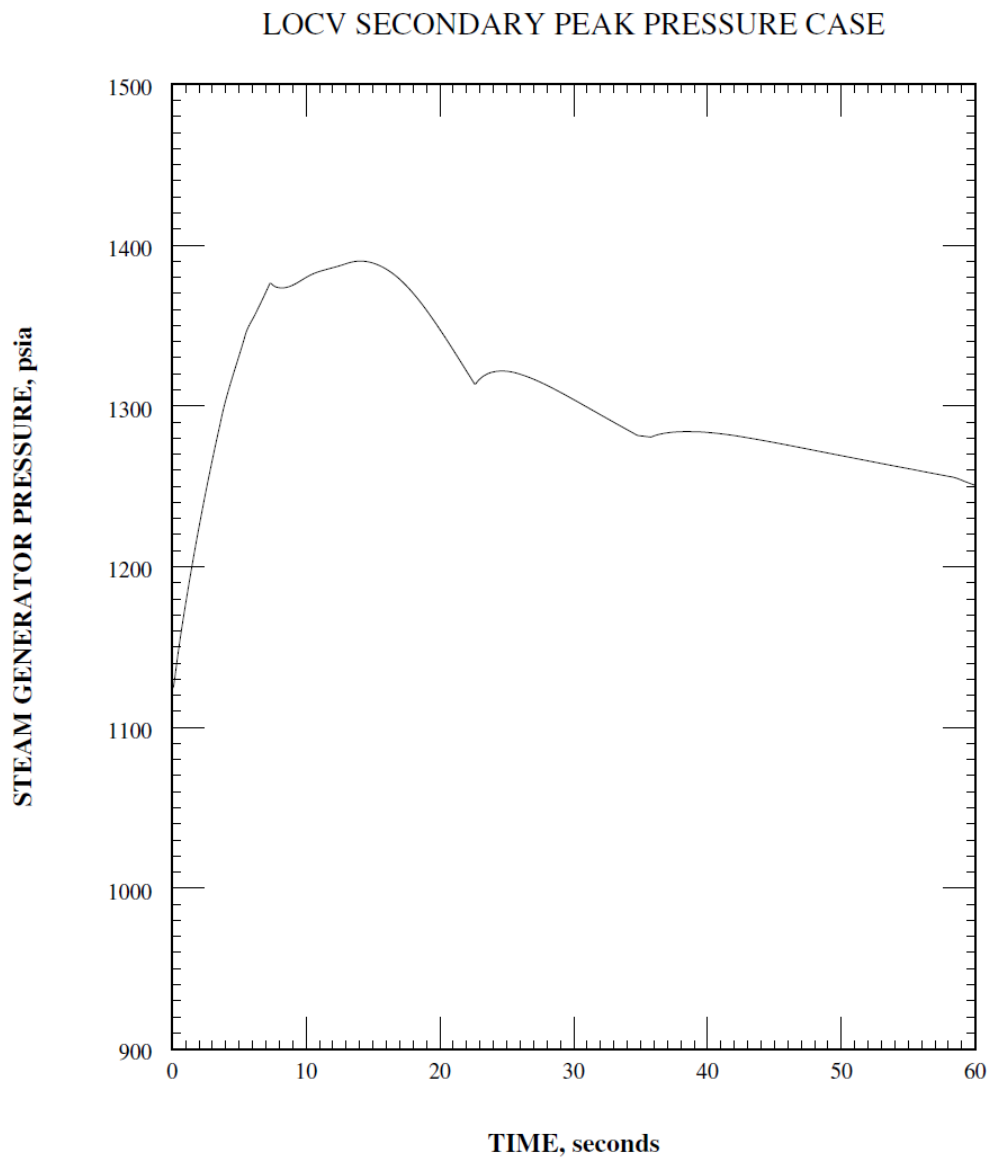


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

PRESSURE WATER VOLUME vs. TIME

FIGURE 15.2.3-21

JUNE 2011 REVISION 16

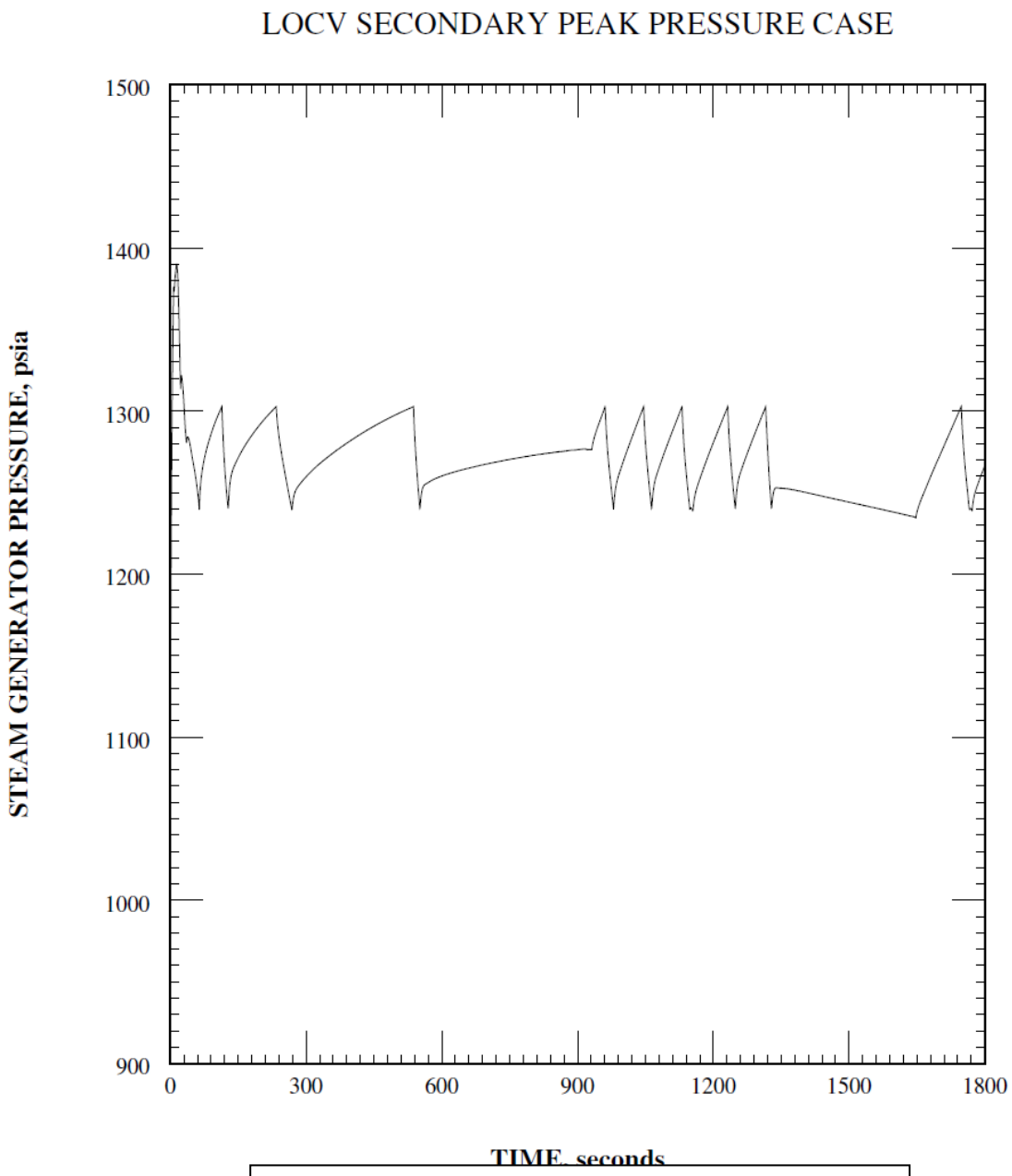


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG PRESSURE vs. TIME

FIGURE 15.2.3-22

JUNE 2011 REVISION 16

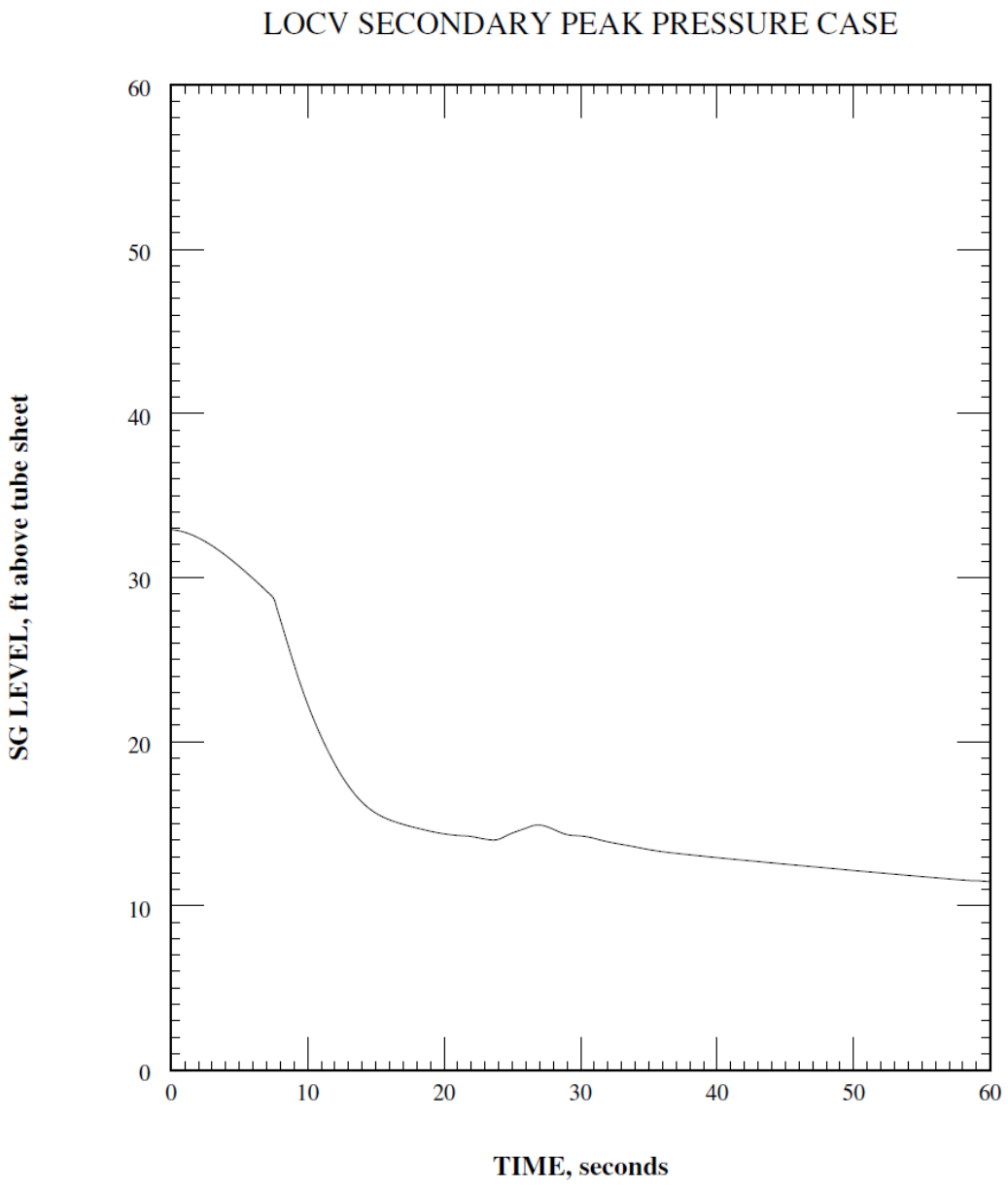


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG PRESSURE vs. TIME

FIGURE 15.2.3-23

JUNE 2011 REVISION 16

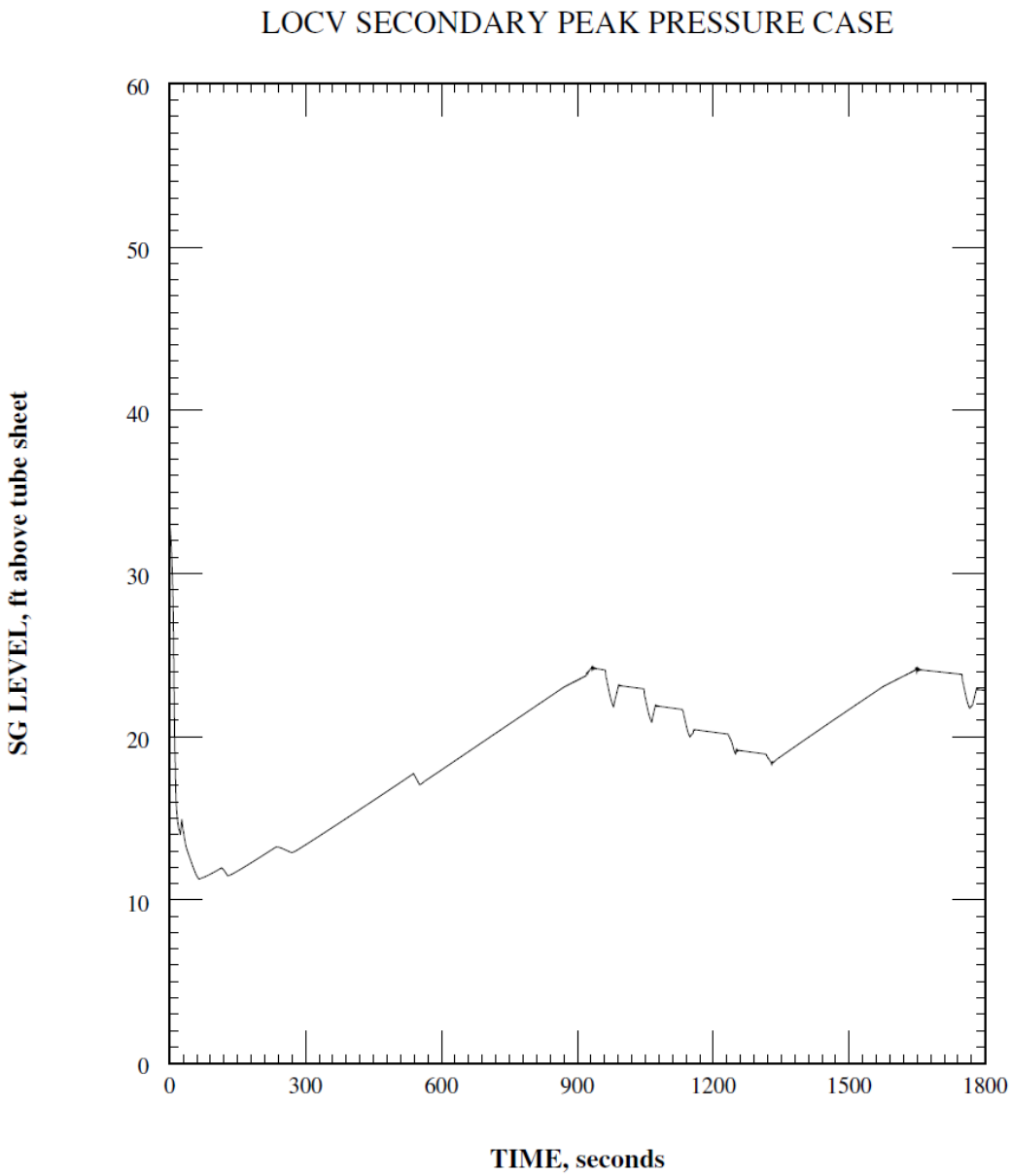


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG LEVEL vs. TIME

FIGURE 15.2.3-24

JUNE 2011 REVISION 16

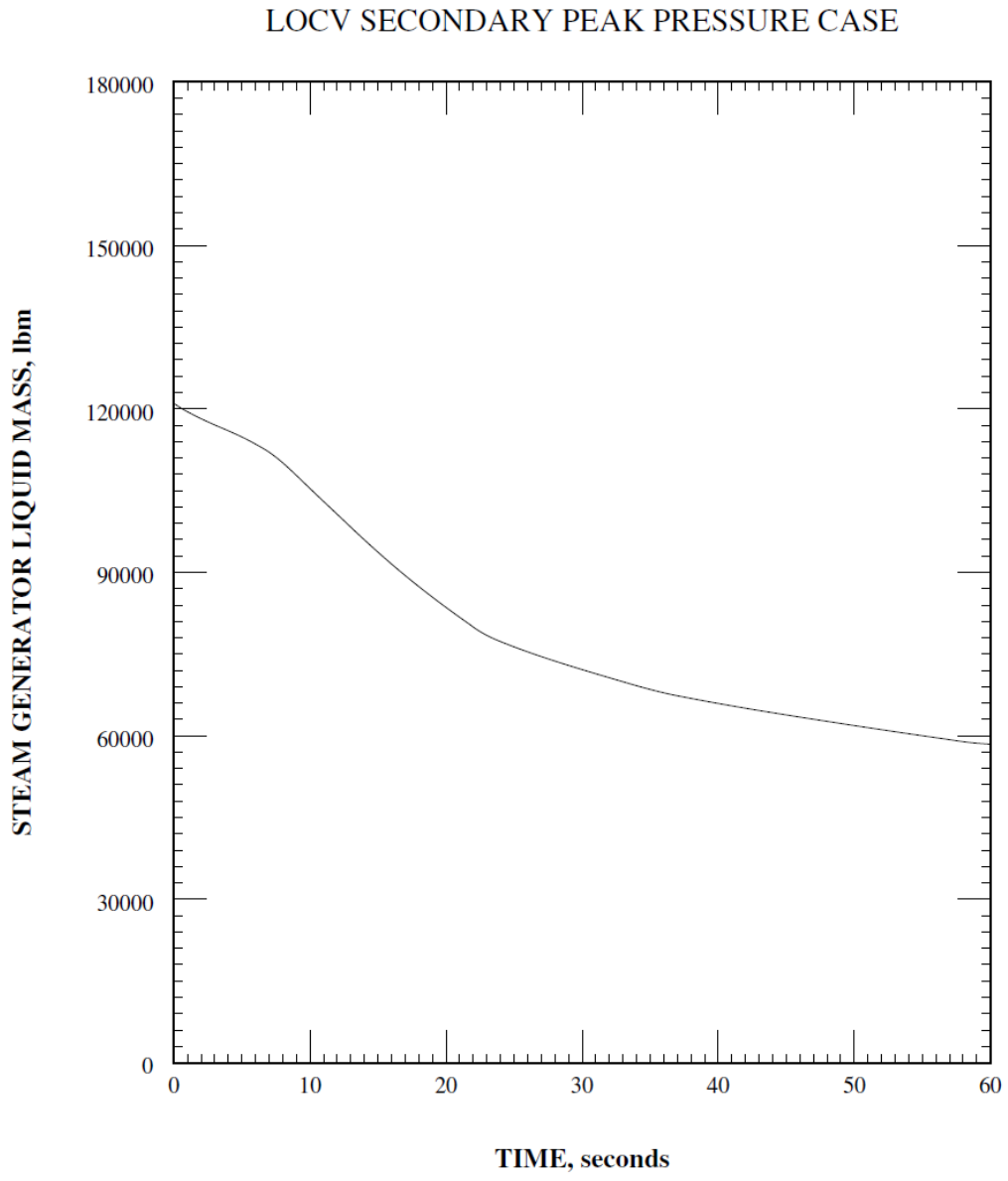


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG LEVEL vs. TIME

FIGURE 15.2.3-25

JUNE 2011 REVISION 16

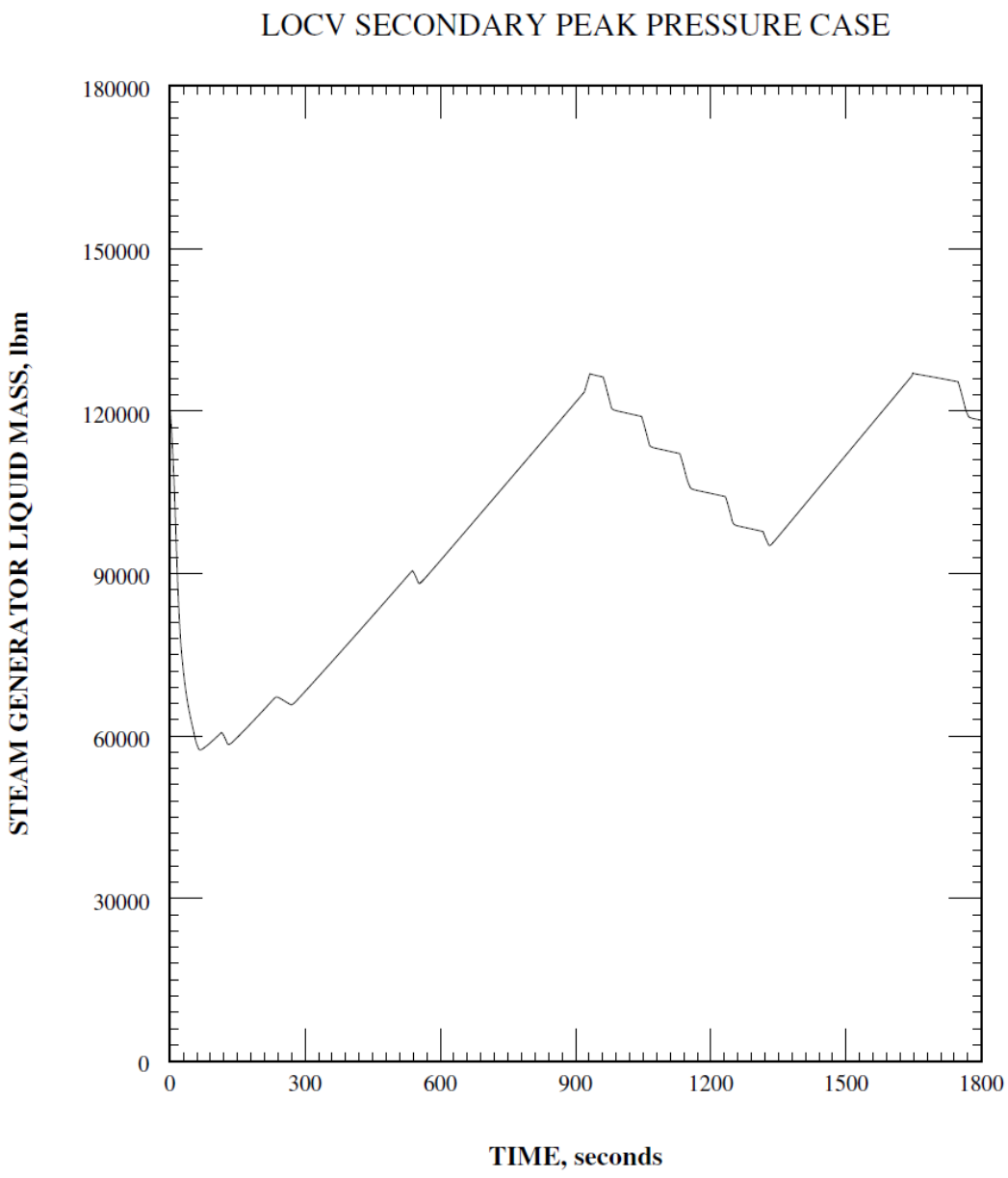


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG LIQUID INVENTORY vs. TIME

FIGURE 15.2.3-26

JUNE 2011 REVISION 16

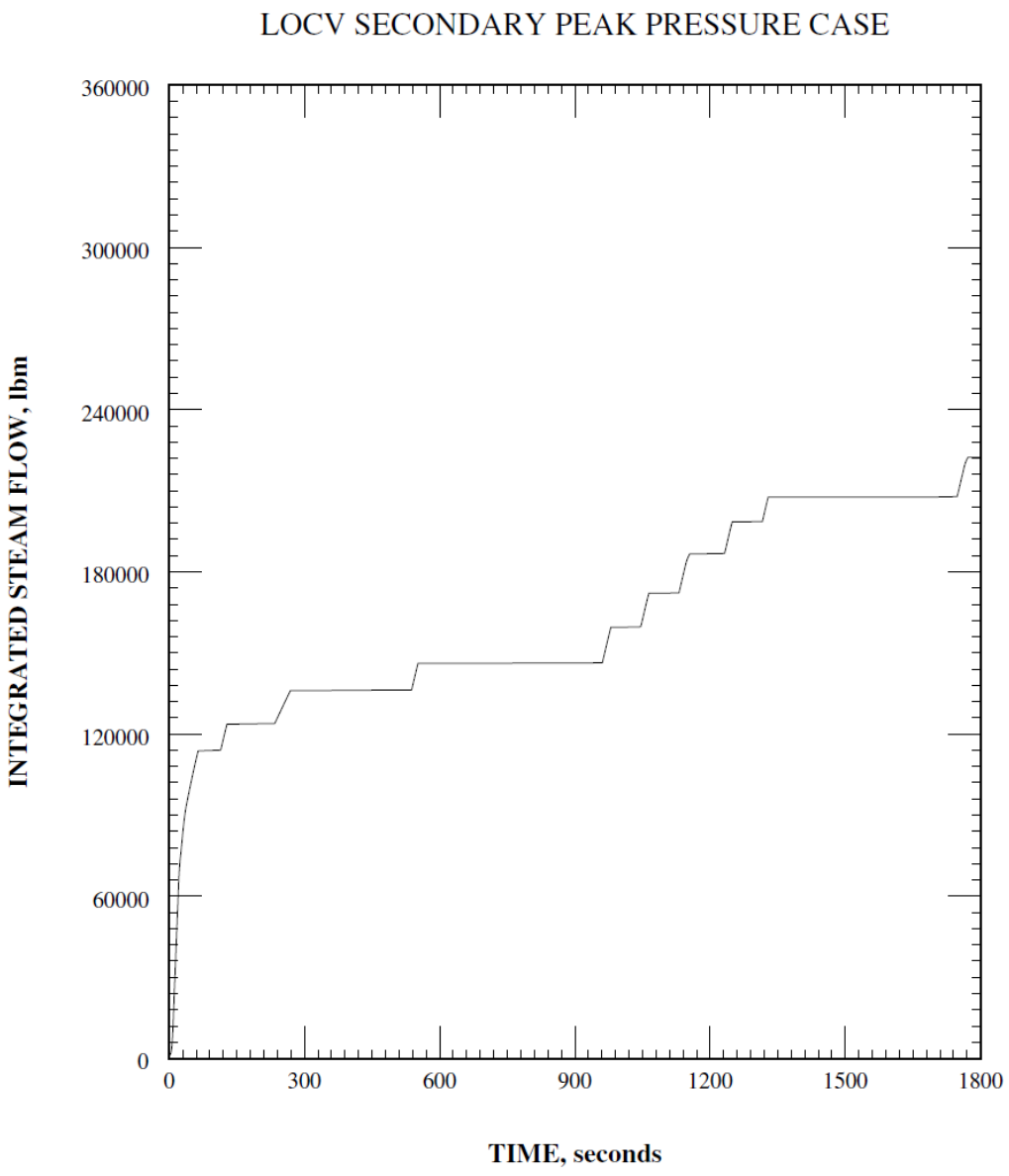


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SG LIQUID INVENTORY vs. TIME

FIGURE 15.2.3-27

JUNE 2011 REVISION 16

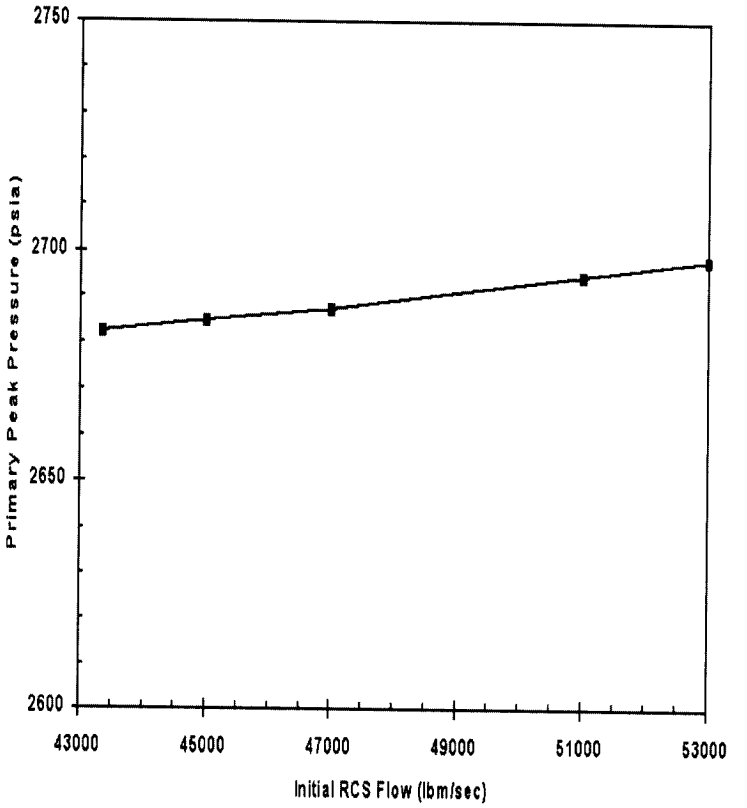


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

INTEGRATED STEAM FLOW vs. TIME

FIGURE 15.2.3-28

JUNE 2011 REVISION 16

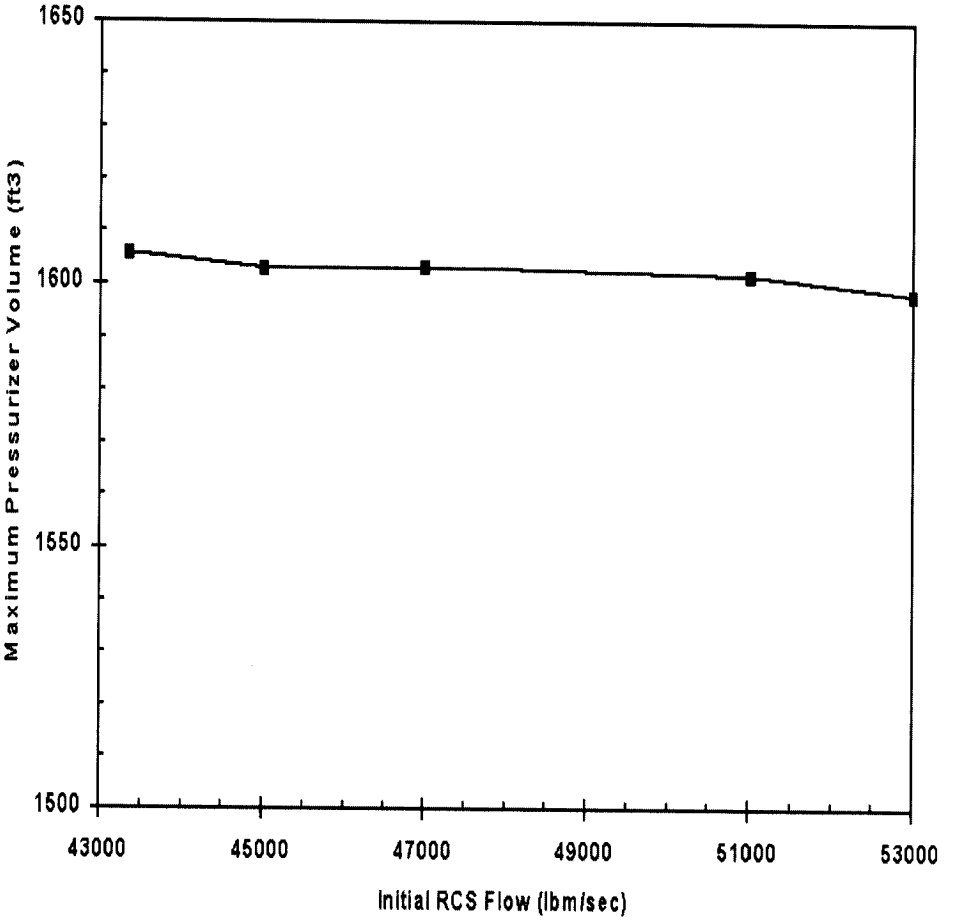


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF INITIAL RCS FLOW ON RCS
PEAK PRESSURE

FIGURE 15.2.8-1

JUNE 2005 REVISION 13

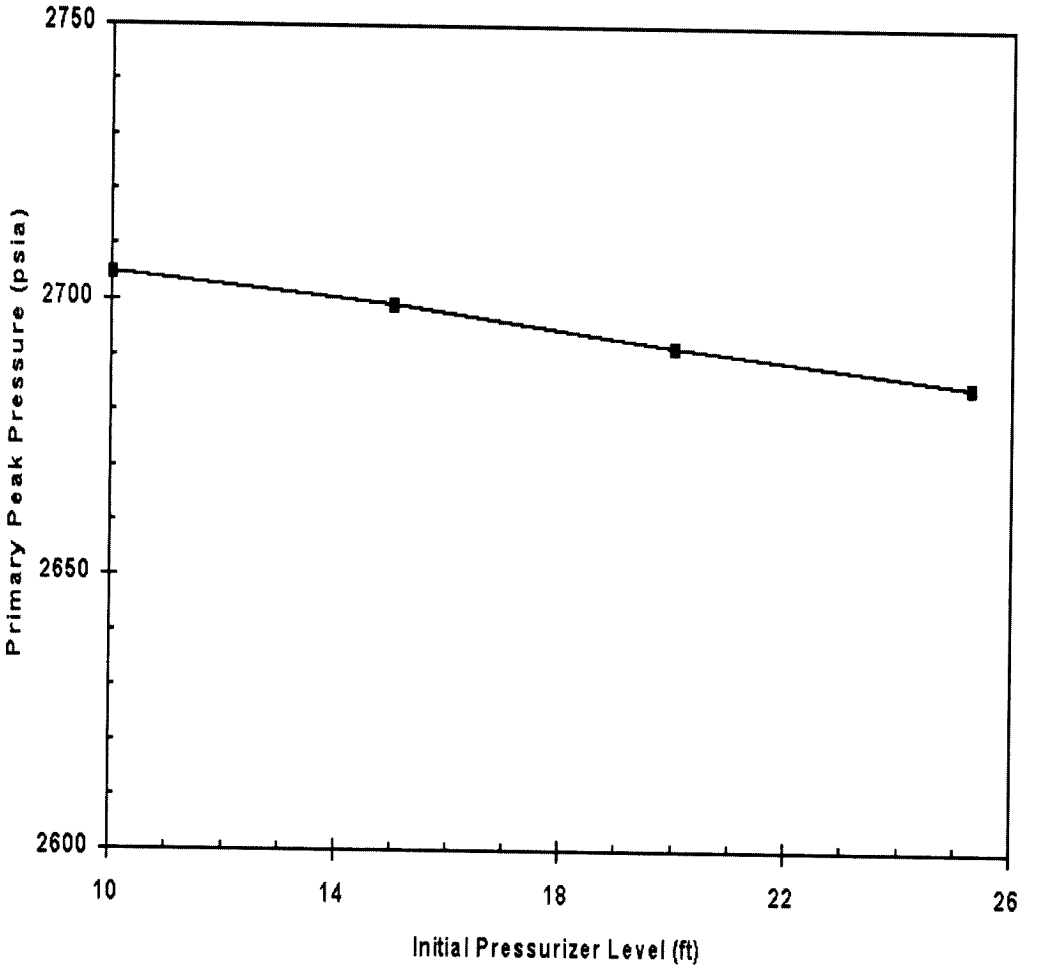


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF INITIAL RCS FLOW ON
PRESSURIZER LEVEL

FIGURE 15.2.8-2

JUNE 2005 REVISION 13

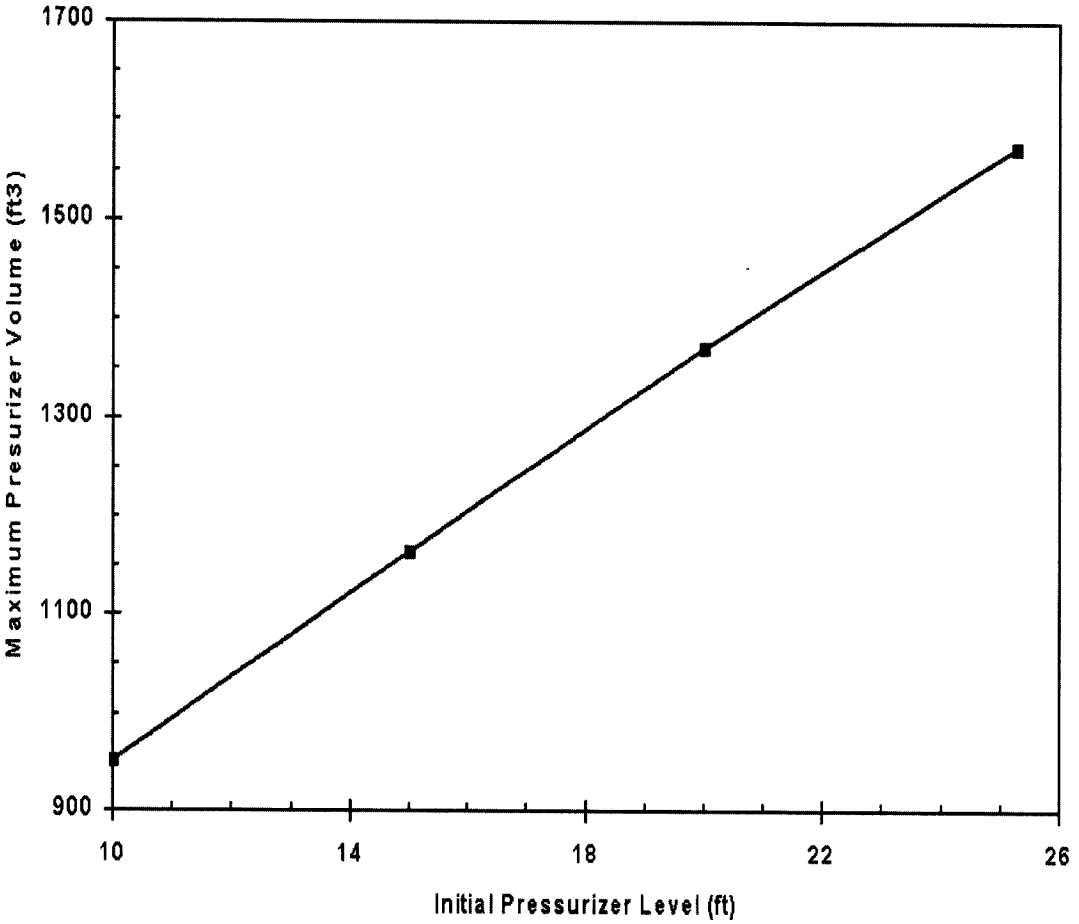


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF INITIAL PRESSURIZER LEVEL
ON RCS PEAK PRESSURE

FIGURE 15.2.8-3

JUNE 2005 REVISION 13

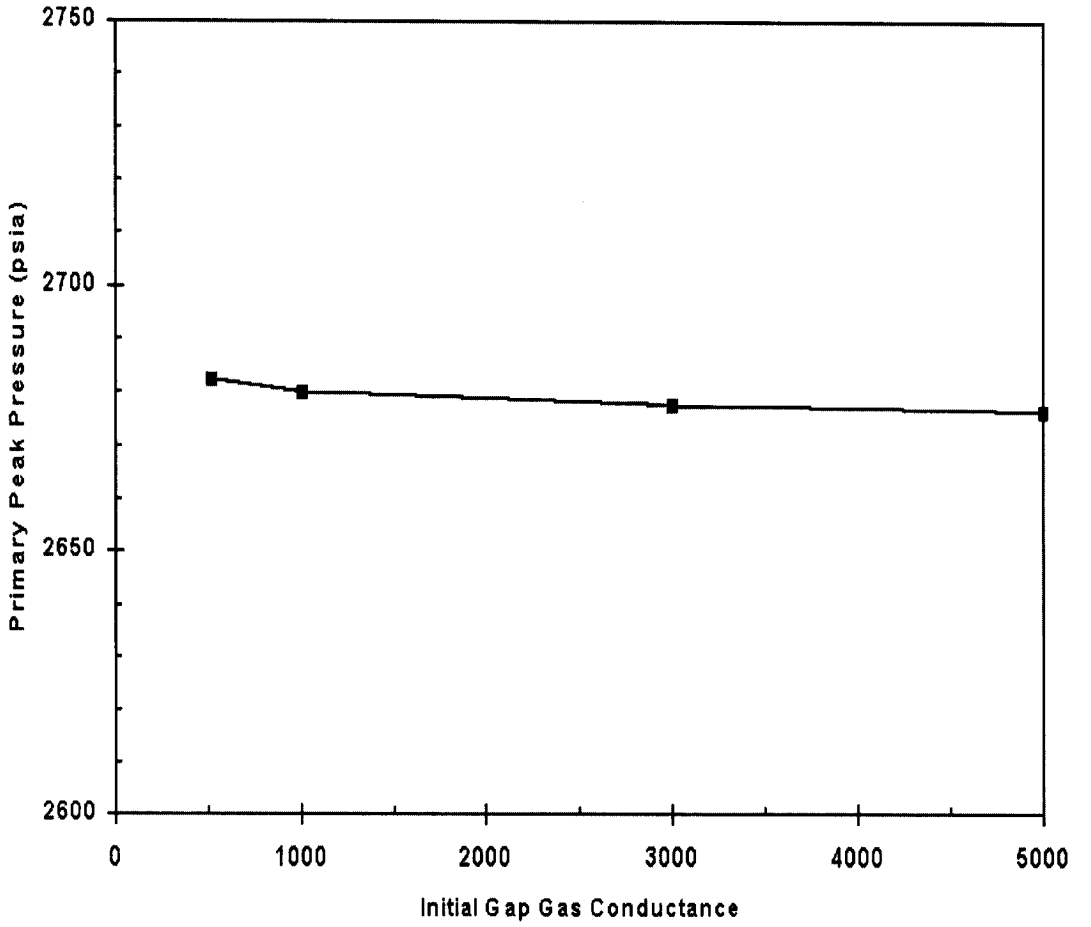


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF INITIAL PRESSURIZER LEVEL ON
MAXIMUM PRESSURIZER LEVEL

FIGURE 15.2.8-4

JUNE 2005 REVISION 13

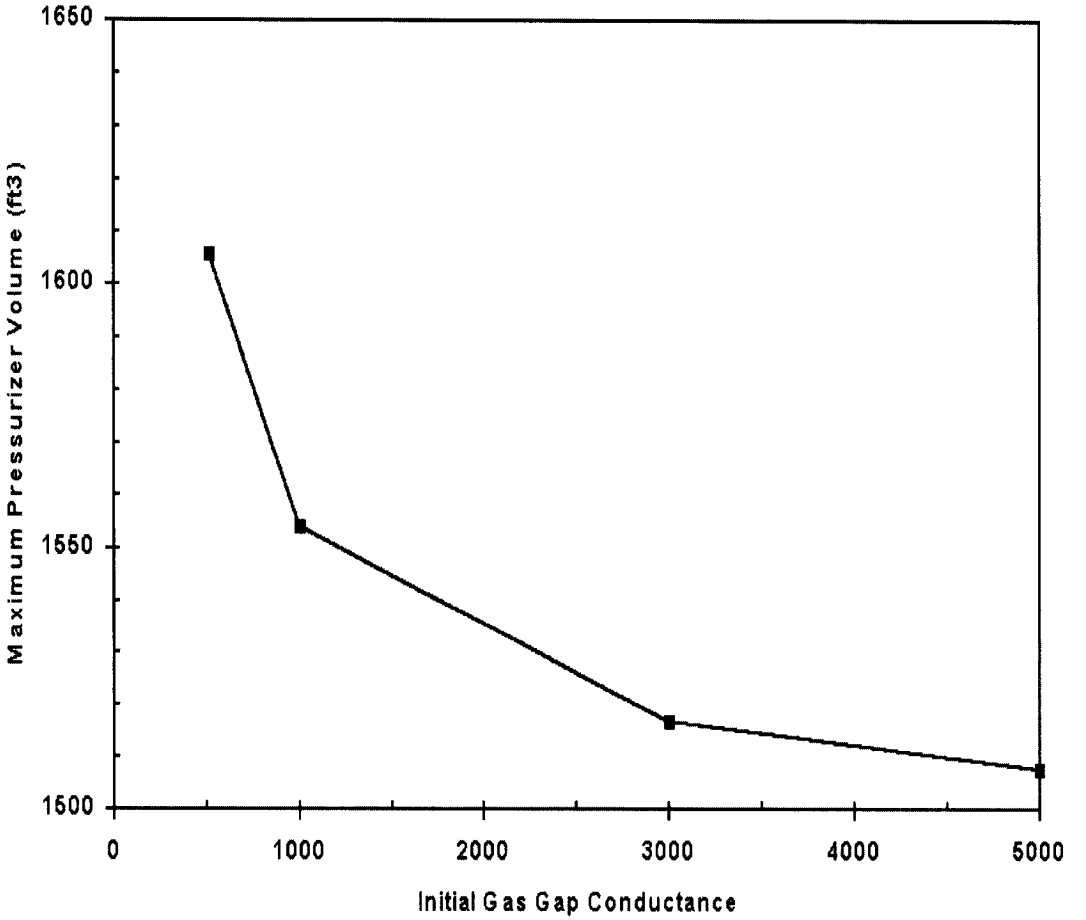


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF INITIAL GAS GAP CONDUCTANCE
ON RCS PRESSURE

FIGURE 15.2.8-5

JUNE 2005 REVISION 13

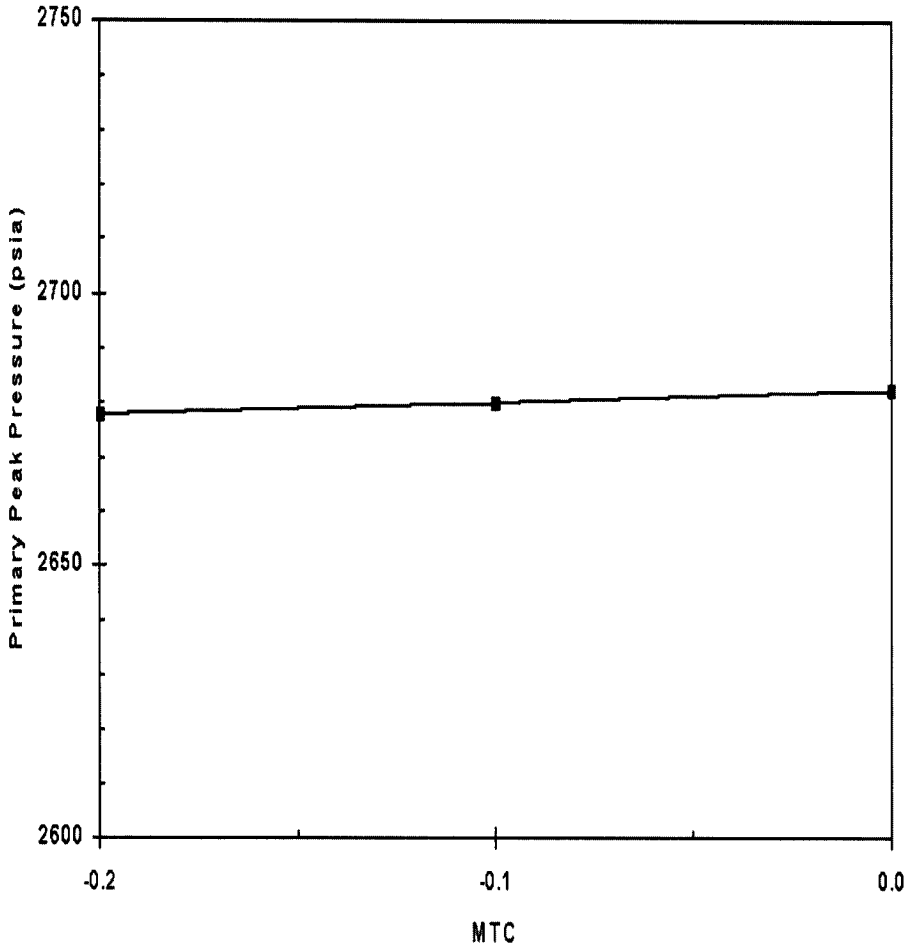


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF INITIAL GAS GAP CONDUCTANCE
ON PRESSURIZER LEVEL

FIGURE 15.2.8-6

JUNE 2005 REVISION 13

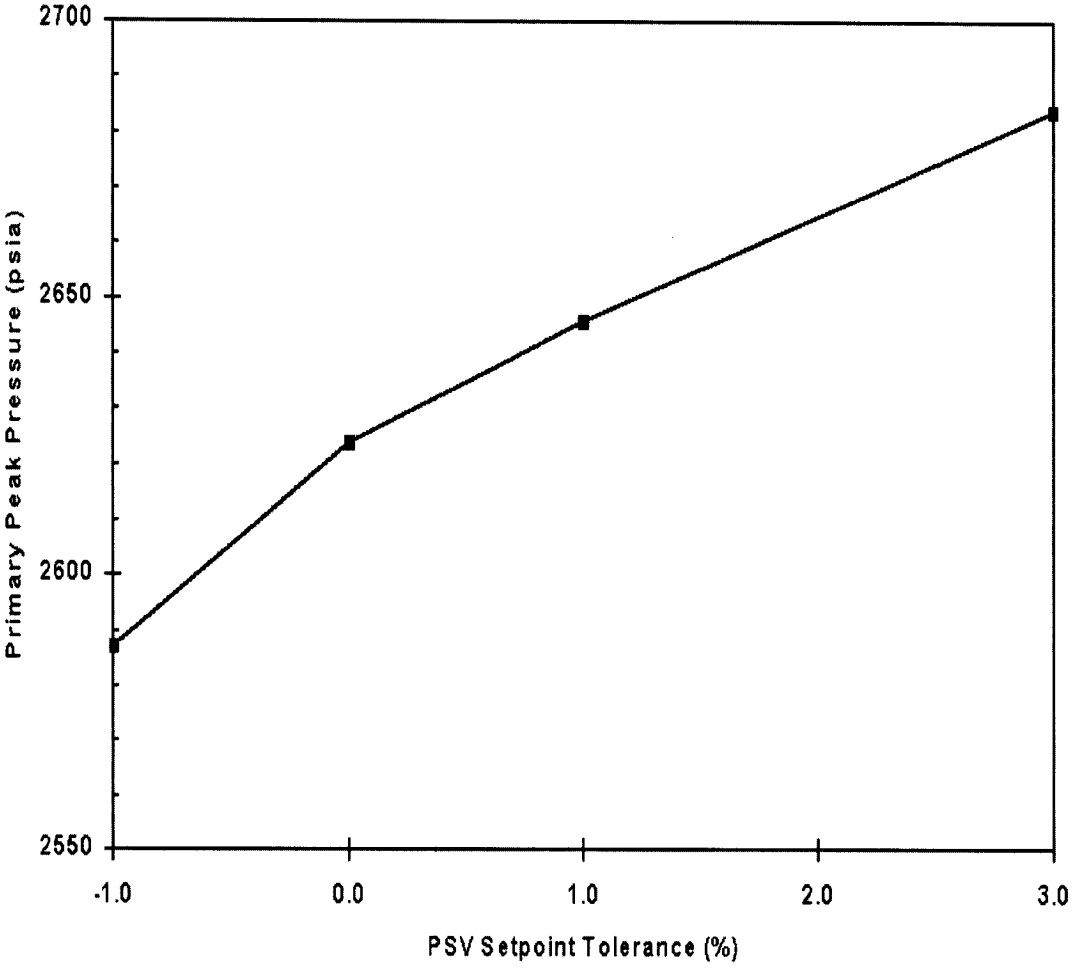


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF MODERATOR TEMPERATURE COEFFICIENT
ON PEAK RCS PRESSURE

FIGURE 15.2.8-7

JUNE 2005 REVISION 13

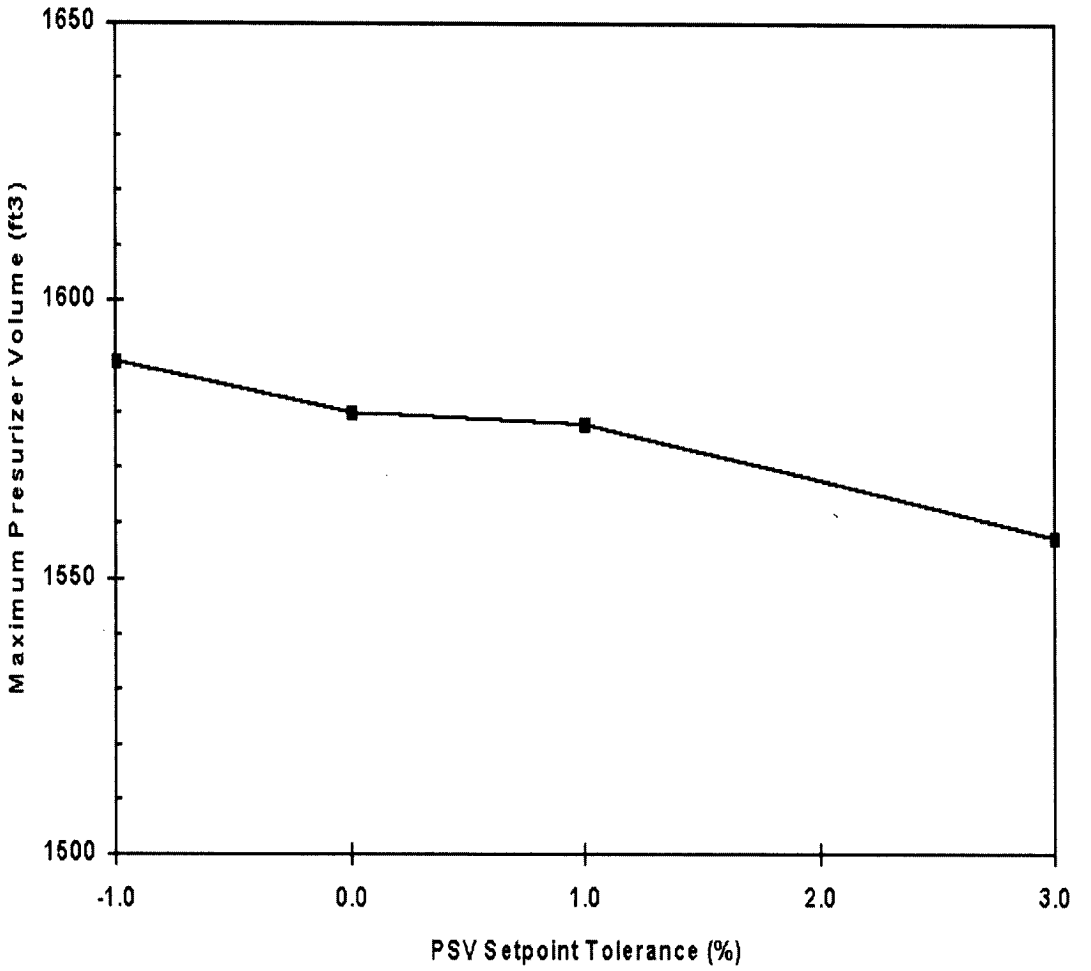


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF PSV TOLERANCE ON RCS
PRESSURE

FIGURE 15.2.8-9

JUNE 2005 REVISION 13

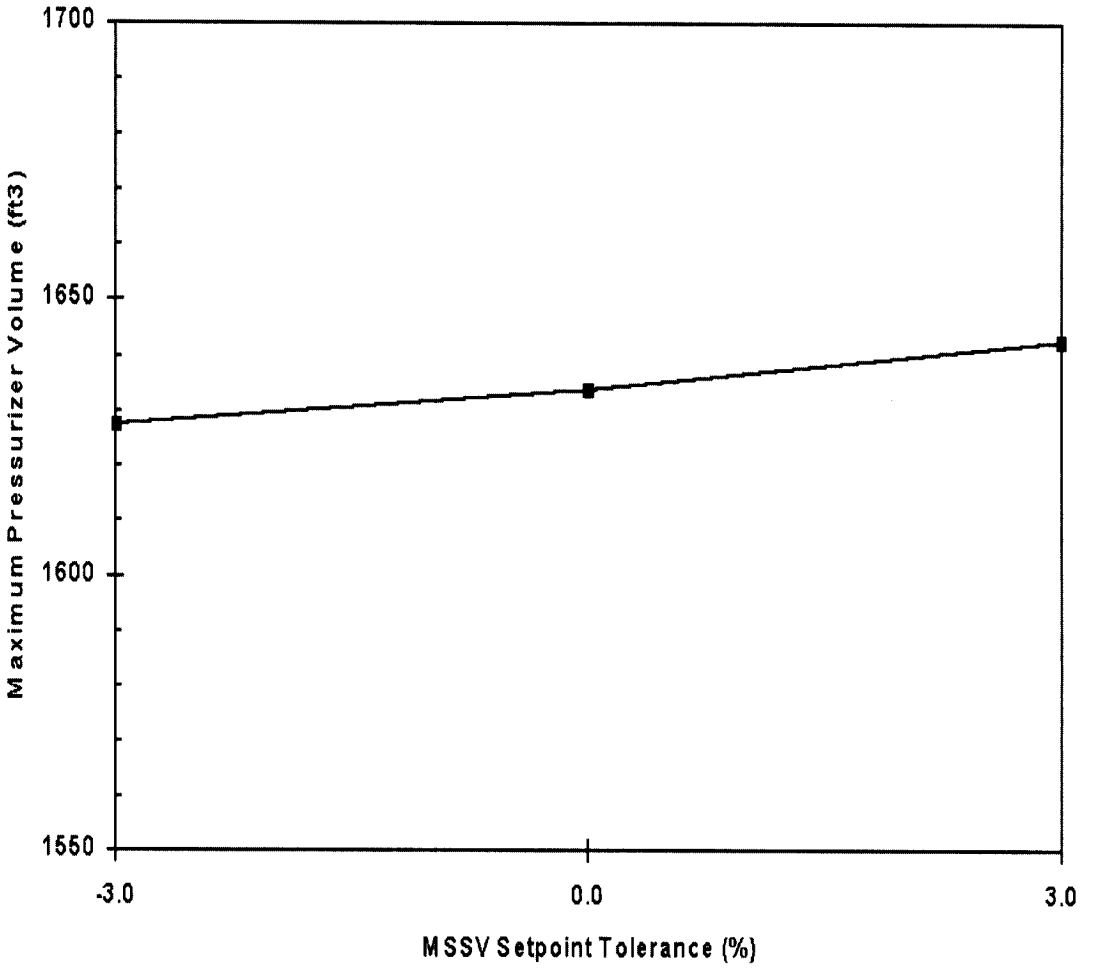


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF PSV TOLERANCE ON
PRESSURIZER LEVEL

FIGURE 15.2.8-10

JUNE 2005 REVISION 13

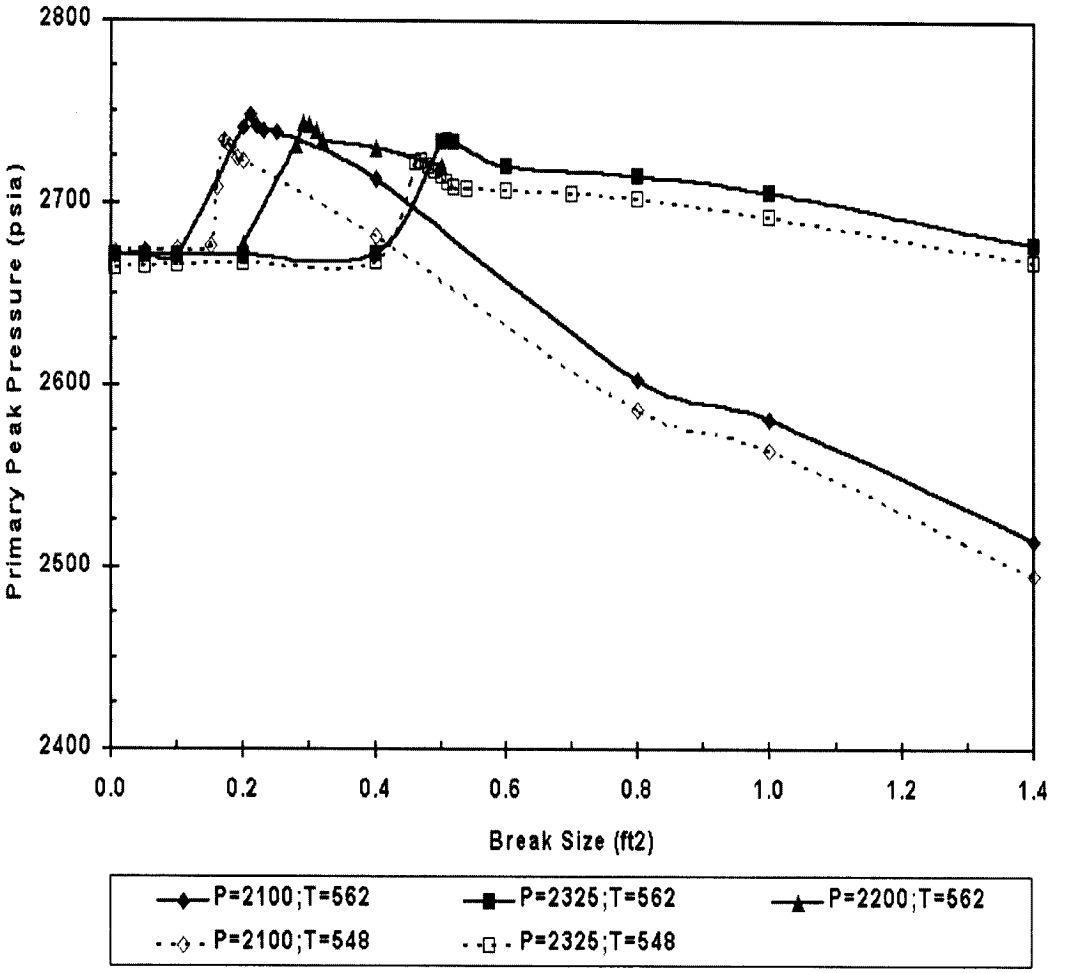


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECT OF MSSV TOLERANCE ON
PRESSURIZER LEVEL

FIGURE 15.2.8-11

JUNE 2005 REVISION 13

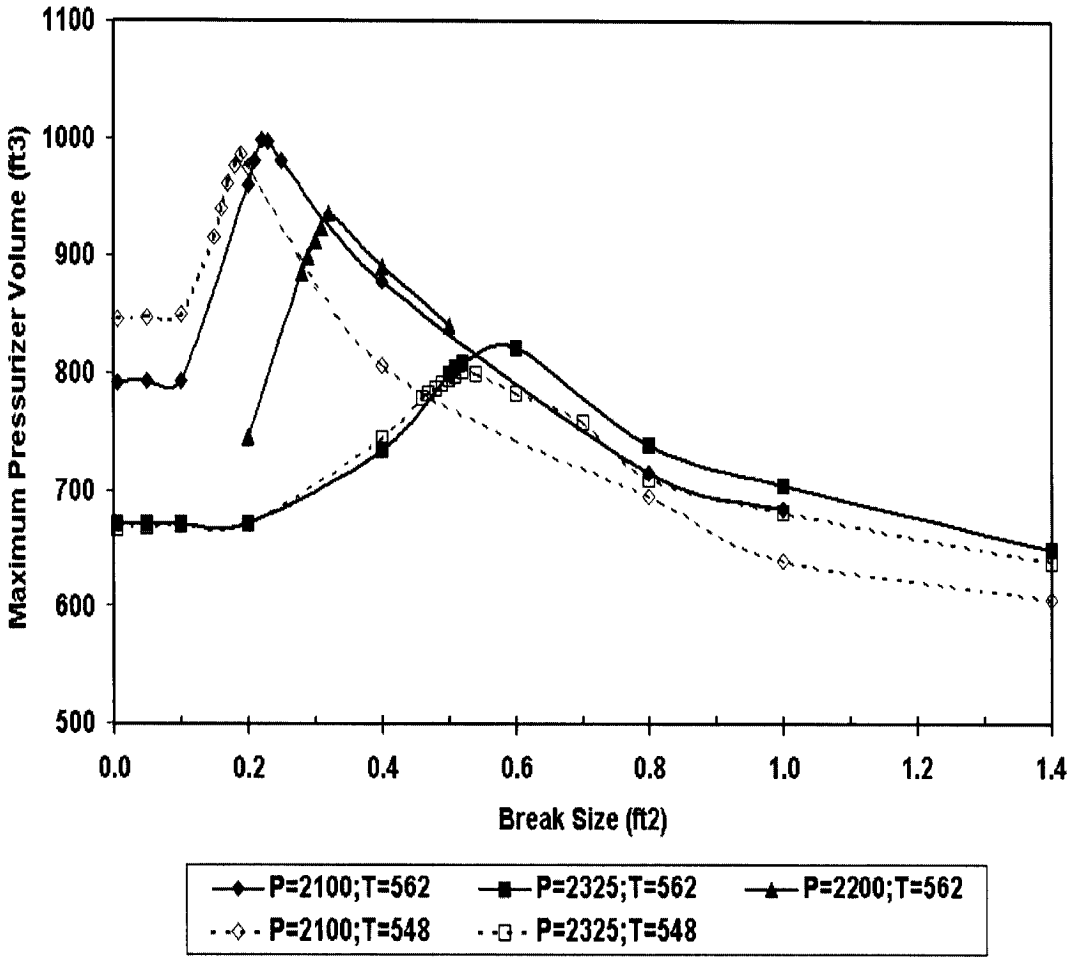


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECTS OF INITIAL PRESSURIZER PRESSURE, INITIAL CORE INLET TEMPERATURE, AND BREAK SIZE ON PEAK RCS PRESSURE FOR DELTA M = 0

FIGURE 15.2.8-12

JUNE 2005 REVISION 13

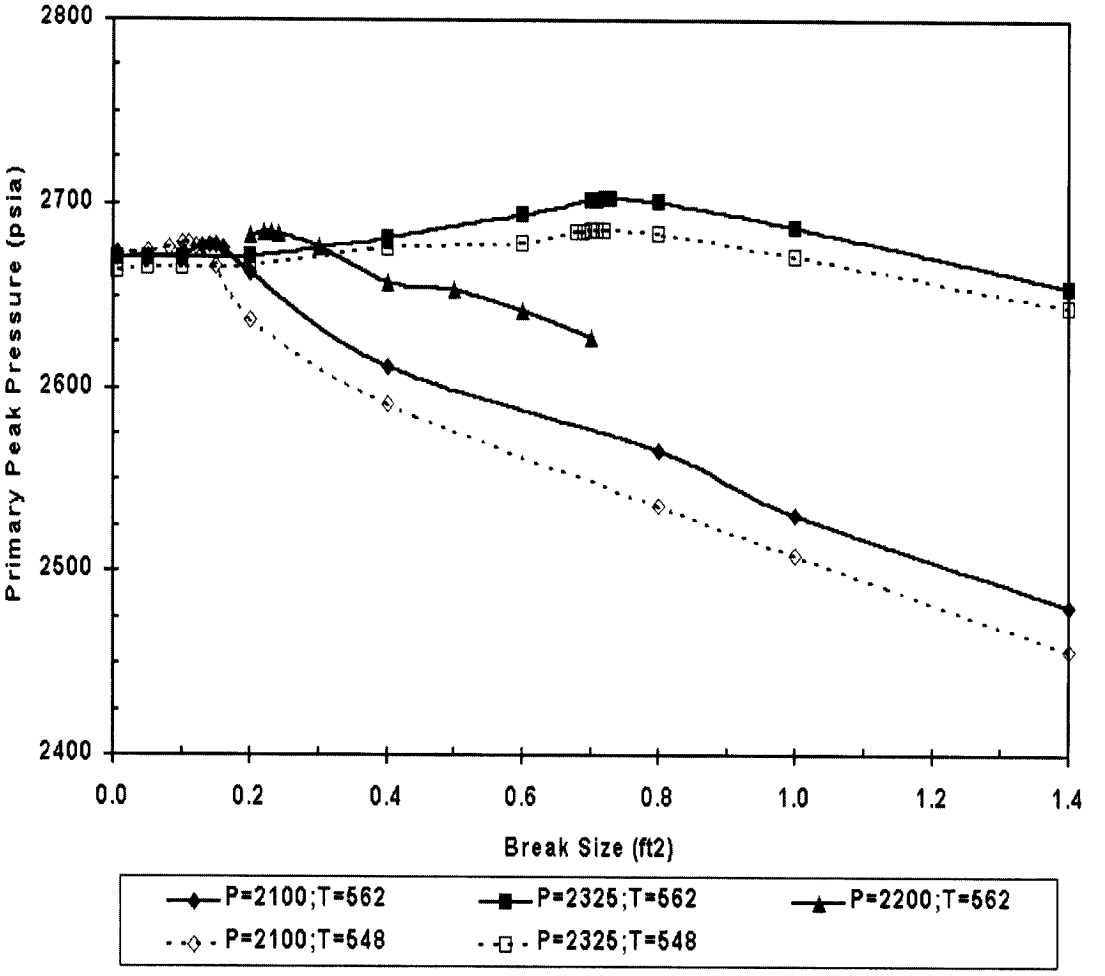


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECTS OF INITIAL PRESSURIZER PRESSURE, INITIAL CORE INLET TEMPERATURE, AND BREAK SIZE ON PRESSURIZER LEVEL FOR DELTA M = 0

FIGURE 15.2.8-13

JUNE 2005 REVISION 13

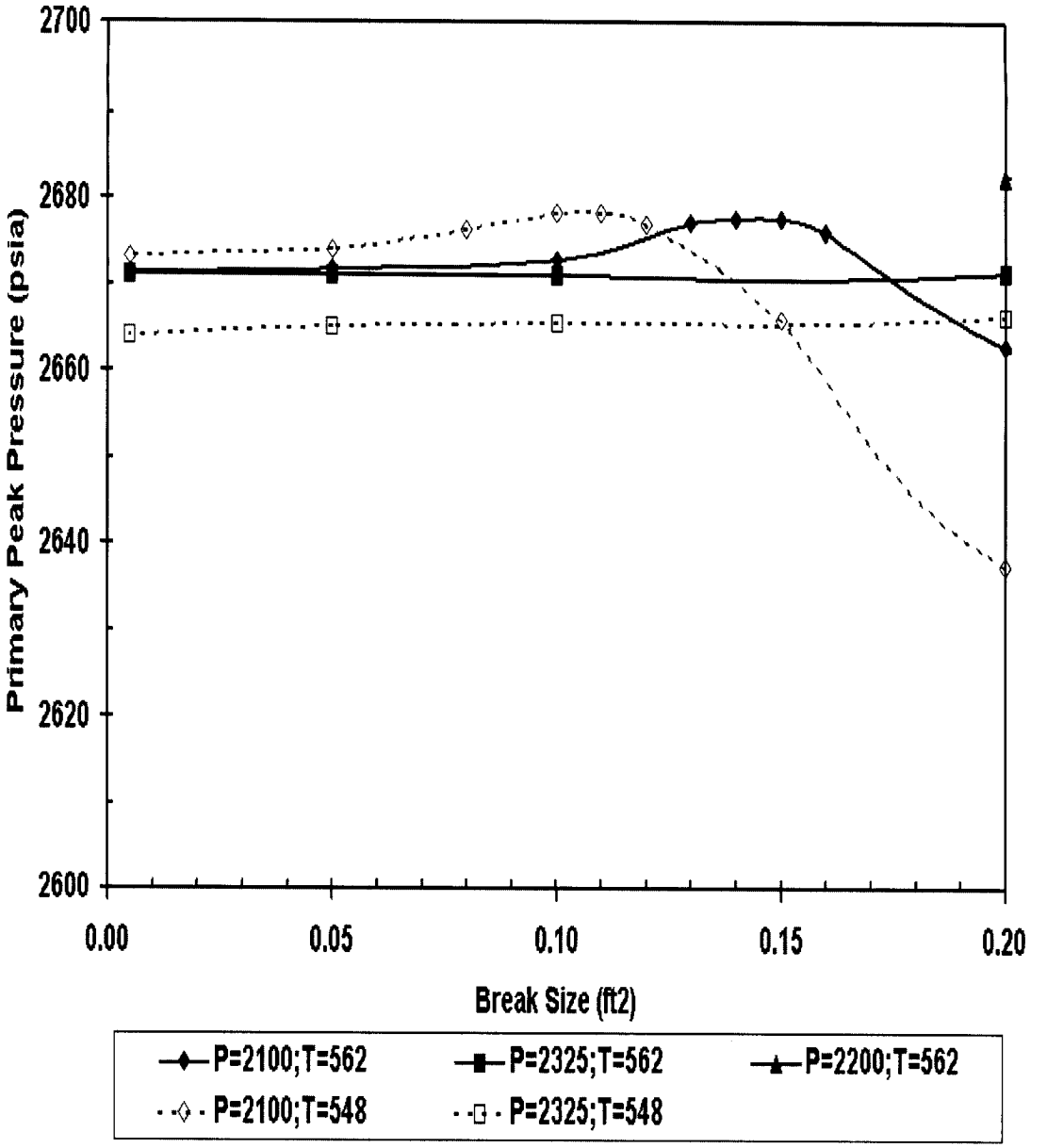


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECTS OF INITIAL PRESSURIZER PRESSURE, INITIAL CORE INLET TEMPERATURE, AND BREAK SIZE ON PEAK RCS PRESSURE FOR DELTA M = 30,000 lbm

FIGURE 15.2.8-14

JUNE 2005 REVISION 13

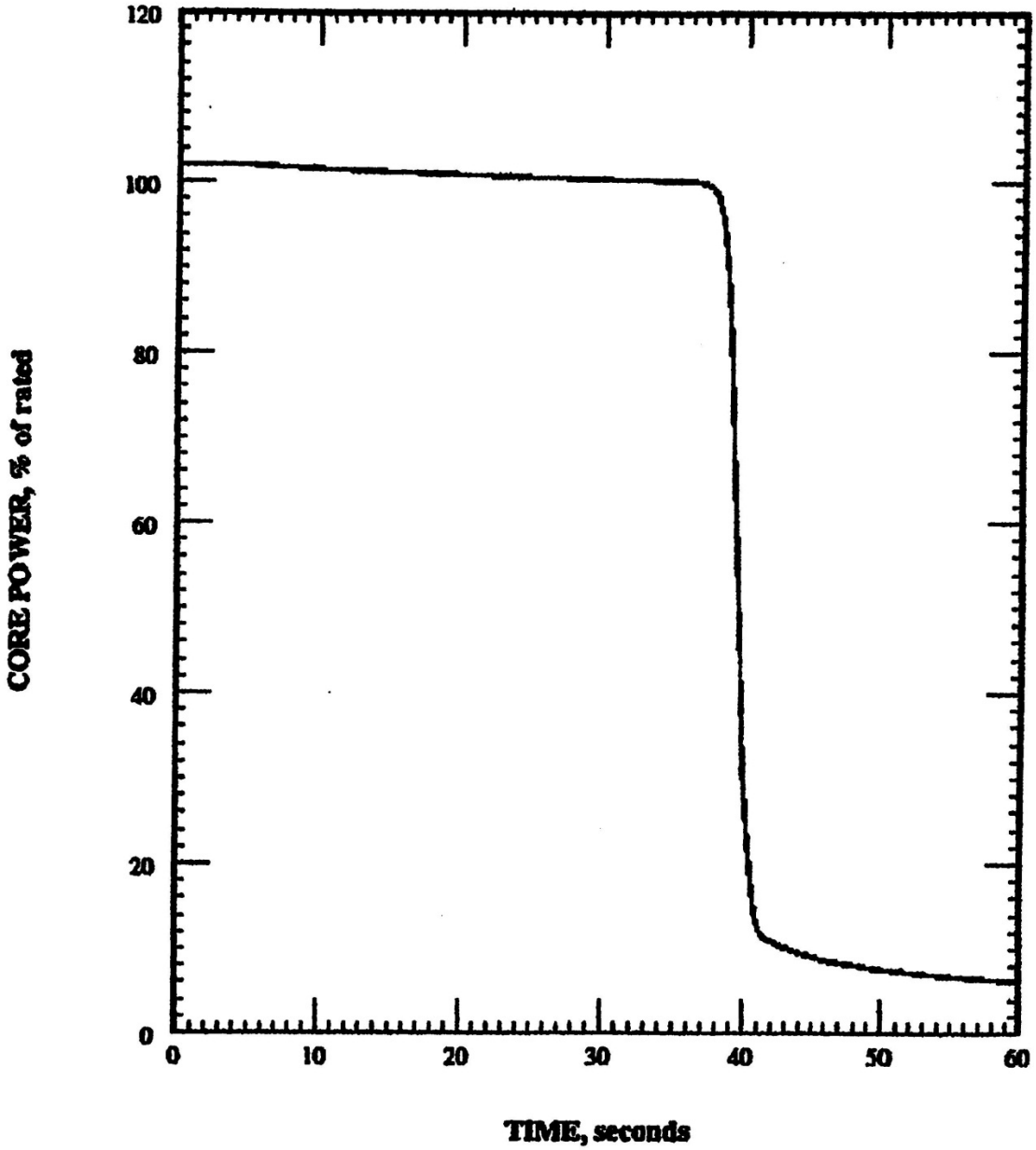


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FEEDWATER LINE BREAK EVENT
EFFECTS ON INITIAL PRESSURIZER PRESSURE, INITIAL CORE INLET TEMPERATURE, AND BREAK SIZE ON PEAK RCS PRESSURE FOR BREAK SIZES LESS THAN 0.2 FT^2 AND DELTA M = 30,000 lbm

FIGURE 15.2.8-15

JUNE 2005 REVISION 13

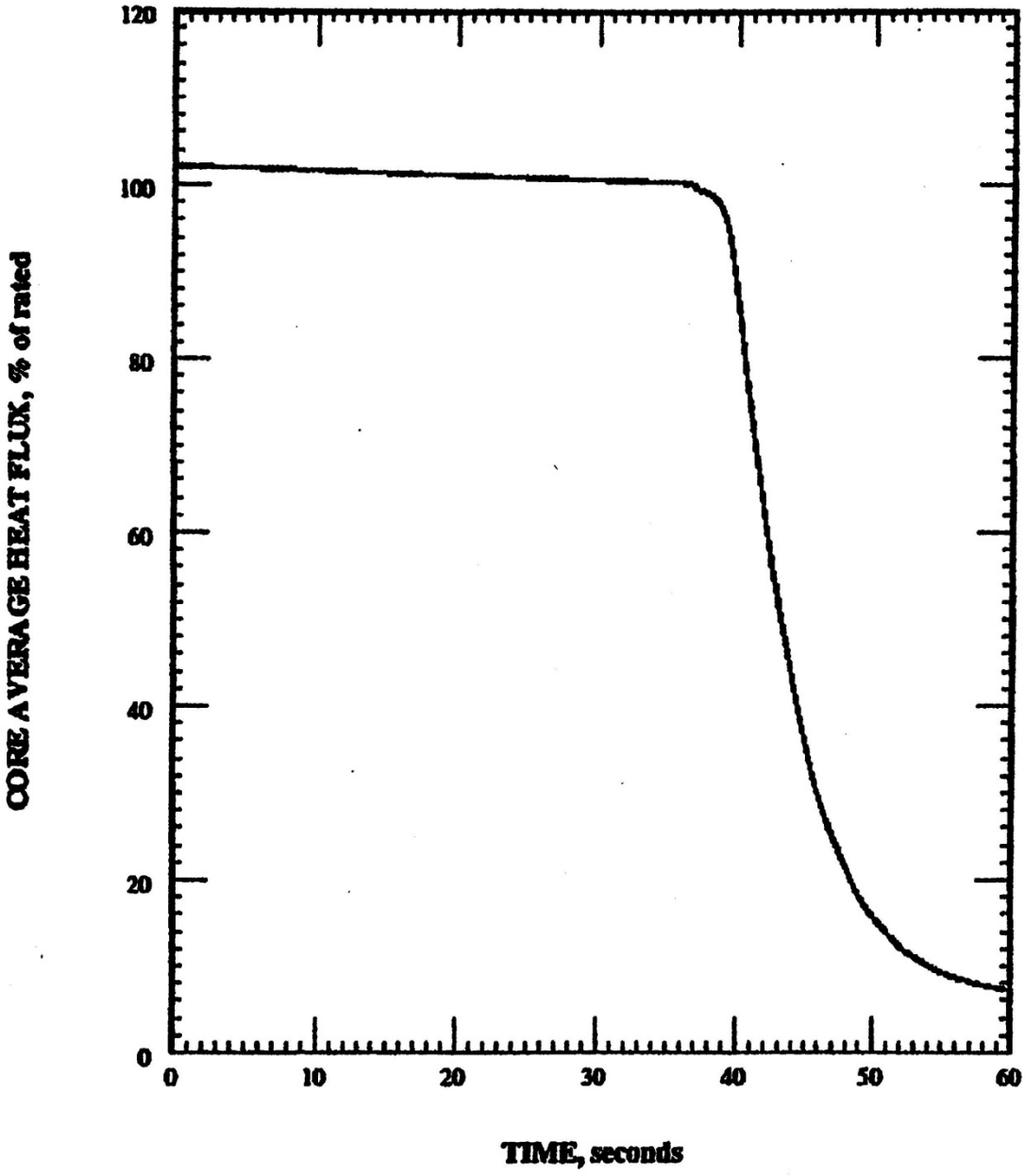


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
CORE POWER vs. TIME

FIGURE 15.2.8-16

JUNE 2015 REVISION 18

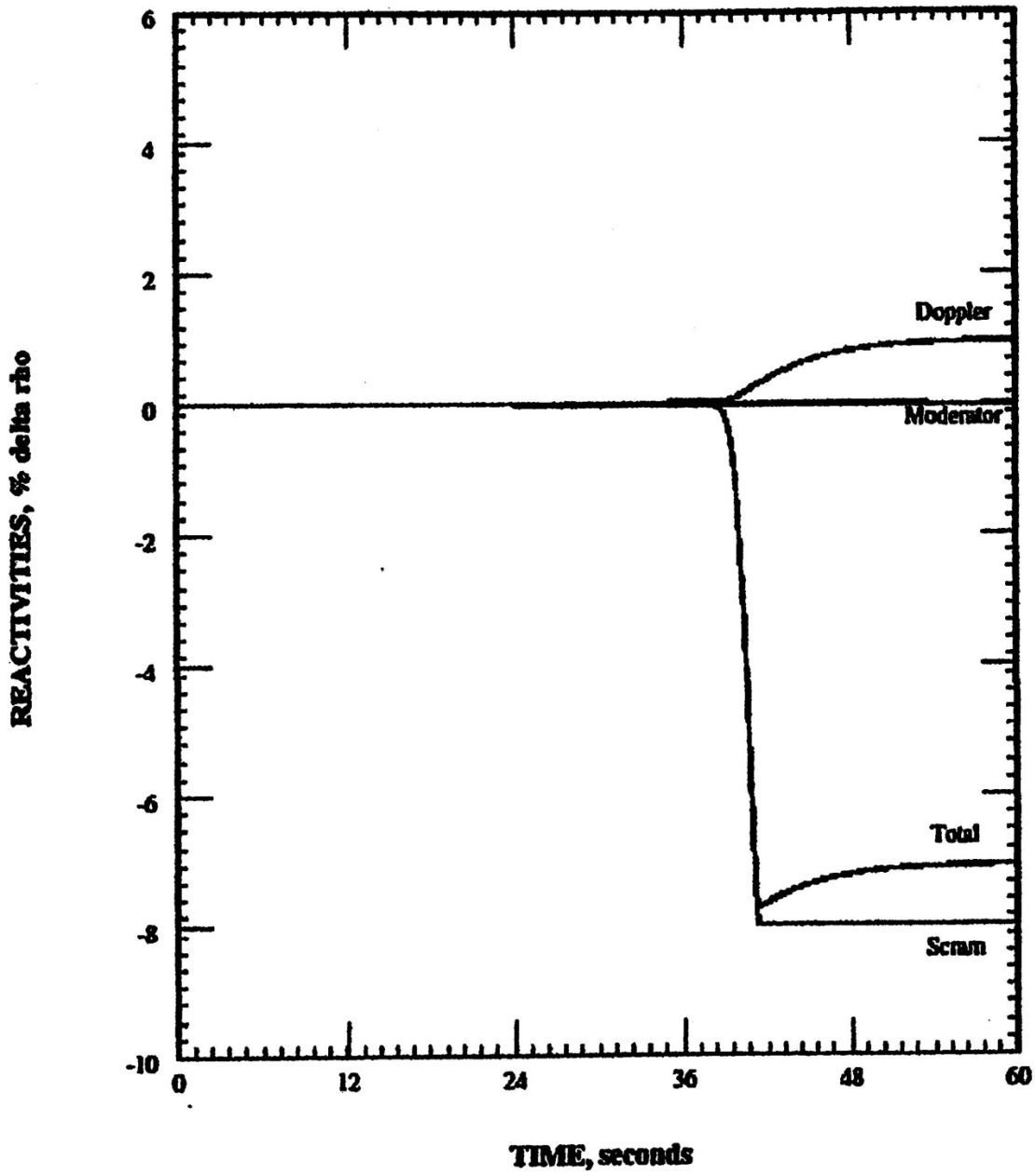


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
CORE HEAT FLUX vs. TIME

FIGURE 15.2.8-17

JUNE 2015 REVISION 18

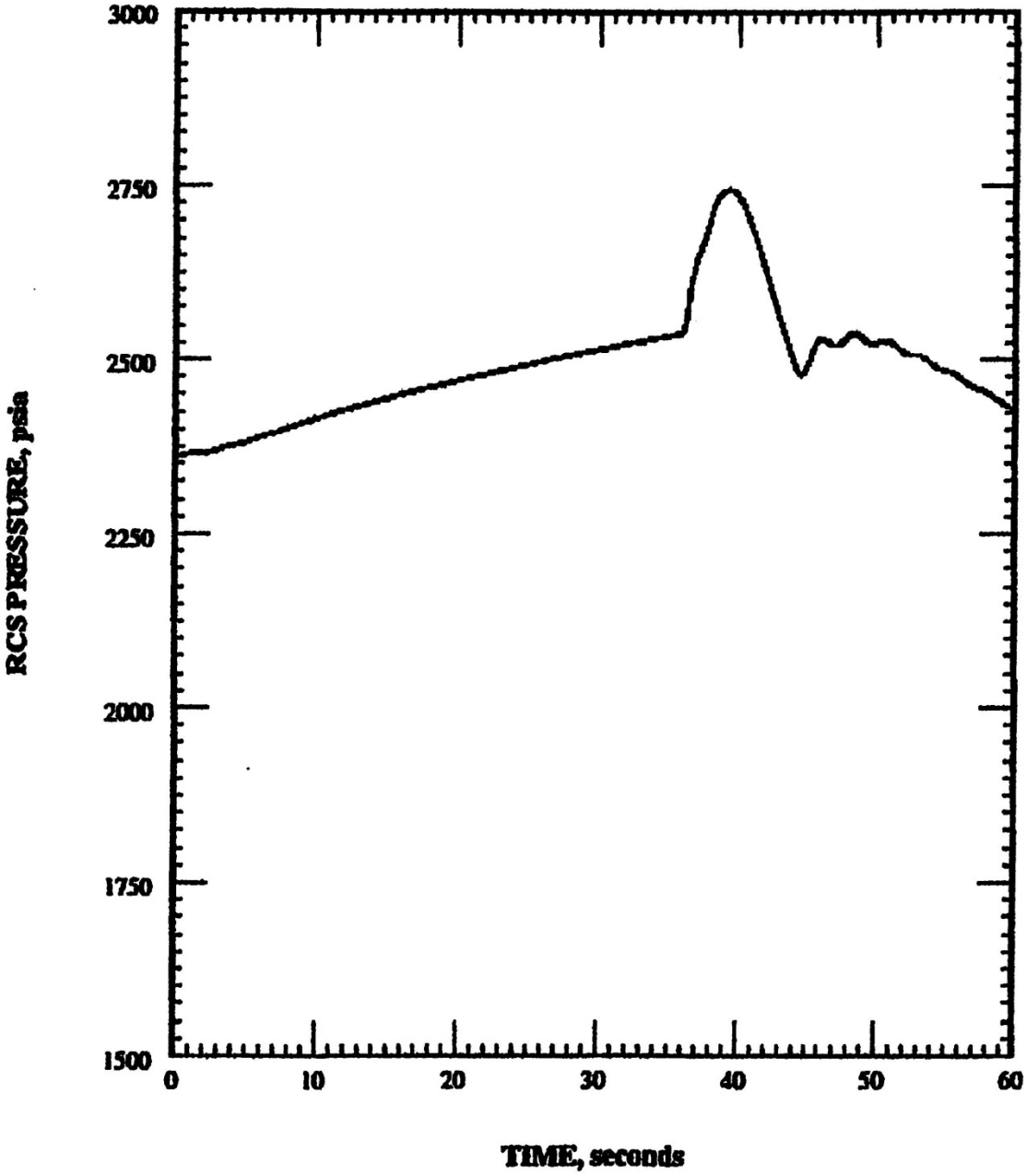


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
CORE REACTIVITIES vs. TIME

FIGURE 15.2.8-18

JUNE 2015 REVISION 18

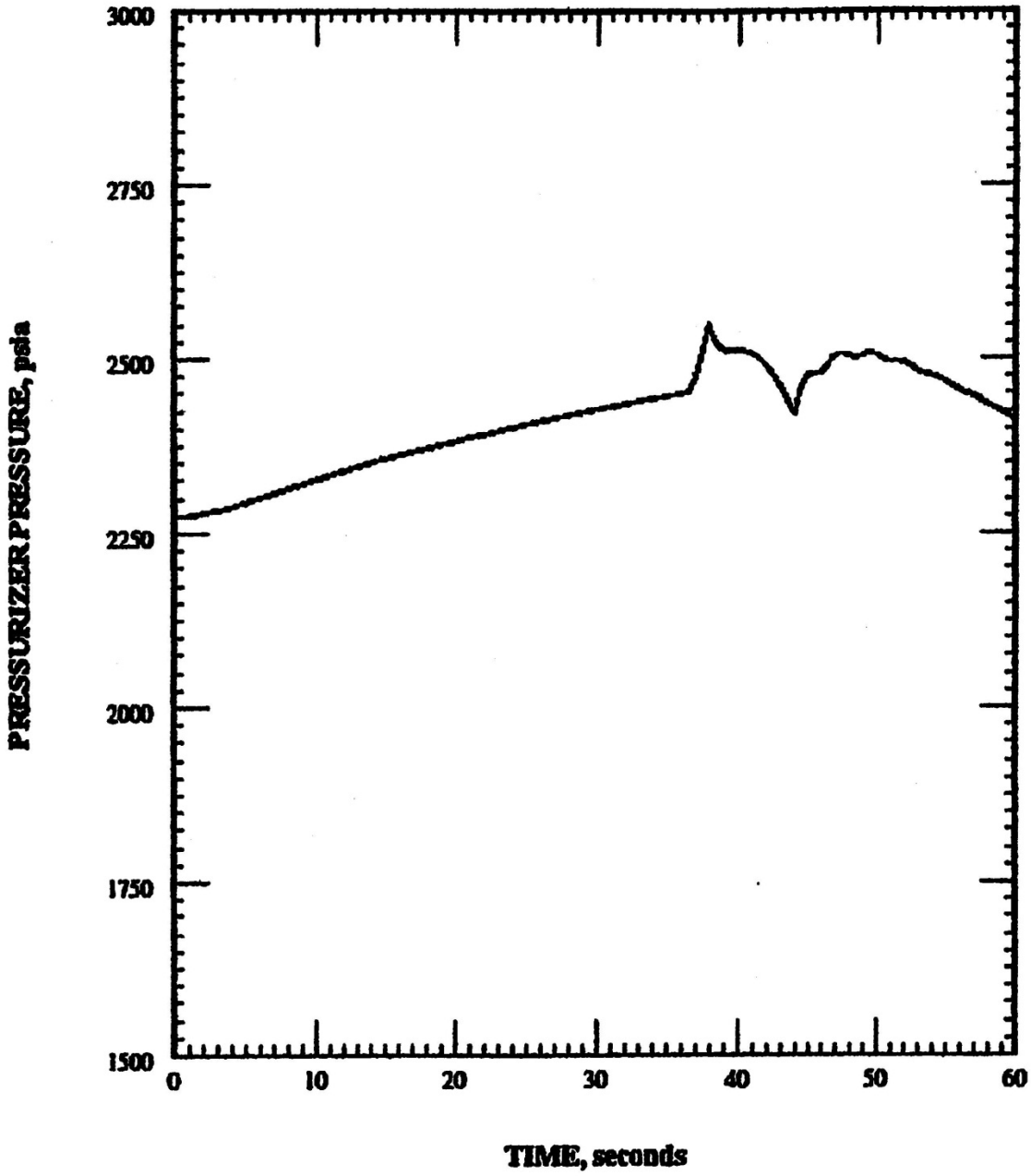


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
RCS PRESSURE vs. TIME

FIGURE 15.2.8-19

JUNE 2015 REVISION 18

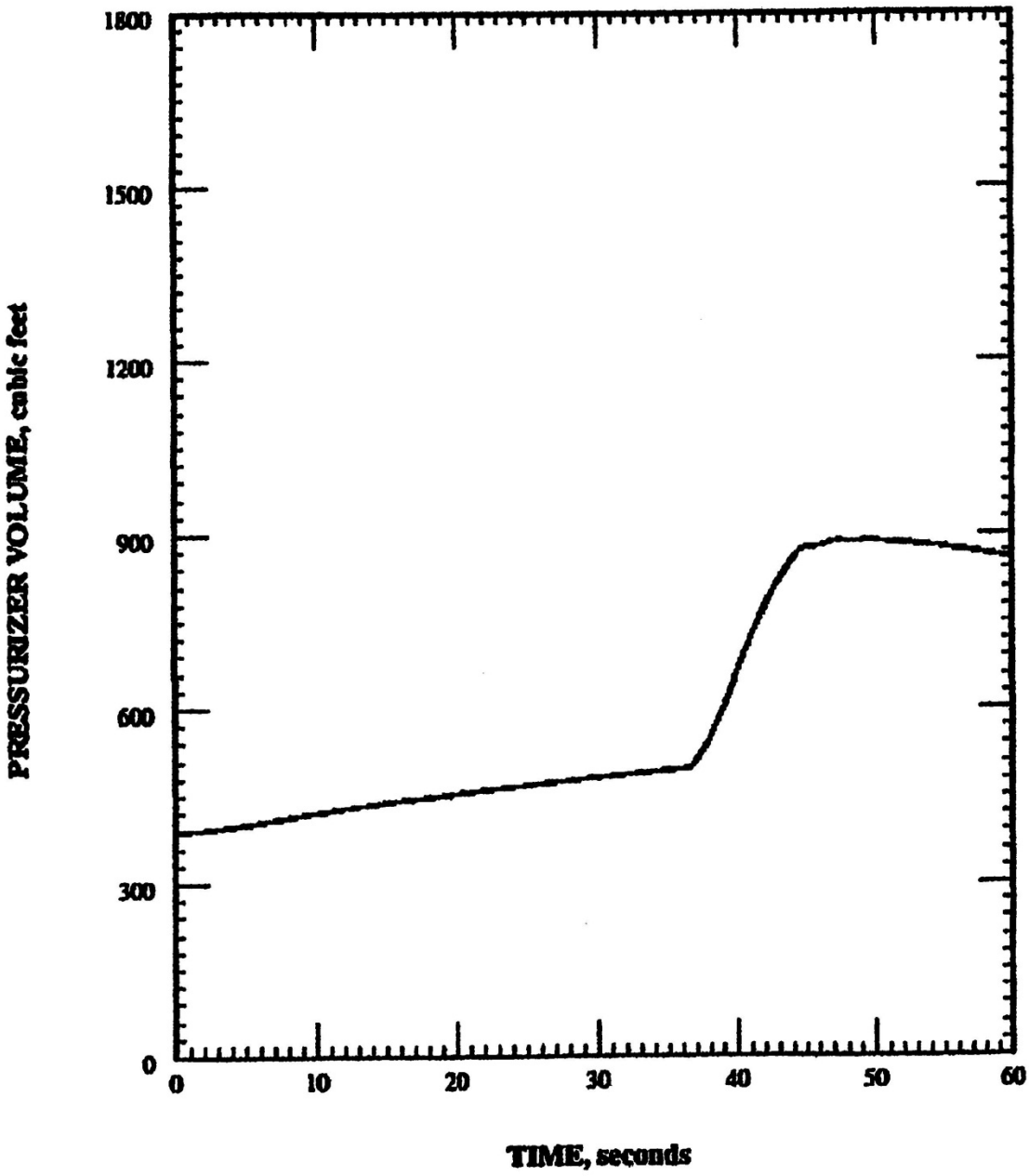


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
PRESSURIZER PRESSURE vs. TIME

FIGURE 15.2.8-20

JUNE 2015 REVISION 18

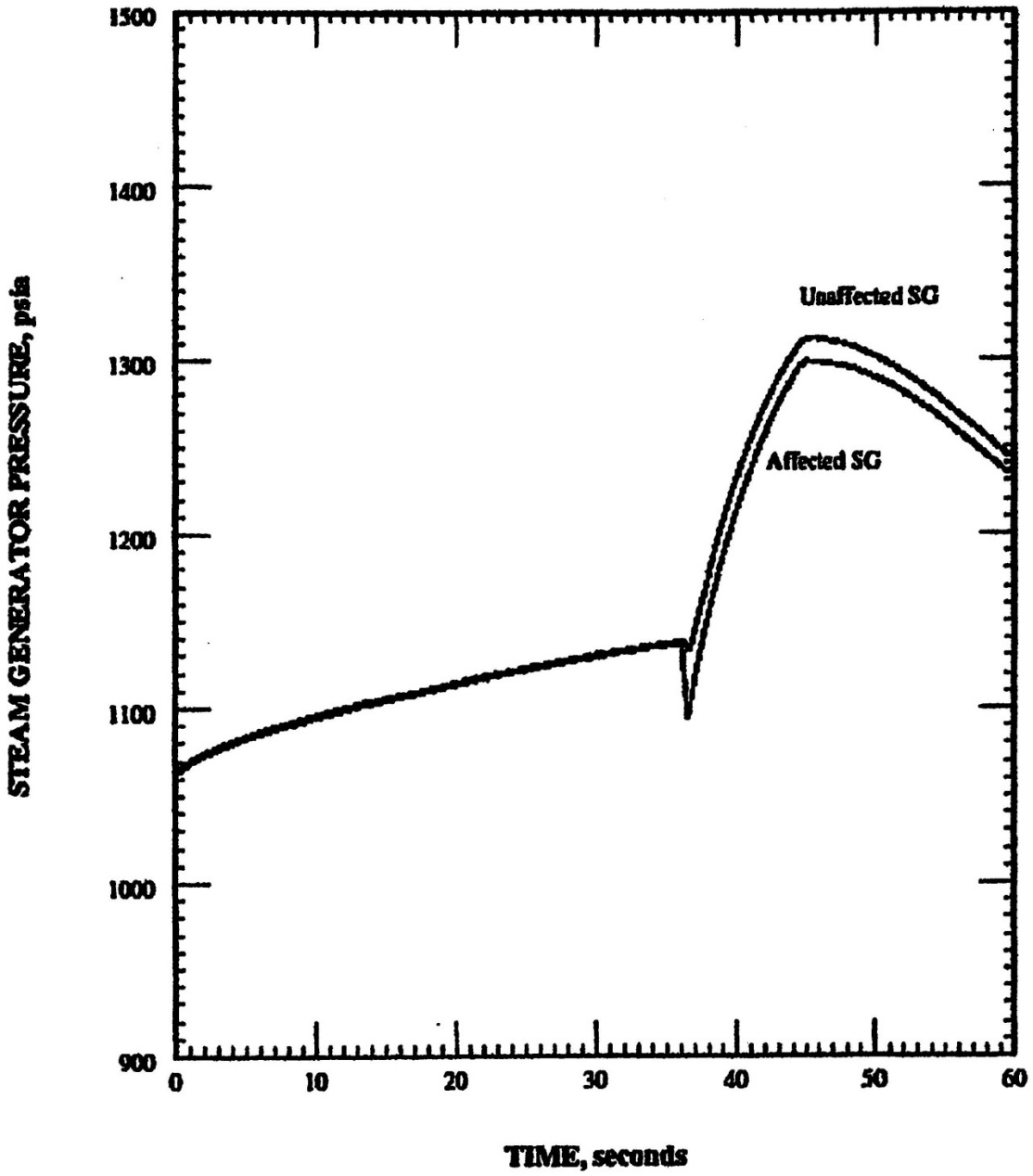


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
PRESSURIZER WATER VOLUME vs. TIME

FIGURE 15.2.8-21

JUNE 2015 REVISION 18

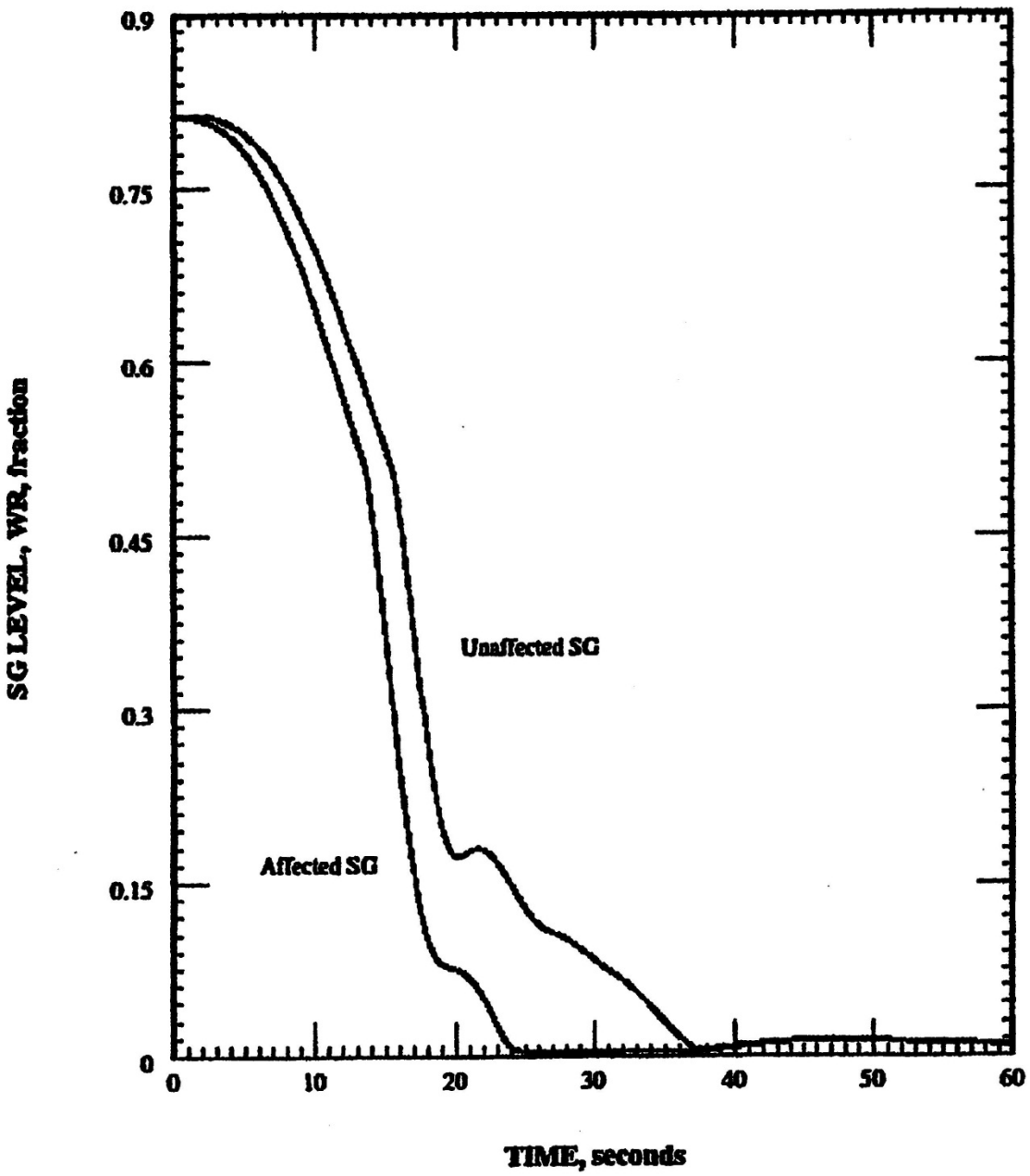


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
SG PRESSURE vs. TIME

FIGURE 15.2.8-22

JUNE 2015 REVISION 18

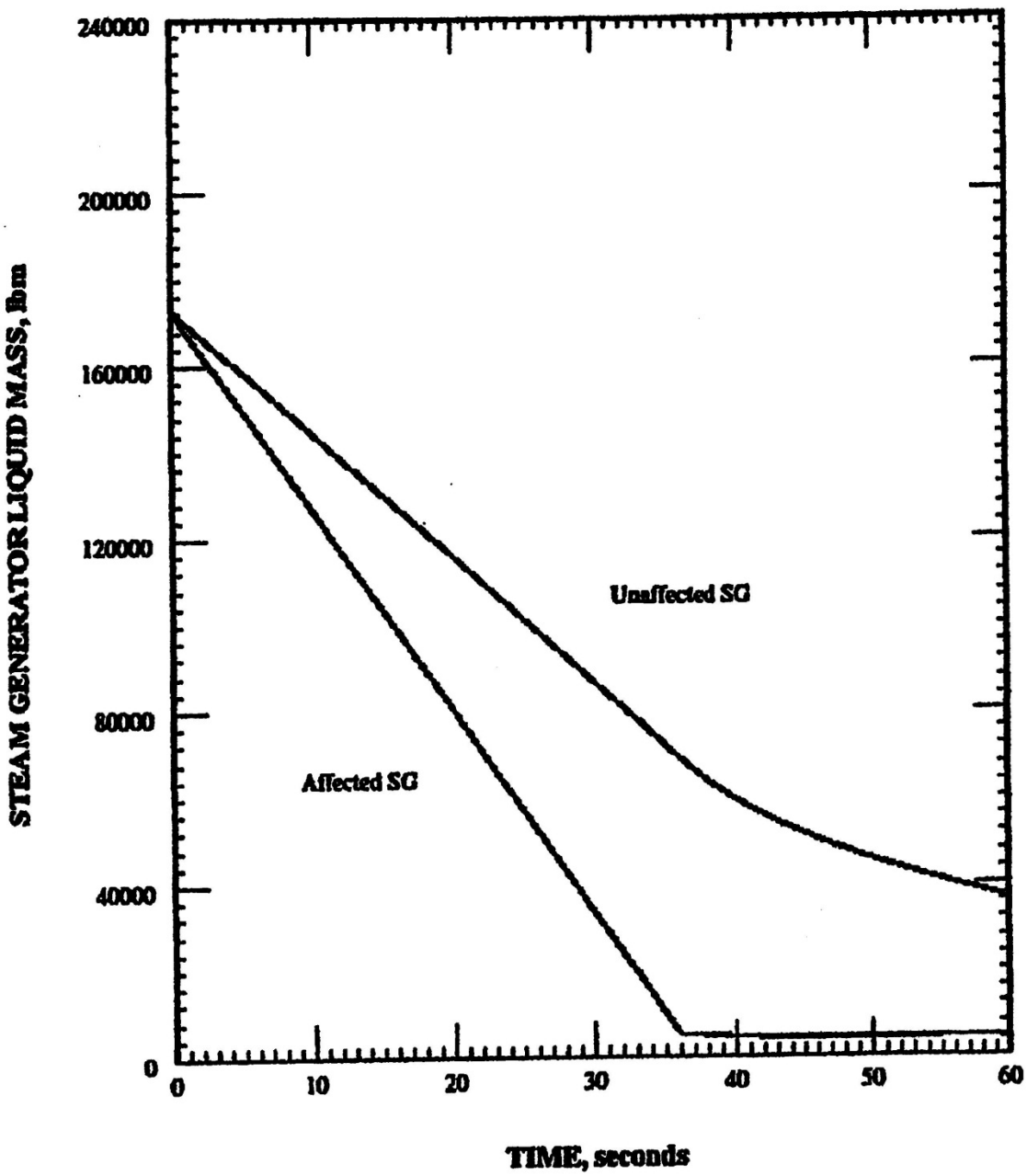


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
SG WATER LEVEL vs. TIME

FIGURE 15.2.8-23

JUNE 2015 REVISION 18

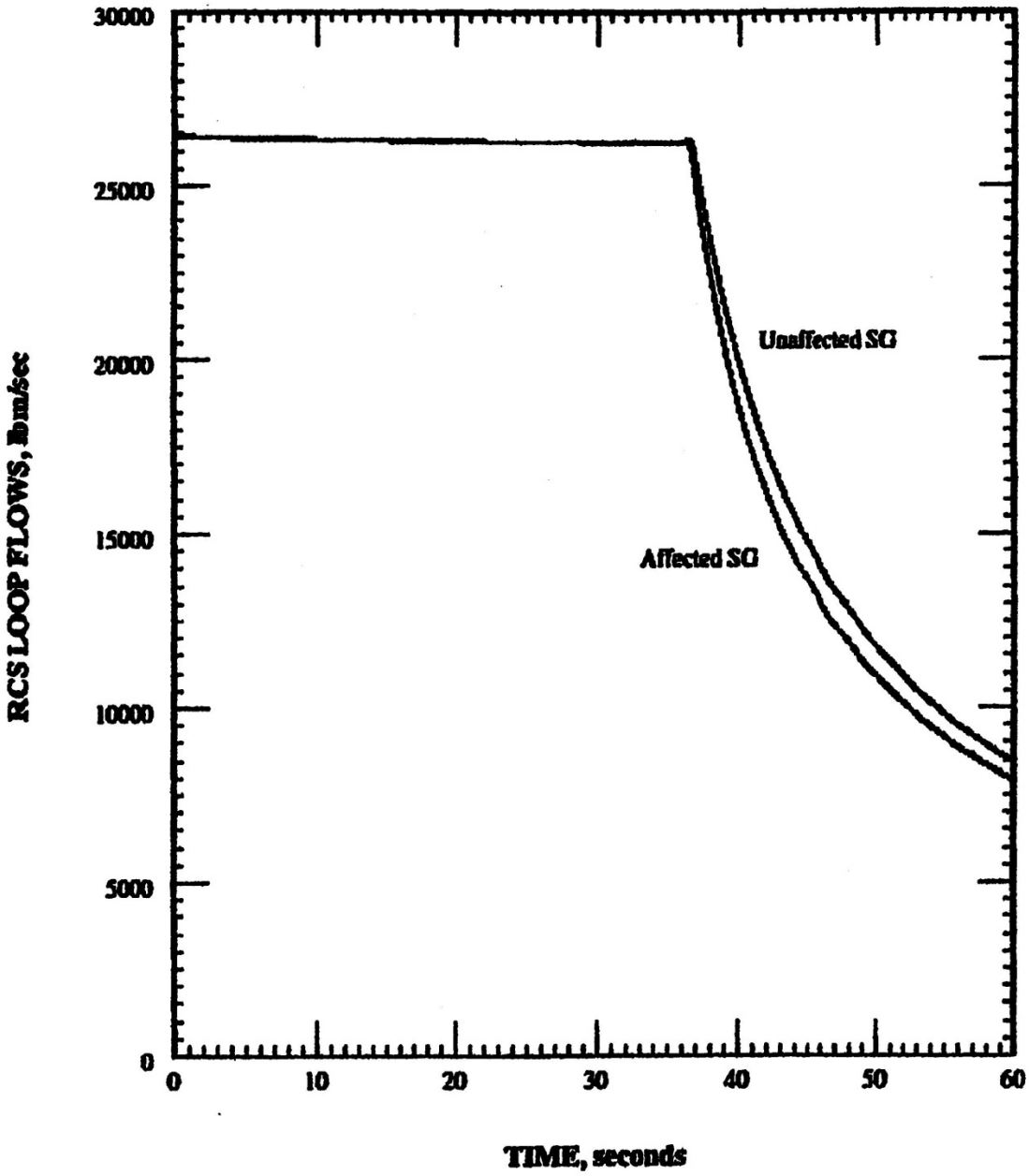


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
SG LIQUID INVENTORY vs. TIME

FIGURE 15.2.8-24

JUNE 2015 REVISION 18

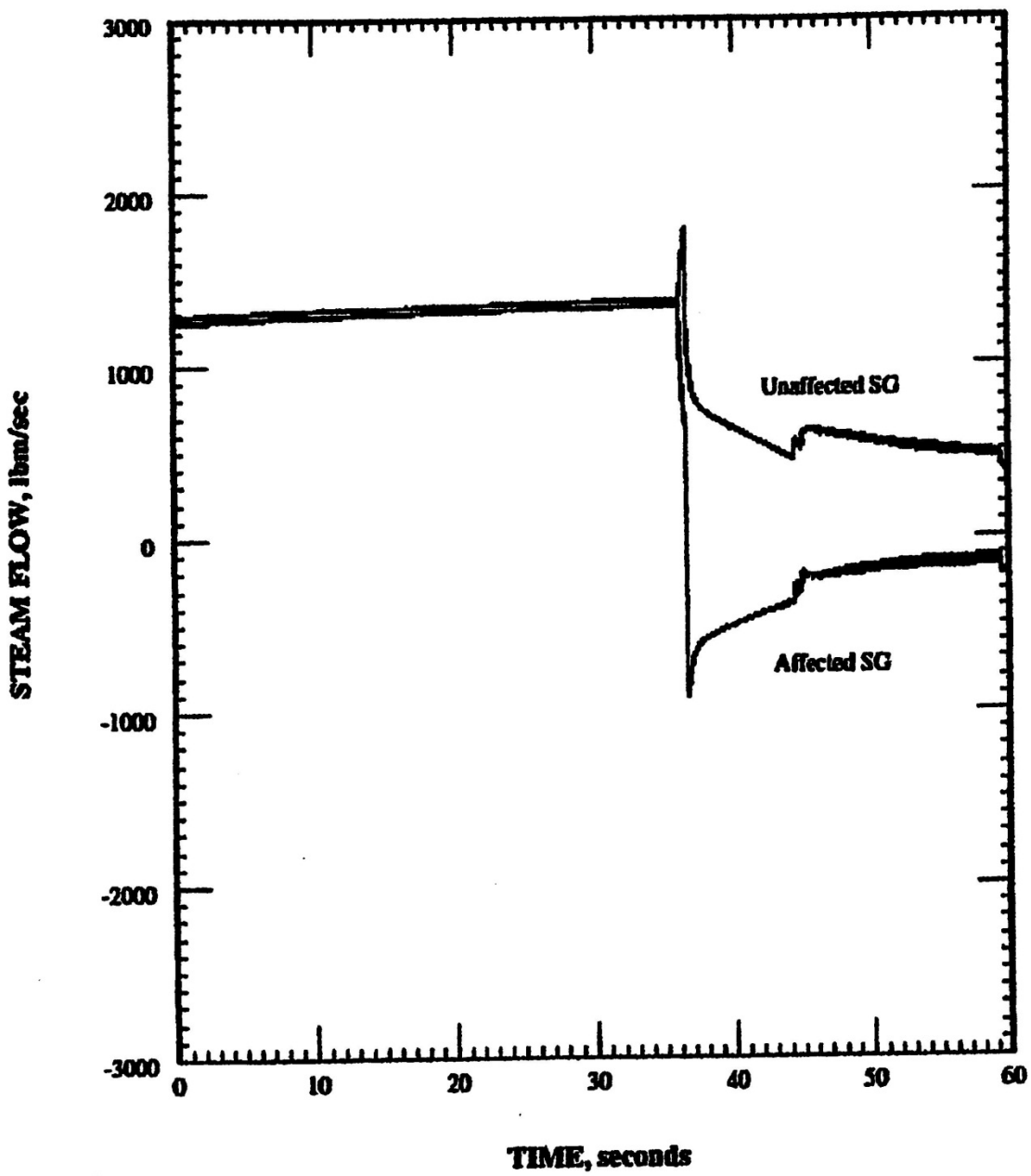


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
RCS LOOP FLOW vs. TIME

FIGURE 15.2.8-25

JUNE 2015 REVISION 18

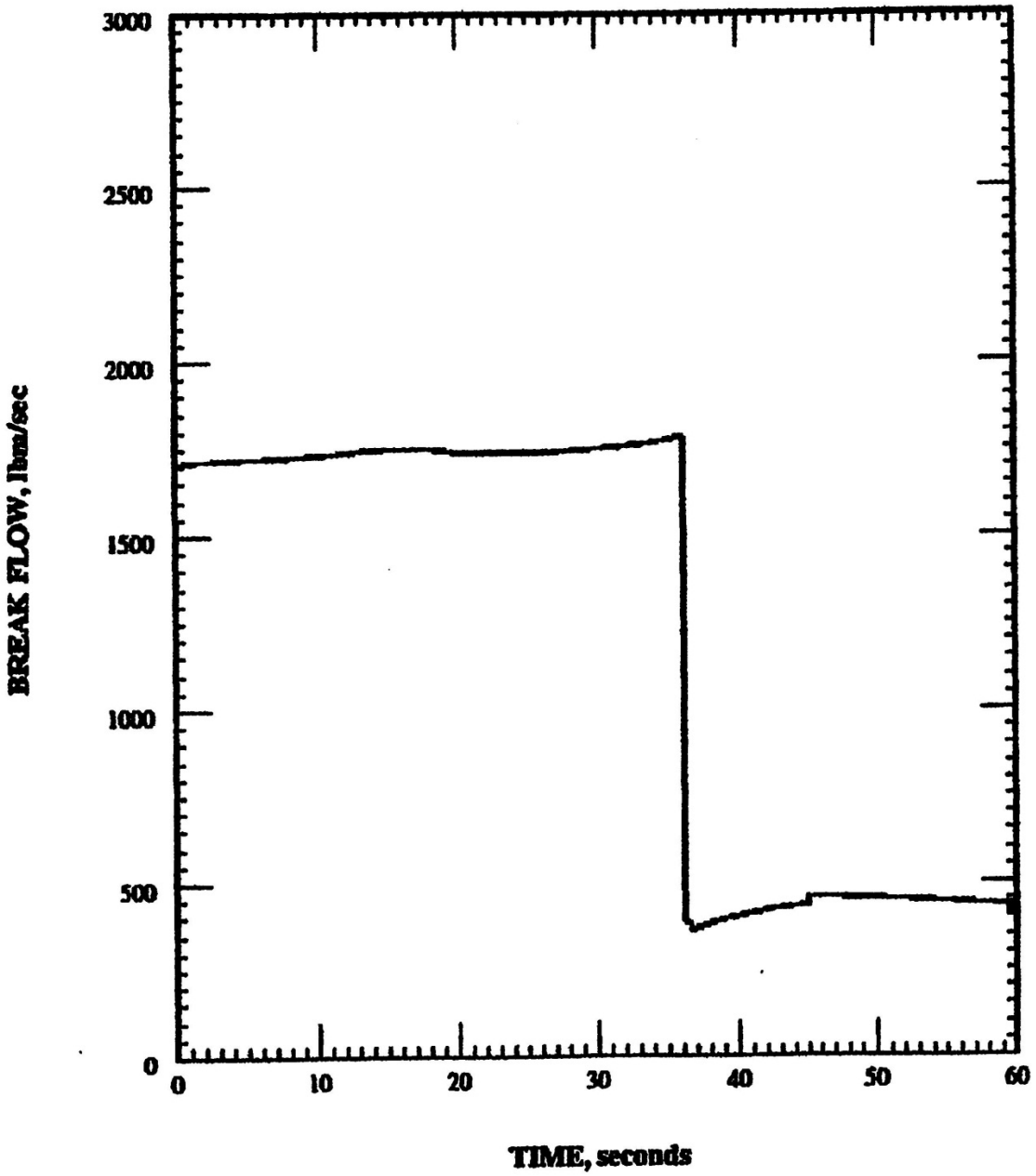


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
SG STEAM FLOW vs. TIME

FIGURE 15.2.8-26

JUNE 2015 REVISION 18

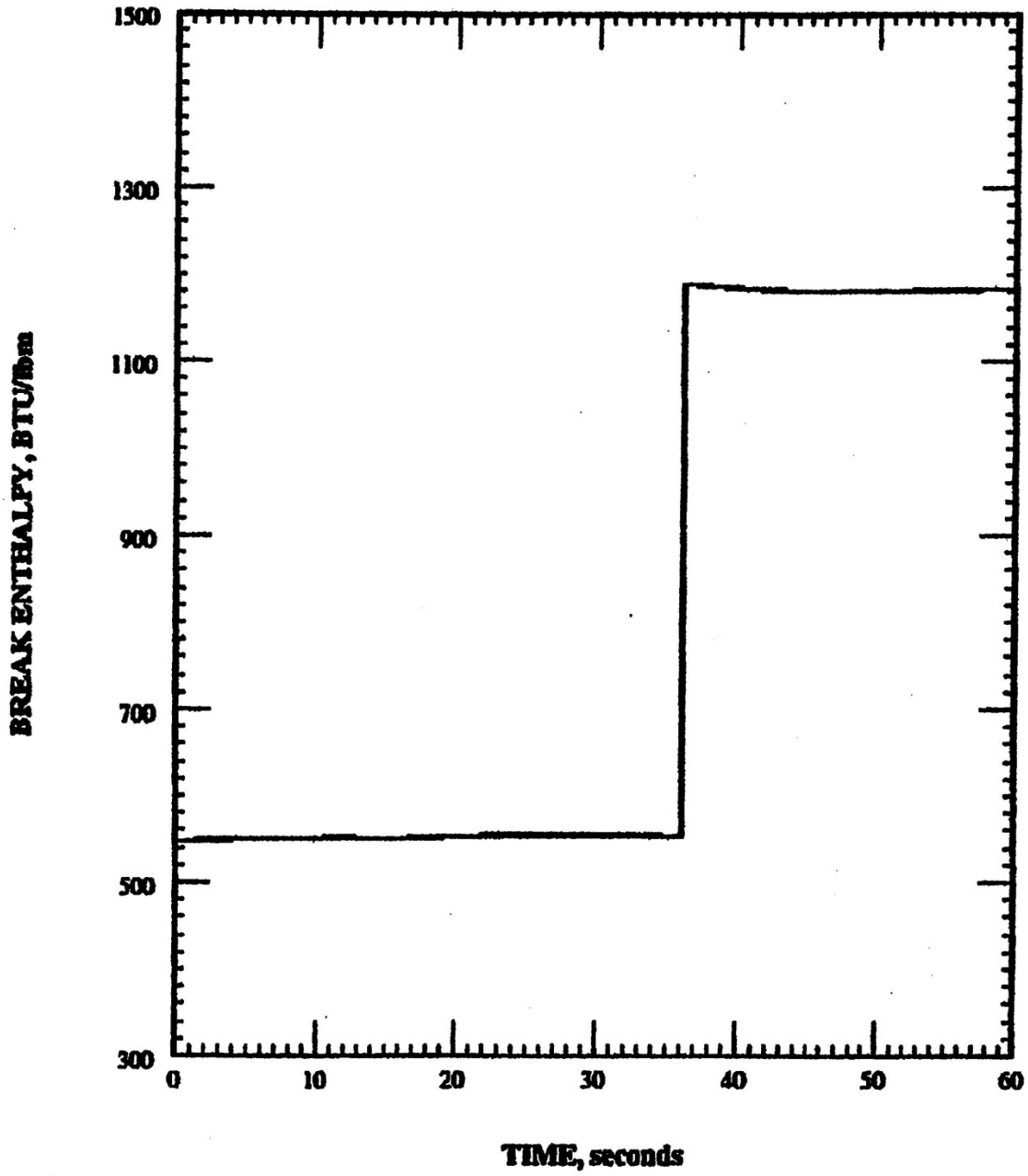


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
BREAK FLOW vs. TIME

FIGURE 15.2.8-27

JUNE 2015 REVISION 18

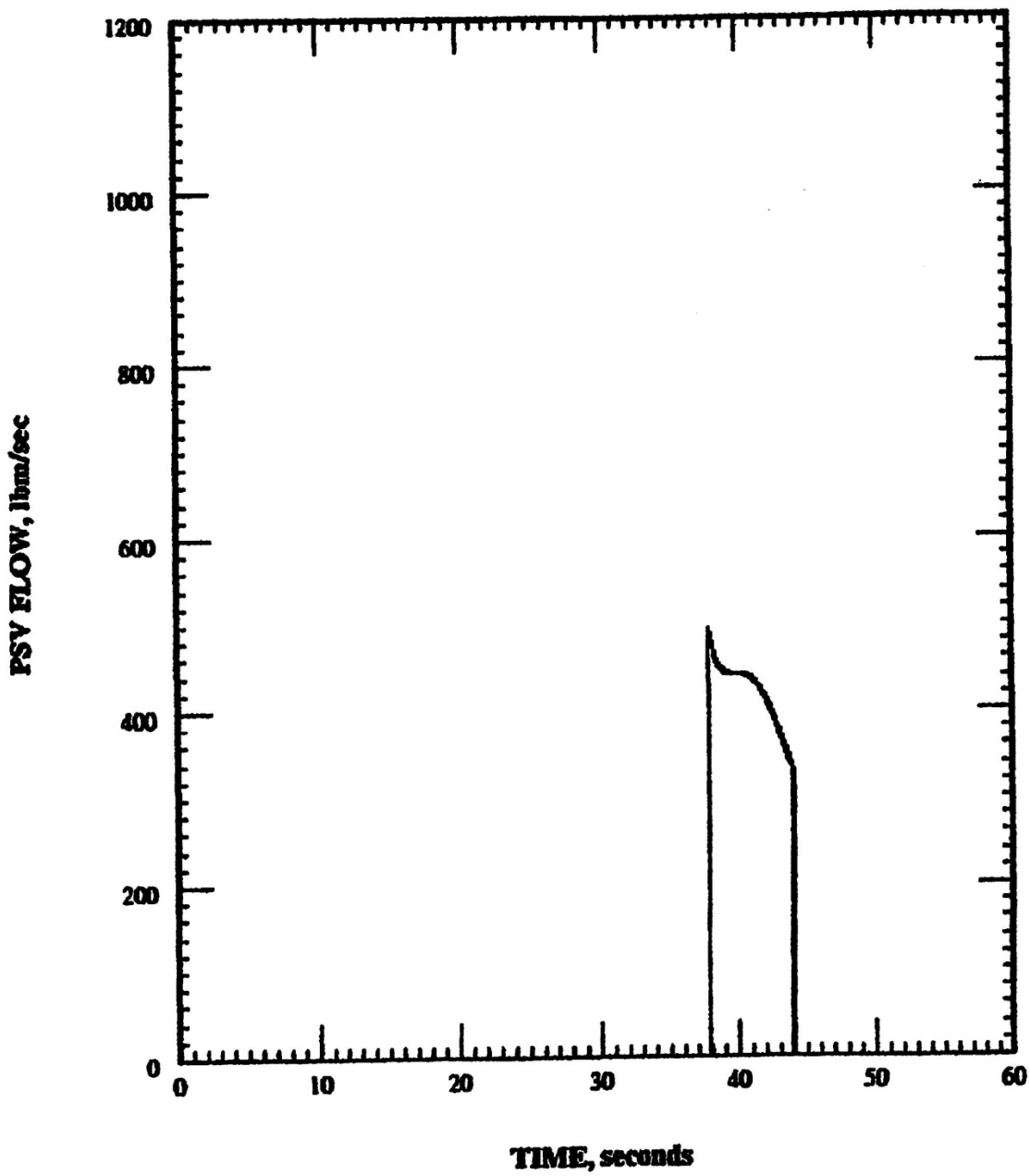


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
BREAK ENTHALPY vs. TIME

FIGURE 15.2.8-28

JUNE 2015 REVISION 18

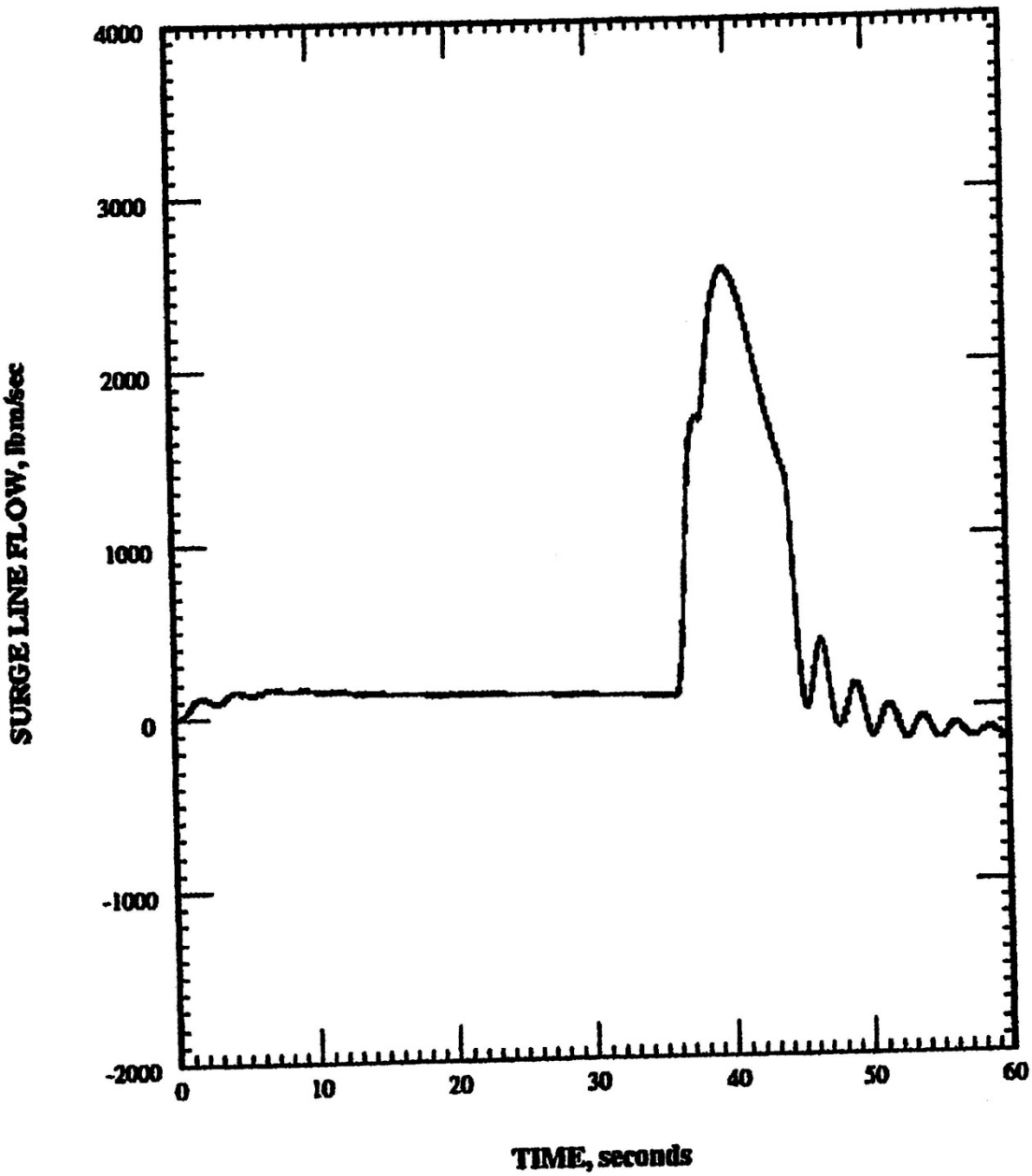


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
PSV FLOW vs. TIME

FIGURE 15.2.8-29

JUNE 2015 REVISION 18

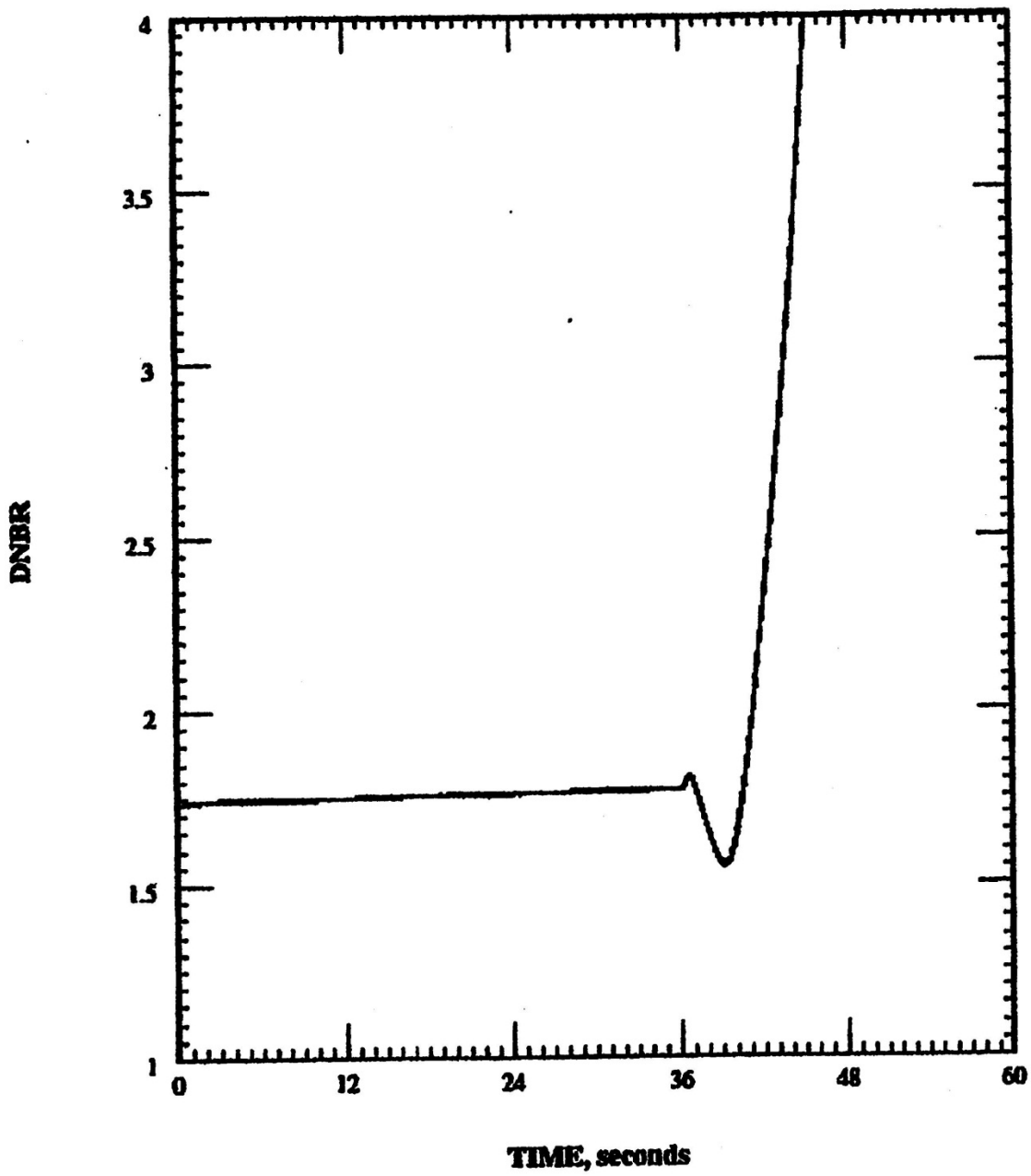


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
SURGE FLOW vs. TIME

FIGURE 15.2.8-30

JUNE 2015 REVISION 18

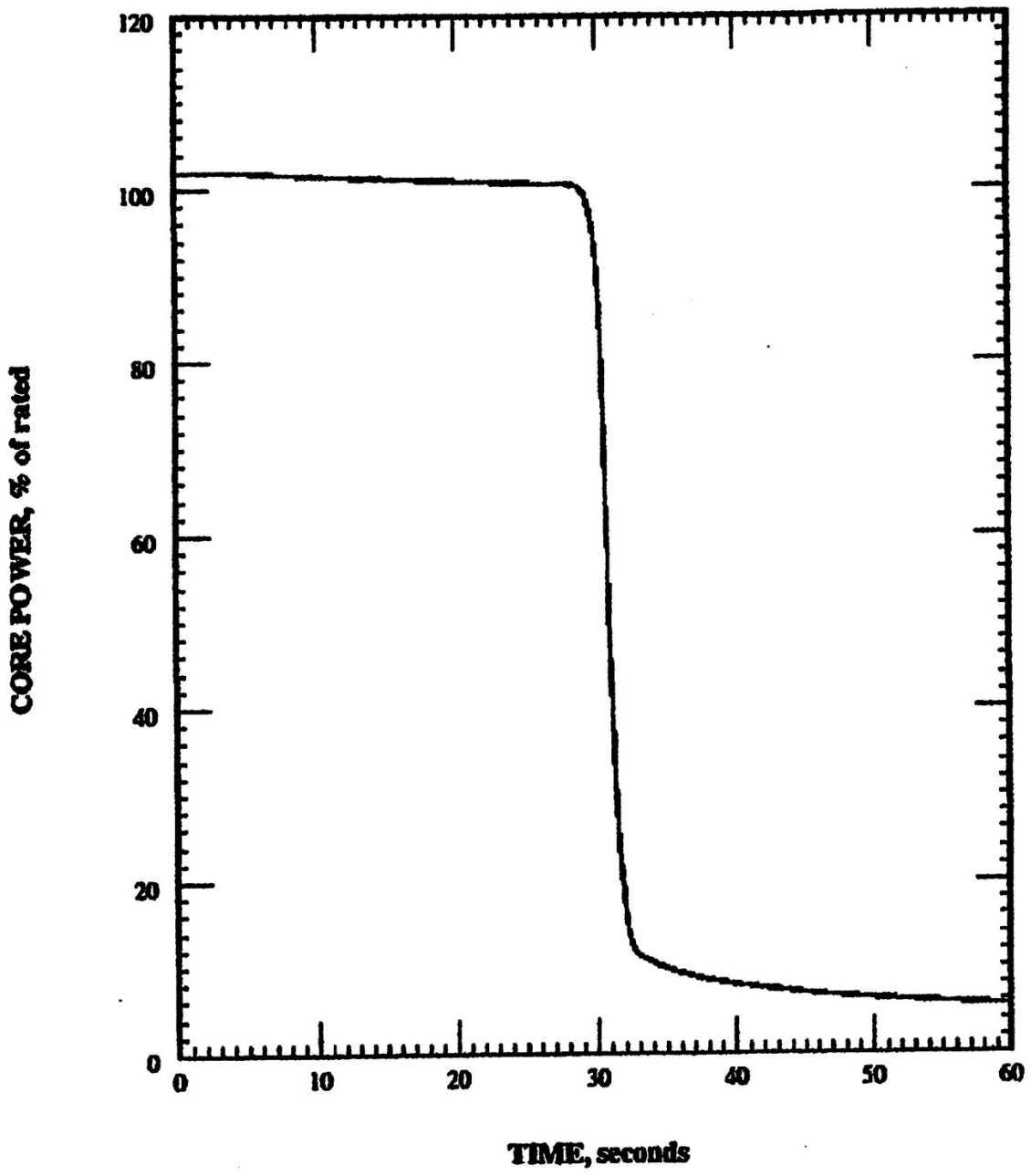


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITH LOP
PRIMARY PEAK PRESSURE/FUEL PERFORMANCE CASE
DNBR vs. TIME

FIGURE 15.2.8-31

JUNE 2015 REVISION 18

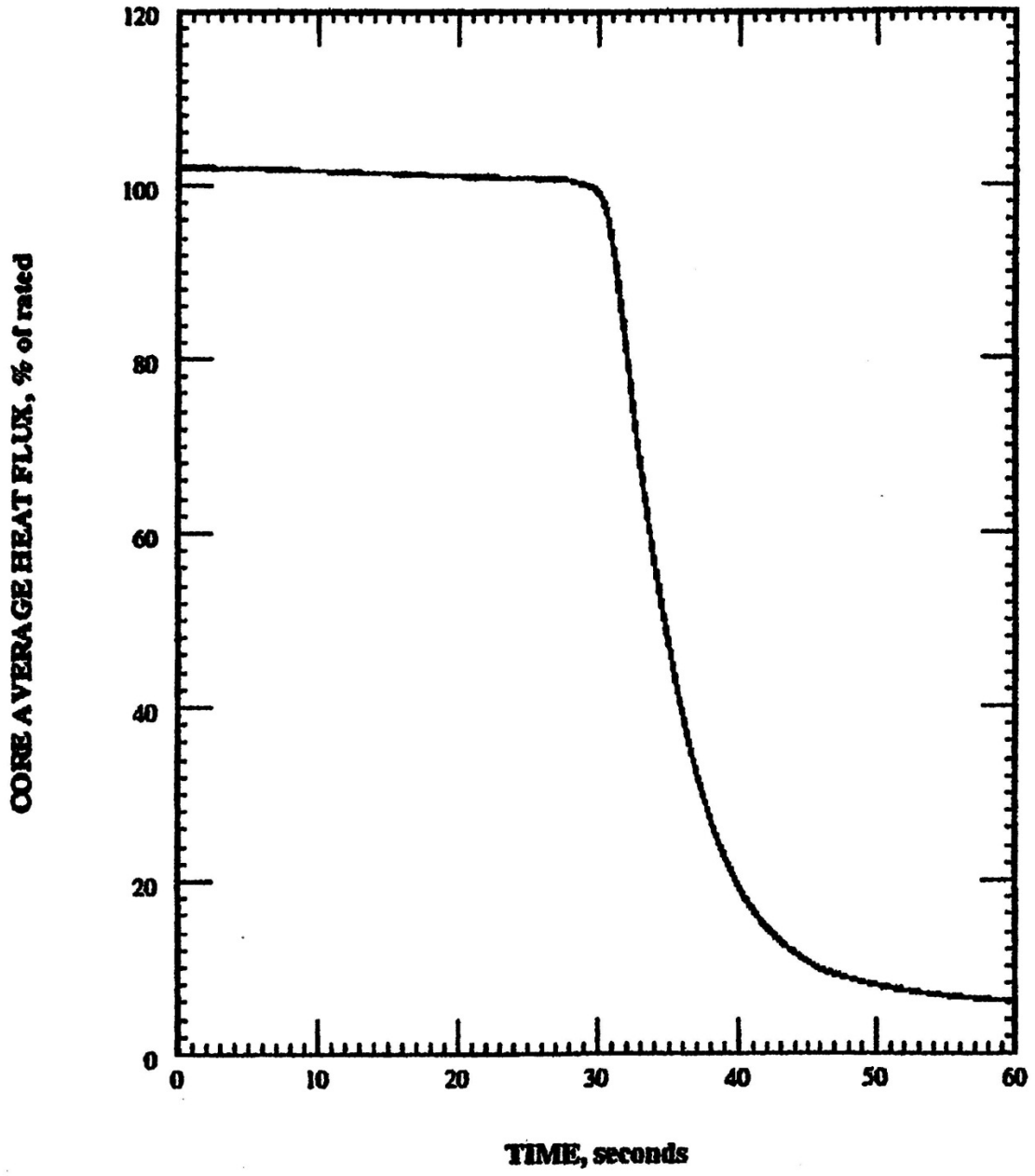


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
CORE POWER vs. TIME

FIGURE 15.2.8-32

JUNE 2015 REVISION 18

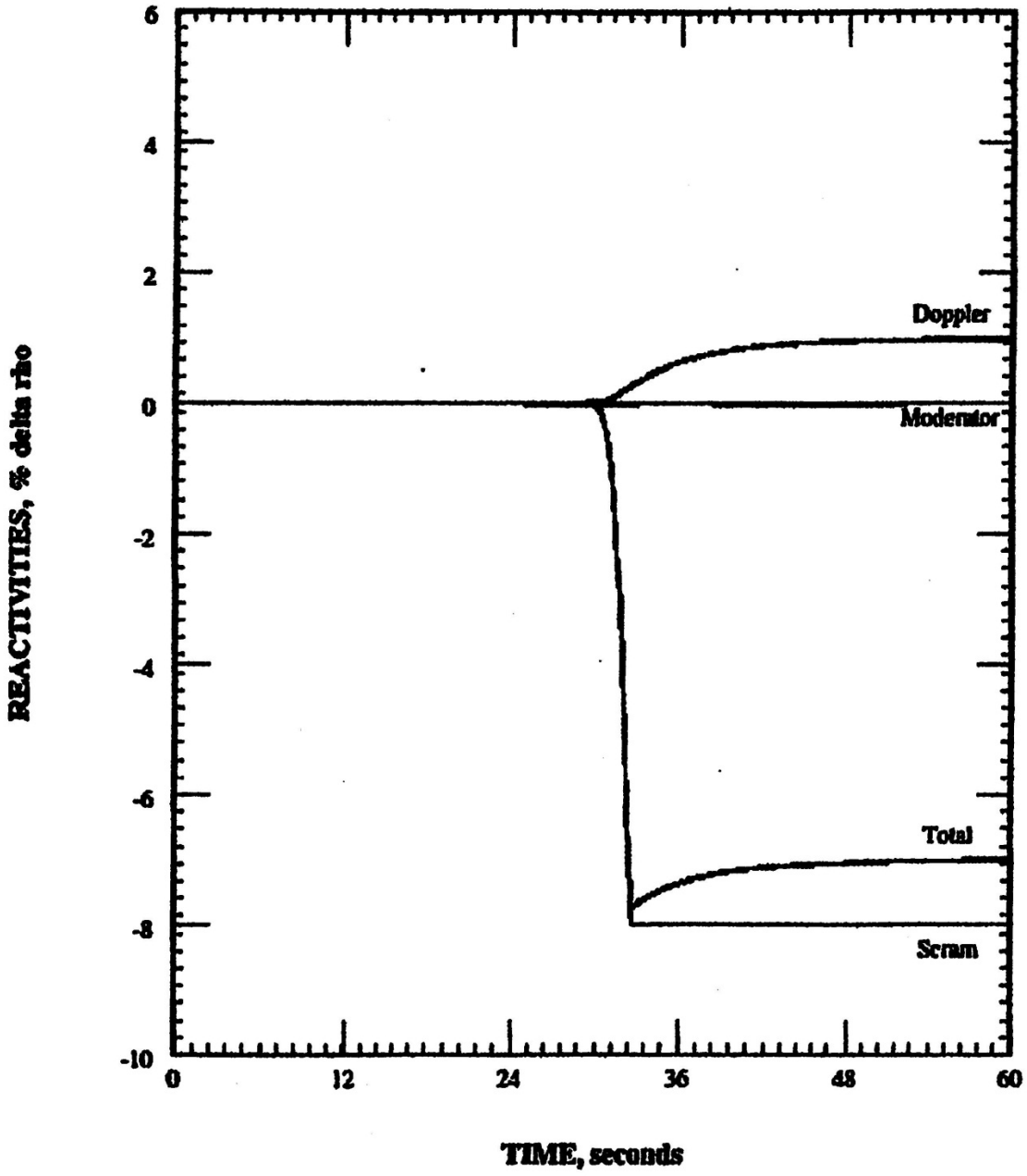


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
CORE HEAT FLUX vs. TIME

FIGURE 15.2.8-33

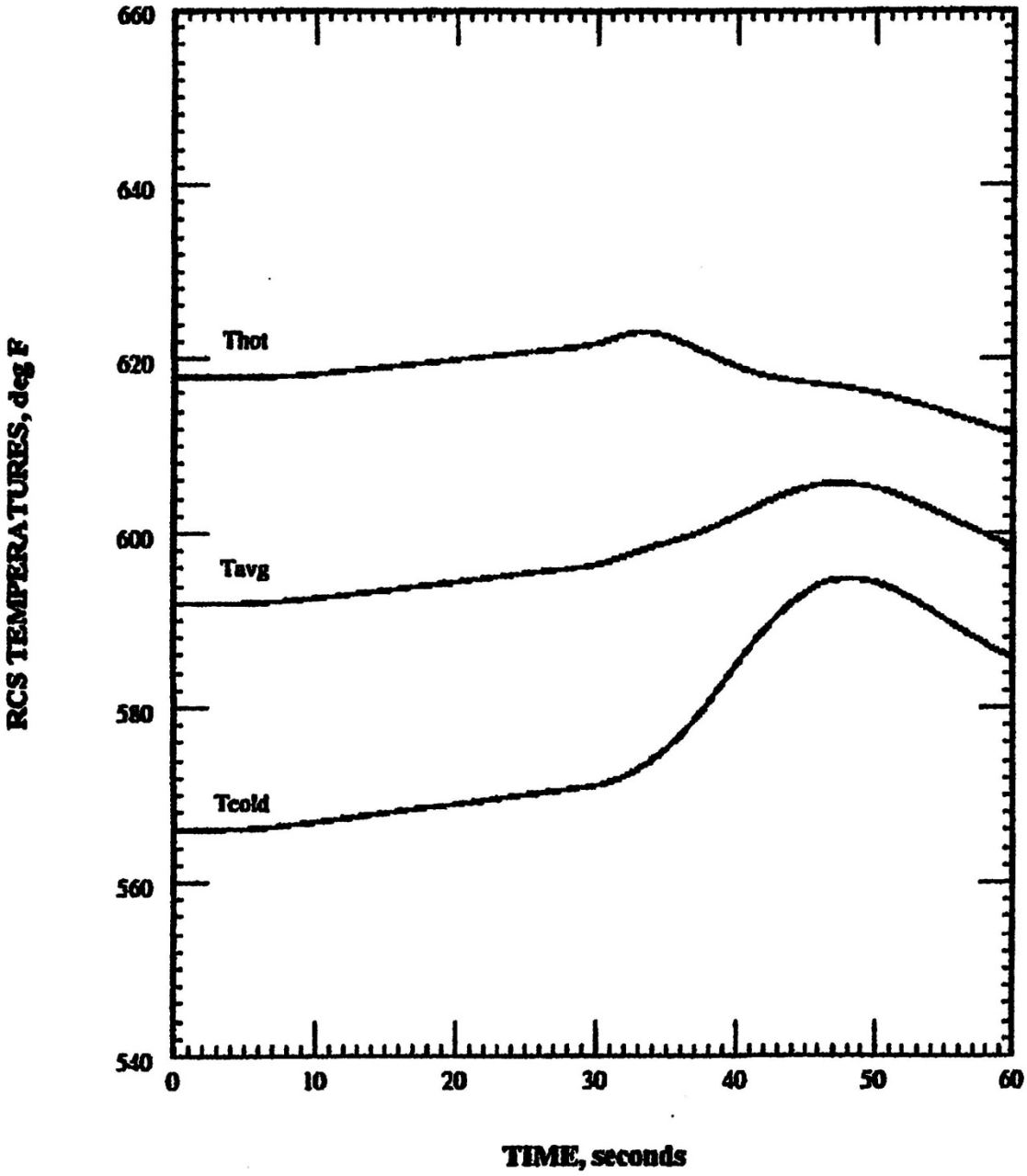
JUNE 2015 REVISION 18



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
CORE REACTIVITIES vs. TIME

FIGURE 15.2.8-34

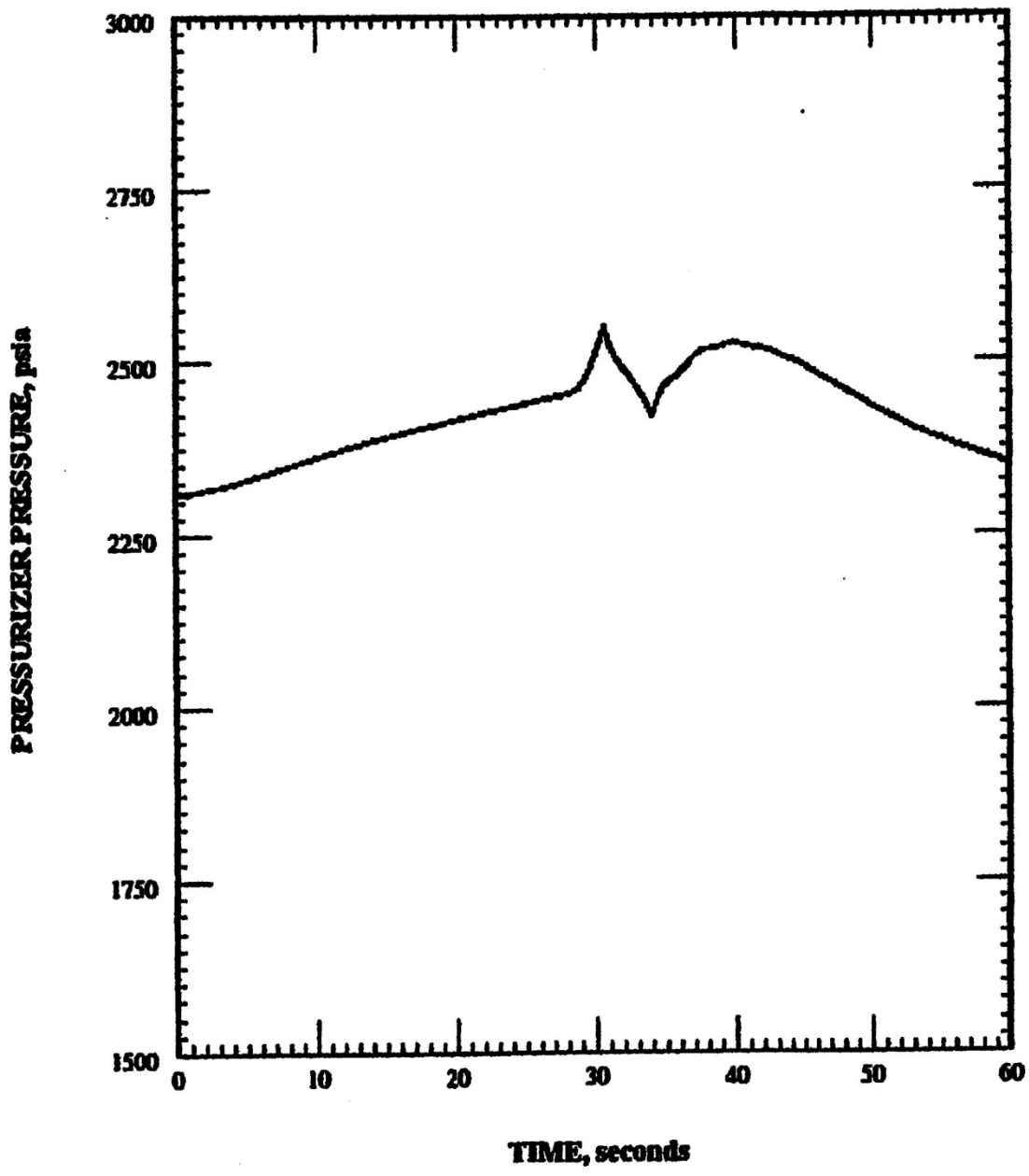


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
RCS TEMPERATURES vs. TIME

FIGURE 15.2.8-35

JUNE 2015 REVISION 18

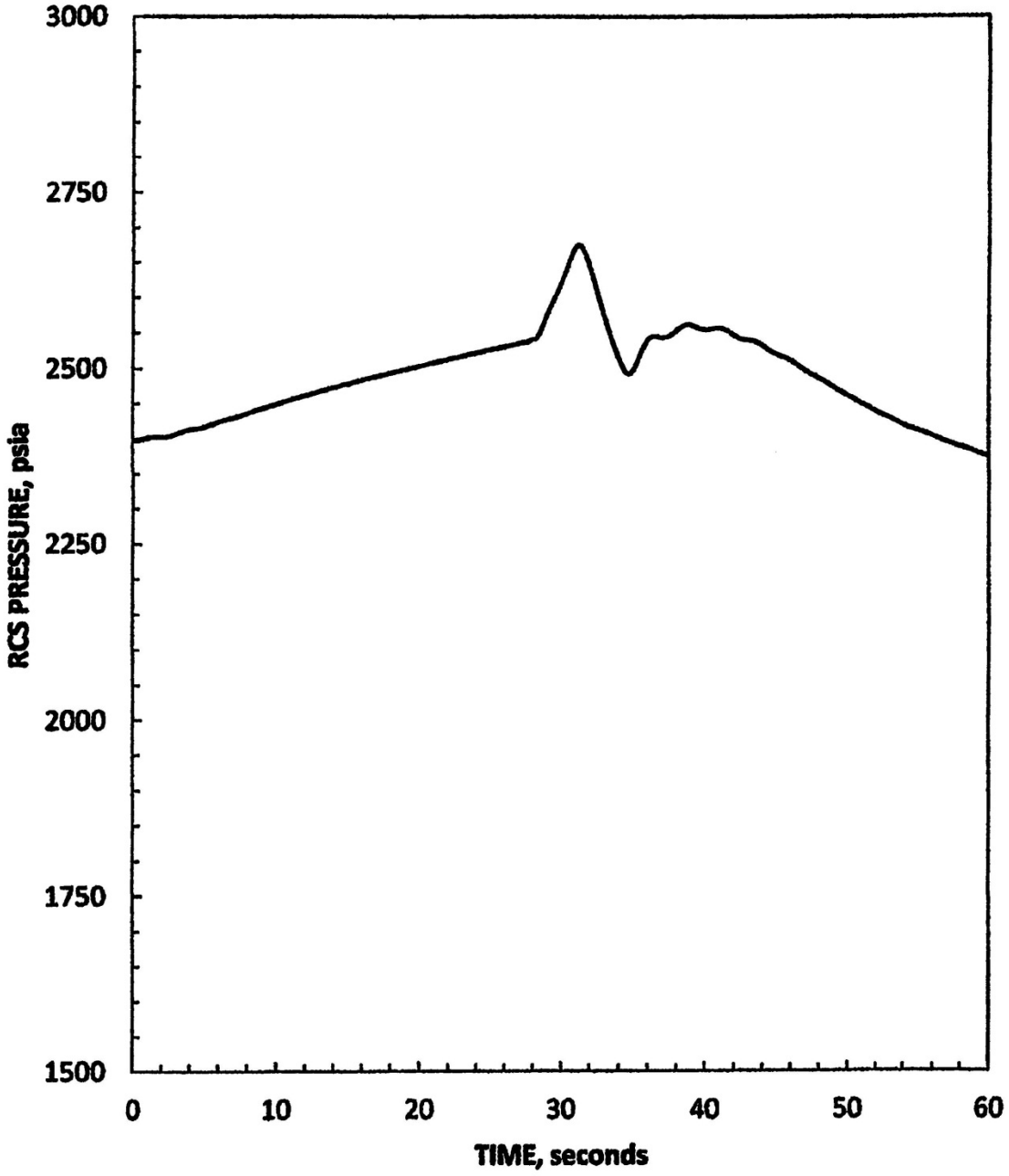


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
PRESSURIZER PRESSURE vs. TIME

FIGURE 15.2.8-36a

JUNE 2015 REVISION 18

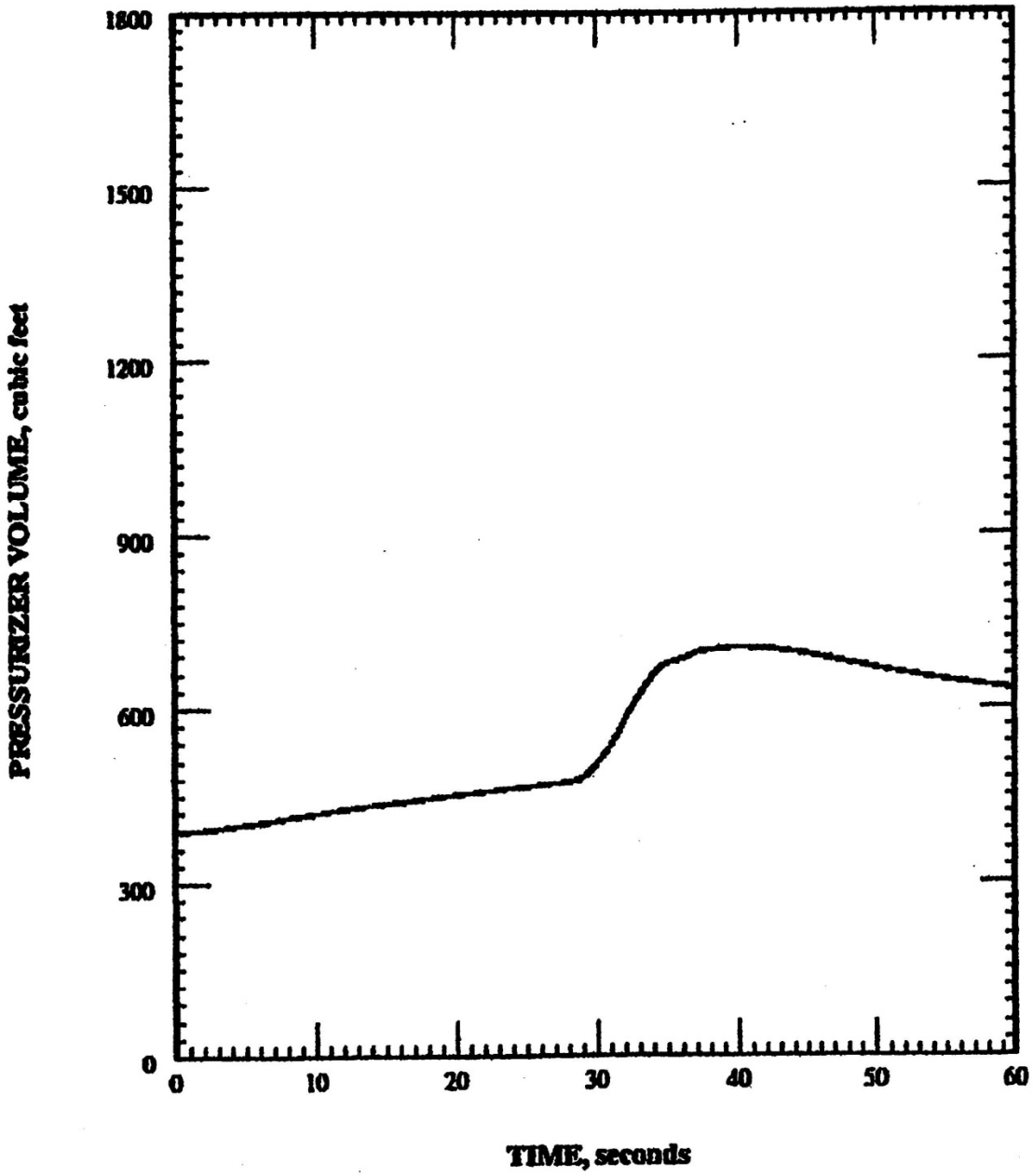


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
RCS PRESSURE vs. TIME

FIGURE 15.2.8-36b

JUNE 2015 REVISION 18

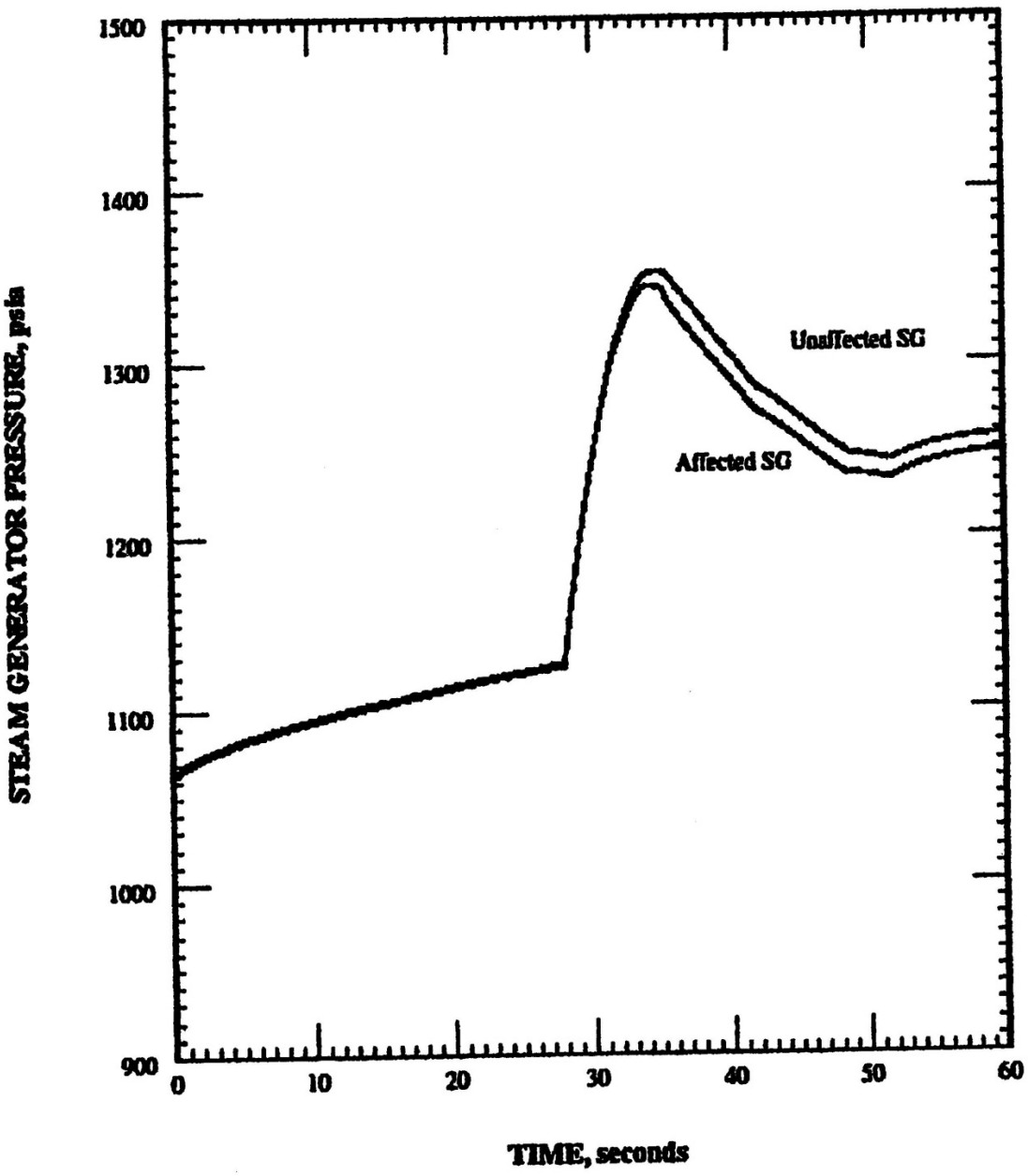


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
PRESSURIZER WATER VOLUME vs. TIME

FIGURE 15.2.8-37

JUNE 2015 REVISION 18

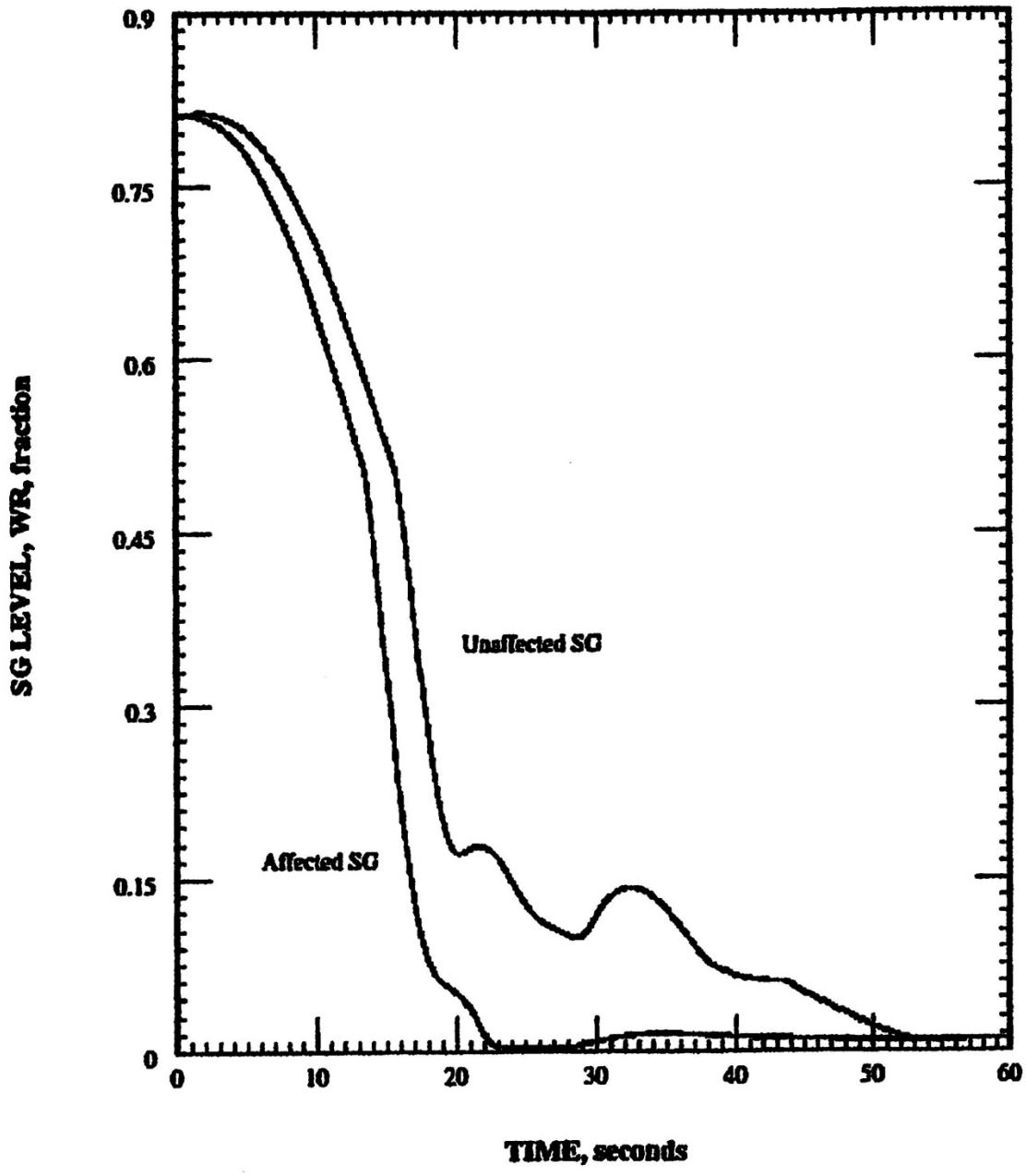


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
SG PRESSURE vs. TIME

FIGURE 15.2.8-38

JUNE 2015 REVISION 18

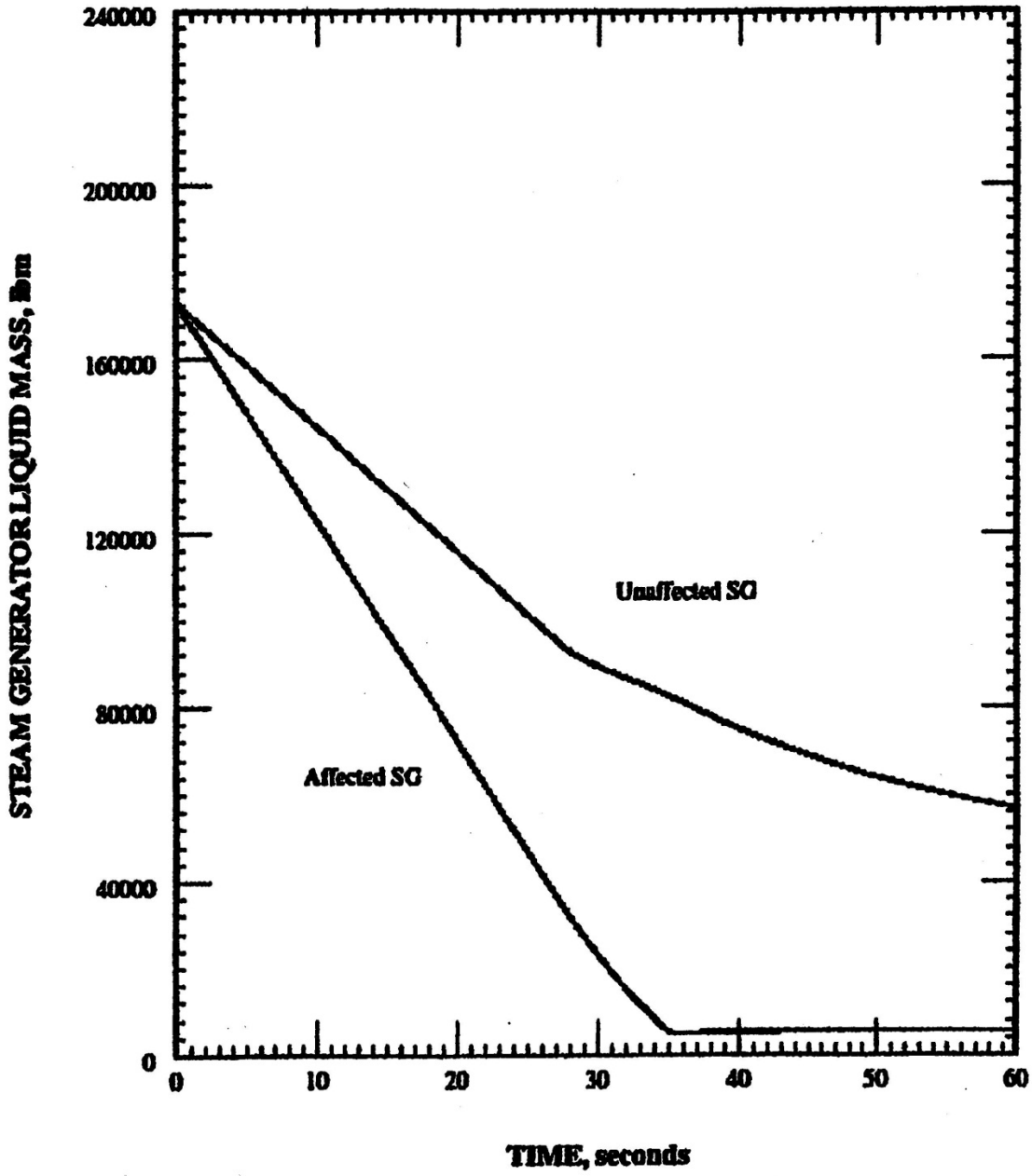


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
SG WATER LEVEL vs. TIME

FIGURE 15.2.8-39

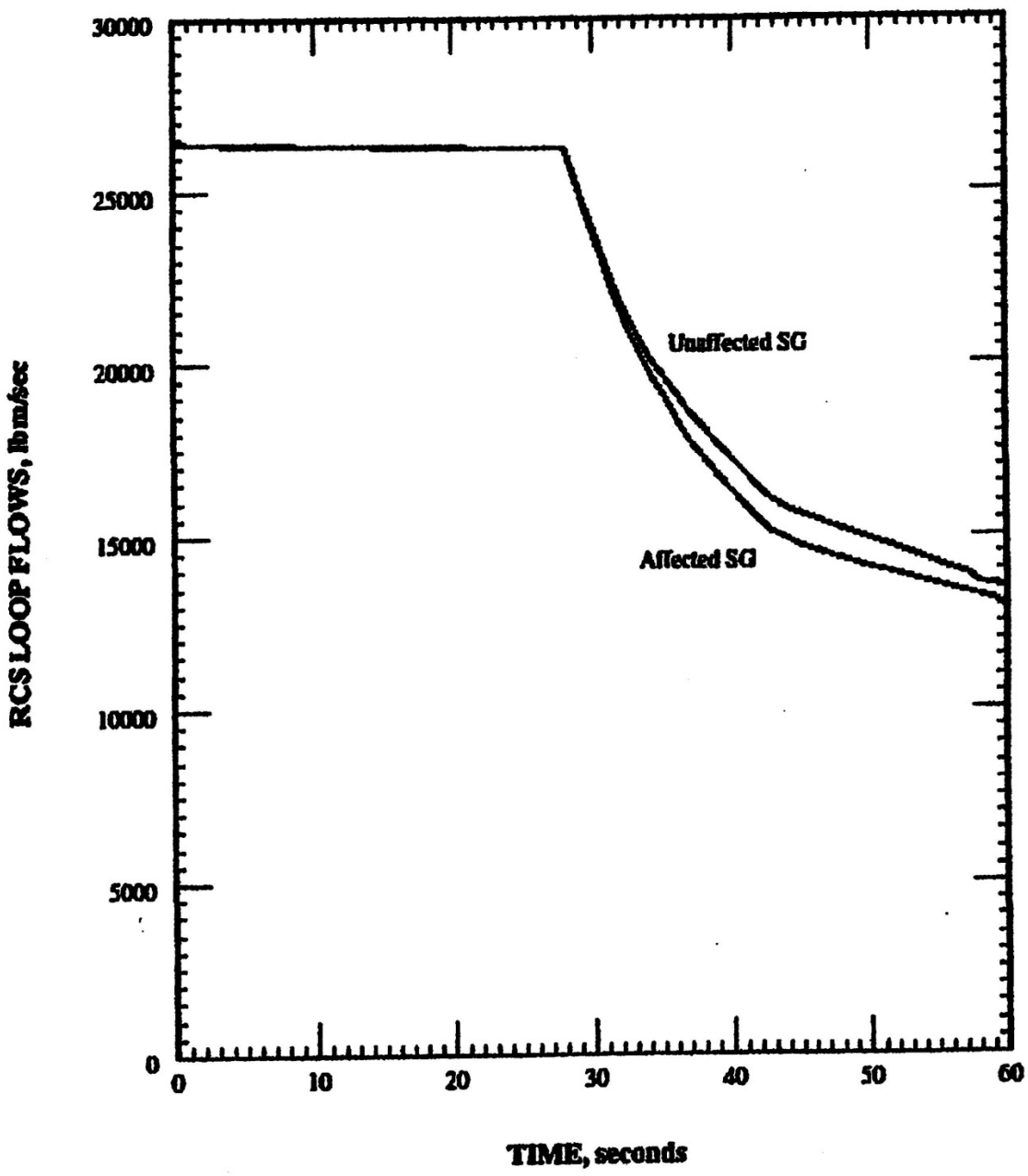
JUNE 2015 REVISION 18



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
SG LIQUID INVENTORY vs. TIME

FIGURE 15.2.8-40

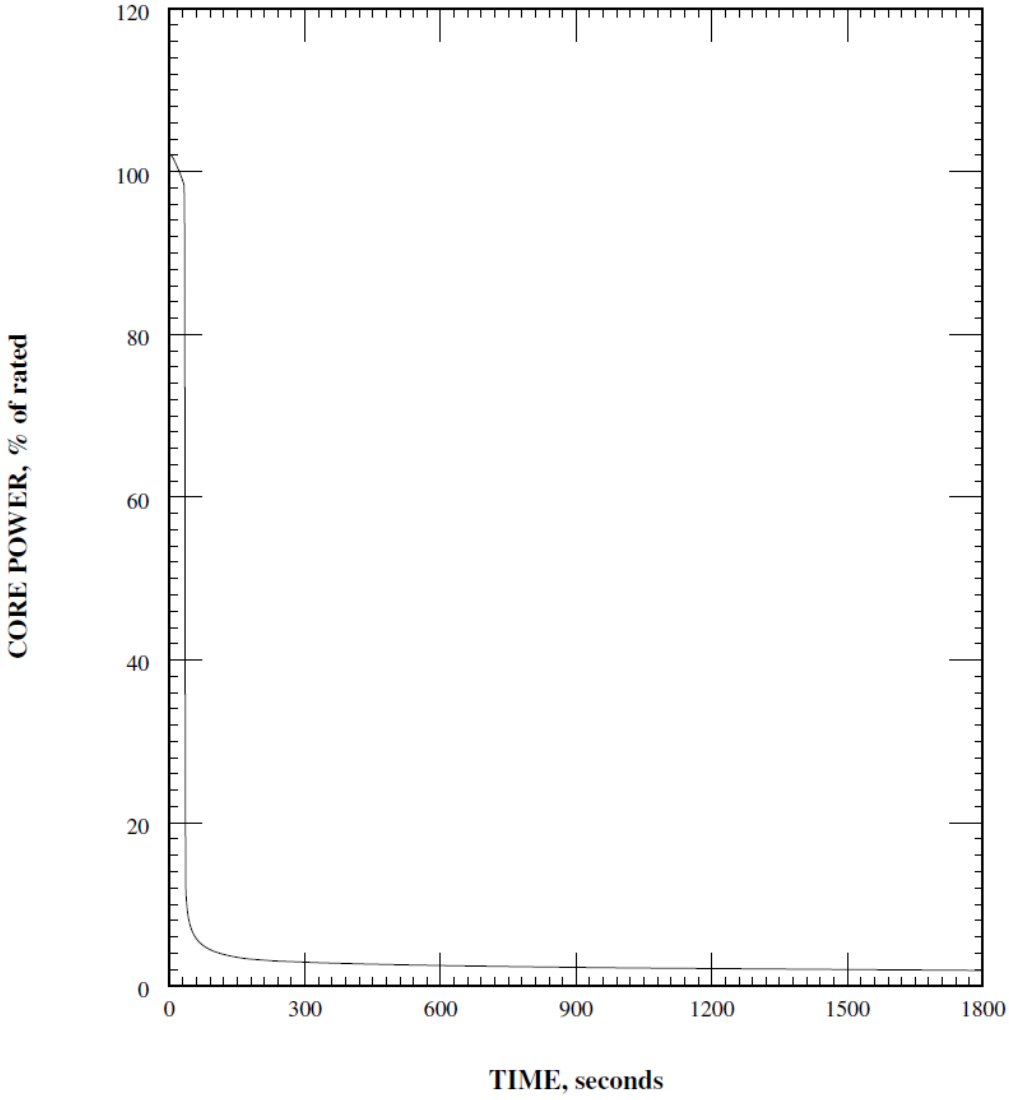


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FWLB WITHOUT LOP PLUS SF
PRIMARY PEAK PRESSURE CASE
RCS LOOP FLOW vs. TIME

FIGURE 15.2.8-41

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



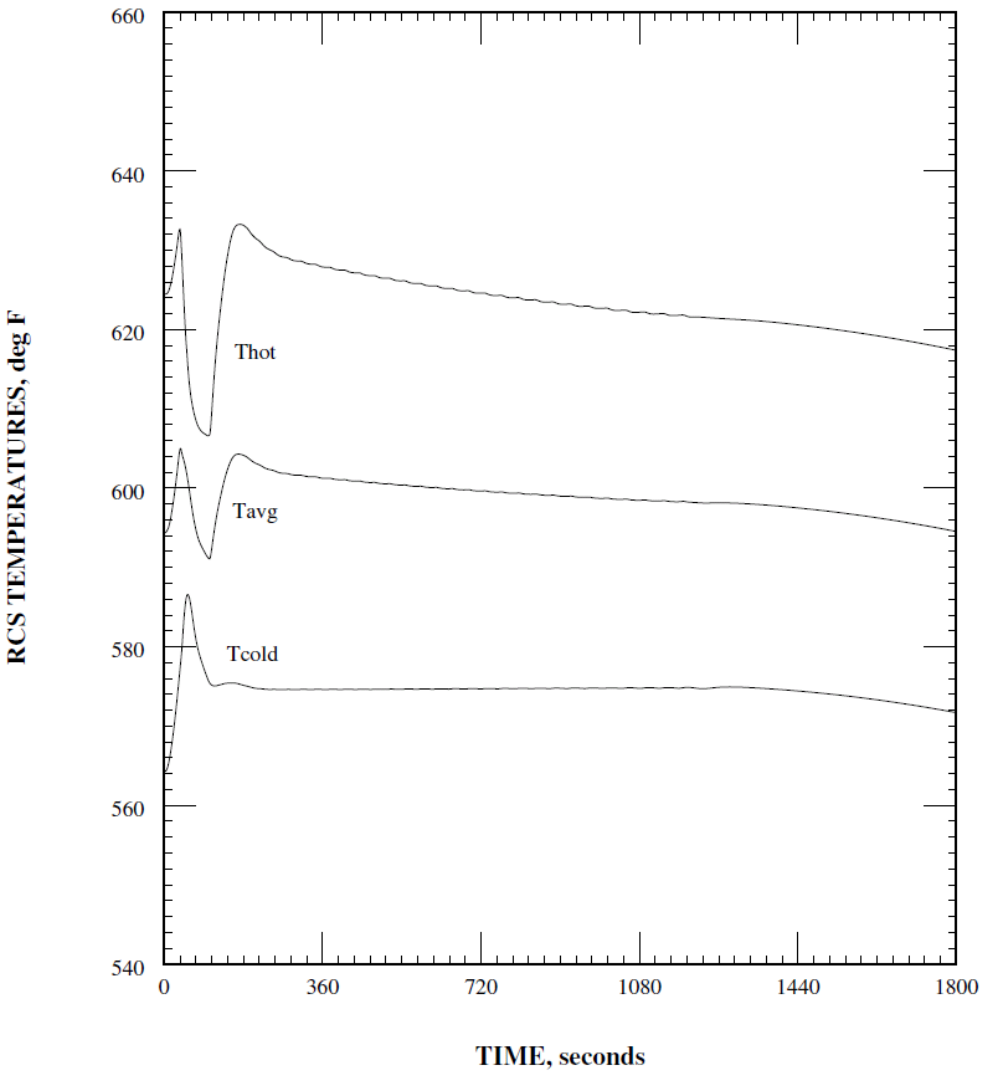
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CORE POWER vs. TIME

FIGURE 15.2.8-42

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE

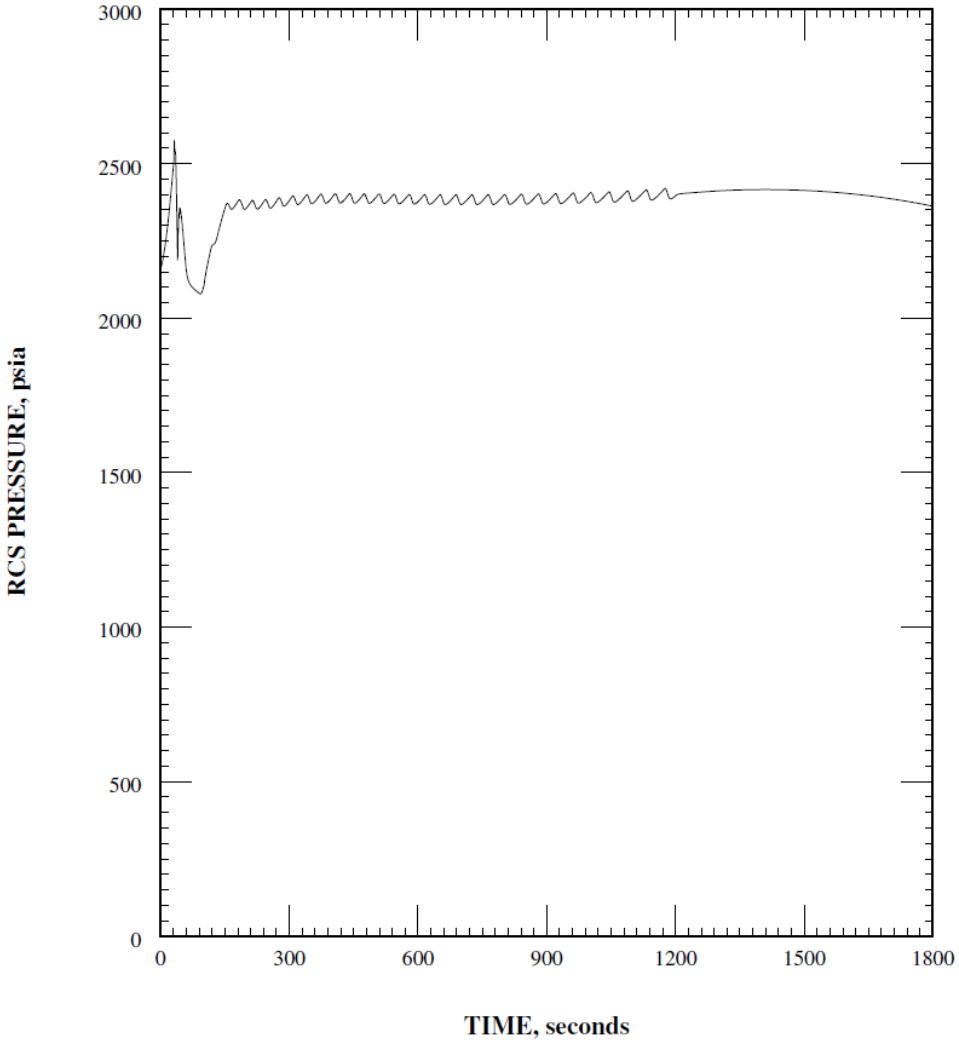


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR
UNAFFECTED LOOP RCS TEMPERATURES vs. TIME

FIGURE 15.2.8-43

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



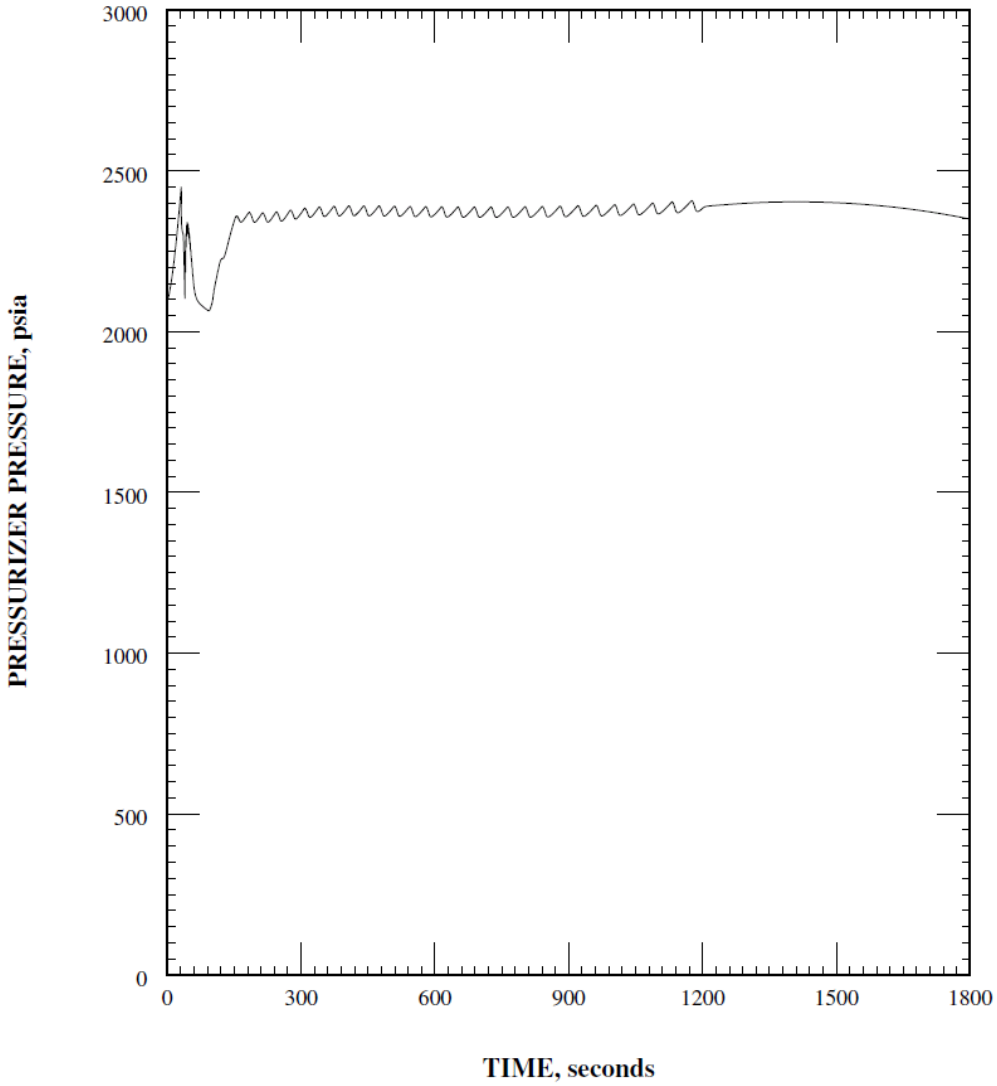
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

RCS PRESSURE vs. TIME

FIGURE 15.2.8-44

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



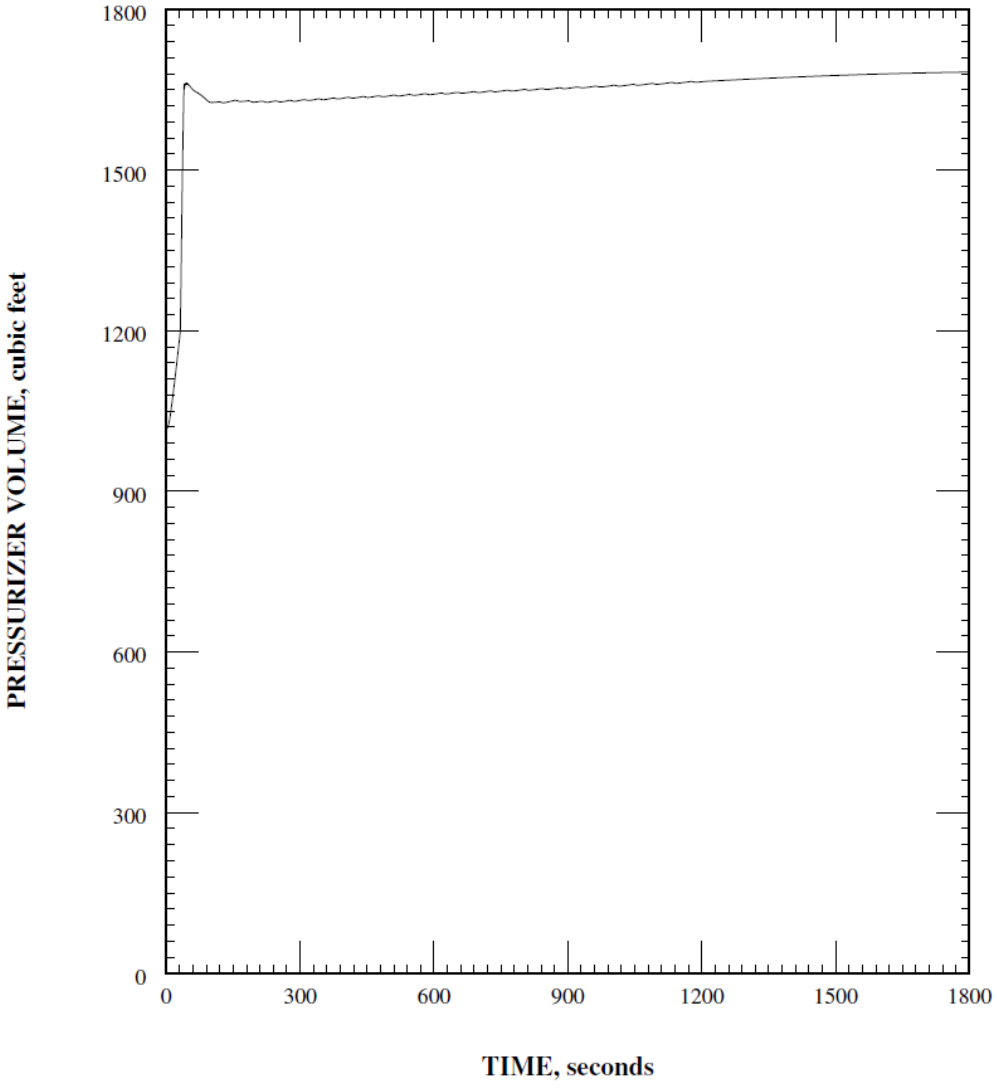
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PRESSURIZER PRESSURE vs. TIME

FIGURE 15.2.8-45

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



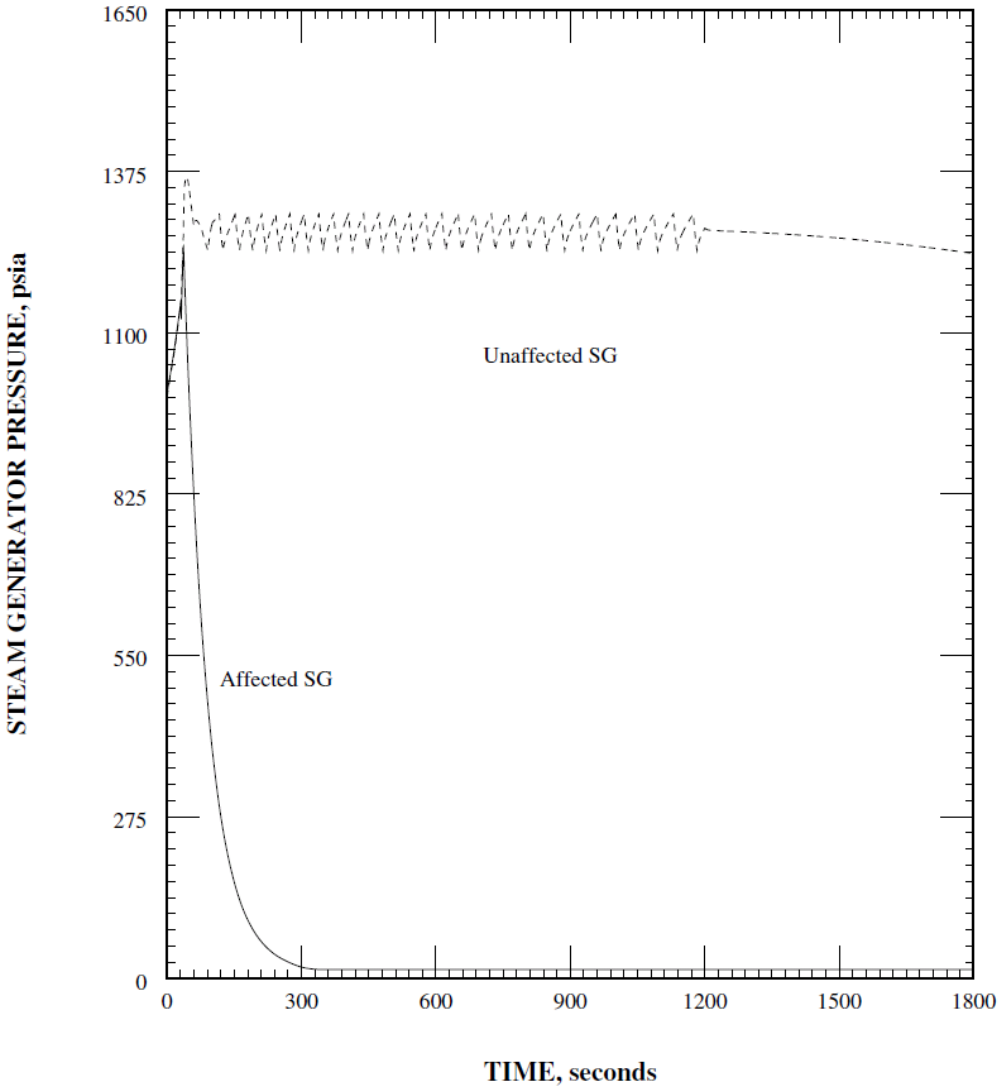
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PRESSURIZER WATER VOLUME vs. TIME

FIGURE 15.2.8-46

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



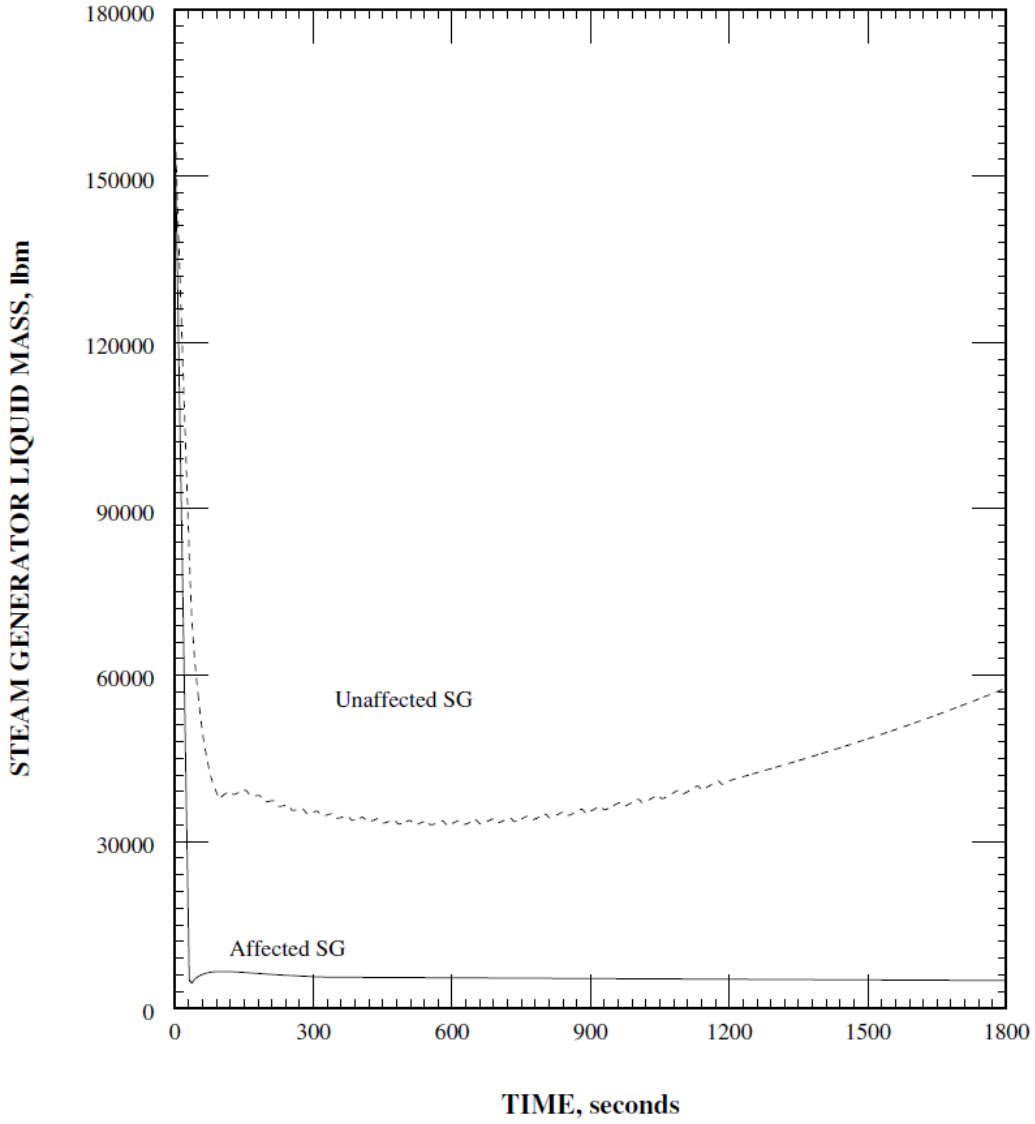
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SG PRESSURE vs. TIME

FIGURE 15.2.8-47

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



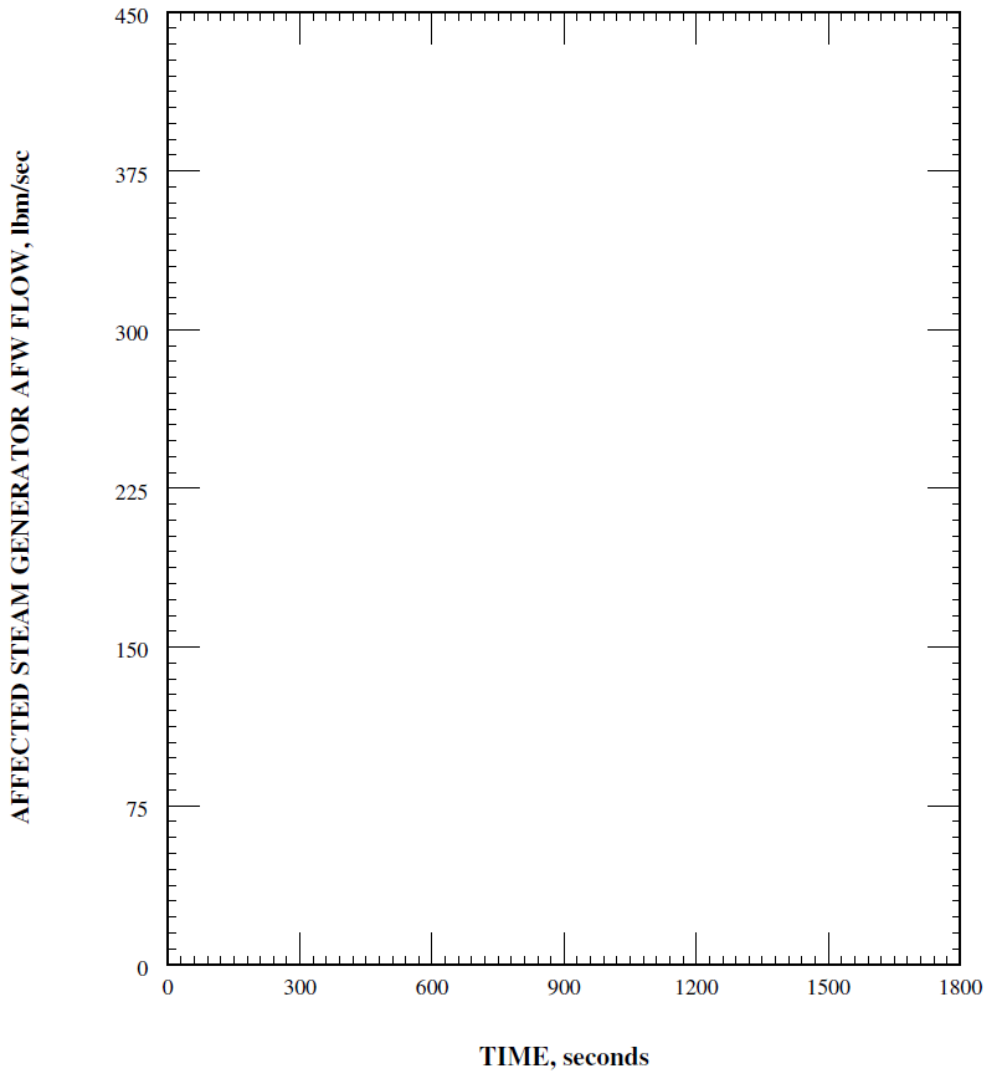
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SG LIQUID INVENTORY vs. TIME

FIGURE 15.2.8-48

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



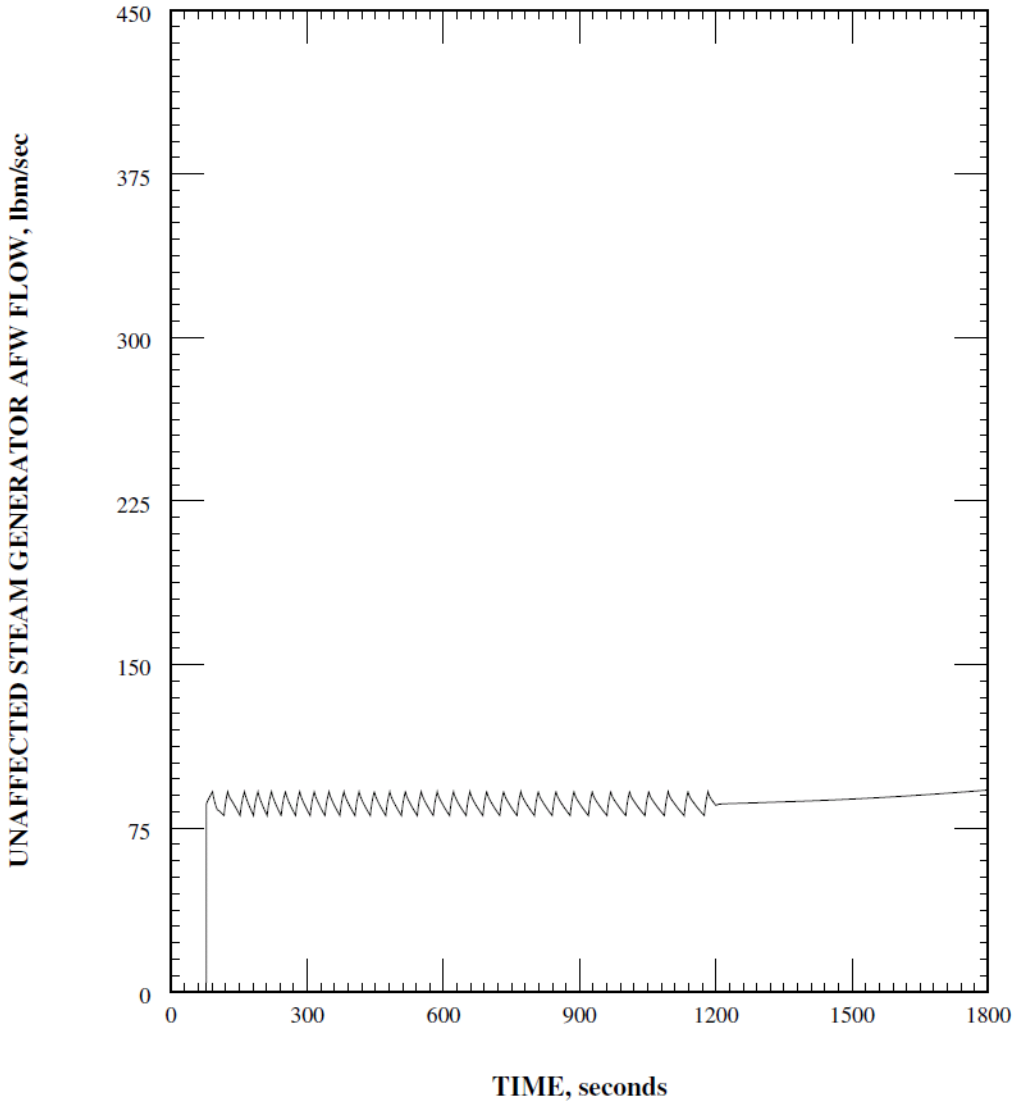
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

AFFECTED SG AFW FLOW vs. TIME

FIGURE 15.2.8-49

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



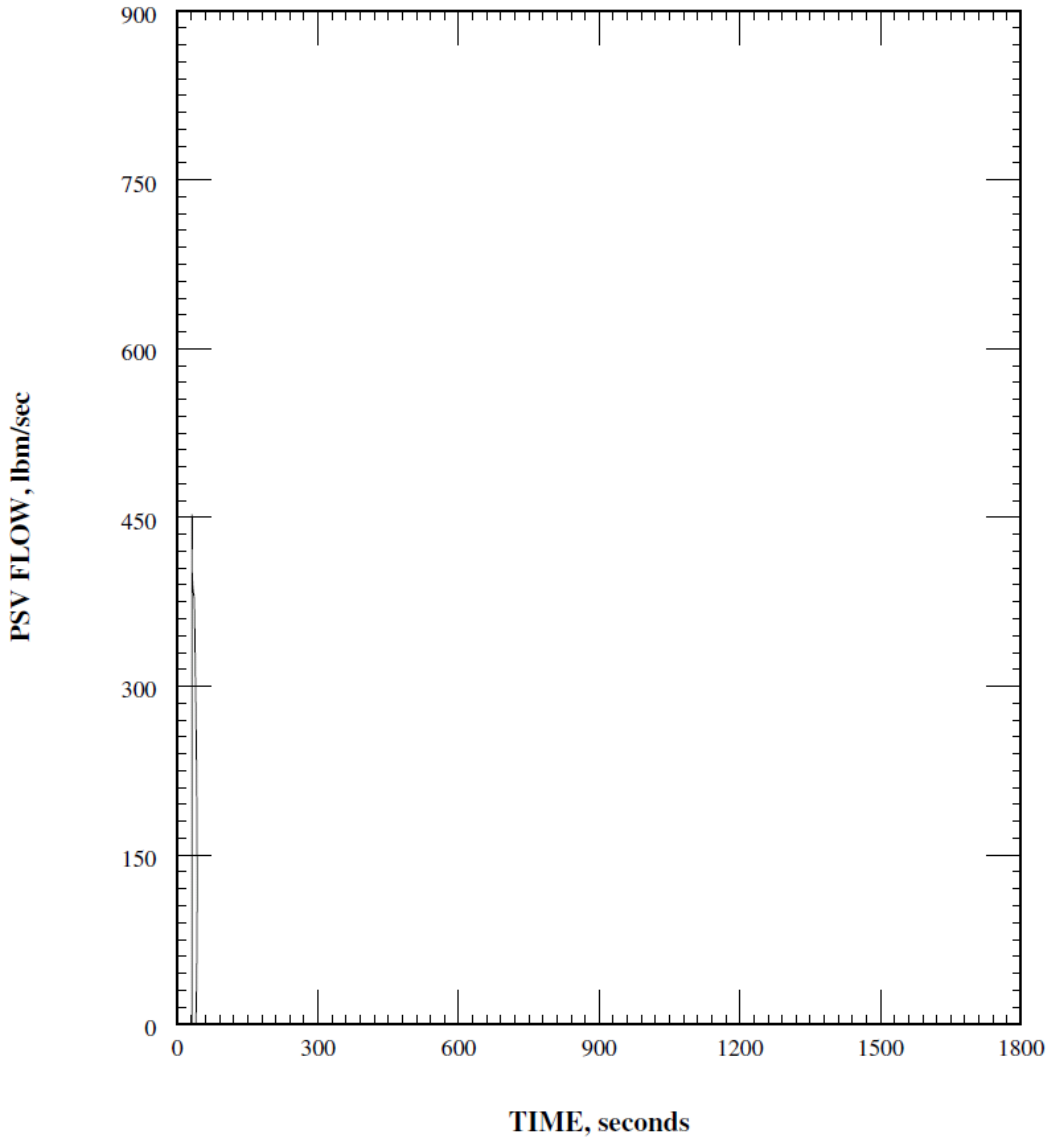
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNAFFECTED SG AFW FLOW vs. TIME

FIGURE 15.2.8-50

JUNE 2013 REVISION 17

FWLB WITH LOP AND SINGLE FAILURE LONG TERM COOLING CASE



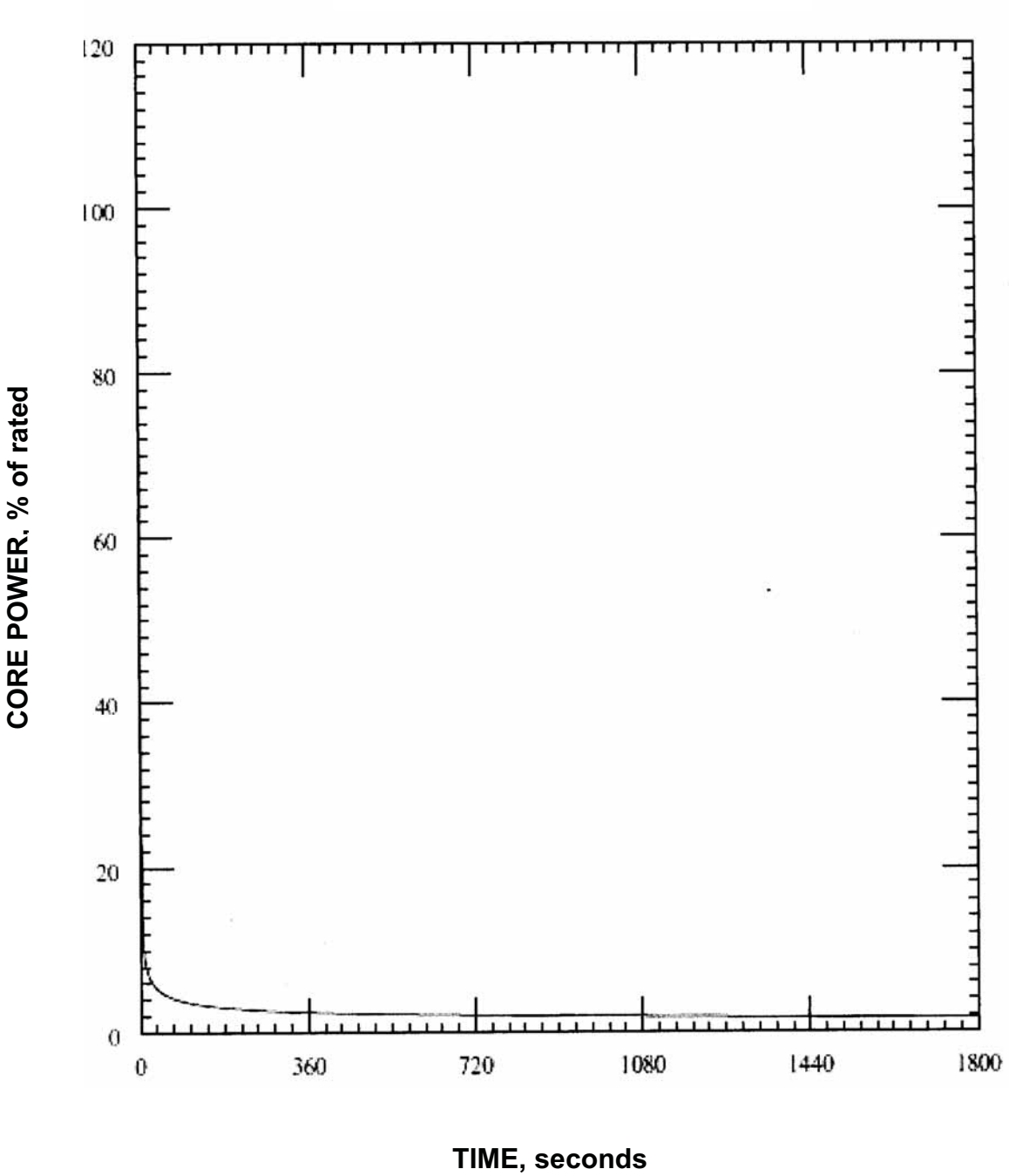
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PSV FLOW vs. TIME

FIGURE 15.2.8-51

JUNE 2013 REVISION 17

Peak Primary Pressure case



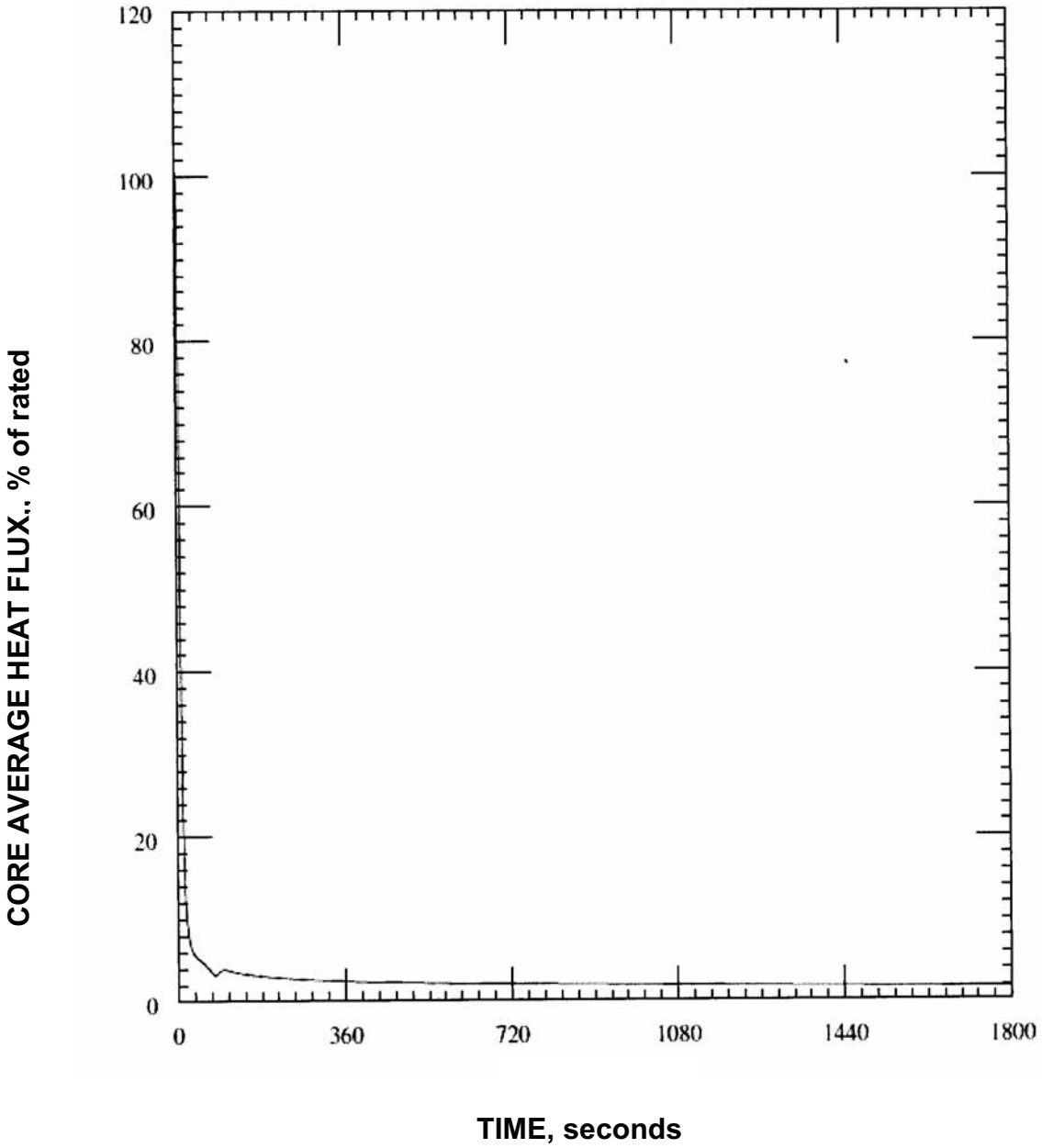
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW CORE POWER vs. TIME

FIGURE 15.3.1-1

JUNE 2013 REVISION 17

Peak Primary Pressure Case



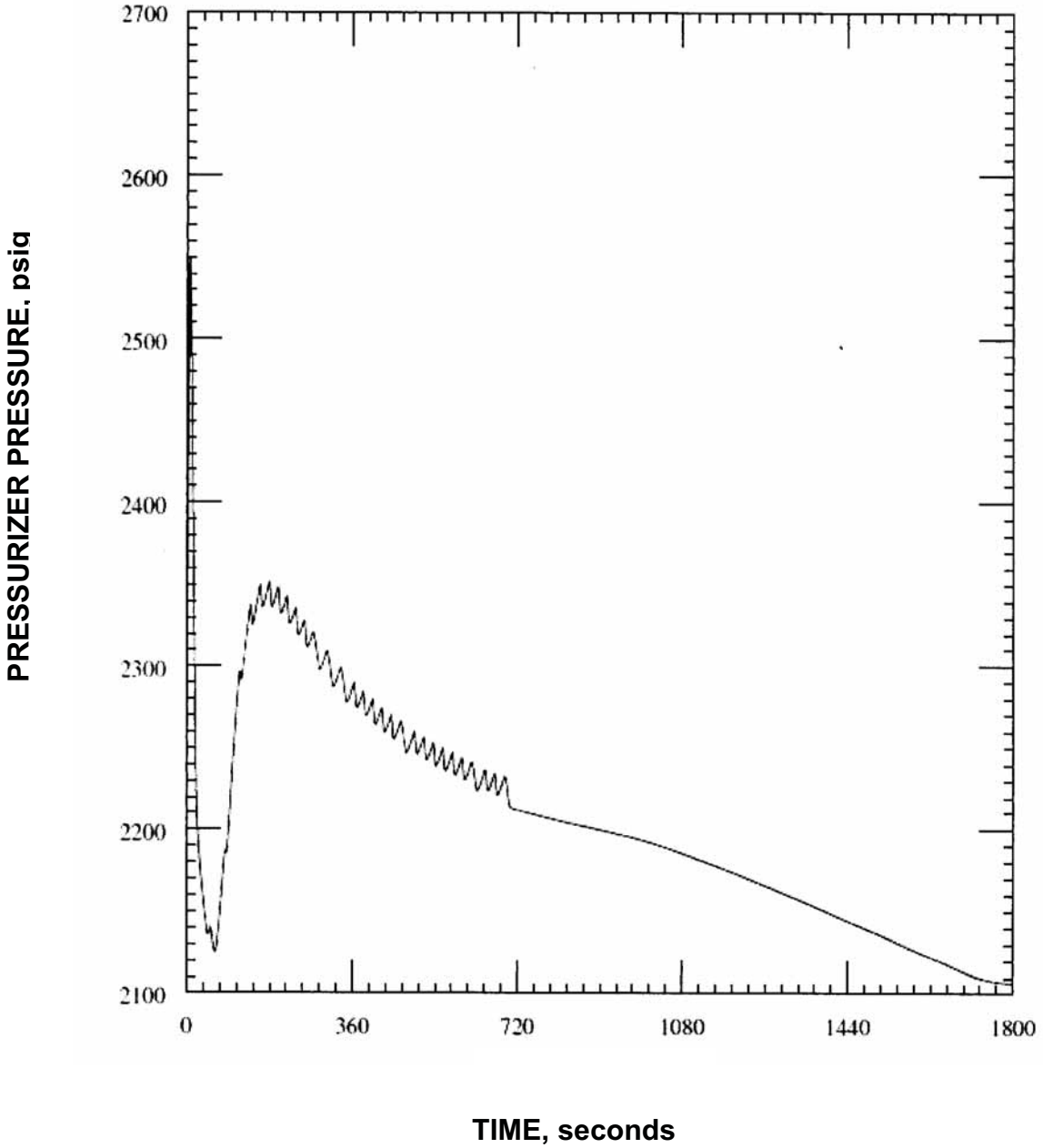
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW CORE AVERAGE HEAT FLUX vs. TIME

FIGURE 15.3.1-2

JUNE 2013 REVISION 17

Peak Primary Pressure Case



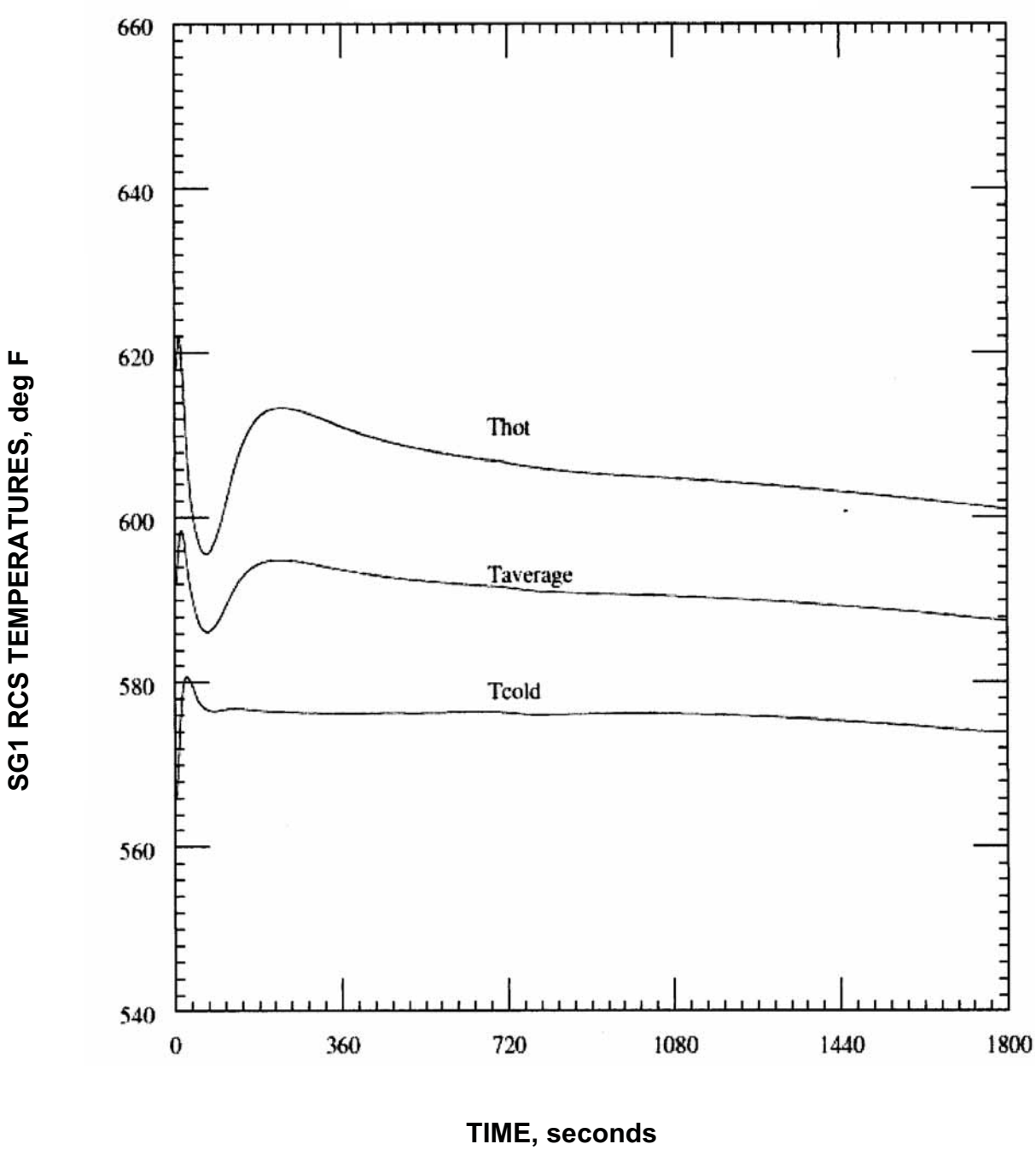
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
PRESSURIZER PRESSURE vs. TIME

FIGURE 15.3.1-3

JUNE 2013 REVISION 17

Peak Primary Pressure Case



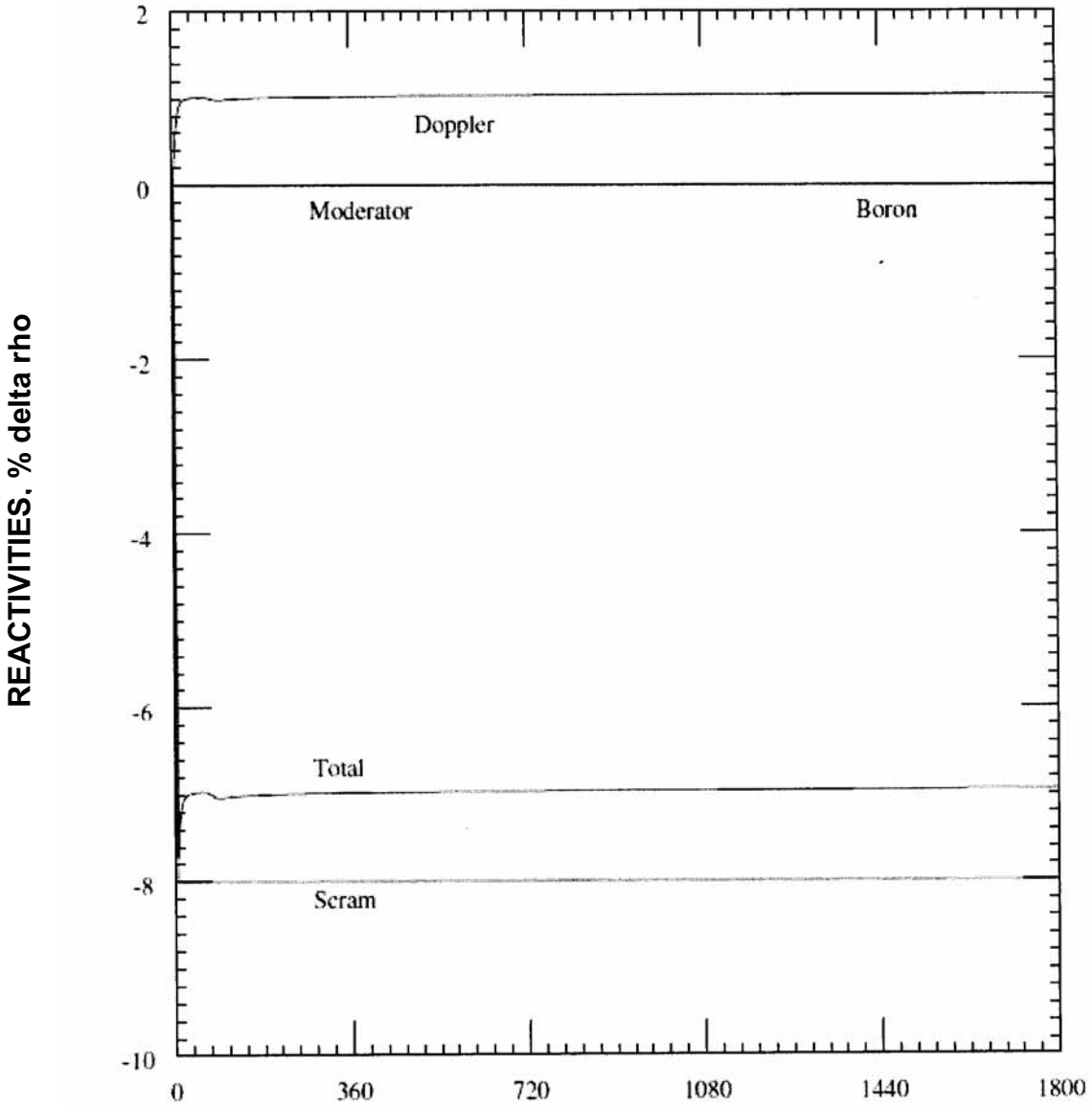
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW RCS TEMPERATURES vs. TIME

FIGURE 15.3.1-4

JUNE 2013 REVISION 17

Peak Primarv Pressure Case



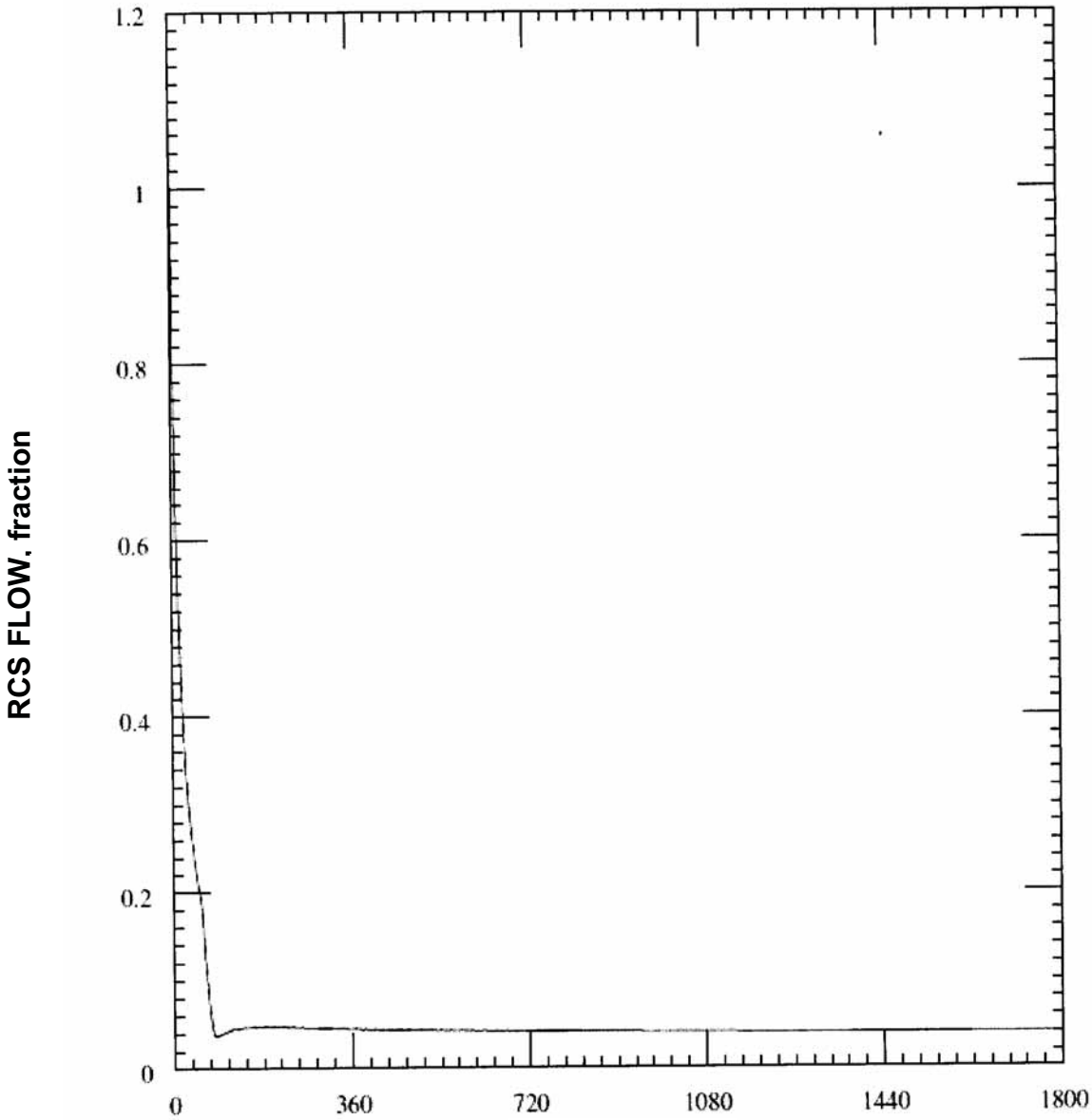
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
REACTIVITIES vs. TIME

FIGURE 15.3.1-5

JUNE 2013 REVISION 17

Peak Primary Pressure Case



TIME, seconds

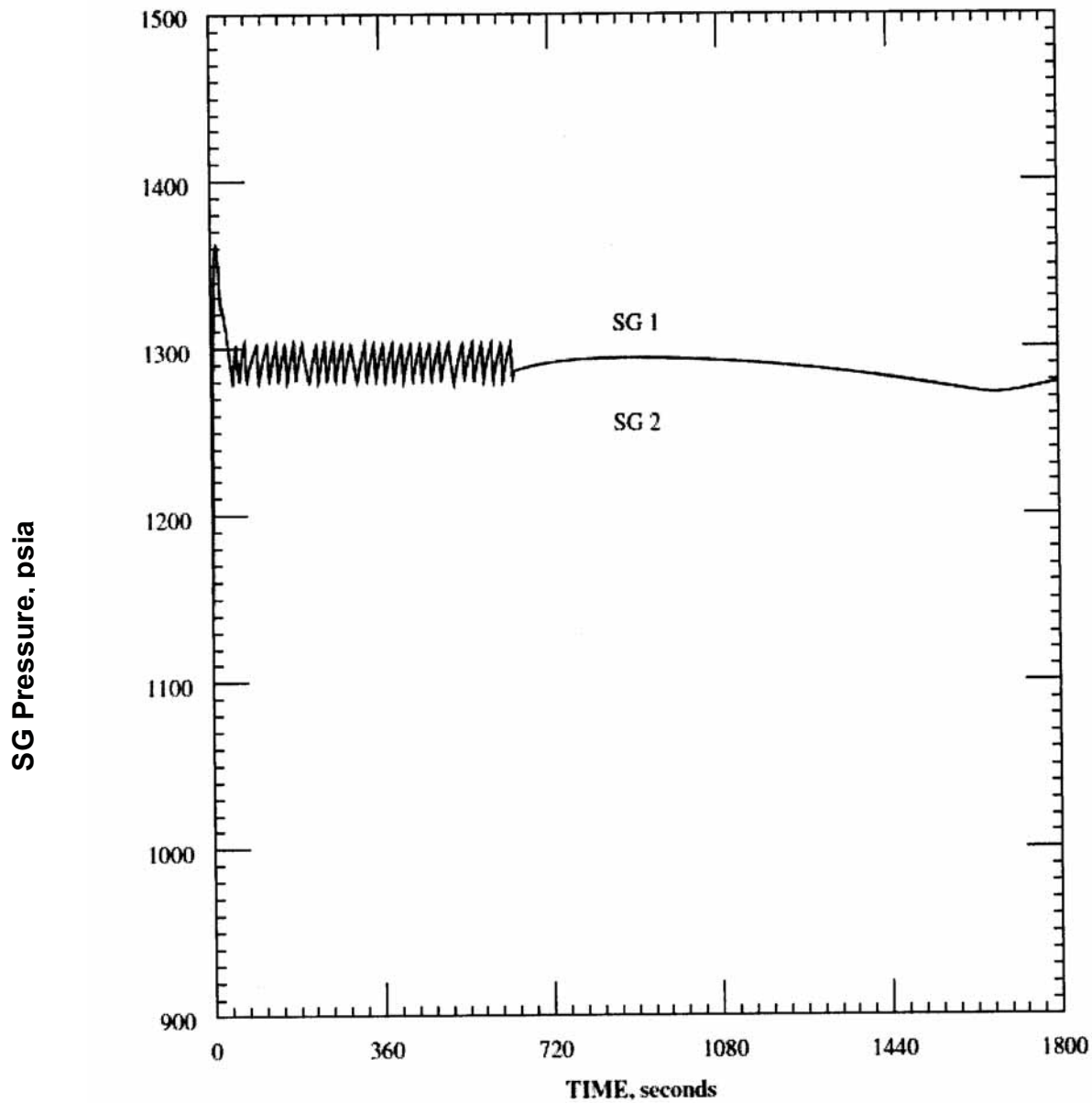
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
CORE FLOW FRACTION vs. TIME

FIGURE 15.3.1-6

JUNE 2013 REVISION 17

Peak Secondary Pressure Case



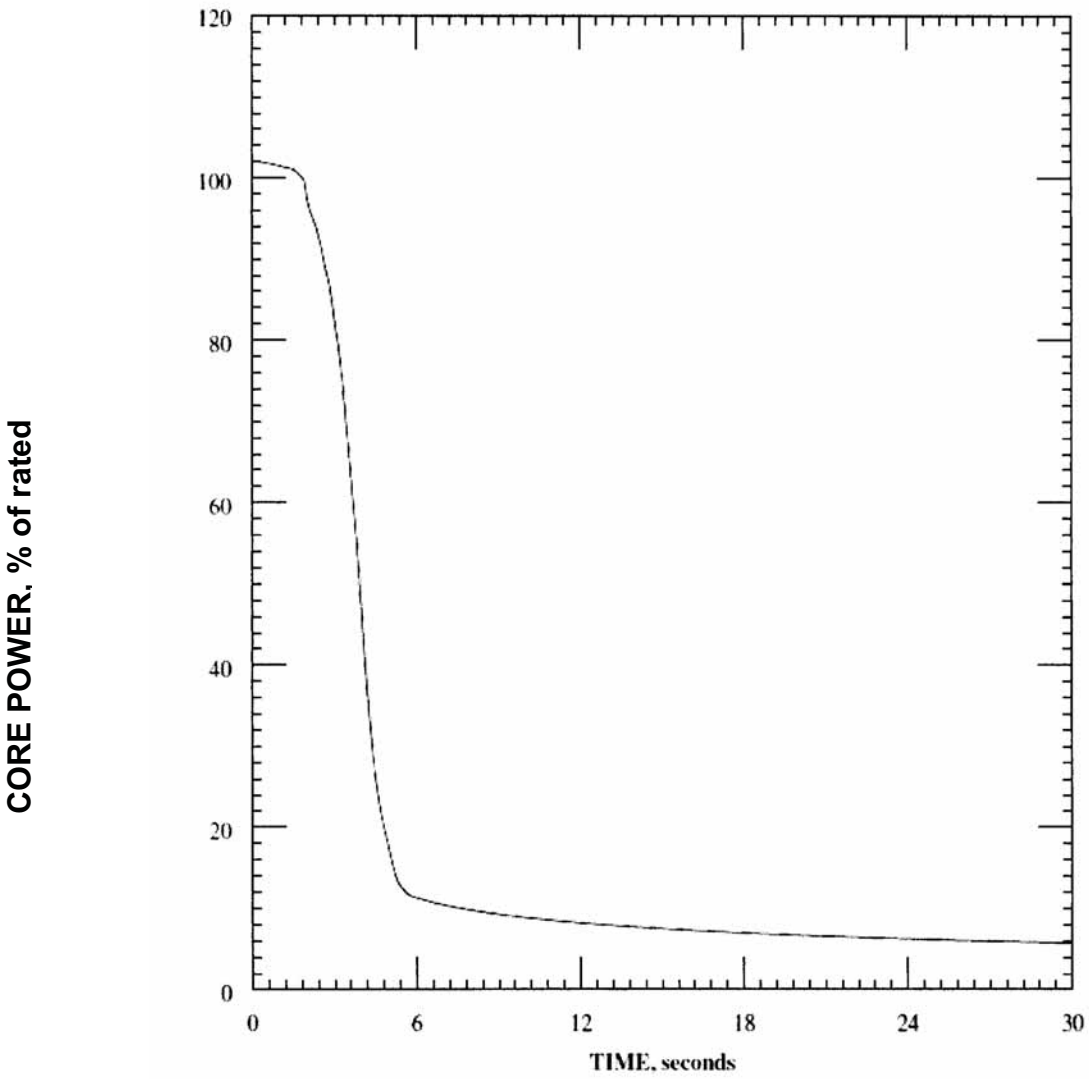
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
STEAM GENERATOR PRESSURE vs. TIME

FIGURE 15.3.1-7

JUNE 2013 REVISION 17

Peak Primary Pressure Case



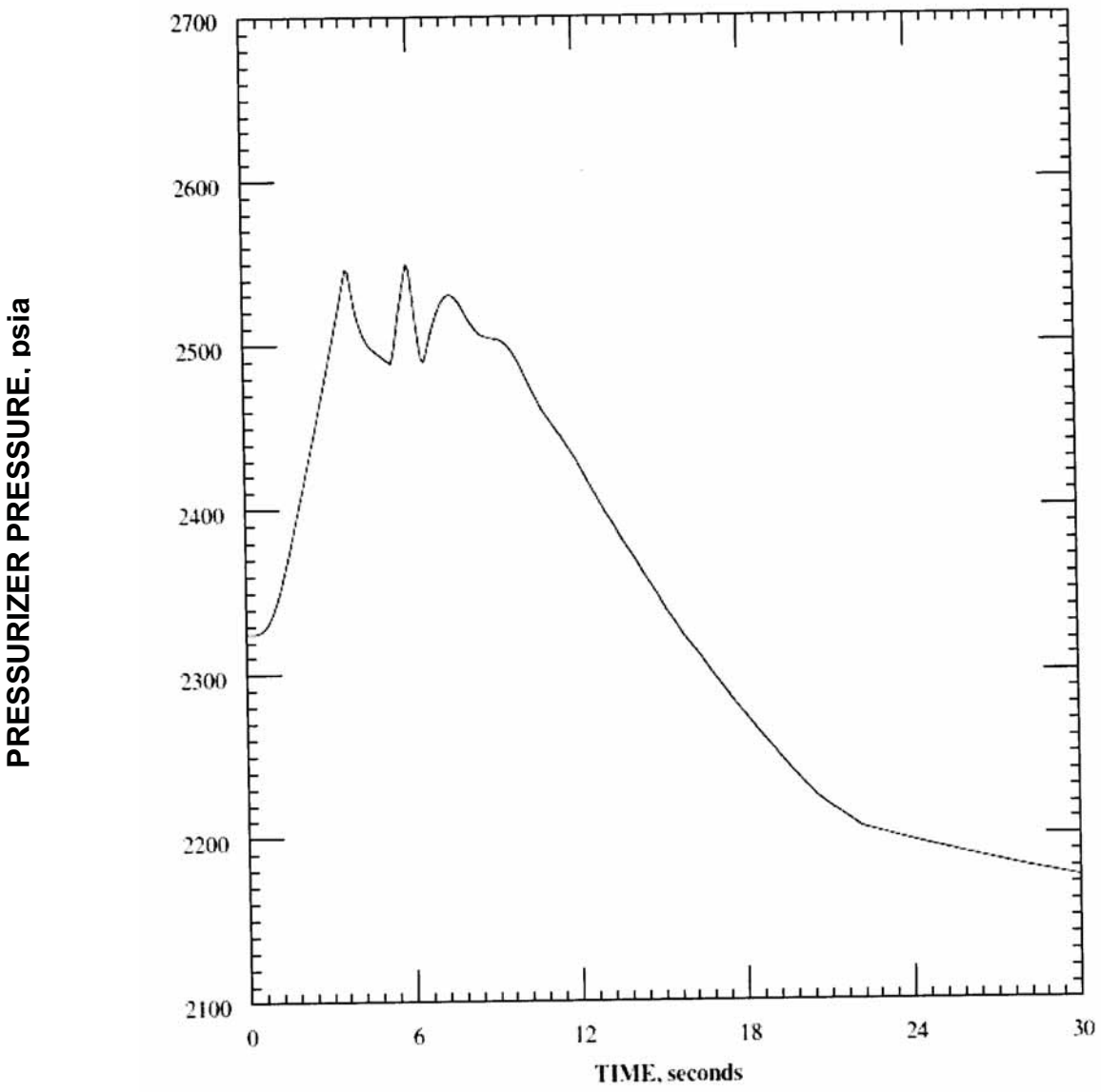
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
CORE POWER vs. TIME (0-30 SEC.)

FIGURE 15.3.1-8

JUNE 2013 REVISION 17

Peak Primary Pressure Case



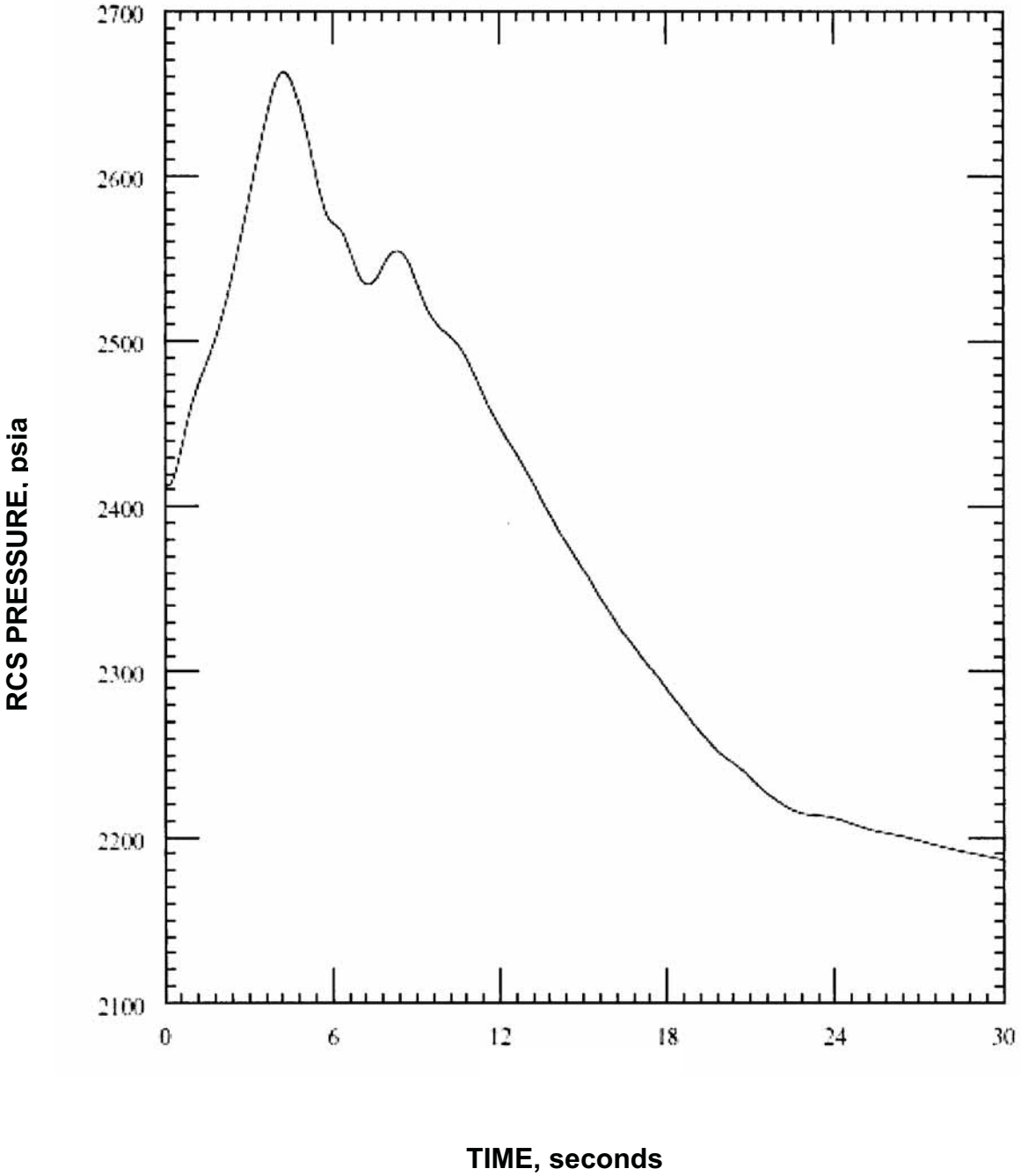
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
PRESSURIZER PRESSURE vs. TIME (0-30 SEC.)

FIGURE 15.3.1-9

JUNE 2013 REVISION 17

Peak Primary Pressure Case



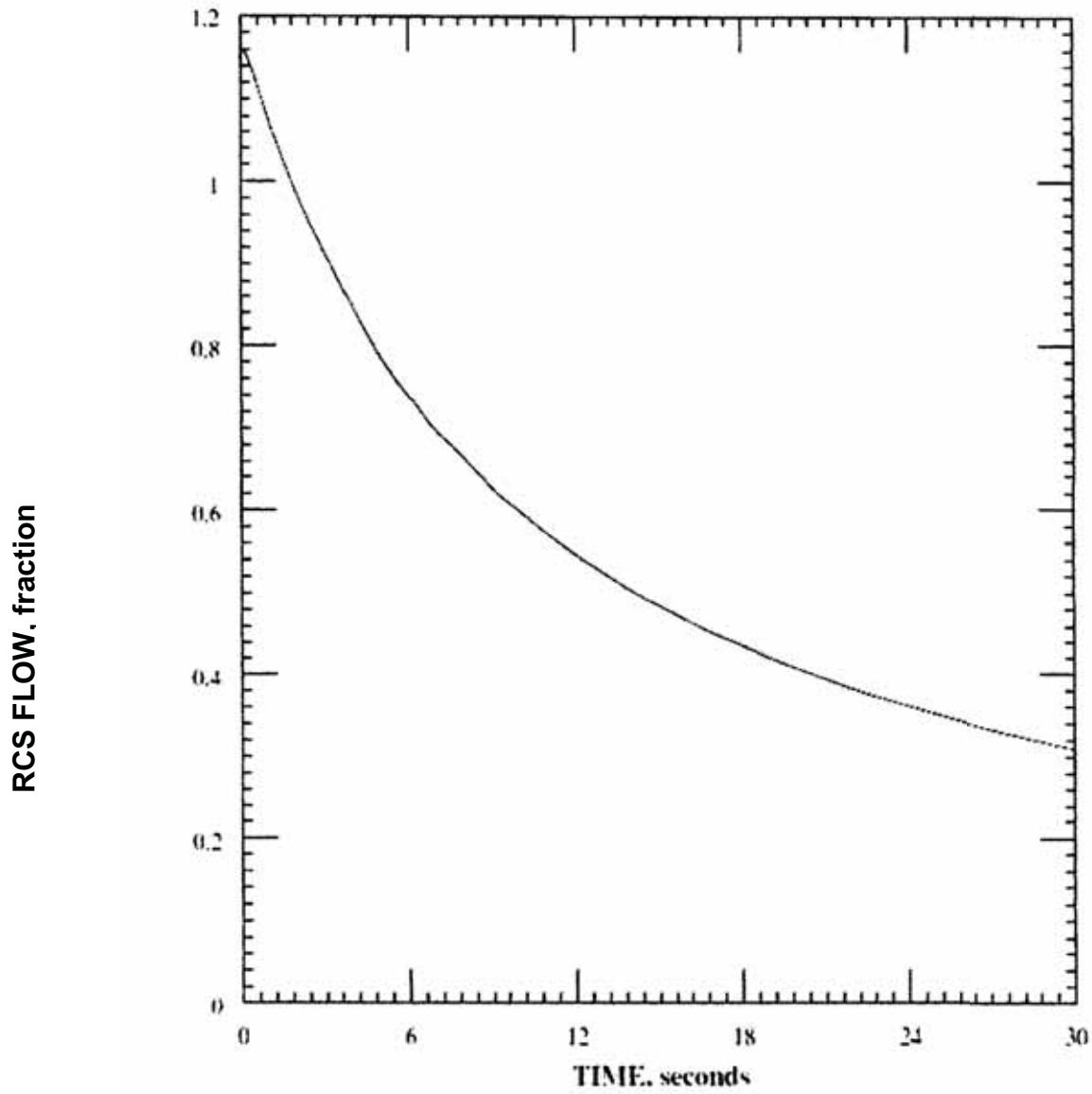
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
RCS PRESSURE vs. TIME (0-30 SEC)

FIGURE 15.3.1-10

JUNE 2013 REVISION 17

Peak Primary Pressure Case



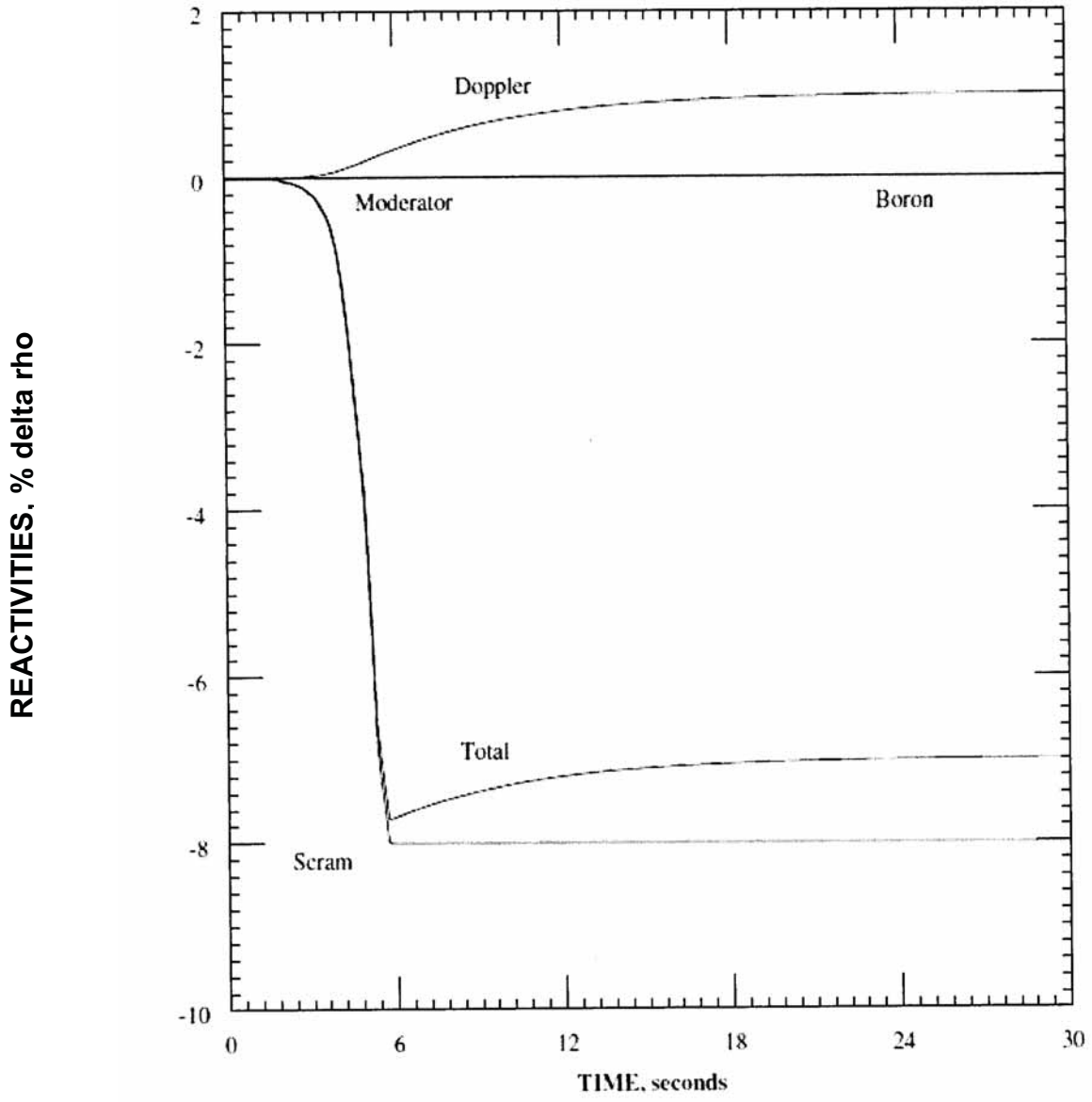
PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
RCS FLOW FRACTION vs. TIME (0-30 SEC)

FIGURE 15.3.1-11

JUNE 2013 REVISION 17

Peak Primary Pressure Case

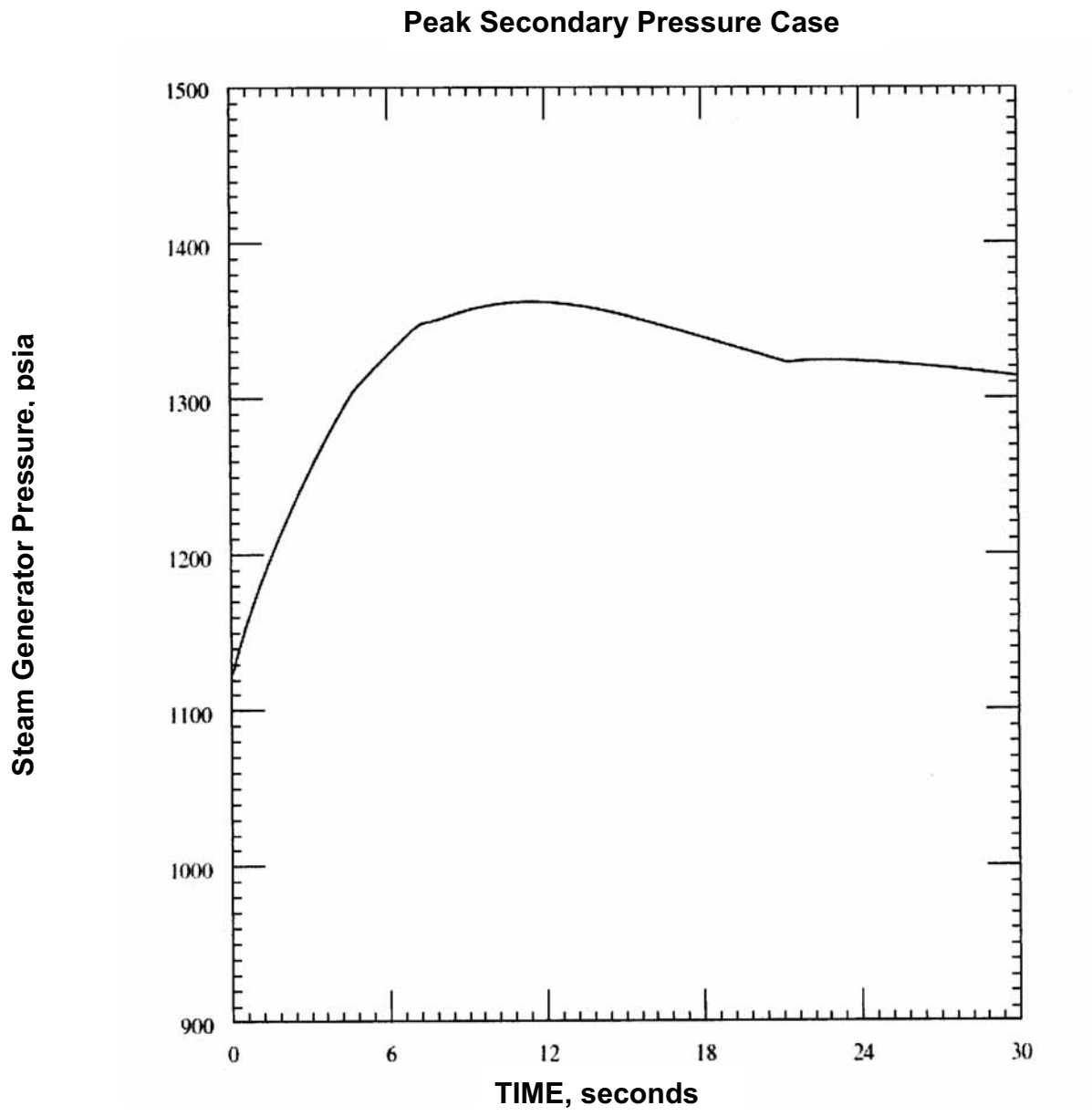


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
REACTIVITIES vs. TIME (0-30 SEC)

FIGURE 15.3.1-12

JUNE 2013 REVISION 17

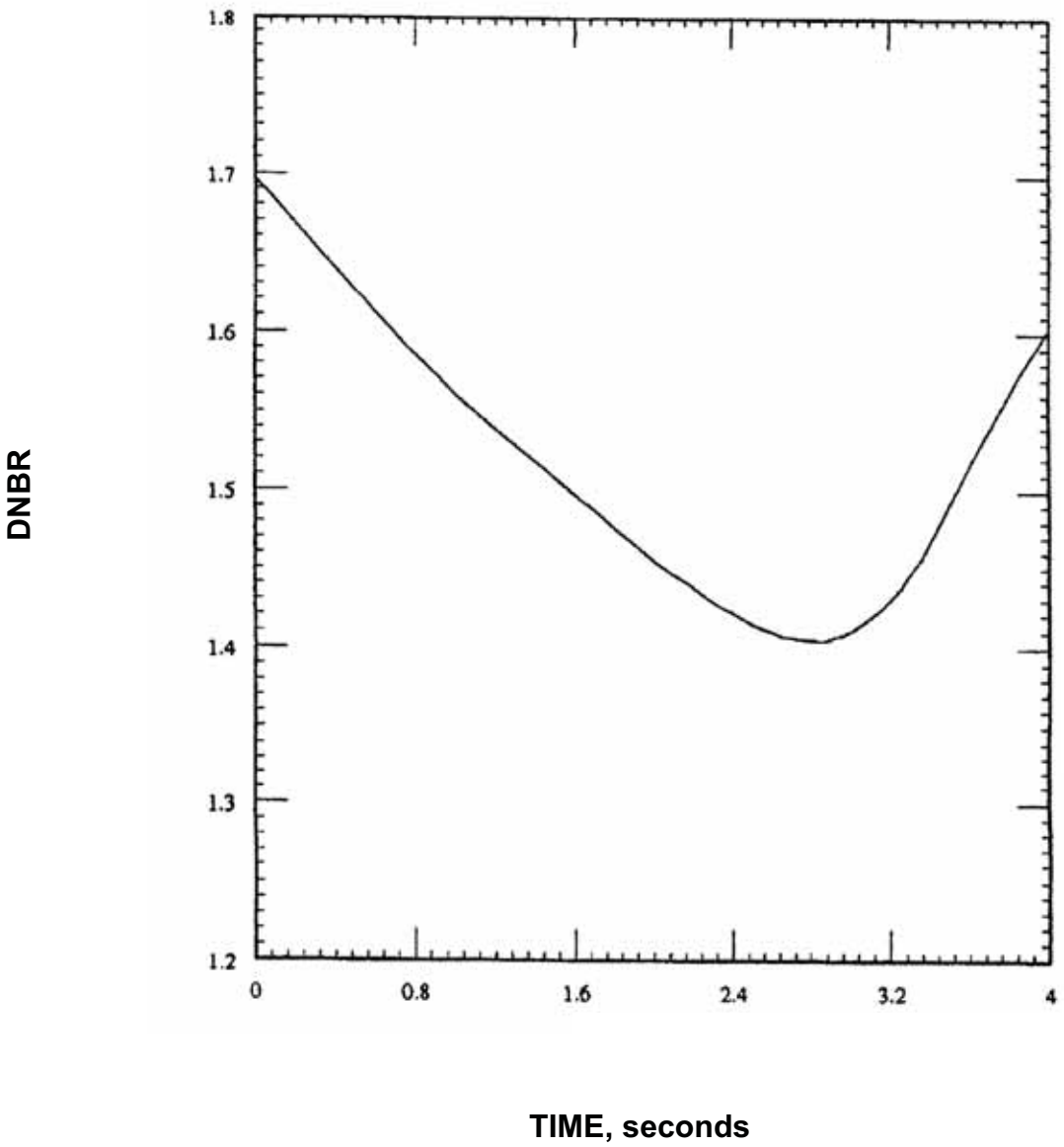


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
SG PRESSURE, psia (0-30 SEC)

FIGURE 15.3.1-13

JUNE 2013 REVISION 17

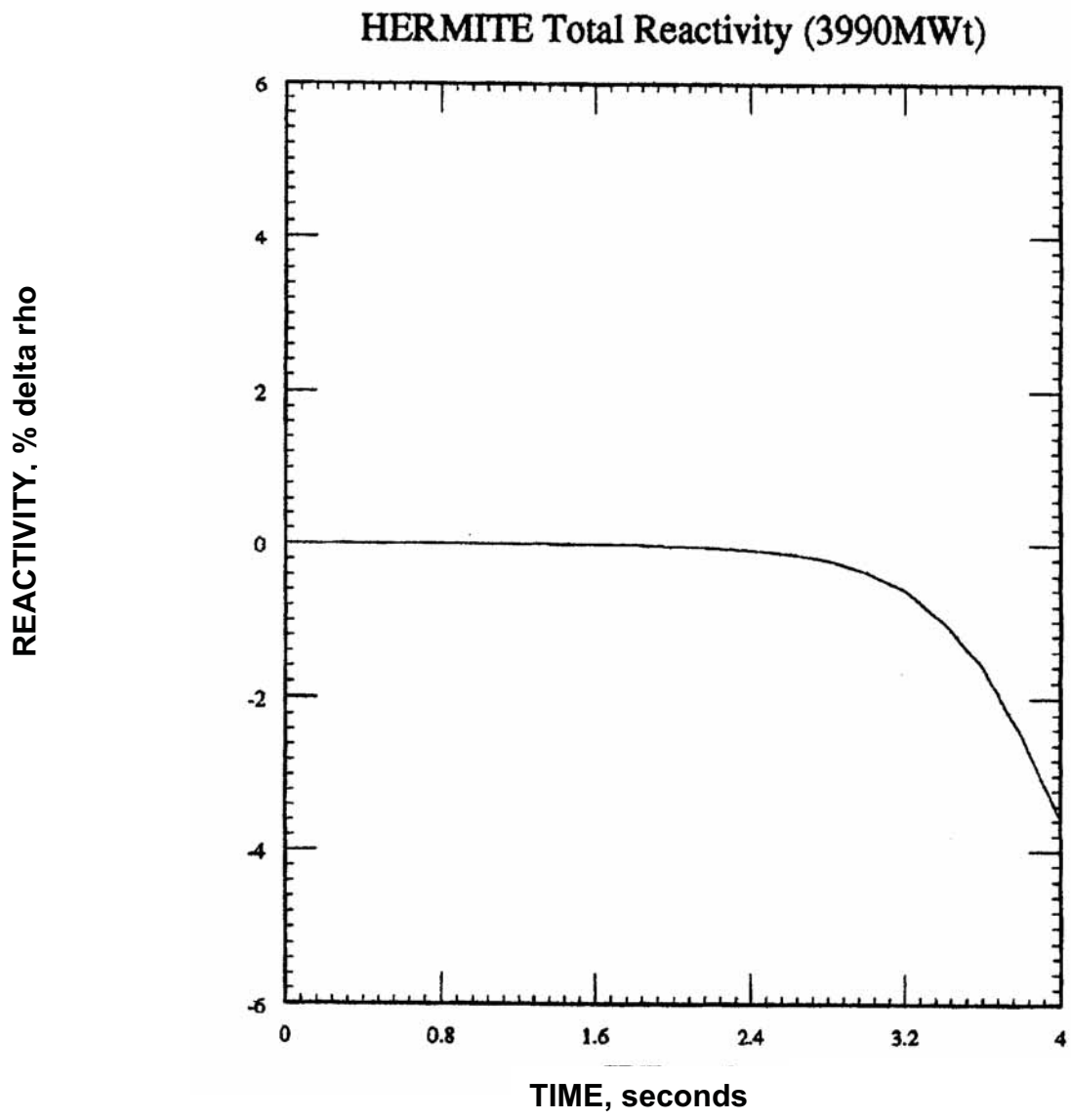


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
MINIMUM DNBR vs. TIME

FIGURE 15.3.1-14

JUNE 2013 REVISION 17

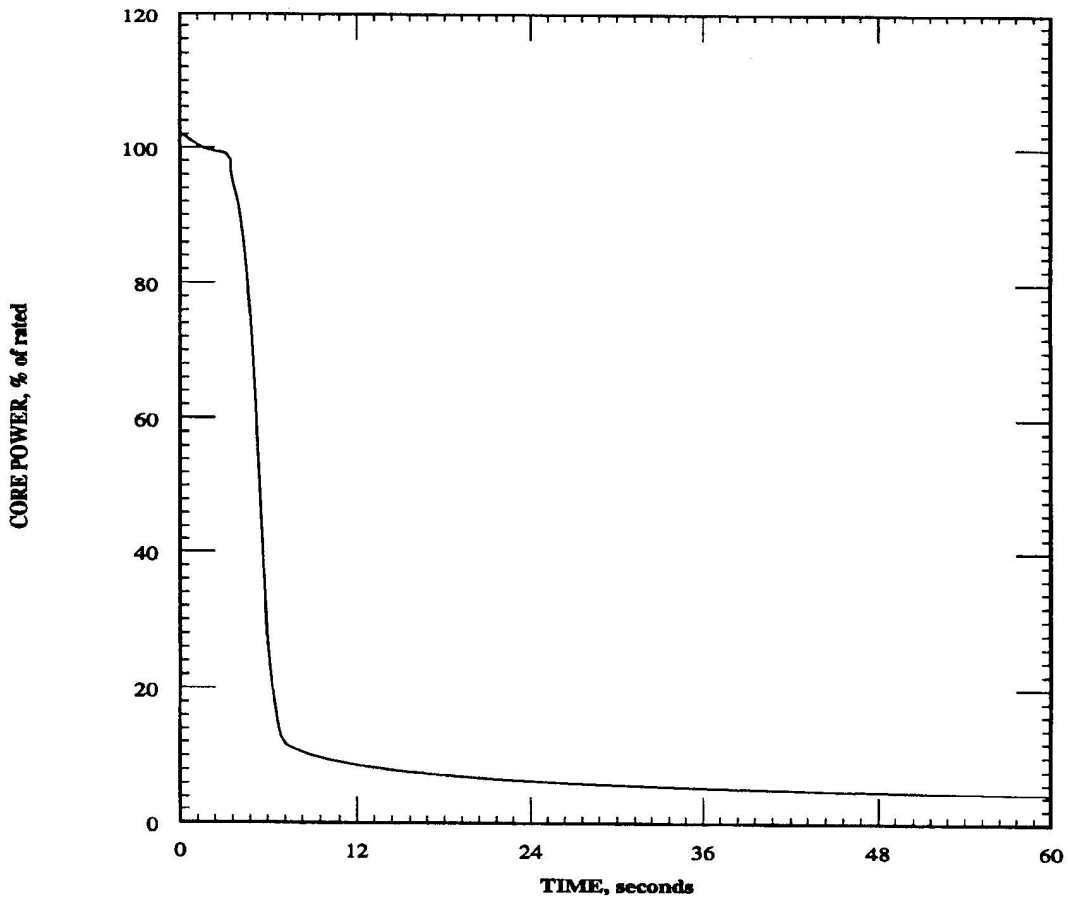


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

TOTAL LOSS OF FORCED COOLANT FLOW
REACTIVITY vs. TIME (0-4 SEC)

FIGURE 15.3.1-15

JUNE 2013 REVISION 17

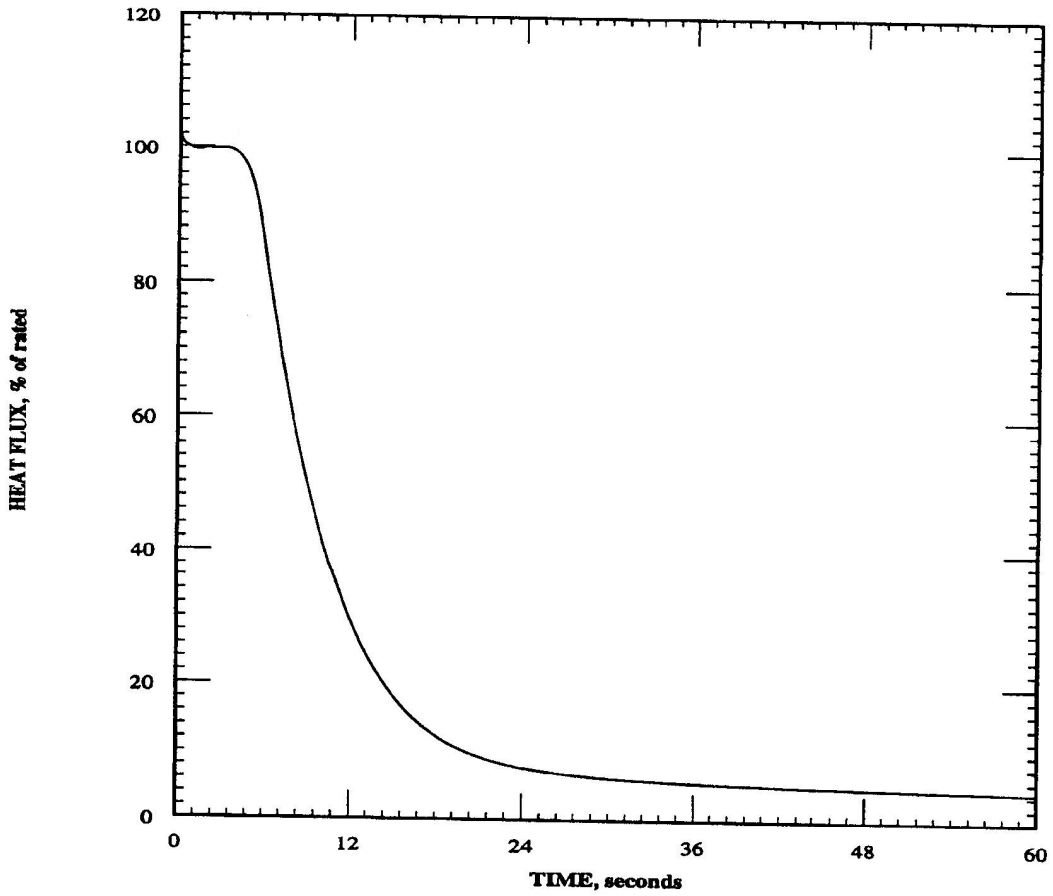


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
CORE POWER vs. TIME

FIGURE 15.3.4-1

JUNE 2009 REVISION 15

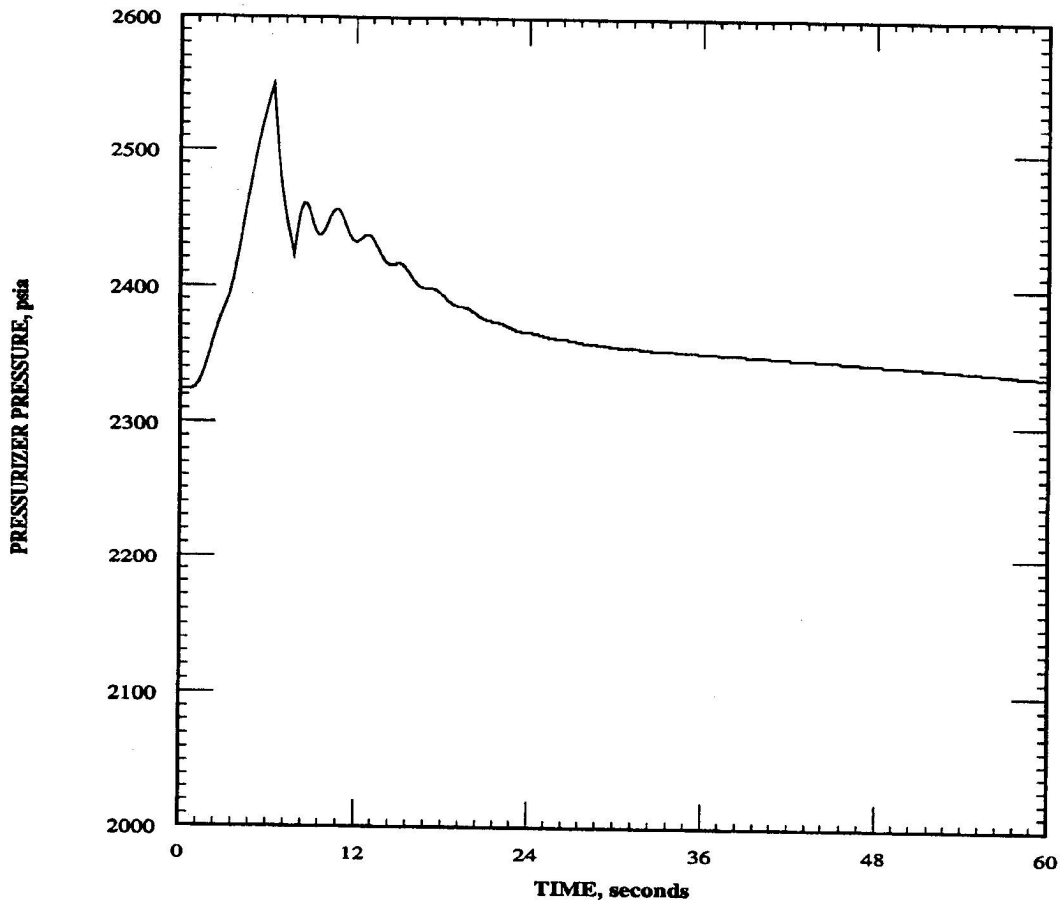


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
HEAT FLUX vs. TIME

FIGURE 15.3.4-2

JUNE 2009 REVISION 15

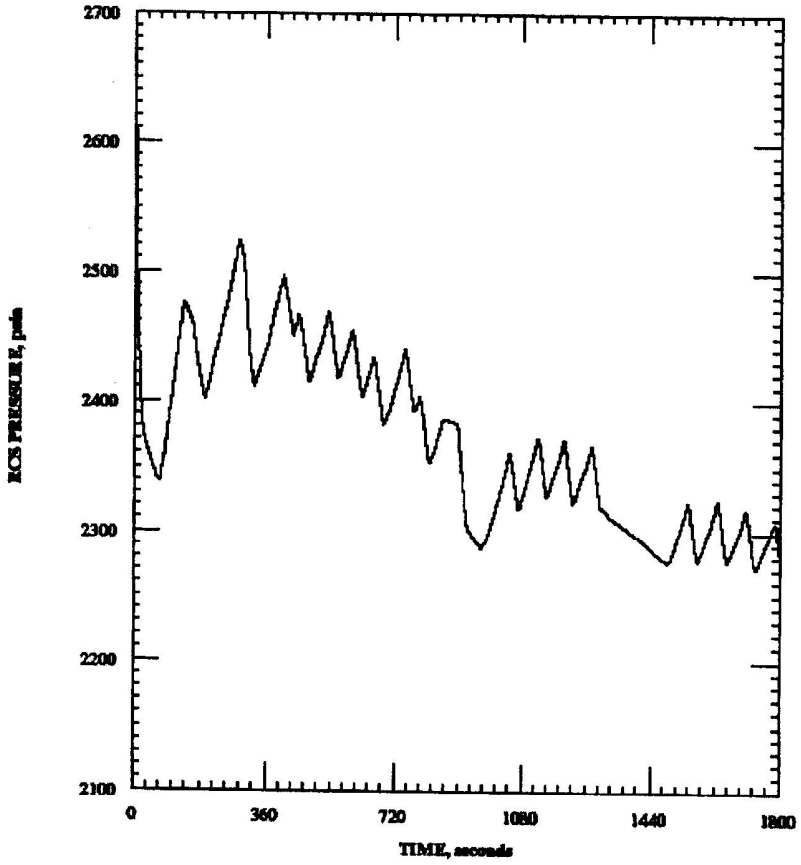


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
PRESSURIZER PRESSURE vs. TIME

FIGURE 15.3.4-3

JUNE 2009 REVISION 15

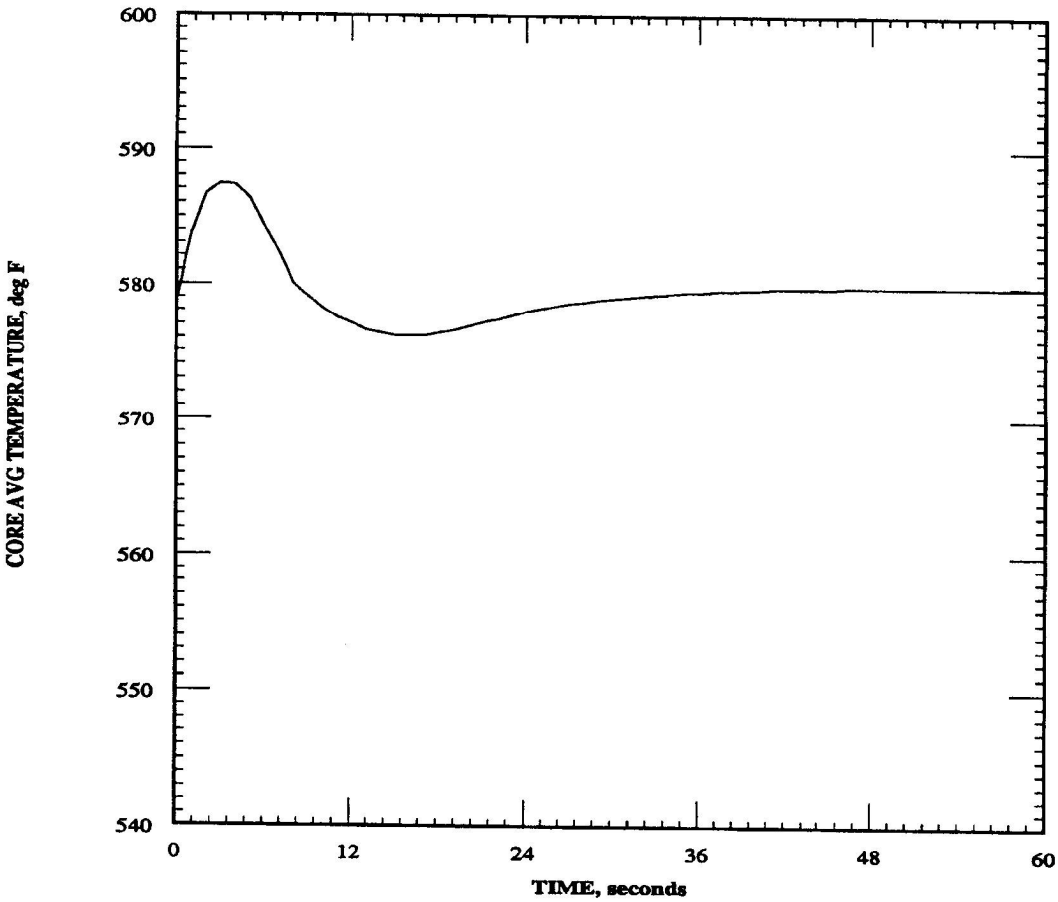


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
RCS PRESSURE vs. TIME

FIGURE 15.3.4-4

JUNE 2009 REVISION 15

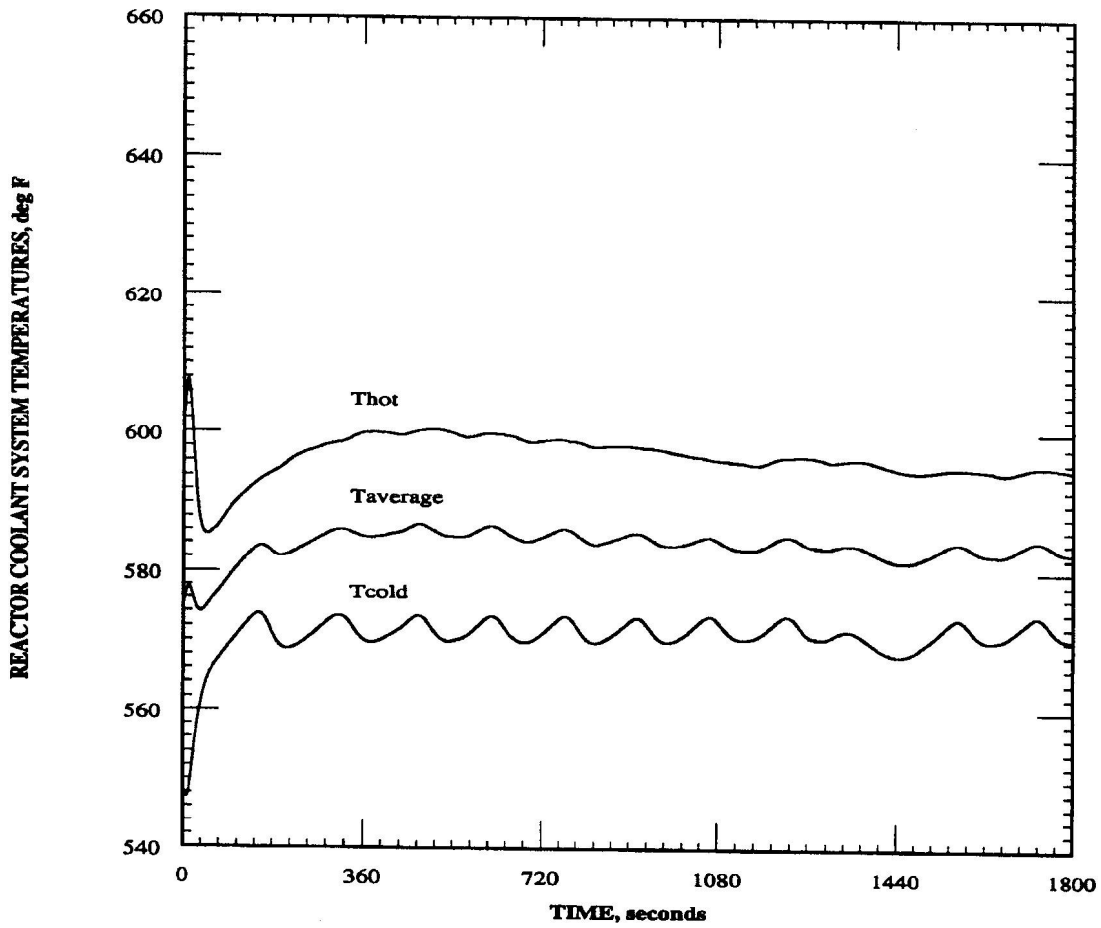


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
CORE INLET TEMPERATURE vs. TIME

FIGURE 15.3.4-5

JUNE 2009 REVISION 15

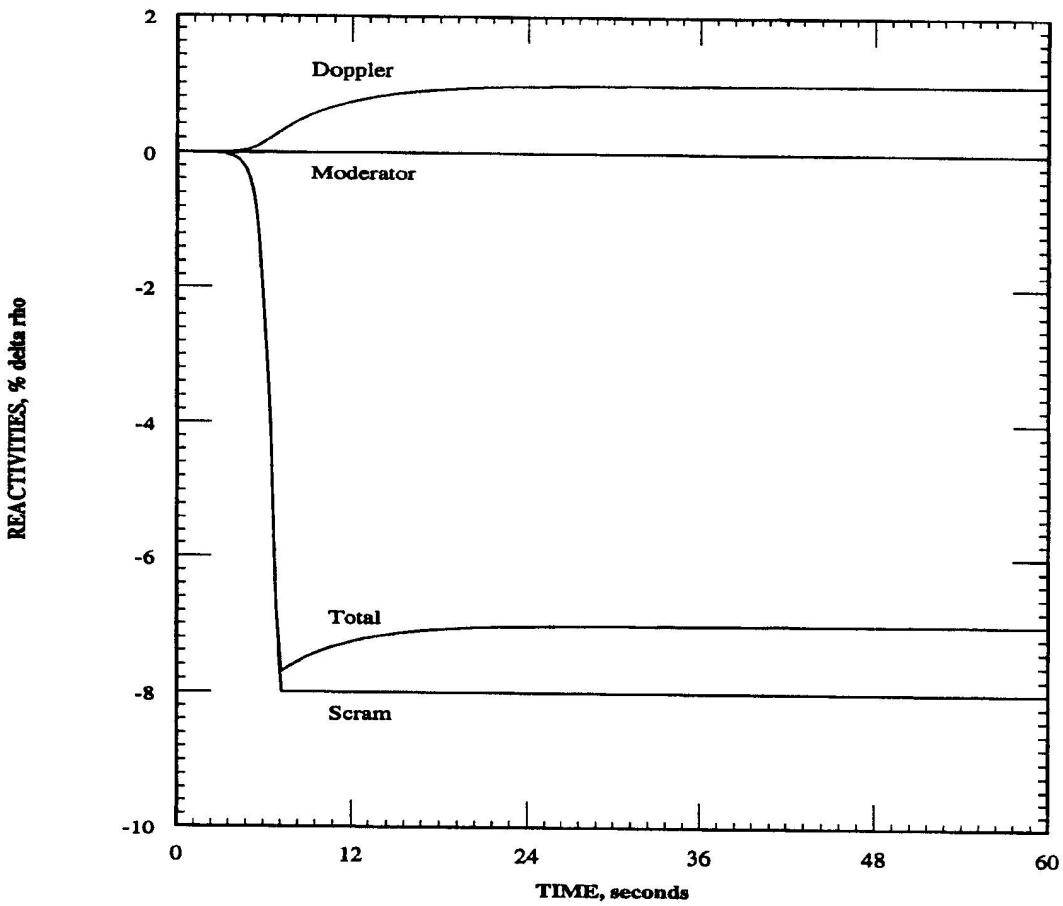


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
RCS TEMPERATURES vs. TIME

FIGURE 15.3.4-6

JUNE 2009 REVISION 15

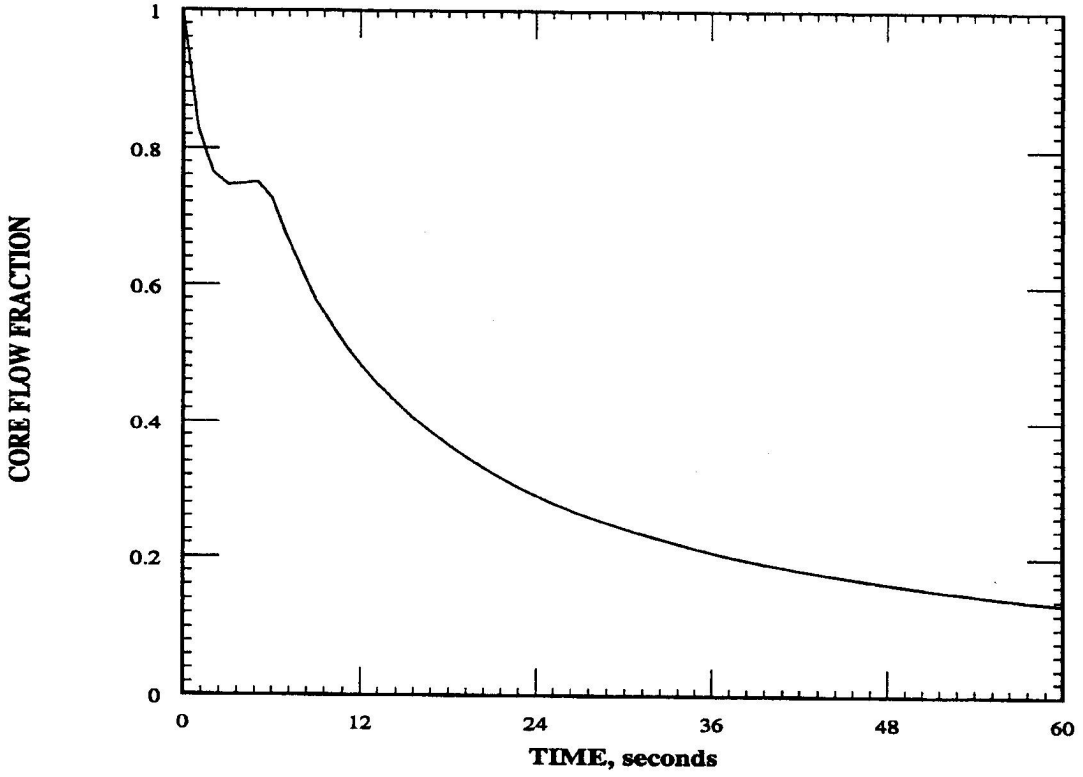


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
REACTIVITY vs. TIME

FIGURE 15.3.4-7

JUNE 2009 REVISION 15

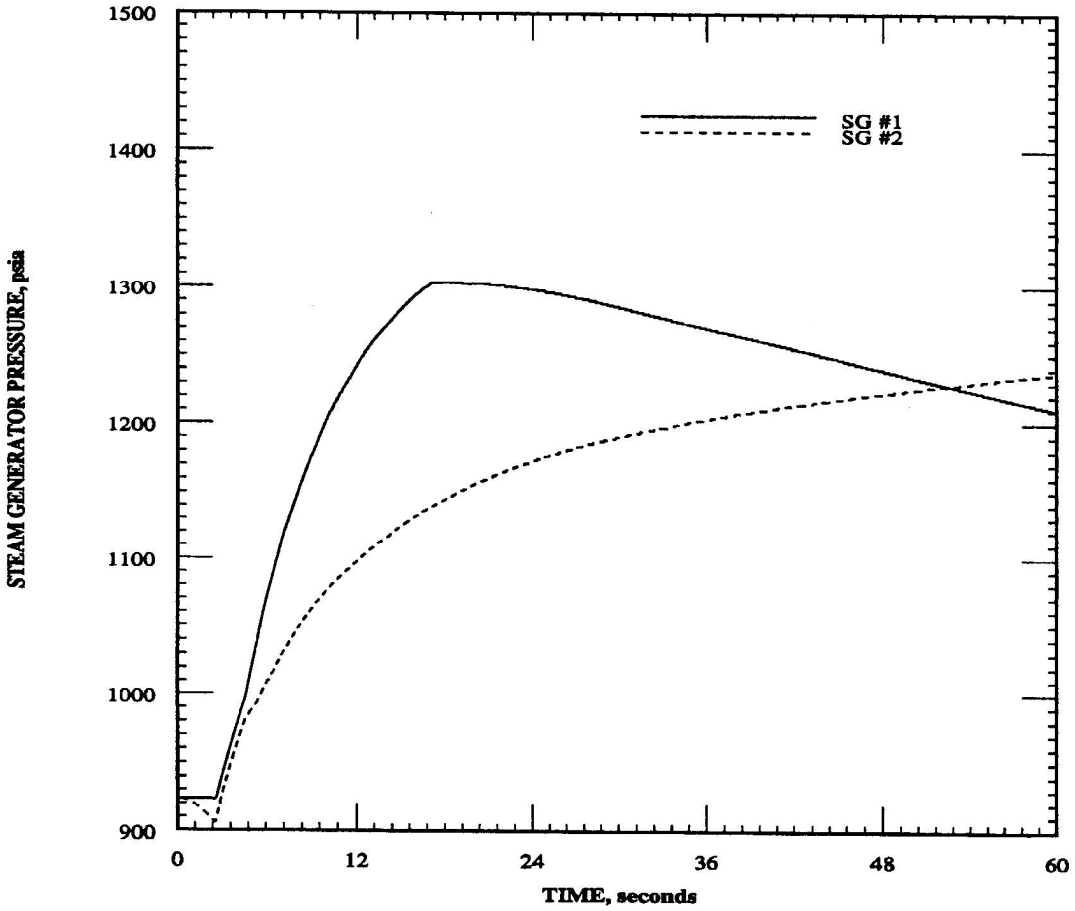


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
CORE FLOW vs. TIME

FIGURE 15.3.4-8

JUNE 2009 REVISION 15

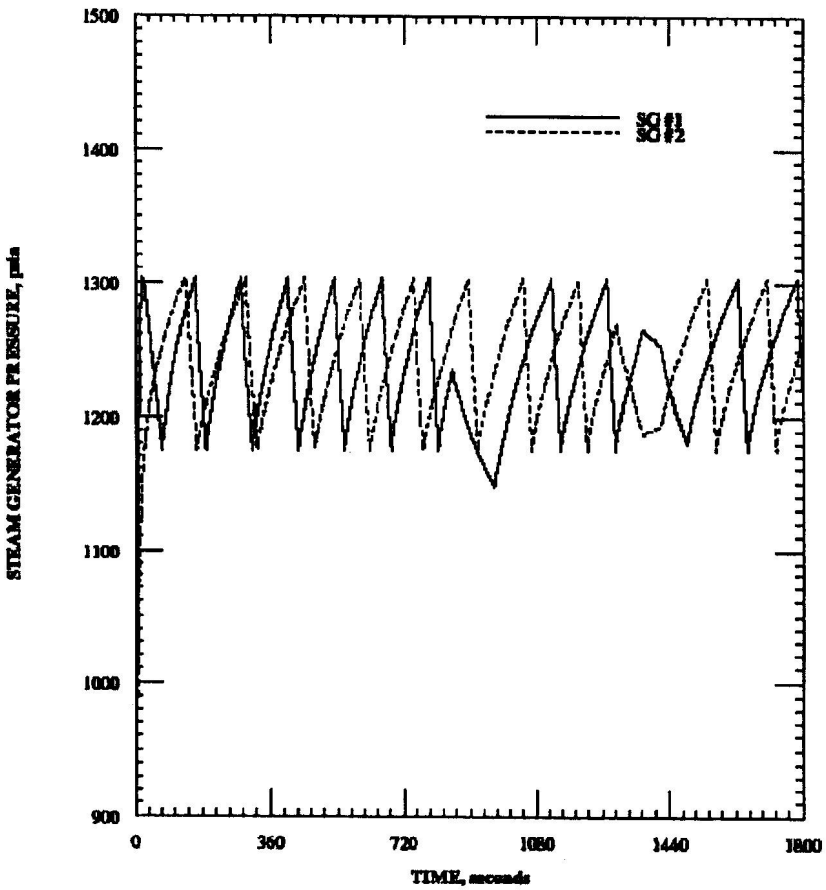


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
STEAM GENERATOR PRESSURE vs. TIME

FIGURE 15.3.4-9

JUNE 2009 REVISION 15

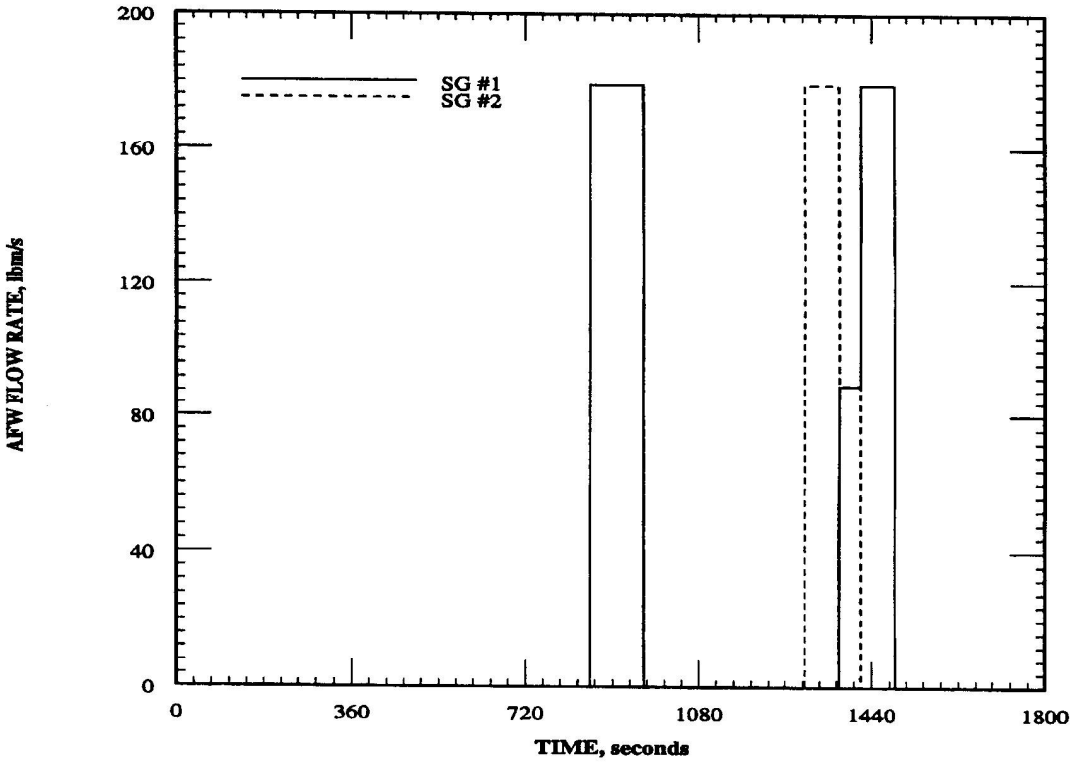


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
STEAM GENERATOR PRESSURE vs. TIME

FIGURE 15.3.4-10

JUNE 2009 REVISION 15

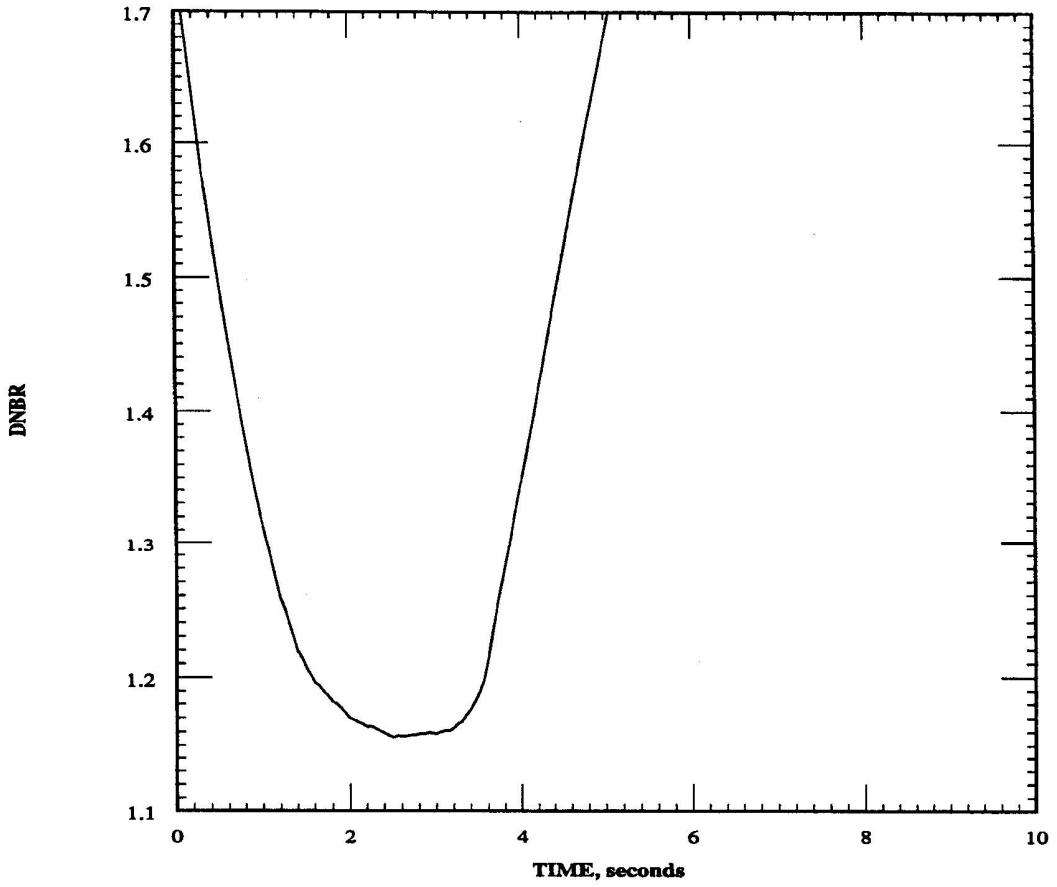


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
AUXILIARY FEEDWATER FLOW vs. TIME

FIGURE 15.3.4-11

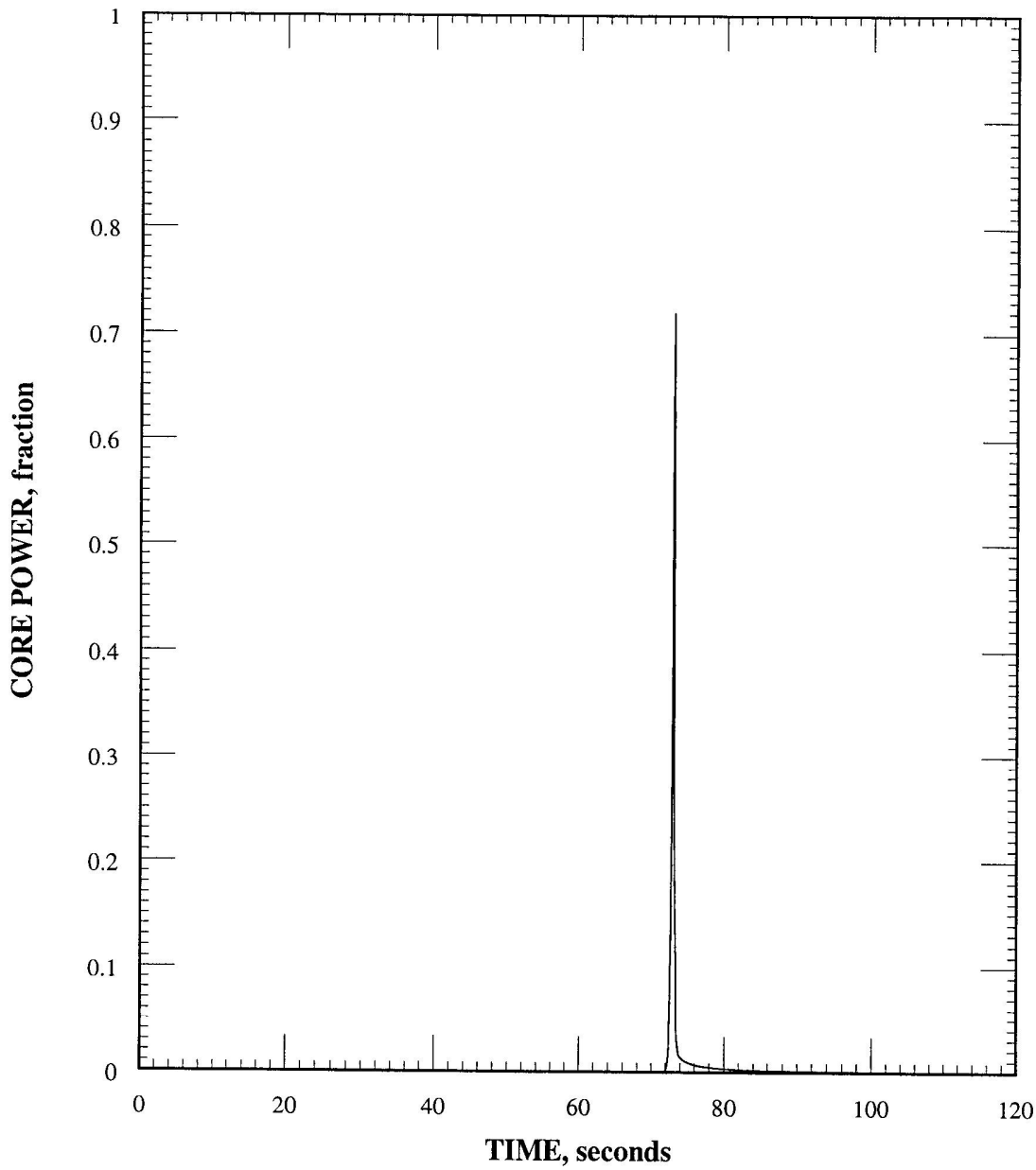
JUNE 2009 REVISION 15



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SINGLE RCP SHAFT BREAK WITH LOSS OF OFF-SITE POWER RESULTING FROM TURBINE TRIP
DNBR vs. TIME

FIGURE 15.3.4-12

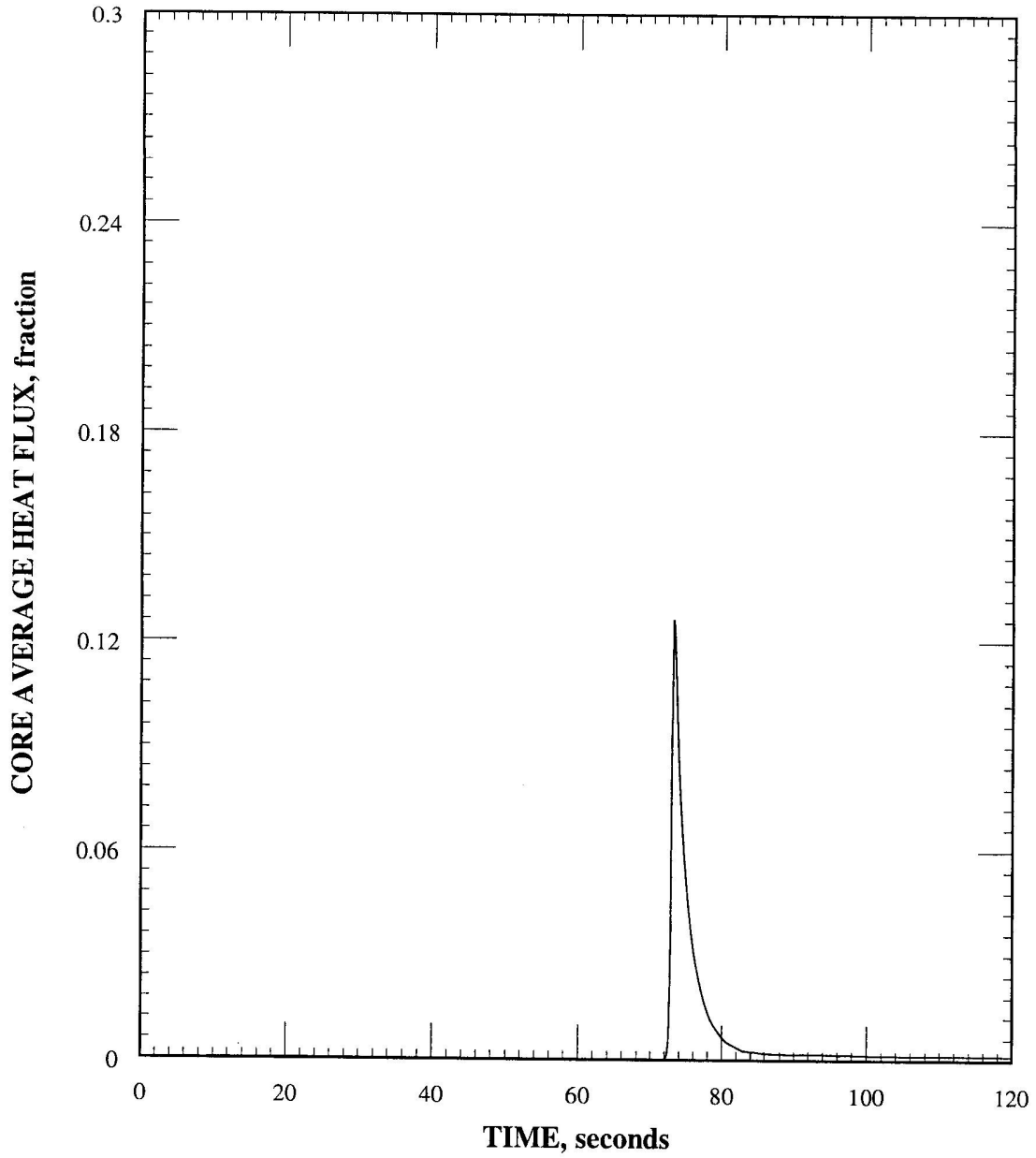


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED SUBCRITICAL CEA WITHDRAWAL
CORE POWER vs. TIME

FIGURE 15.4.1-1

JUNE 2009 REVISION 15

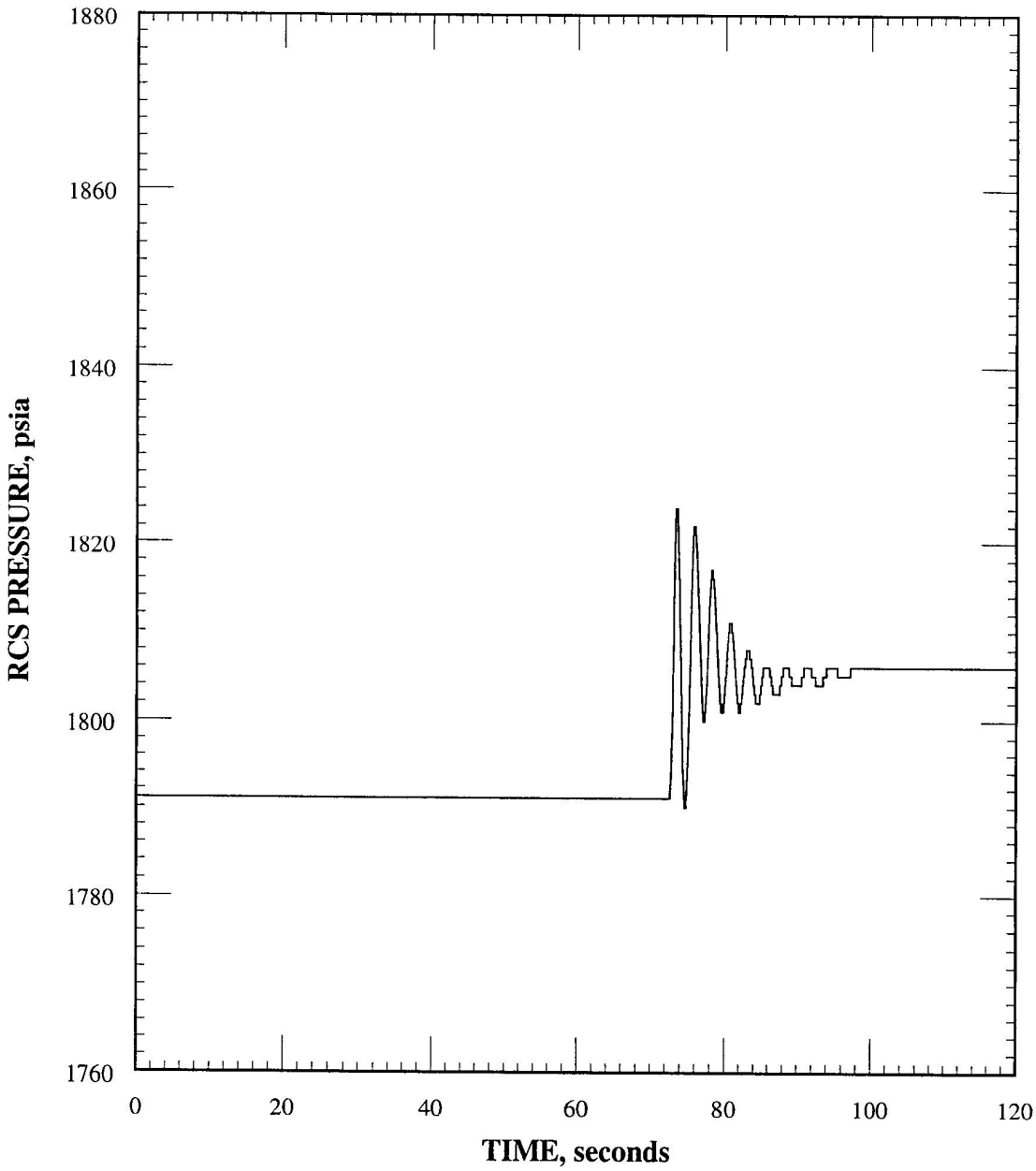


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED SUBCRITICAL CEA WITHDRAWAL
CORE HEAT FLUX vs. TIME

FIGURE 15.4.1-2

JUNE 2009 REVISION 15

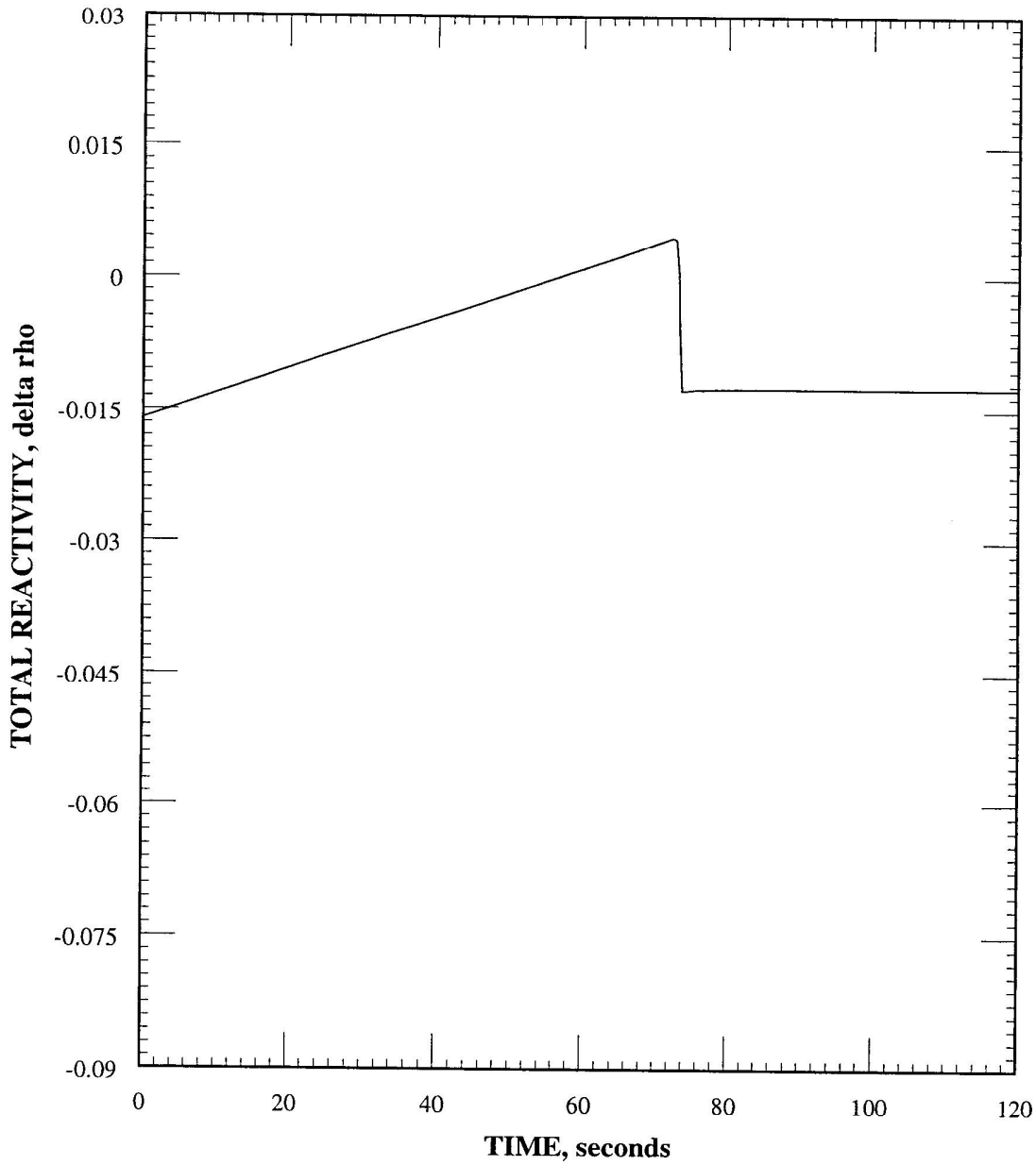


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED SUBCRITICAL CEA WITHDRAWAL
RCS PRESSURE vs. TIME

FIGURE 15.4.1-3

JUNE 2009 REVISION 15

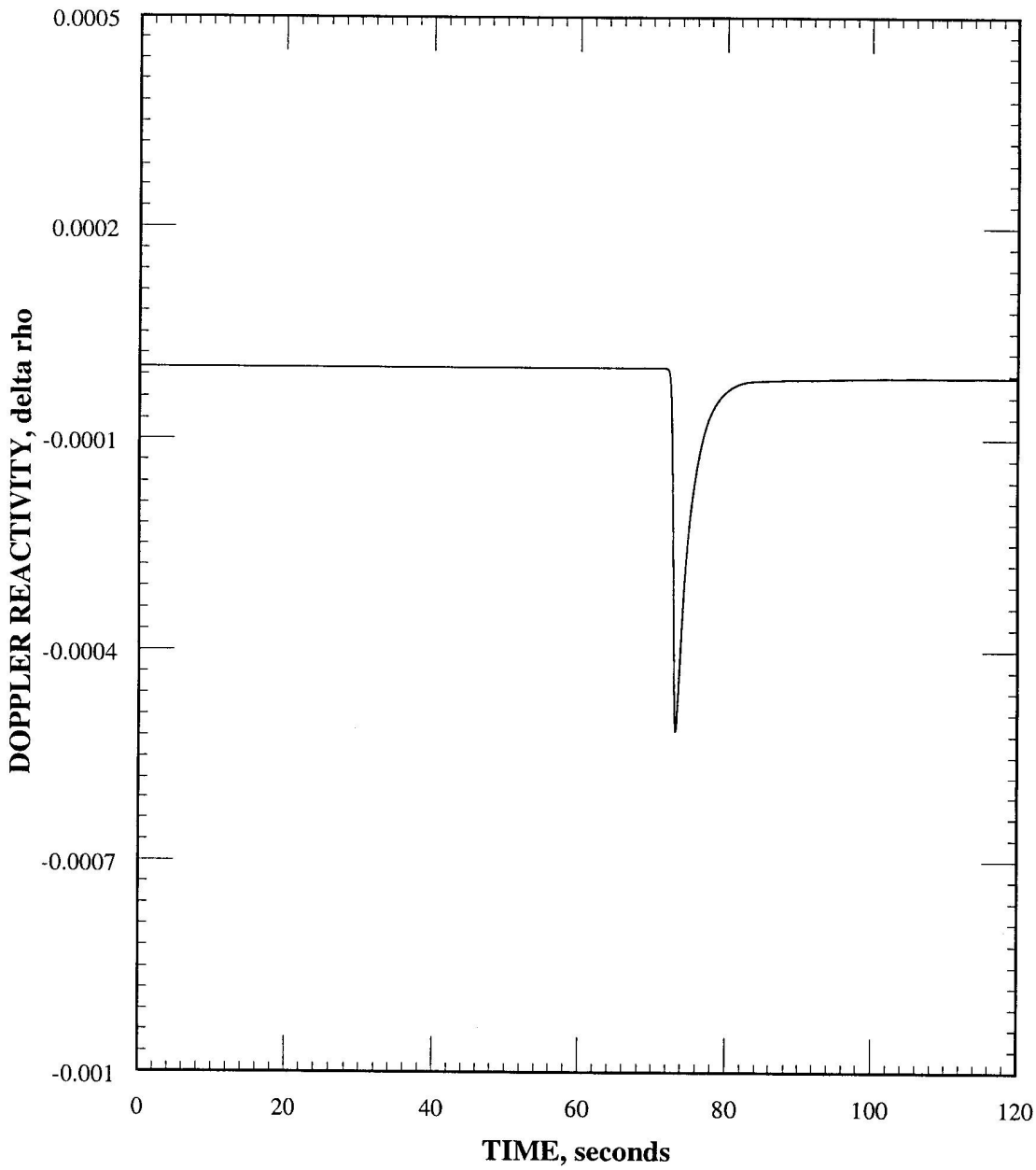


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED SUBCRITICAL CEA WITHDRAWAL
TOTAL REACTIVITY vs. TIME

FIGURE 15.4.1-4

JUNE 2009 REVISION 15

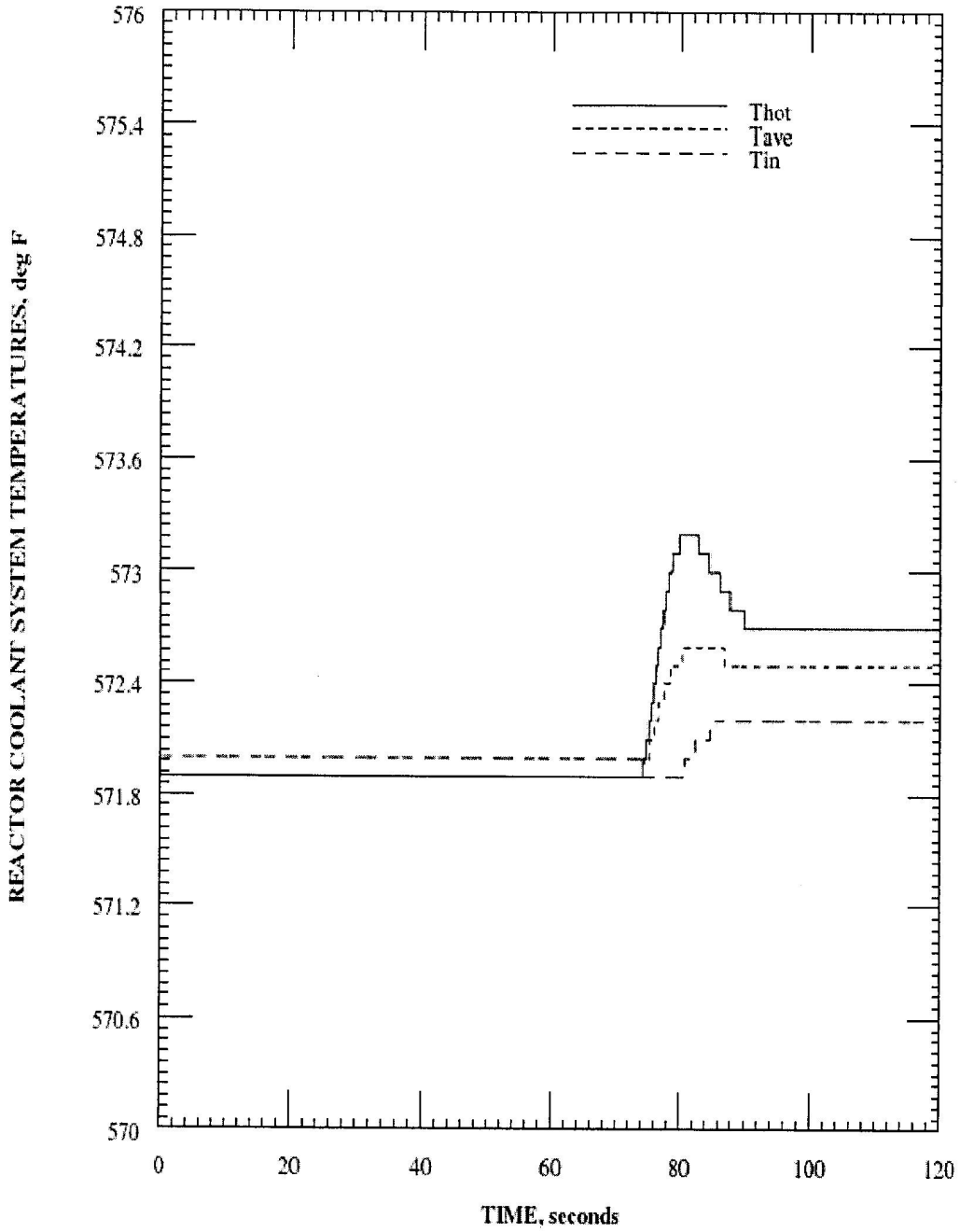


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED SUBCRITICAL CEA WITHDRAWAL
DOPPLER REACTIVITY vs. TIME

FIGURE 15.4.1-5

JUNE 2009 REVISION 15

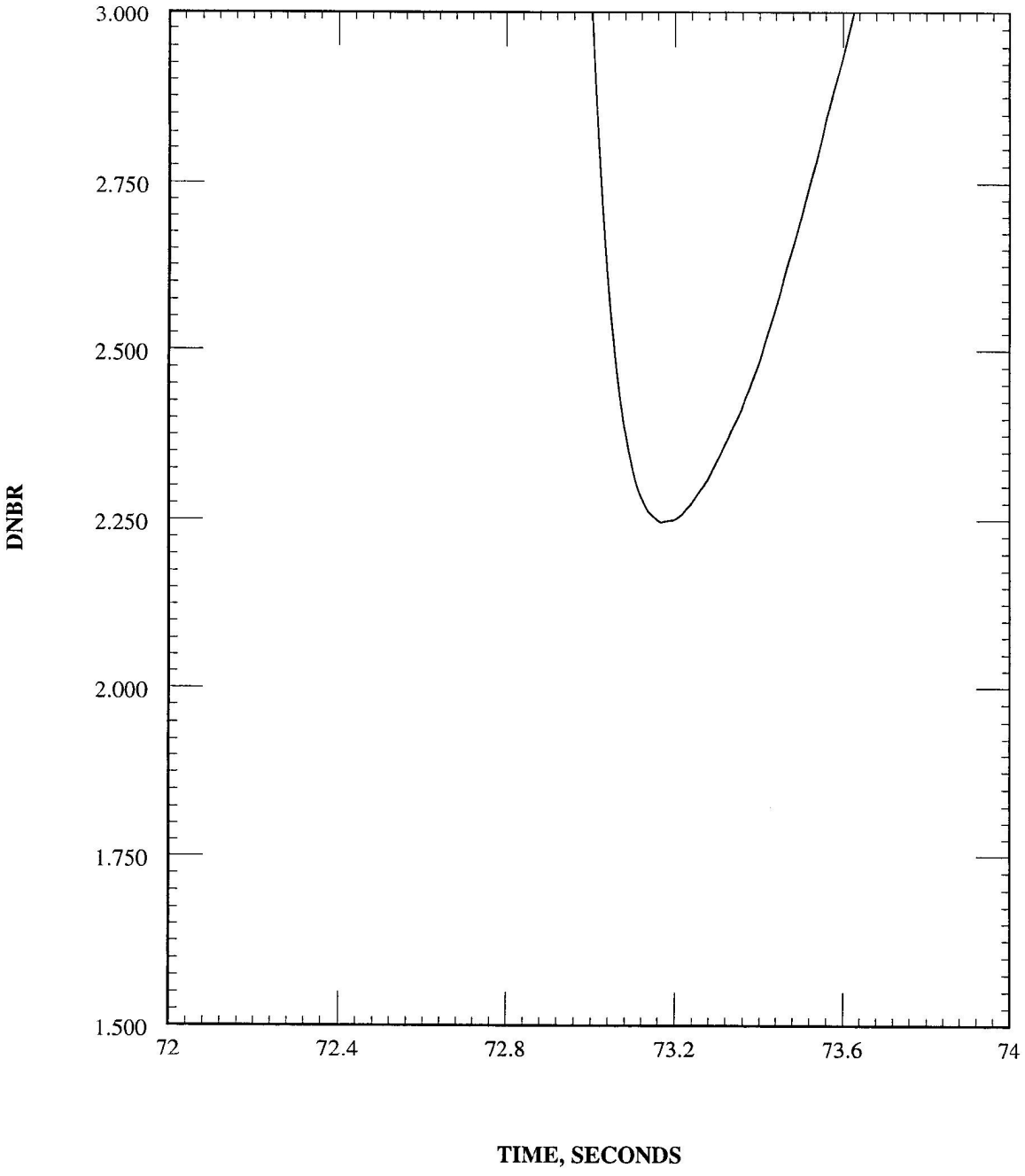


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED SUBCRITICAL CEA WITHDRAWAL
RCS TEMPERATURE vs. TIME

FIGURE 15.4.1-6

JUNE 2009 REVISION 15

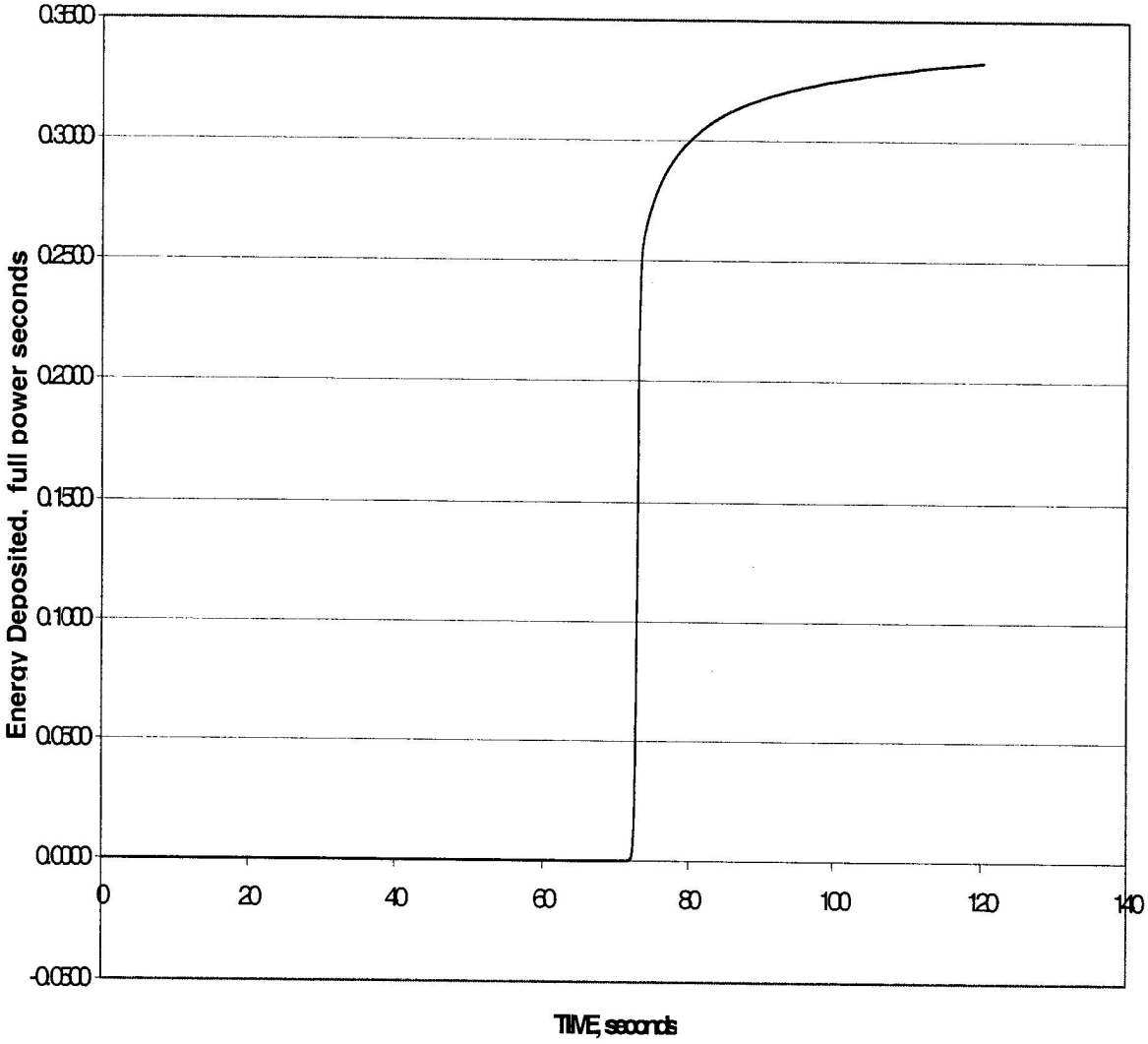


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED SUBCRITICAL CEA WITHDRAWAL
CETOP DNBR vs. TIME

FIGURE 15.4.1-7

JUNE 2009 REVISION 15

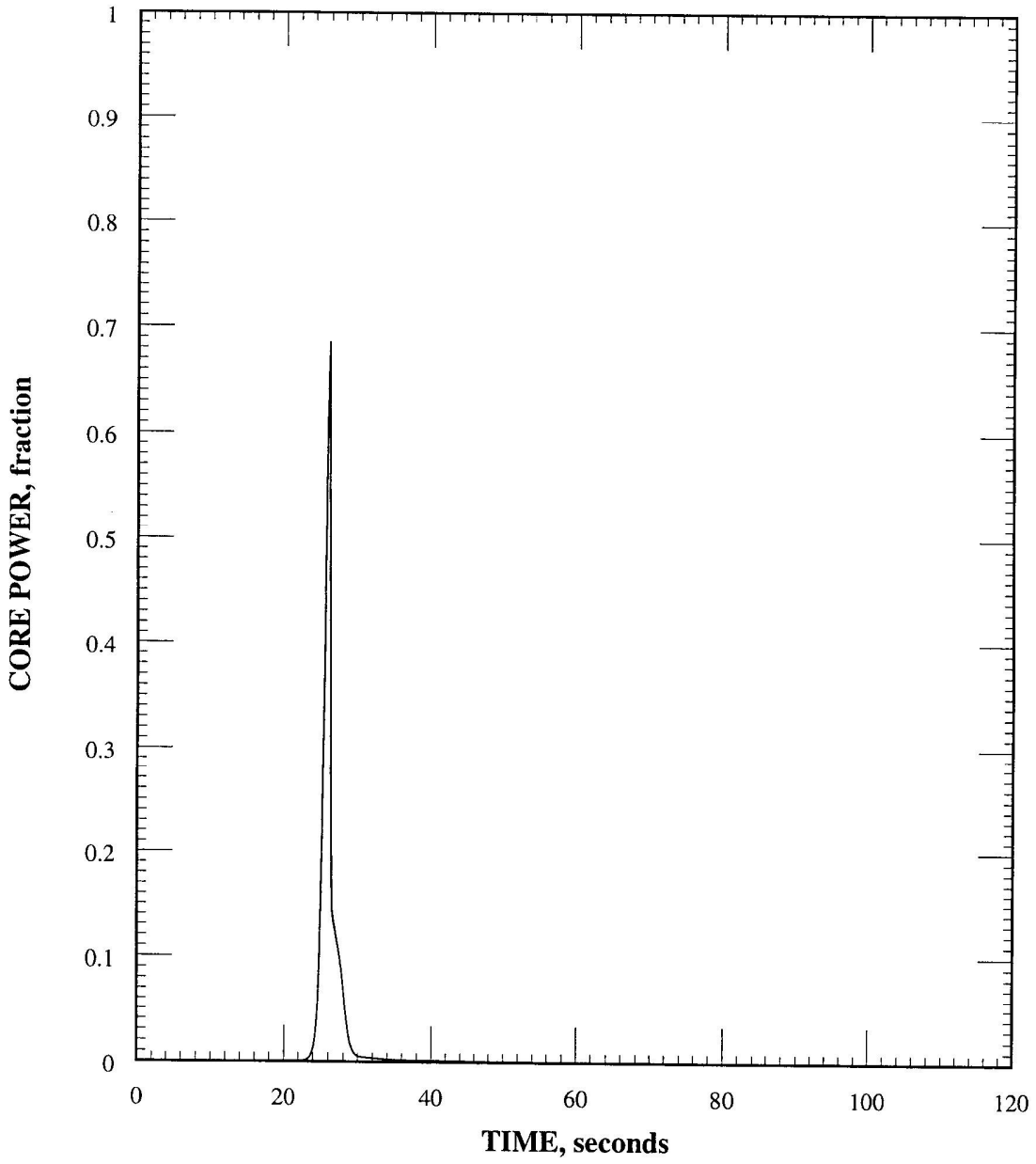


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED SUBCRITICAL CEA WITHDRAWAL
SUBCRITICAL ENERGY DEPOSITION vs. TIME

FIGURE 15.4.1-8

JUNE 2009 REVISION 15

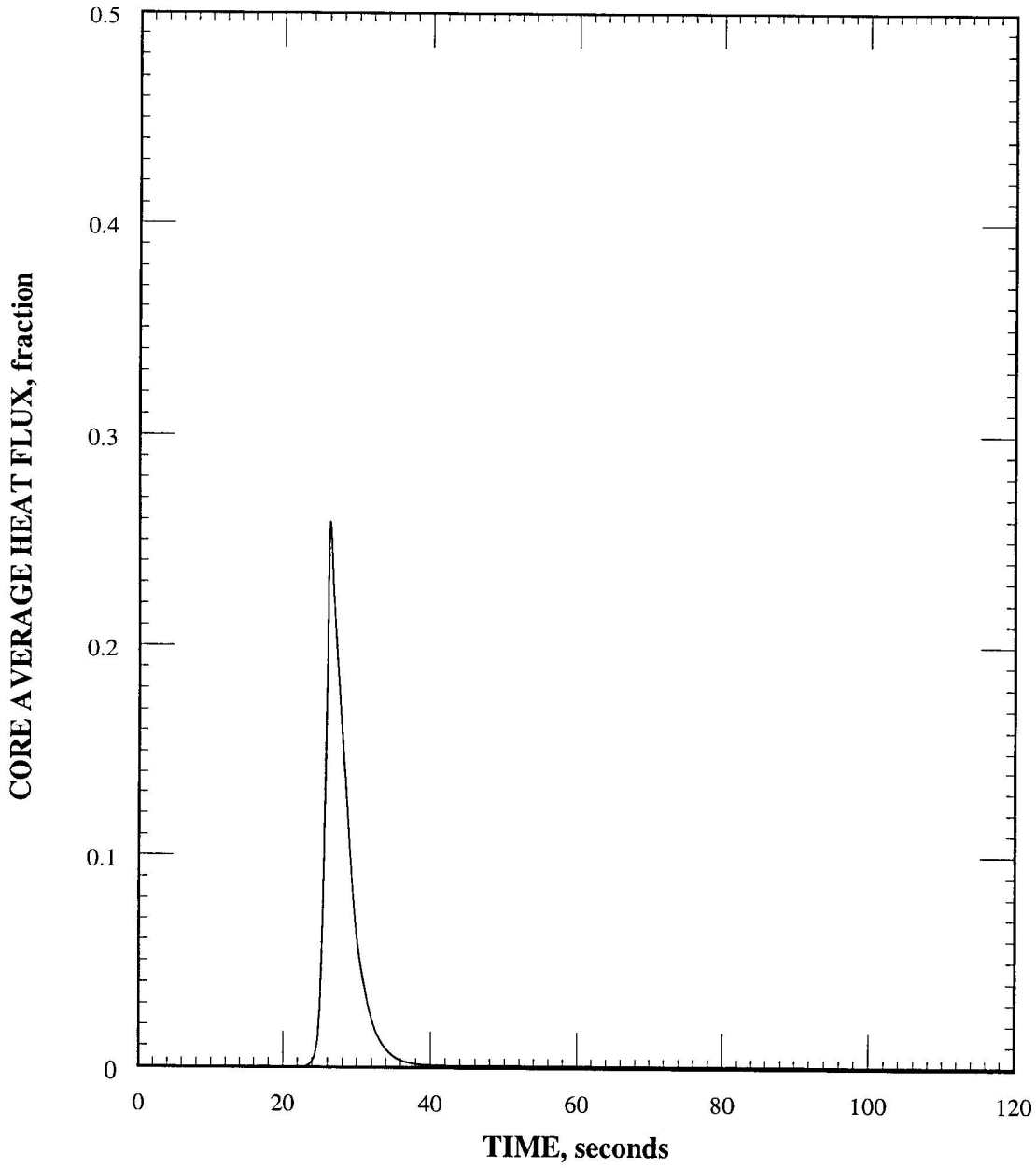


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HOT ZERO POWER CEA WITHDRAWAL
CORE POWER vs. TIME

FIGURE 15.4.1-9

JUNE 2009 REVISION 15

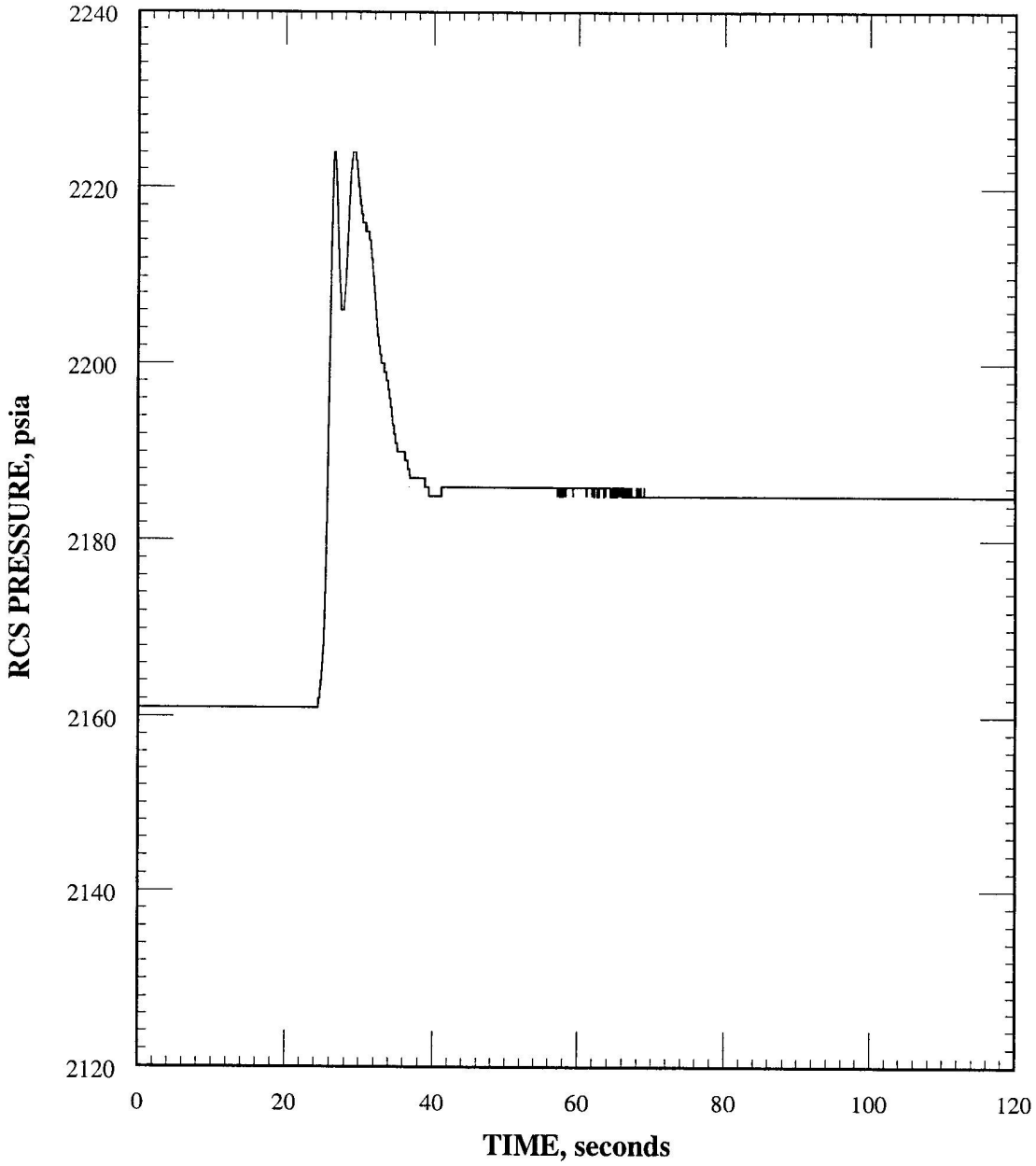


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HOT ZERO POWER CEA WITHDRAWAL
CORE AVERAGE HEAT FLUX vs. TIME

FIGURE 15.4.1-10

JUNE 2009 REVISION 15

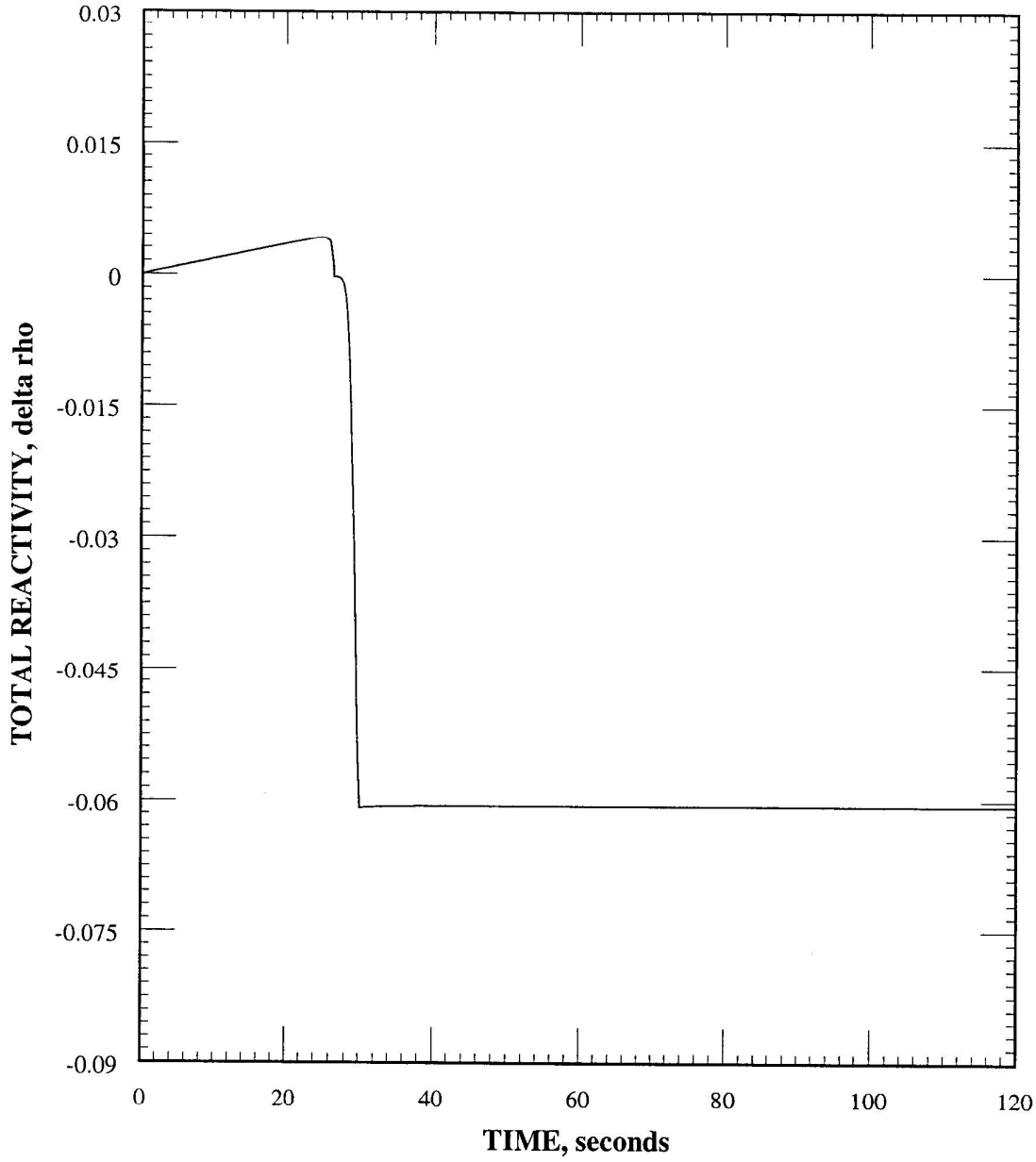


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HOT ZERO POWER CEA WITHDRAWAL
PRESSURIZER PRESSURE vs. TIME

FIGURE 15.4.1-11

JUNE 2009 REVISION 15

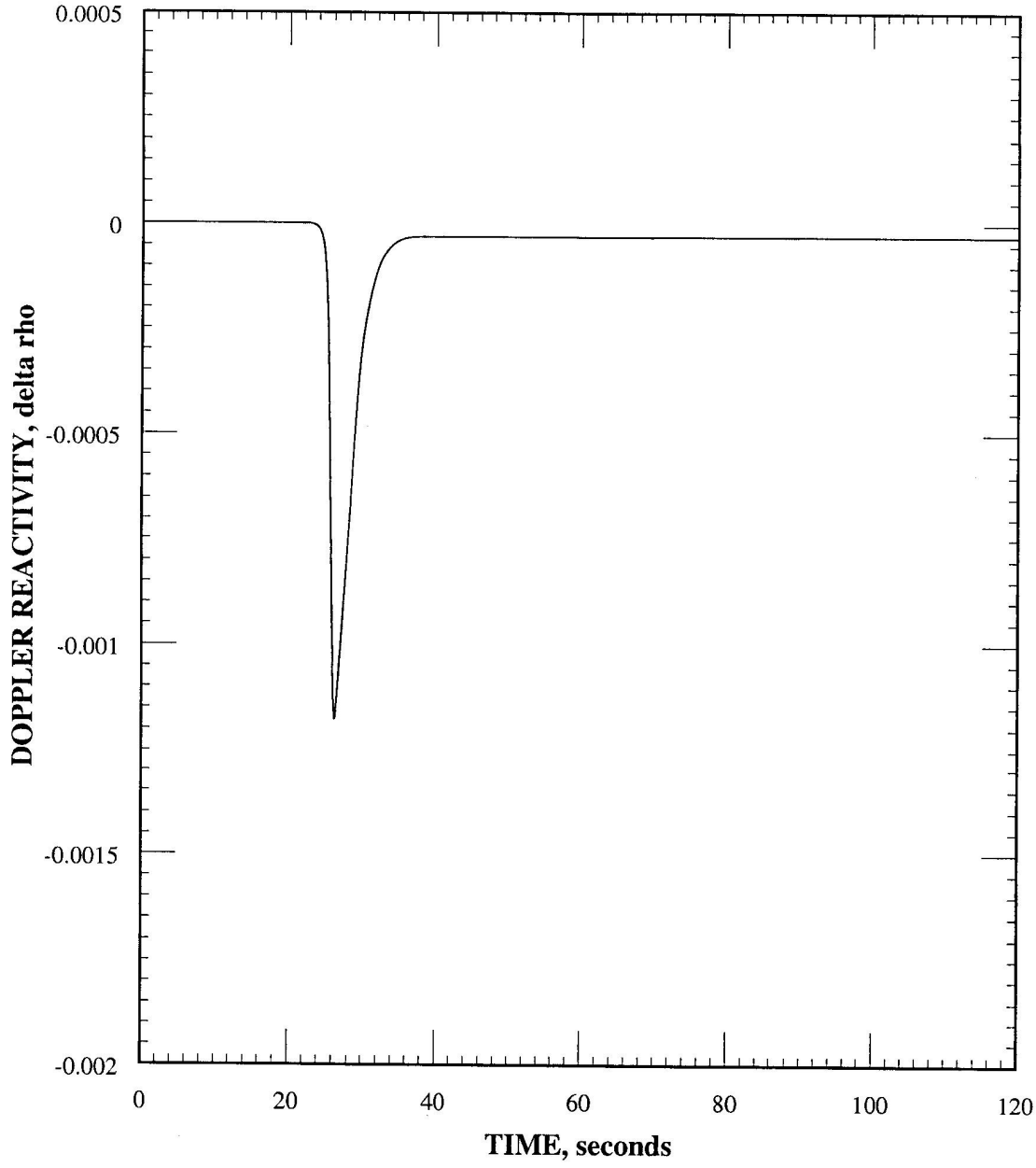


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HOT ZERO POWER CEA WITHDRAWAL
TOTAL REACTIVITY vs. TIME

FIGURE 15.4.1-12

JUNE 2009 REVISION 15

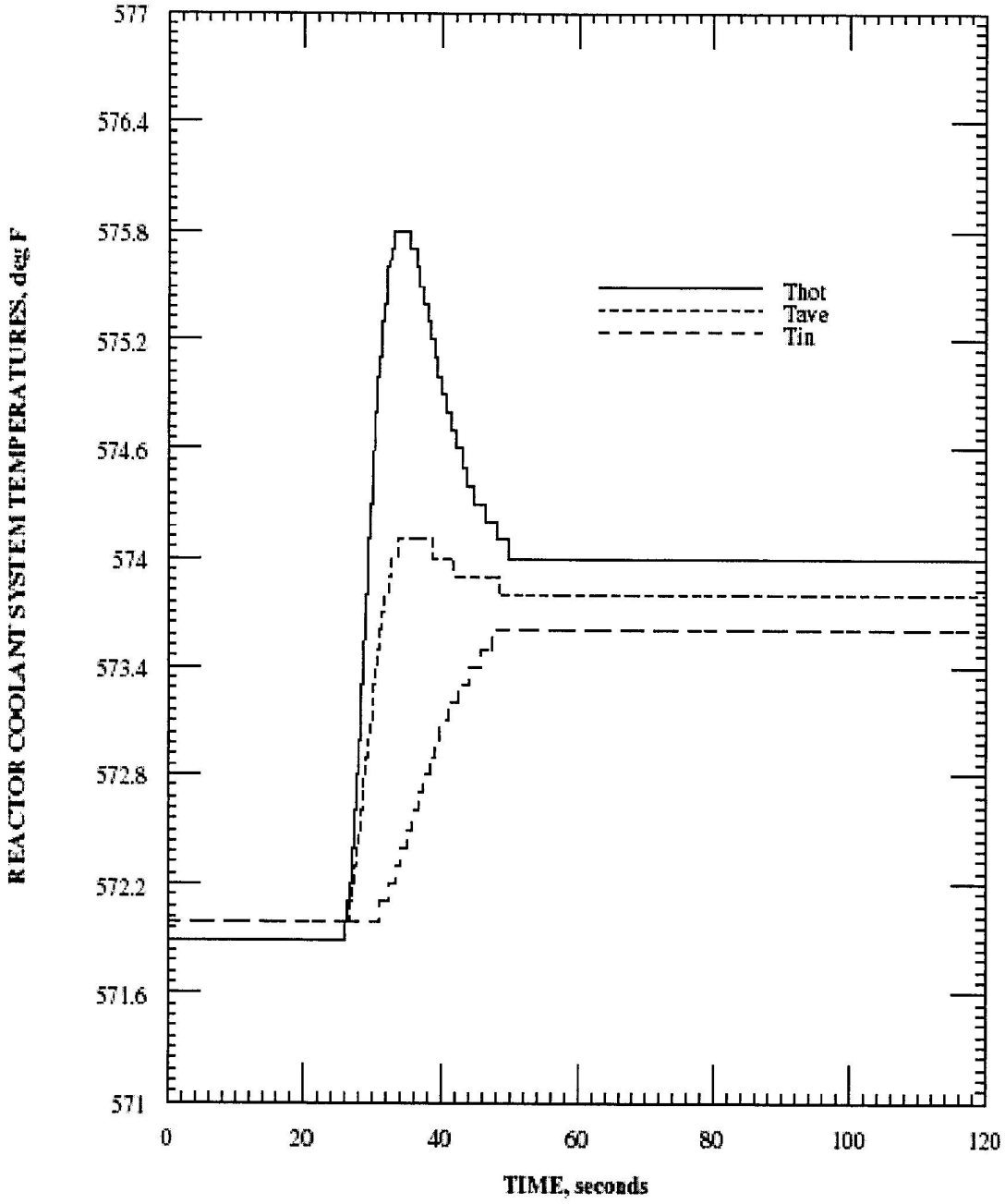


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HOT ZERO POWER CEA WITHDRAWAL
DOPPLER REACTIVITY vs. TIME

FIGURE 15.4.1-13

JUNE 2009 REVISION 15

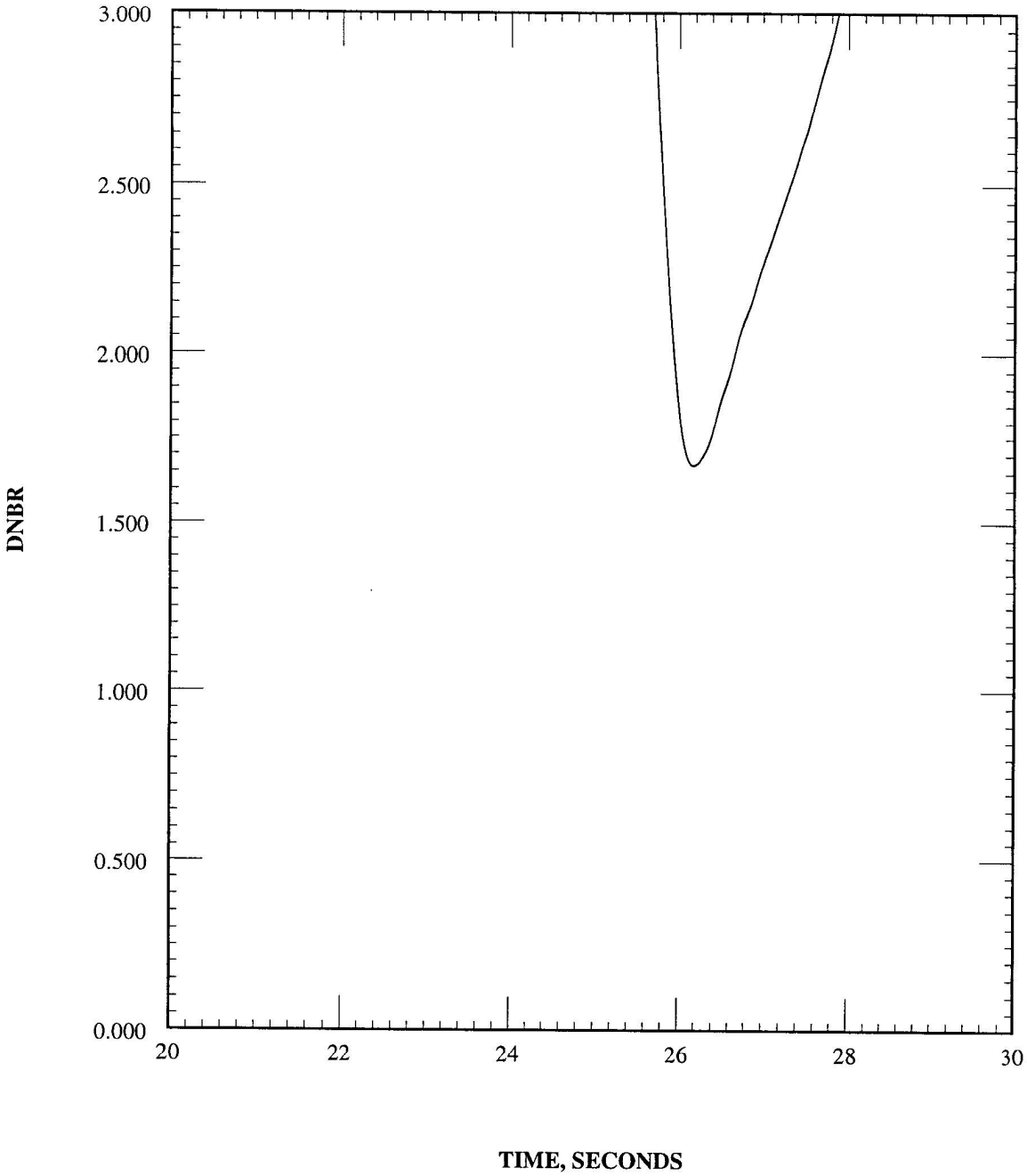


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HOT ZERO POWER CEA WITHDRAWAL
RCS TEMPERATURE vs. TIME

FIGURE 15.4.1-14

JUNE 2009 REVISION 15

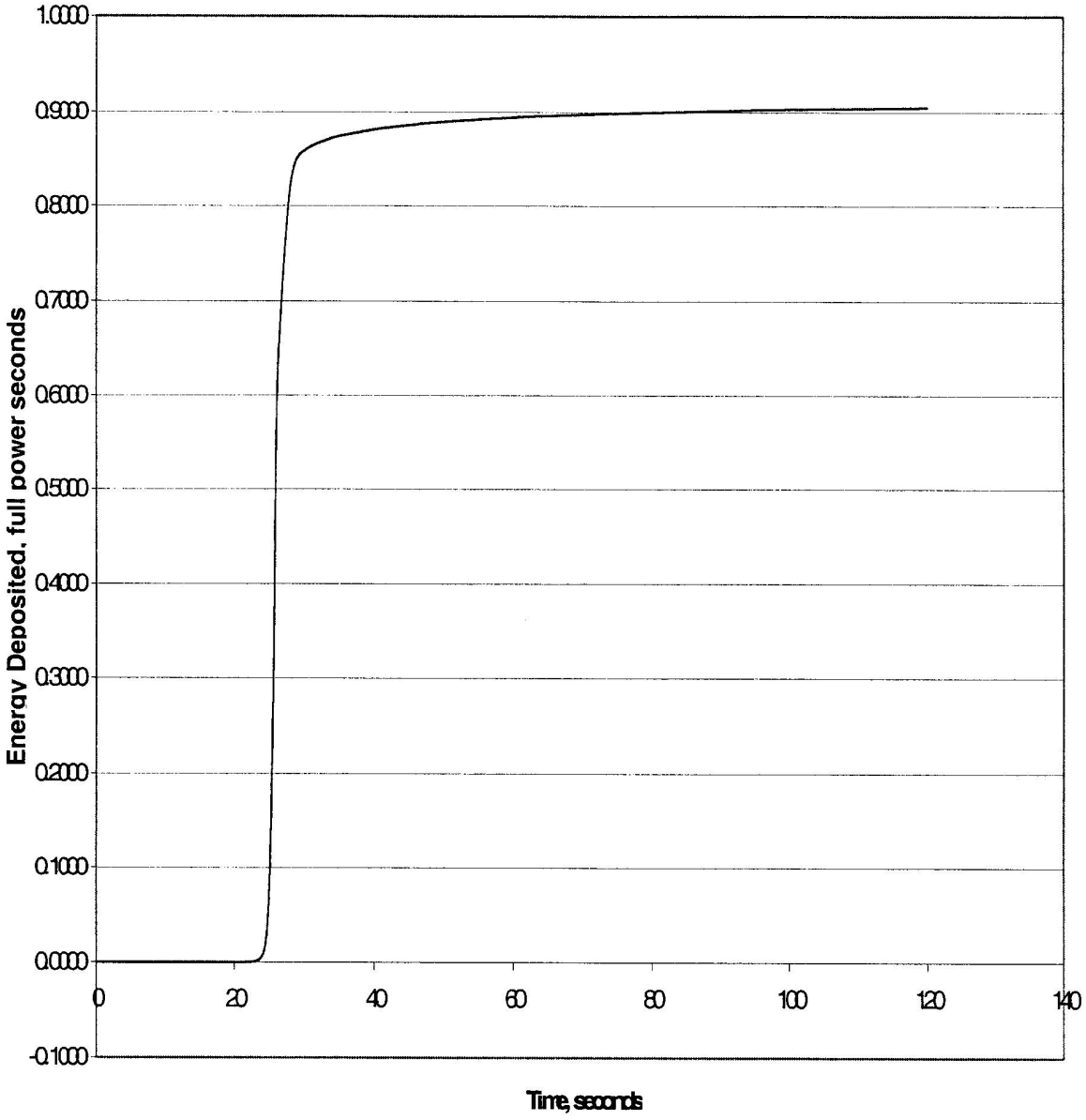


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HOT ZERO POWER CEA WITHDRAWAL
CETOP DNBR vs. TIME

FIGURE 15.4.1-15

JUNE 2009 REVISION 15

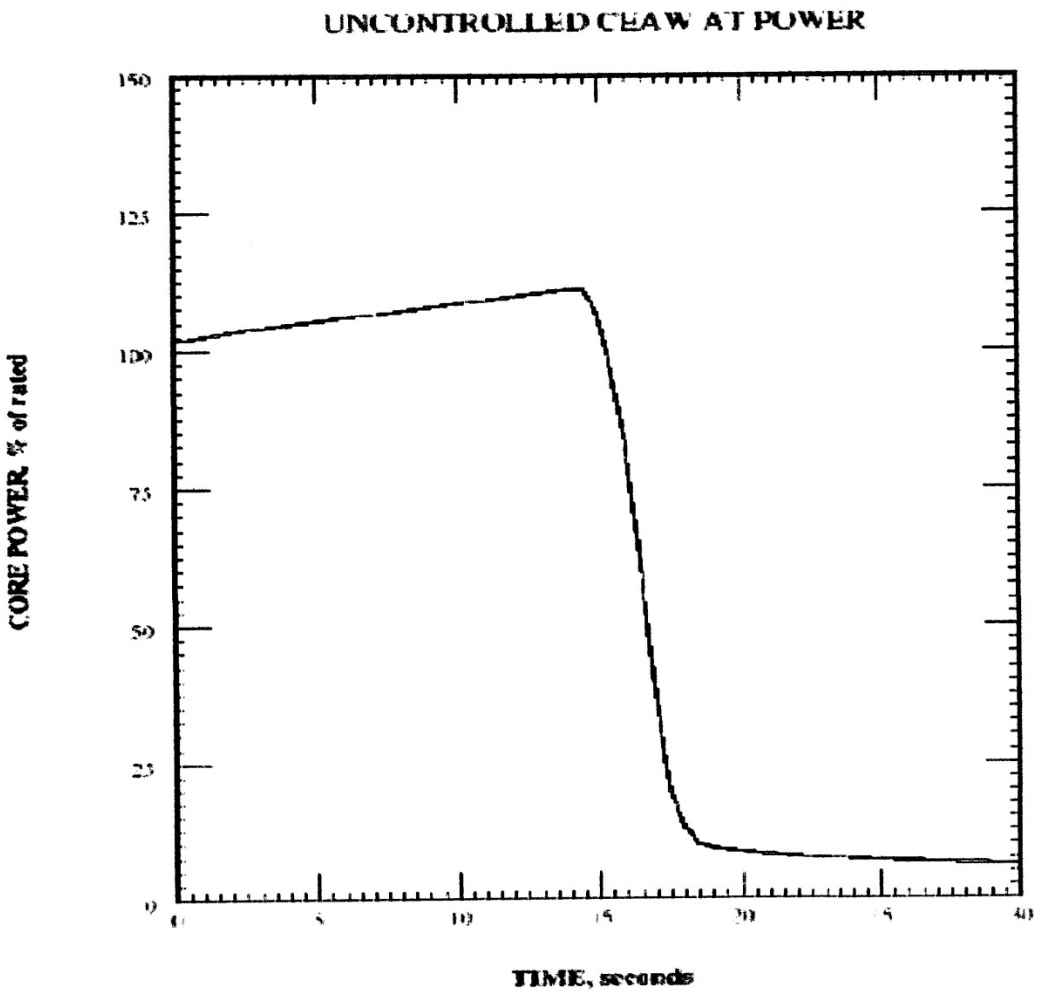


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HOT ZERO POWER CEA WITHDRAWAL
HOT ZERO POWER ENERGY DEPOSITION vs. TIME

FIGURE 15.4.1-16

JUNE 2009 REVISION 15

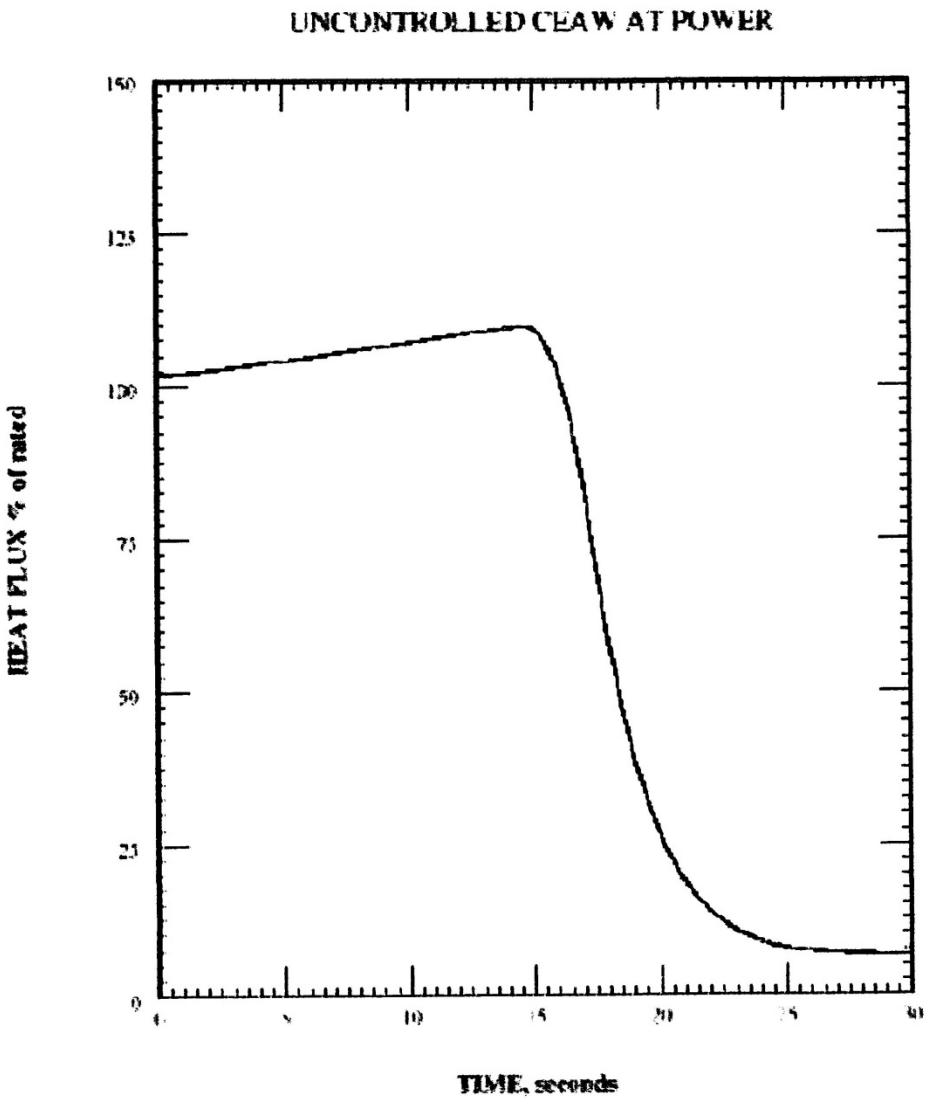


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
CORE POWER vs. TIME

FIGURE 15.4.2-1

JUNE 2015 REVISION 18

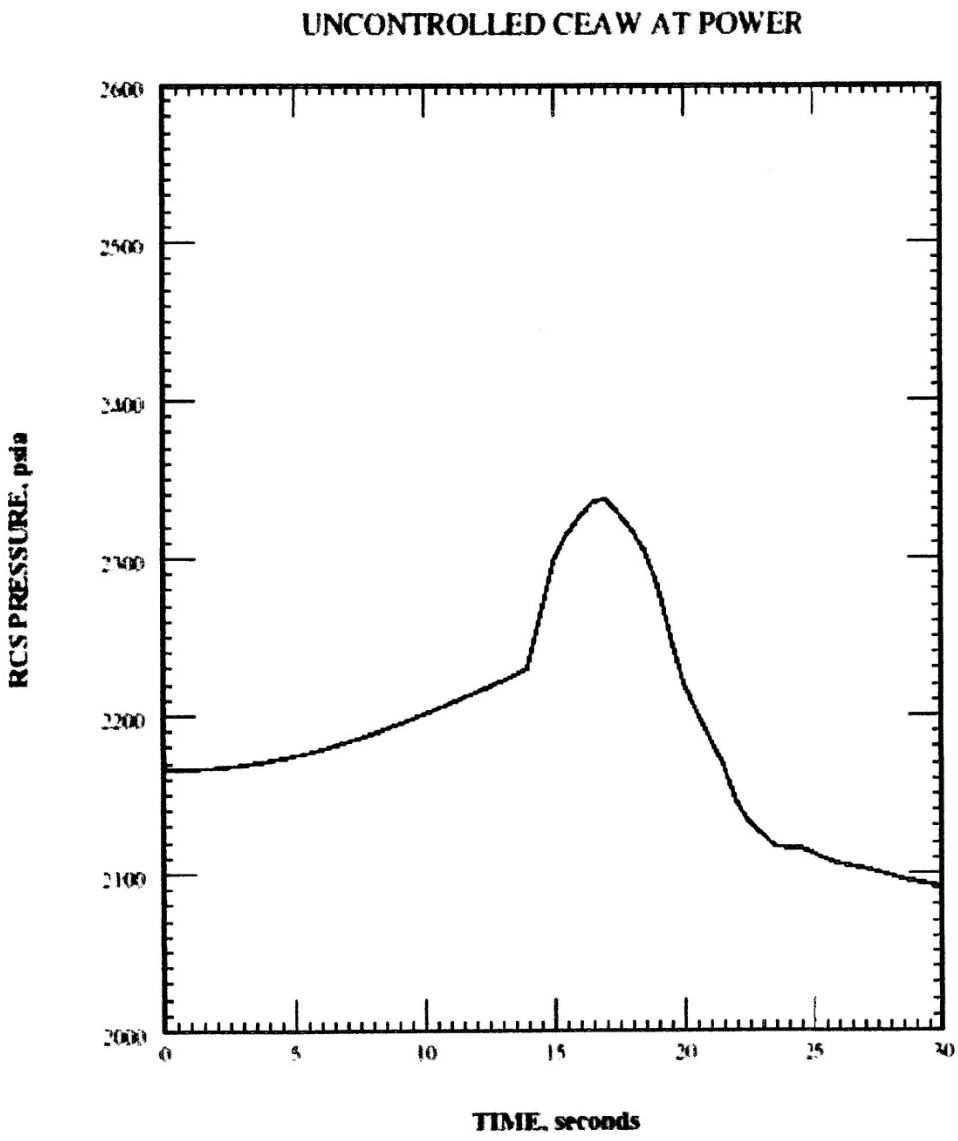


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
CORE HEAT FLUX vs. TIME

FIGURE 15.4.2-2

JUNE 2015 REVISION 18

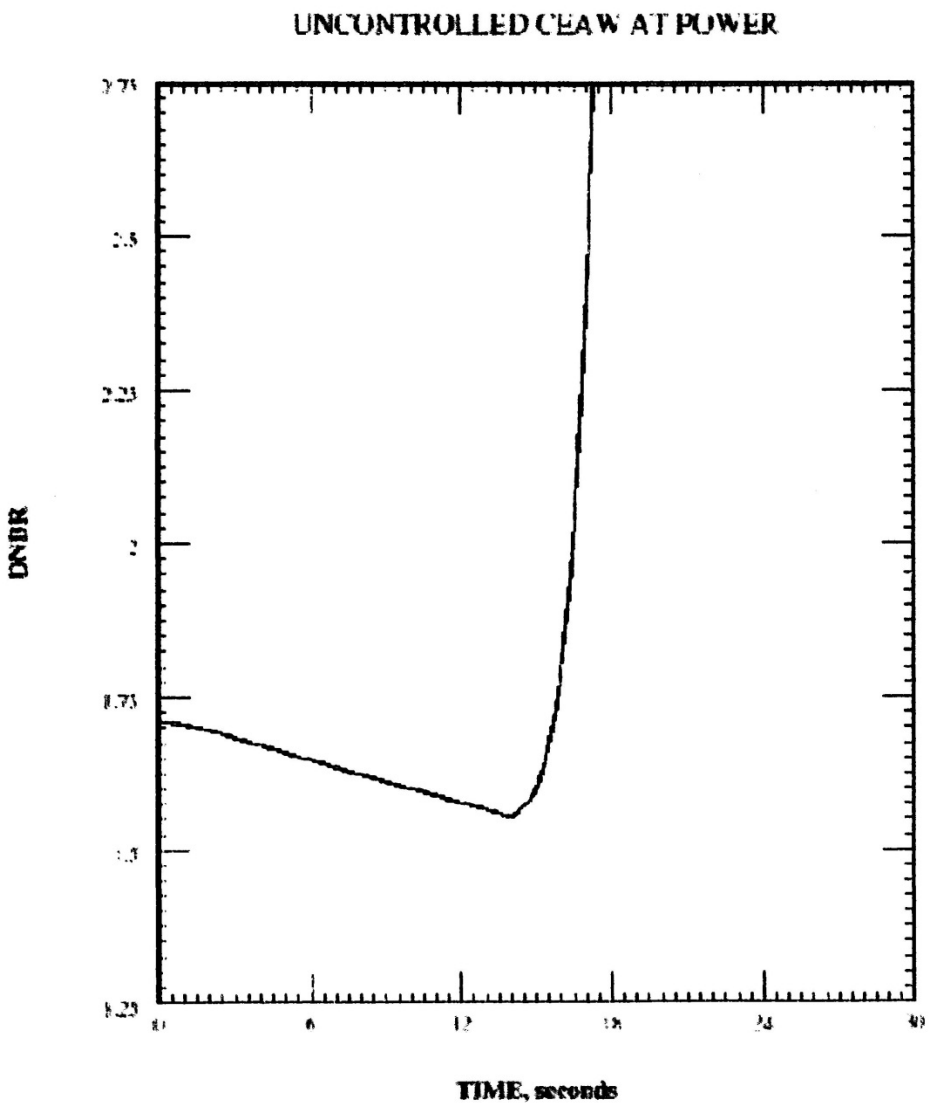


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
RCS PRESSURE vs. TIME

FIGURE 15.4.2-3

JUNE 2015 REVISION 18

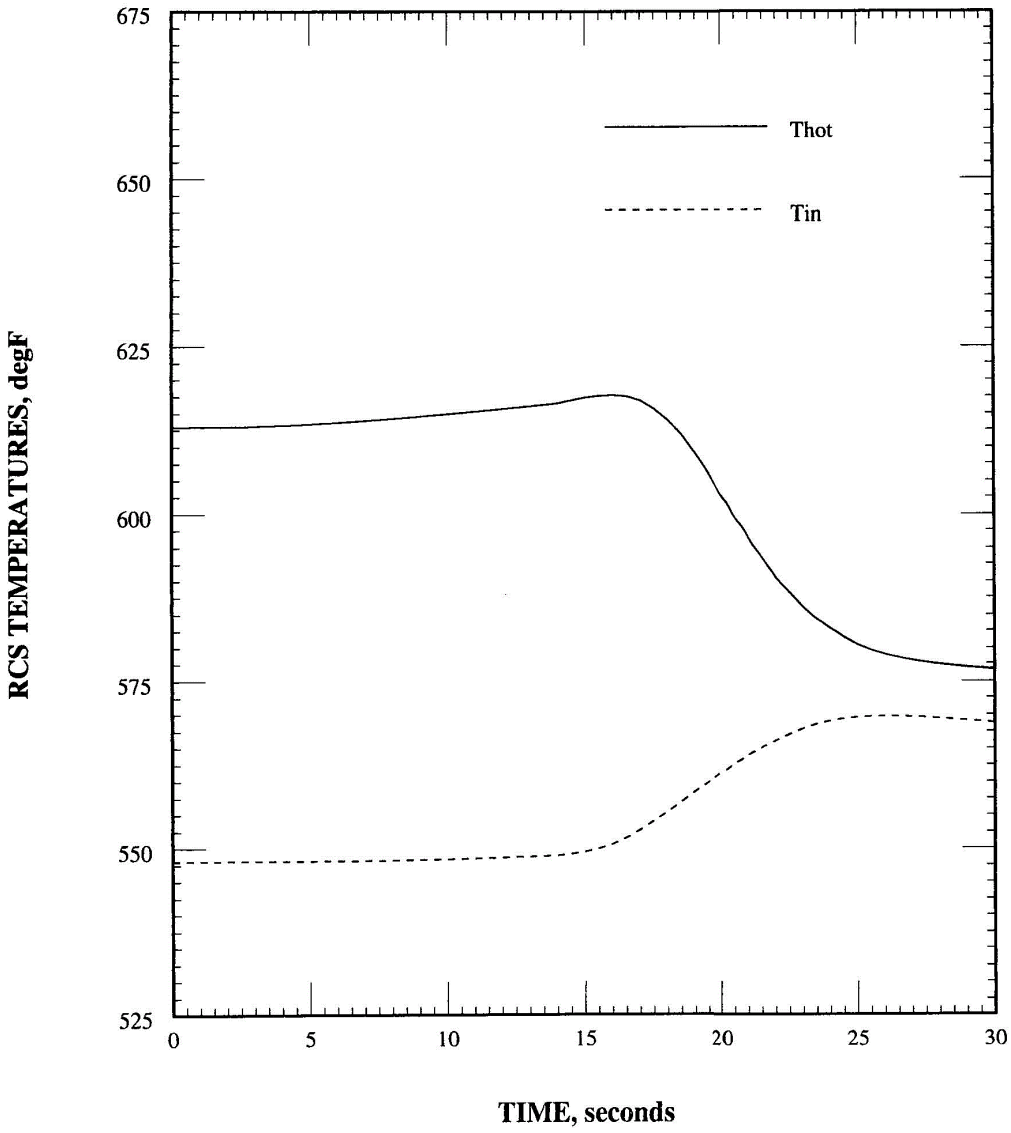


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
DNBR vs. TIME

FIGURE 15.4.2-4

UNCONTROLLED CEAW AT POWER



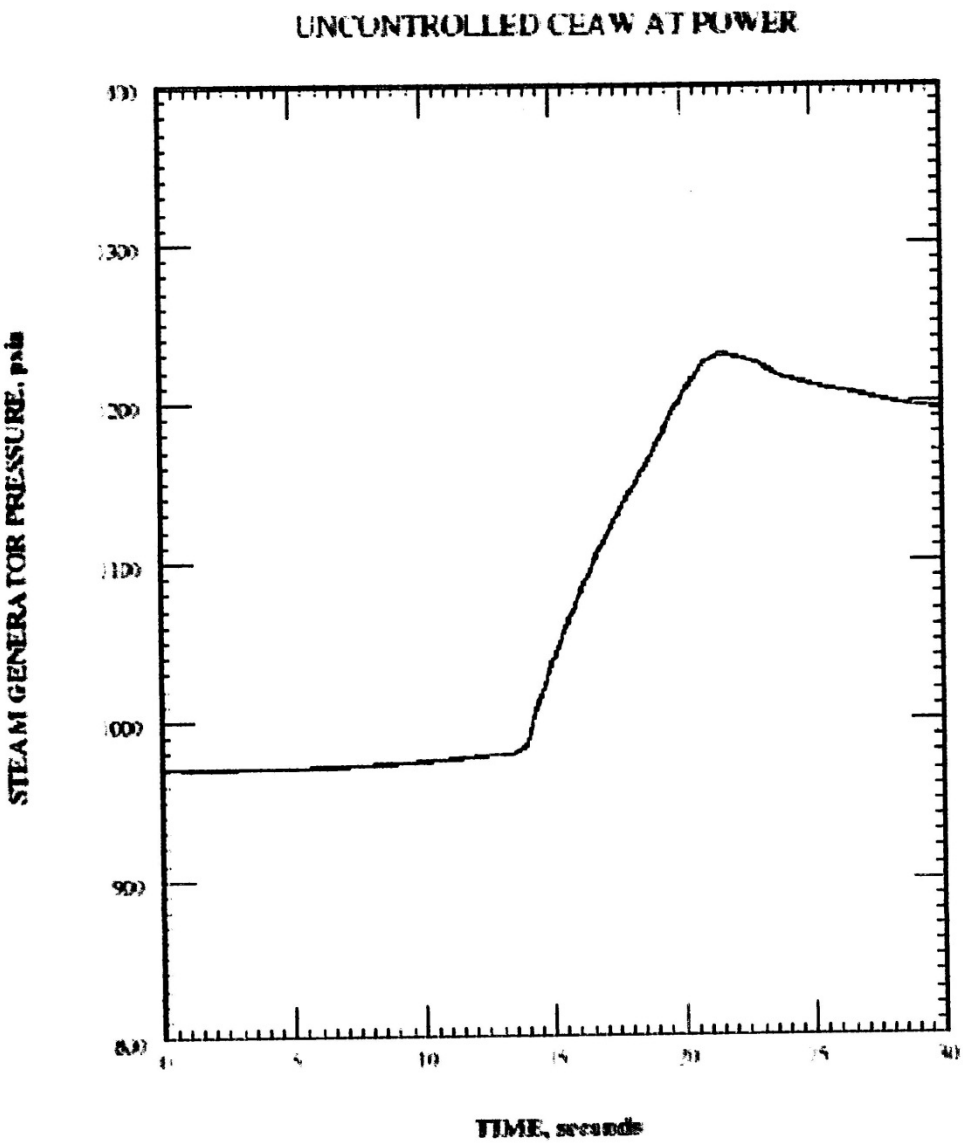
RCS TEMPERATURE vs. TIME

FIGURE 15.4.2-5

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
RCS TEMPERATURE vs. TIME

FIGURE 15.4.2-5

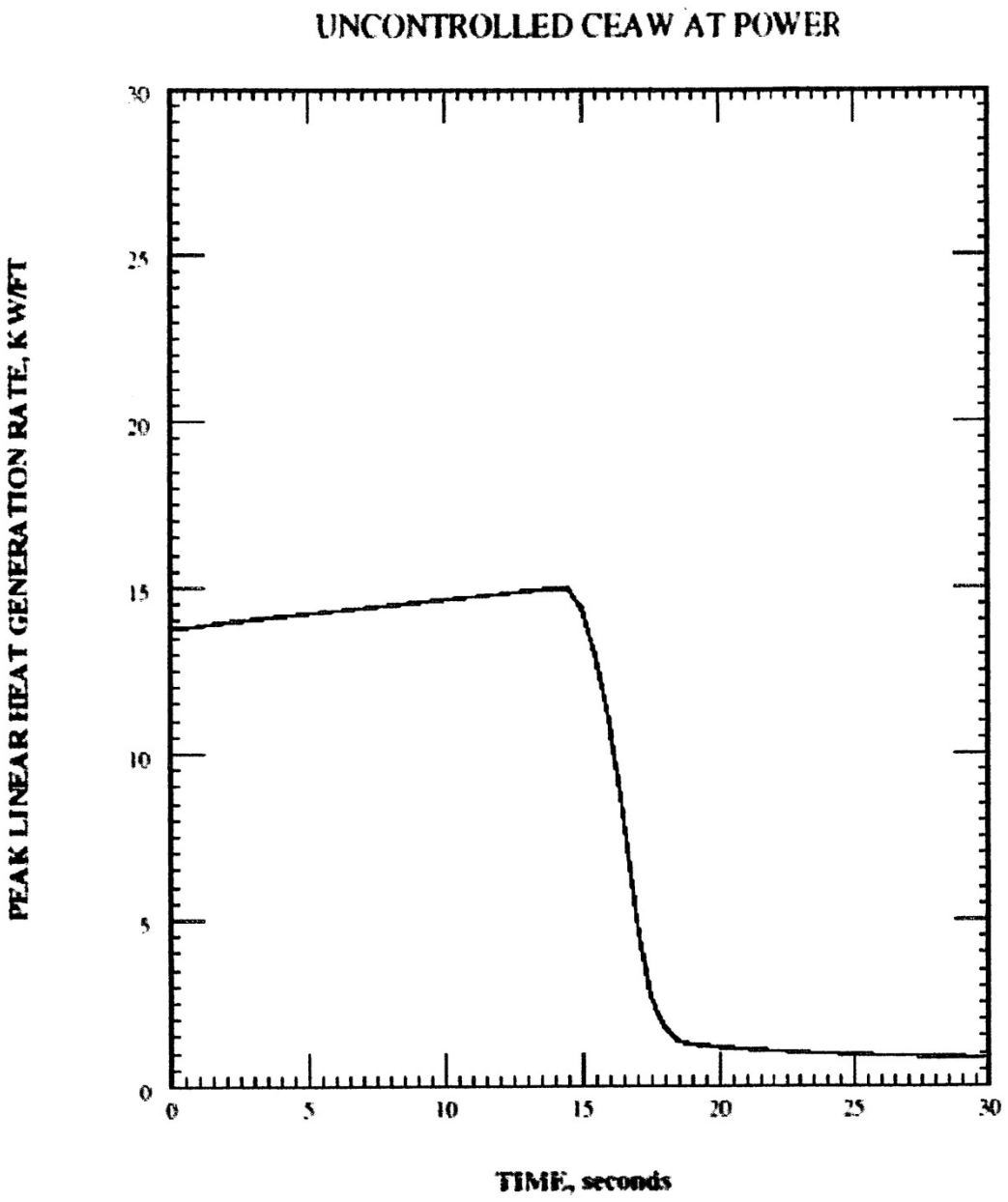


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
STEAM GENERATOR PRESSURE vs. TIME

FIGURE 15.4.2-6

JUNE 2015 REVISION 18

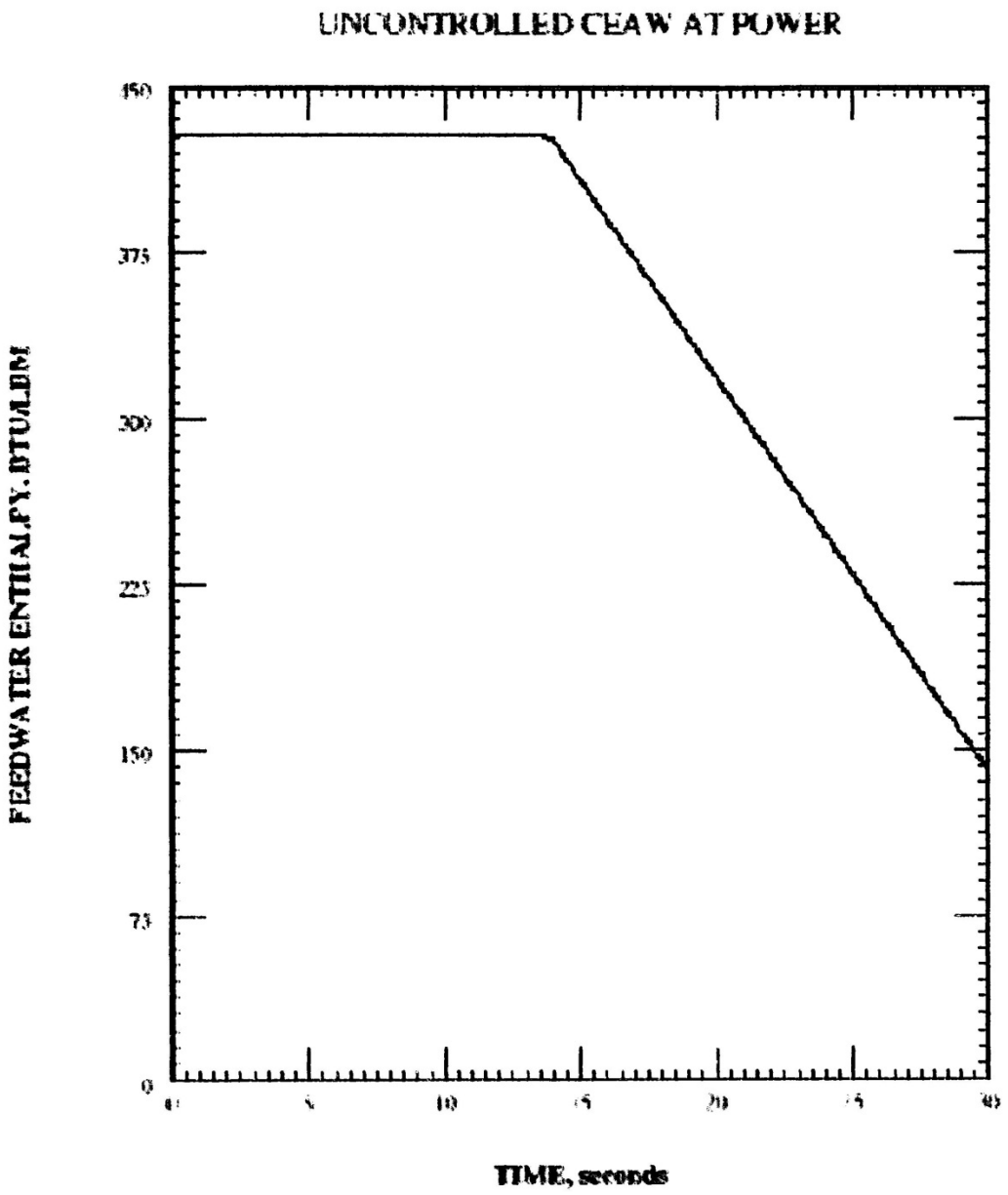


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
PEAK LINEAR HEAT GENERATION vs. TIME

FIGURE 15.4.2-7

JUNE 2015 REVISION 18

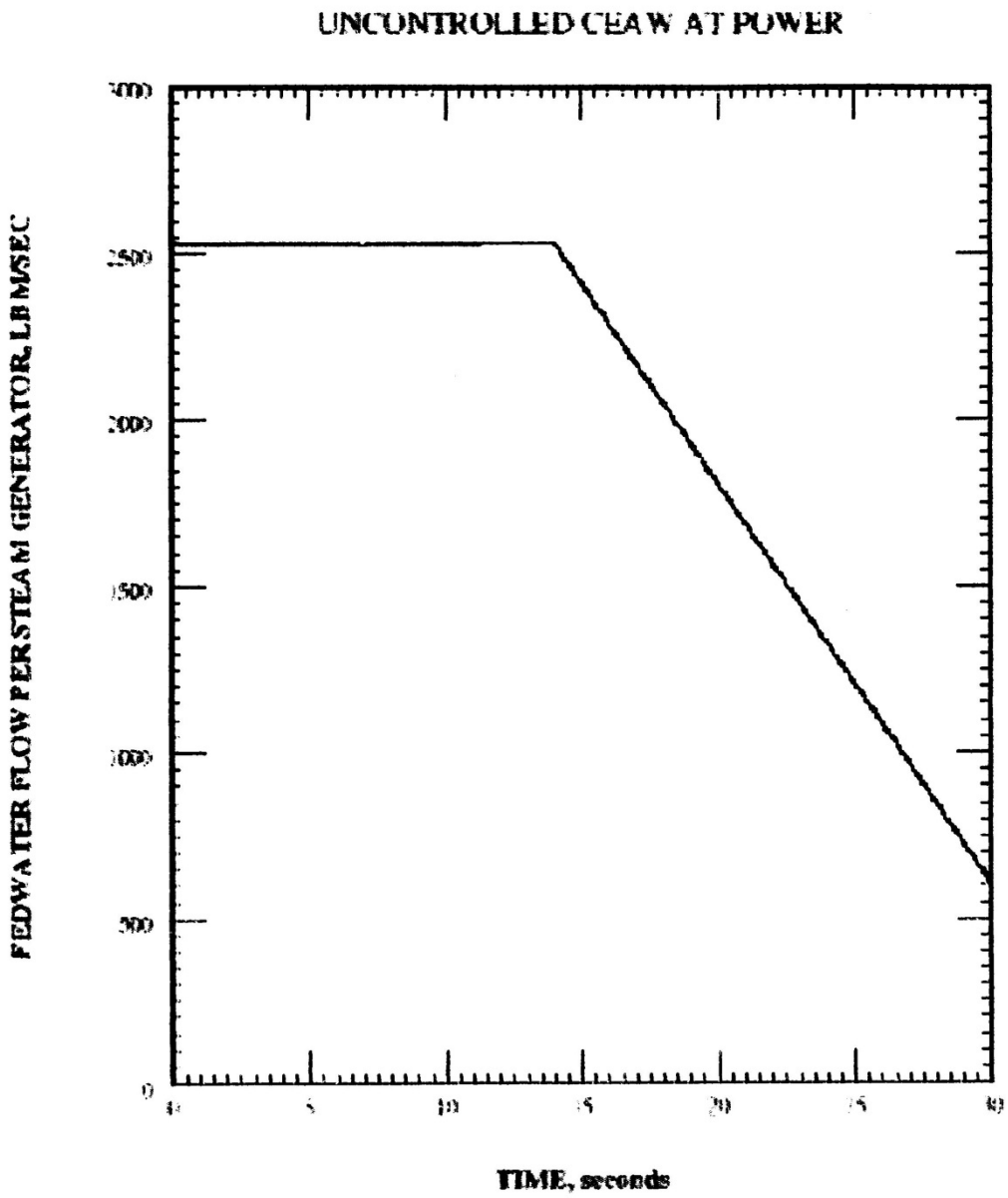


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
FEEDWATER ENTHALPY vs. TIME

FIGURE 15.4.2-8

JUNE 2015 REVISION 18

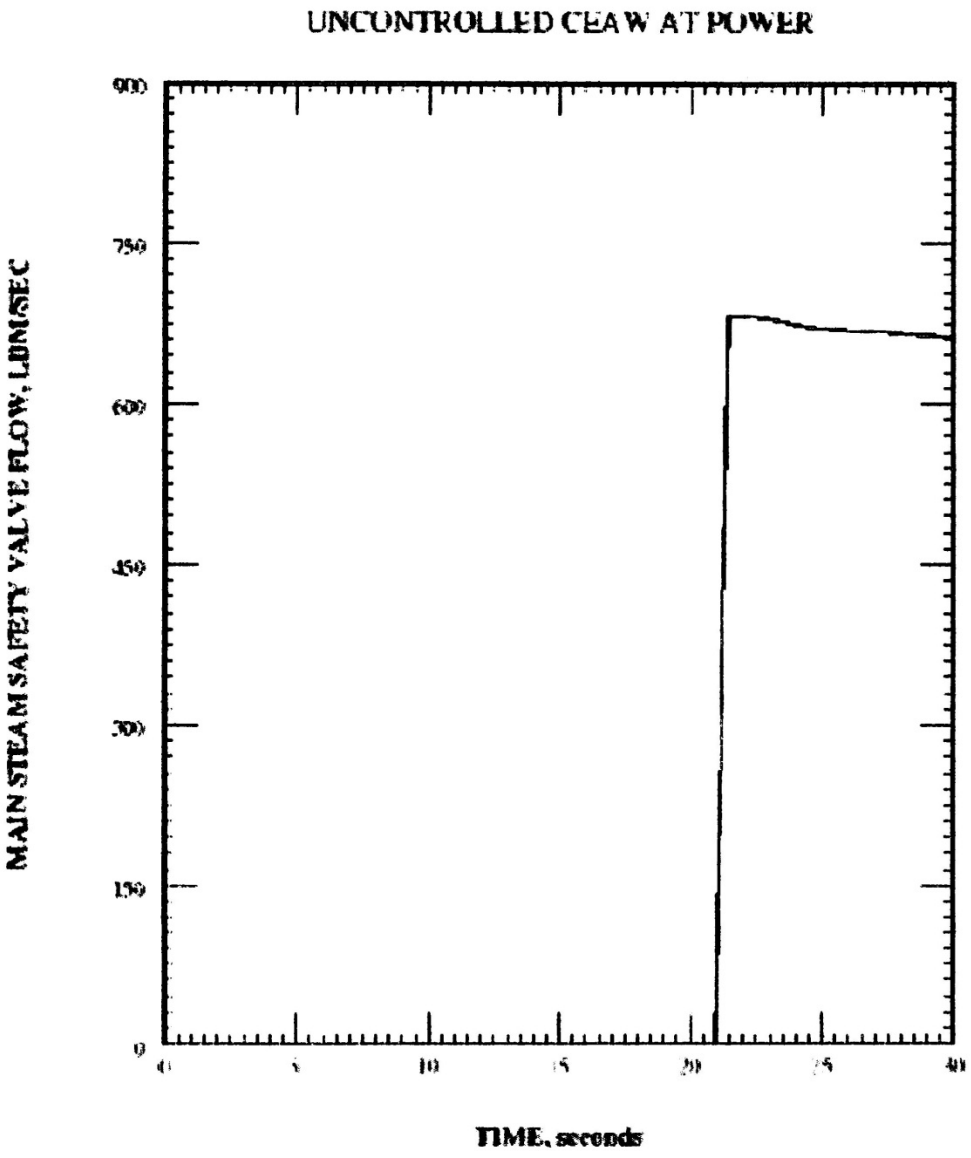


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
FEEDWATER FLOW vs. TIME

FIGURE 15.4.2-9

JUNE 2015 REVISION 18

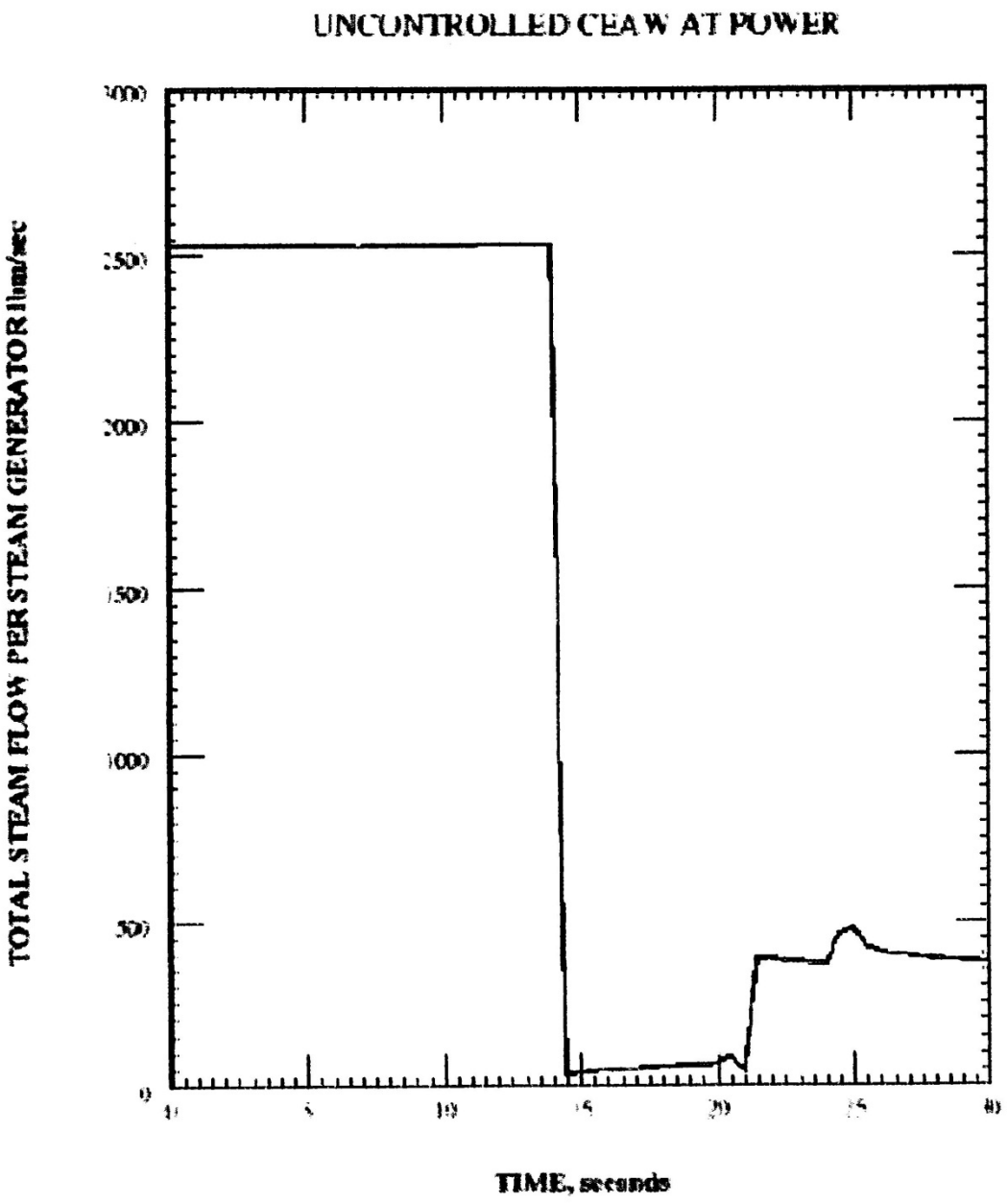


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
MSSV FLOW vs. TIME

FIGURE 15.4.2-10

JUNE 2015 REVISION 18



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

UNCONTROLLED CEA WITHDRAWAL AT POWER
TOTAL STEAM FLOW vs. TIME

FIGURE 15.4.2-11

JUNE 2015 REVISION 18

Box #/Fuel Type
Assm Pwr
Max Rod Pwr

					1 L2	2 K4	3 L1	4 L1	5 L1	6 K4	7 L2					
					0.26	0.34	0.33	0.33	0.33	0.31	0.25					
					0.57	0.63	0.58	0.57	0.57	0.56	0.56					
			8 L1	9 M1	10 N1	11 N2	12 N2	13 N3	14 N2	15 N2	16 N1	17 M1	18 L1			
			0.32	0.71	1.05	1.07	1.03	0.98	1.03	1.05	1.04	0.71	0.32			
			0.73	1.18	1.33	1.31	1.29	1.23	1.28	1.30	1.32	1.17	0.73			
		19 M2	20 N2	21 N2	22 M3	23 N4	24 M3	25 N5	26 M3	27 N4	28 M3	29 N2	30 N2	31 M2		
		0.50	0.99	1.20	1.08	1.23	1.11	1.18	1.11	1.23	1.08	1.19	0.99	0.50		
		1.05	1.34	1.34	1.16	1.32	1.20	1.28	1.19	1.31	1.16	1.34	1.34	1.04		
	32 L1	33 N2	34 N2	35 M4	36 N4	37 M4	38 N5	39 M3	40 N5	41 M4	42 N4	43 M4	44 N2	45 N2	46 L1	
	0.32	0.99	1.29	1.14	1.26	1.13	1.23	1.09	1.24	1.13	1.26	1.14	1.29	0.99	0.32	
	0.73	1.34	1.37	1.20	1.35	1.19	1.33	1.14	1.34	1.20	1.34	1.20	1.37	1.34	0.73	
	47 M1	48 N2	49 M4	50 N4	51 M4	52 N4	53 M2	54 M2	55 M2	56 N4	57 M4	58 N4	59 M4	60 N2	61 M1	
	0.71	1.20	1.14	1.28	1.15	1.26	1.16	1.17	1.17	1.26	1.14	1.27	1.14	1.20	0.71	
	1.17	1.34	1.20	1.37	1.19	1.35	1.23	1.27	1.25	1.35	1.19	1.36	1.20	1.34	1.17	
62 L2	63 N1	64 M3	65 N4	66 M4	67 N5	68 M3	69 M4	70 M3	71 M4	72 M3	73 N5	74 M4	75 N4	76 M3	77 N1	78 L2
0.25	1.05	1.08	1.26	1.15	1.25	1.11	1.06	1.11	1.06	1.11	1.25	1.14	1.26	1.08	1.05	0.26
0.56	1.33	1.16	1.35	1.20	1.35	1.19	1.12	1.19	1.13	1.18	1.34	1.19	1.34	1.16	1.33	0.58
79 L6	80 N2	81 N4	82 M4	83 N4	84 M3	85 N4	86 M5	87 N3	88 M5	89 N4	90 M3	91 N4	92 M4	93 N4	94 N2	95 L6
0.31	1.06	1.24	1.14	1.27	1.12	1.23	1.09	1.24	1.09	1.22	1.11	1.26	1.13	1.23	1.07	0.34
0.56	1.31	1.32	1.21	1.36	1.18	1.31	1.17	1.31	1.17	1.31	1.18	1.35	1.19	1.32	1.31	0.62
96 L1	97 N2	98 M3	99 N5	100 M2	101 M4	102 M5	103 N3	104 M5	105 N3	106 M5	107 M4	108 M2	109 N5	110 M3	111 N2	112 L1
0.33	1.04	1.12	1.25	1.18	1.07	1.10	1.23	1.07	1.23	1.09	1.06	1.16	1.23	1.11	1.03	0.33
0.58	1.29	1.20	1.35	1.26	1.14	1.17	1.31	1.15	1.31	1.17	1.11	1.23	1.33	1.20	1.29	0.58
113 L1	114 N3	115 N5	116 M3	117 M2	118 M3	119 N3	120 M5	121 H0	122 M5	123 N3	124 M3	125 M2	126 M3	127 N5	128 N3	129 L1
0.34	0.99	1.20	1.11	1.18	1.12	1.25	1.08	0.93	1.07	1.24	1.11	1.17	1.09	1.18	0.98	0.33
0.58	1.24	1.30	1.16	1.29	1.21	1.32	1.16	0.98	1.15	1.31	1.19	1.27	1.14	1.27	1.23	0.57
130 L1	131 N2	132 M3	133 N5	134 M2	135 M4	136 M5	137 N3	138 M5	139 N3	140 M5	141 M4	142 M2	143 N5	144 M3	145 N2	146 L1
0.34	1.06	1.14	1.26	1.18	1.08	1.10	1.24	1.08	1.23	1.09	1.07	1.17	1.24	1.11	1.03	0.33
0.59	1.32	1.23	1.37	1.26	1.14	1.18	1.32	1.16	1.31	1.17	1.13	1.25	1.34	1.19	1.28	0.58
147 L6	148 N2	149 N4	150 M4	151 N4	152 M3	153 N4	154 M5	155 N3	156 M5	157 N4	158 M3	159 N4	160 M4	161 N4	162 N2	163 L6
0.35	1.10	1.27	1.17	1.30	1.14	1.25	1.11	1.25	1.09	1.23	1.11	1.26	1.13	1.23	1.05	0.31
0.64	1.35	1.36	1.23	1.41	1.22	1.35	1.18	1.32	1.17	1.31	1.18	1.35	1.20	1.31	1.30	0.56
164 L2	165 N1	166 M3	167 N4	168 M4	169 N5	170 M3	171 M4	172 M3	173 M4	174 M3	175 N5	176 M4	177 N4	178 M3	179 N1	180 L2
0.27	1.09	1.13	1.33	1.22	1.31	1.15	1.09	1.12	1.06	1.11	1.25	1.15	1.26	1.08	1.04	0.25
0.60	1.38	1.22	1.45	1.30	1.44	1.22	1.15	1.21	1.12	1.19	1.34	1.20	1.35	1.16	1.32	0.56
	181 M1	182 N2	183 M4	184 N4	185 M4	186 N4	187 M2	188 M2	189 M2	190 N4	191 M4	192 N4	193 M4	194 N2	195 M1	
	0.75	1.27	1.24	1.44	1.24	1.31	1.19	1.18	1.17	1.26	1.15	1.28	1.14	1.20	0.71	
	1.23	1.45	1.37	1.64	1.36	1.43	1.27	1.29	1.24	1.35	1.19	1.37	1.20	1.34	1.17	
	196 L1	197 N2	198 N2	199 N2	200 N4	201 M4	202 N5	203 M3	204 N5	205 M4	206 N4	207 M4	208 N2	209 N2	210 L1	
	0.34	1.05	1.42	1.51	1.37	1.17	1.26	1.10	1.24	1.14	1.26	1.14	1.29	0.99	0.32	
	0.77	1.45	1.63	1.65	1.59	1.25	1.37	1.16	1.34	1.20	1.35	1.20	1.37	1.34	0.73	
		211 M2	212 N2	213 M4	214 M3	215 N4	216 M3	217 N5	218 M3	219 N4	220 M3	221 N2	222 N2	223 M2		
		0.53	0.99	0.99	1.07	1.24	1.13	1.19	1.12	1.24	1.08	1.20	0.99	0.50		
		1.11	1.41	1.23	1.20	1.35	1.20	1.29	1.20	1.32	1.16	1.34	1.34	1.05		
			224 L1	225 M1	226 N1	227 N2	228 N2	229 N3	230 N2	231 N2	232 N1	233 M1	234 L1			
			0.30	0.65	1.01	1.05	1.03	0.98	1.04	1.07	1.05	0.71	0.32			
			0.66	1.07	1.29	1.30	1.28	1.23	1.29	1.31	1.33	1.18	0.73			
					235 L2	236 K4	237 L1	238 L1	239 L1	240 K4	241 L2					
					0.25	0.31	0.33	0.33	0.33	0.34	0.26					
					0.55	0.56	0.58	0.58	0.58	0.63	0.58					

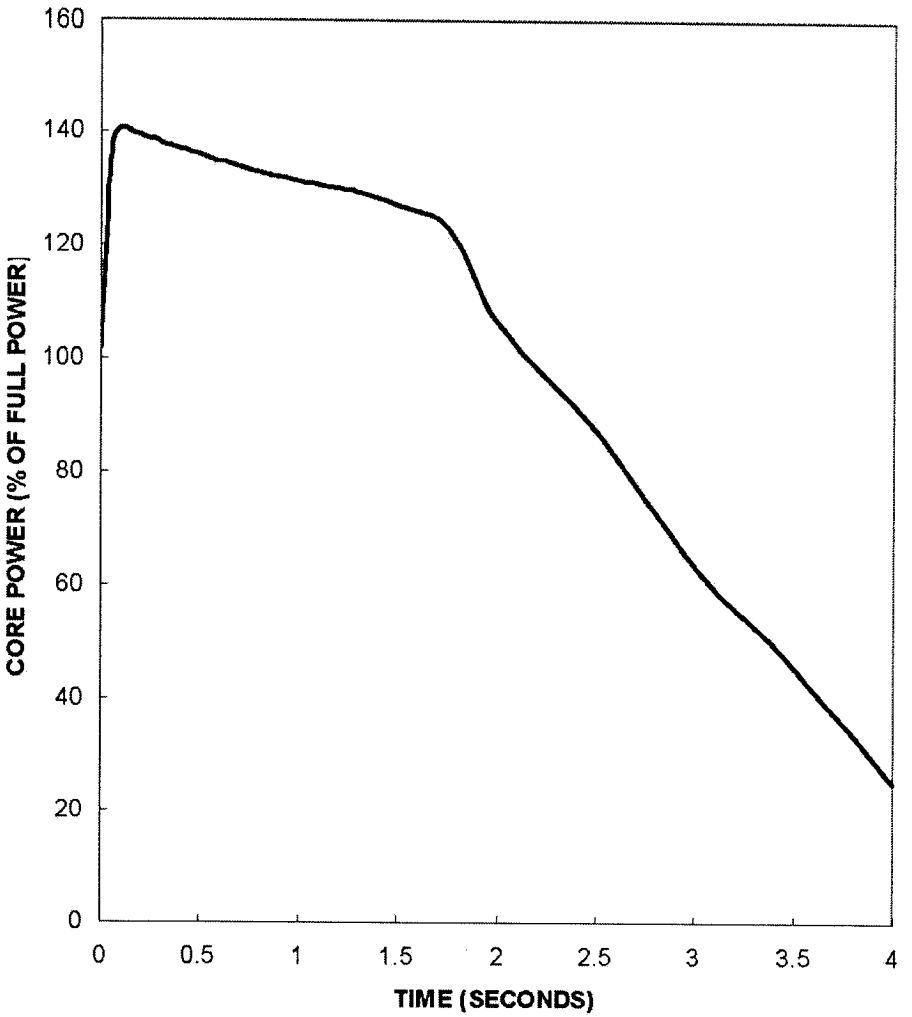
Postulated Interchange of Assemblies 199 and 213

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

RADIAL POWER DISTRIBUTION AT TIME OF MAXIMUM ROPM FOR WORST UNDETECTABLE MISLOAD

FIGURE 15.4.7-1

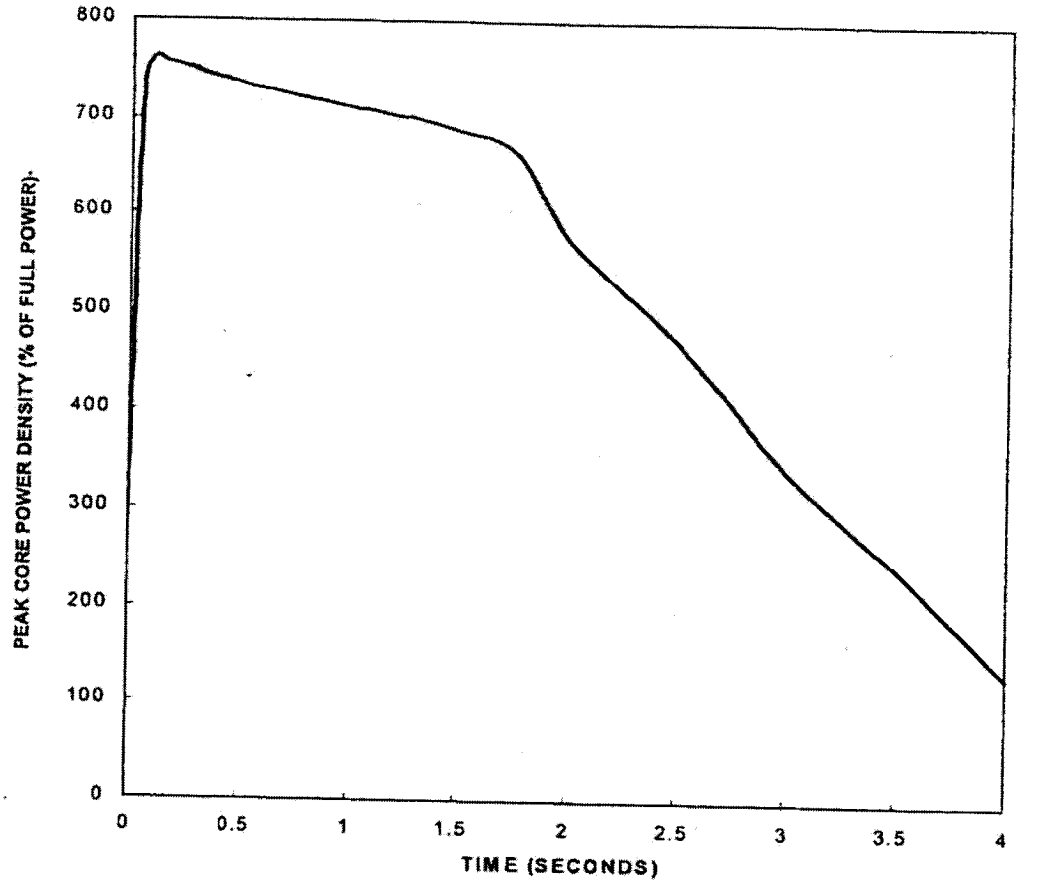
JUNE 2015 REVISION 18



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
CORE POWER vs. TIME
(Plots are based on bounding 3990 MWt case)

FIGURE 15.4.8-1

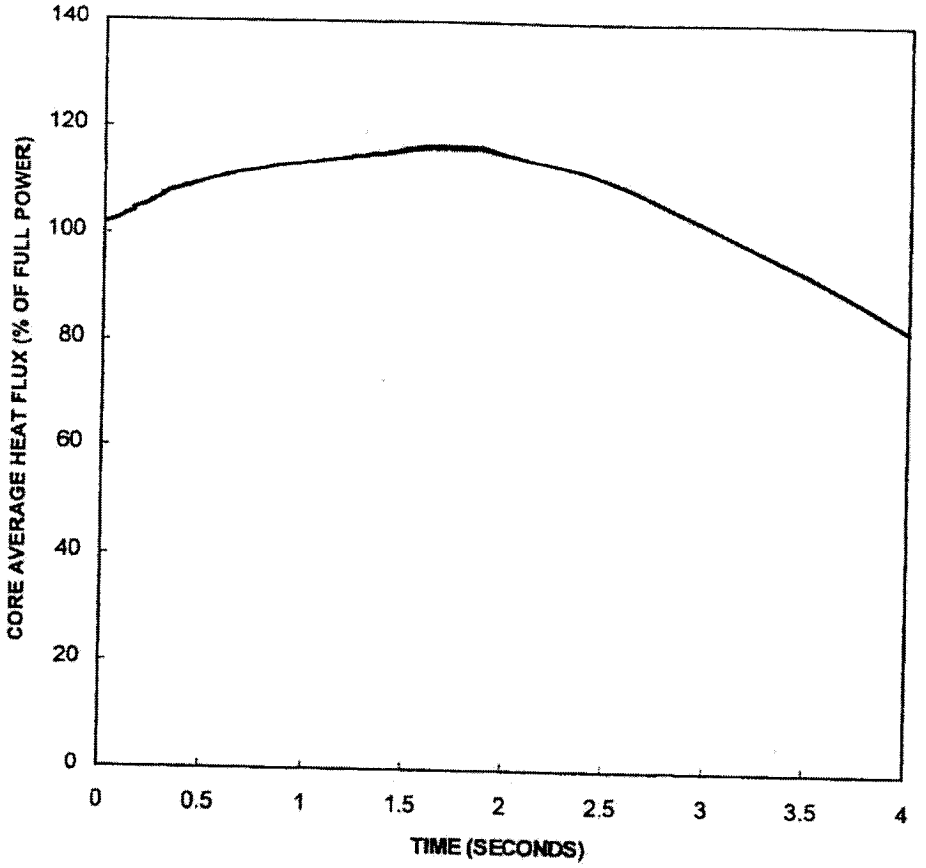


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
PEAK POWER DENSITY vs. TIME
(Plots are based on bounding 3990 MWt case)

FIGURE 15.4.8-2

JUNE 2005 REVISION 13

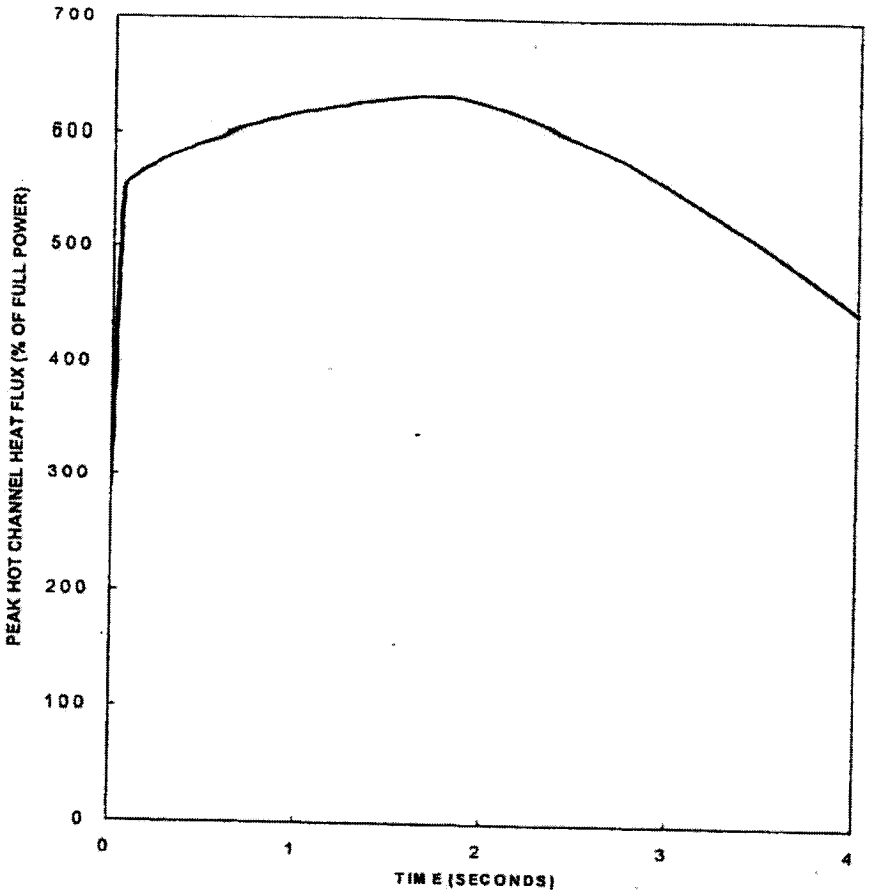


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
CORE AVERAGE HEAT FLUX vs. TIME
(Plots are based on bounding 3990 MWt case)

FIGURE 15.4.8-3

JUNE 2005 REVISION 13

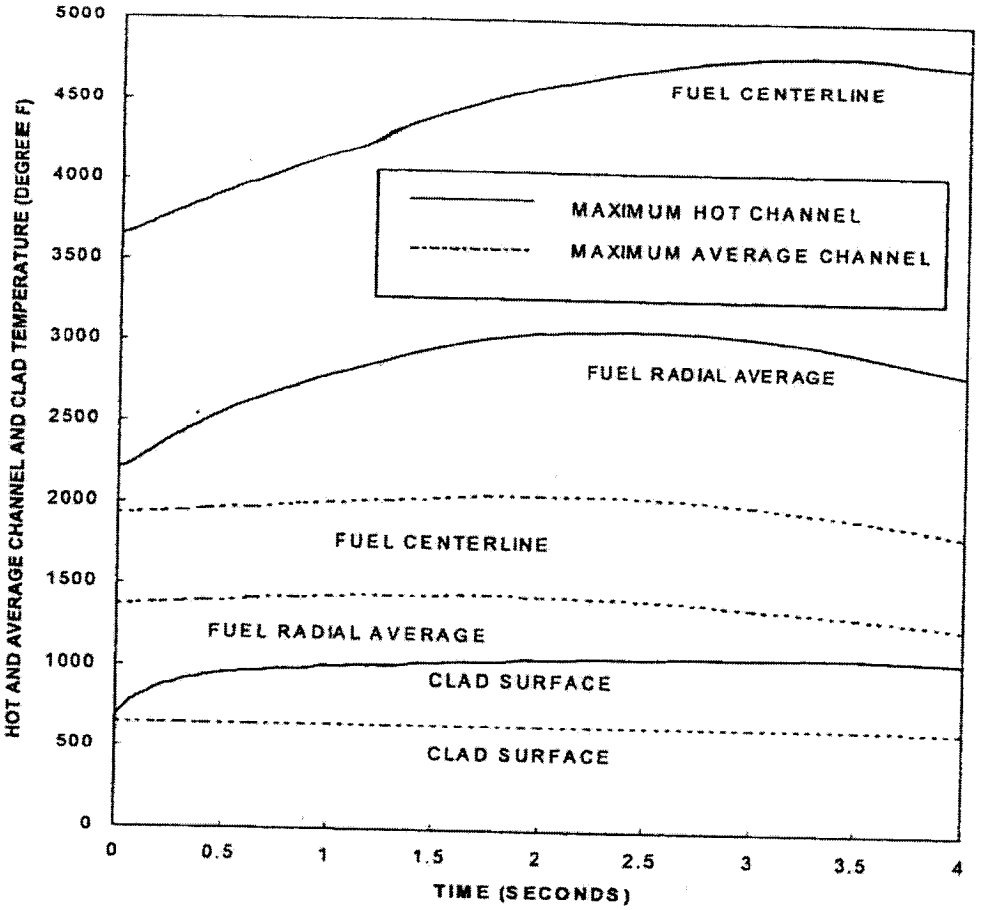


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
PEAK HOT CHANNEL HEAT FLUX vs. TIME
(Plots are based on bounding 3990 MWt case)

FIGURE 15.4.8-4

JUNE 2005 REVISION 13

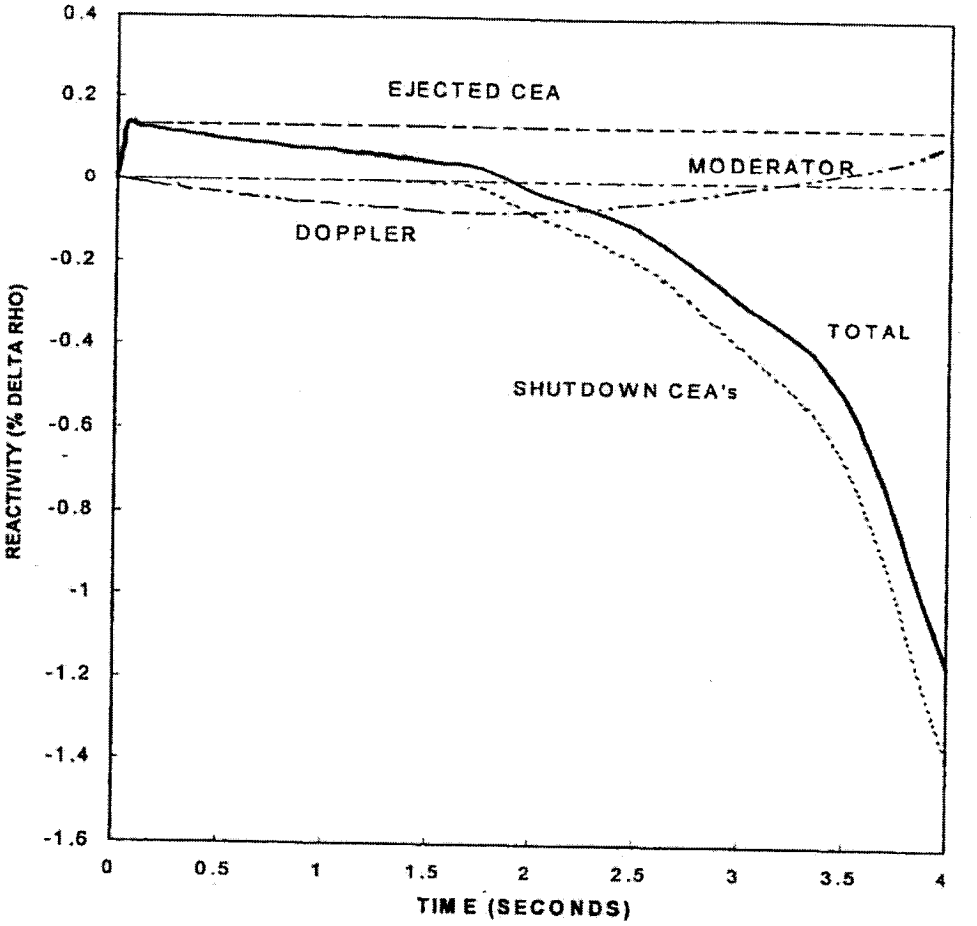


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
HOT AND AVERAGE CHANNEL FUEL AND CLAD TEMPERATURE
(Plots are based on bounding 3990 MWt case)

FIGURE 15.4.8-5

JUNE 2005 REVISION 13

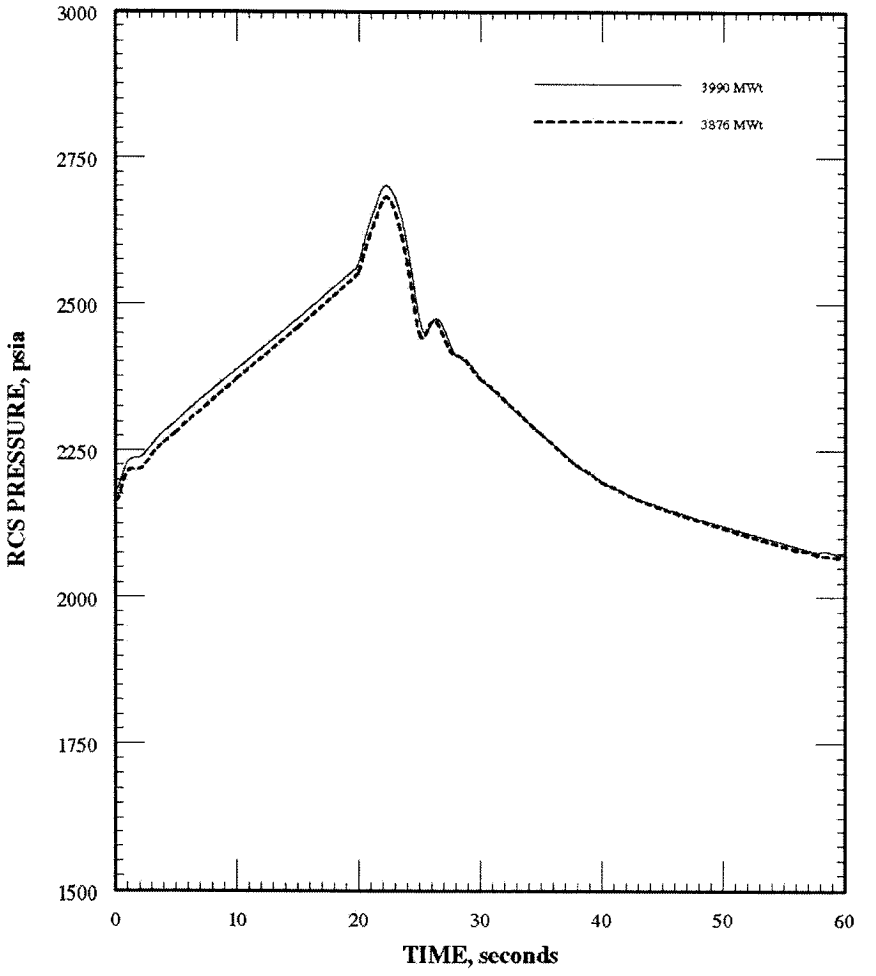


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
REACTIVITY vs. TIME
(Plots are based on bounding 3990 MWt case)

FIGURE 15.4.8-6

JUNE 2005 REVISION 13

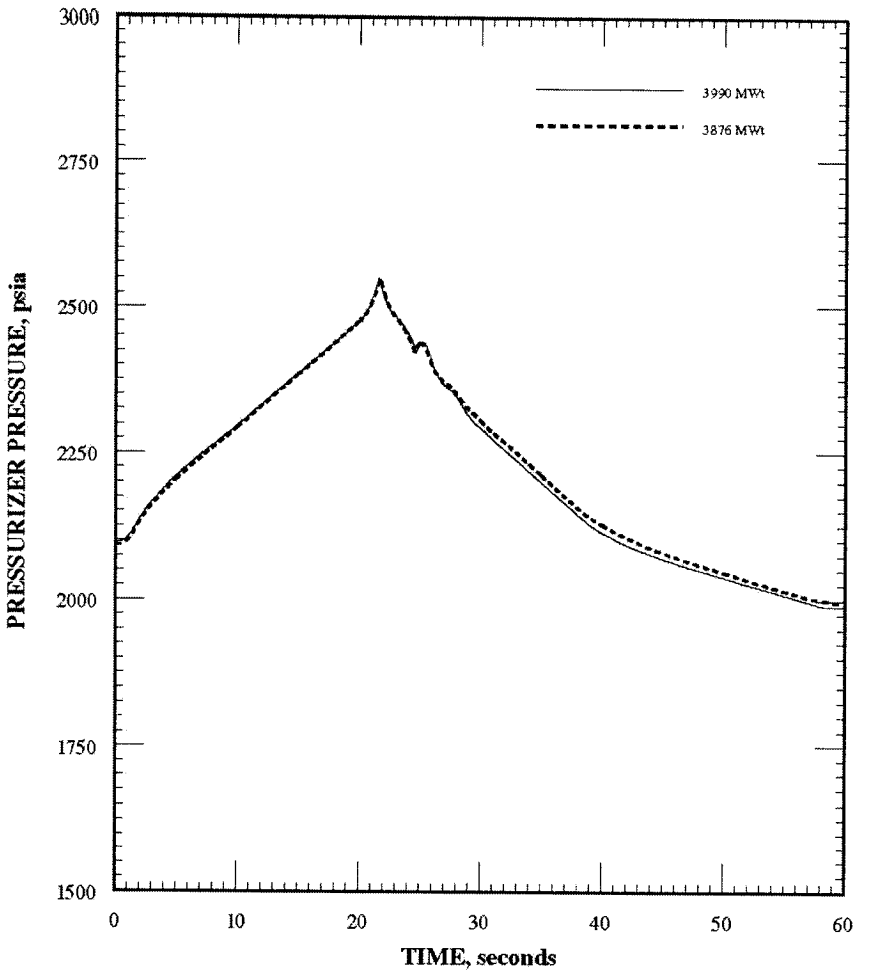


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
RCS PRESSURE vs. TIME

FIGURE 15.4.8-7

JUNE 2005 REVISION 13

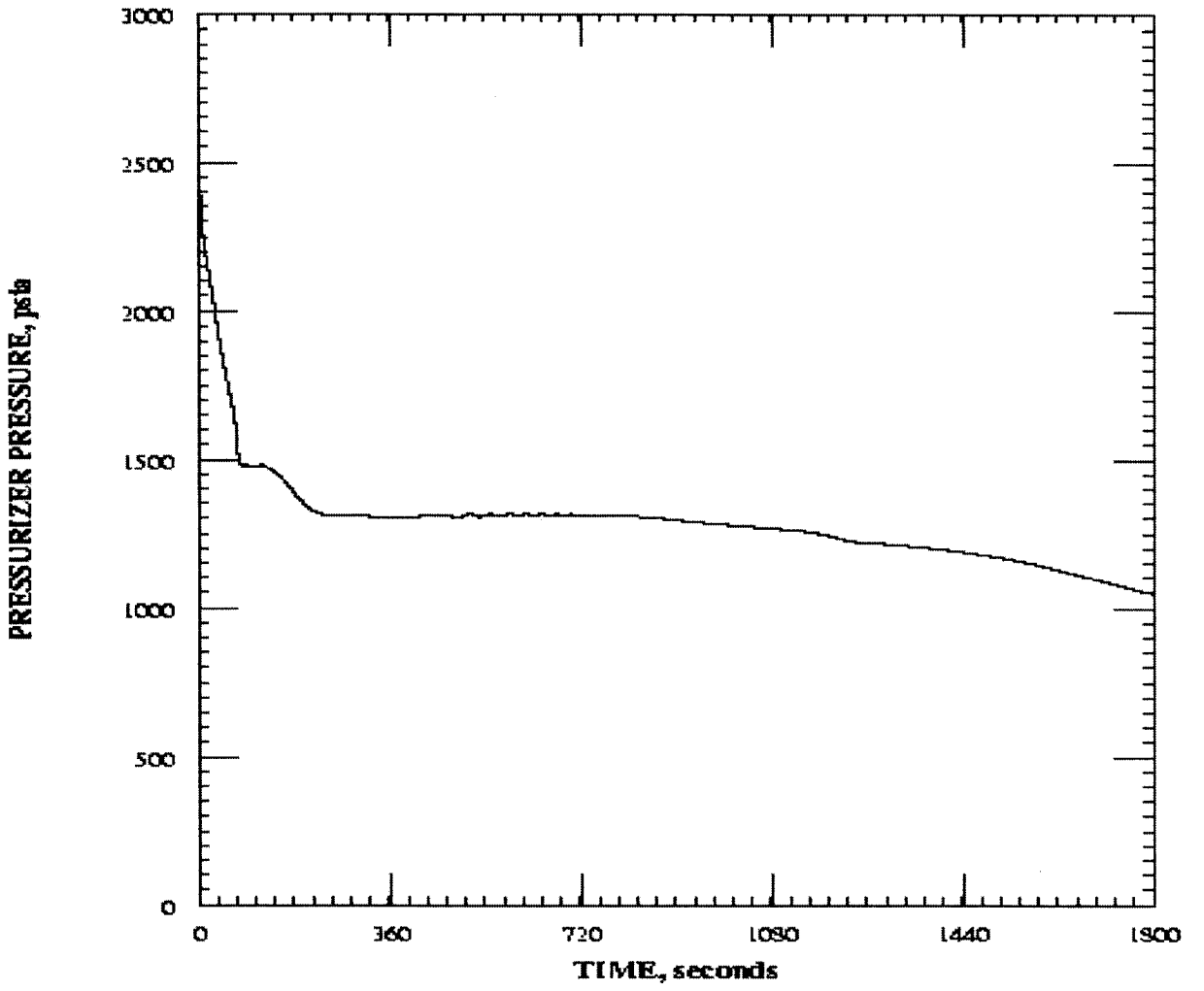


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
PRESSURIZER PRESSURE vs. TIME

FIGURE 15.4.8-8

JUNE 2005 REVISION 13

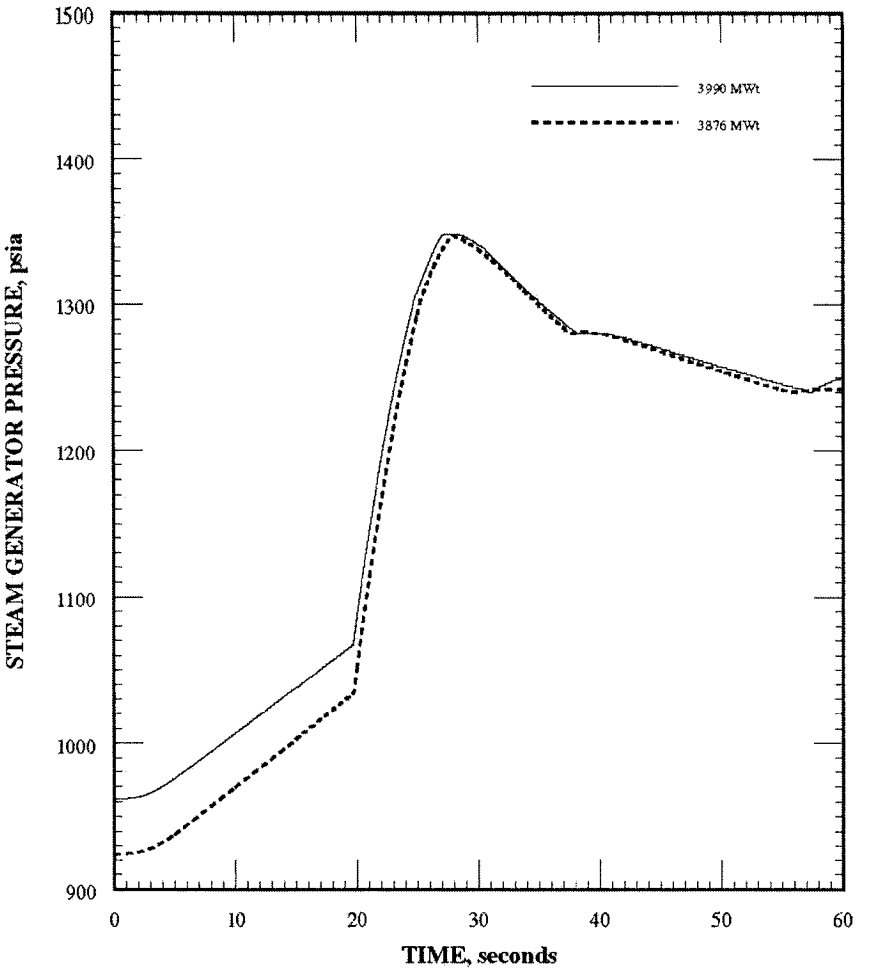


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
PRESSURIZER PRESSURE vs. TIME
(THIS PLOT IS FOR 3878 MWt AND IS REPRESENTAIVE OF THE SYSTEM RESPONSE FOR 3990 MWt)

FIGURE 15.4.8-9

JUNE 2005 REVISION 13

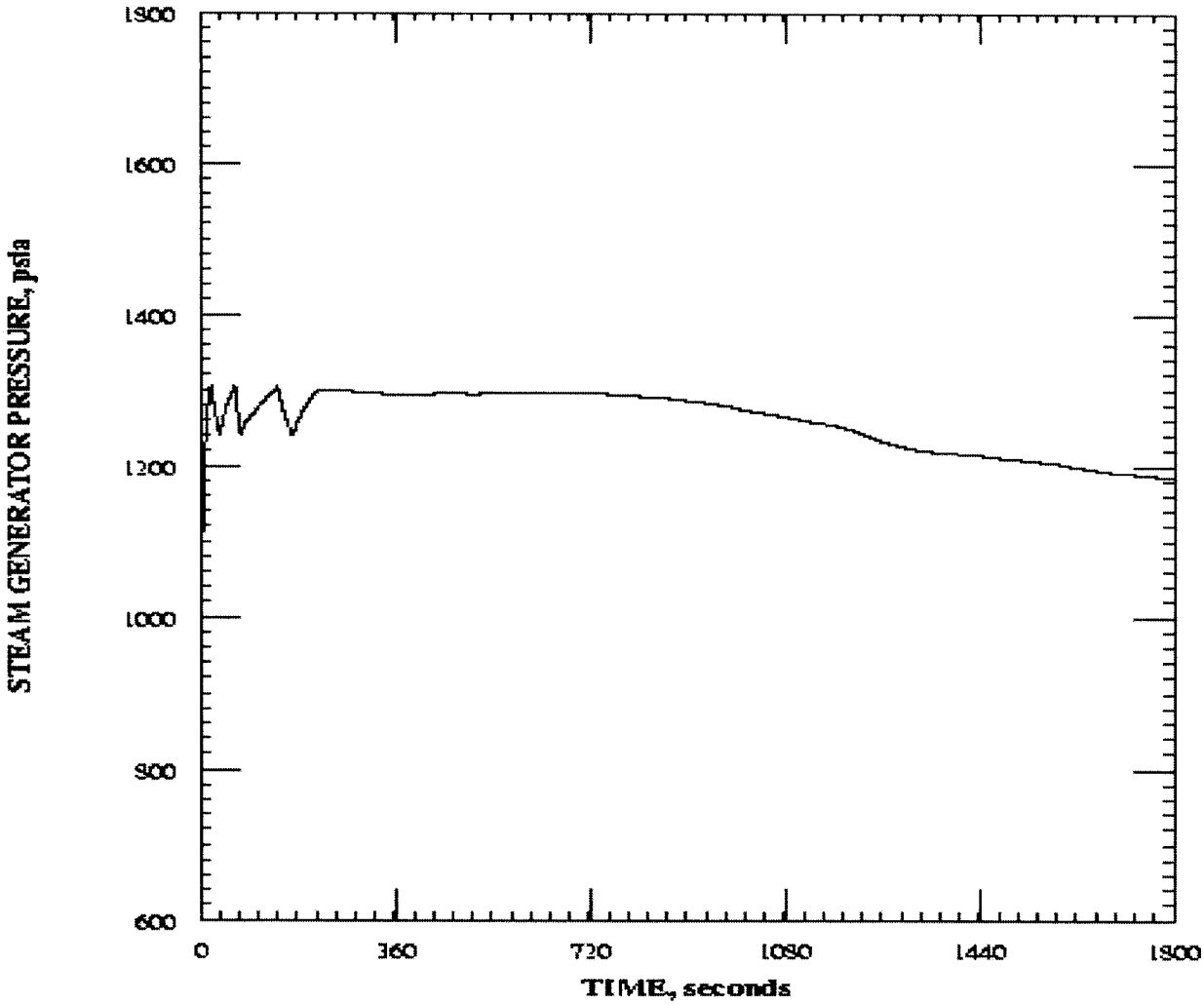


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
STEAM GENERATOR PRESSURE vs. TIME

FIGURE 15.4.8-10

JUNE 2005 REVISION 13

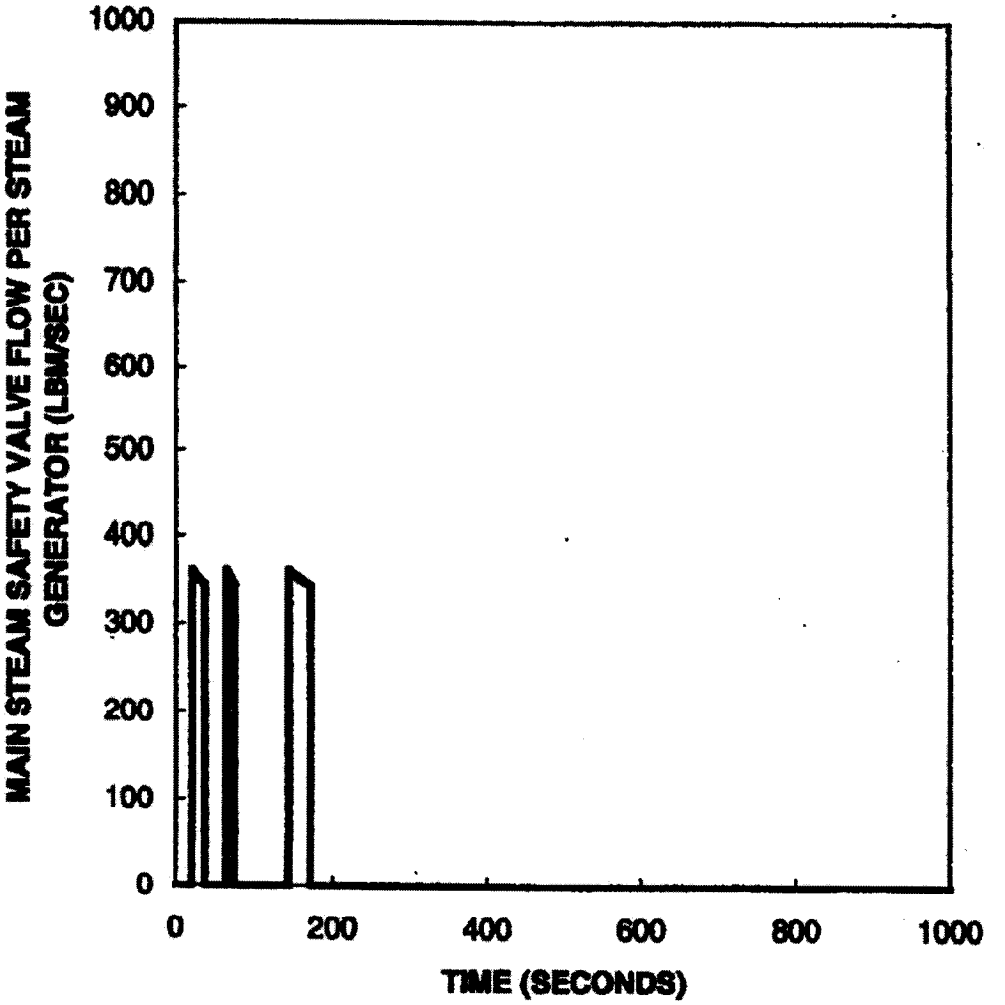


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
STEAM GENERATOR PRESSURE vs. TIME
(THIS PLOT IS FOR 3976 MWt AND IS REPRESENTATIVE OF THE SYSTEM RESPONSE FOR 3990 MWt)

FIGURE 15.4.8-11

JUNE 2005 REVISION 13

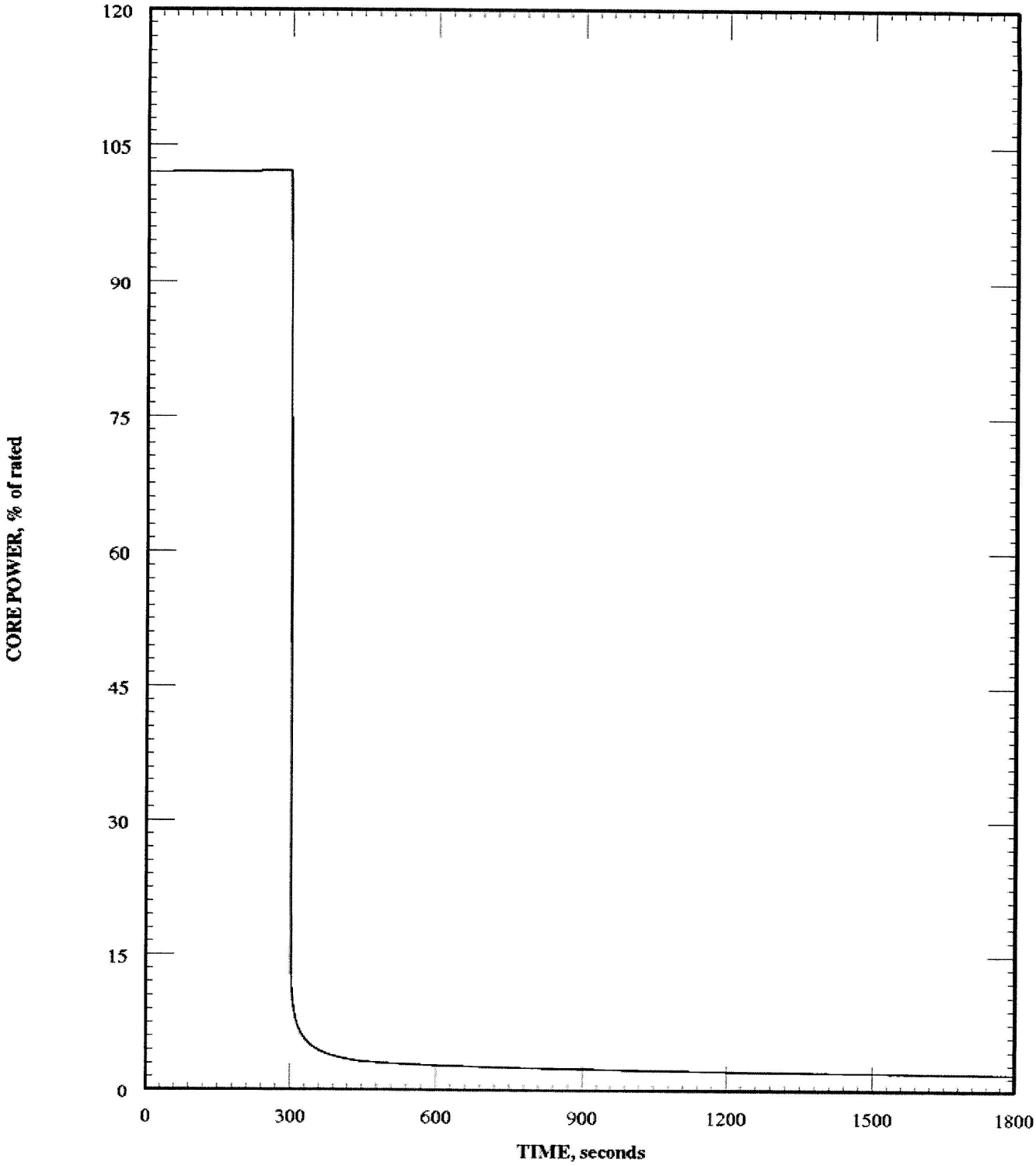


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CEA EJECTION
MSSV FLOW vs. TIME
(Plot based on 3876 MWt
Typical of the system response for 3990 MWt)

FIGURE 15.4.8-12

JUNE 2005 REVISION 13

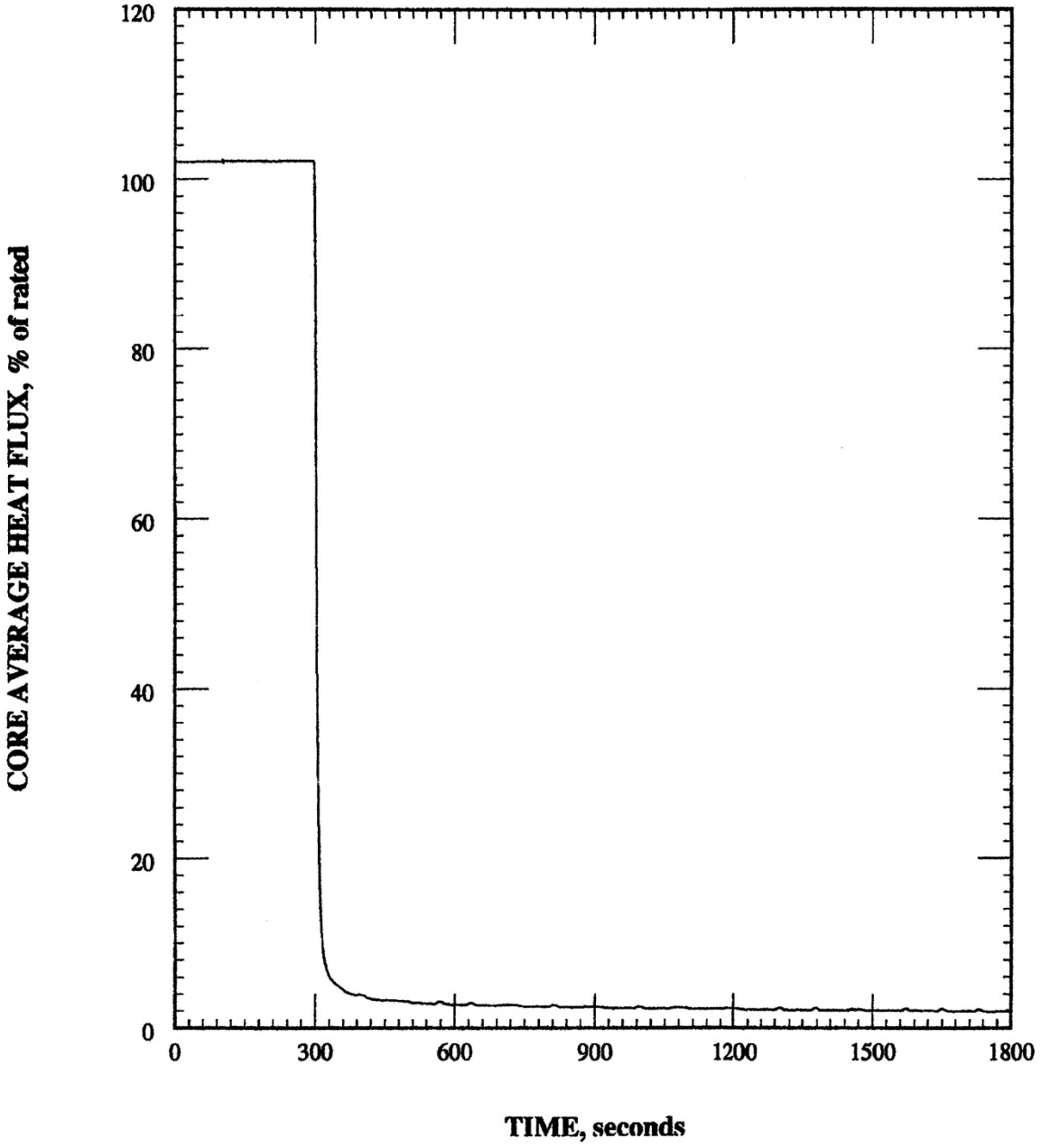


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
CORE POWER vs. TIME

FIGURE 15.5.2-2

JUNE 2009 REVISION 15

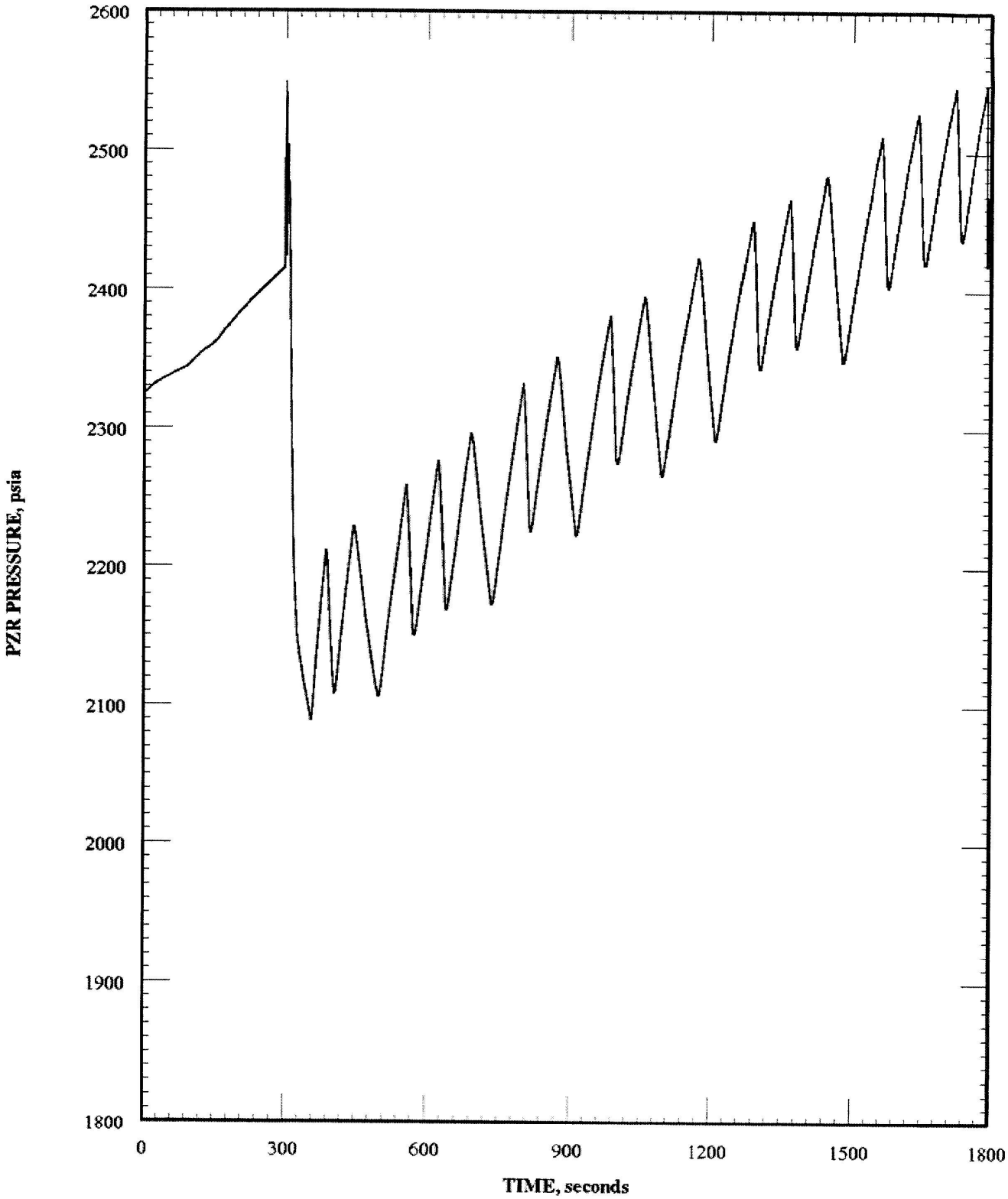


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
CORE AVERAGE HEAT FLUX vs. TIME

FIGURE 15.5.2-3

JUNE 2015 REVISION 18

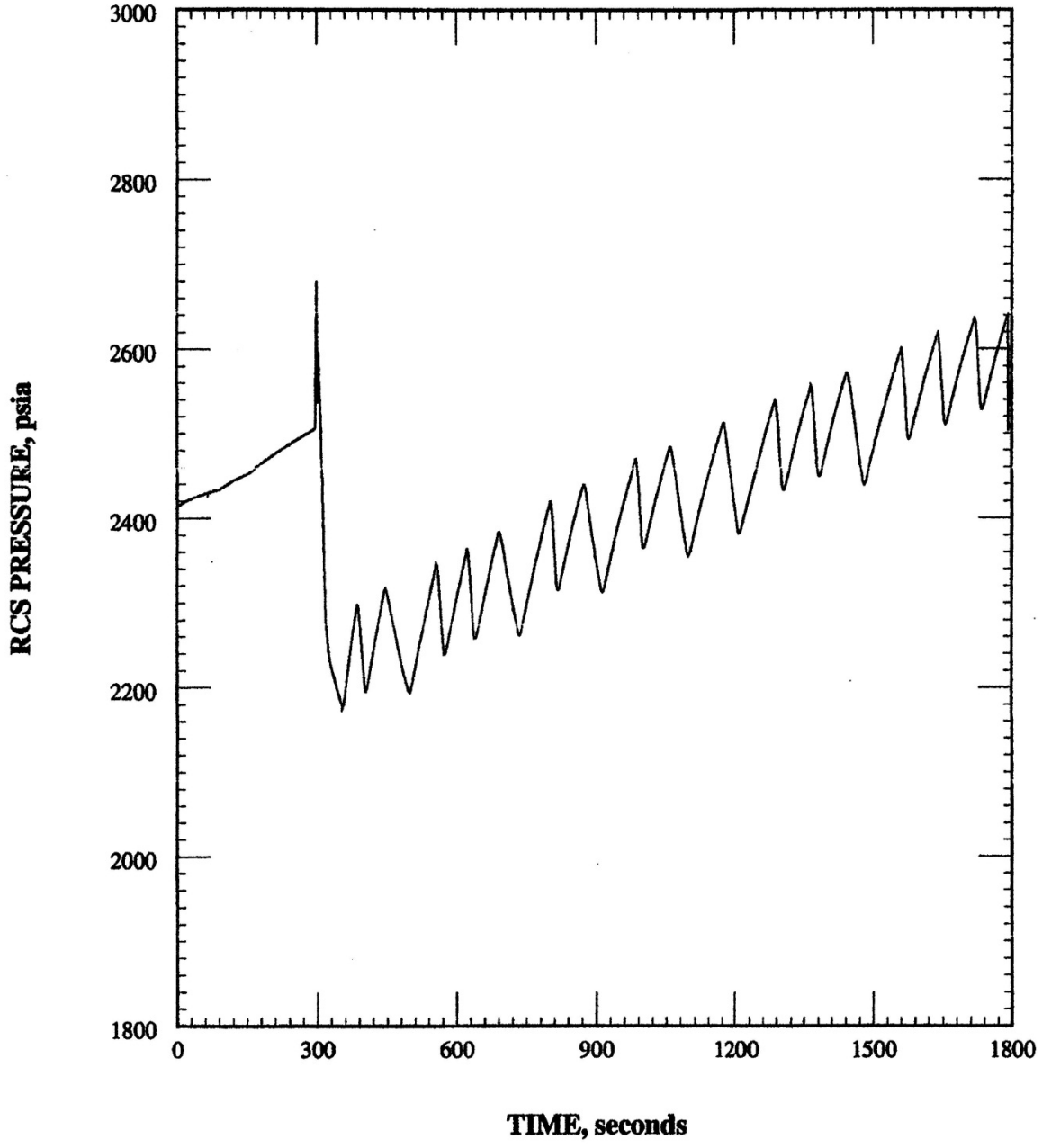


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
PRESSURIZER PRESSURE vs. TIME

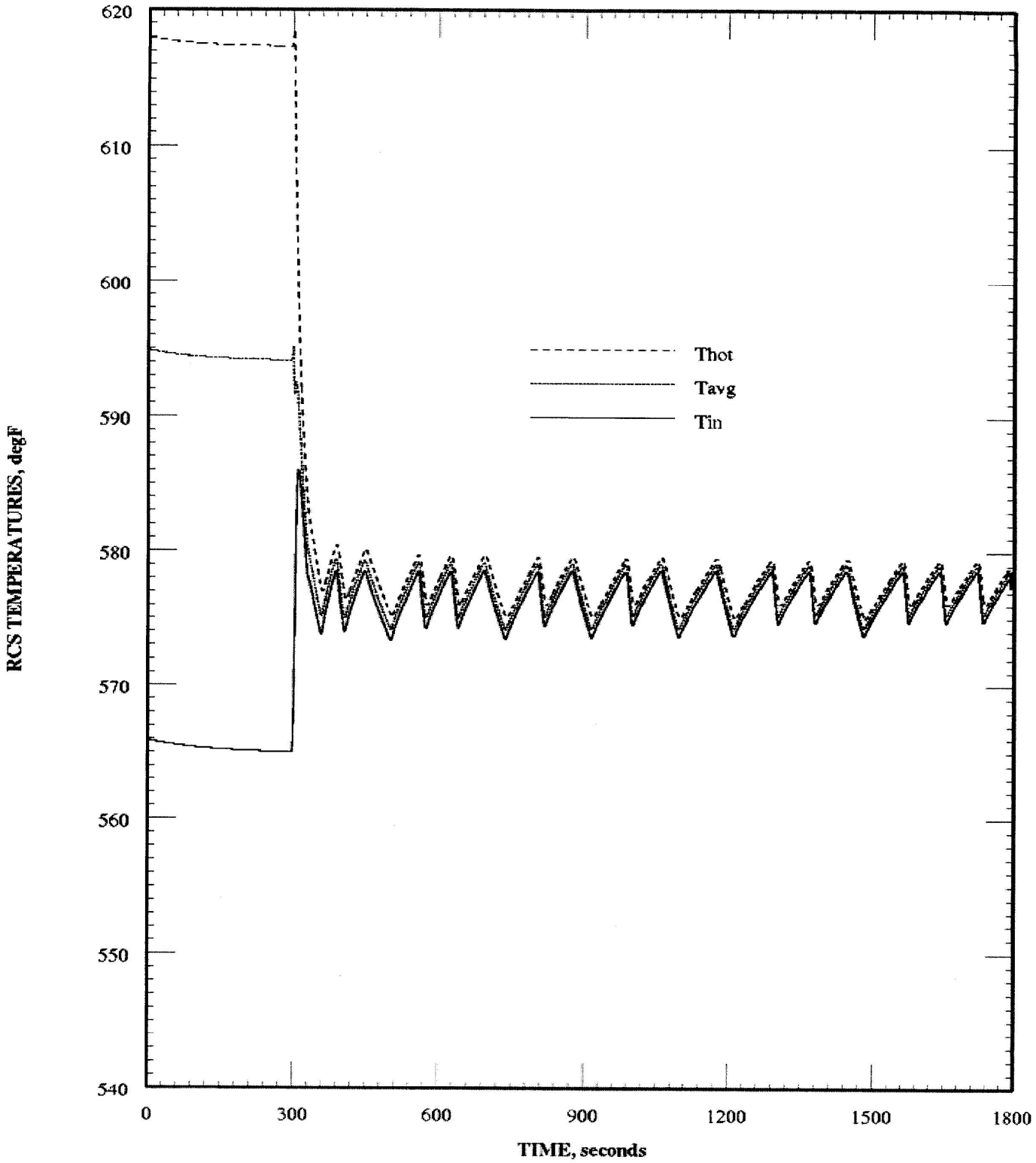
FIGURE 15.5.2-4

JUNE 2009 REVISION 15



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

FIGURE 15.5.2-4A

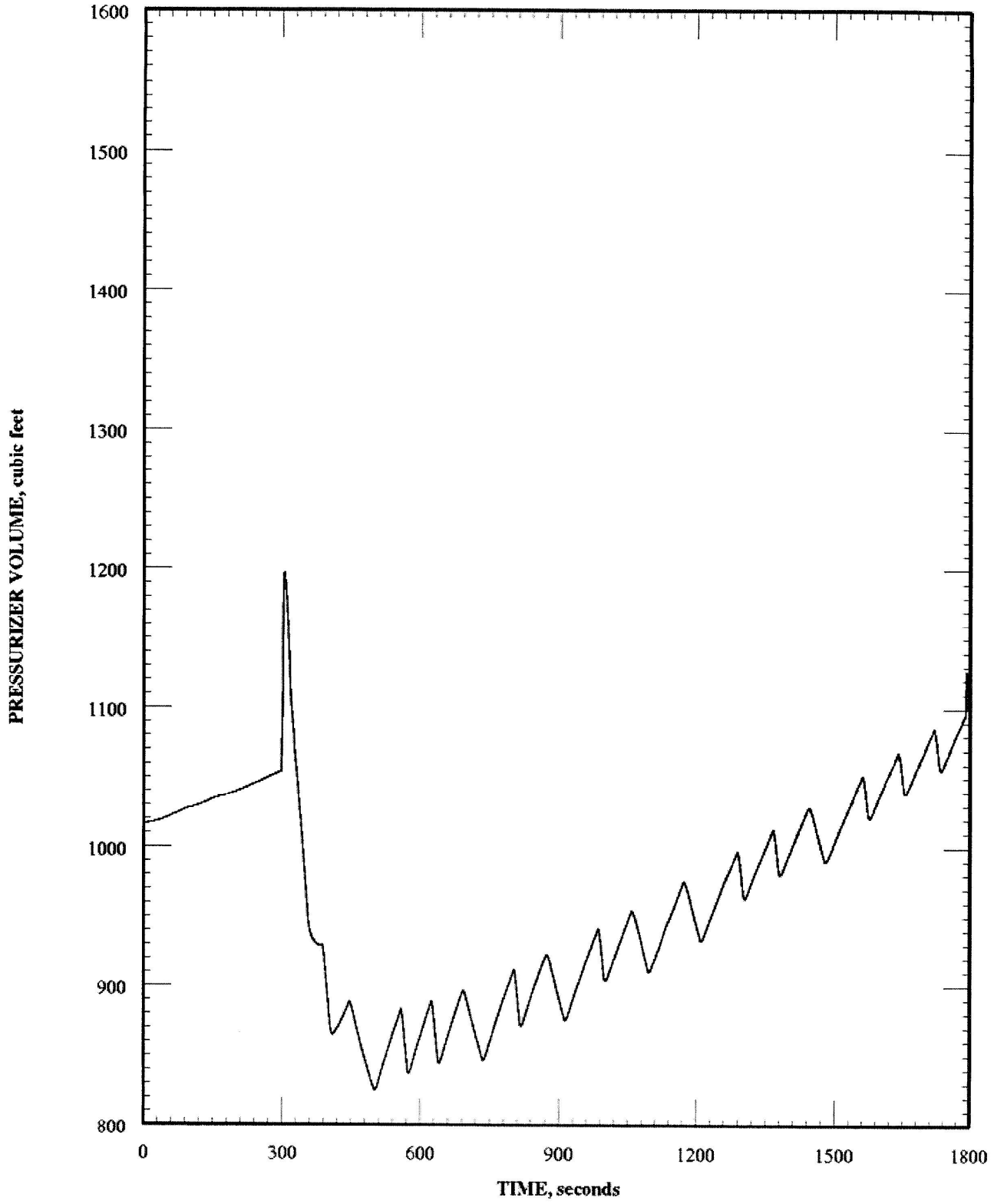


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
CORE AVERAGE COOLANT TEMPERATURES vs. TIME

FIGURE 15.5.2-5

JUNE 2009 REVISION 15

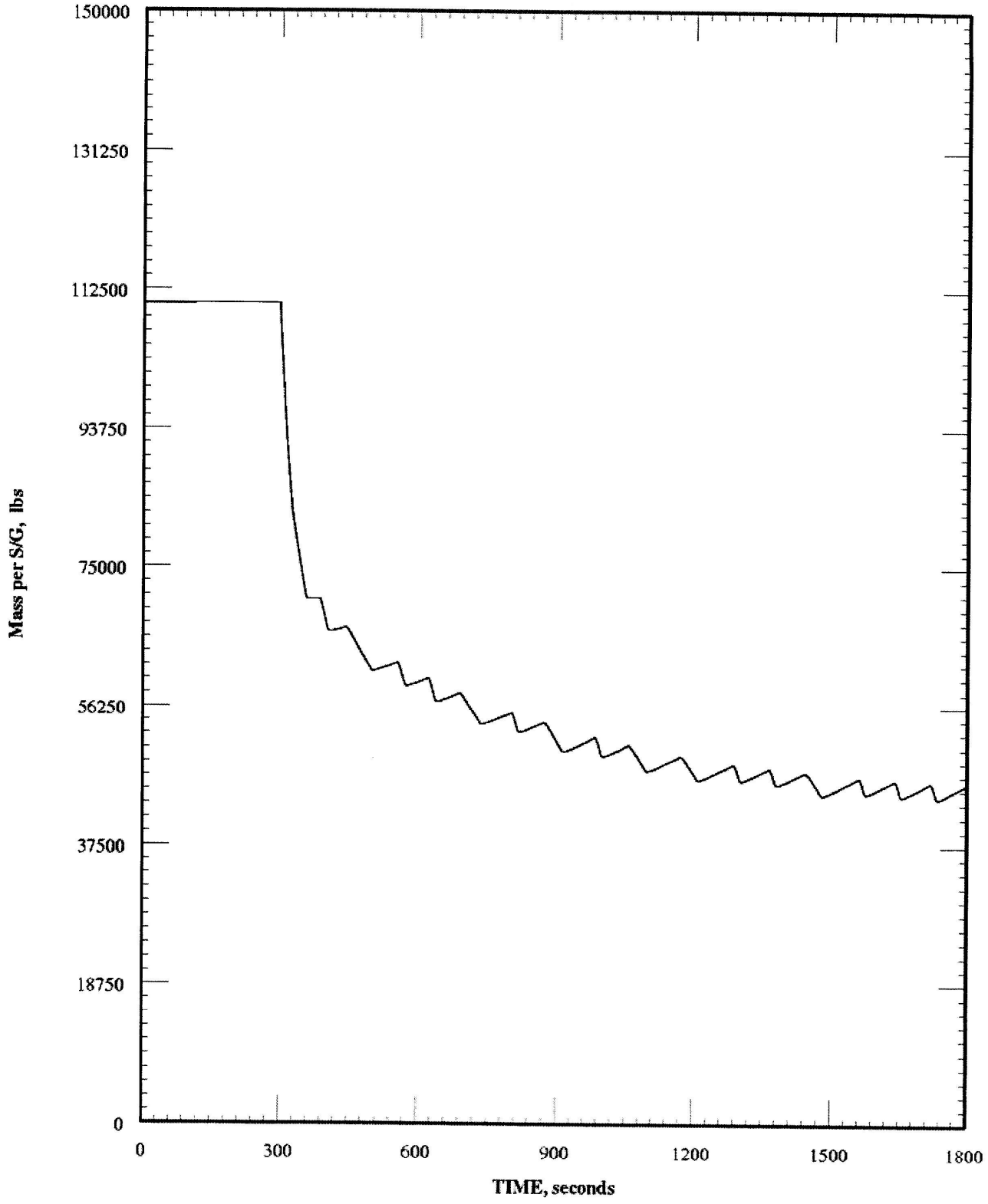


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
PRESSURIZER WATER VOLUME vs. TIME

FIGURE 15.5.2-6

JUNE 2009 REVISION 15

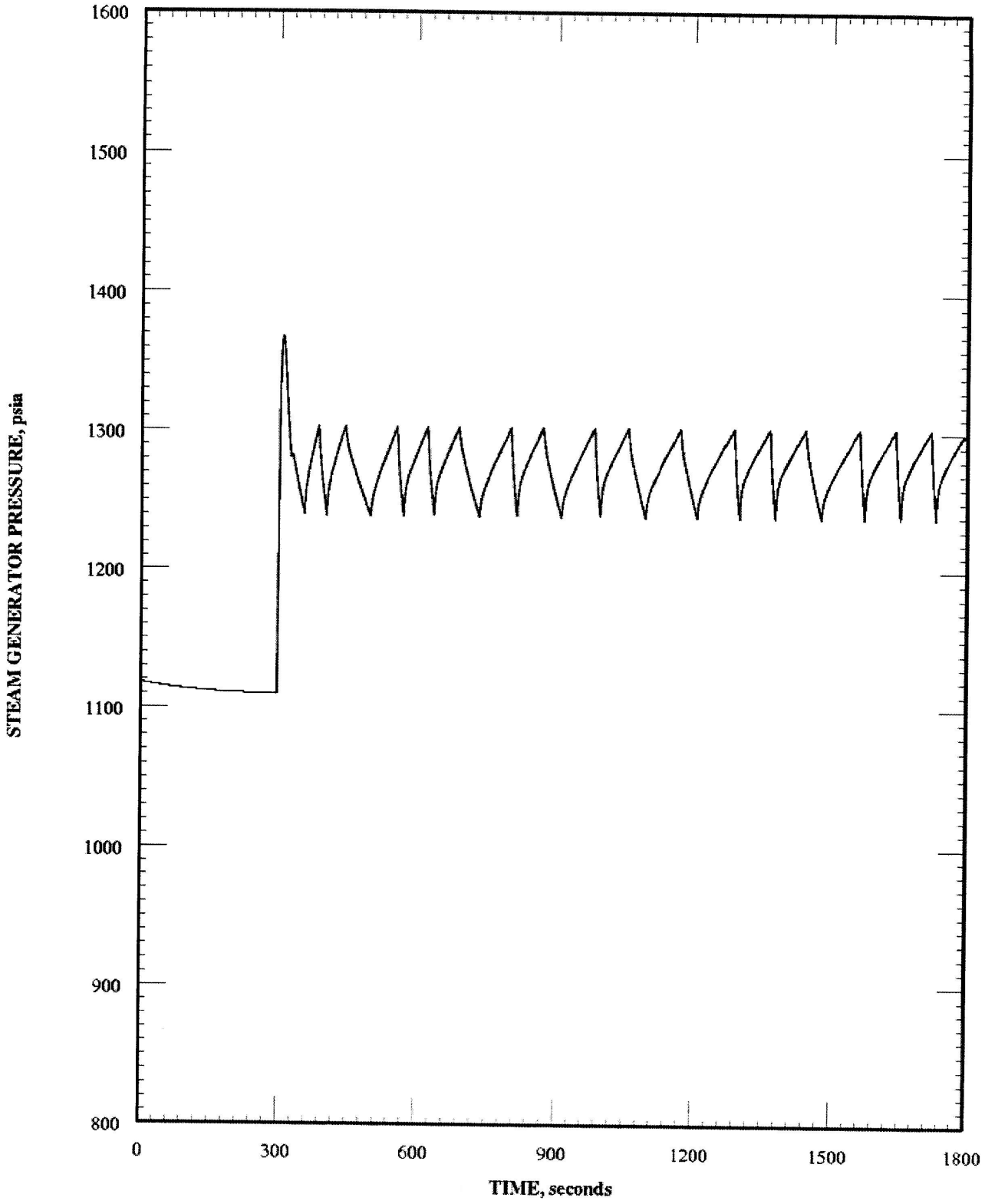


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
STEAM GENERATOR WATER LEVEL vs. TIME

FIGURE 15.5.2-7

JUNE 2009 REVISION 15

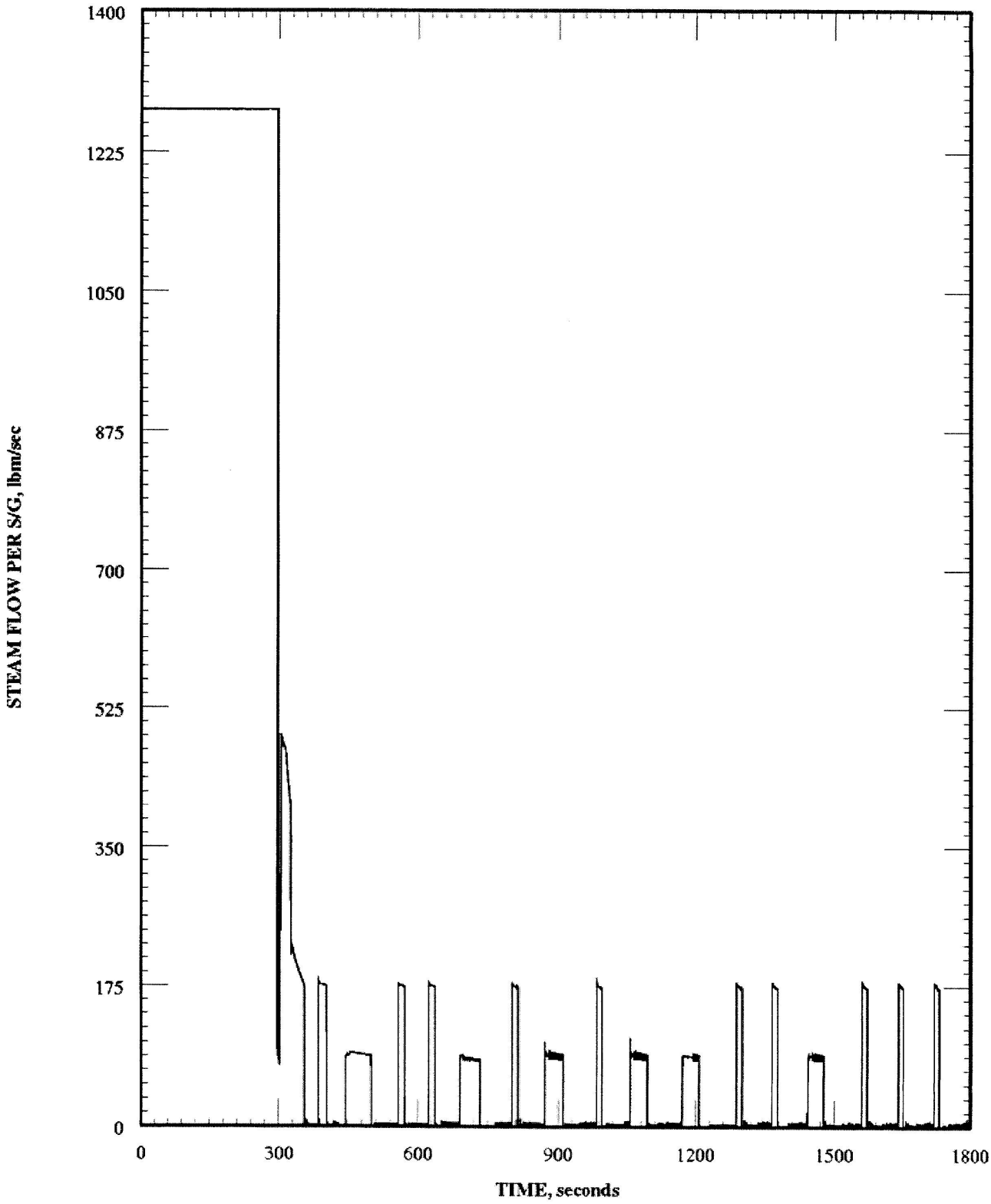


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
STEAM GENERATOR PRESSURE vs. TIME

FIGURE 15.5.2-8

JUNE 2009 REVISION 15

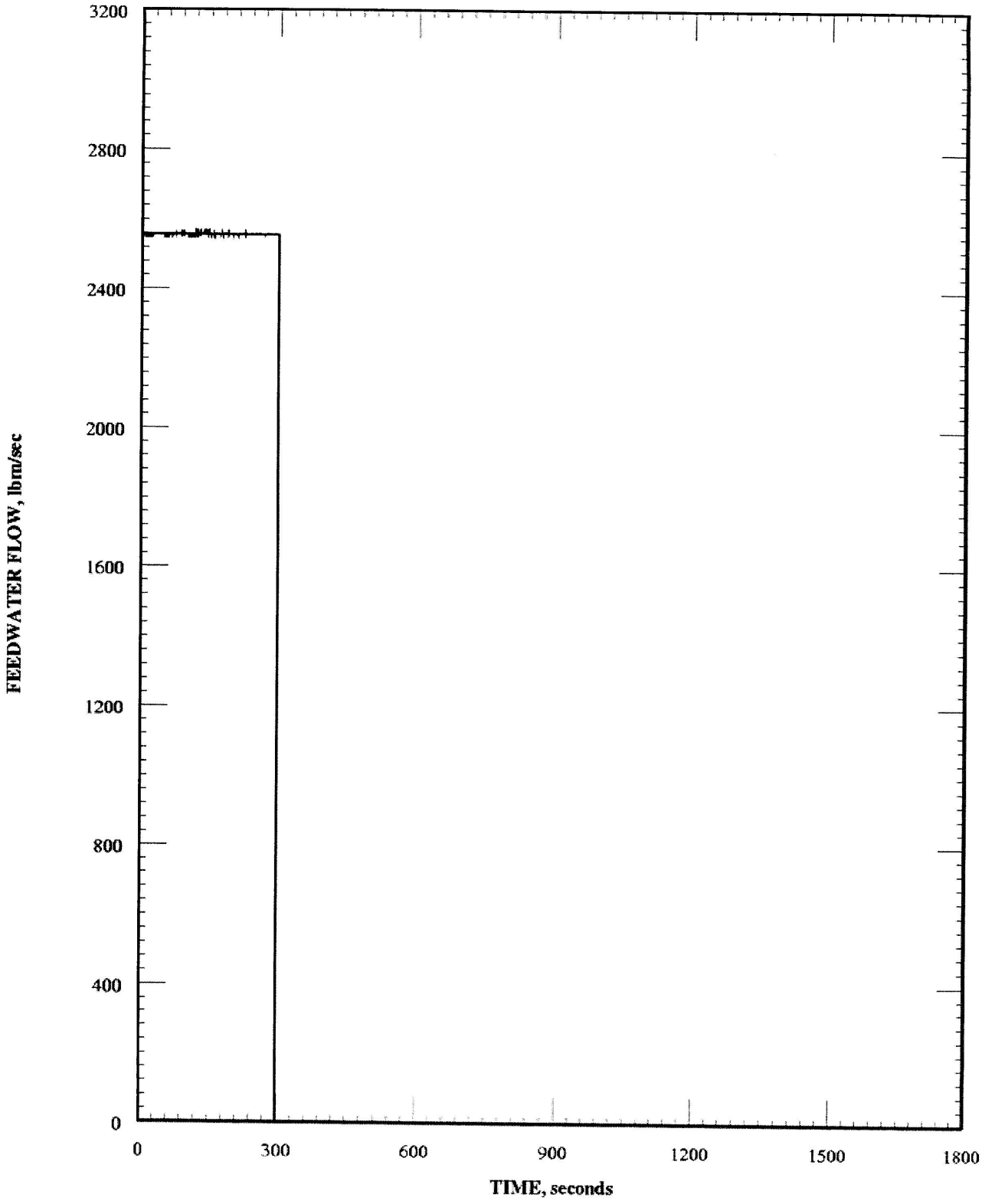


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
TOTAL STEAM FLOW vs. TIME

FIGURE 15.5.2-9

JUNE 2009 REVISION 15

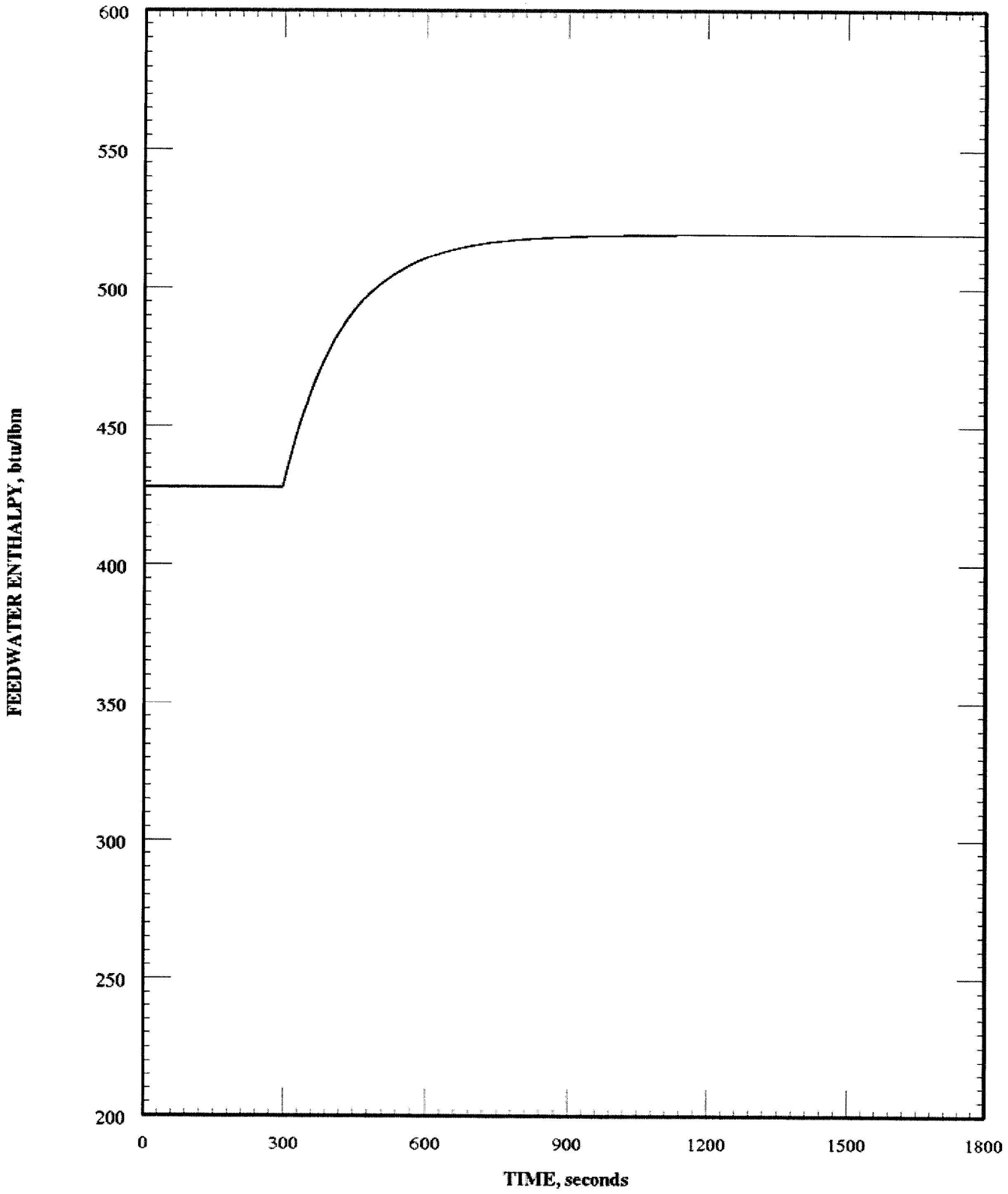


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
FEEDWATER FLOW vs. TIME

FIGURE 15.5.2-10

JUNE 2009 REVISION 15

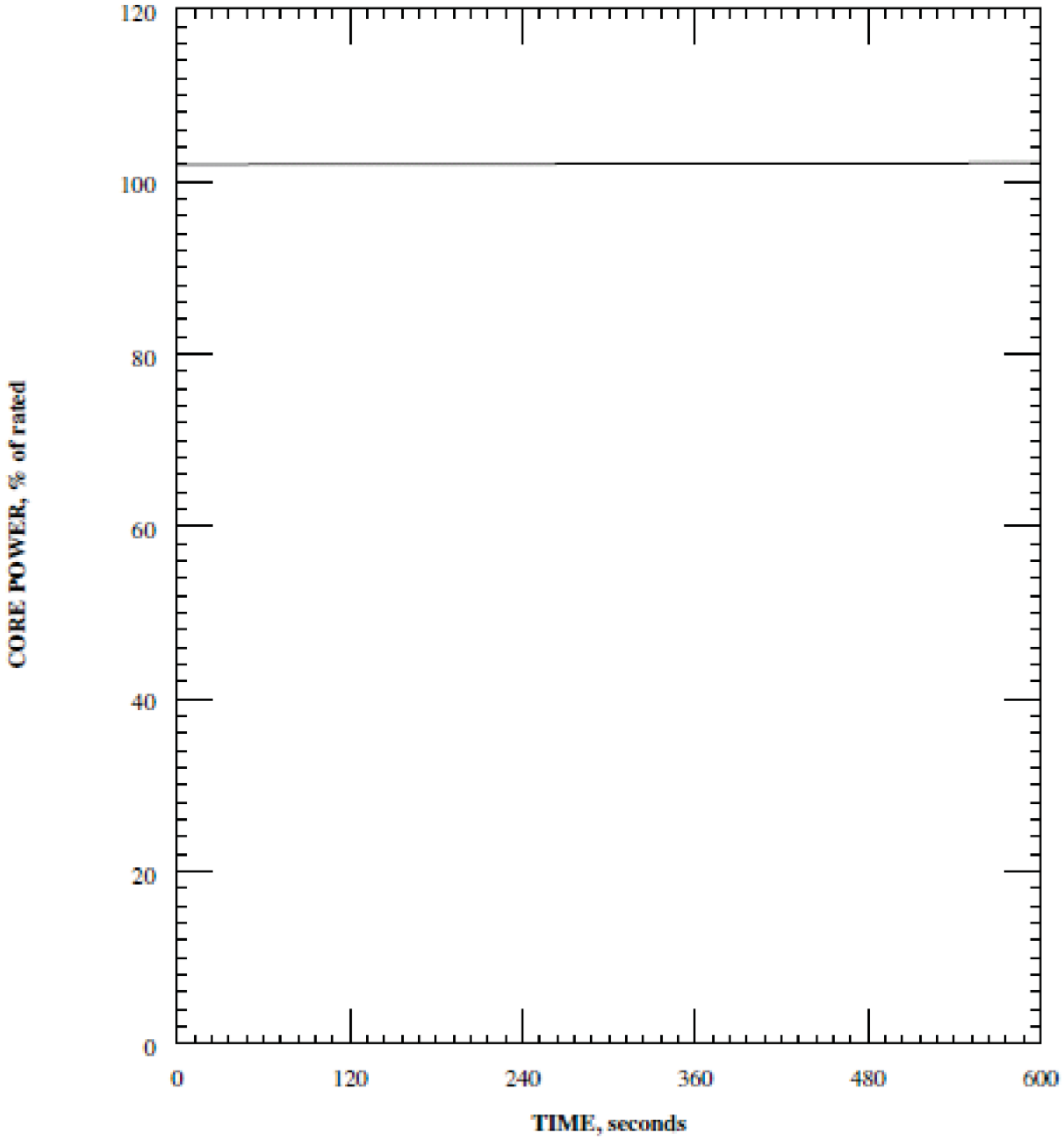


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PLCS MALFUNCTION
FEEDWATER ENTHALPY vs. TIME

FIGURE 15.5.2-11

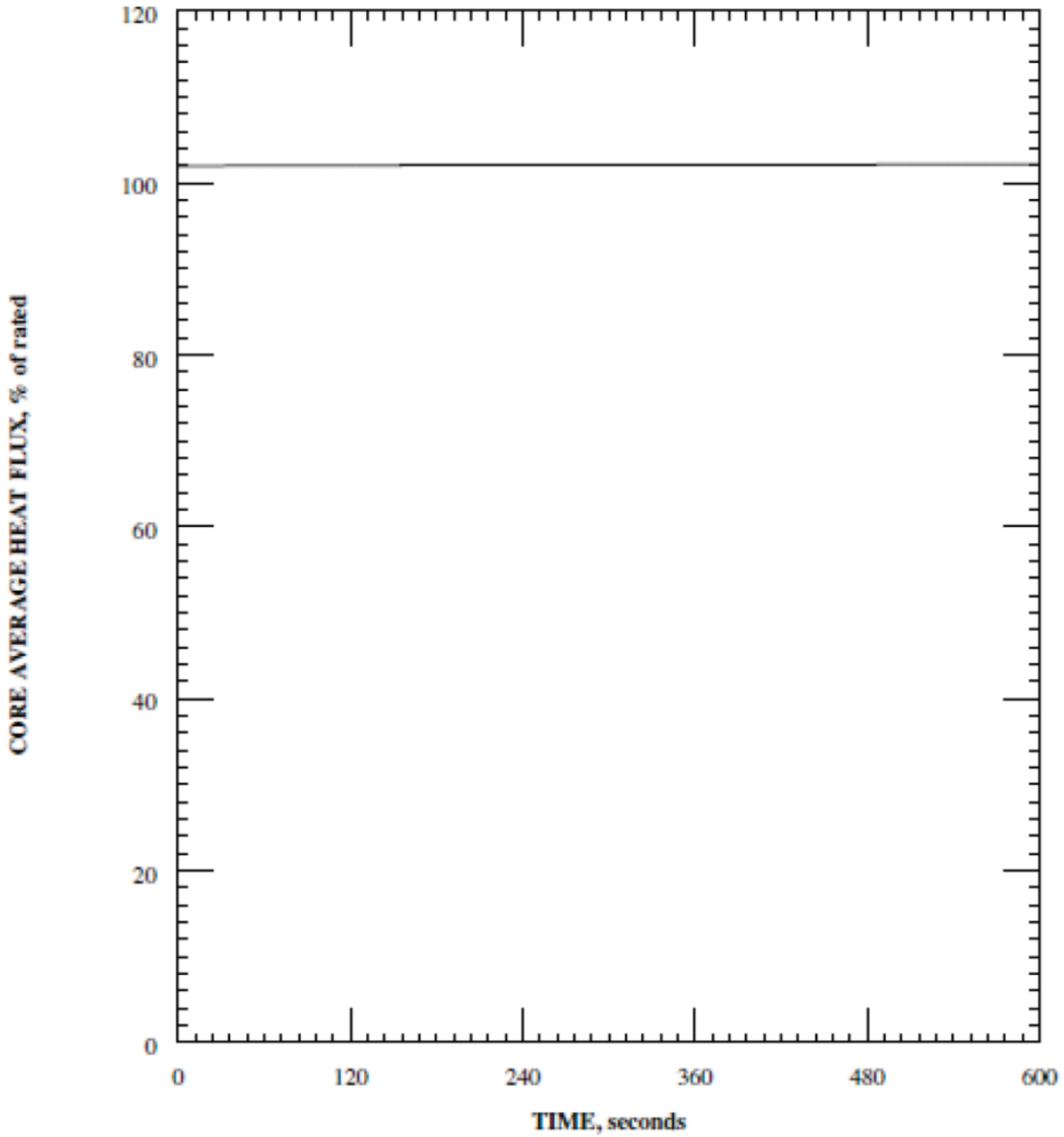
JUNE 2009 REVISION 15



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE CORE POWER VS. TIME

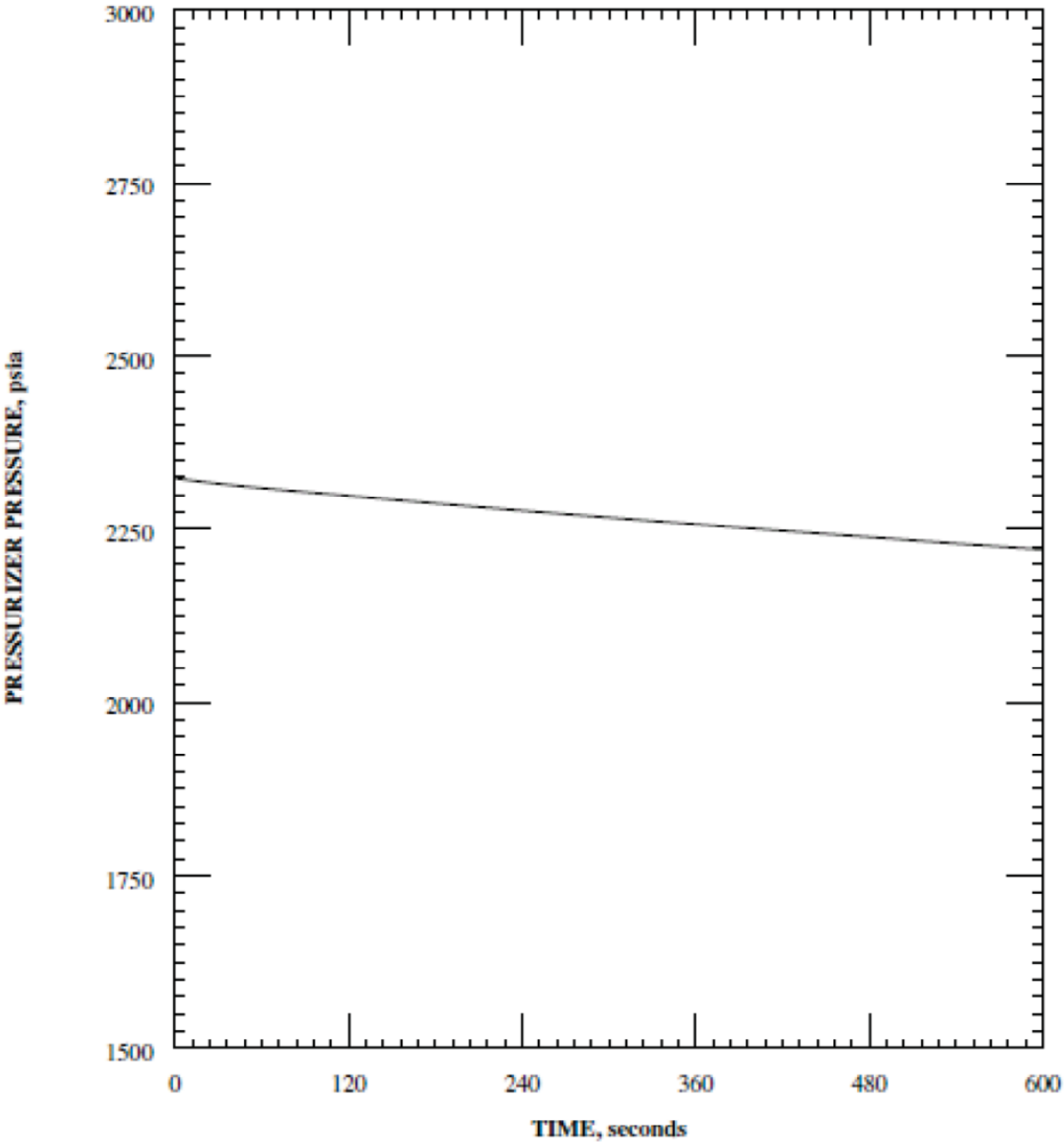
FIGURE 15.6.2-1



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE CORE AVERAGE HEAT FLUX VS. TIME

FIGURE 15.6.2-2

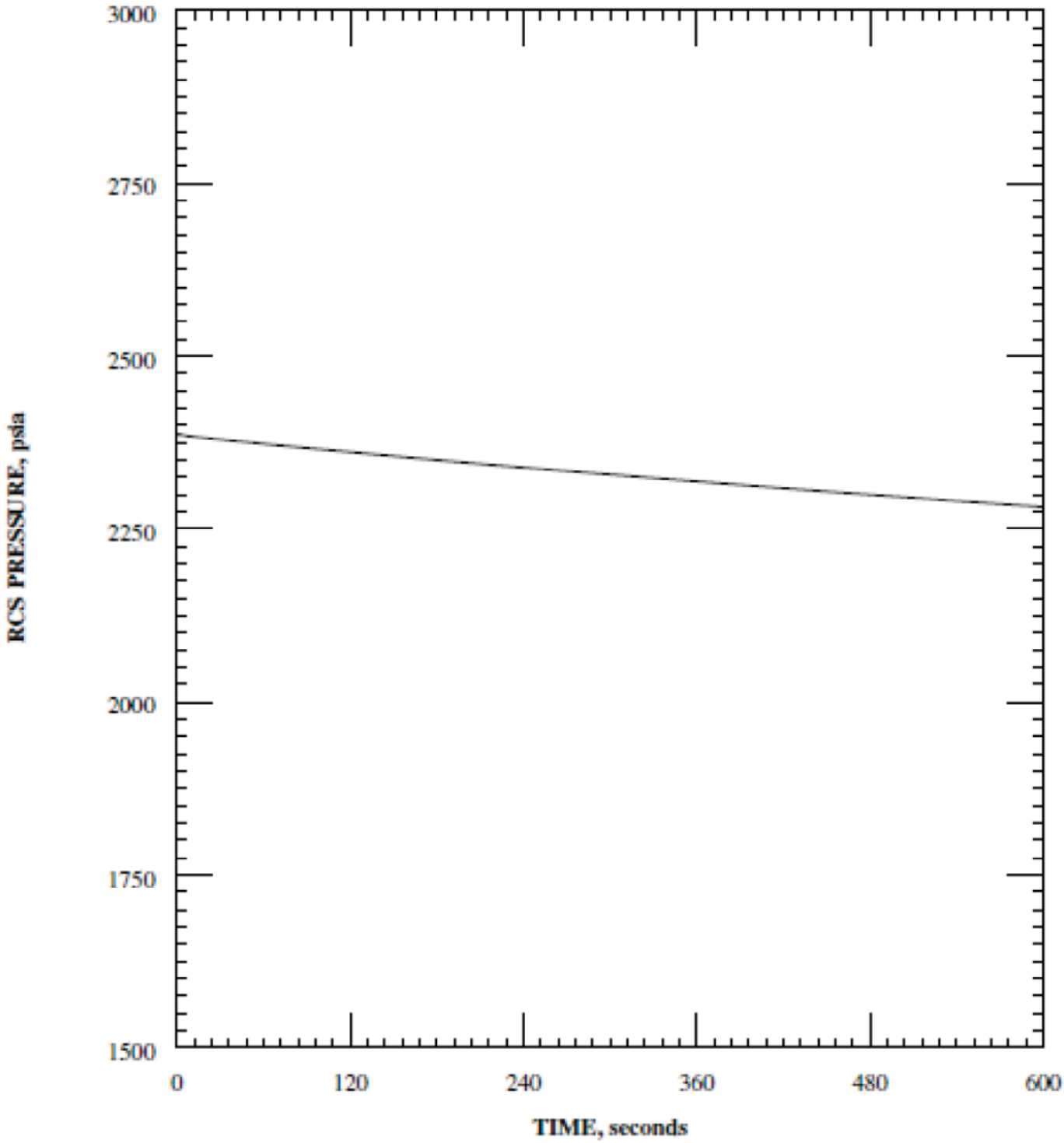


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE PRESSURIZER PRESSURE VS. TIME

FIGURE 15.6.2-3

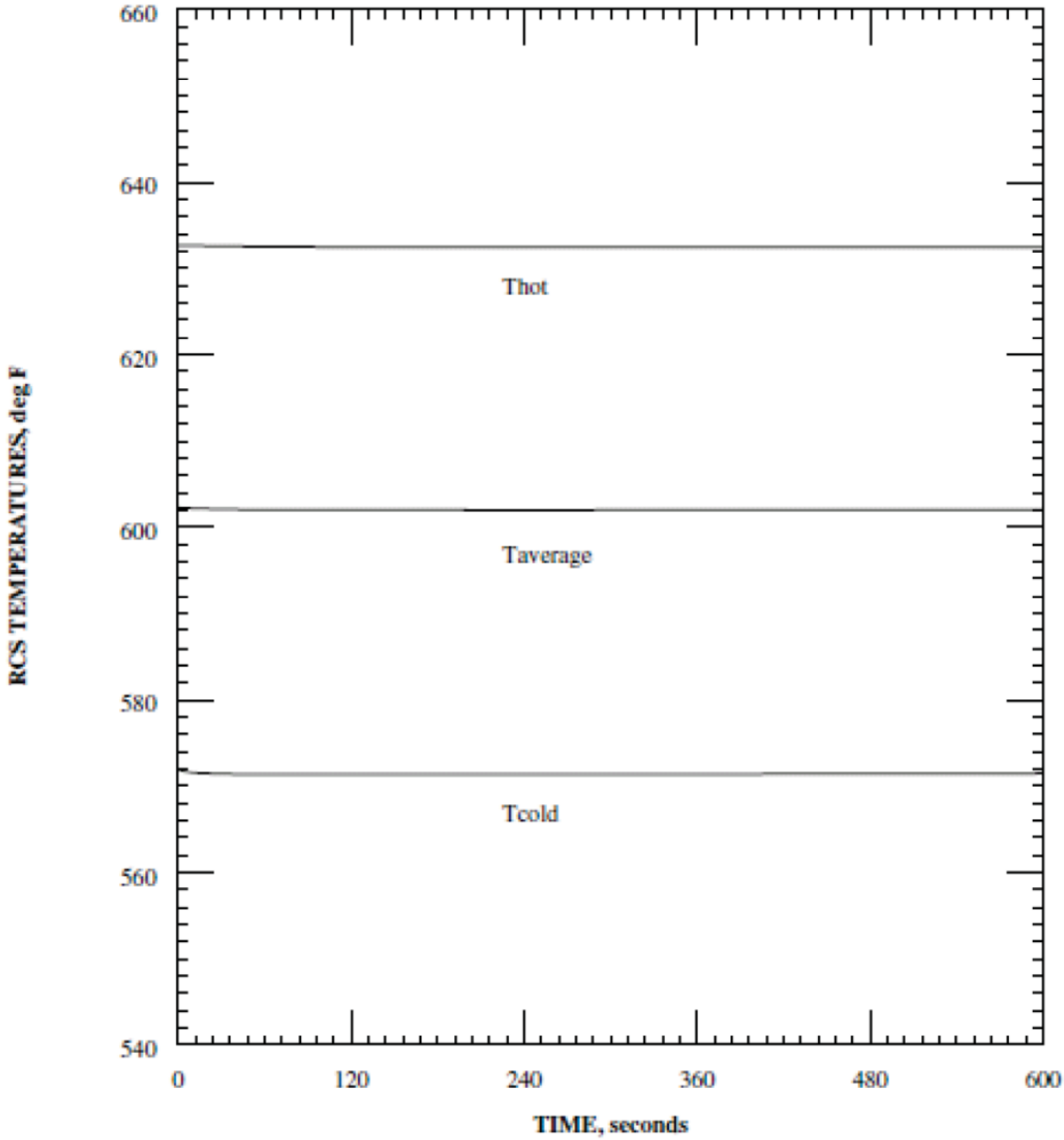
JUNE 2013 REVISION 17



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE RCS PRESSURE VS. TIME

FIGURE 15.6.2-4

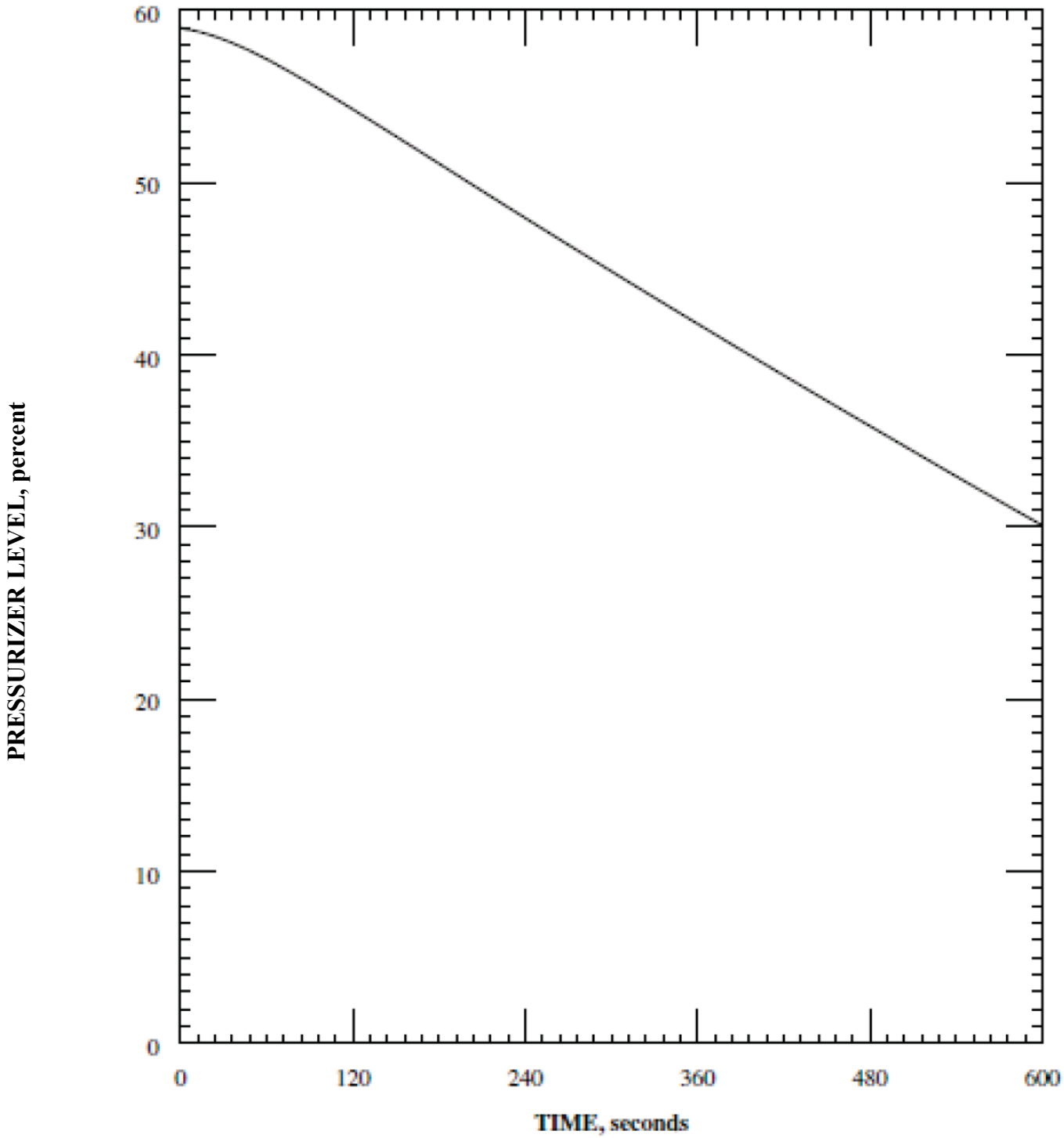


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE RCS TEMPERATURE VS. TIME

FIGURE 15.6.2-5

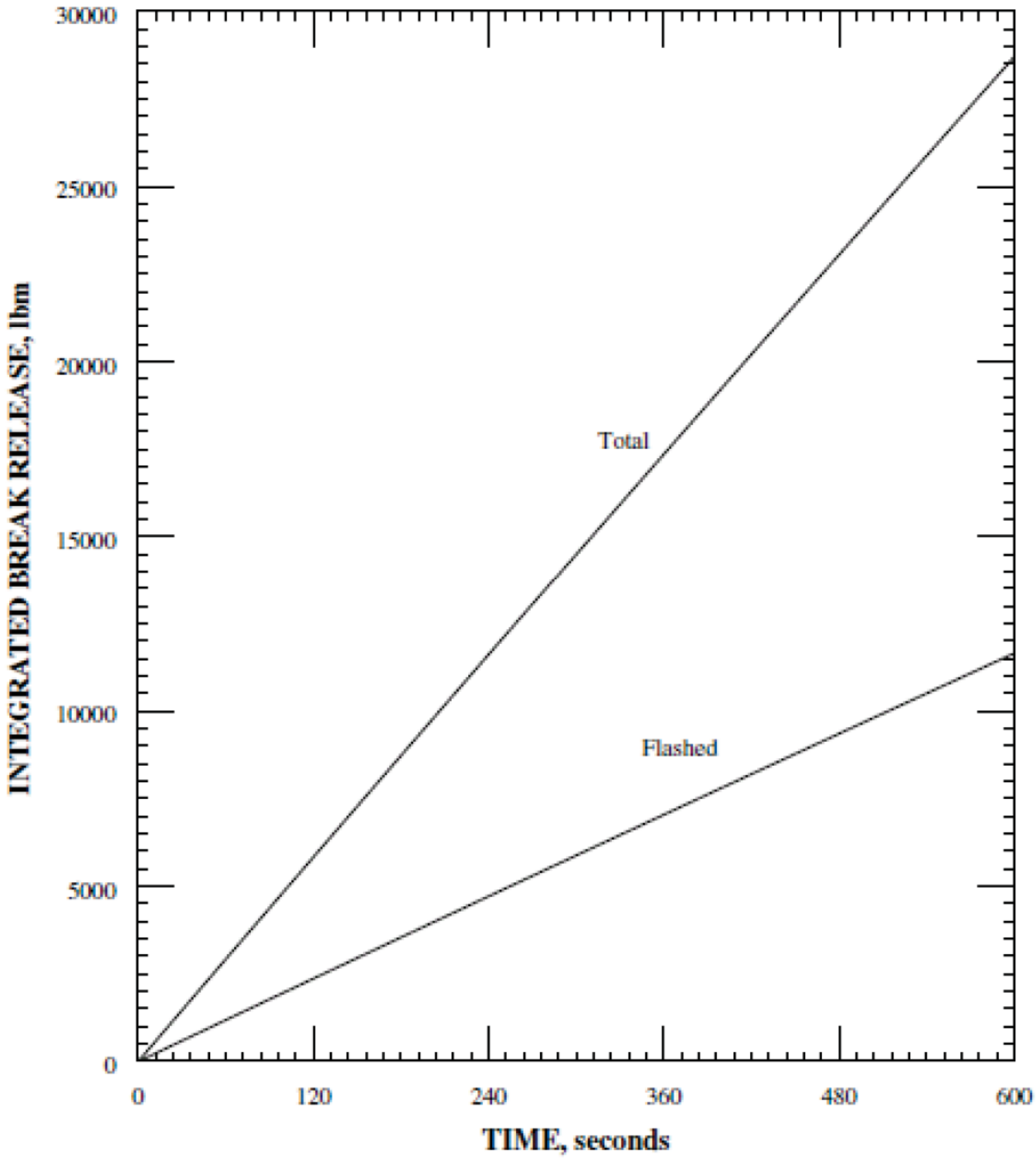
JUNE 2013 REVISION 17



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT,
UPSTREAM OF LETDOWN LINE CONTROL VALVE
PRESSURIZER LEVEL VS. TIME

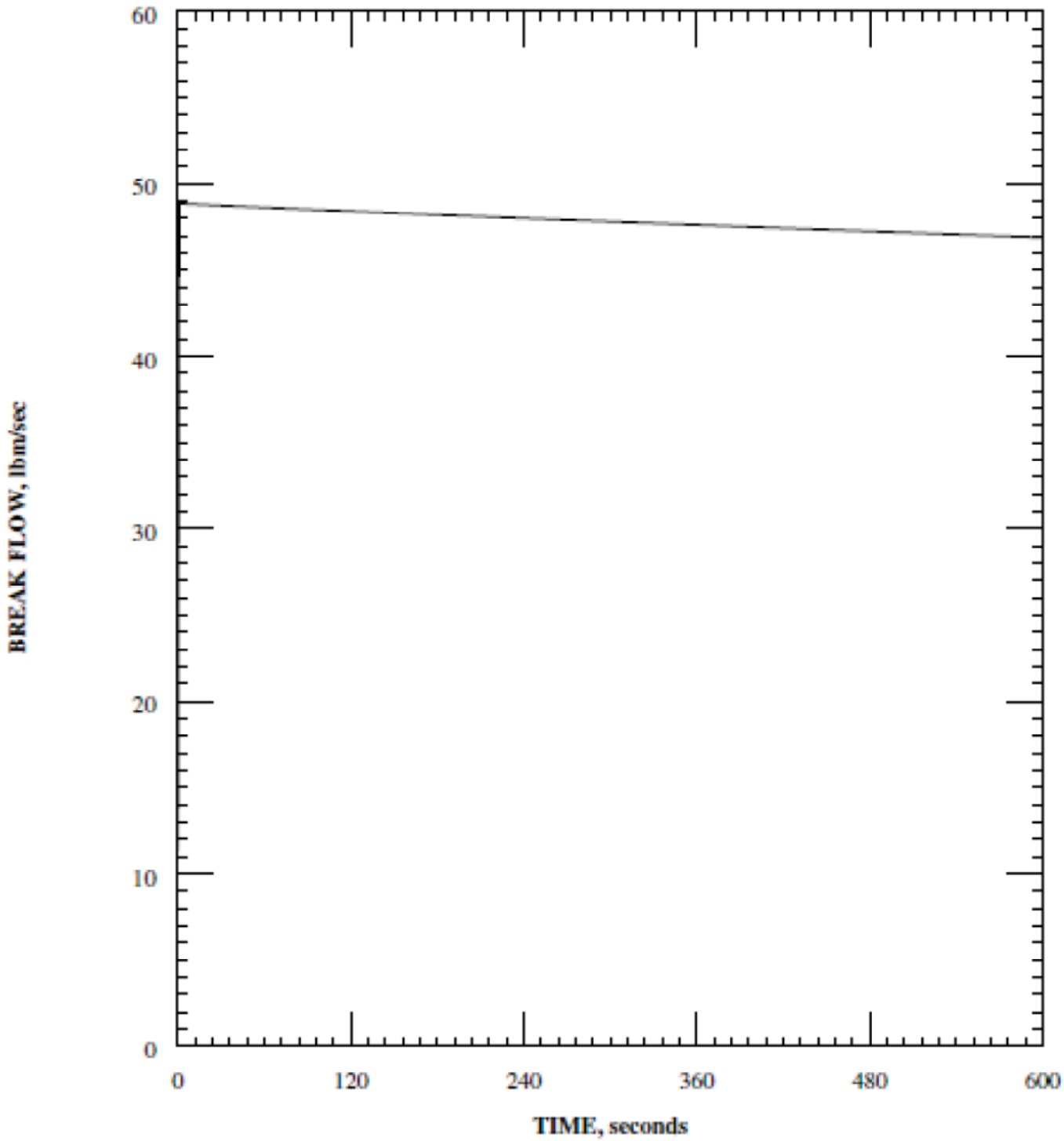
FIGURE 15.6.2-6



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT,
UPSTREAM OF LETDOWN LINE CONTROL VALVE
INTEGRATED PRIMARY COOLANT DISCHARGE VS. TIME

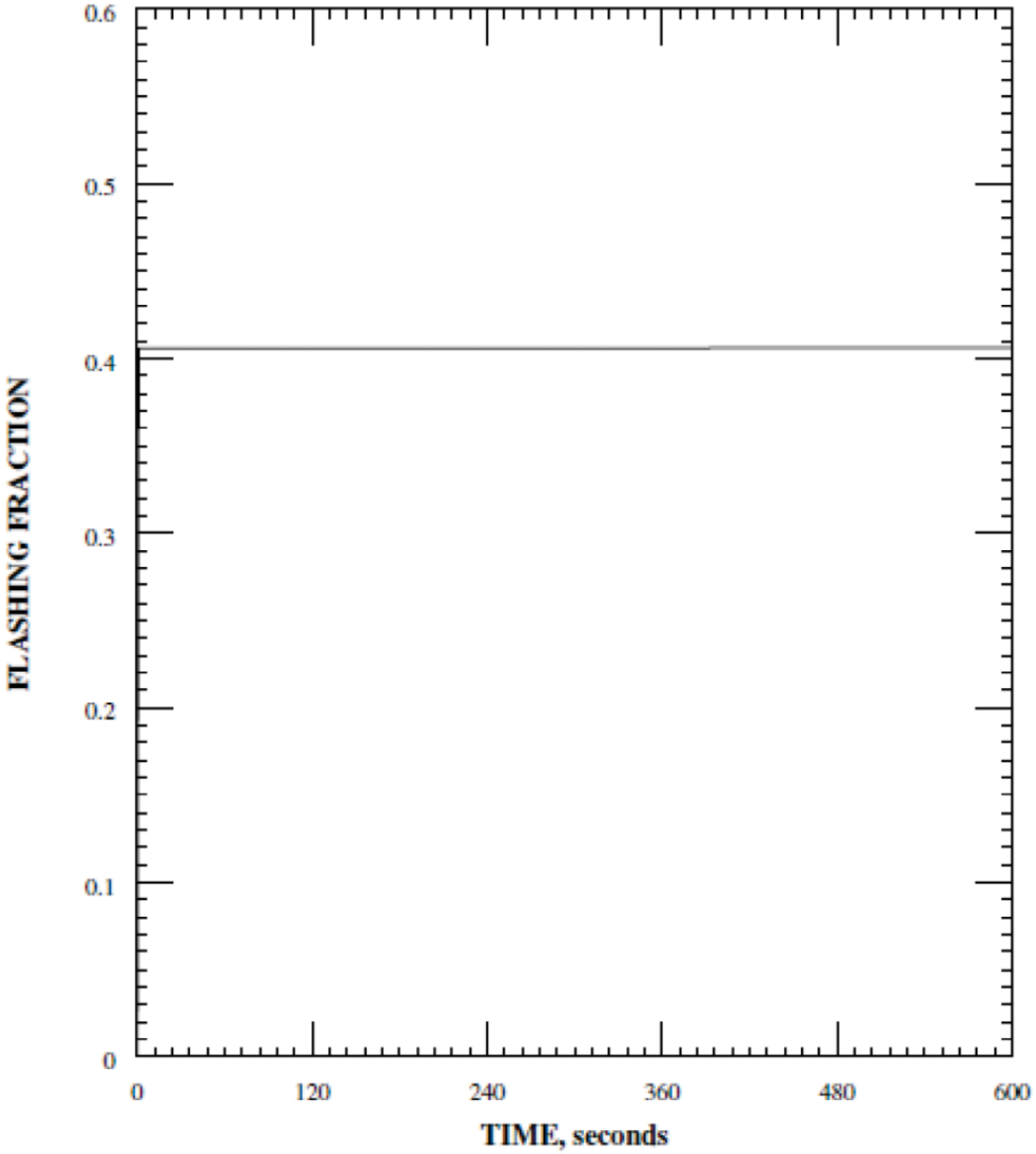
FIGURE 15.6.2-7



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT,
UPSTREAM OF LETDOWN LINE CONTROL VALVE
BREAK FLOW VS. TIME

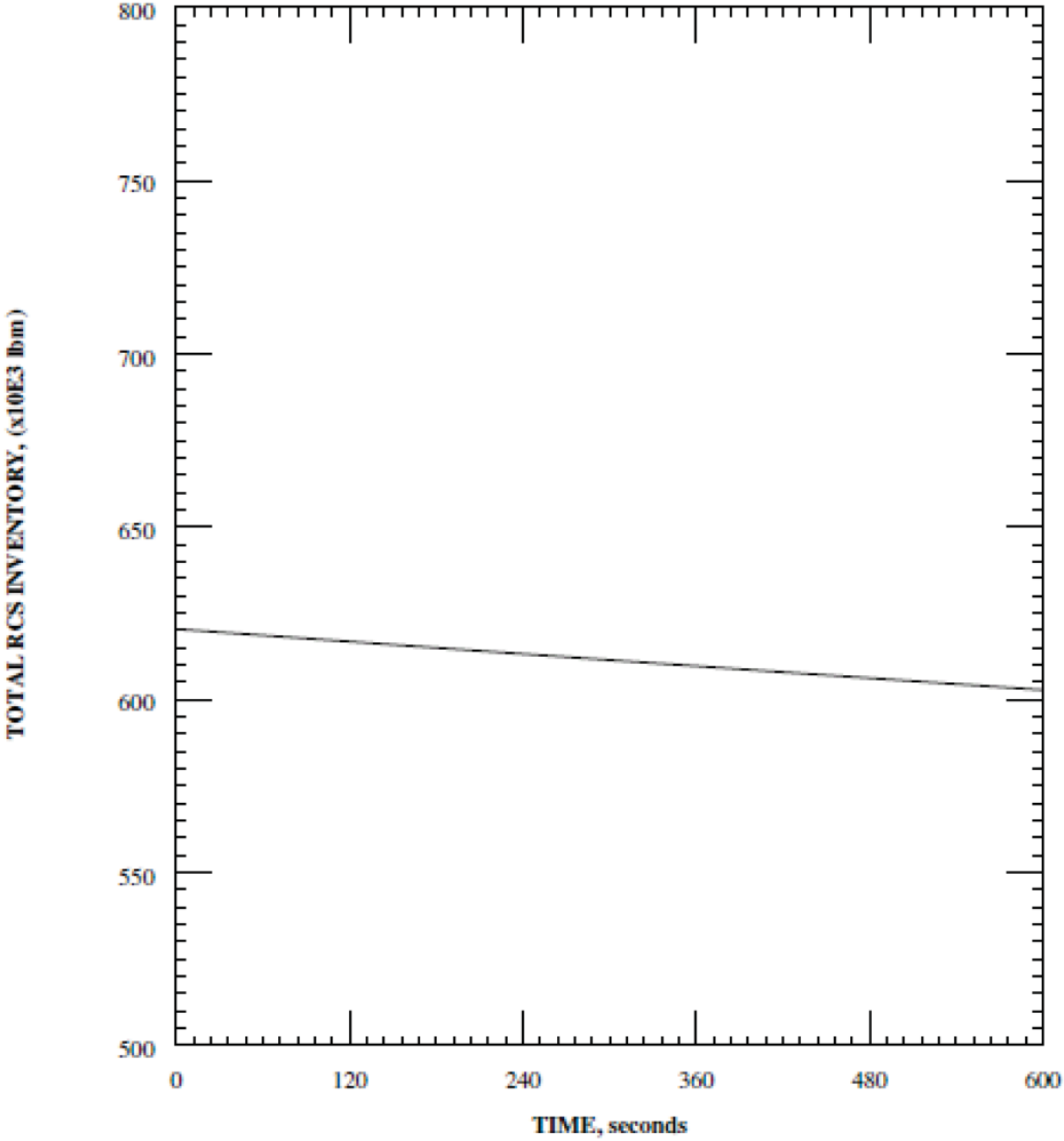
FIGURE 15.6.2-8



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE BREAK FLASHING FRACTION VS. TIME

FIGURE 15.6.2-9

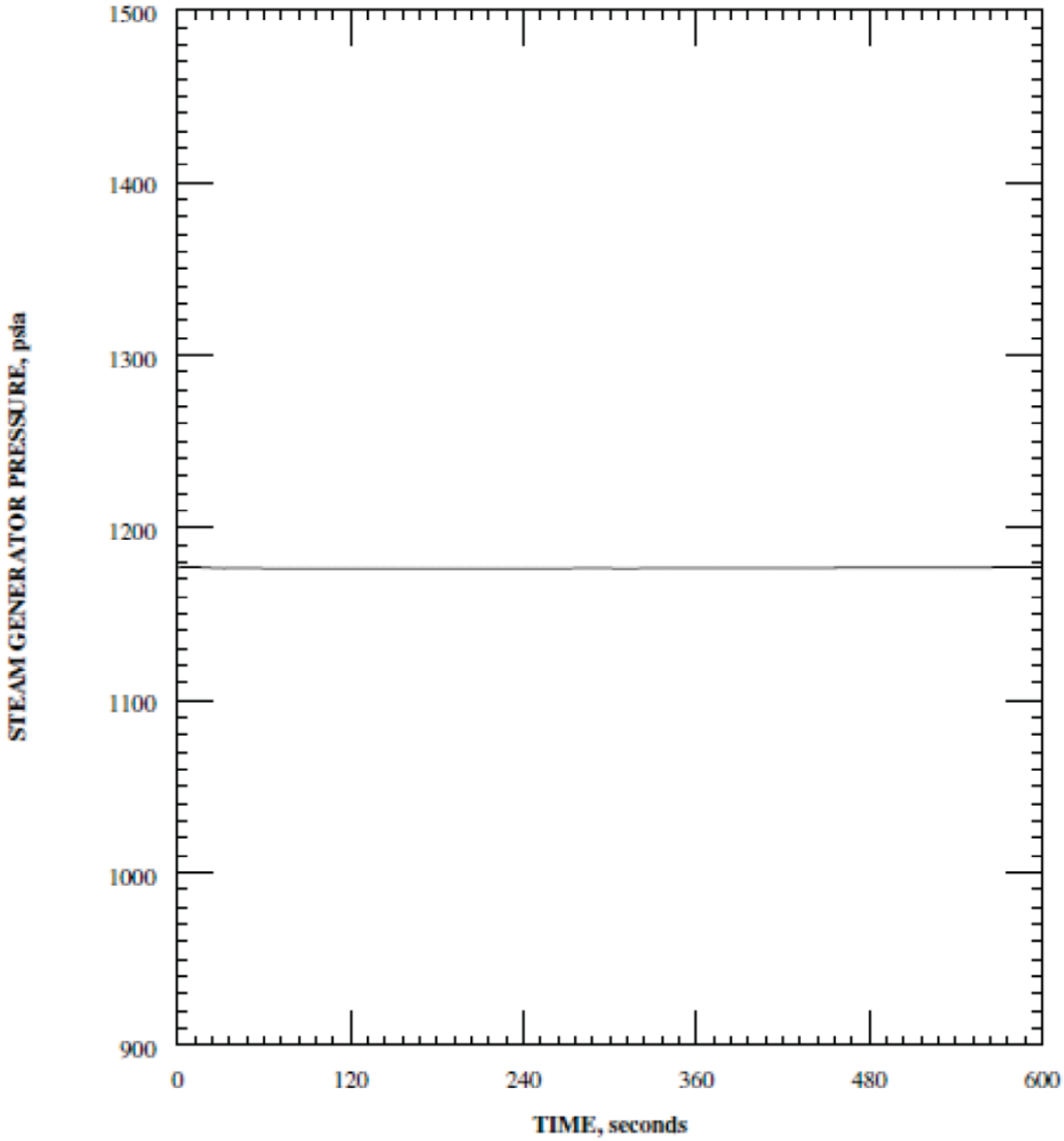


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT,
UPSTREAM OF LETDOWN LINE CONTROL VALVE
RCS INVENTORY VS. TIME

FIGURE 15.6.2-10

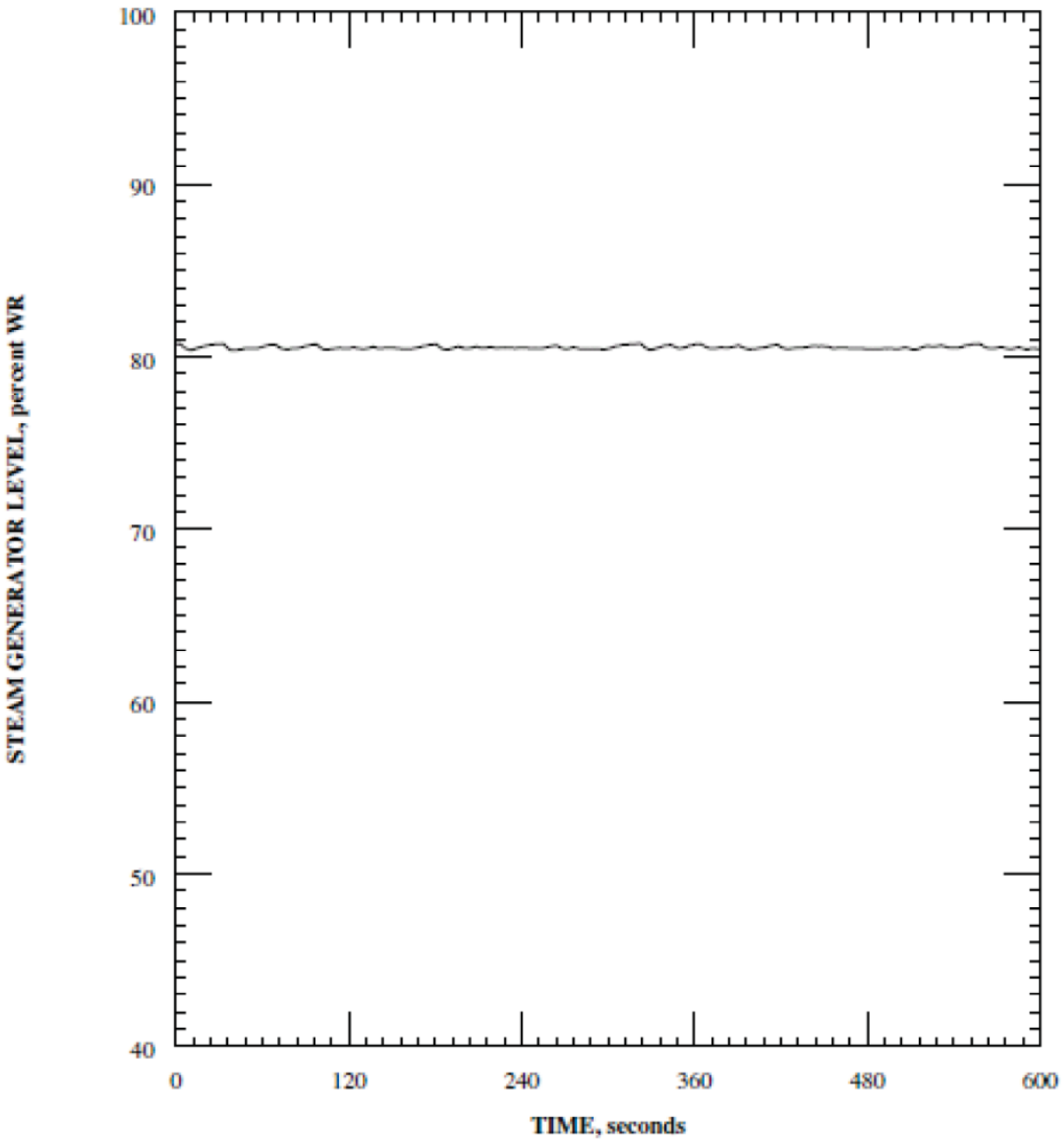
JUNE 2013 REVISION 17



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT,
UPSTREAM OF LETDOWN LINE CONTROL VALVE
SG PRESSURE VS. TIME

FIGURE 15.6.2-11

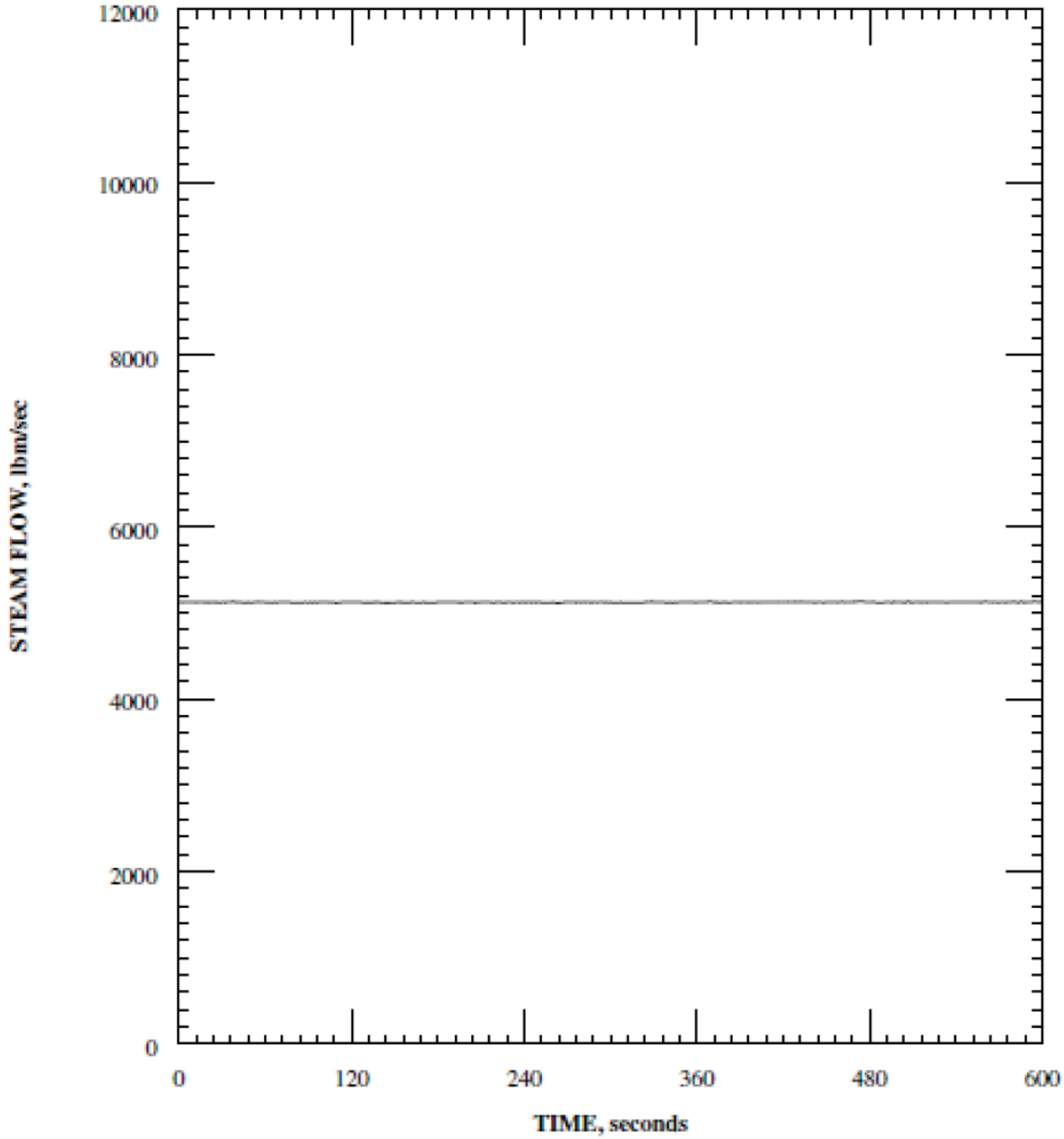


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT,
UPSTREAM OF LETDOWN LINE CONTROL VALVE
SG WATER LEVEL VS. TIME

FIGURE 15.6.2-12

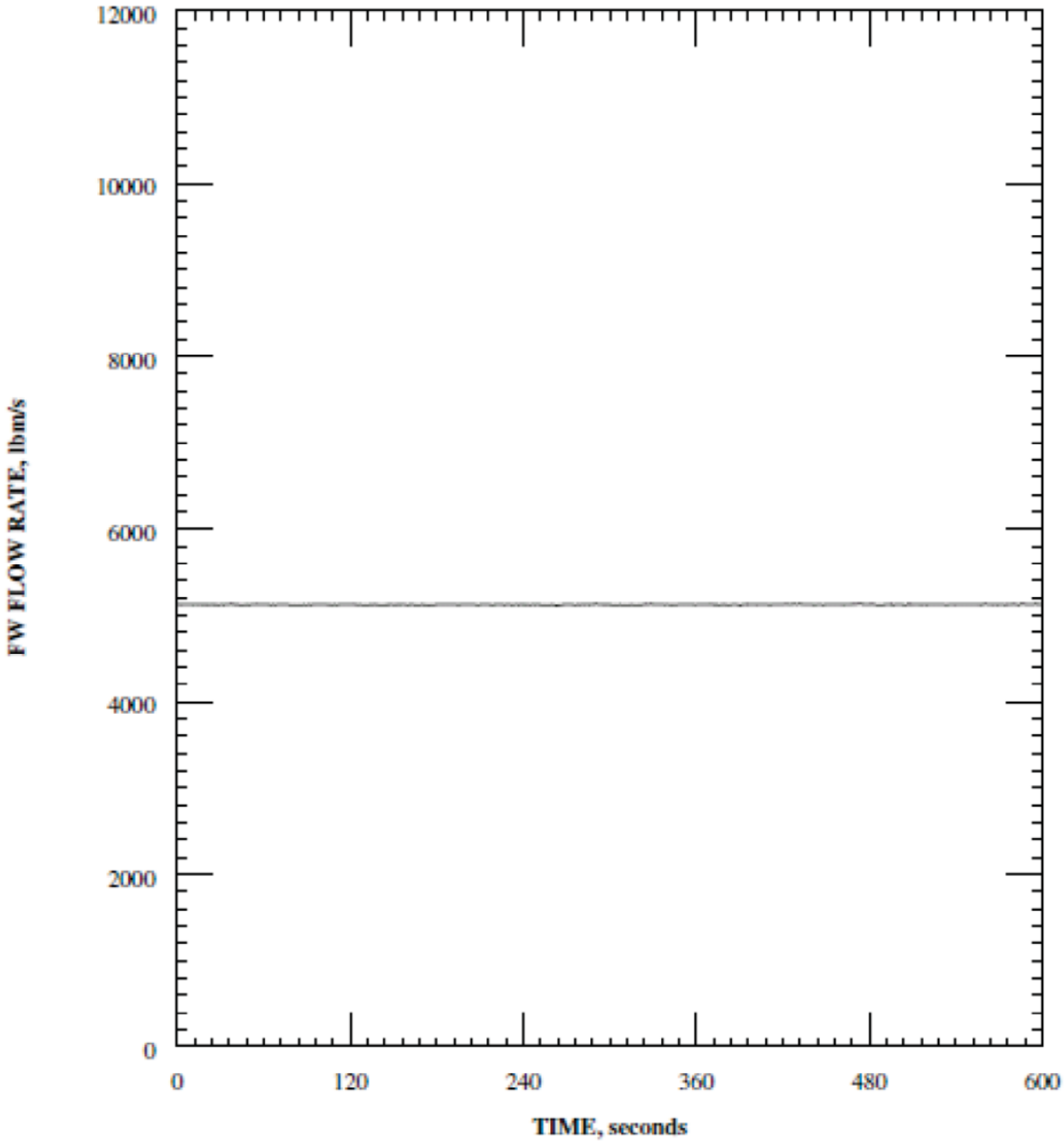
JUNE 2013 REVISION 17



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT,
UPSTREAM OF LETDOWN LINE CONTROL VALVE
TOTAL STEAM FLOW VS. TIME

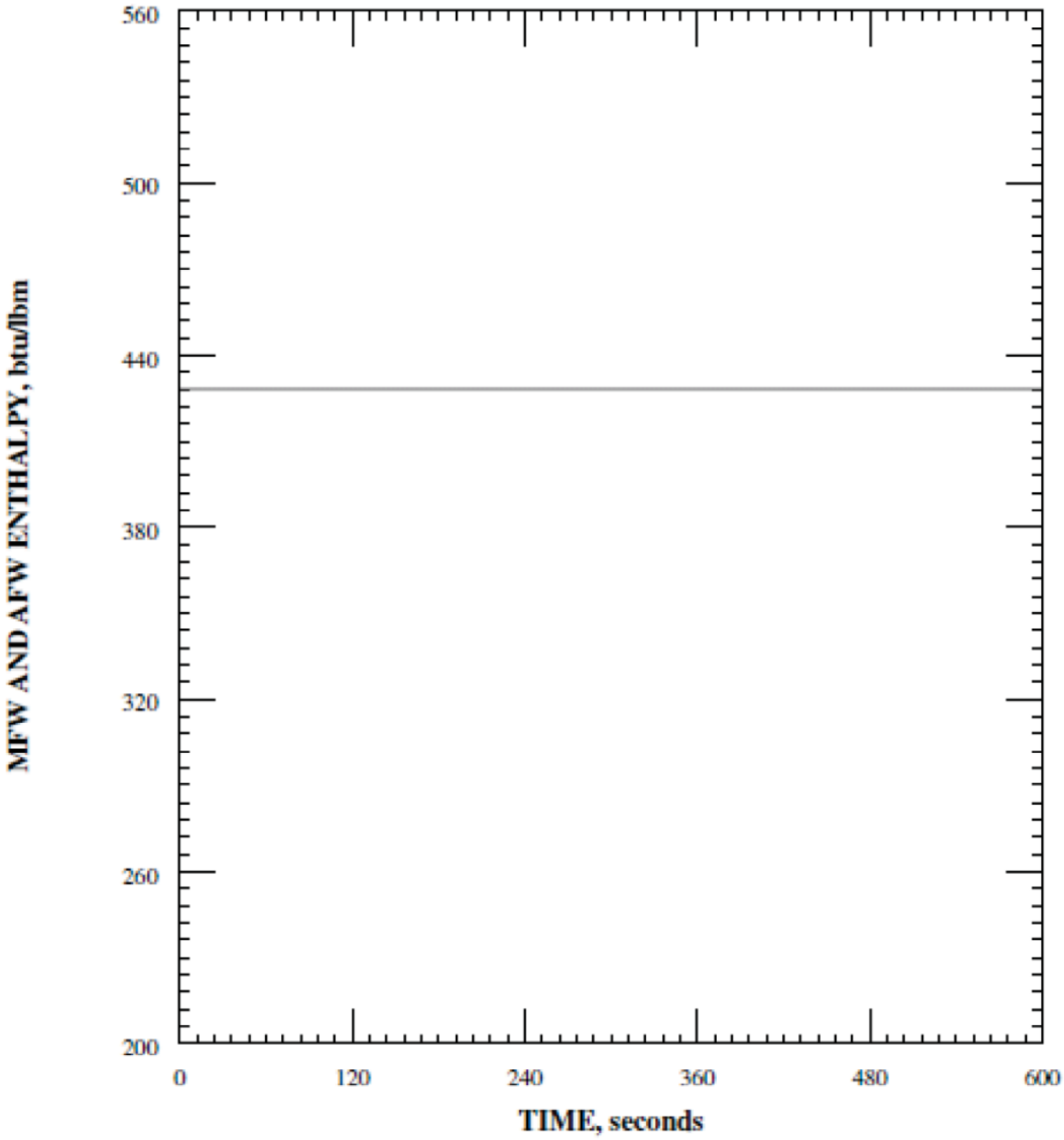
FIGURE 15.6.2-13



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE TOTAL FW FLOW VS. TIME

FIGURE 15.6.2-14



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE FW ENTHALPY VS. TIME

FIGURE 15.6.2-15

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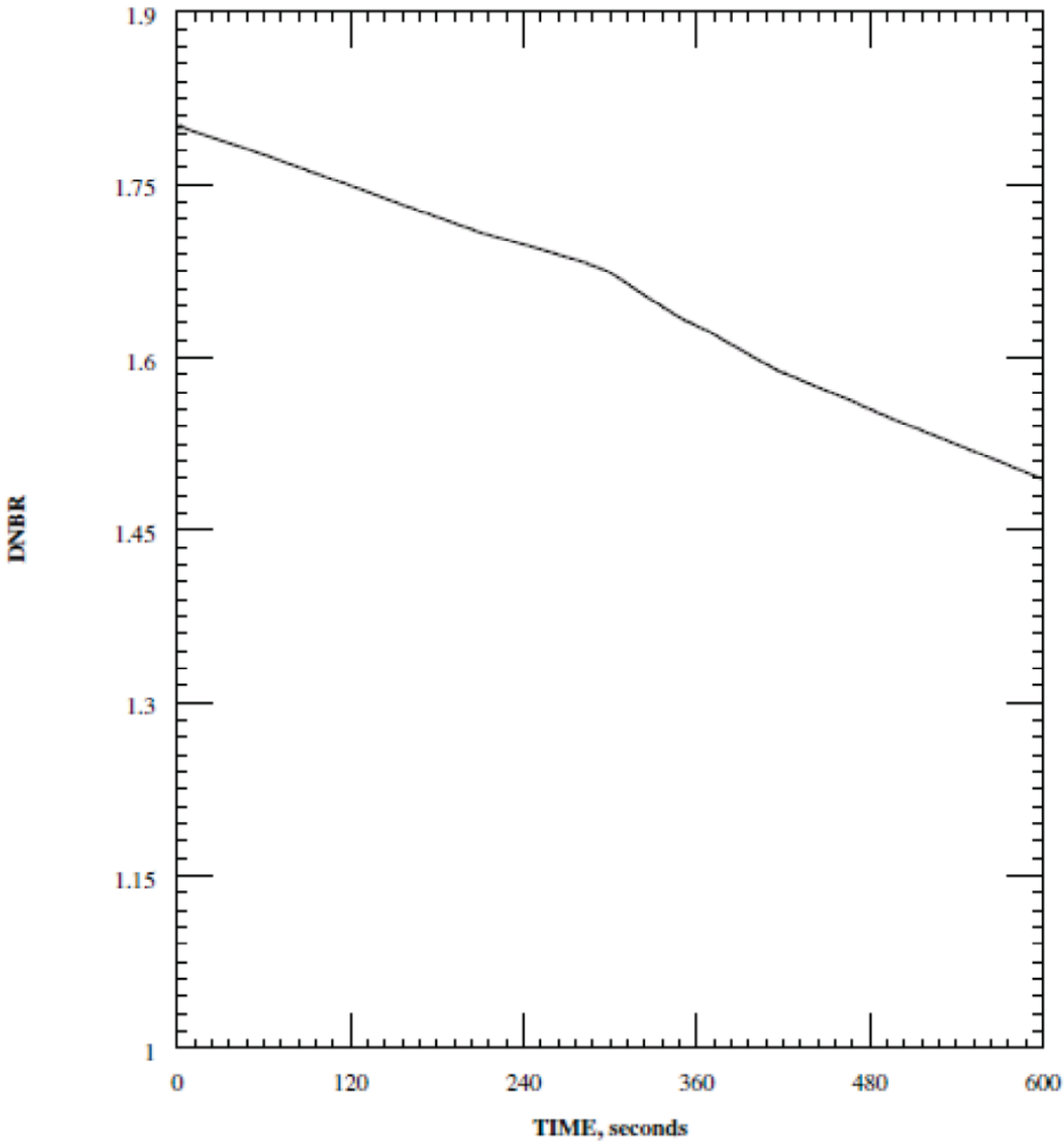
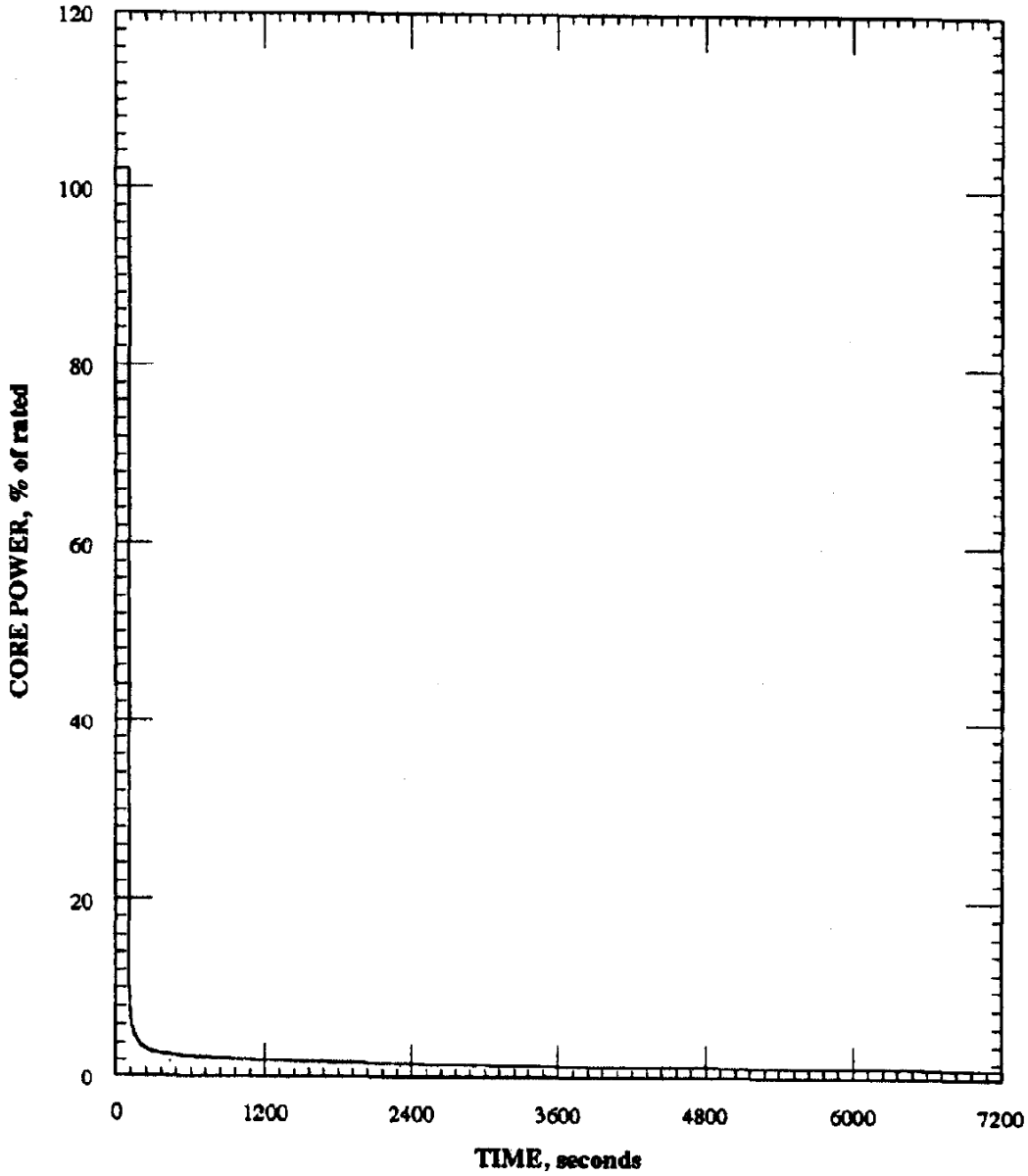


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LETDOWNLINE BREAK, OUTSIDE CONTAINMENT, UPSTREAM OF LETDOWN LINE CONTROL VALVE DNBR VS. TIME

FIGURE 15.6.2-16

JUNE 2013 REVISION 17

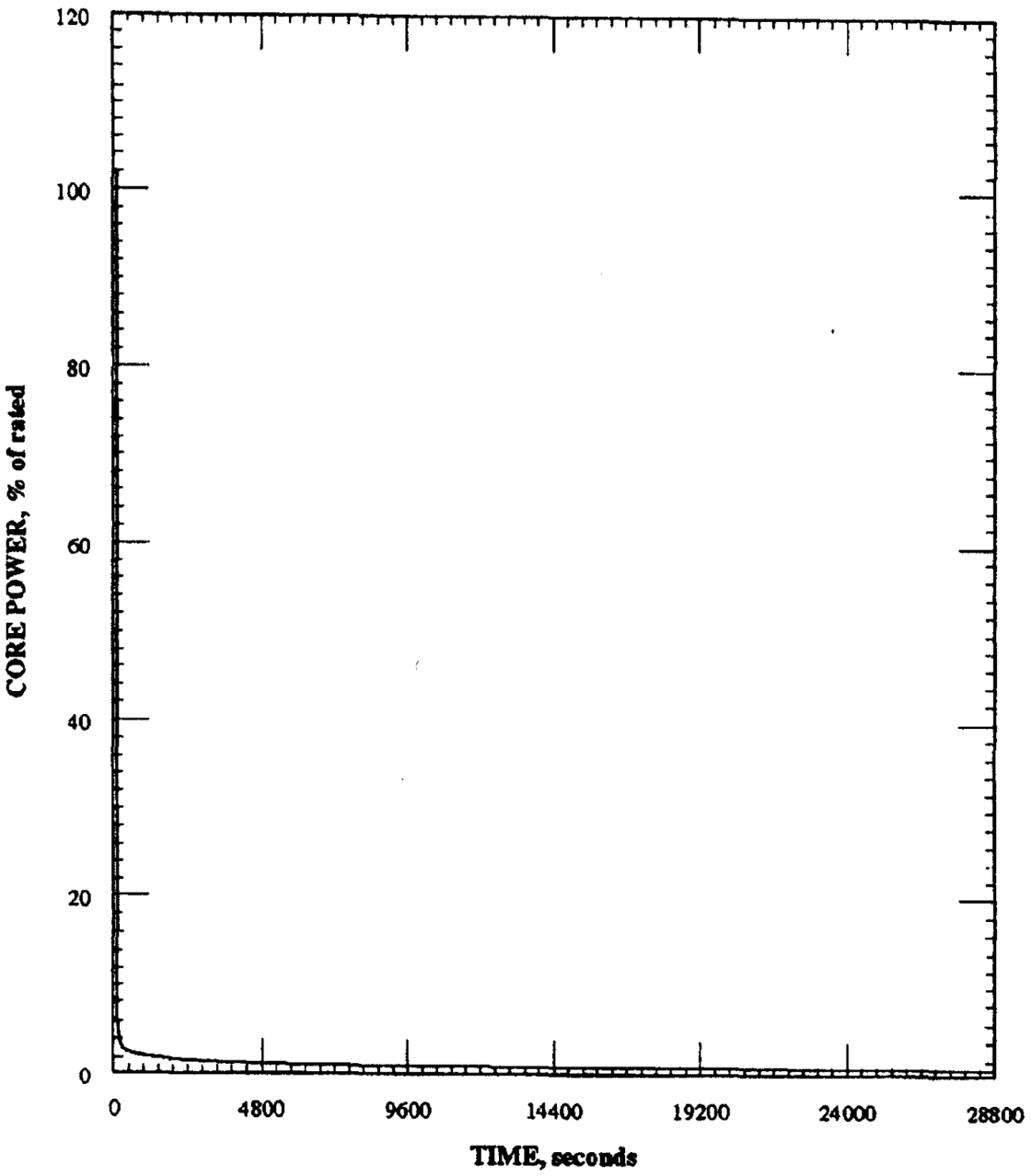


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
CORE POWER vs. TIME

FIGURE 15.6.3-1 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

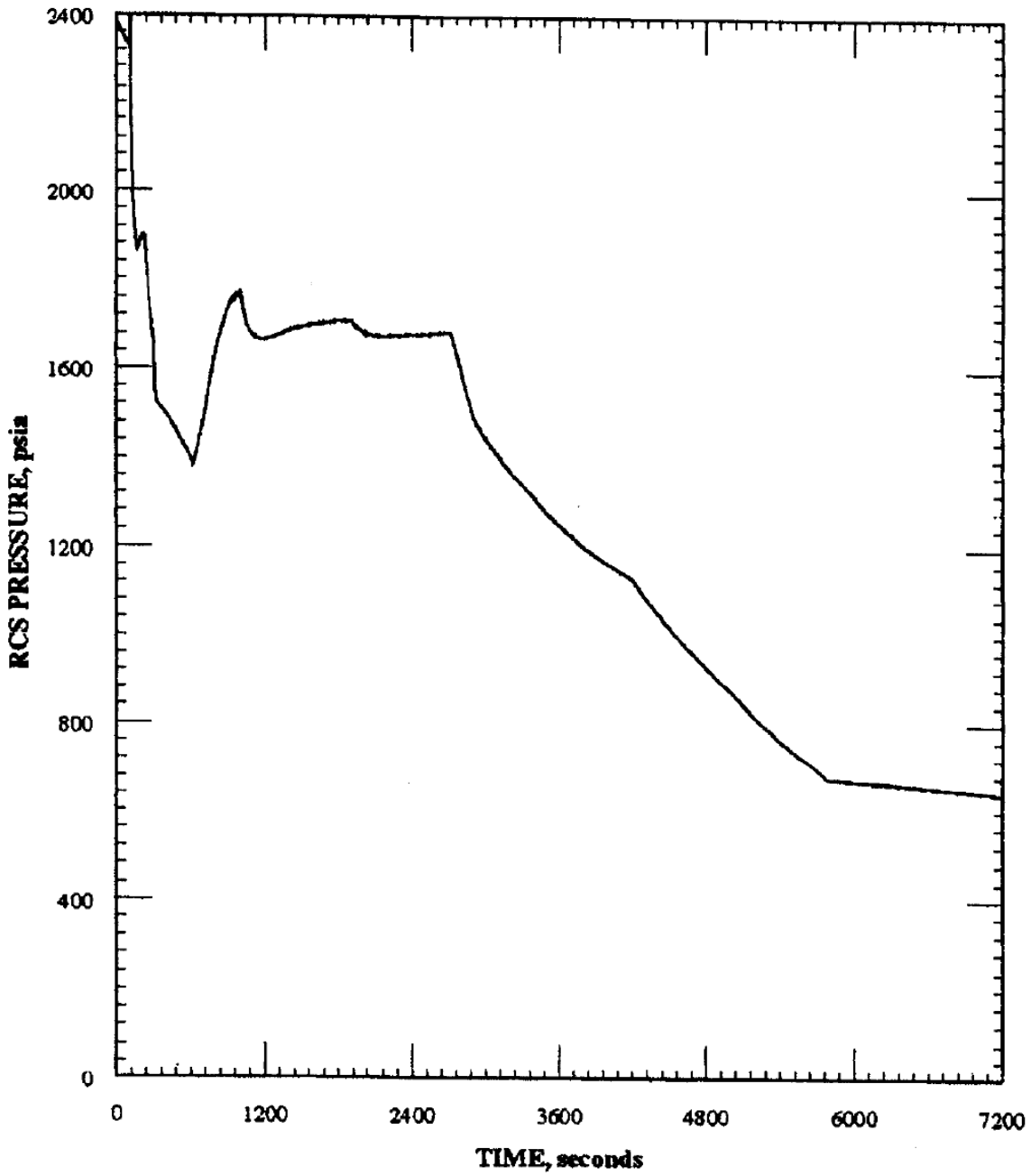


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
CORE POWER vs. TIME

FIGURE 15.6.3-1 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

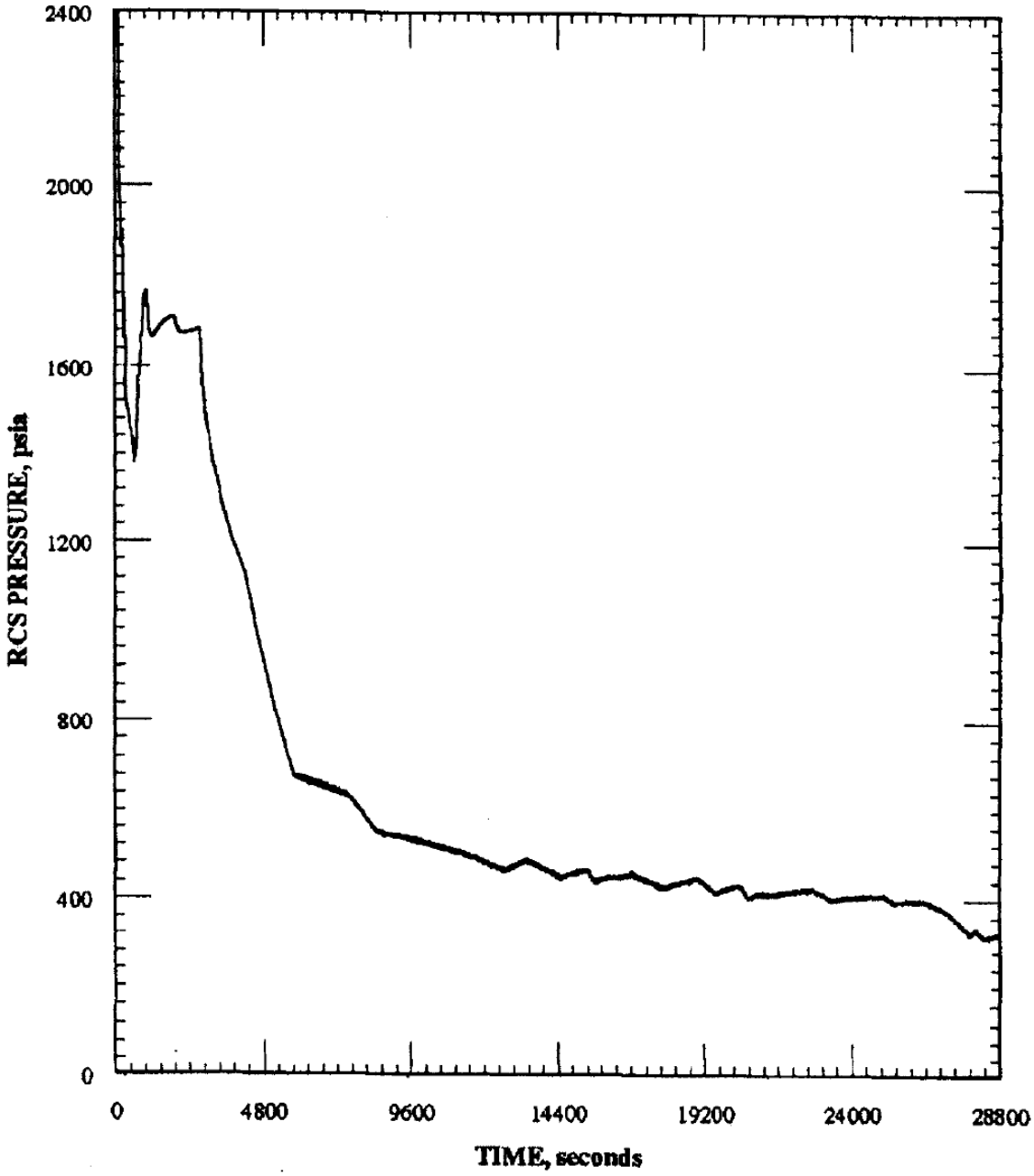


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
RCS PRESSURE vs. TIME

FIGURE 15.6.3-2 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

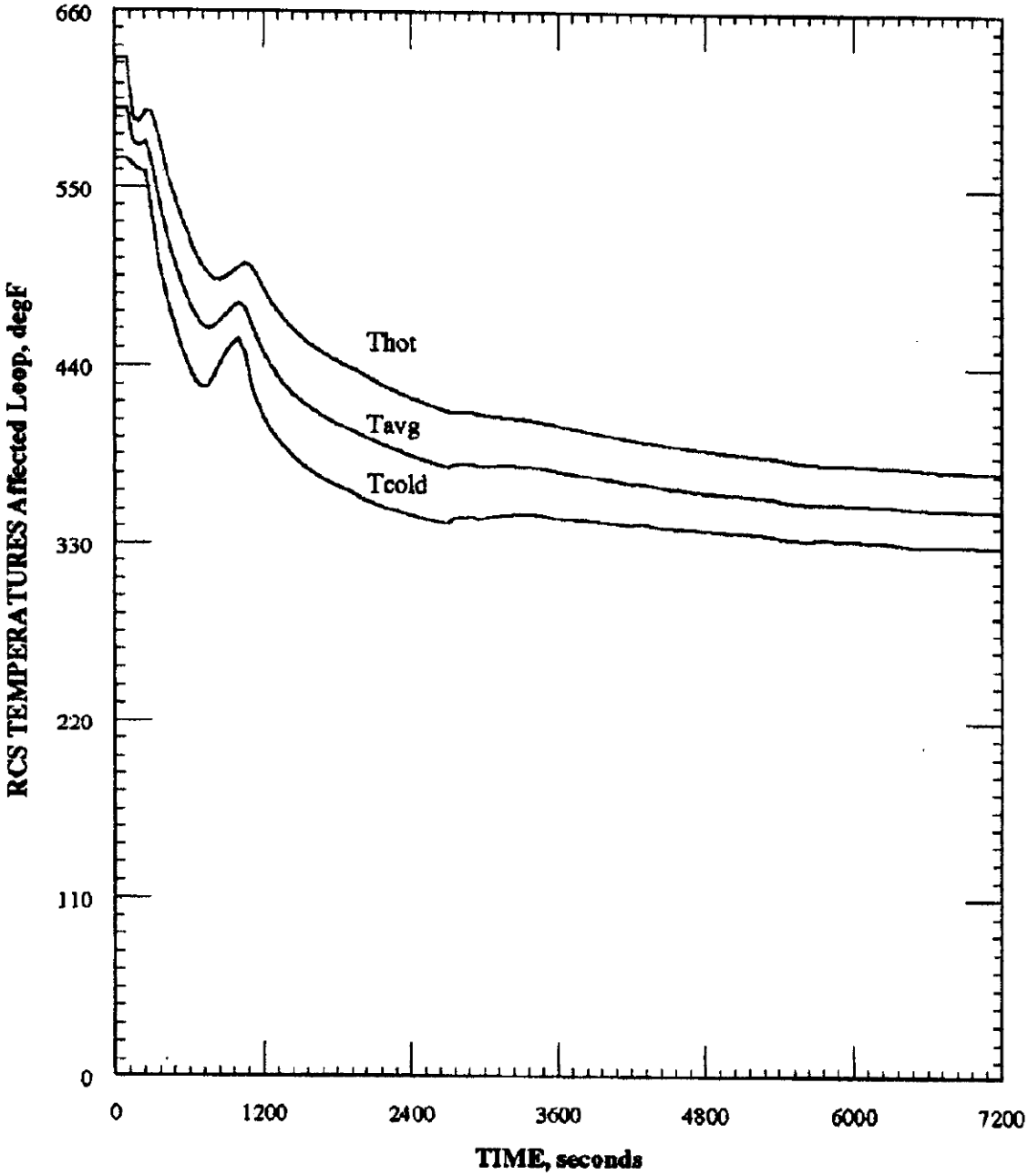


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
RCS PRESSURE vs. TIME

FIGURE 15.6.3-2 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

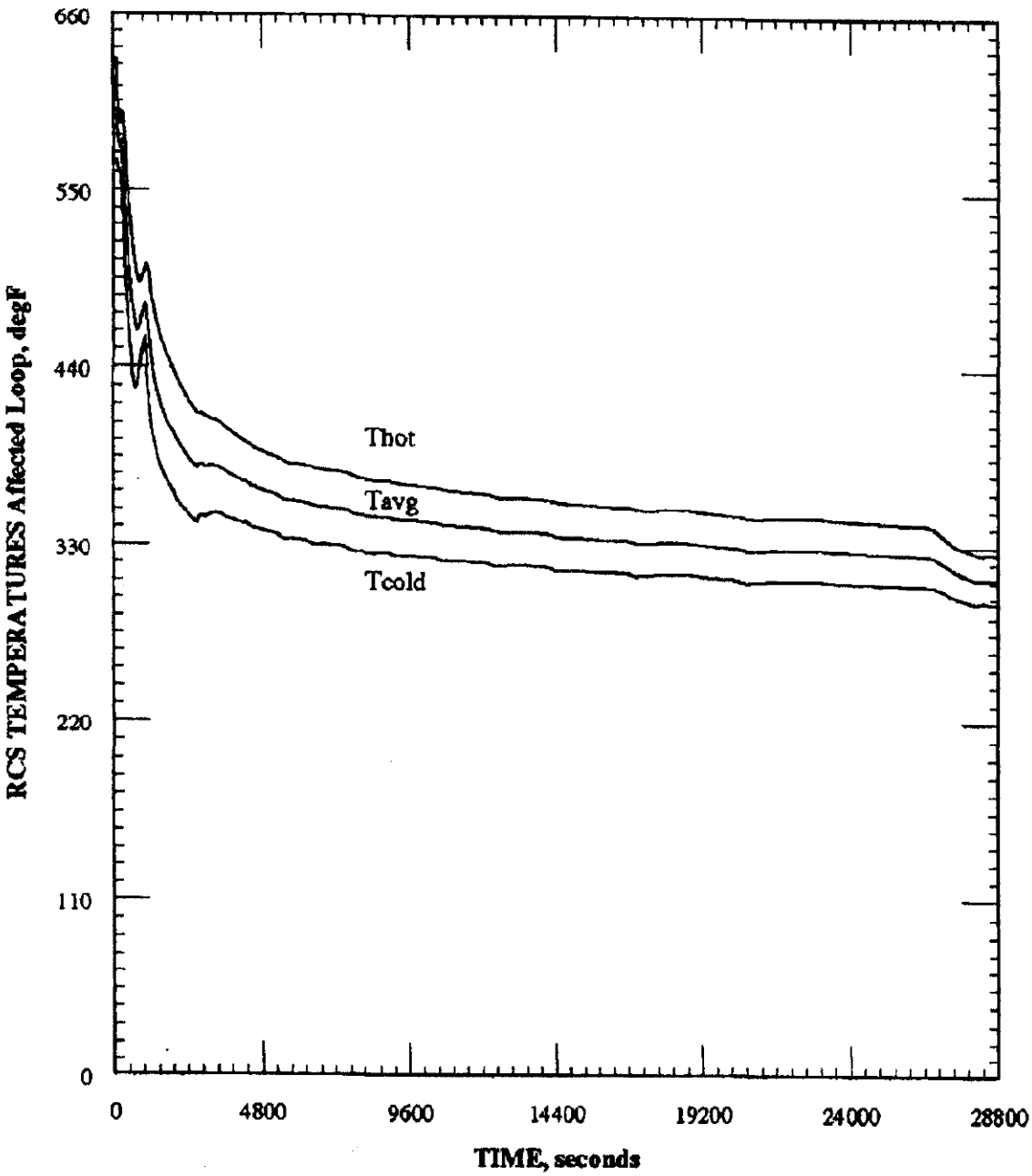


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
RCS TEMPERATURES AFFECTED LOOP vs. TIME

FIGURE 15.6.3-3 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

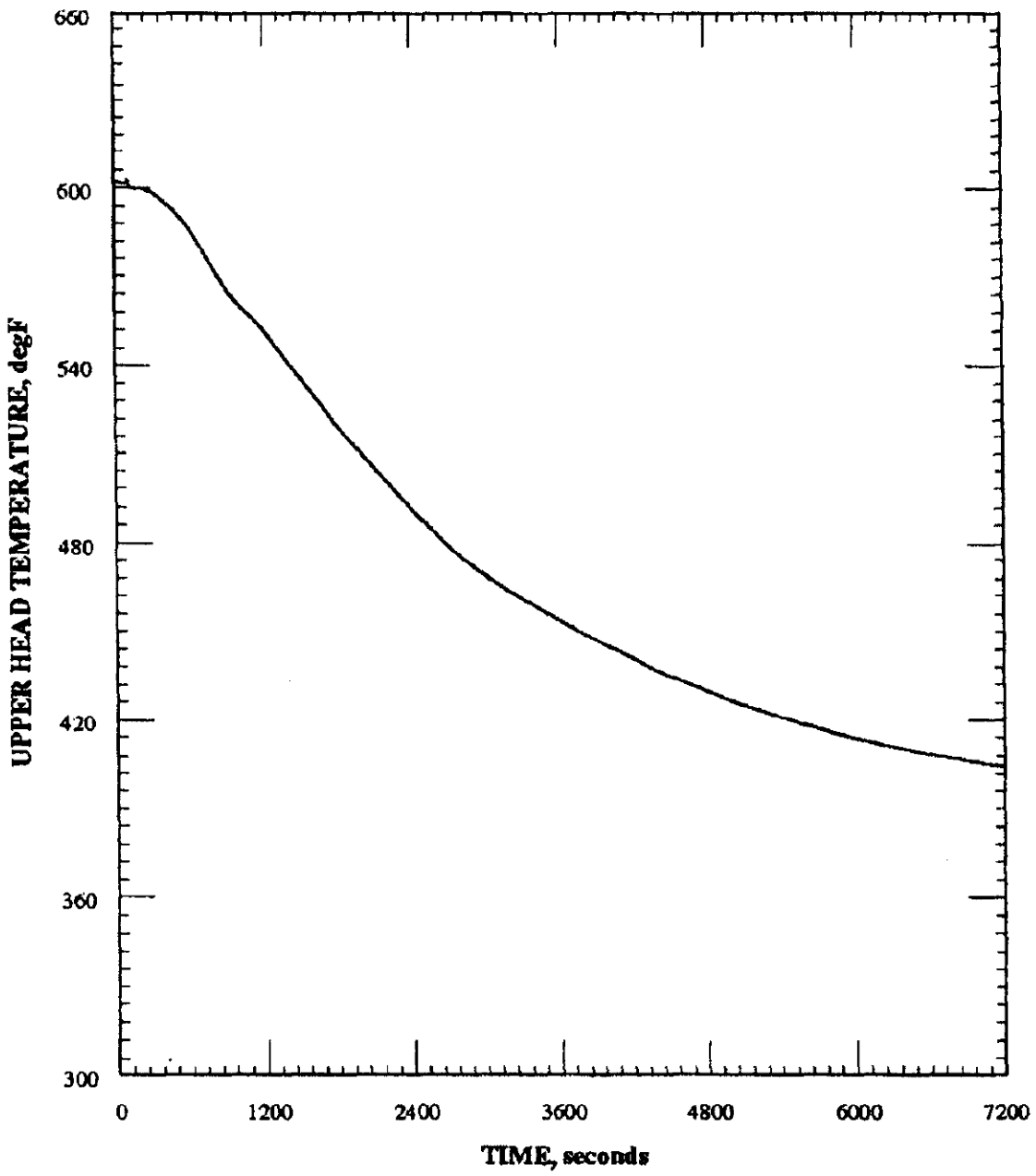


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
RCS TEMPERATURES AFFECTED LOOP vs. TIME

FIGURE 15.6.3-3 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

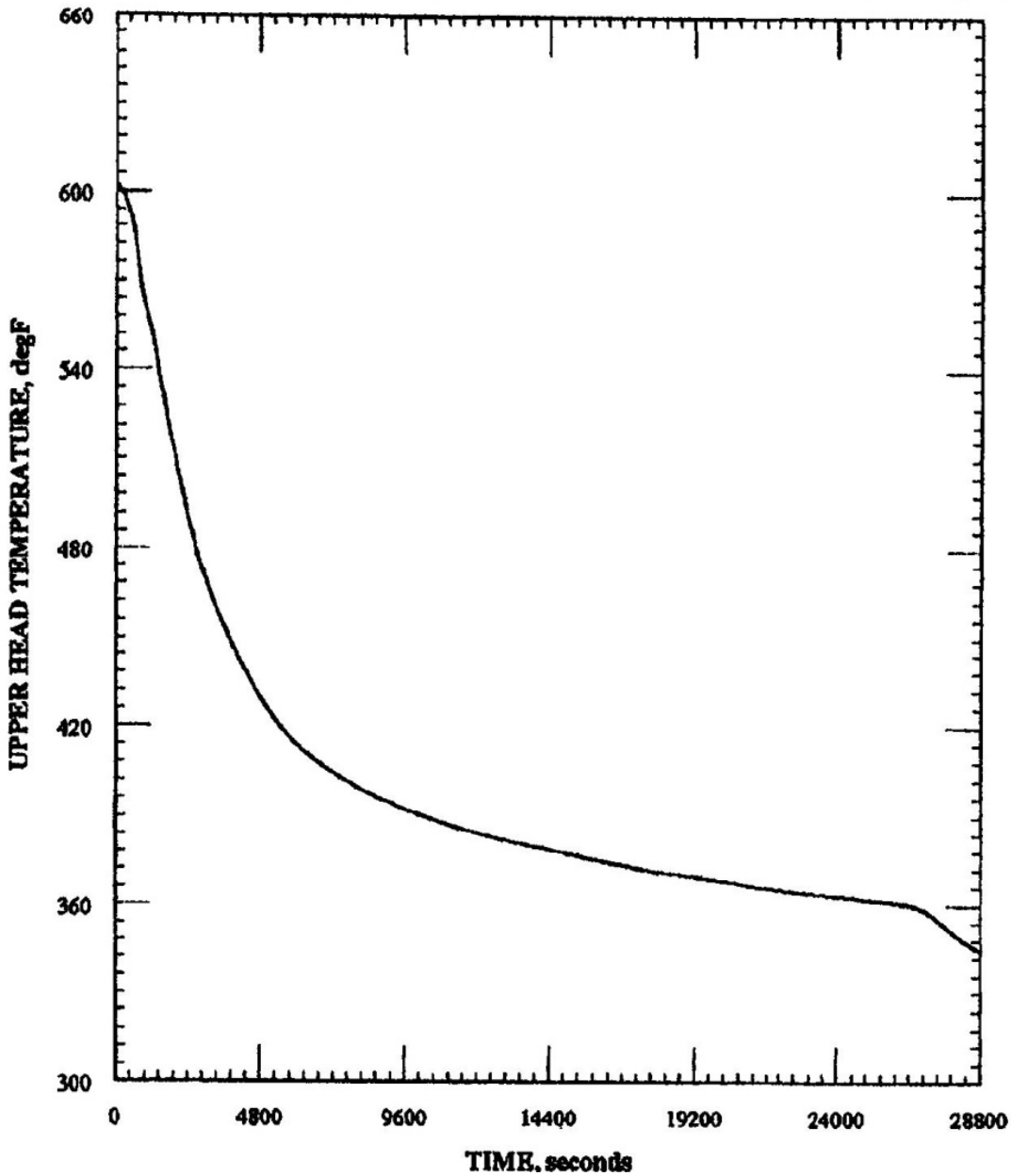


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
UPPER HEAD TEMPERATURE vs. TIME

FIGURE 15.6.3-4 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

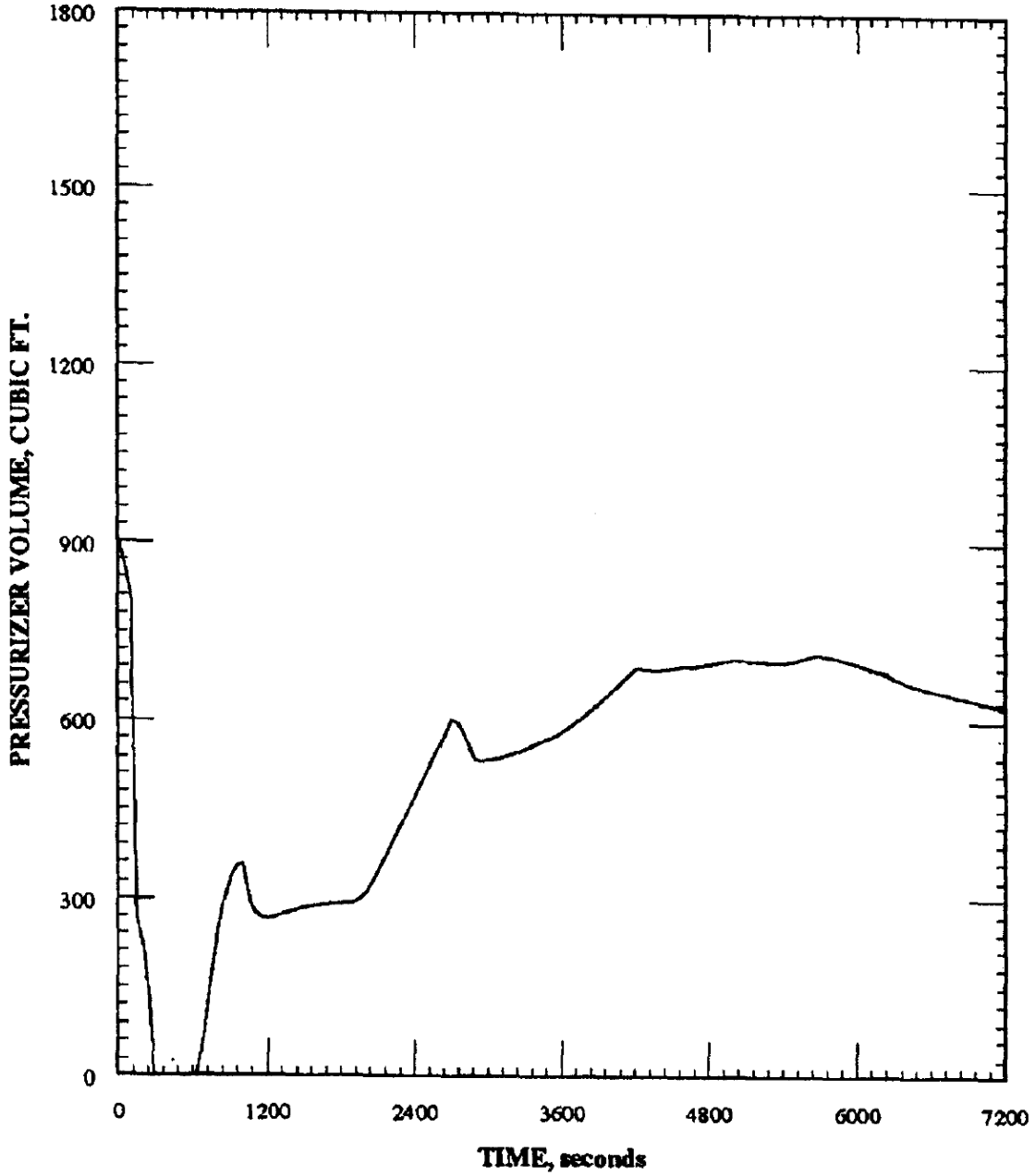


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
UPPER HEAD TEMPERATURE vs. TIME

FIGURE 15.6.3-4 (SHEET 2 OF 2)

JUNE 2017 REVISION 19



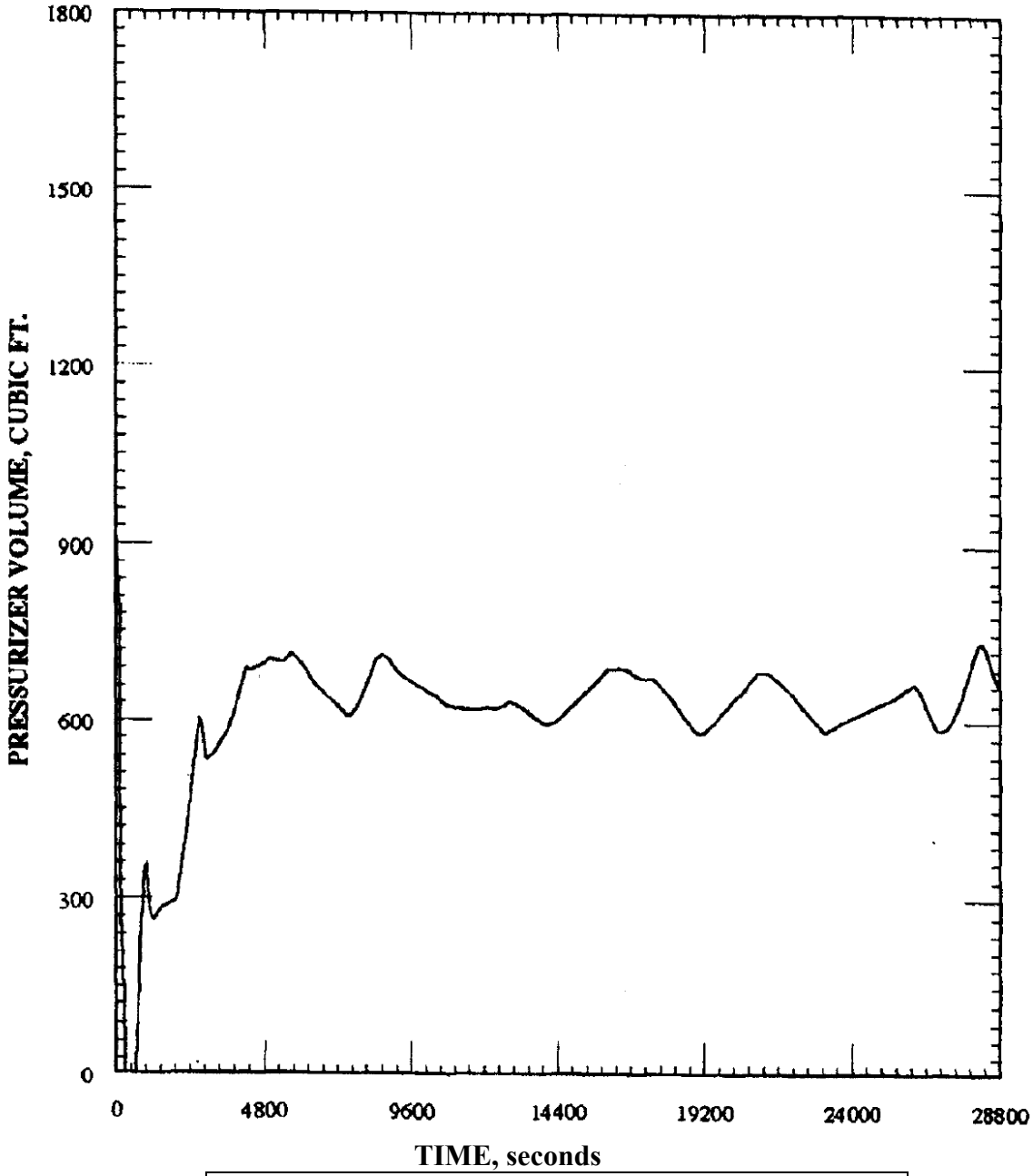
TIME, seconds

PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
PRESSURIZER LIQUID VOLUME vs. TIME

FIGURE 15.6.3-5 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

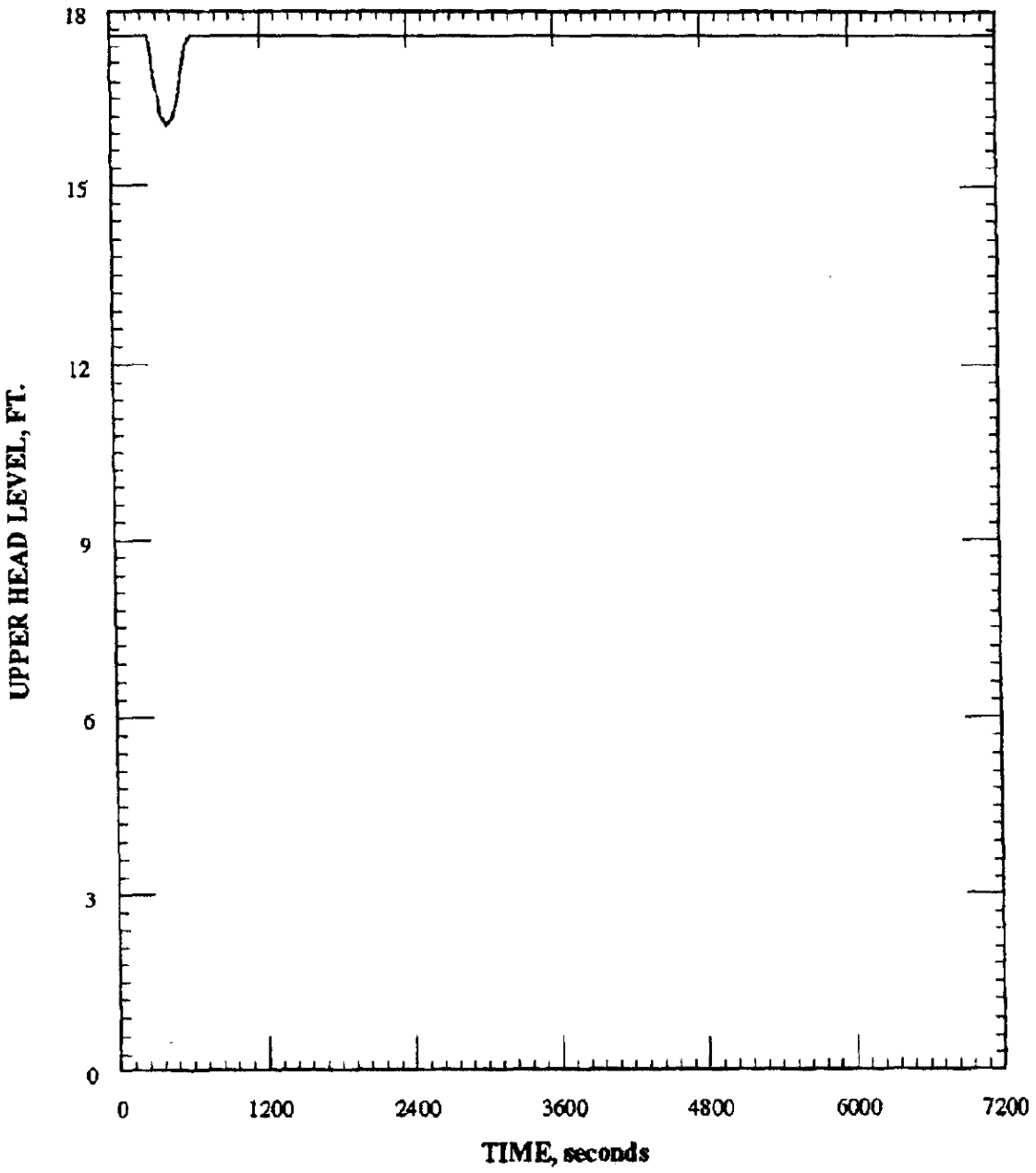


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
PRESSURIZER LIQUID VOLUME vs. TIME

FIGURE 15.6.3-5 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

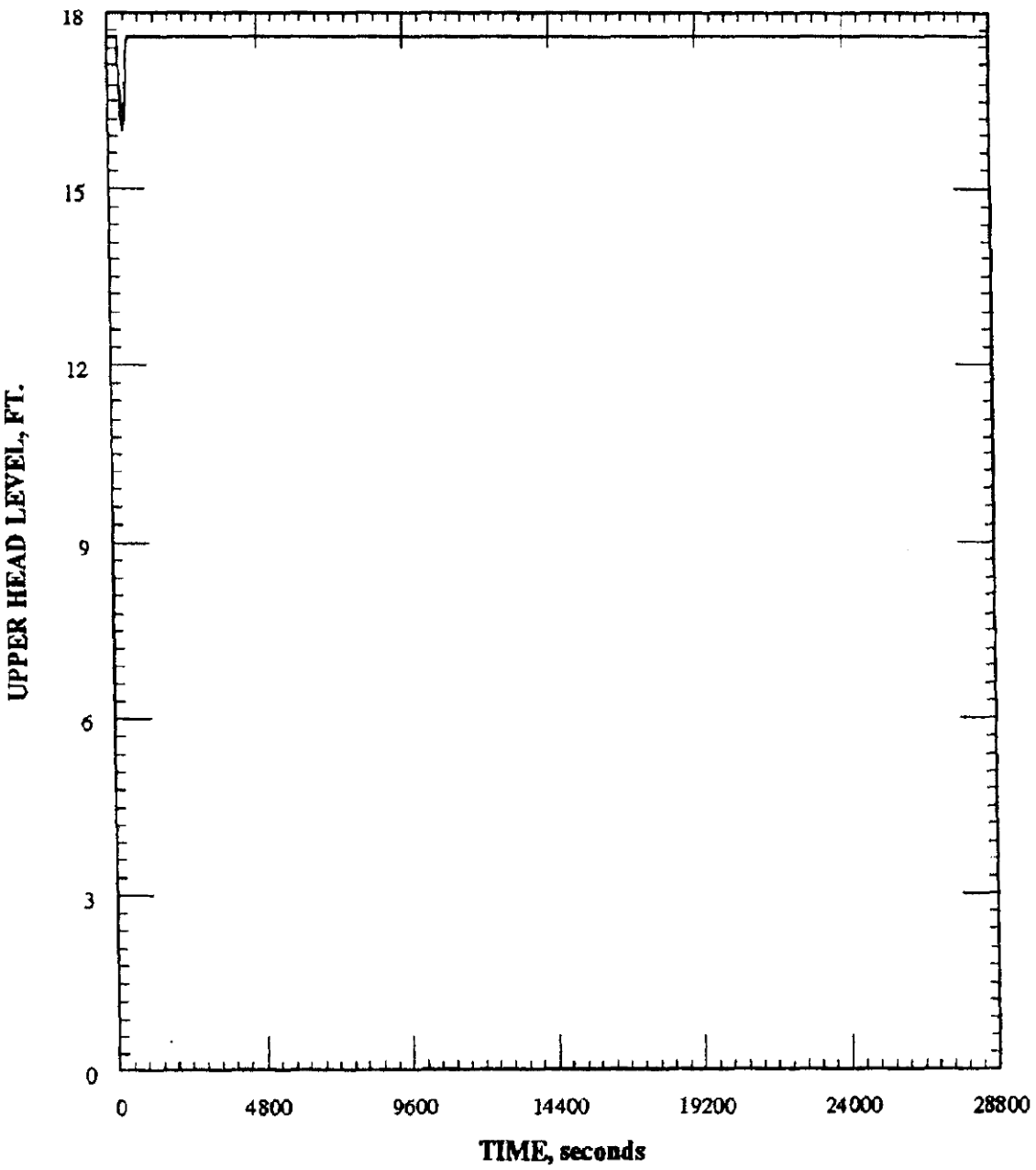


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
UPPER HEAD LEVEL vs. TIME

FIGURE 15.6.3-6 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

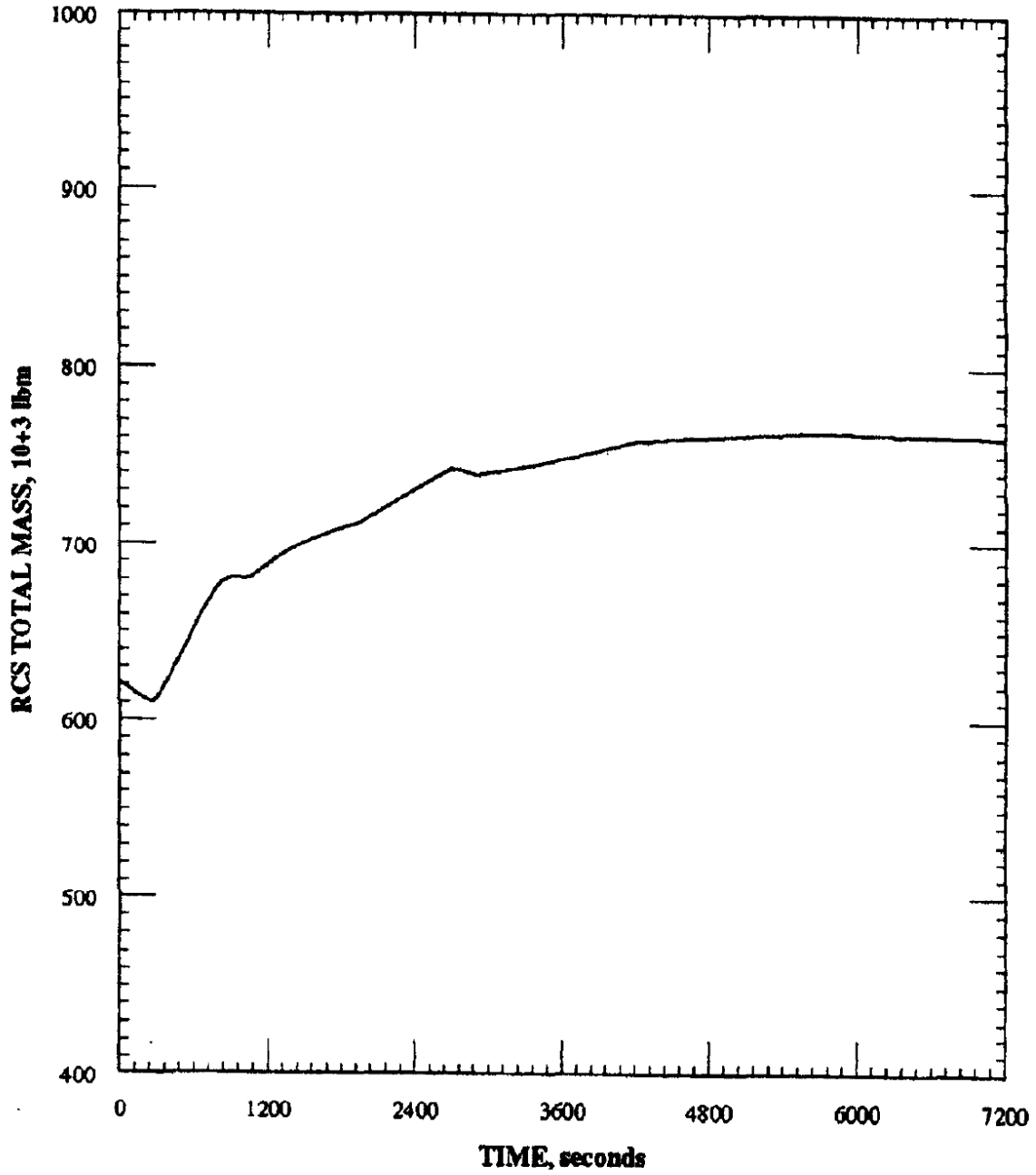


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
UPPER HEAD LEVEL vs. TIME

FIGURE 15.6.3-6 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

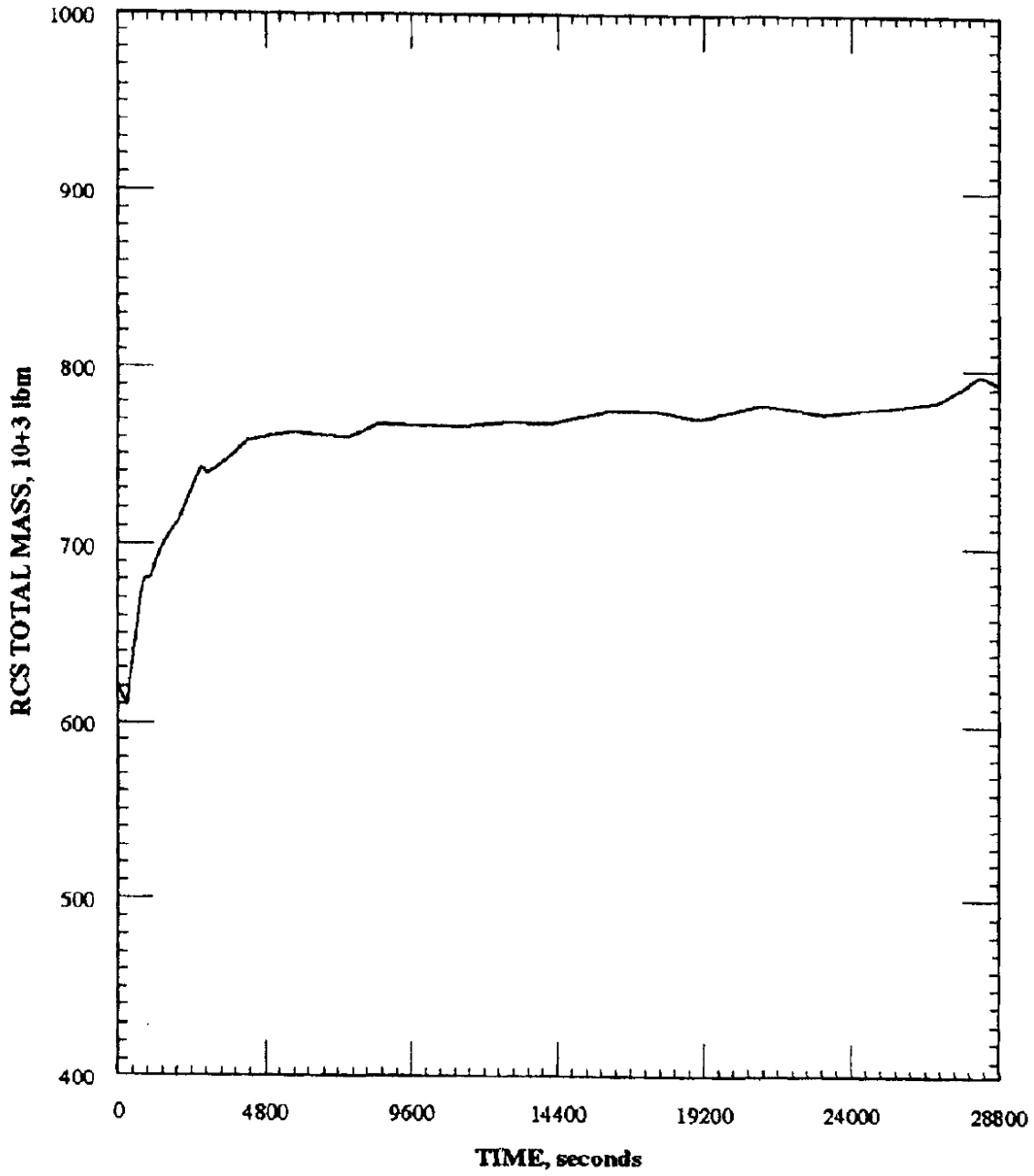


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
RCS TOTAL MASS vs. TIME

FIGURE 15.6.3-7 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

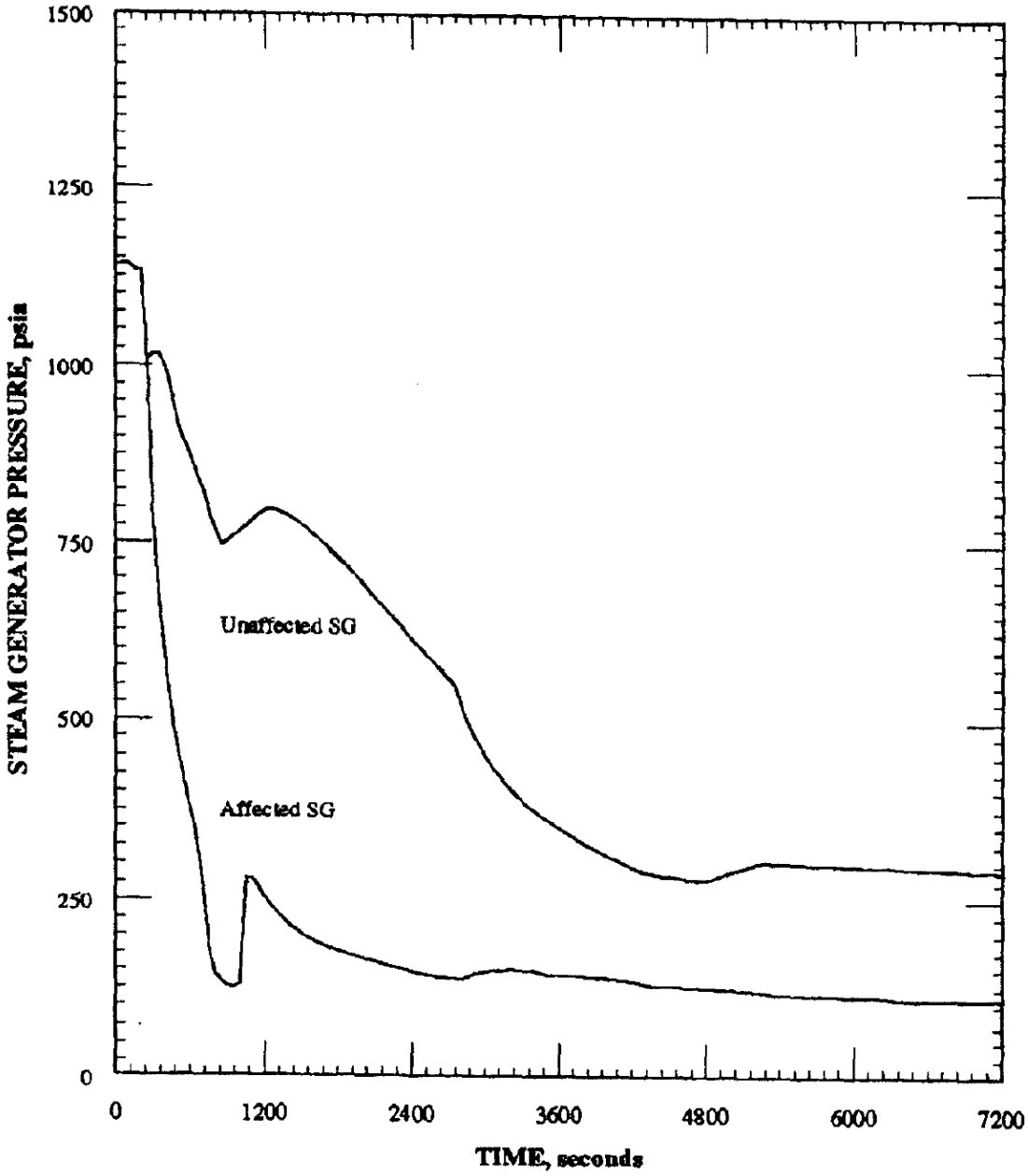


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
RCS TOTAL MASS vs. TIME

FIGURE 15.6.3-7 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

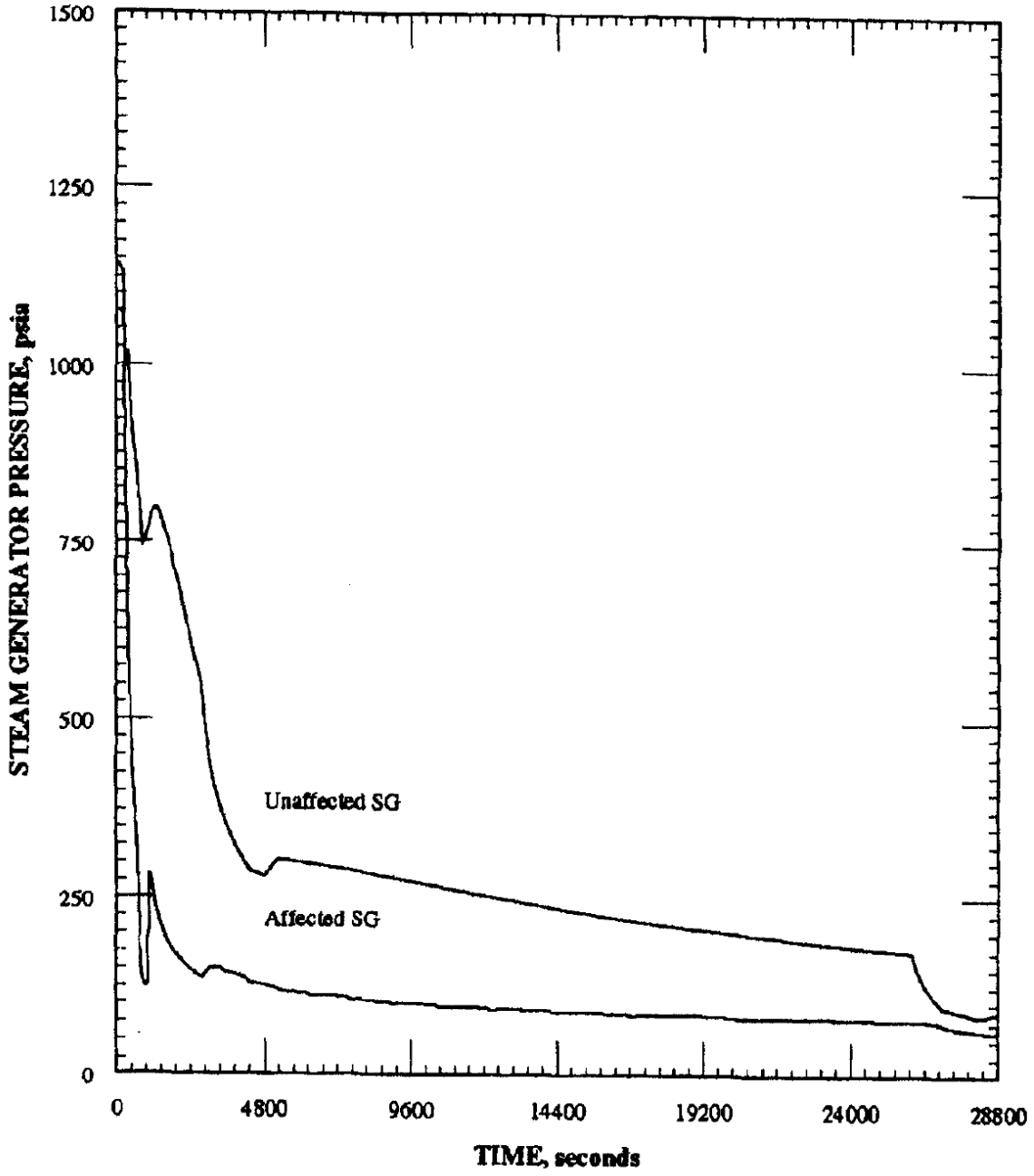


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
SG PRESSURE vs. TIME

FIGURE 15.6.3-8 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

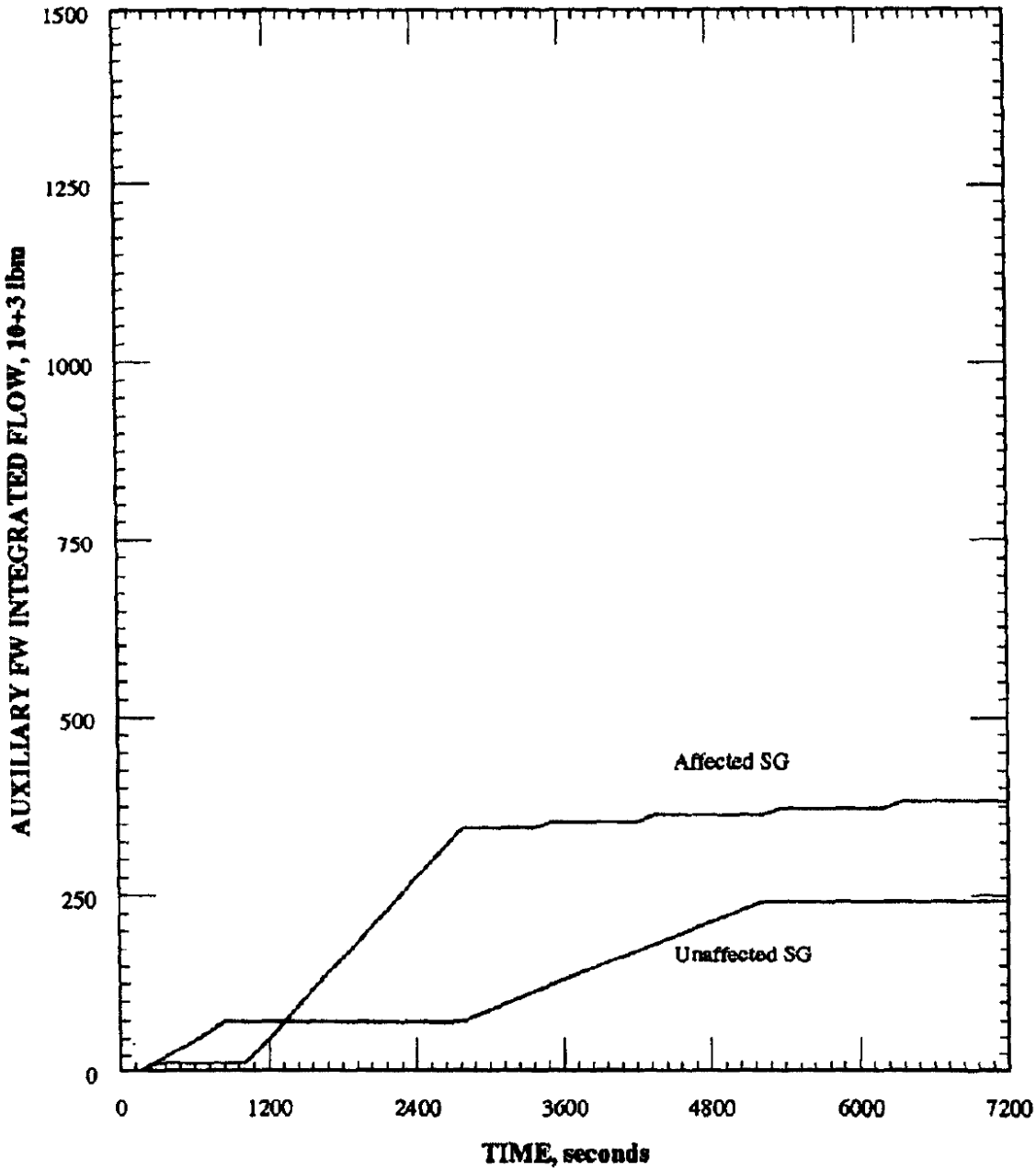


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
SG PRESSURE vs. TIME

FIGURE 15.6.3-8 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

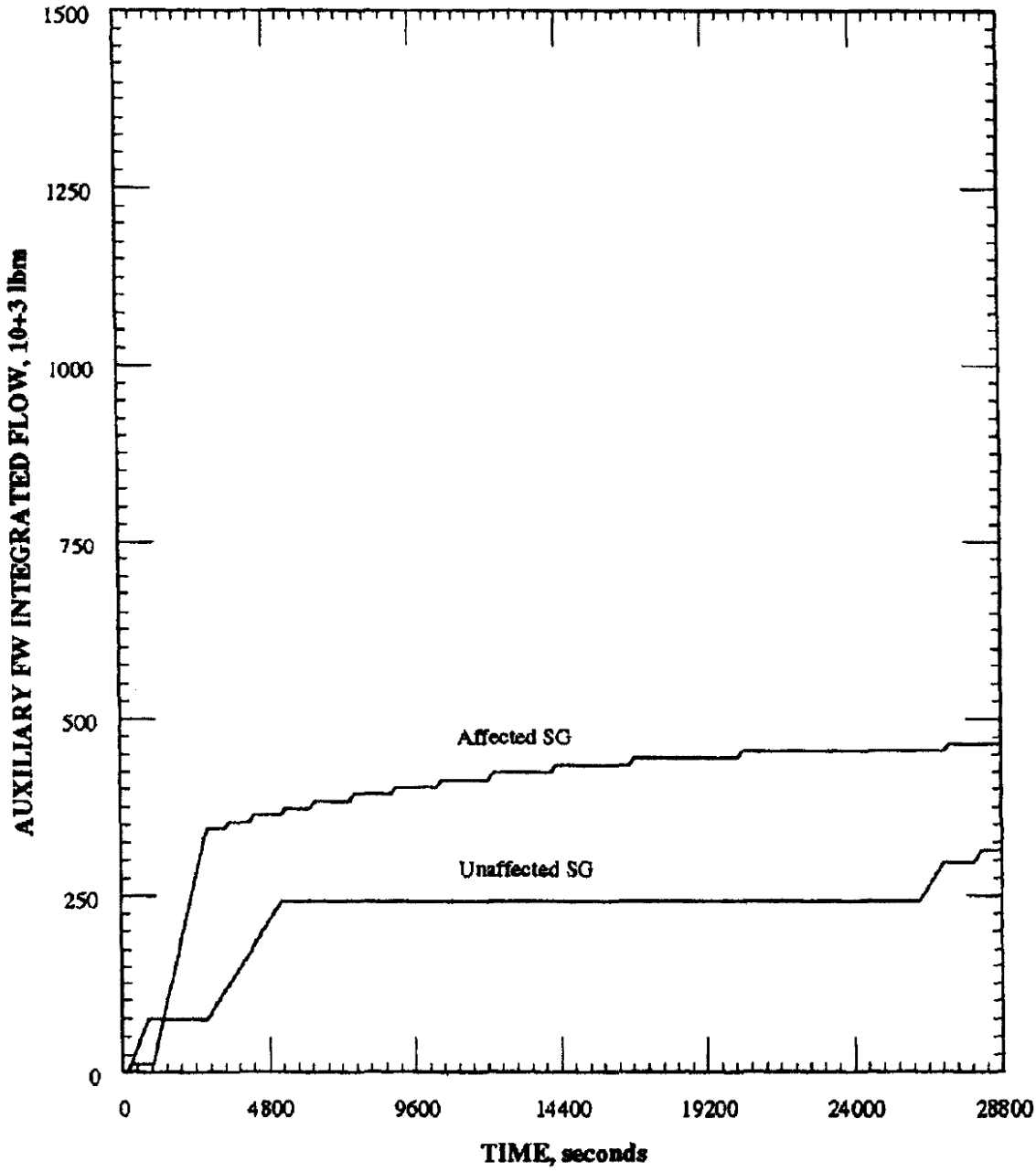


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
AFW INTEGRATED FLOW vs. TIME

FIGURE 15.6.3-9 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

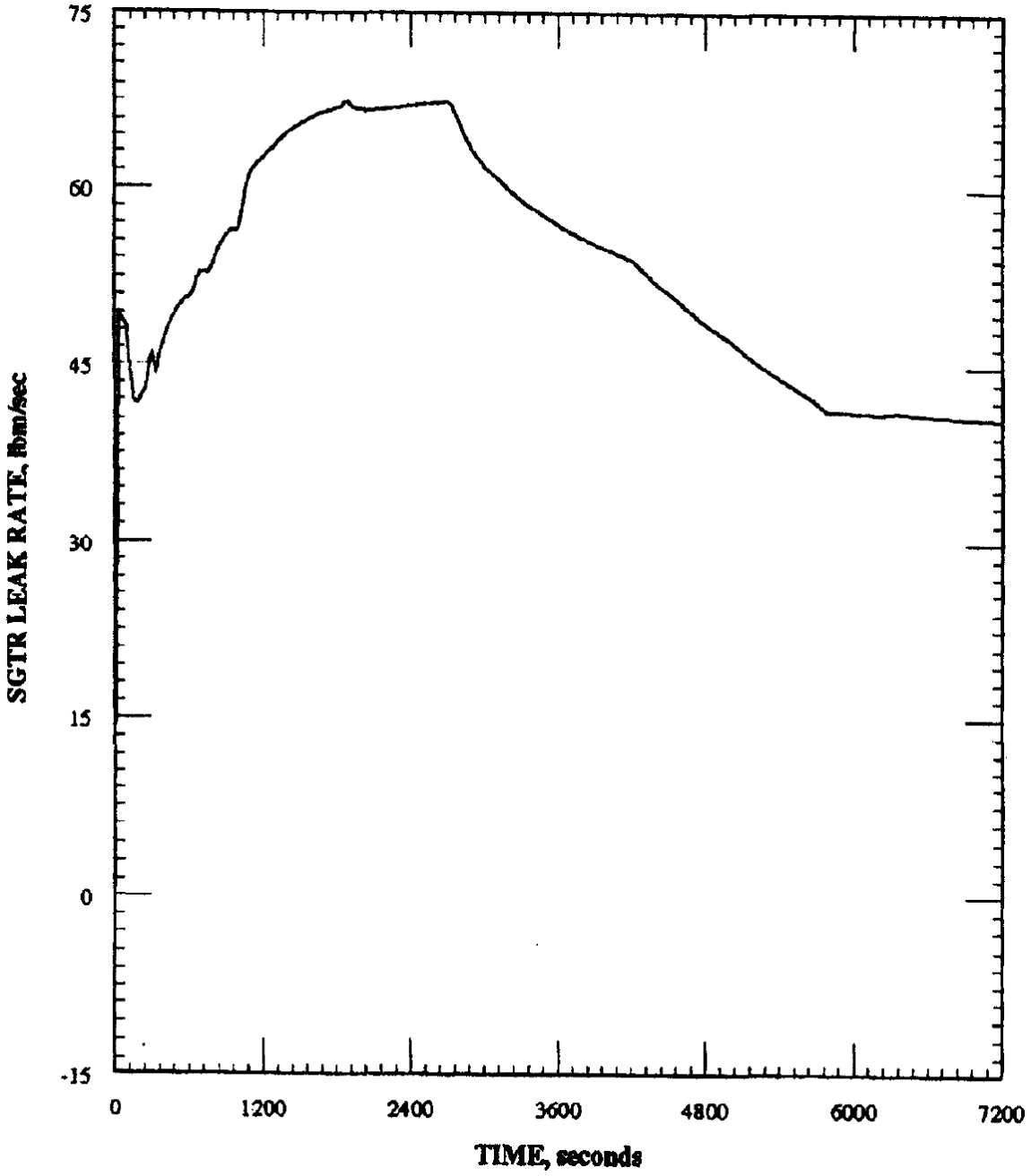


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
AFW INTEGRATED FLOW vs. TIME

FIGURE 15.6.3-9 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

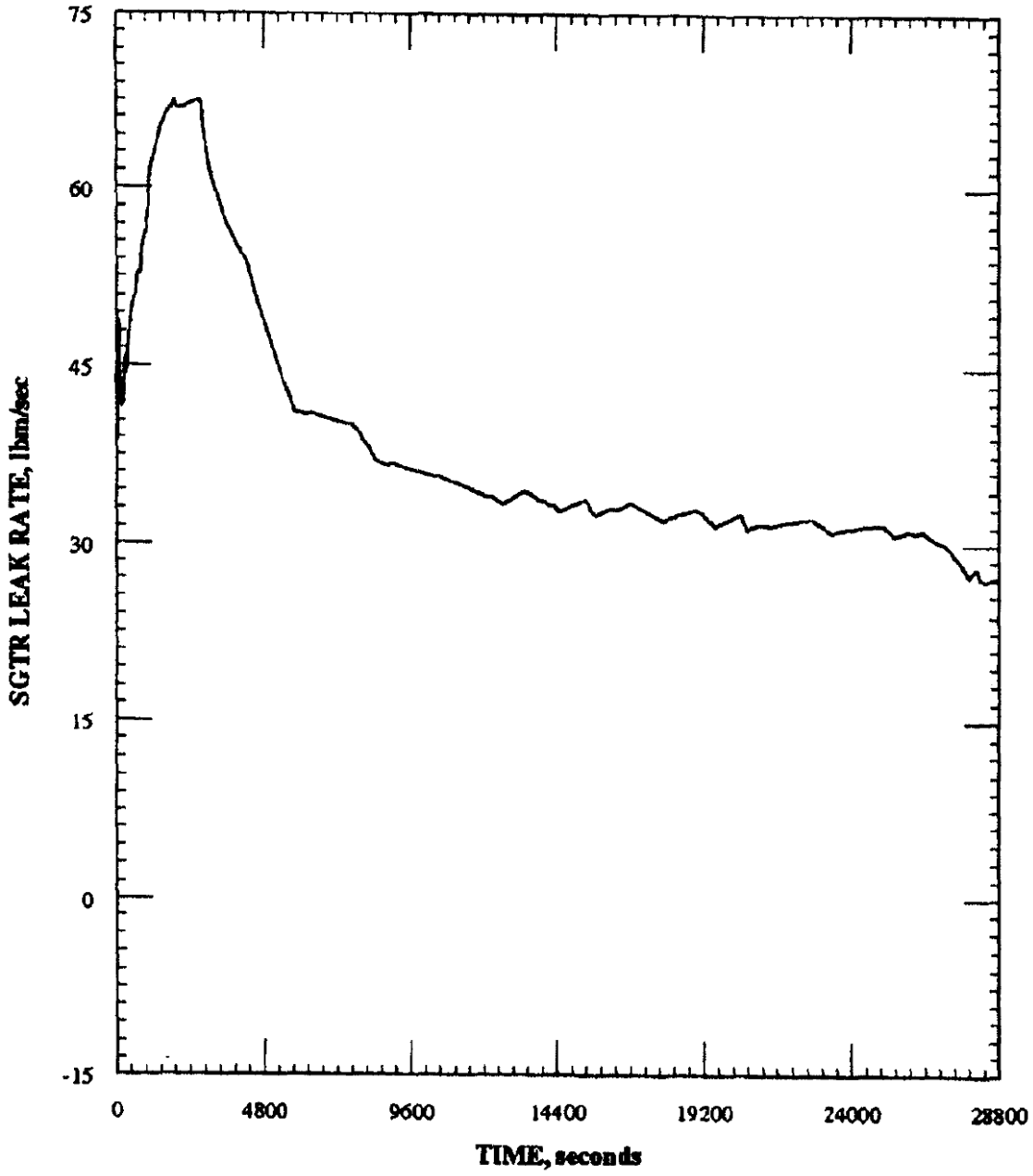


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
TUBE LEAK RATE vs. TIME

FIGURE 15.6.3-10 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

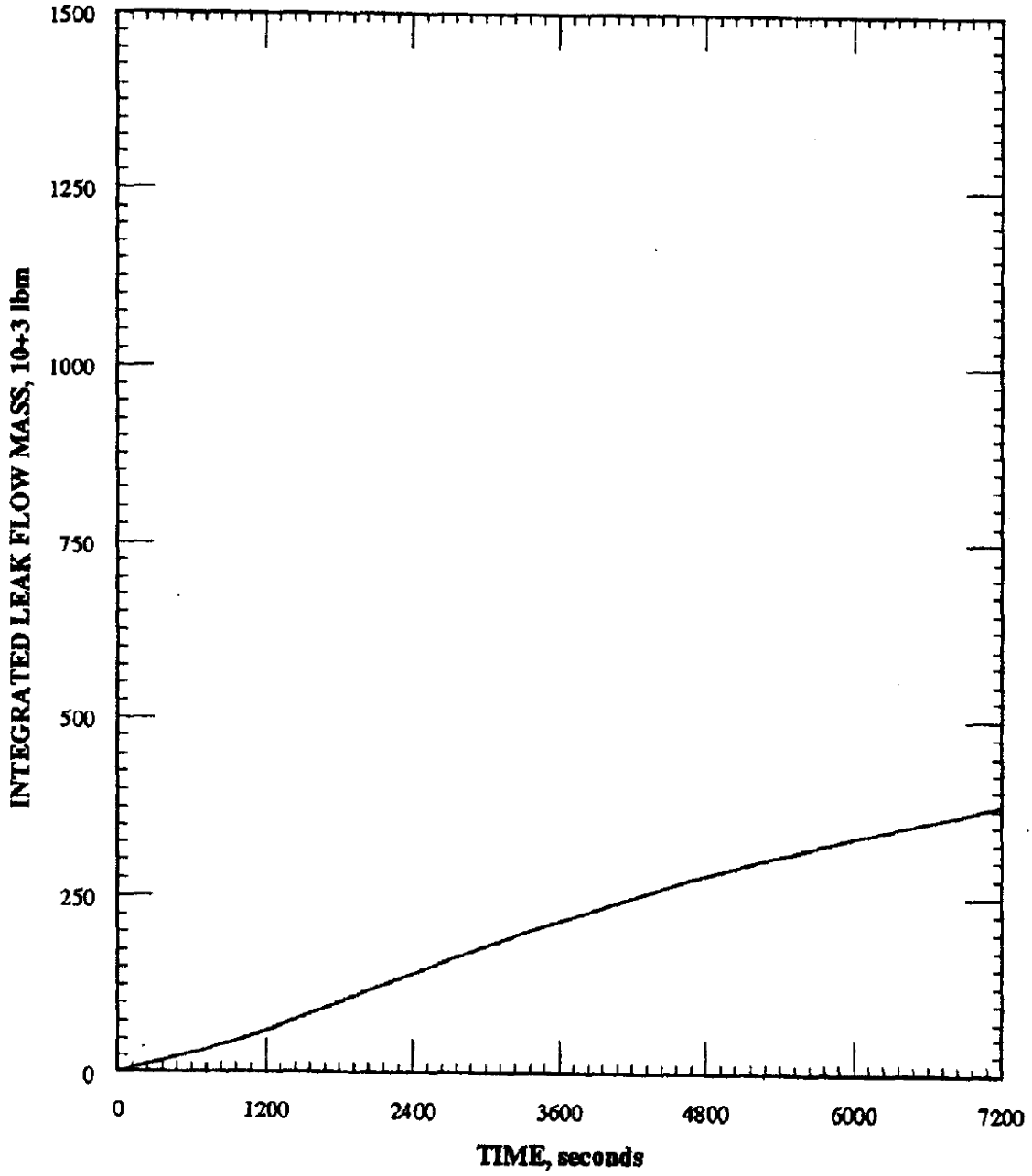


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
TUBE LEAK RATE vs. TIME

FIGURE 15.6.3-10 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

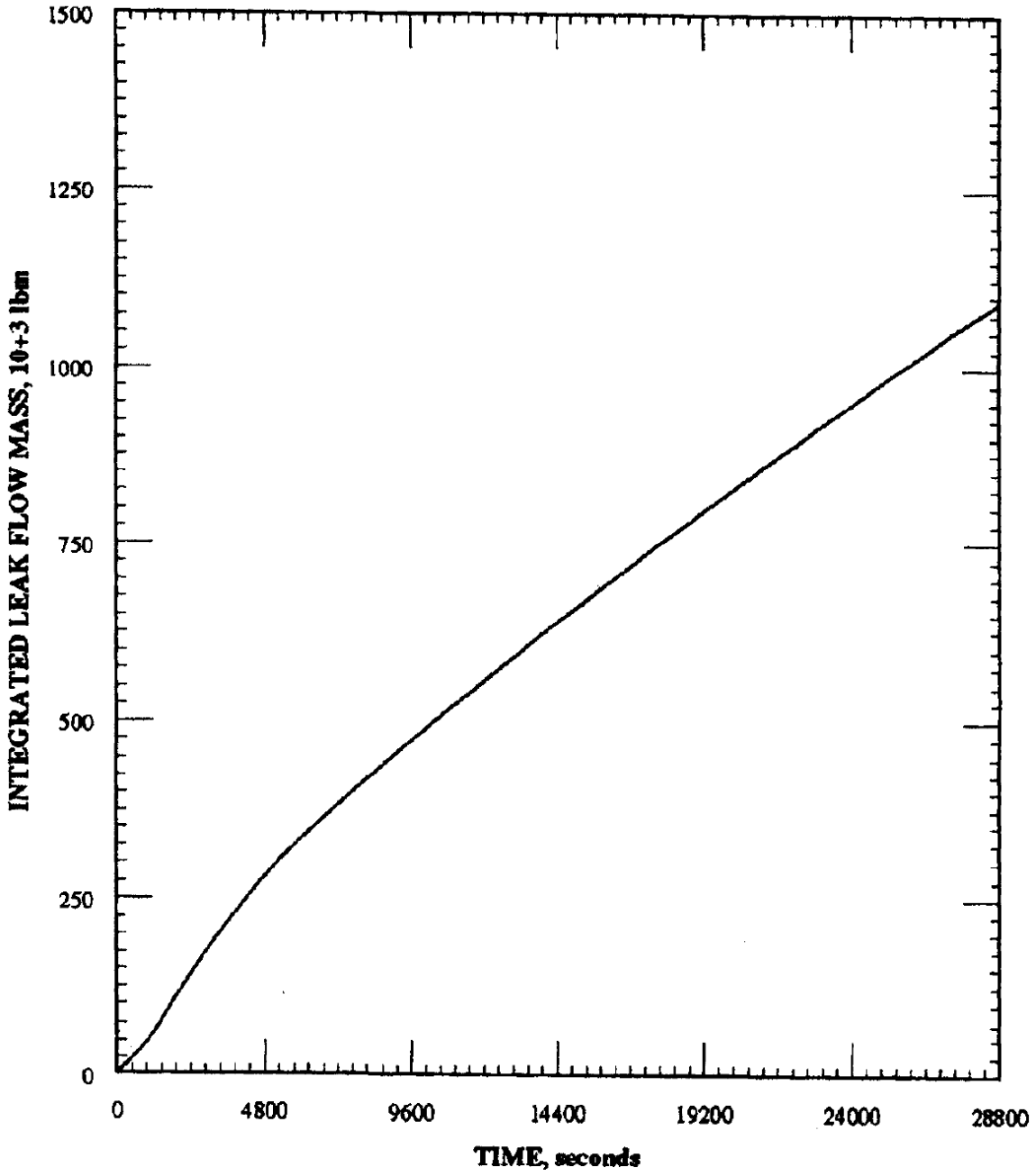


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
INTEGRATED TUBE LEAK FLOW vs. TIME

FIGURE 15.6.3-11 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

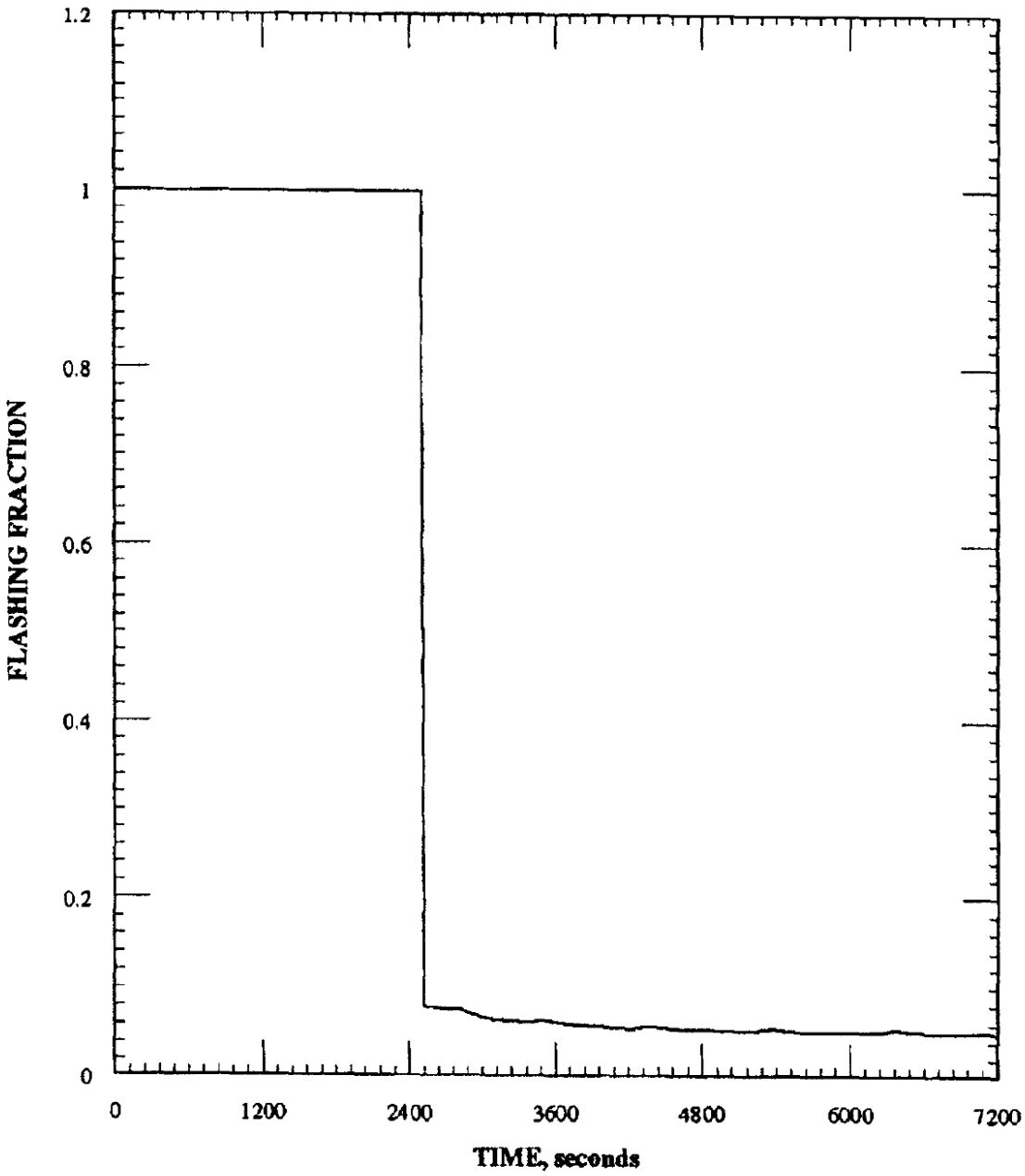


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
INTEGRATED TUBE LEAK FLOW vs. TIME

FIGURE 15.6.3-11 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

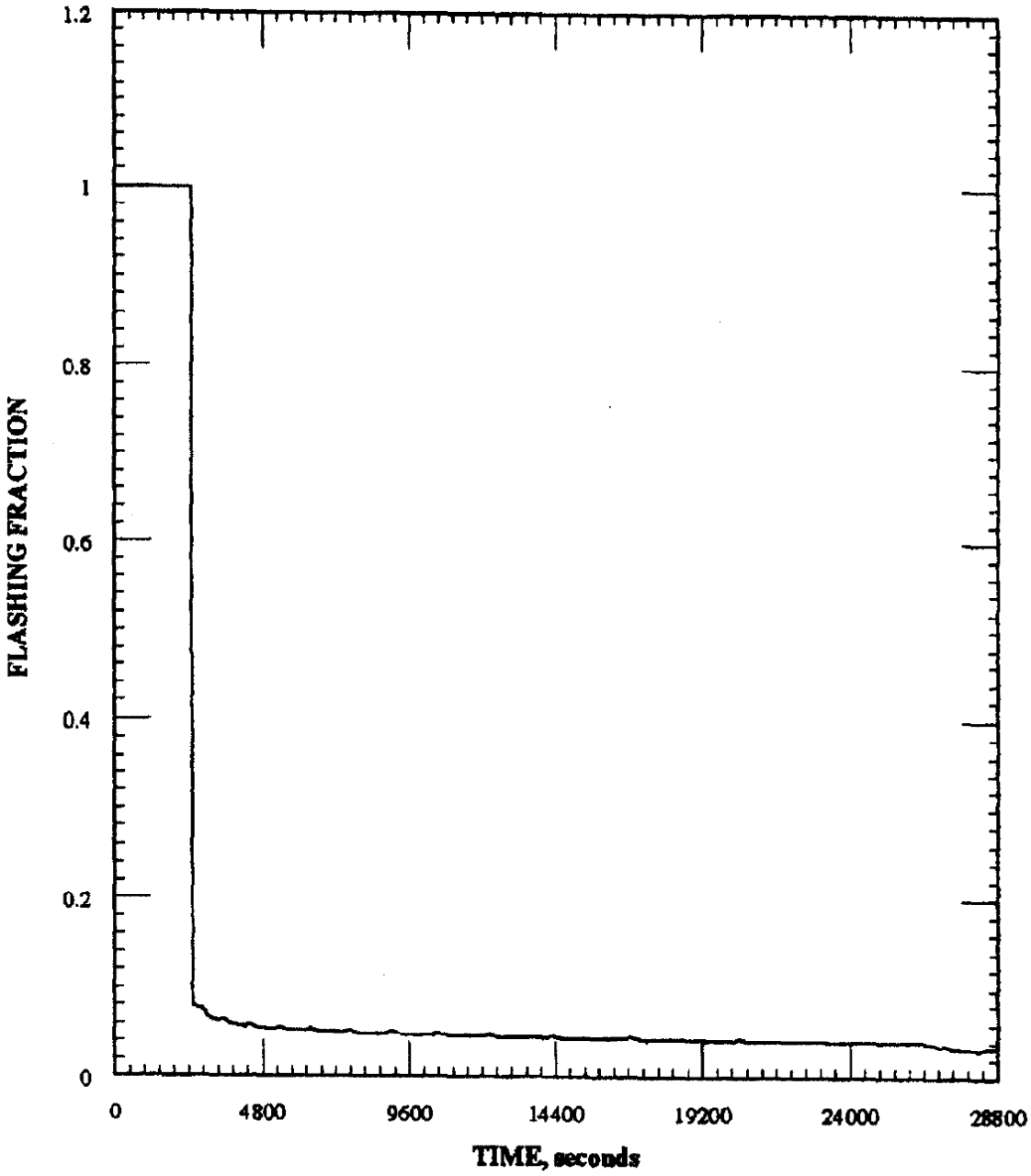


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
RUPTURED TUBE LEAK FLASHING FRACTION vs. TIME

FIGURE 15.6.3-12 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

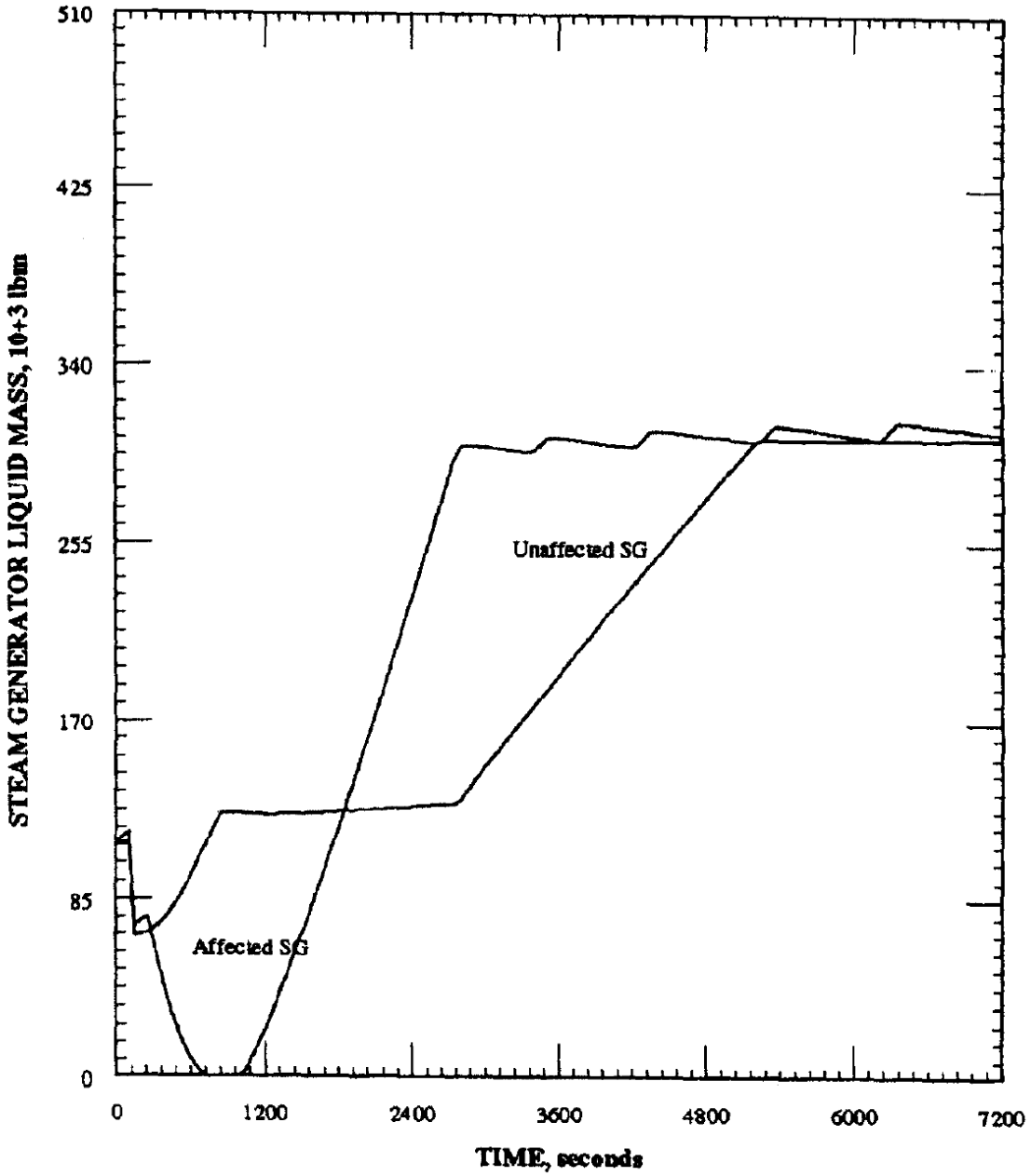


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
RUPTURED TUBE LEAK FLASHING FRACTION vs. TIME

FIGURE 15.6.3-12 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

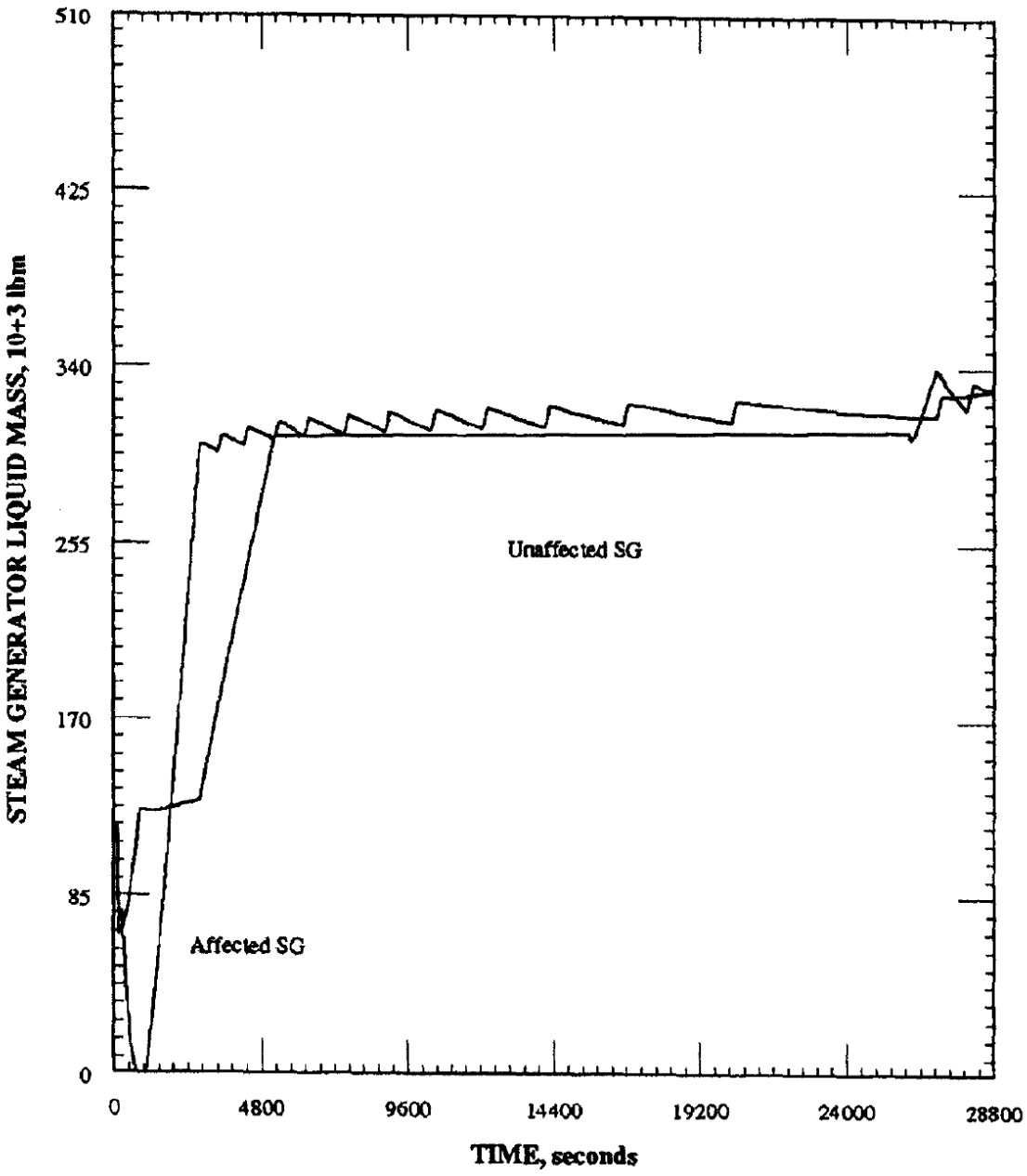


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
SG LIQUID INVENTORY vs. TIME

FIGURE 15.6.3-13 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

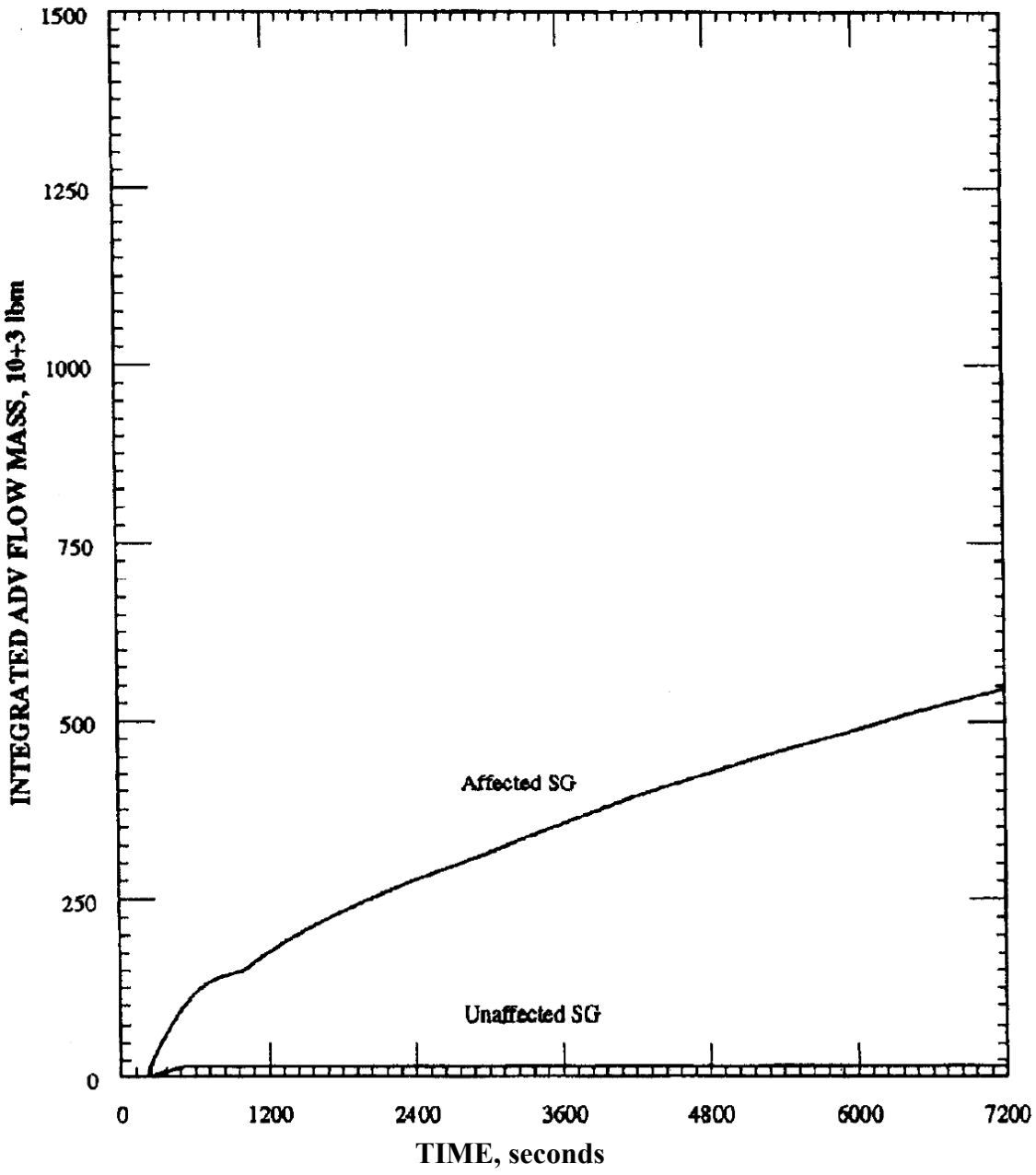


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
SG LIQUID INVENTORY vs. TIME

FIGURE 15.6.3-13 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

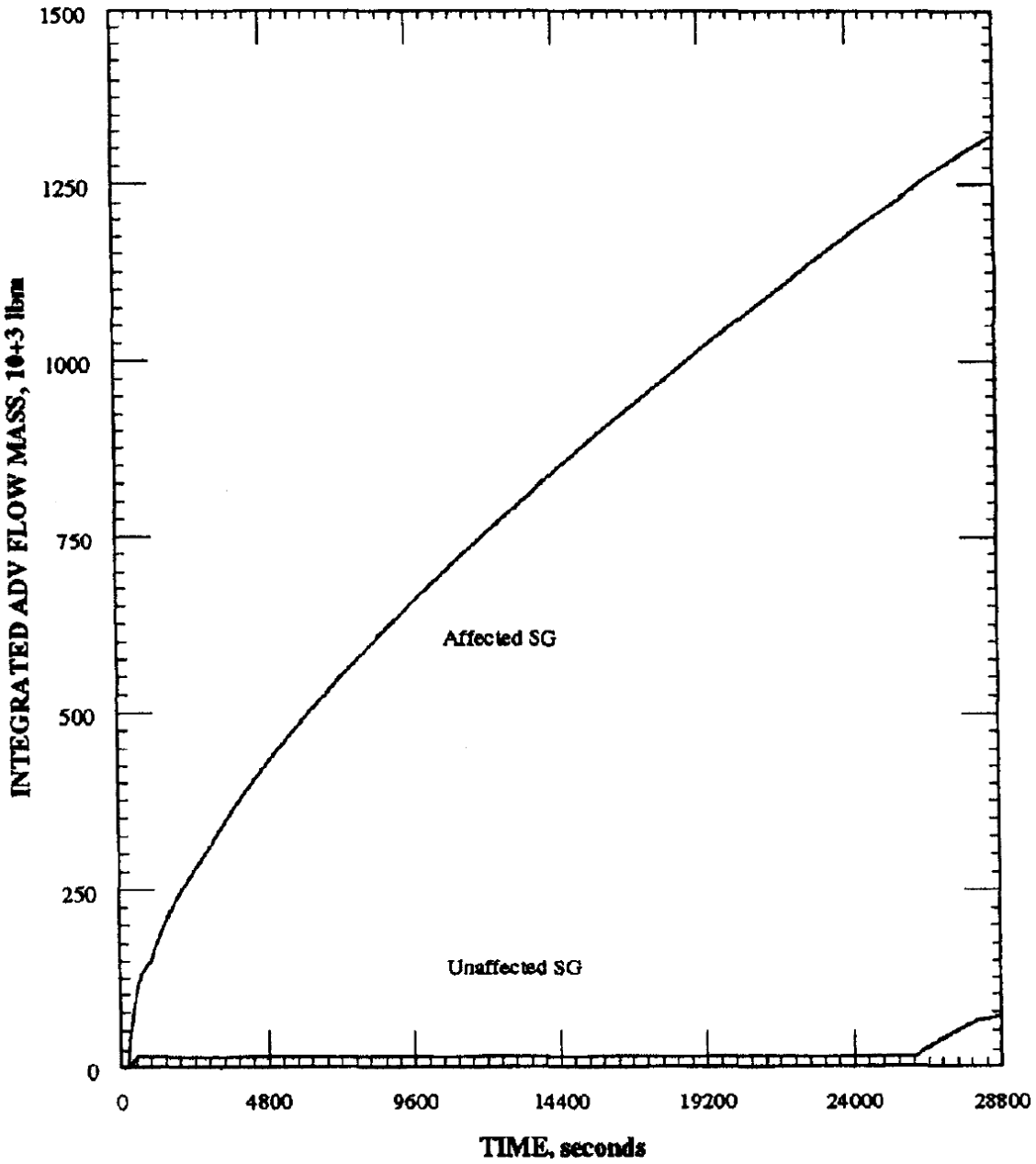


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
INTEGRATED ADV FLOW vs. TIME

FIGURE 15.6.3-14 (SHEET 1 OF 2)

JUNE 2011 REVISION 16

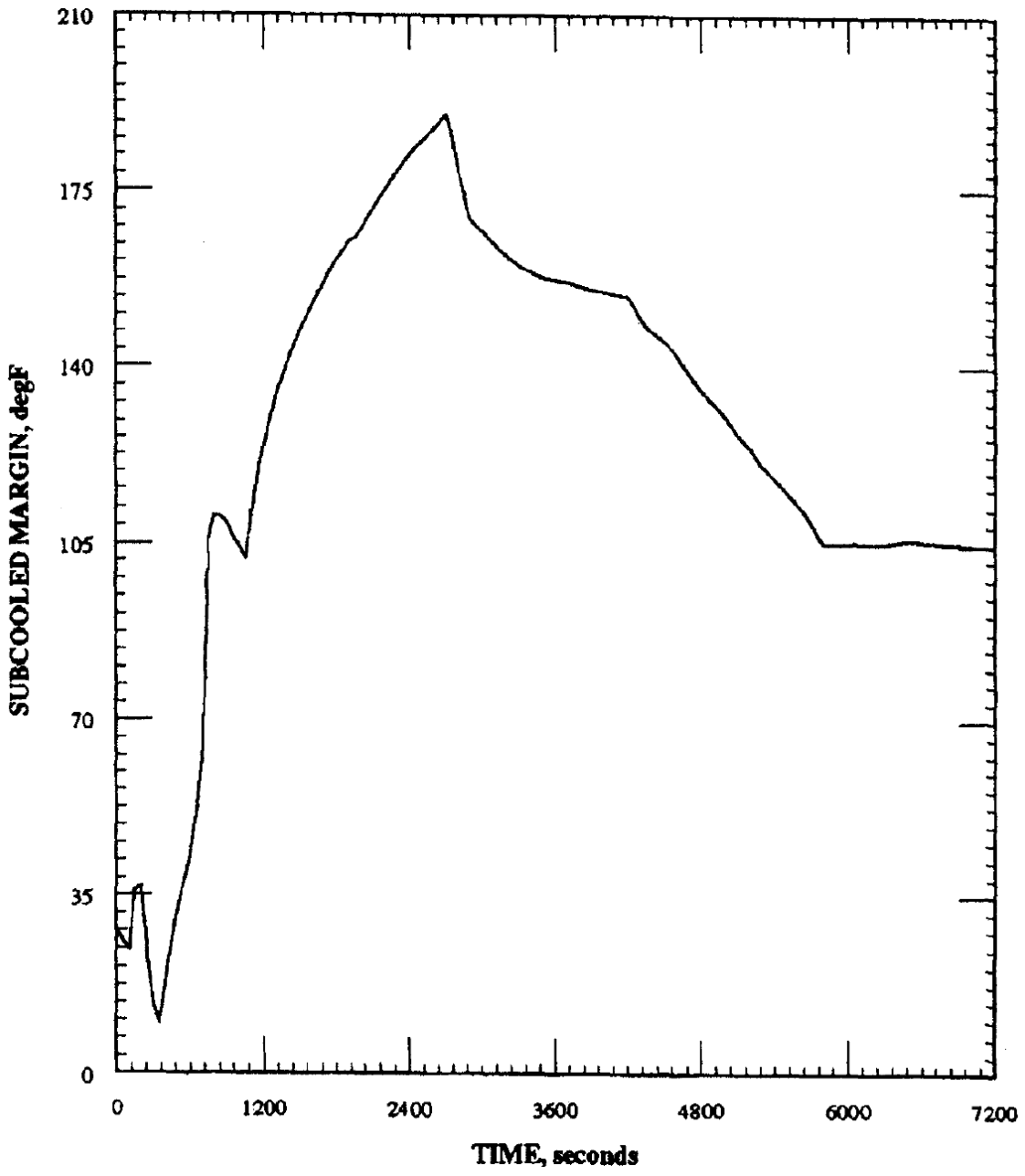


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
INTEGRATED ADV FLOW vs. TIME

FIGURE 15.6.3-14 (SHEET 2 OF 2)

JUNE 2011 REVISION 16

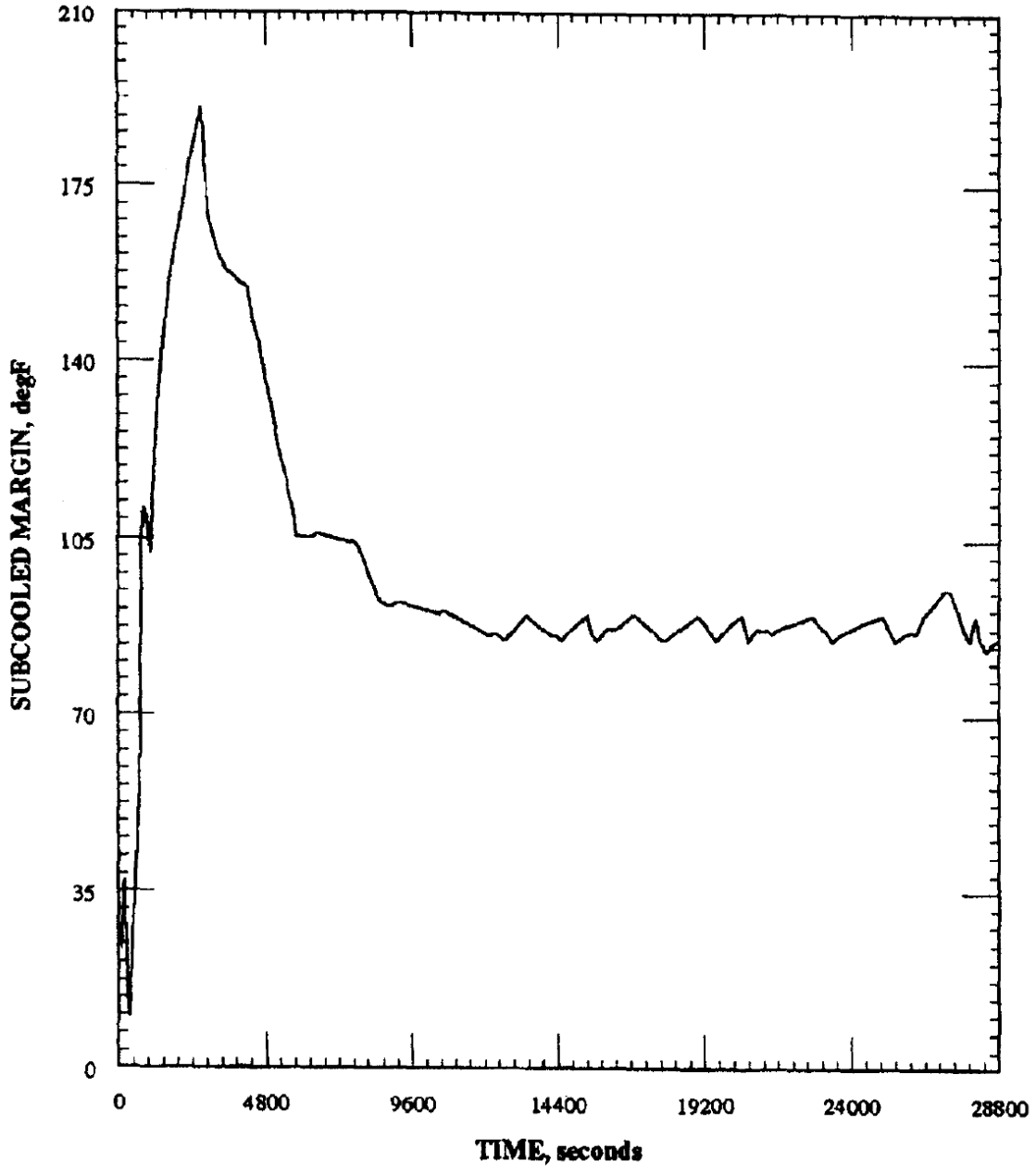


PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
SUBCOOLED MARGIN vs. TIME

FIGURE 15.6.3-15 (SHEET 1 OF 2)

JUNE 2011 REVISION 16



PALO VERDE NUCLEAR GENERATING STATION
UPDATED UFSAR

SGTRLOP WITH SINGLE FAILURE EVENT
SUBCOOLED MARGIN vs. TIME

FIGURE 15.6.3-15 (SHEET 2 OF 2)

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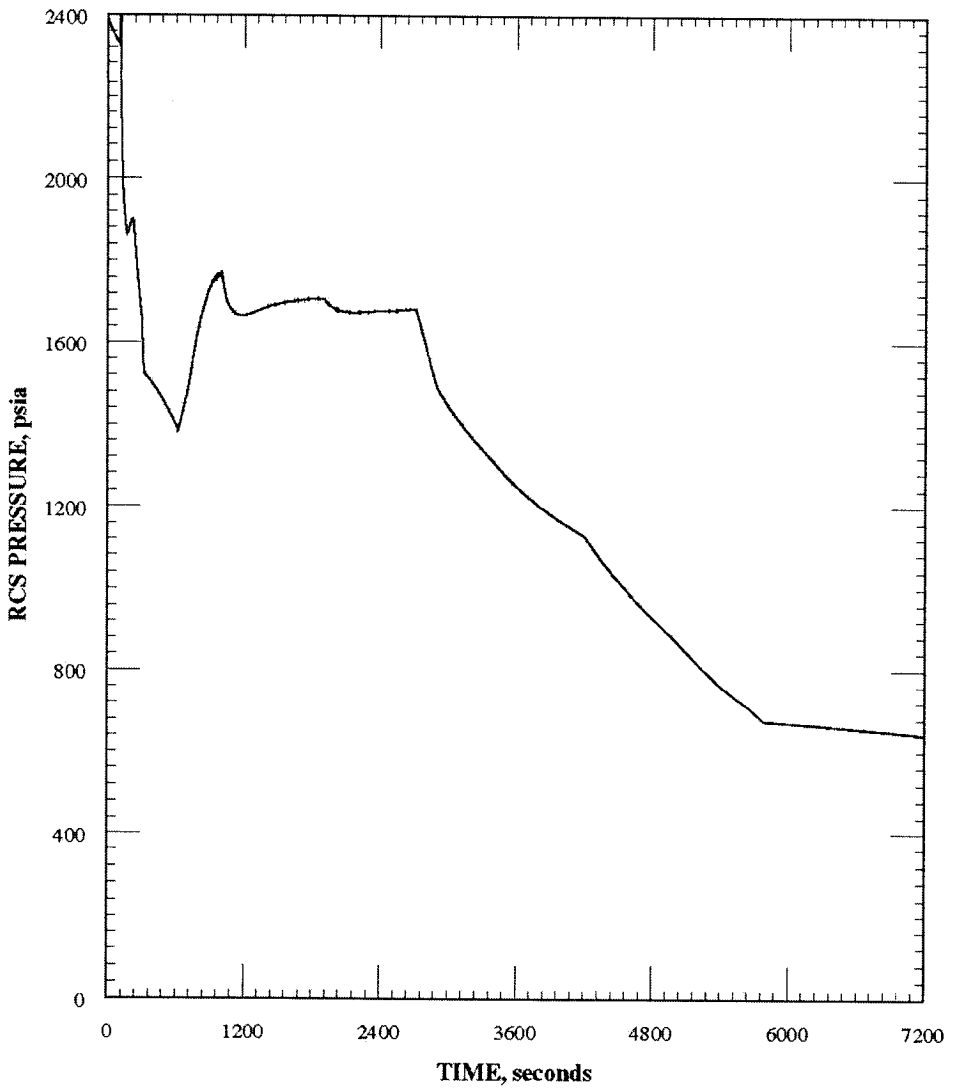
FIGURE 15.6.3-16 - DELETED

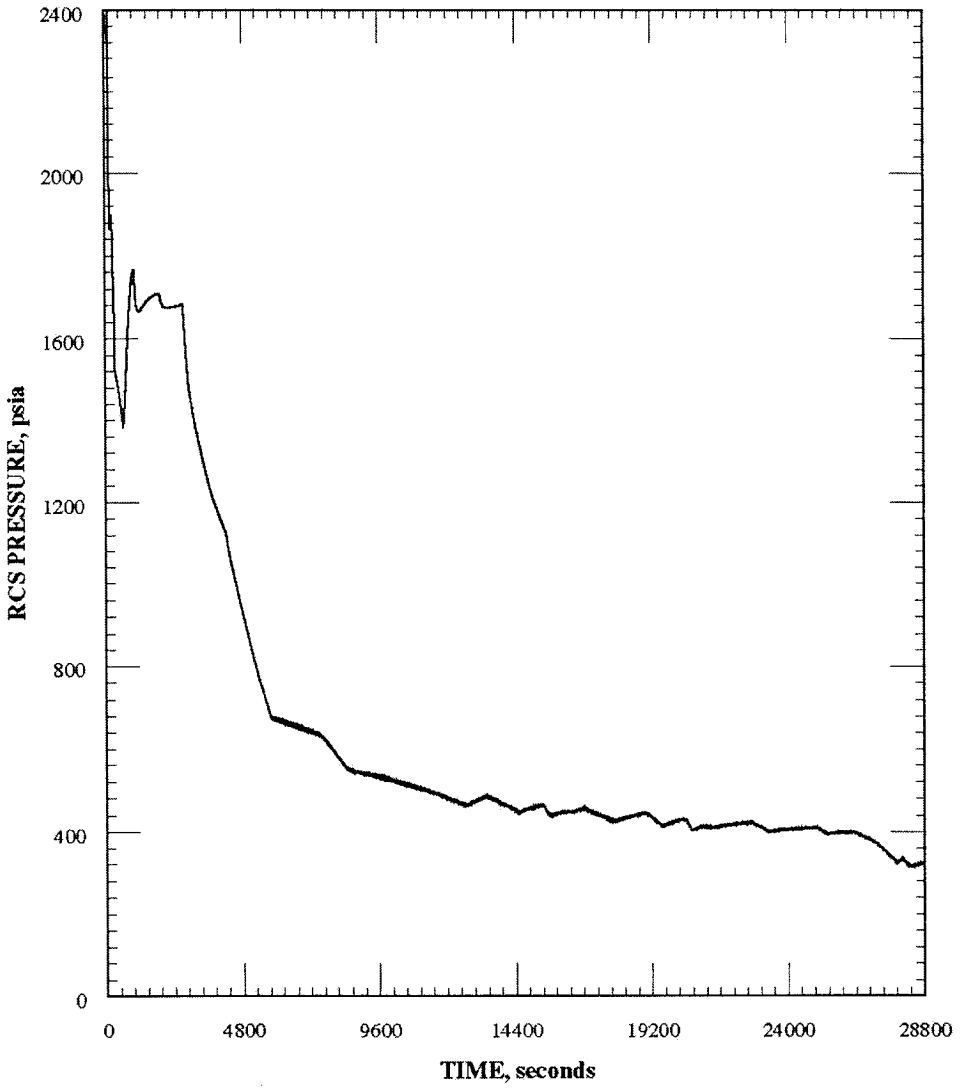


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
RCS PRESSURE vs. TIME

FIGURE 15.6.3-17 (SHEET 1 OF 2)

JUNE 2005 REVISION 13

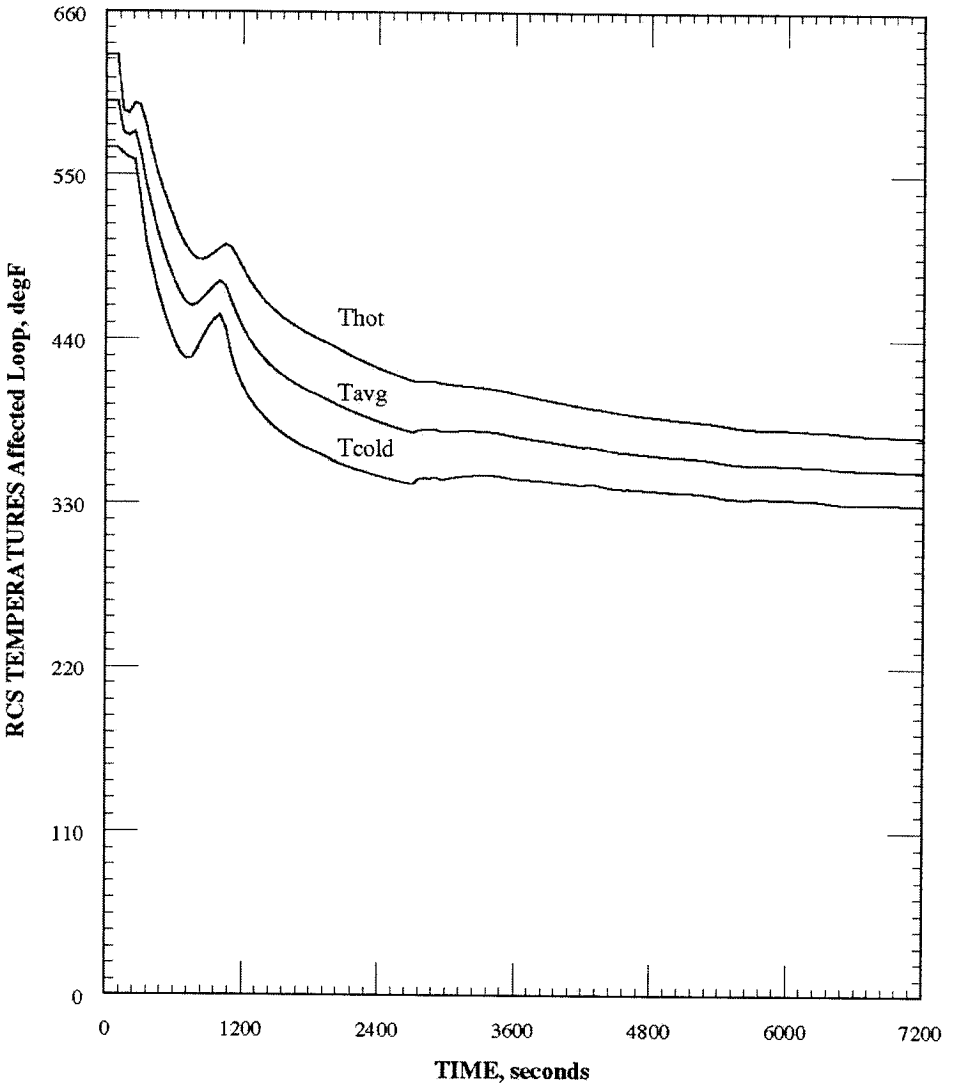


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
RCS PRESSUR vs. TIME

FIGURE 15.6.3-17 (SHEET 2 OF 2)

JUNE 2005 REVISION 13

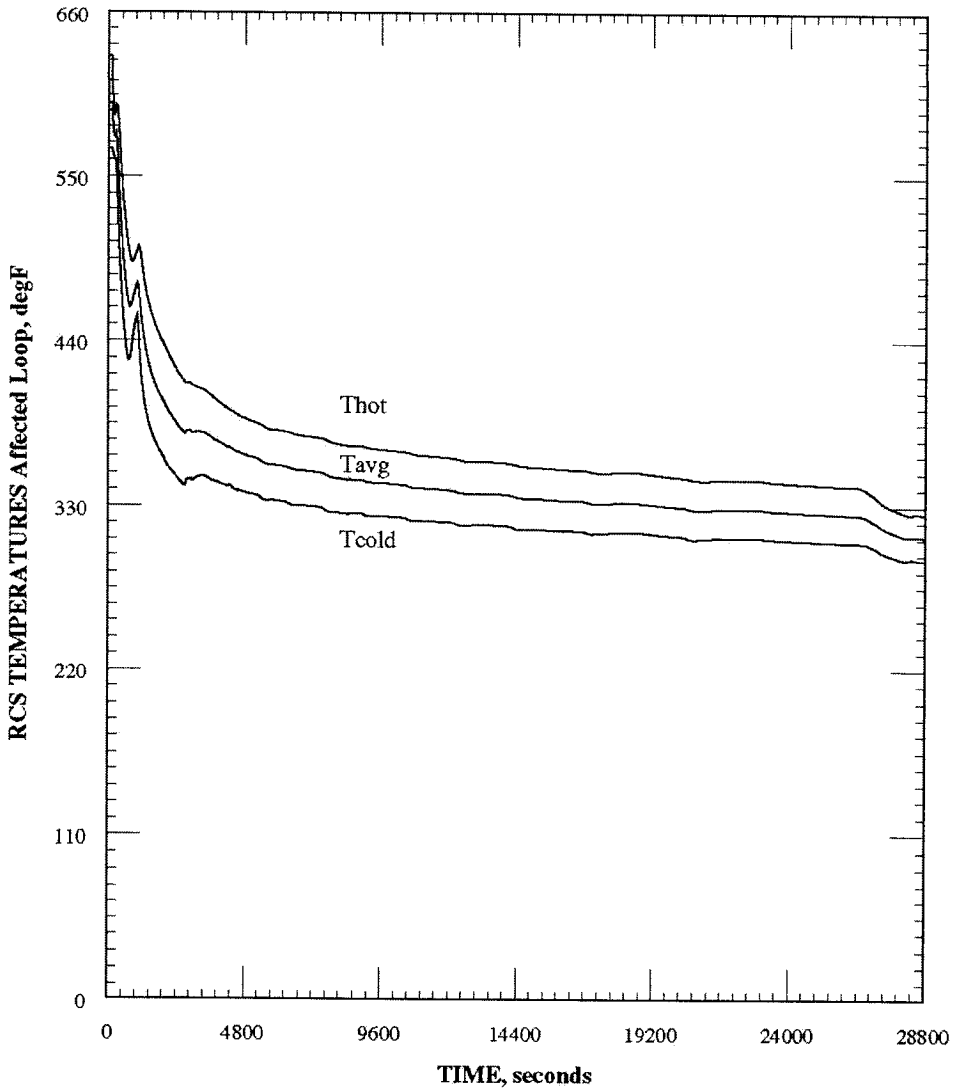


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
RCS TEMPERATURES AFFECTED LOOP vs. TIME

FIGURE 15.6.3-18 (Sheet 1 of 2)

JUNE 2005 REVISION 13

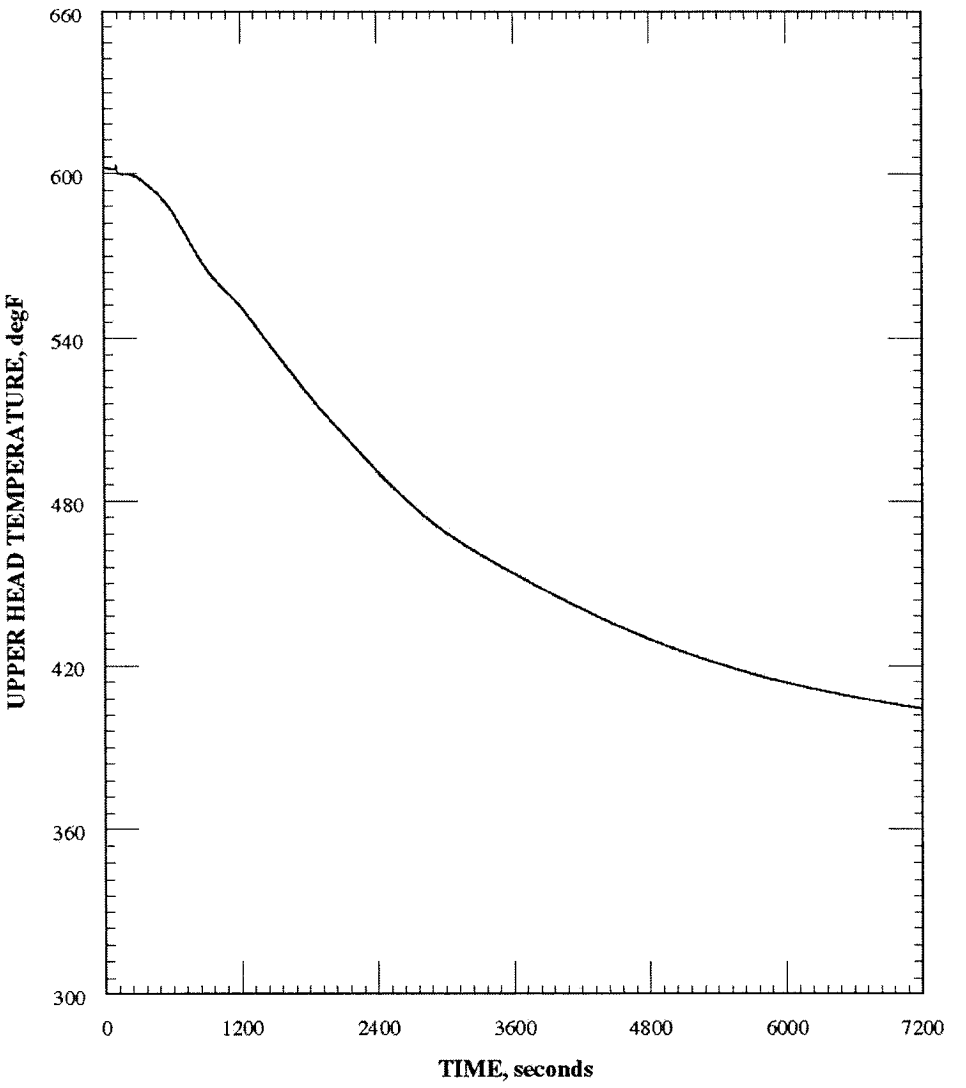


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
RCS TEMPERATURES AFFECTED LOOP vs. TIME

FIGURE 15.6.3-18 (Sheet 2 of 2)

JUNE 2005 REVISION 13

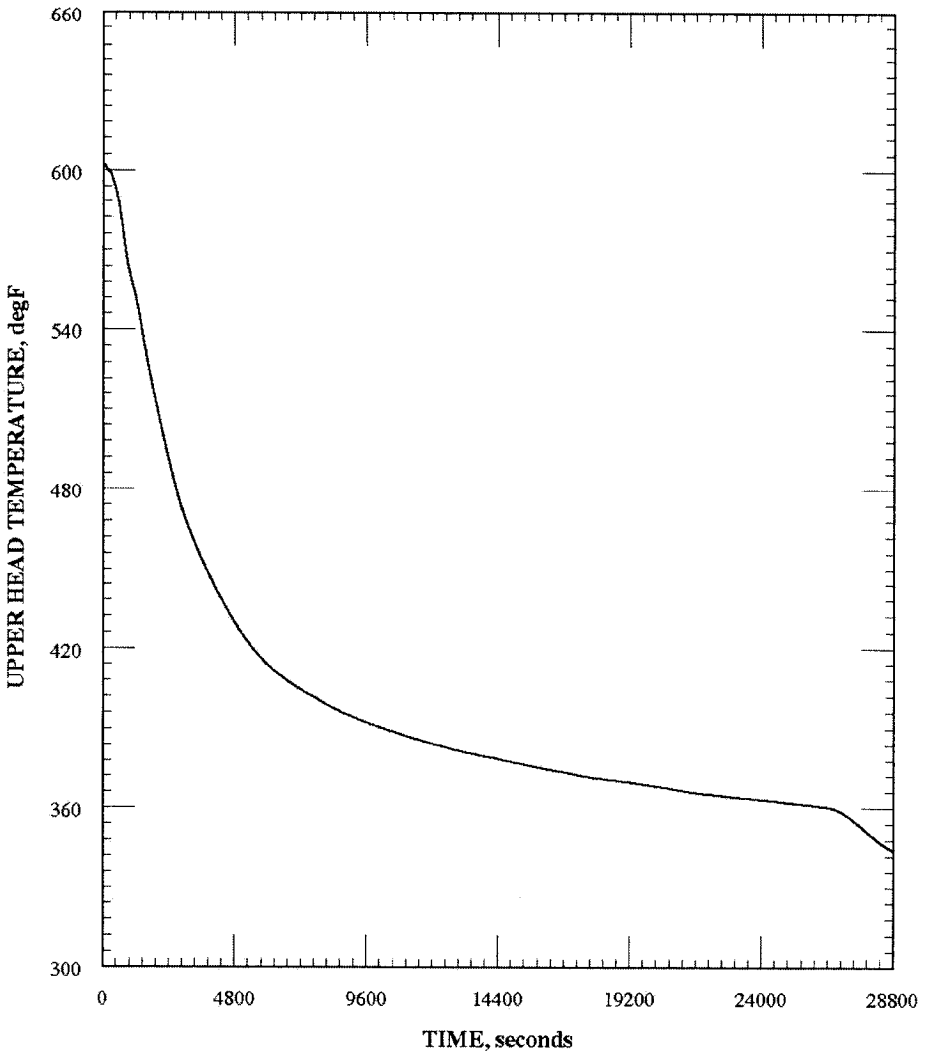


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
UPPER HEAD TEMPERATURE vs TIME

FIGURE 15.6.3-19 SHEET 1 OF 2

JUNE 2005 REVISION 13

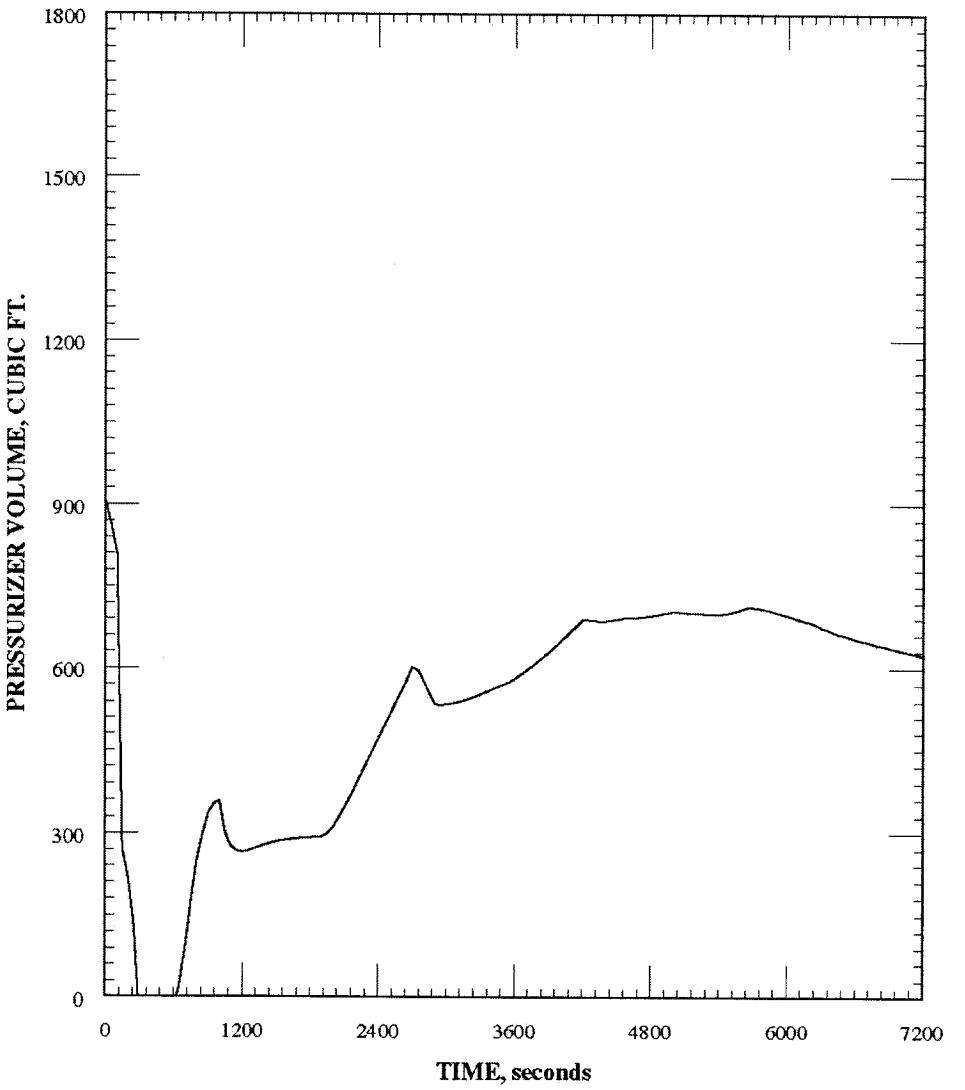


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
UPPER HEAD TEMPERATURE vs TIME

FIGURE 15.6.3-19 SHEET 2 OF 2

JUNE 2005 REVISION 13

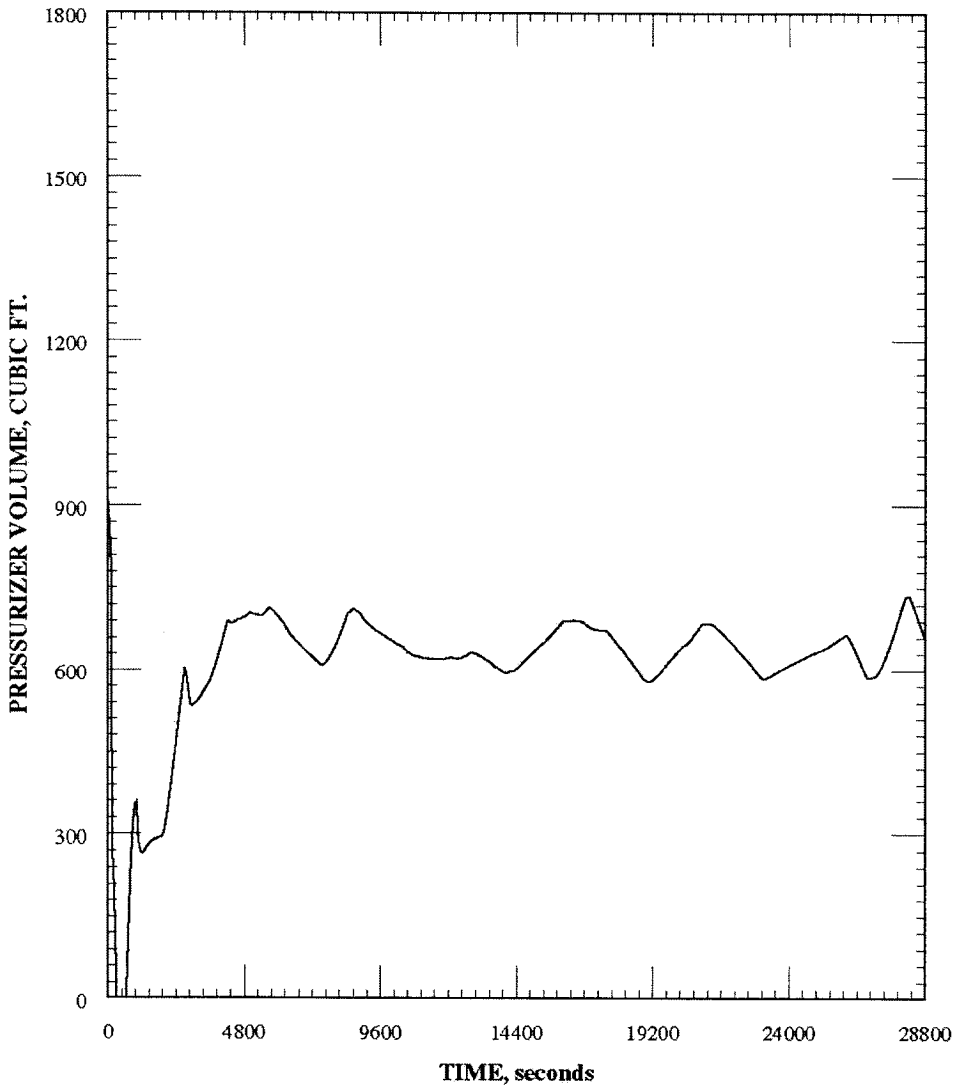


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
PRESSURIZER LIQUID VOLUME vs TIME

FIGURE 15.6.3-20 SHEET 1 OF 2

JUNE 2005 REVISION 13

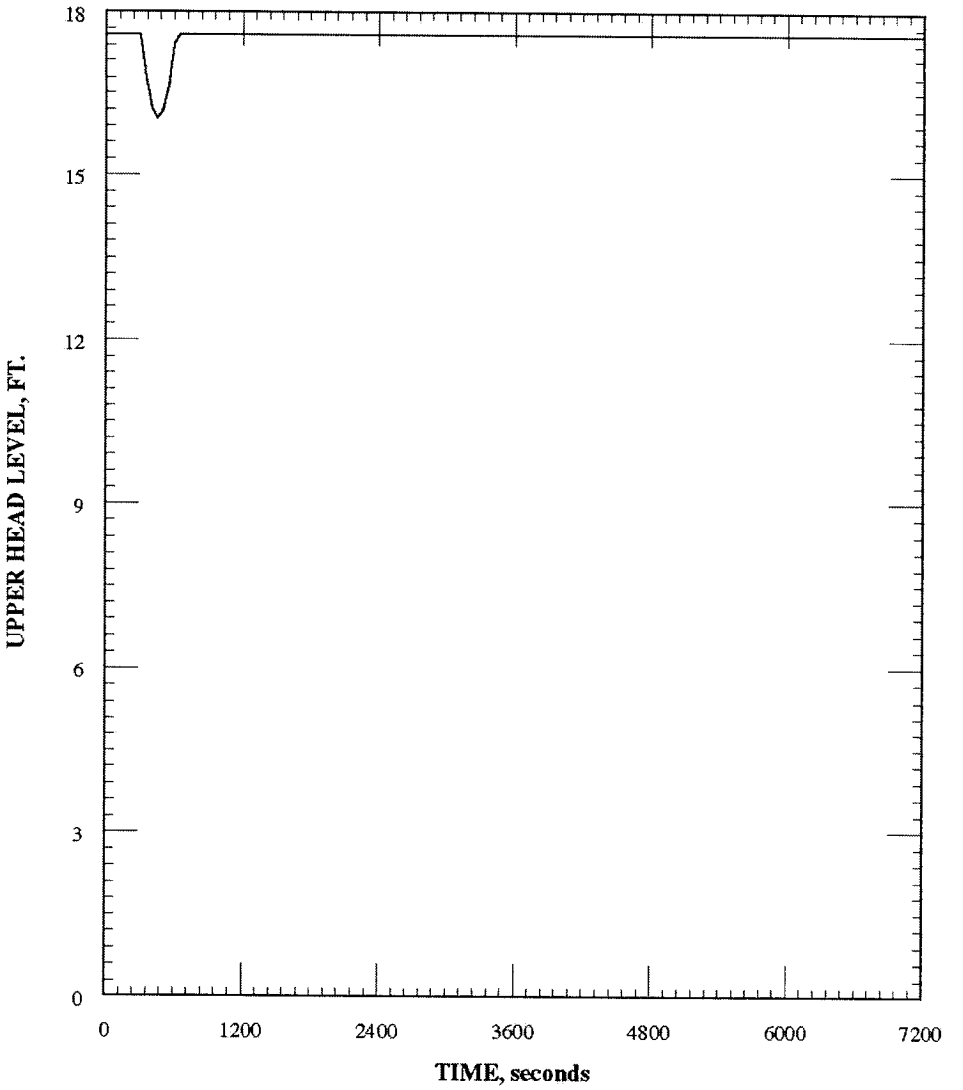


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
PRESSURIZER LIQUID VOLUME vs TIME

FIGURE 15.6.3-20 SHEET 2 OF 2

JUNE 2005 REVISION 13

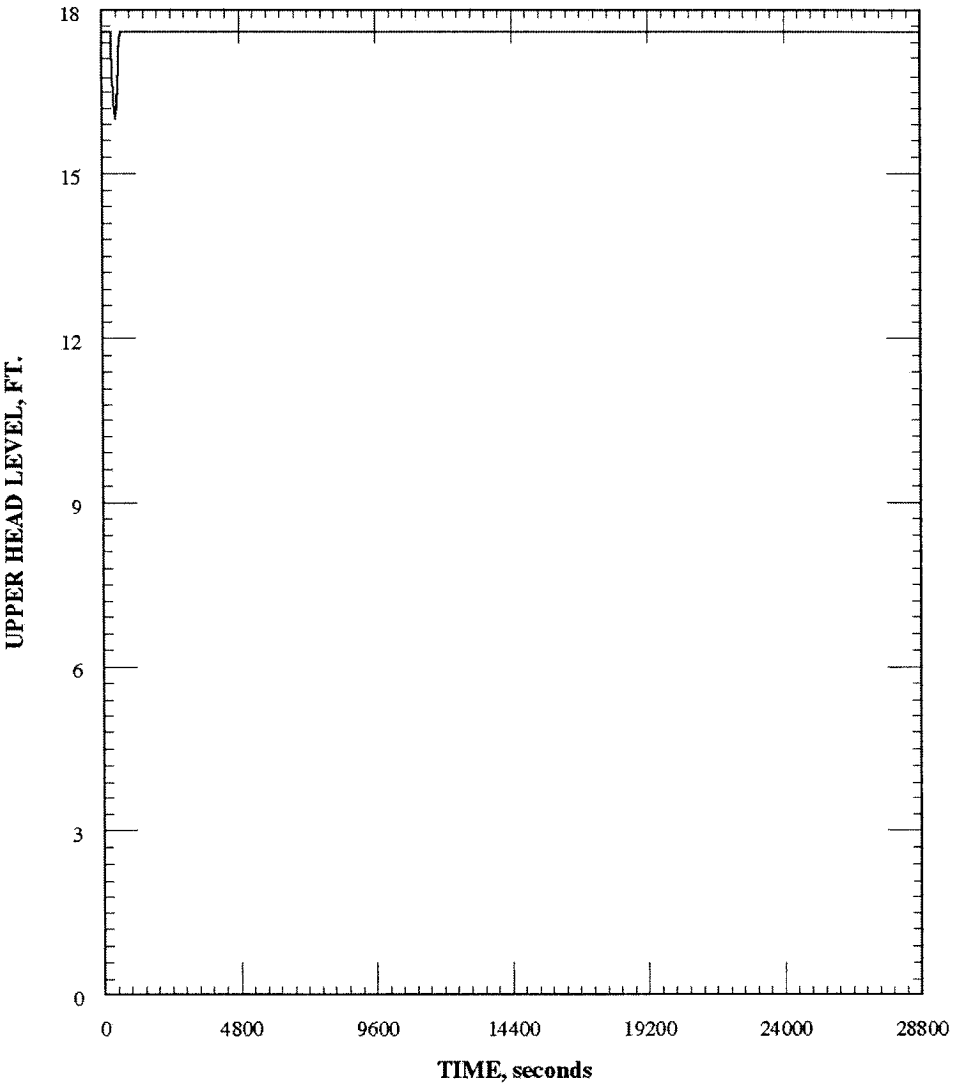


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
UPPER HEAD LEVEL vs TIME

FIGURE 15.6.3-21 SHEET 1 OF 2

JUNE 2005 REVISION 13

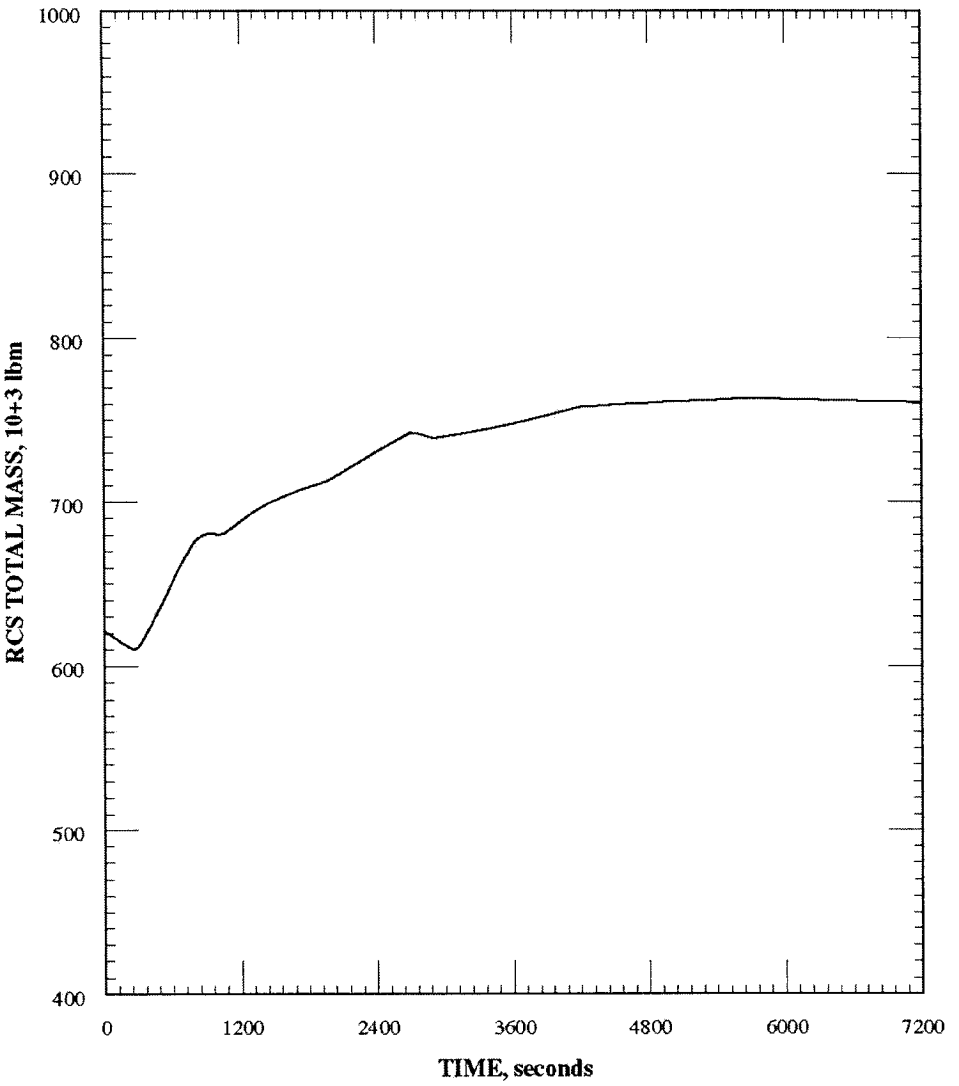


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
UPPER HEAD LEVEL vs TIME

FIGURE 15.6.3-21 SHEET 2 OF 2

JUNE 2005 REVISION 13

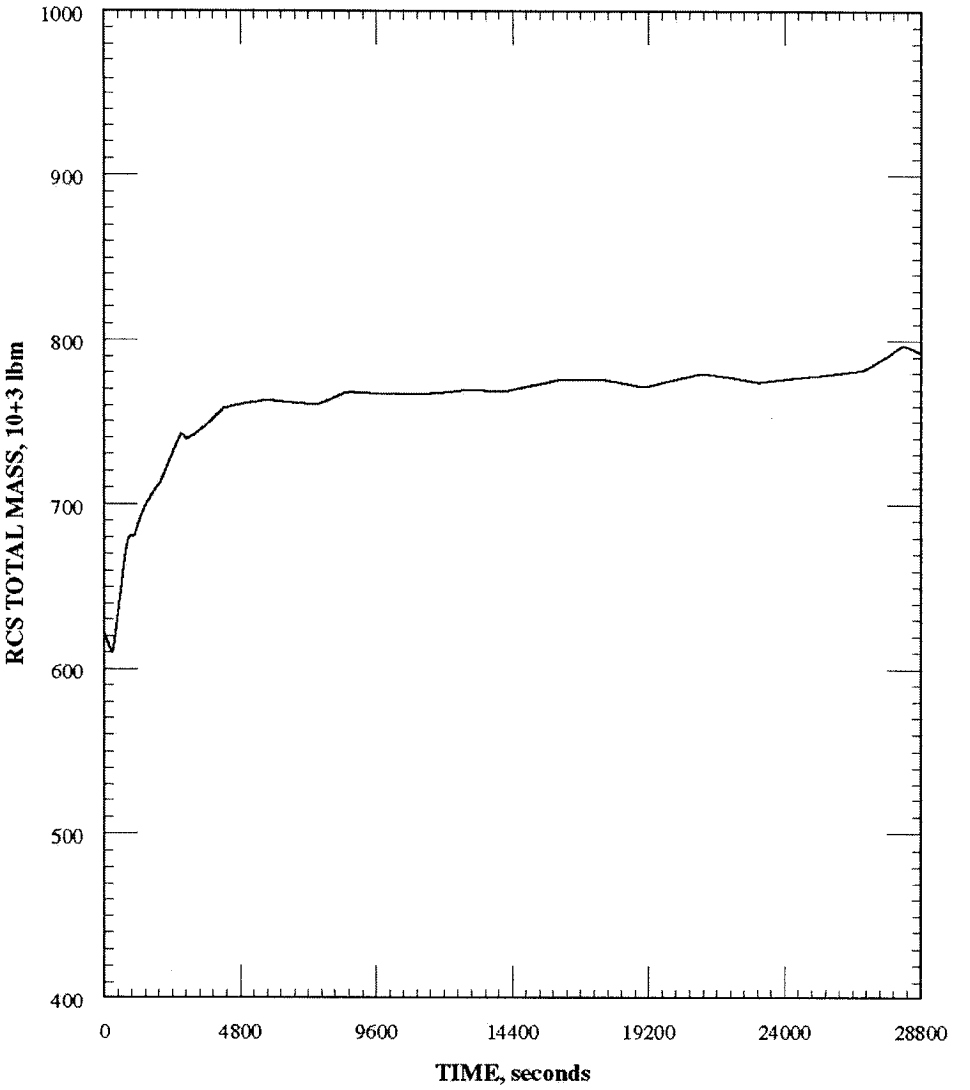


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
RCS TOTAL MASS vs TIME

FIGURE 15.6.3-22 SHEET 1 OF 2

JUNE 2005 REVISION 13

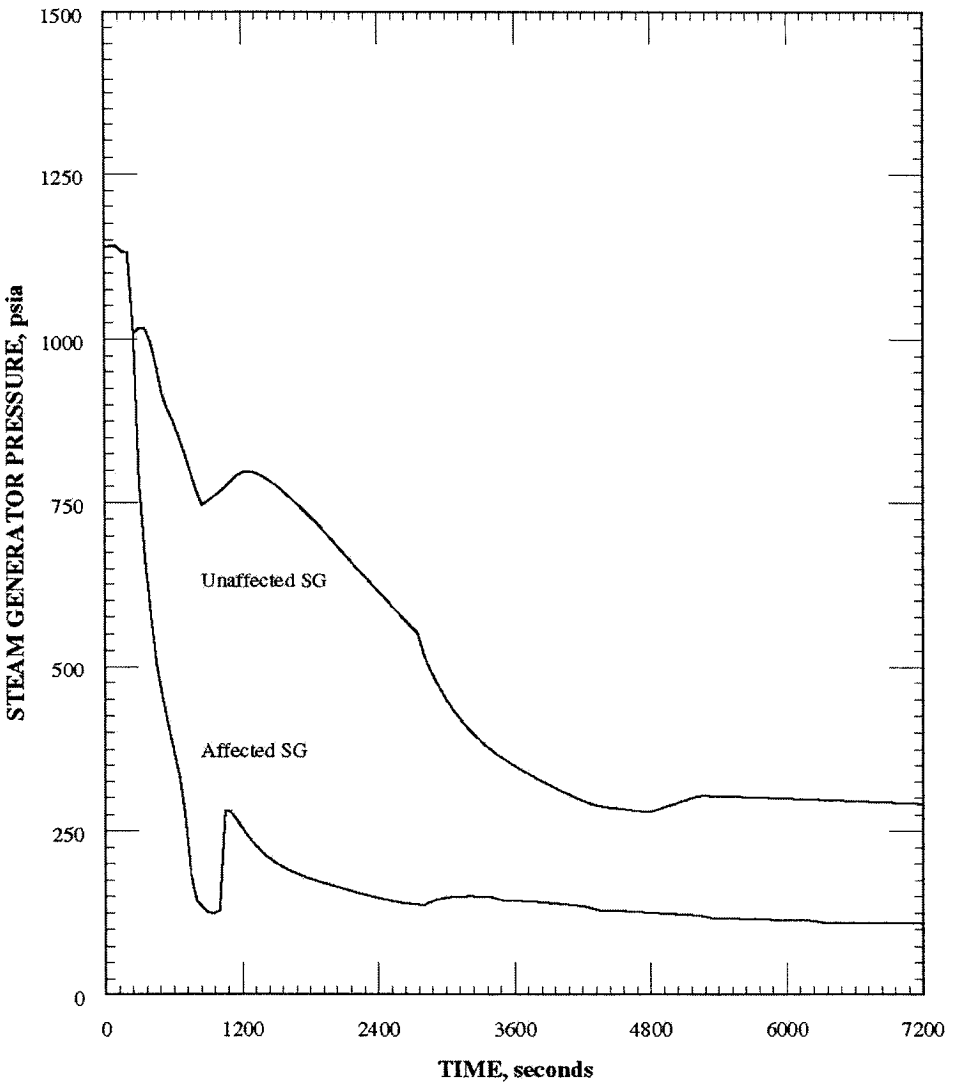


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
RCS TOTAL MASS vs TIME

FIGURE 15.6.3-22 SHEET 2 OF 2

JUNE 2005 REVISION 13

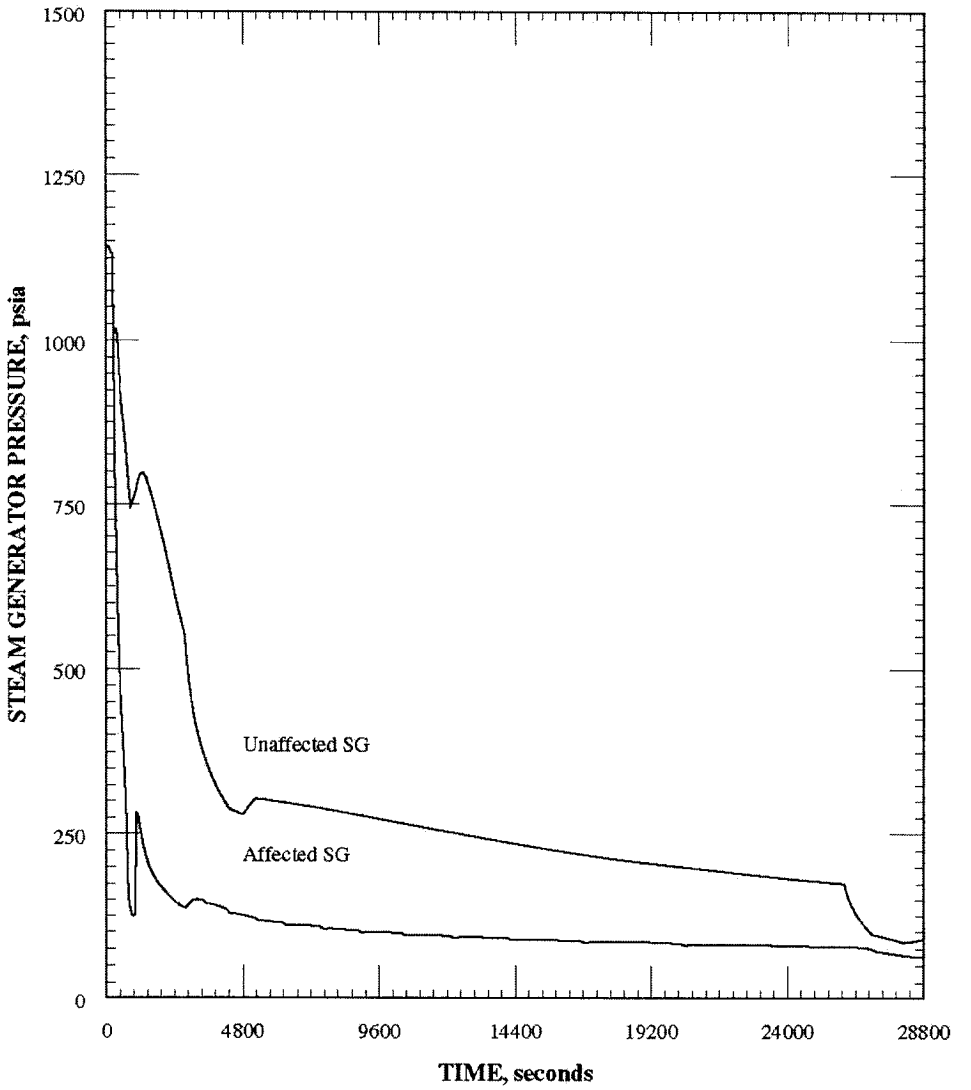


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
SG PRESSURE vs TIME

FIGURE 15.6.3-23 SHEET 1 OF 2

JUNE 2005 REVISION 13

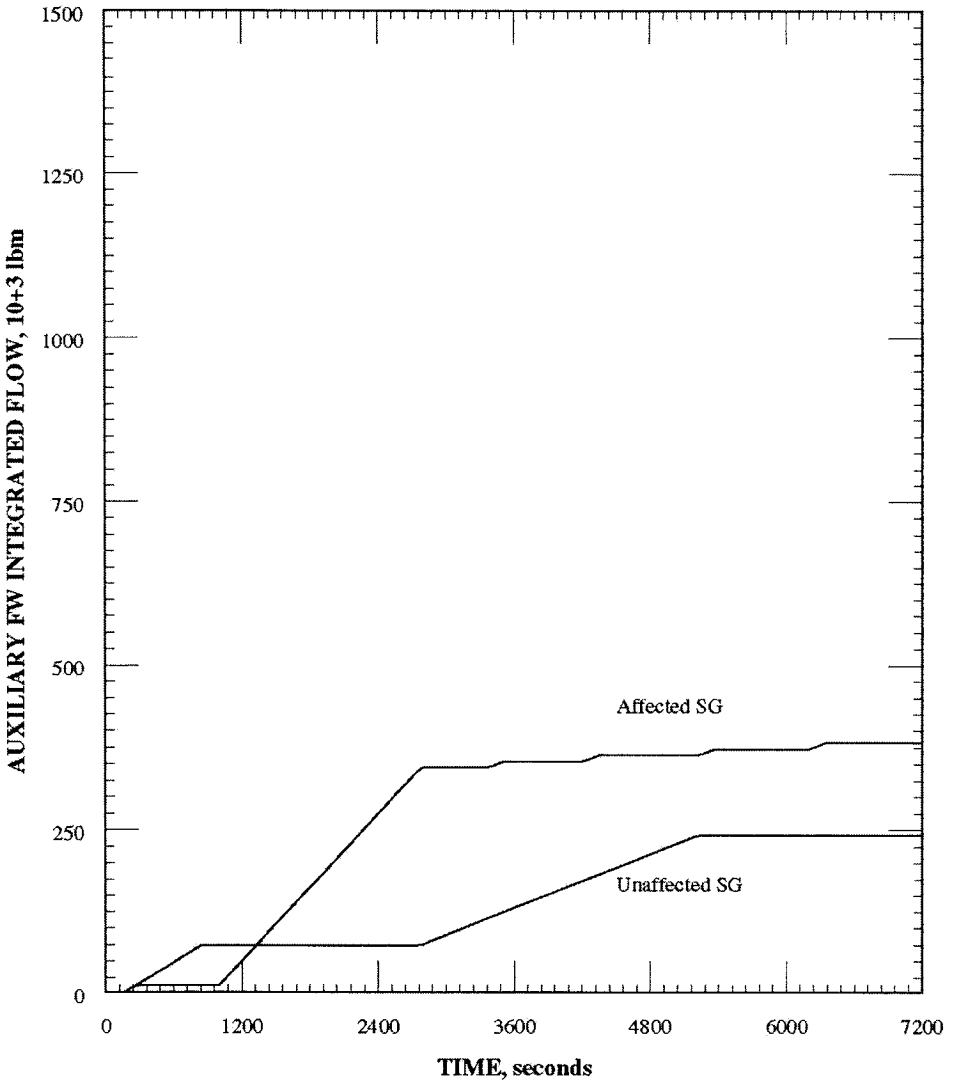


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
SG PRESSURE vs TIME

FIGURE 15.6.3-23 SHEET 2 OF 2

JUNE 2005 REVISION 13

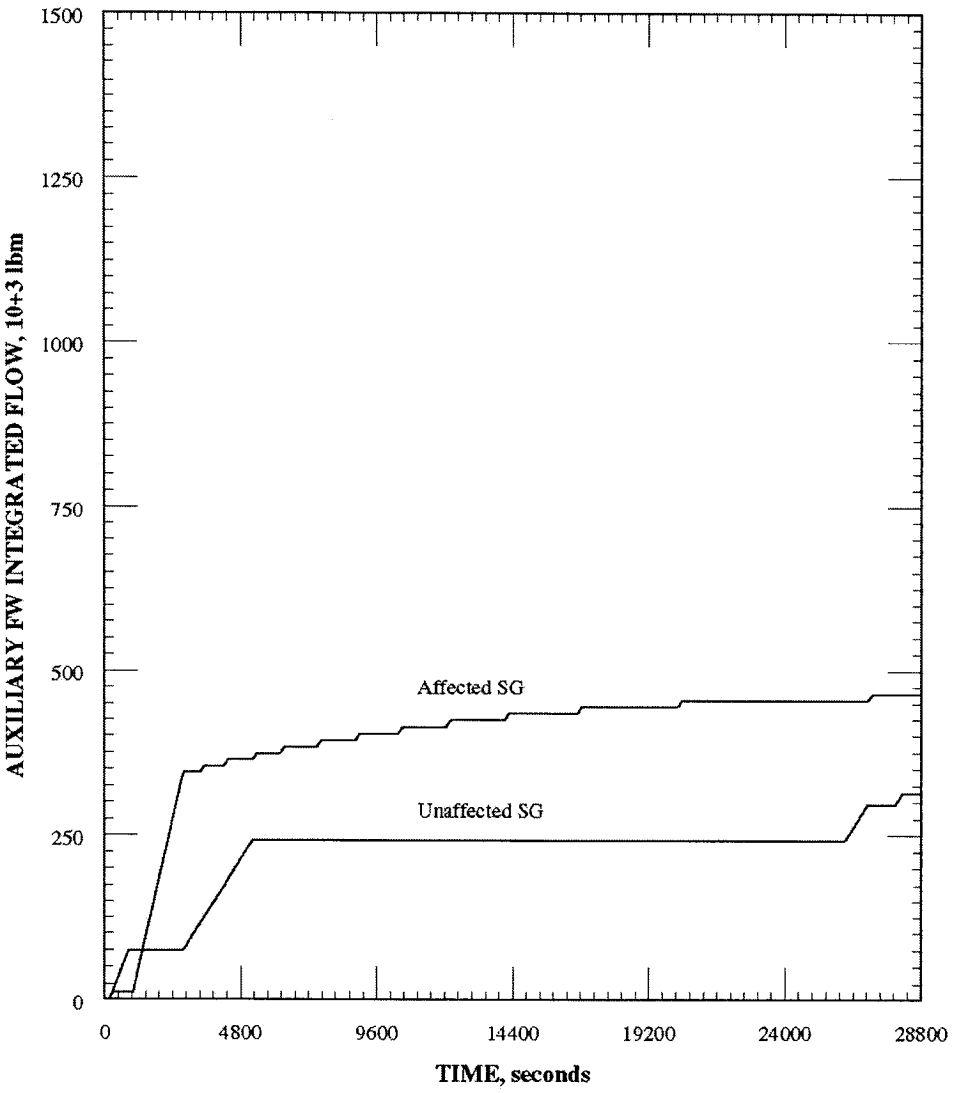


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
AFW INTERGRATED FLOW vs TIME

FIGURE 15.6.3-24 SHEET 1 OF 2

JUNE 2005 REVISION 13

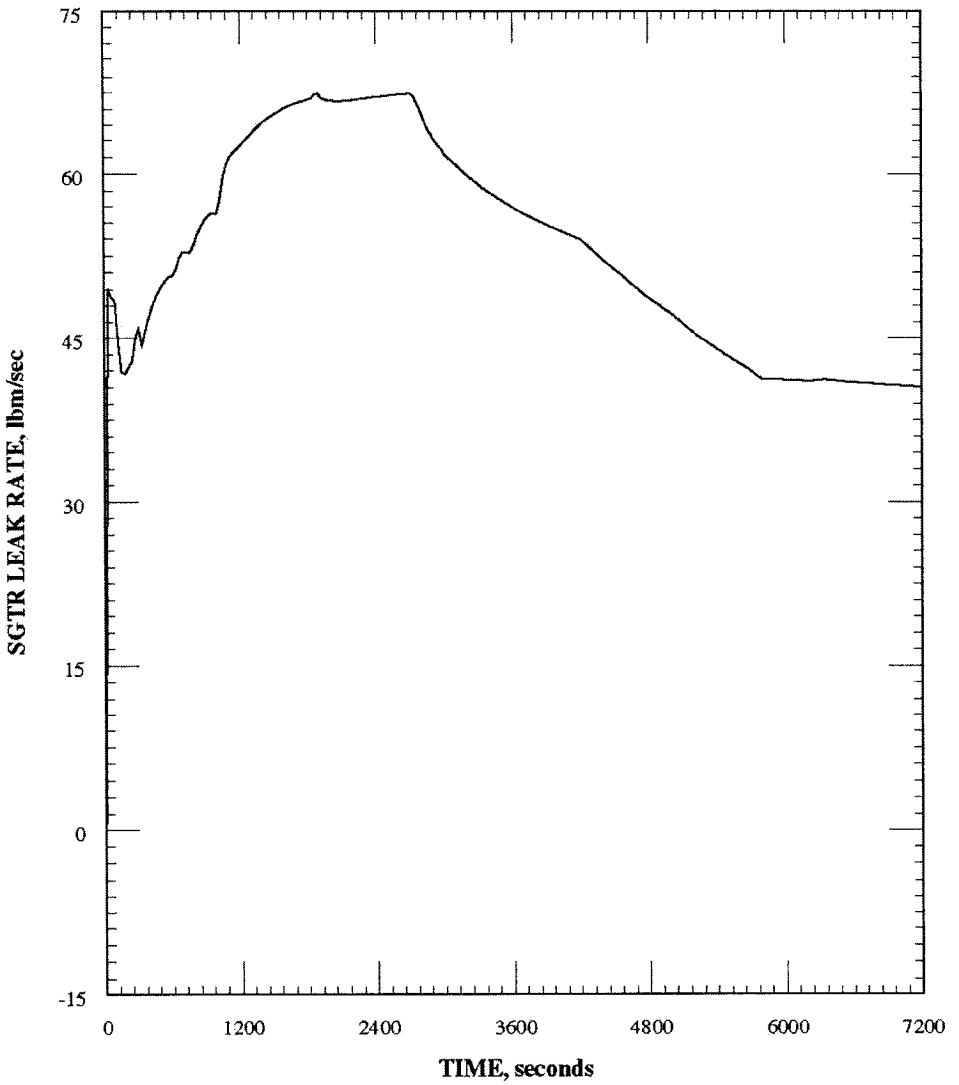


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
AFW INTERGRATED FLOW vs TIME

FIGURE 15.6.3-24 SHEET 2 OF 2

JUNE 2005 REVISION 13

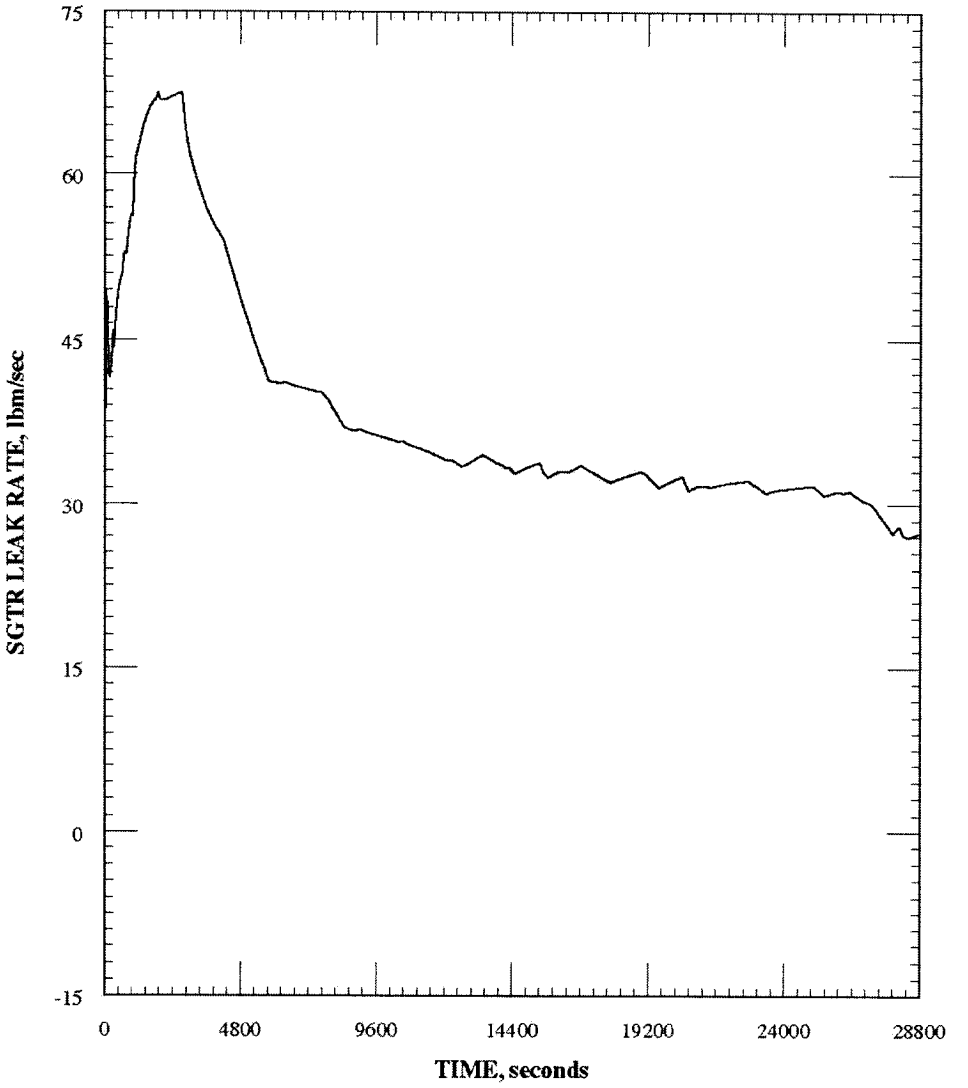


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
TUBE LEAK RATE vs TIME

FIGURE 15.6.3-25 SHEET 1 OF 2

JUNE 2005 REVISION 13

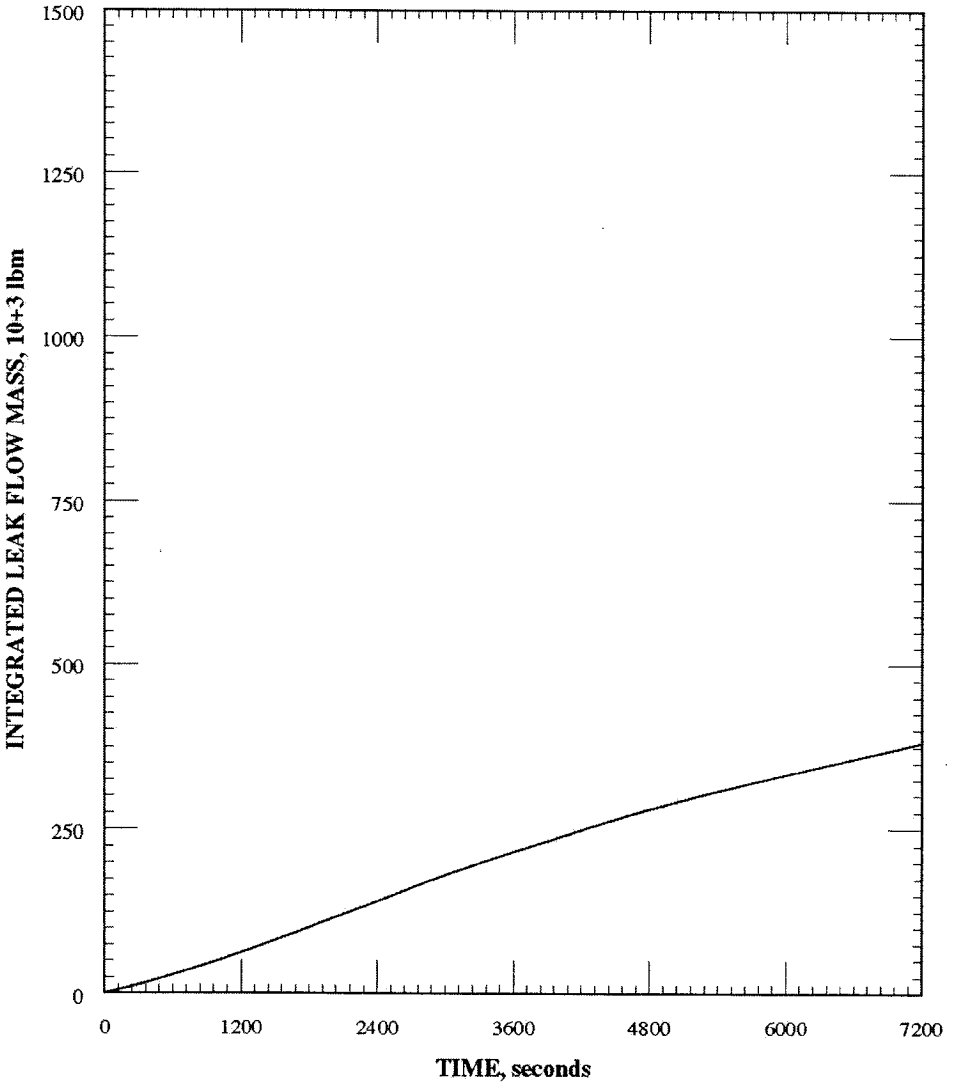


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
TUBE LEAK RATE vs TIME

FIGURE 15.6.3-25 SHEET 2 OF 2

JUNE 2005 REVISION 13

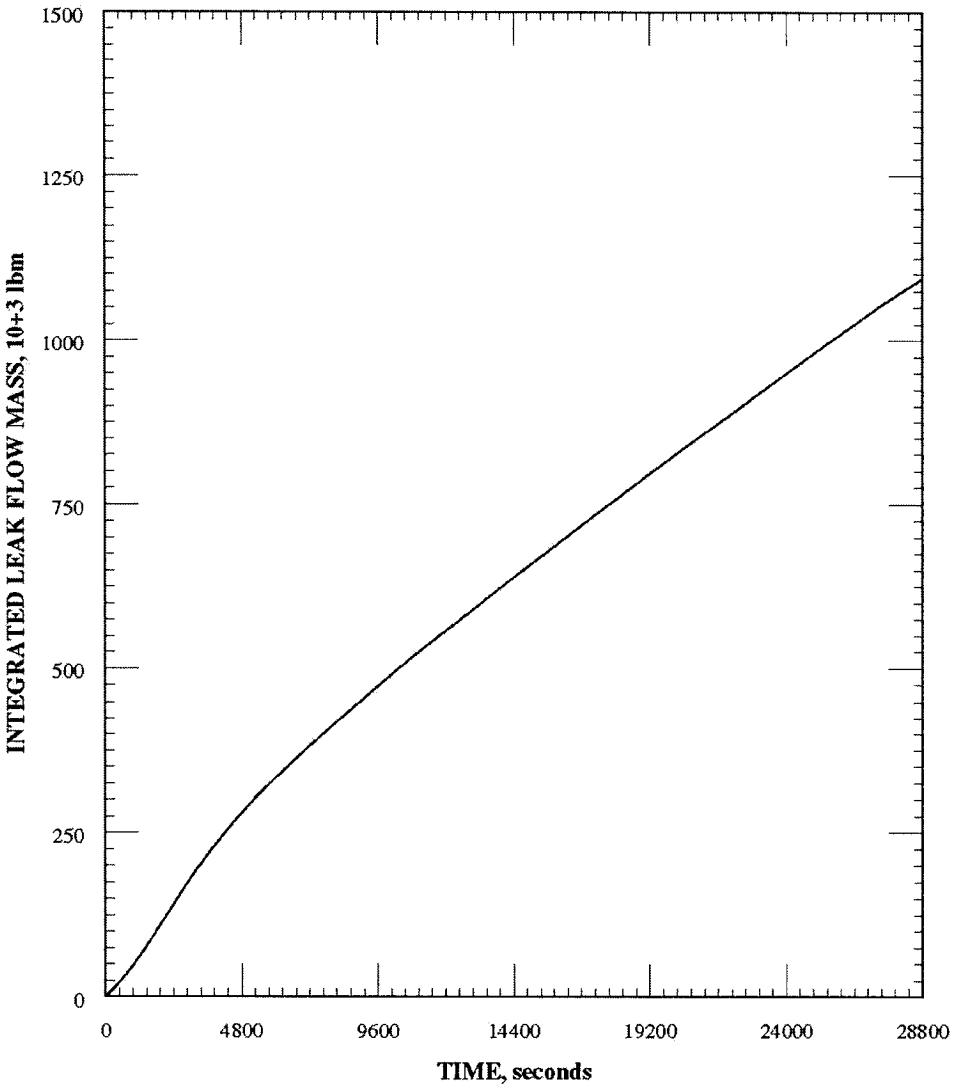


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
INTERGATED TUBE LEAK FLOW vs TIME

FIGURE 15.6.3-26 SHEET 1 OF 2

JUNE 2005 REVISION 13

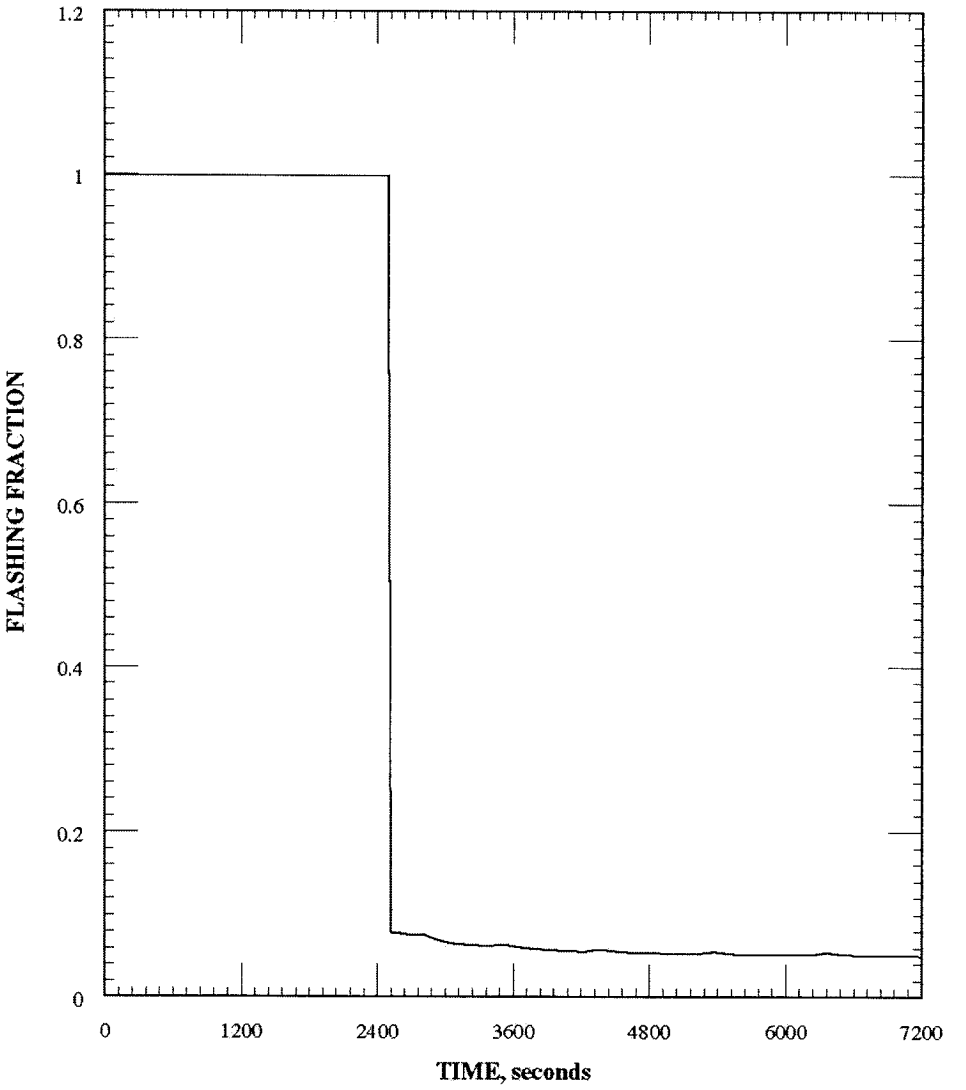


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
INTERGATED TUBE LEAK FLOW vs TIME

FIGURE 15.6.3-26 SHEET 2 OF 2

JUNE 2005 REVISION 13

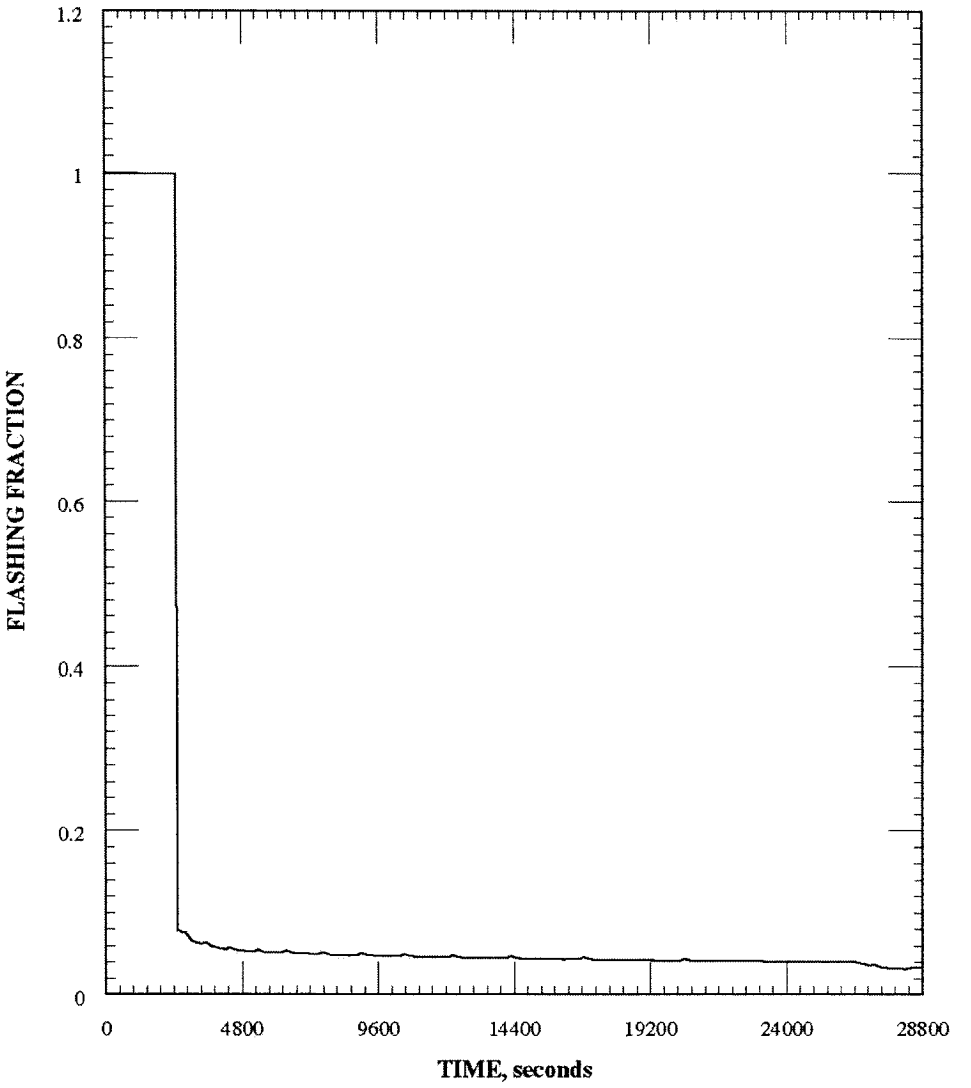


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
RUPTURED TUBE LEAK FLASHING FRACTION vs TIME

FIGURE 15.6.3-27 SHEET 1 OF 2

JUNE 2005 REVISION 13

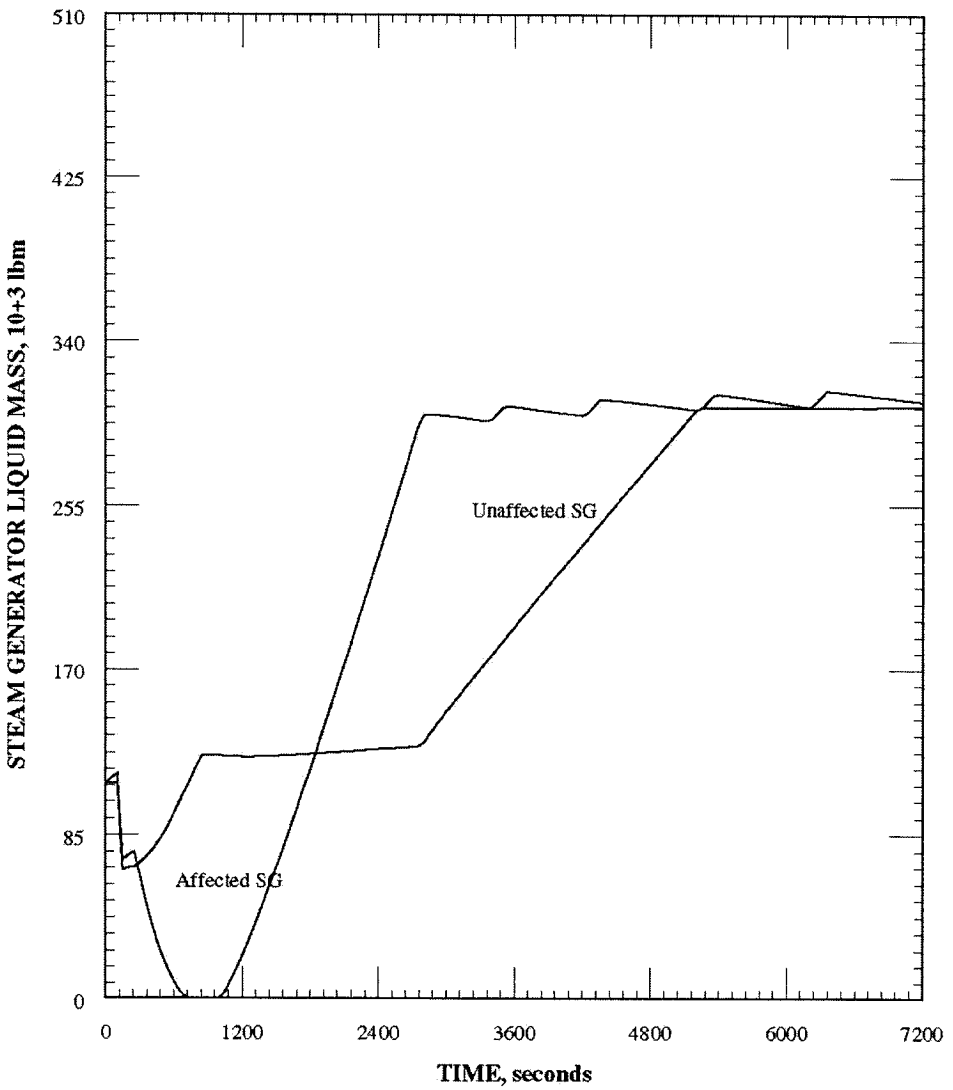


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
RUPTURED TUBE LEAK FLASHING FRACTION vs TIME

FIGURE 15.6.3-27 SHEET 2 OF 2

JUNE 2005 REVISION 13

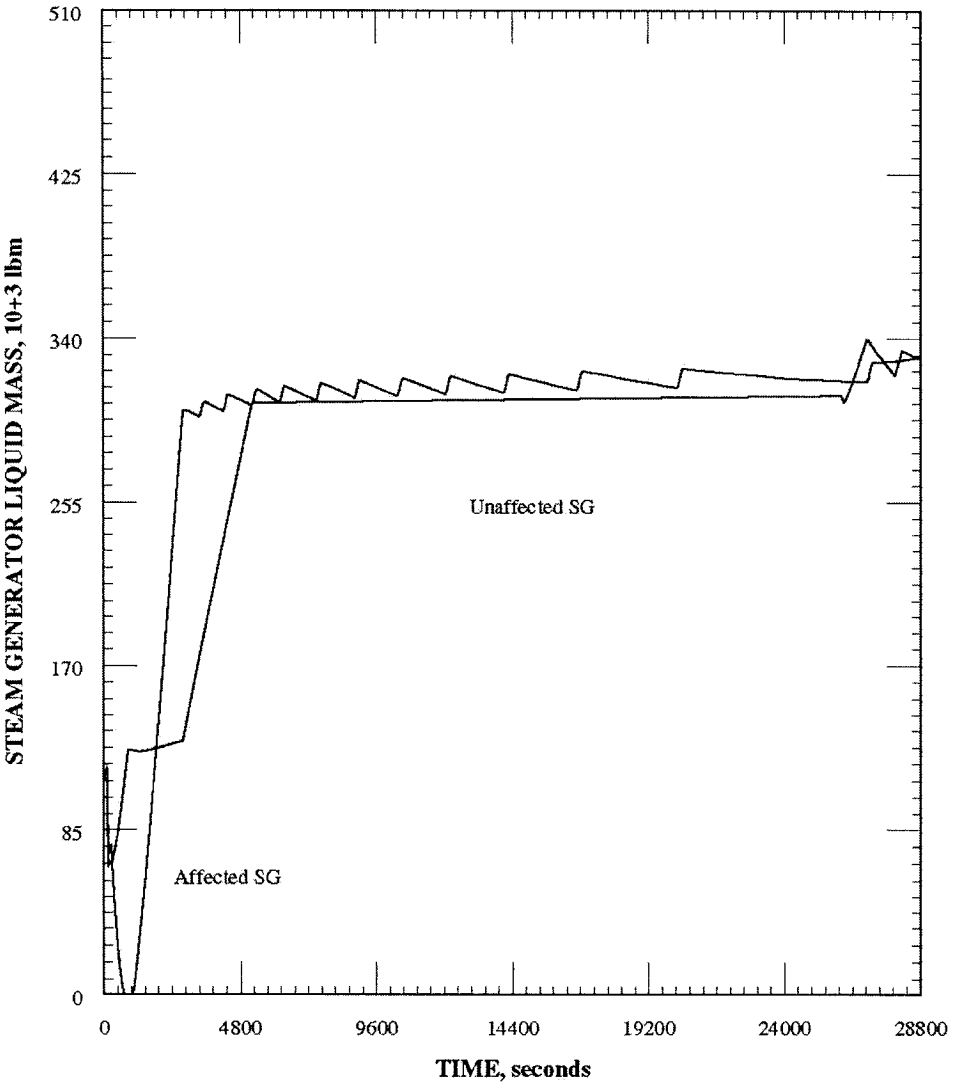


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
SG LIQUID INVENTORY vs TIME

FIGURE 15.6.3-28 SHEET 1 OF 2

JUNE 2005 REVISION 13

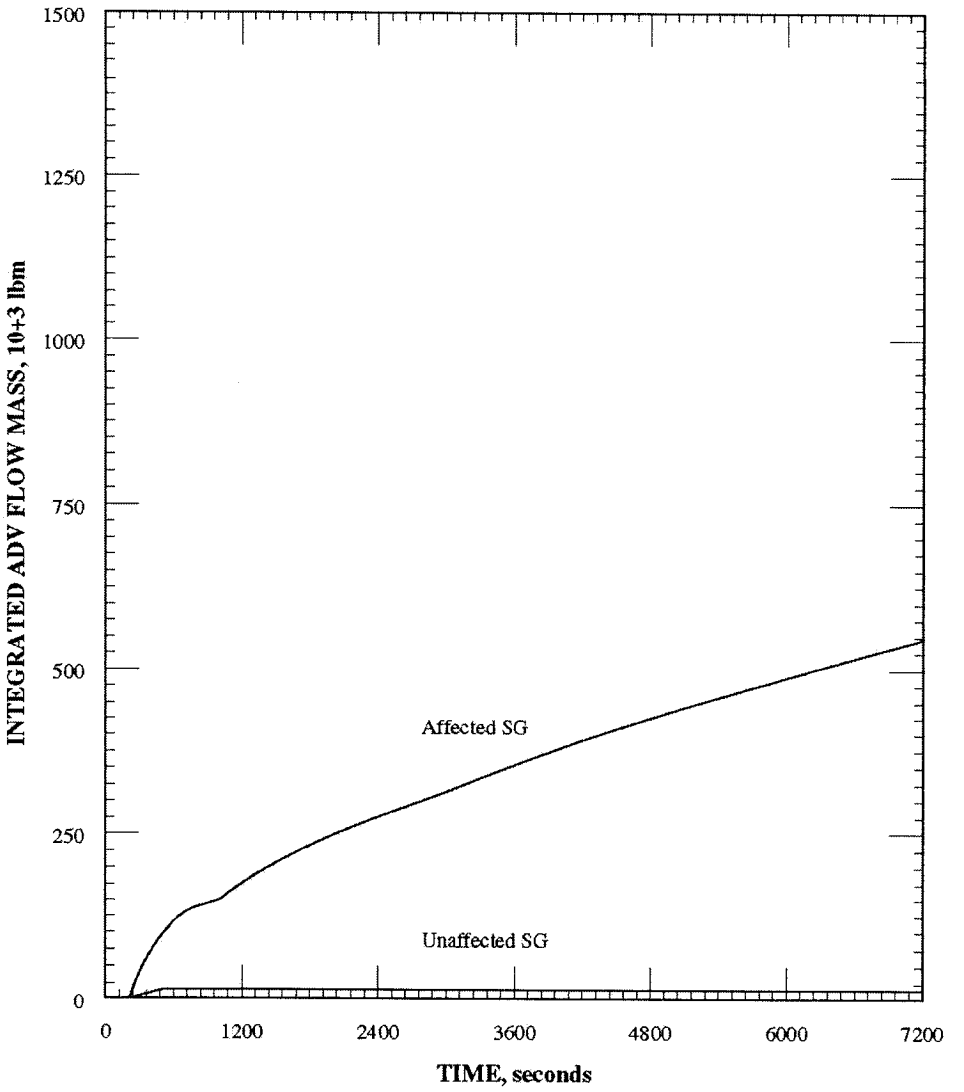


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
SG LIQUID INVENTORY vs TIME

FIGURE 15.6.3-28 SHEET 2 OF 2

JUNE 2005 REVISION 13

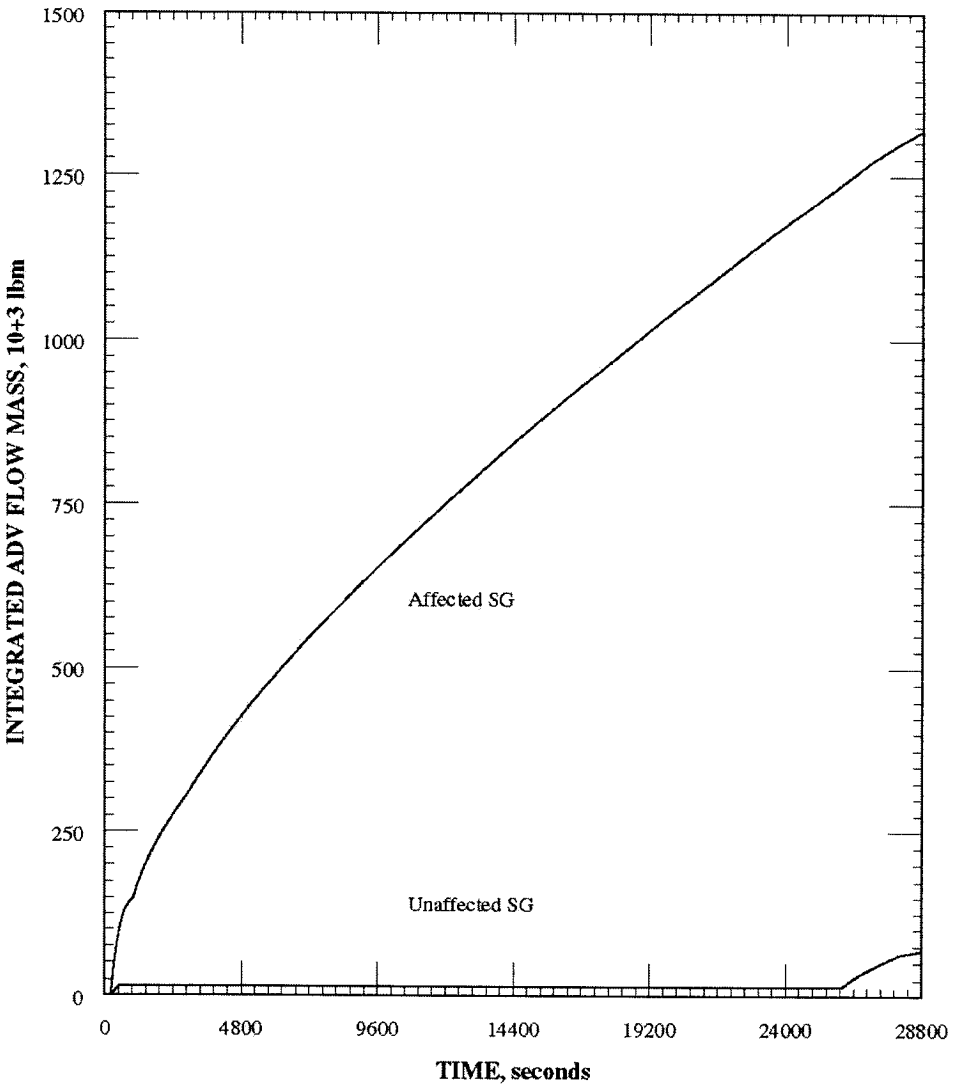


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
INTEGRATED ADV FLOW vs TIME

FIGURE 15.6.3-29 SHEET 1 OF 2

JUNE 2005 REVISION 13

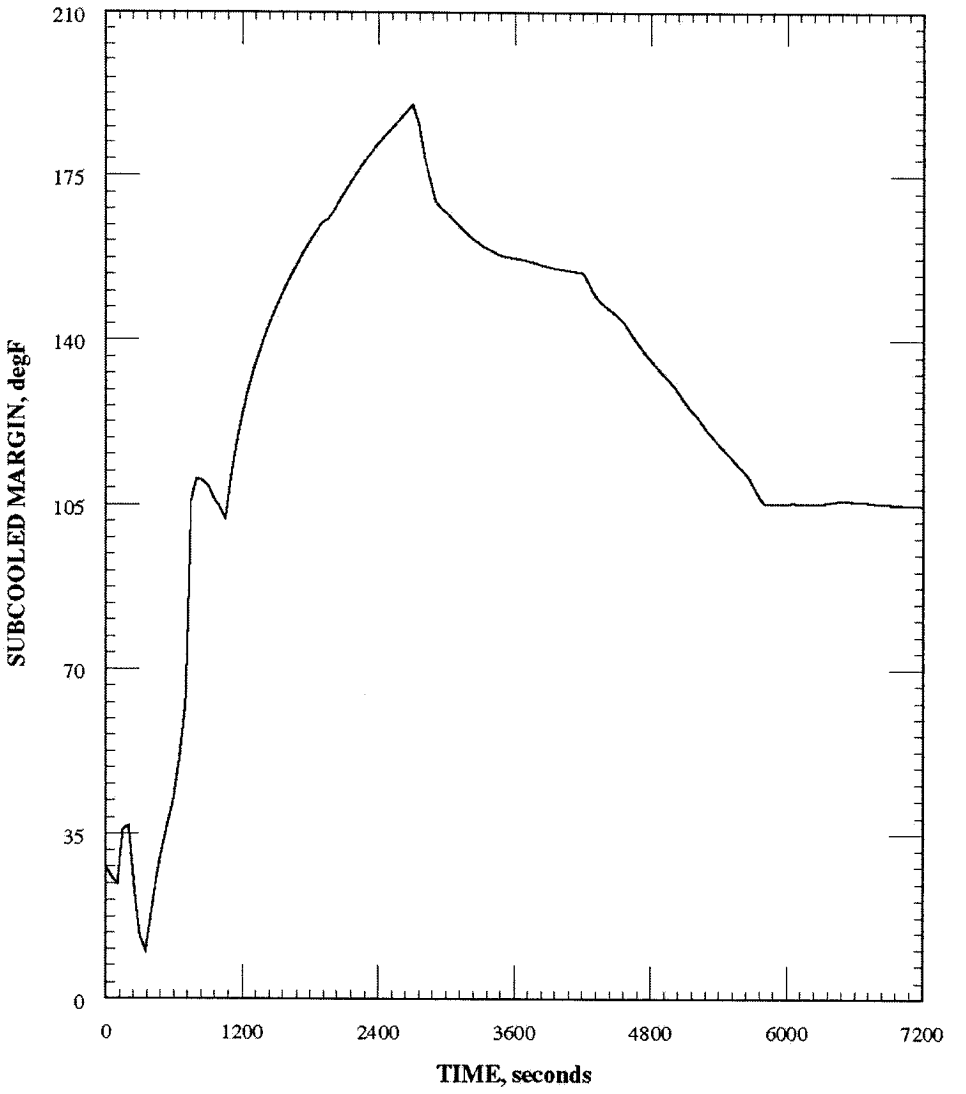


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
INTEGRATED ADV FLOW vs TIME

FIGURE 15.6.3-29 SHEET 2 OF 2

JUNE 2005 REVISION 13

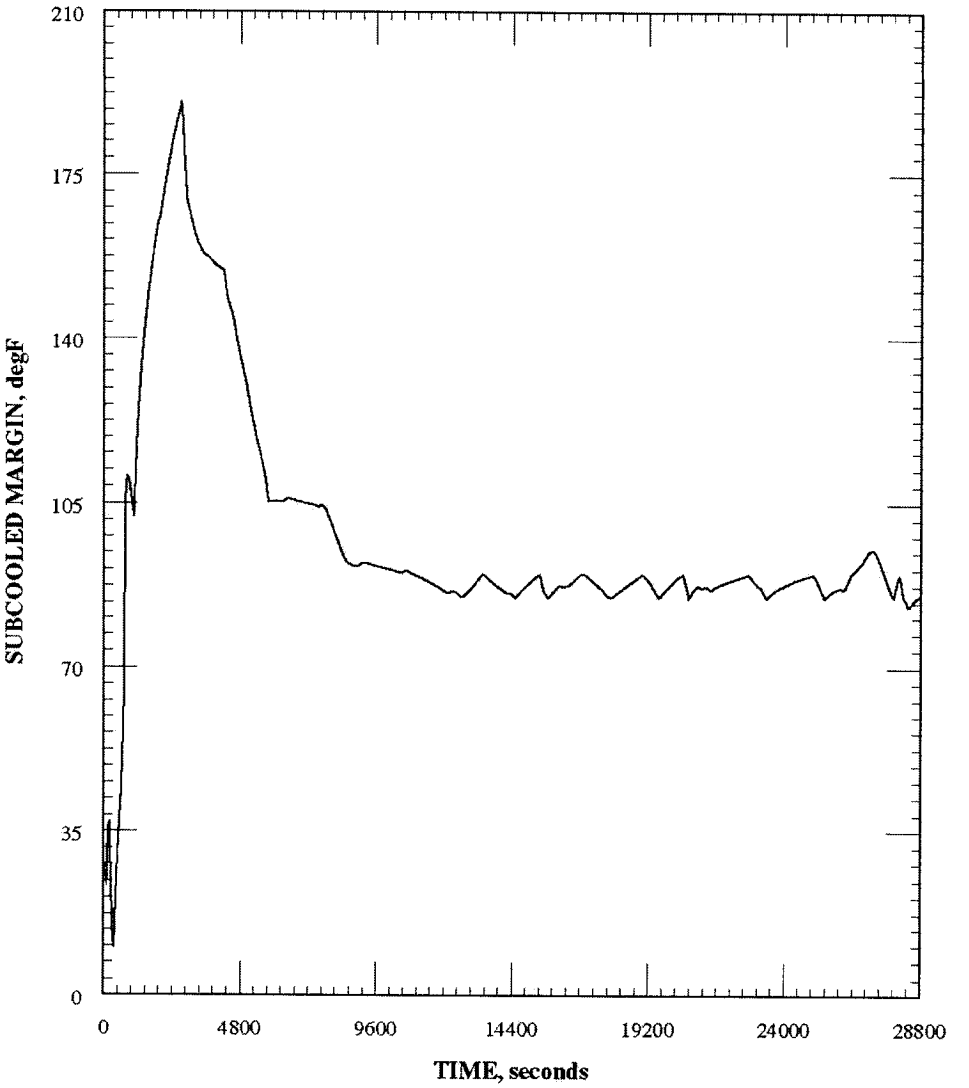


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
SUBCOOLED MARGIN vs TIME

FIGURE 15.6.3-30 SHEET 1 OF 2

JUNE 2005 REVISION 13

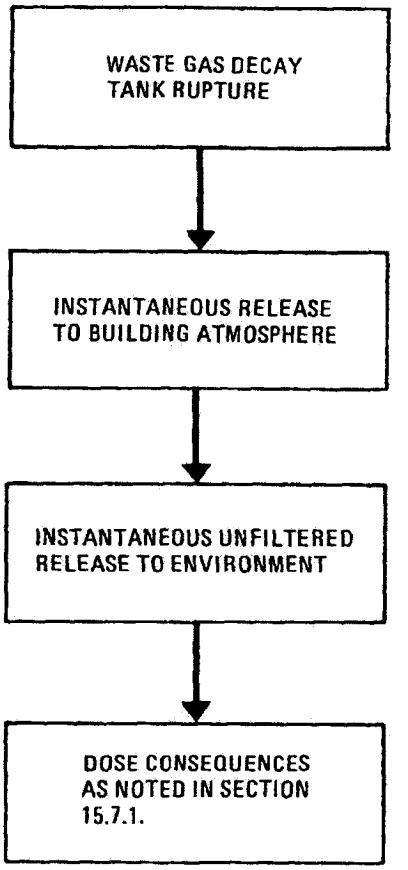


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SGTRLOP WITH A SINGLE FAILURE EVENT
SUBCOOLED MARGIN vs TIME

FIGURE 15.6.3-30 SHEET 2 OF 2

JUNE 2005 REVISION 13

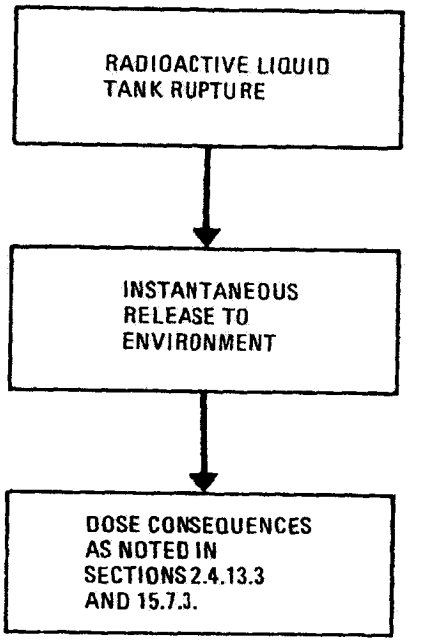


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SEQUENCE OF EVENTS DIAGRAM FOR A WASTE GAS DECAY TANK RUPTURE

FIGURE 15.7.1-1

JUNE 2001 REVISION 11

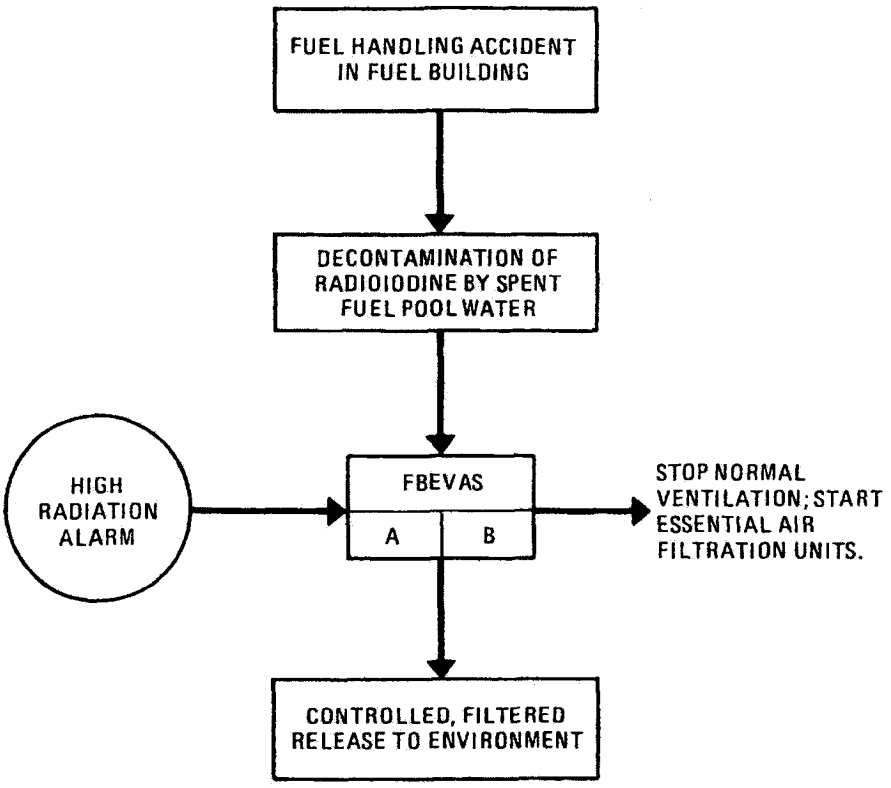


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SEQUENCE OF EVENTS DIAGRAM FOR A
RADIOACTIVE LIQUID TANK RUPTURE

FIGURE 15.7.3-1

JUNE 2001 REVISION 11

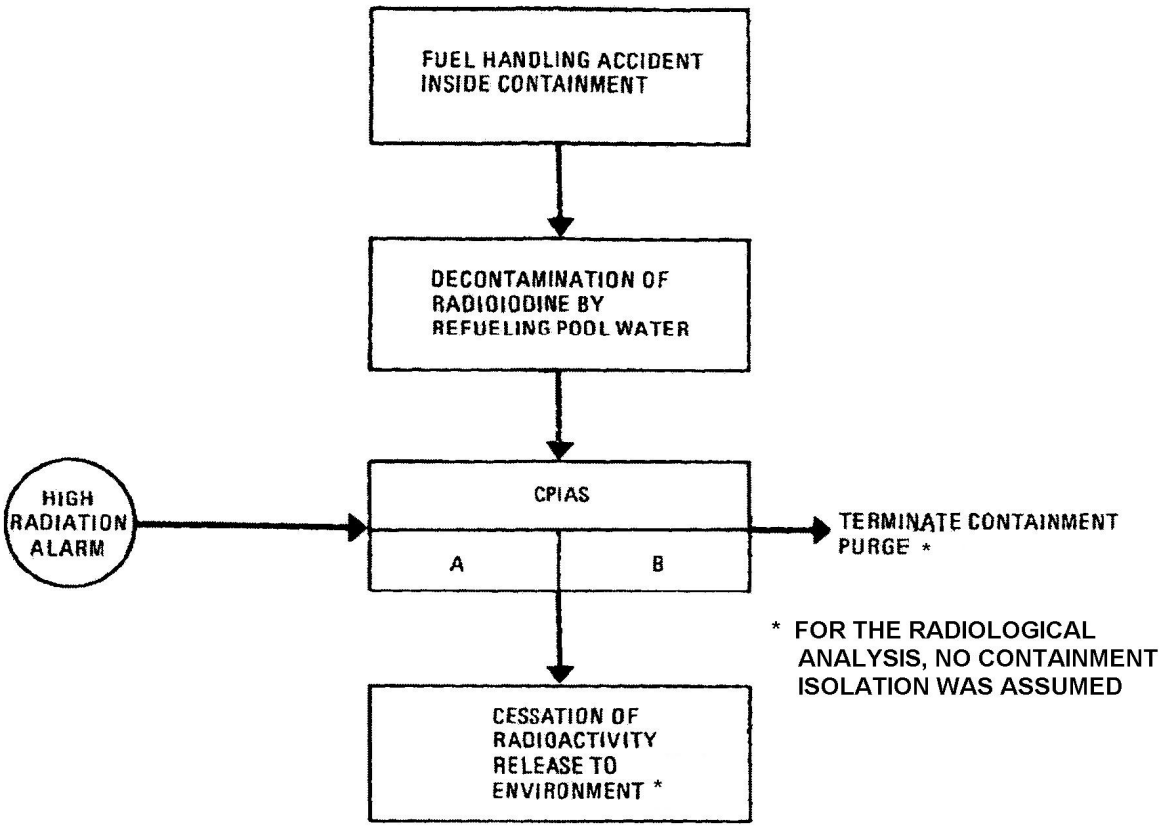


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SEQUENCE OF EVENTS DIAGRAM FOR A FUEL HANDLING ACCIDENT OUTSIDE CONTAINMENT

FIGURE 15.7.4-1

JUNE 2001 REVISION 11

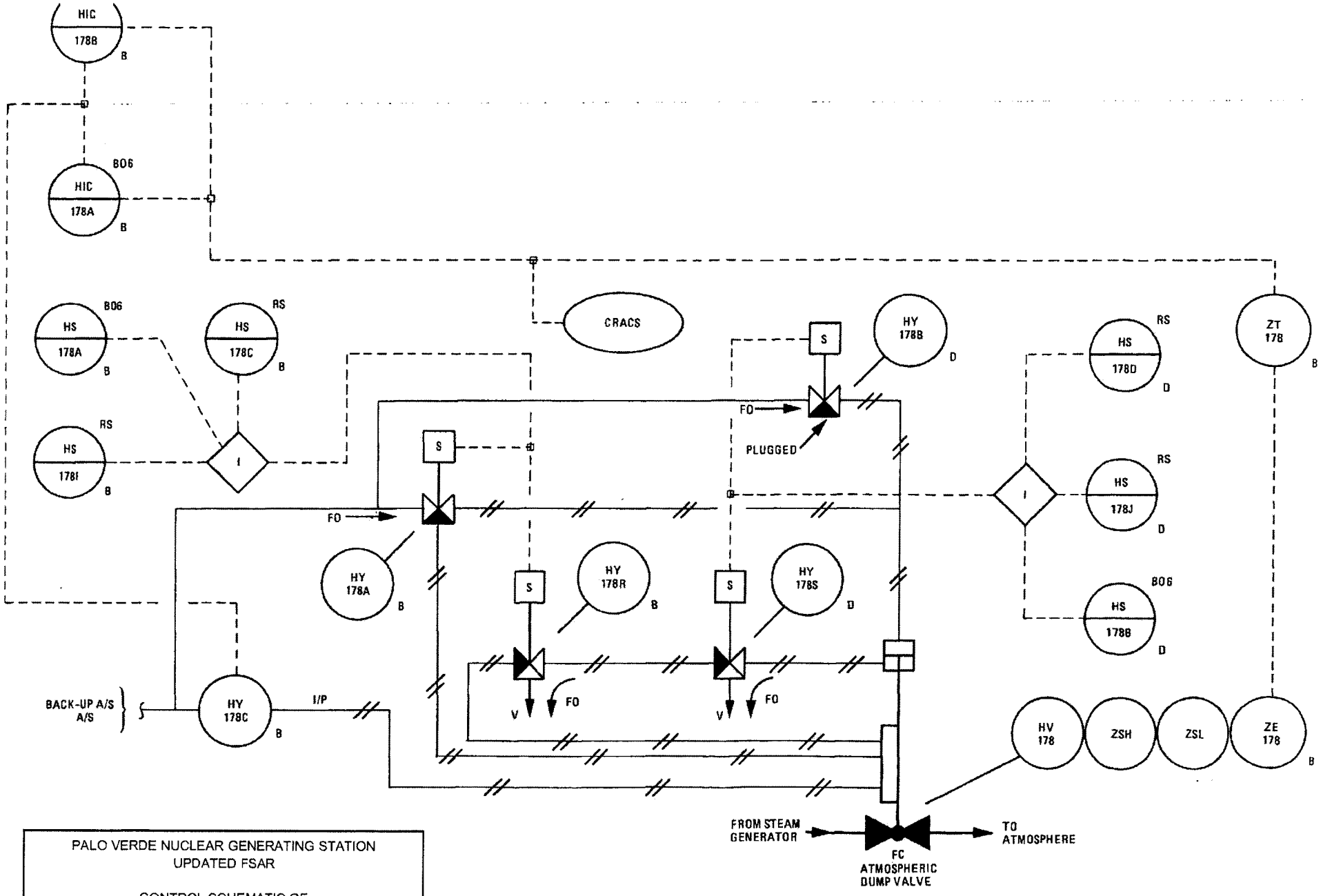


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SEQUENCE OF EVENTS DIAGRAM FOR A FUEL HANDLING ACCIDENT INSIDE CONTAINMENT

FIGURE 15.7.4-2

JUNE 2007 REVISION 14

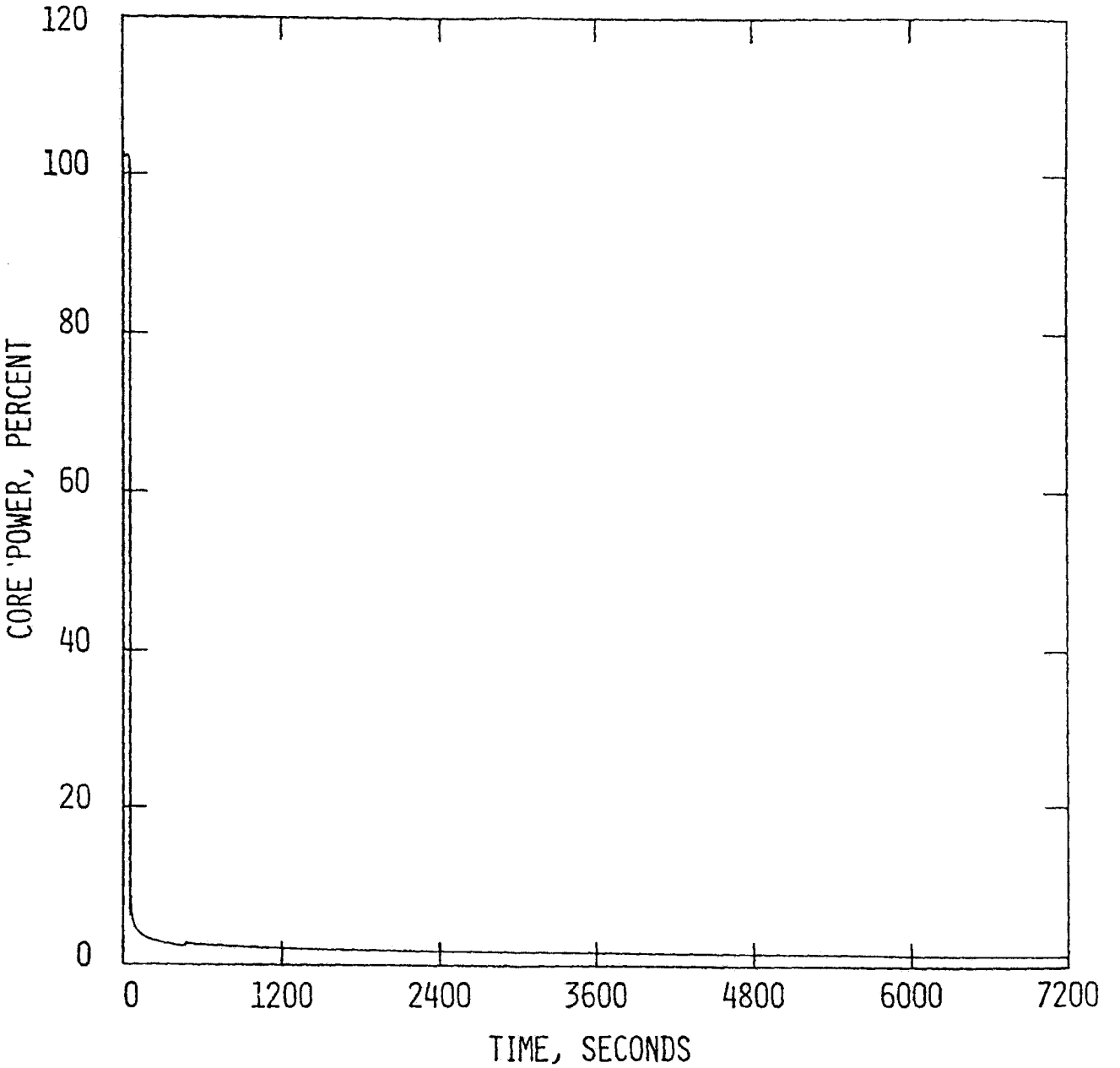


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CONTROL SCHEMATIC OF
AN ATMOSPHERIC DUMP VALVE

FIGURE 15A-1

JUNE 2001 REVISION 11

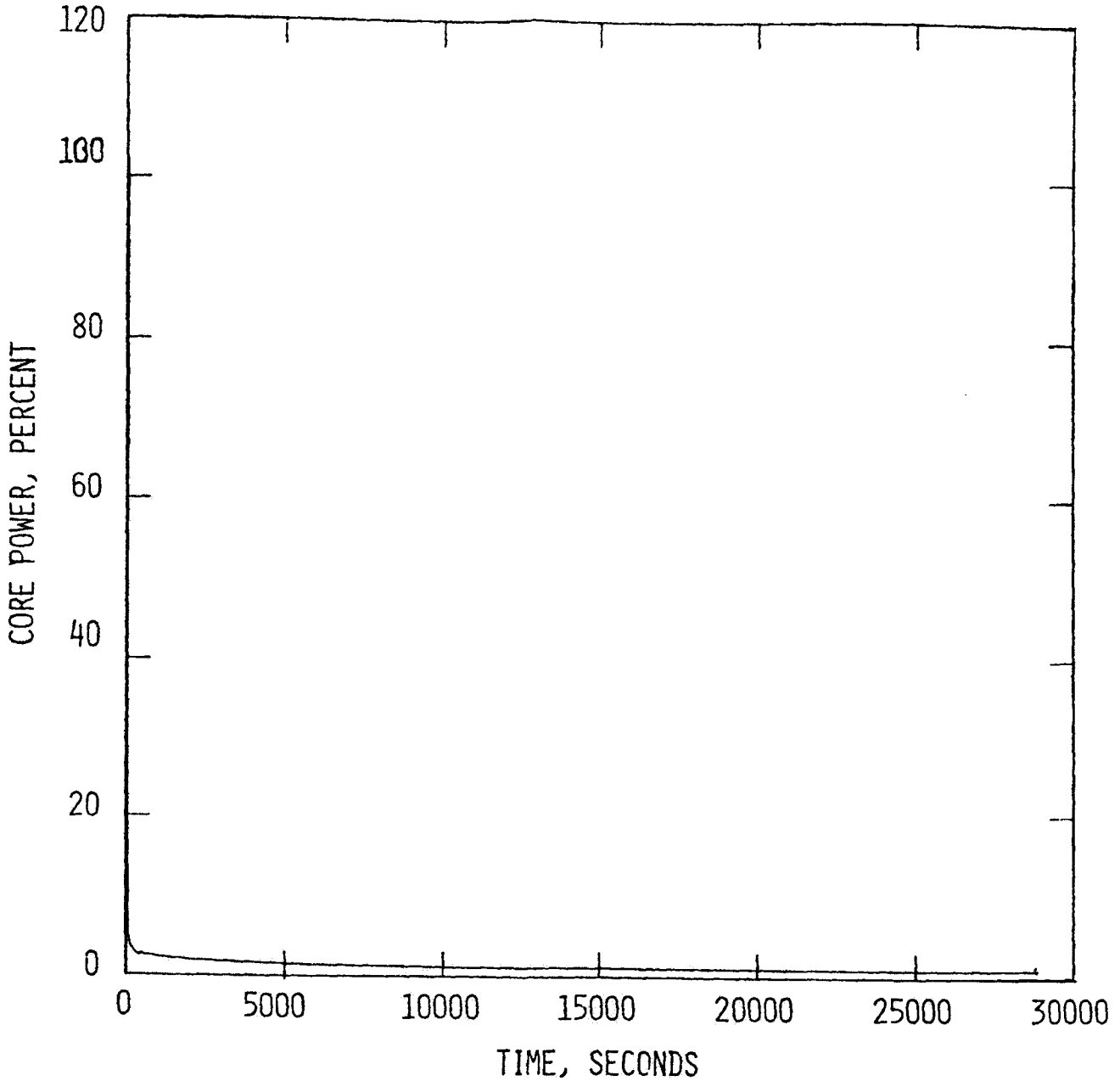


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV CORE POWER VS TIME

FIGURE 15A-2 SHEET 1 OF 2

JUNE 2001 REVISION 11

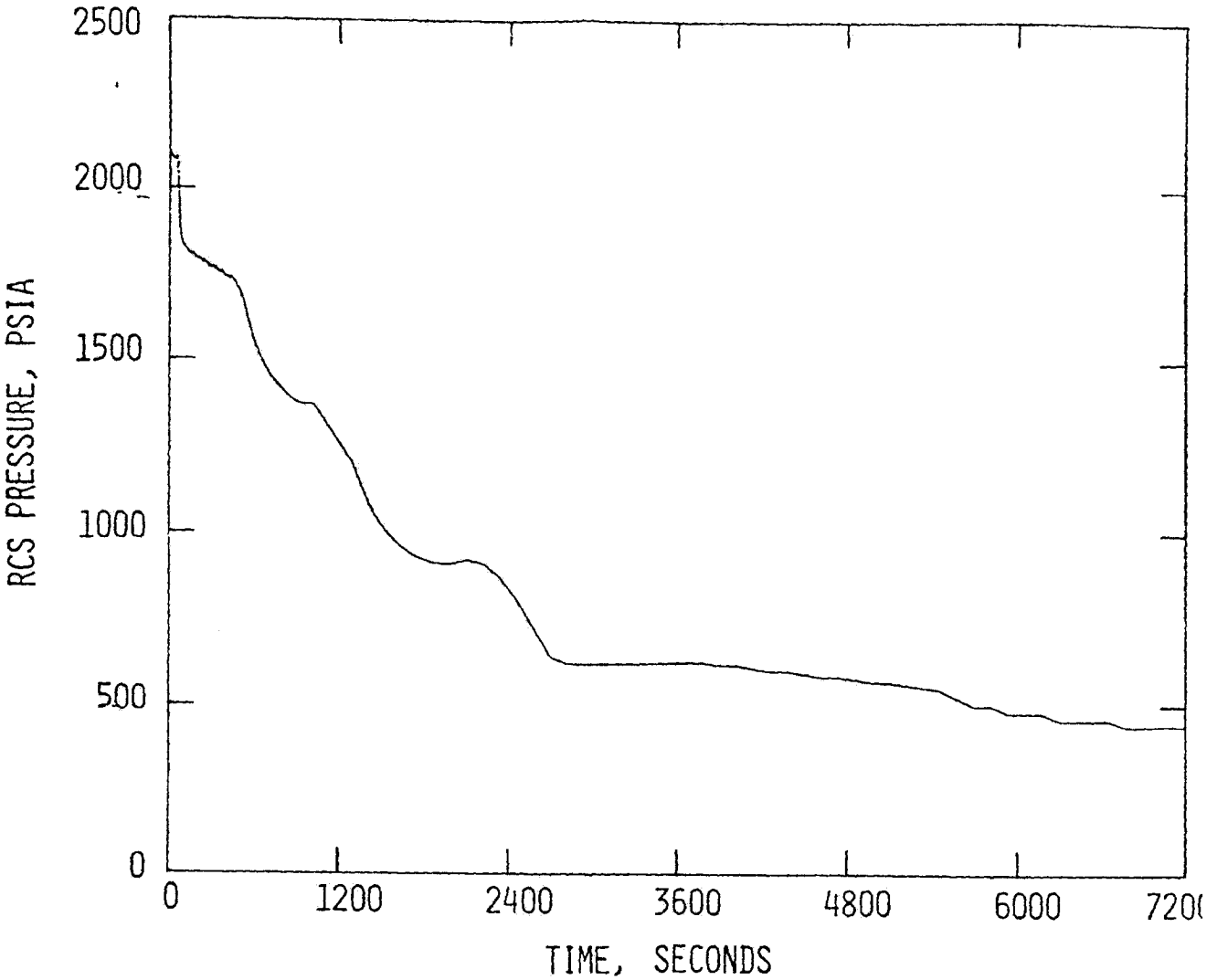


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV CORE POWER VS TIME

FIGURE 15A-2 SHEET 2 OF 2

JUNE 2001 REVISION 11

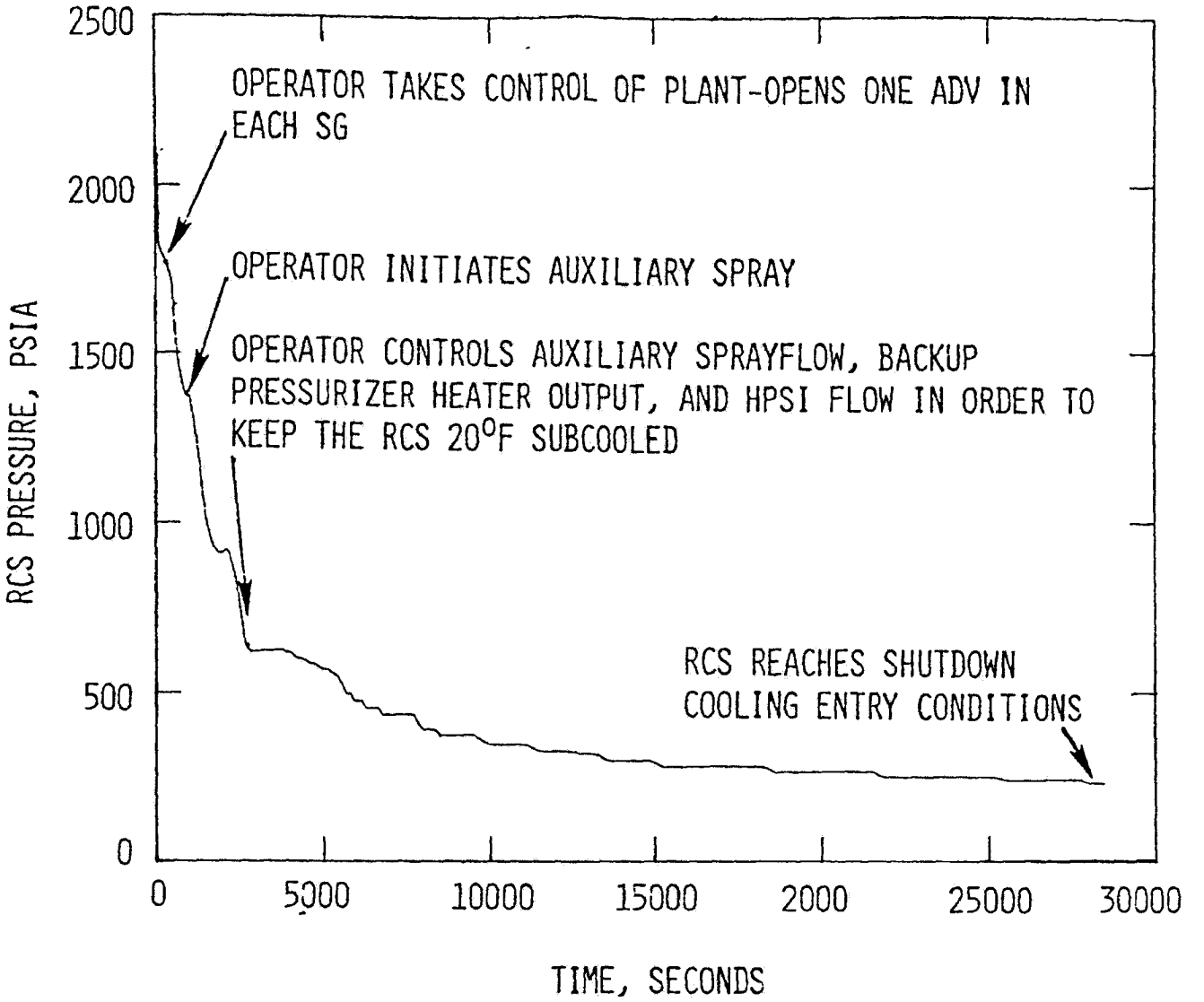


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV RCS PRESSURE VS TIME

FIGURE 15A-3 SHEET 1 OF 2

JUNE 2001 REVISION 11

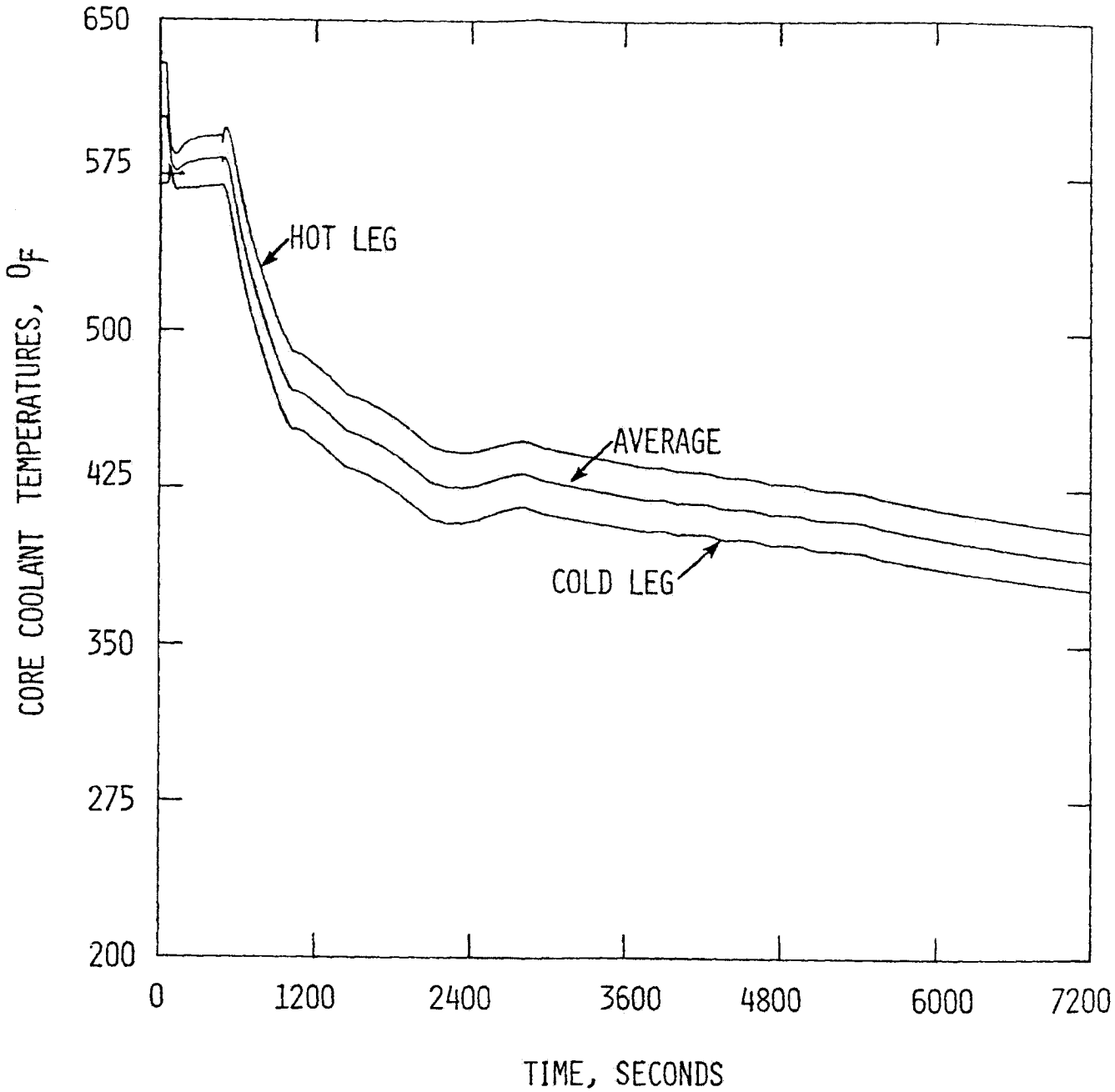


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV RCS PRESSURE VS TIME

FIGURE 15A-3 SHEET 2 OF 2

JUNE 2001 REVISION 11

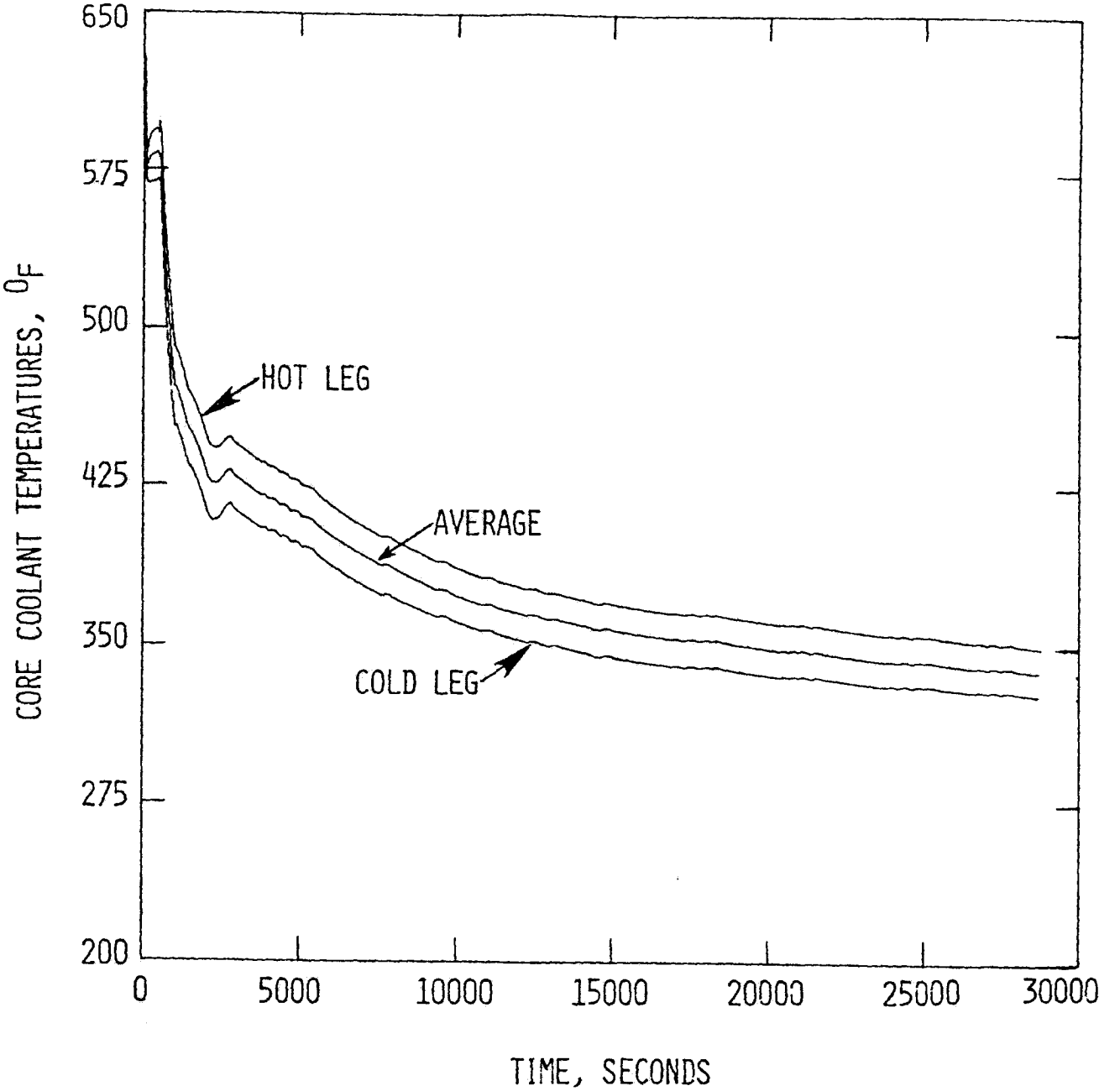


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV CORE COOLANT TEMPERATURE VS TIME

FIGURE 15A-4 SHEET 1 OF 2

JUNE 2001 REVISION 11

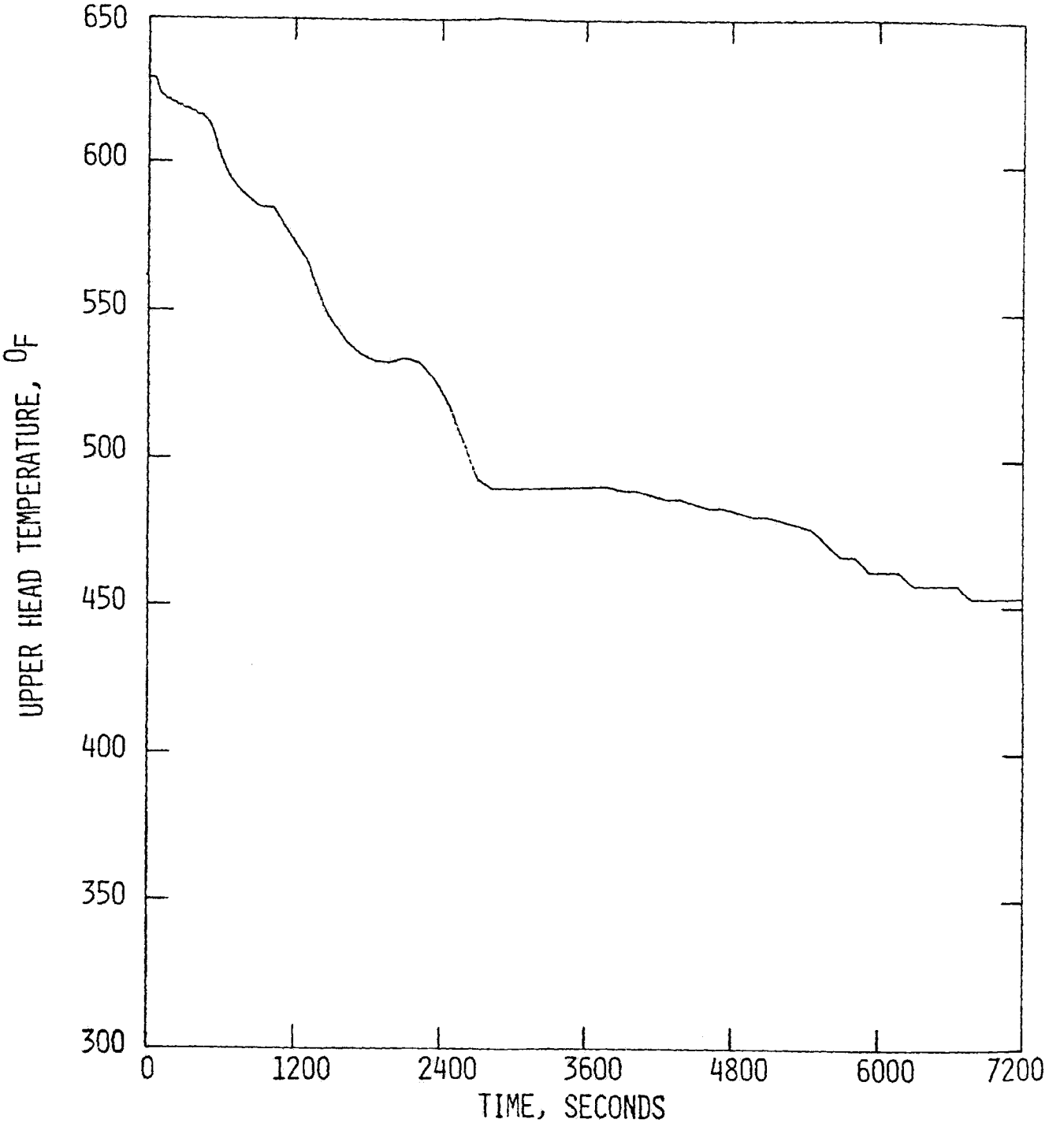


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV CORE COOLANT TEMPERATURE VS TIME

FIGURE 15A-4 SHEET 2 OF 2

JUNE 2001 REVISION 11

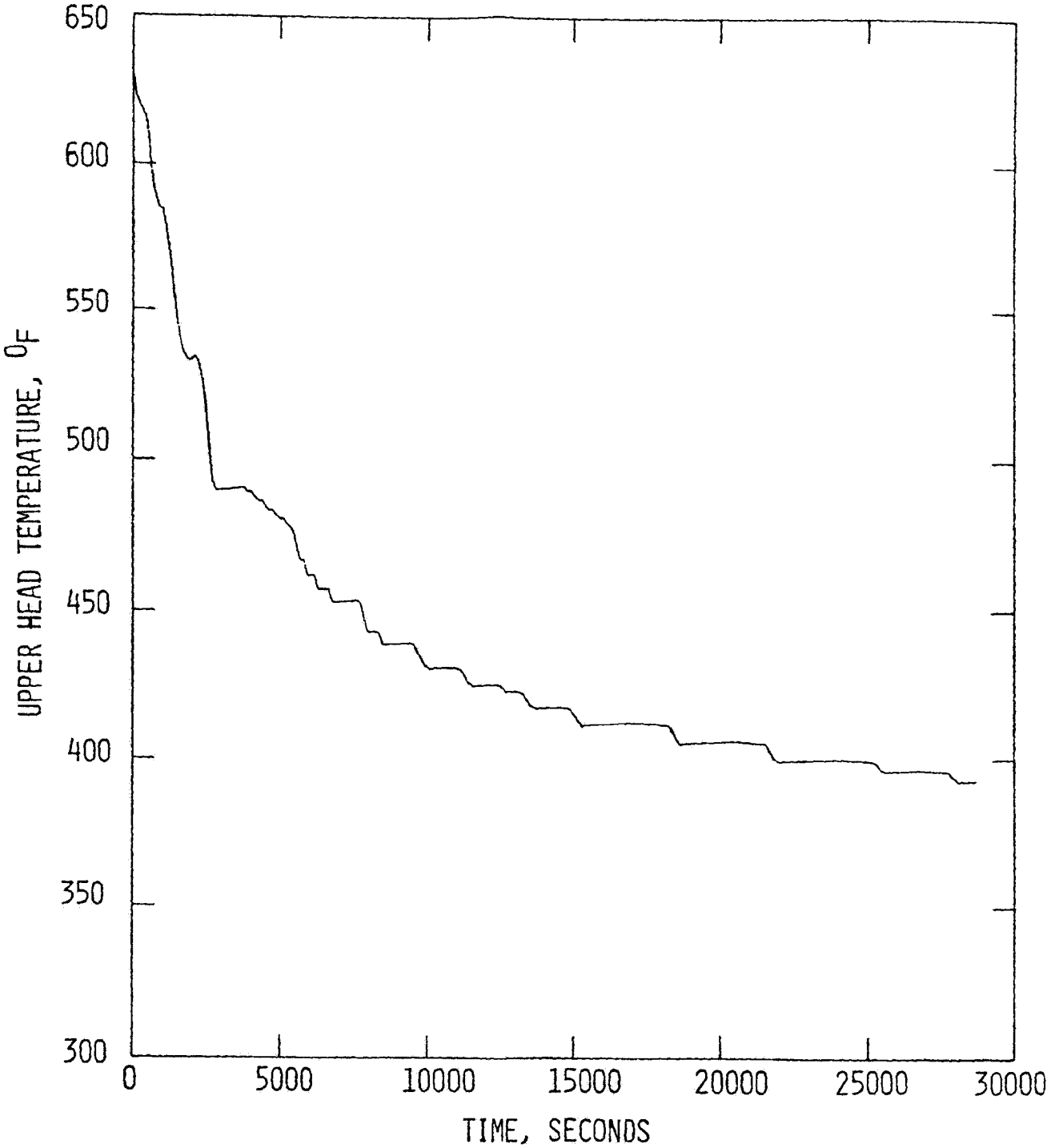


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV UPPER HEAD TEMPERATURE VS TIME

FIGURE 15A-5 SHEET 1 OF 2

JUNE 2001 REVISION 11

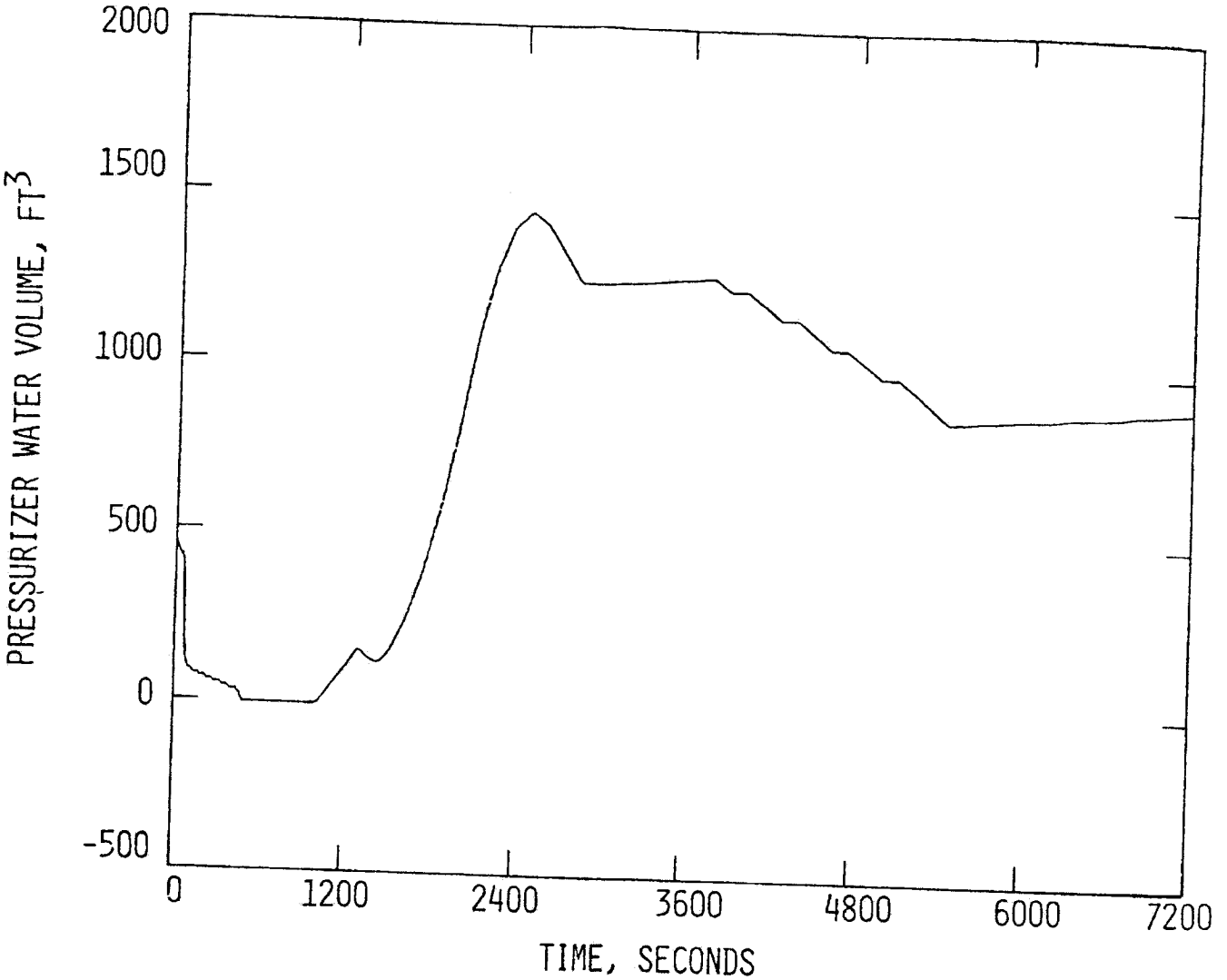


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV UPPER HEAD TEMPERATURE VS TIME

FIGURE 15A-5 SHEET 2 OF 2

JUNE 2001 REVISION 11

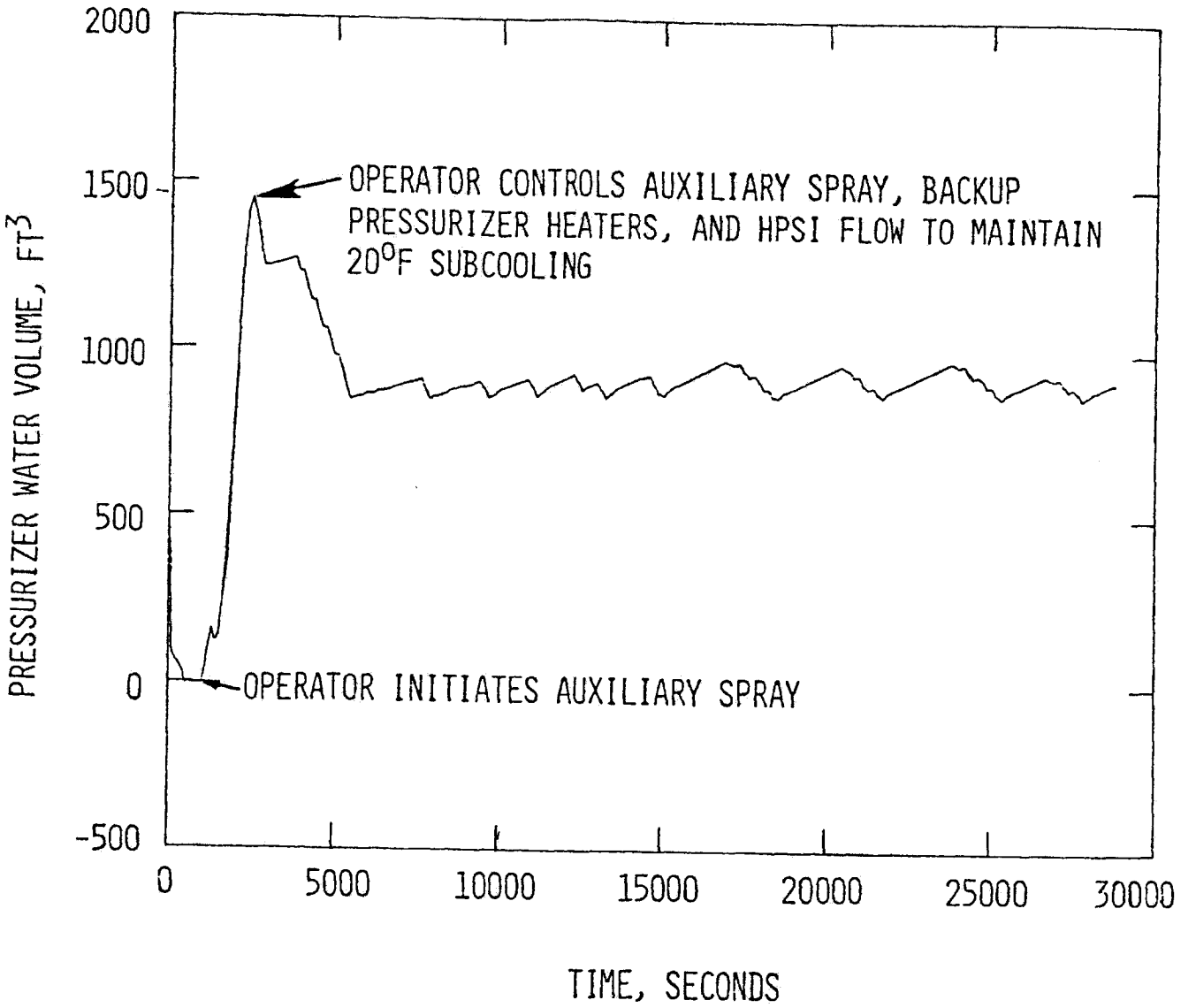


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV PRESSURIZER WATER VOLUME VS TIME

FIGURE 15A-6 SHEET 1 OF 2

JUNE 2001 REVISION 11

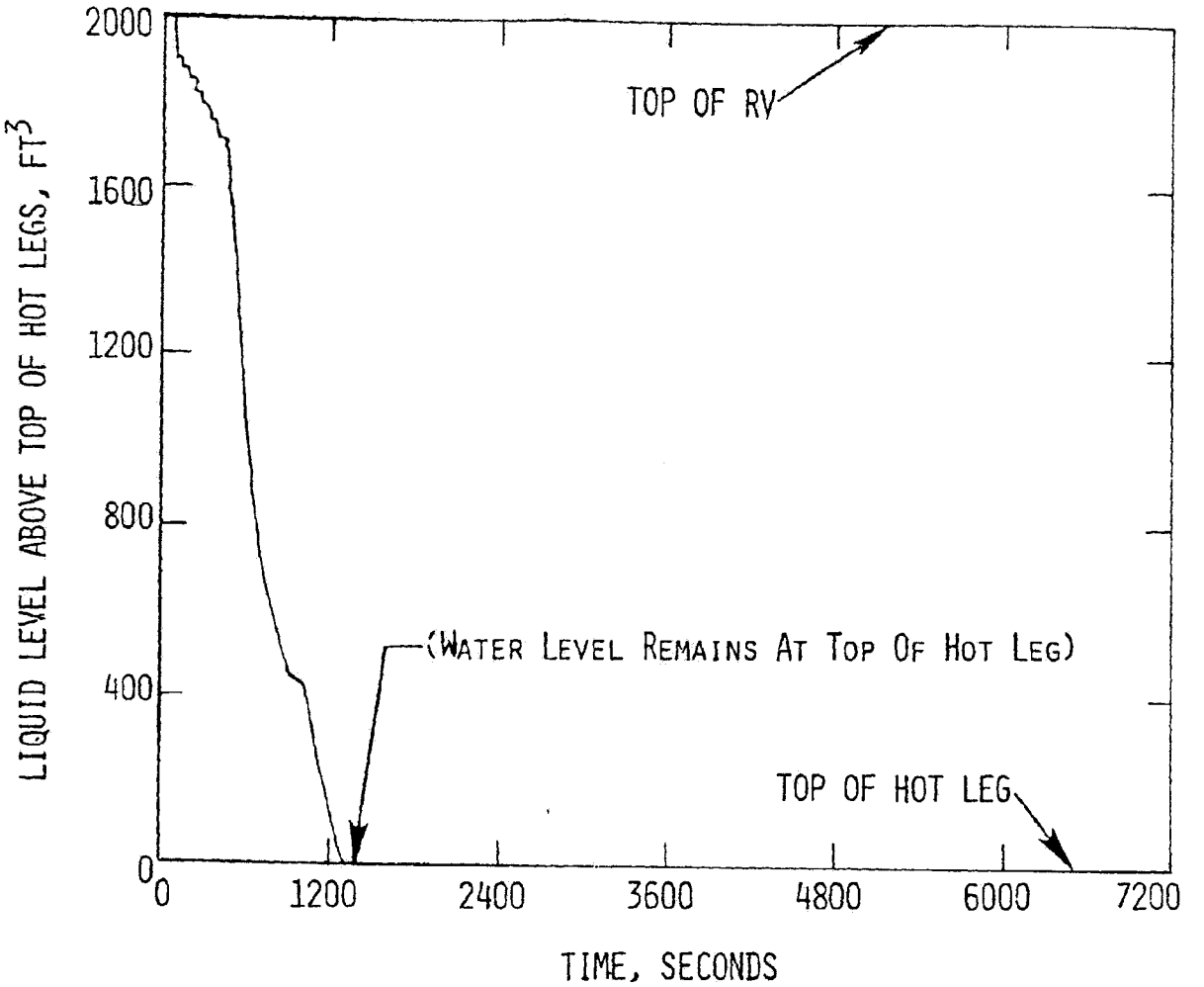


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV PRESSURIZER WATER VOLUME VS TIME

FIGURE 15A-6 SHEET 2 OF 2

JUNE 2001 REVISION 11

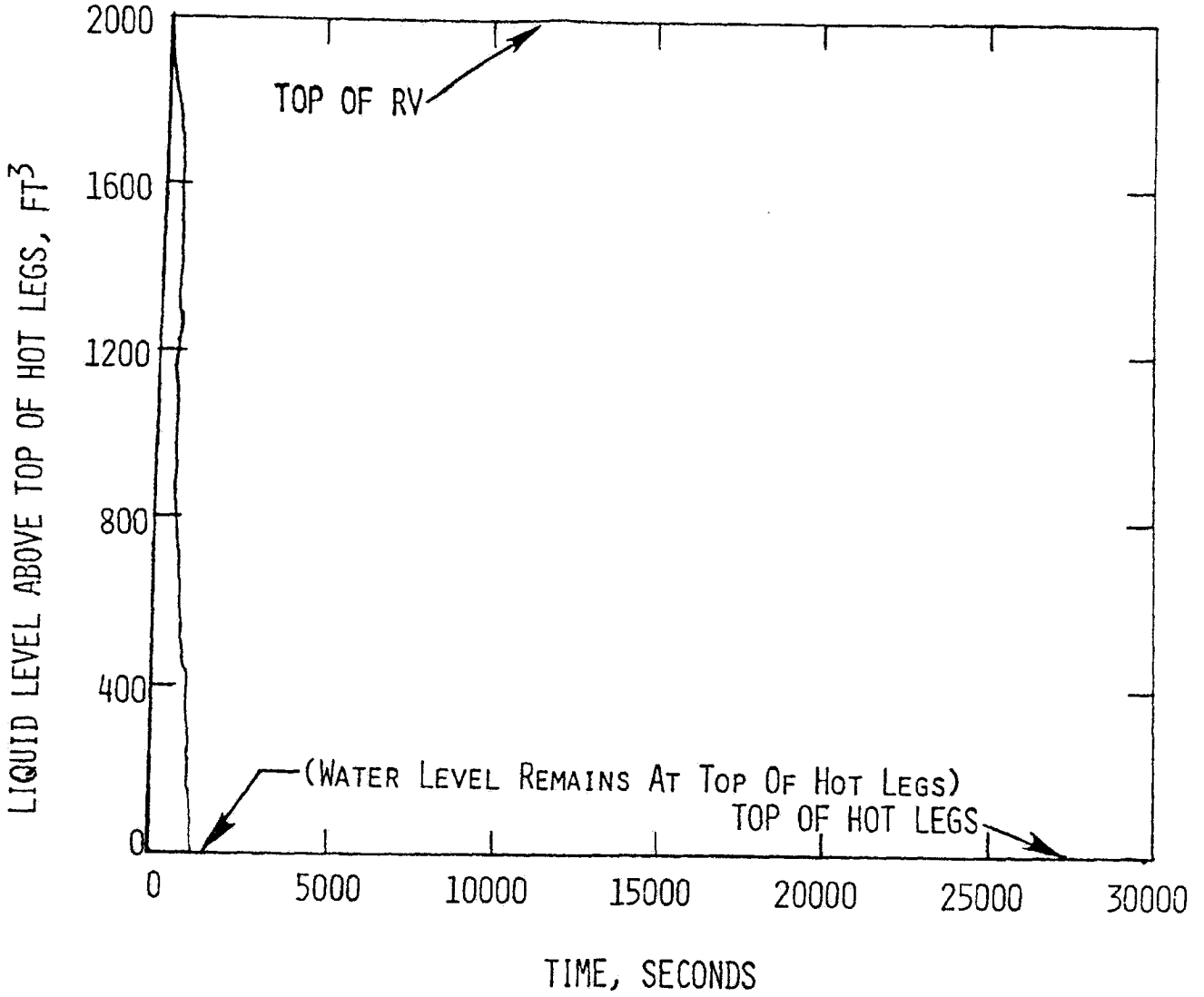


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
LIQUID VOLUME ABOVE TOP OF HOT LEG VS TIME

FIGURE 15A-7 SHEET 1 OF 2

JUNE 2001 REVISION 11

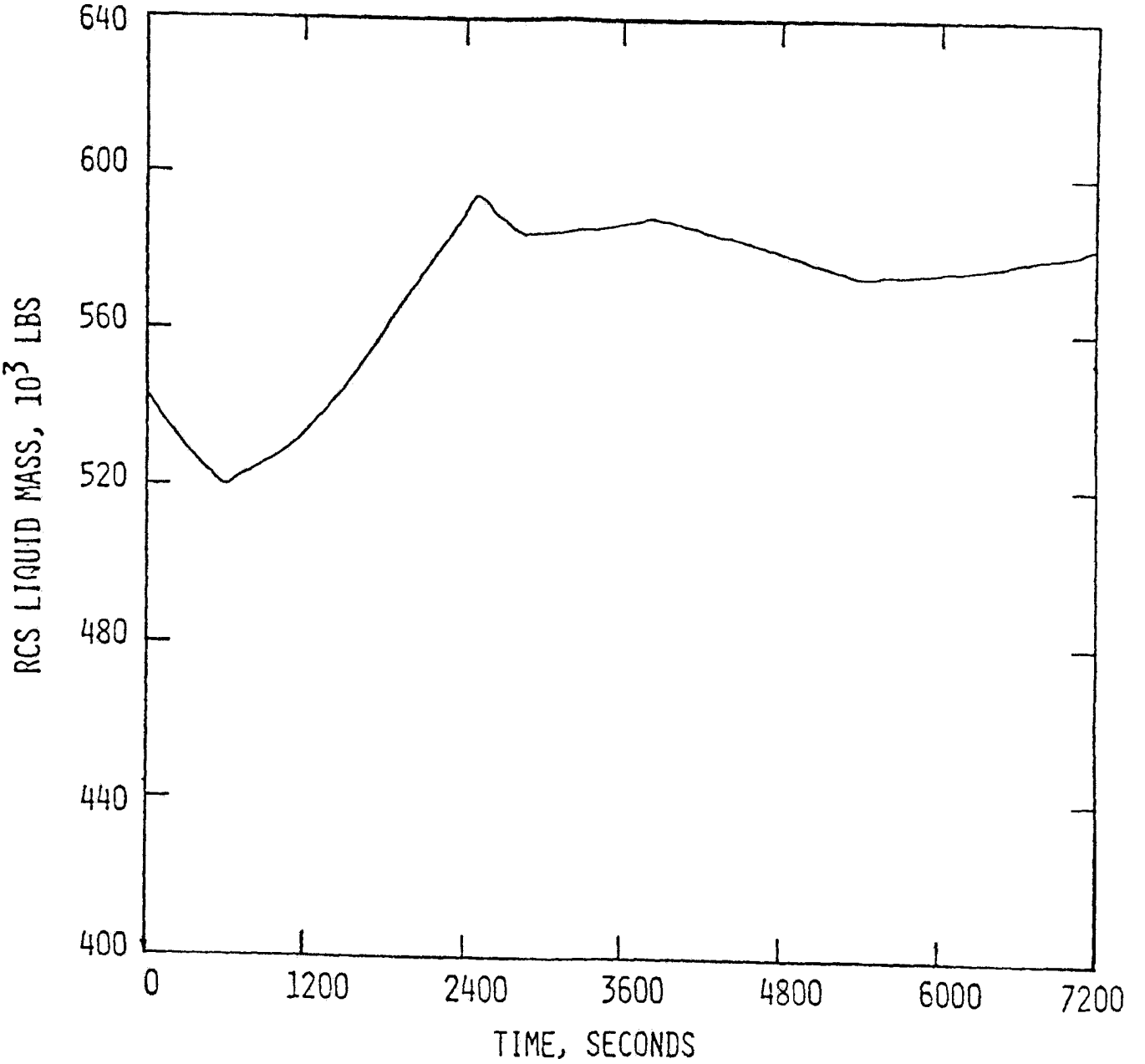


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
LIQUID VOLUME ABOVE TOP OF HOT LEG VS TIME

FIGURE 15A-7 SHEET 2 OF 2

JUNE 2001 REVISION 11

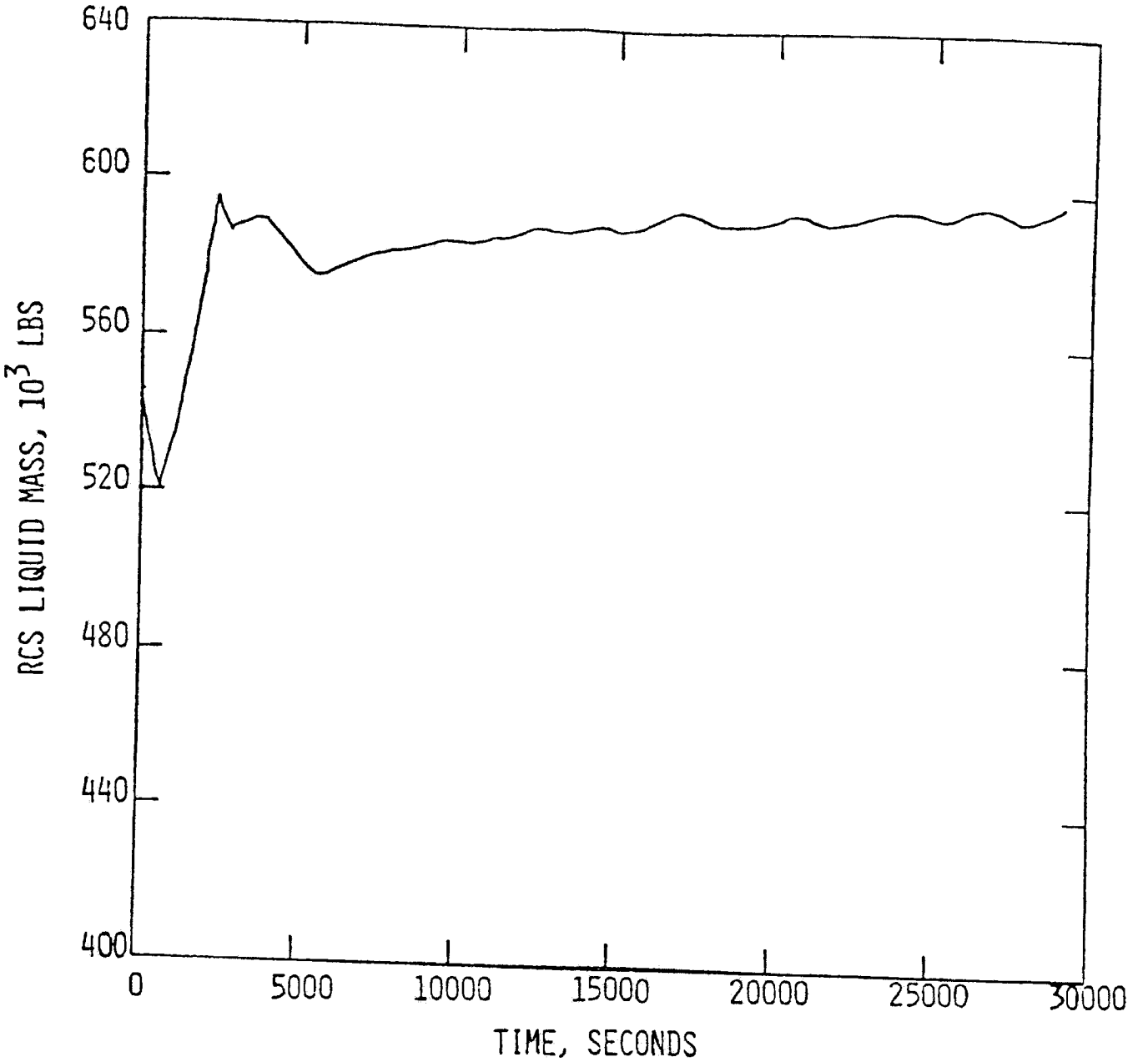


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
RCS LIQUID MASS VS TIME

FIGURE 15A-8 SHEET 1 OF 2

JUNE 2001 REVISION 11

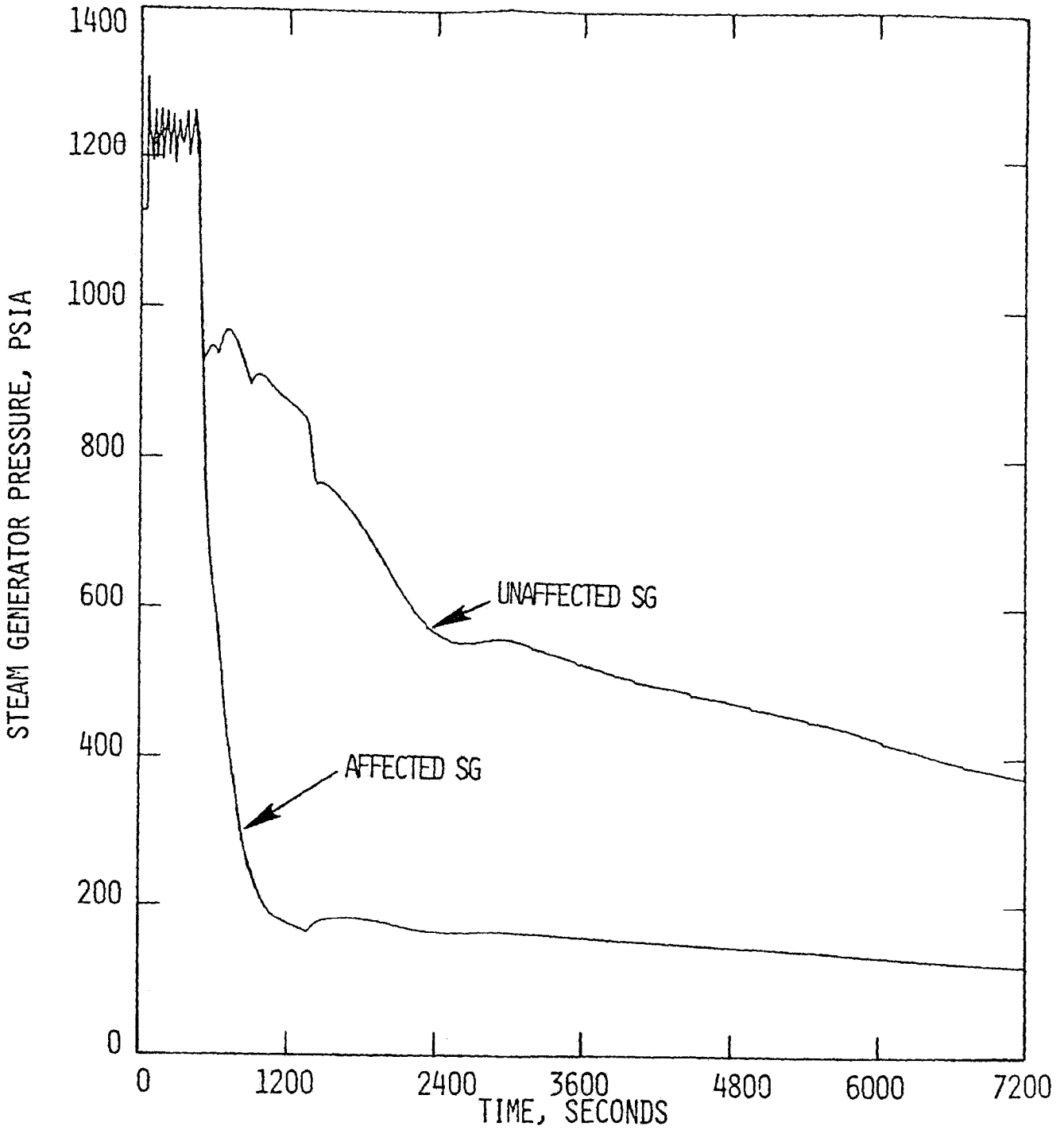


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
RCS LIQUID MASS VS TIME

FIGURE 15A-8 SHEET 2 OF 2

JUNE 2001 REVISION 11

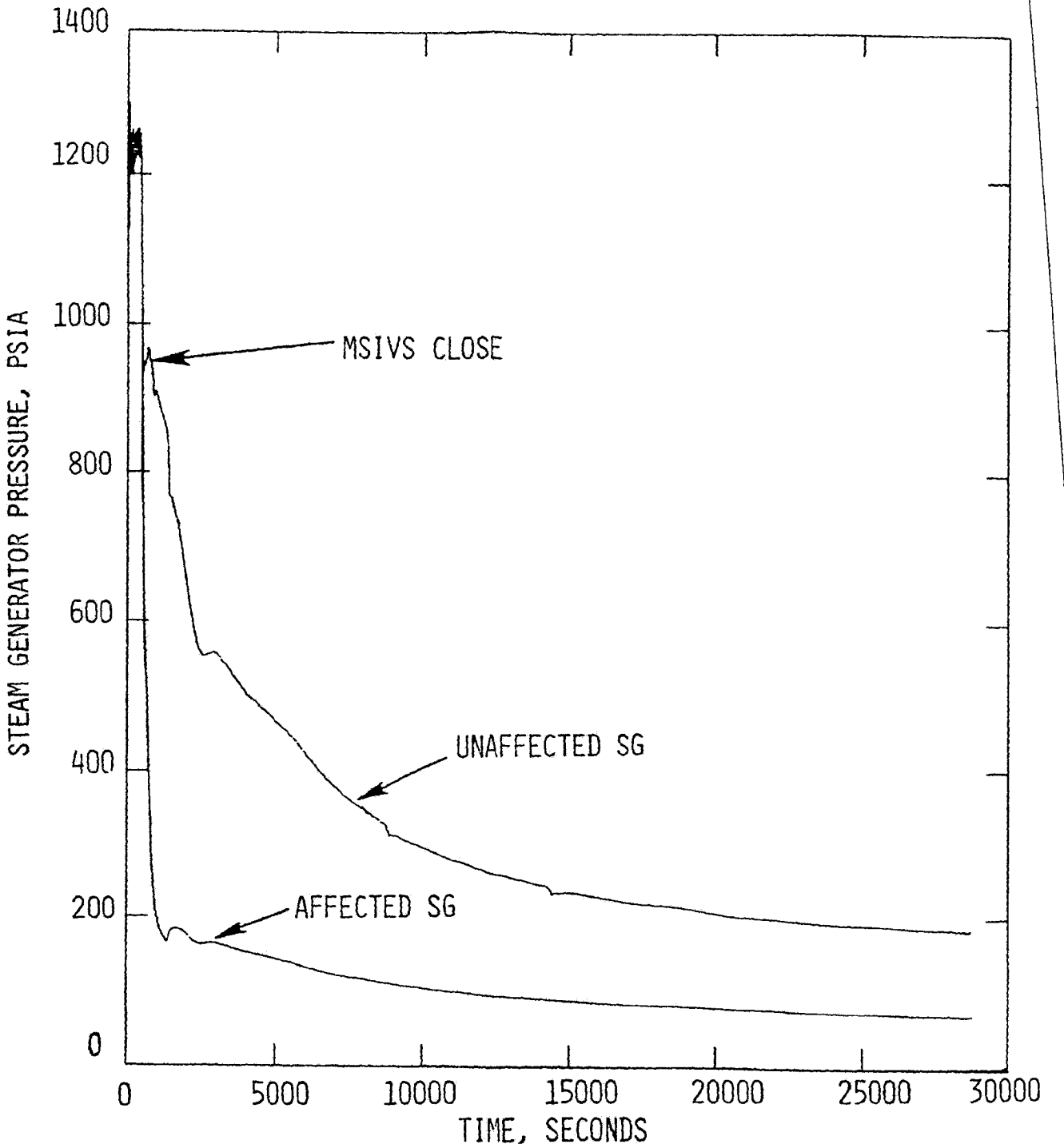


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV STEAM GENERATOR PRESSURE VS TIME

FIGURE 15A-9 SHEET 1 OF 2

JUNE 2001 REVISION 11

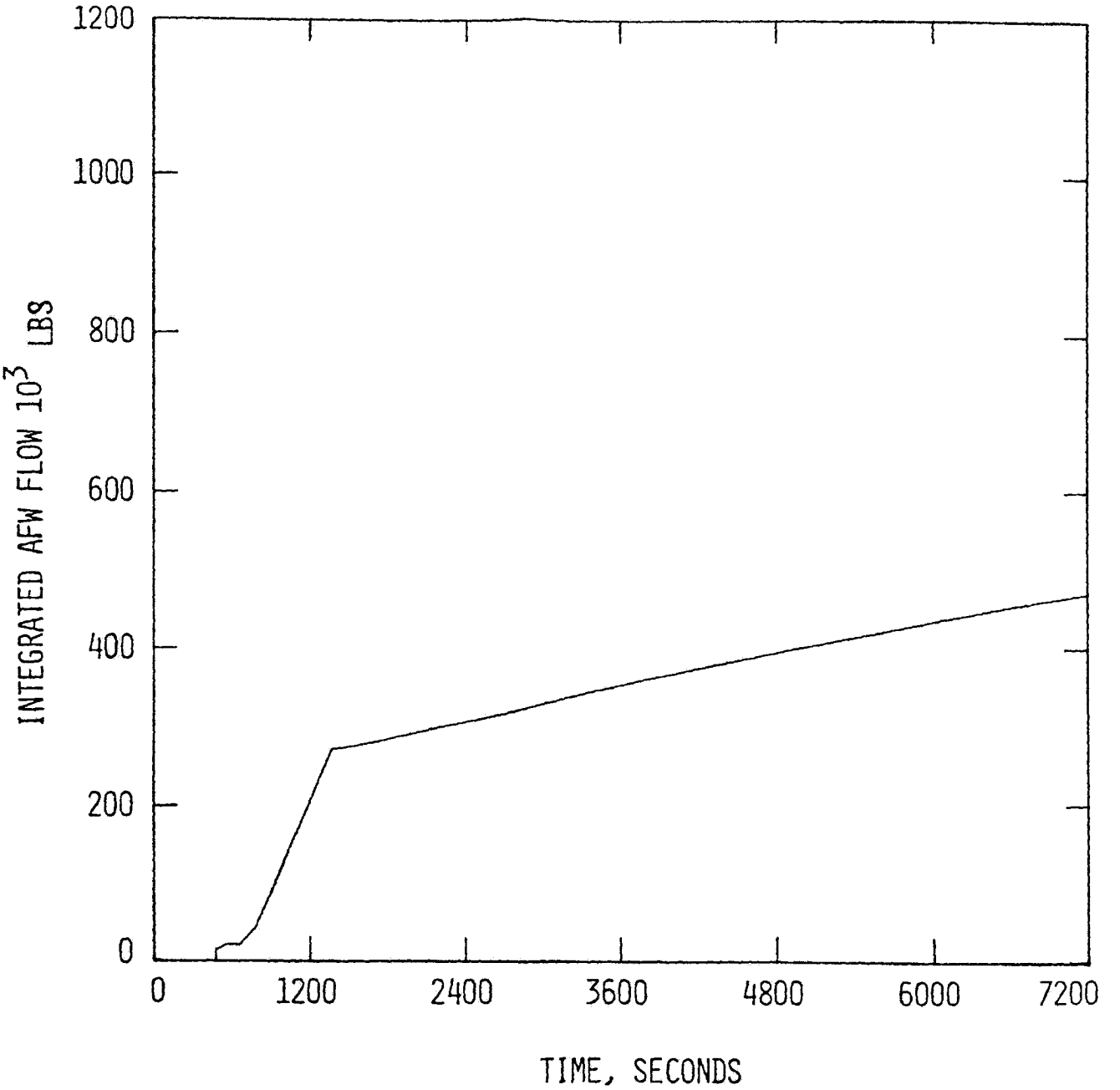


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
STEAM GENERATOR PRESSURE VS TIME

FIGURE 15A-9 SHEET 2 OF 2

JUNE 2001 REVISION 11

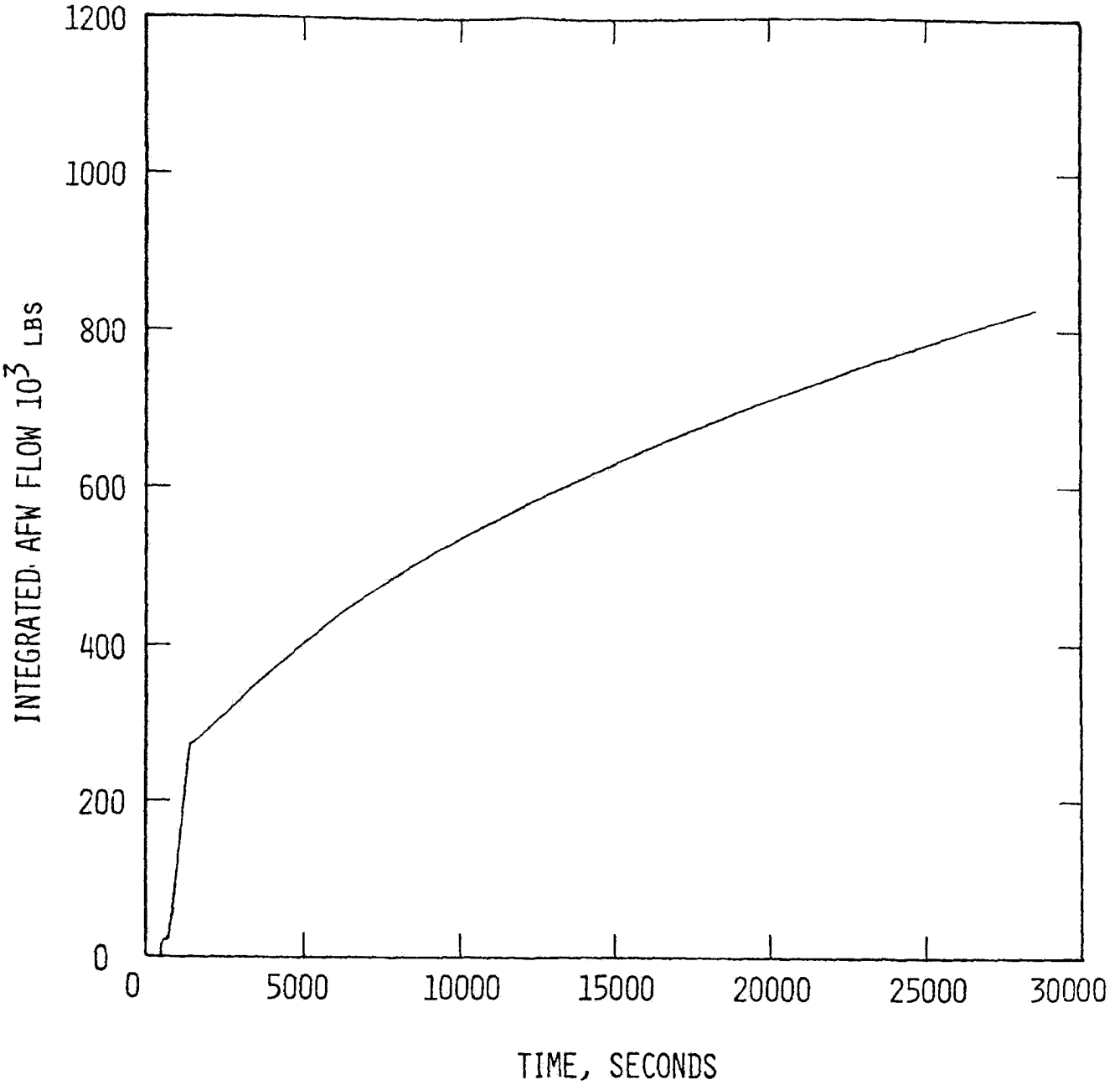


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV INTEGRATED AFW FLOW TO AFFECTED S/G VS TIME

FIGURE 15A-10 SHEET 1 OF 2

JUNE 2001 REVISION 11

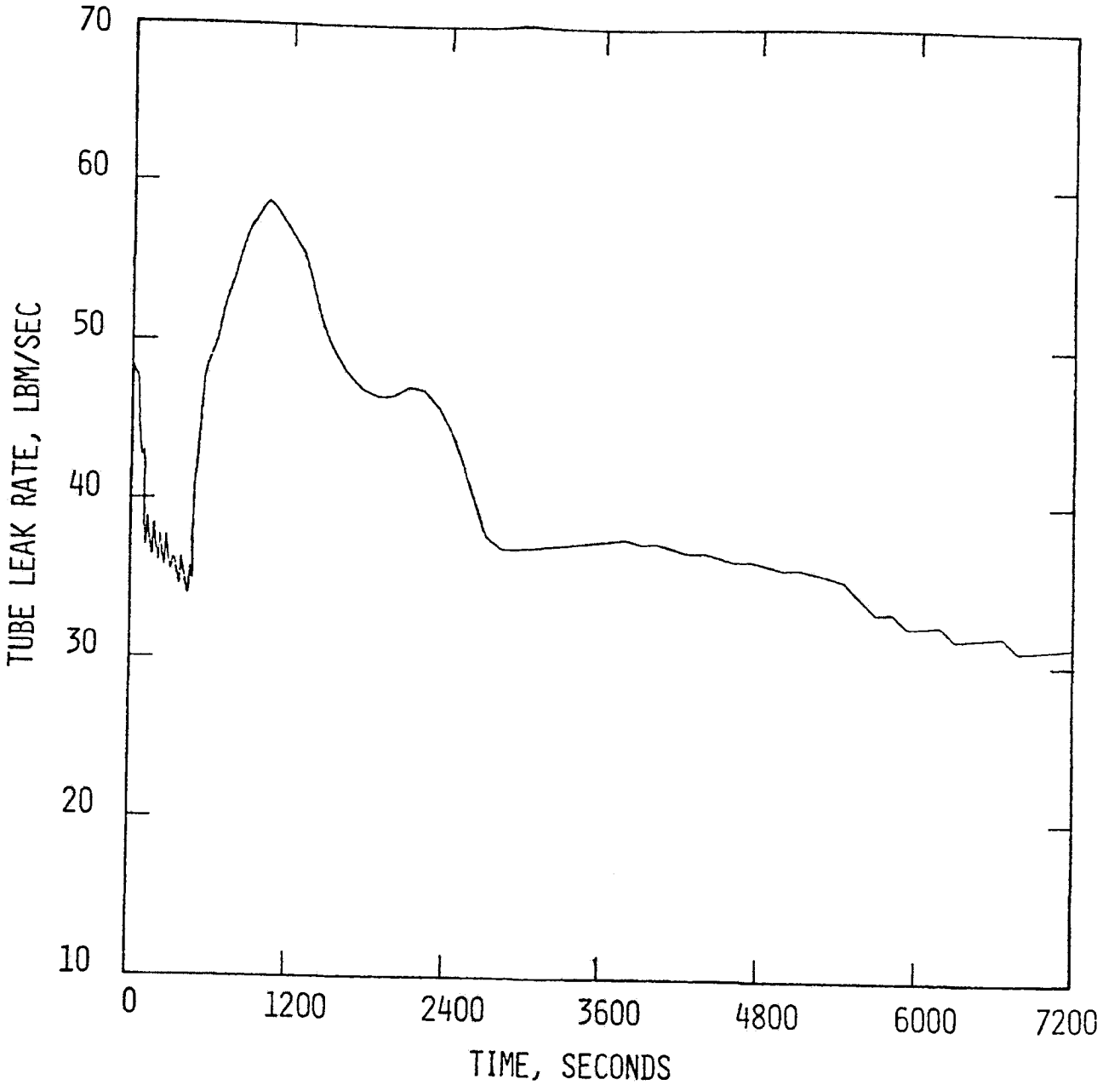


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV INTEGRATED AFW FLOW TO AFFECTED S/G VS TIME

FIGURE 15A-10 SHEET 2 OF 2

JUNE 2001 REVISION 11

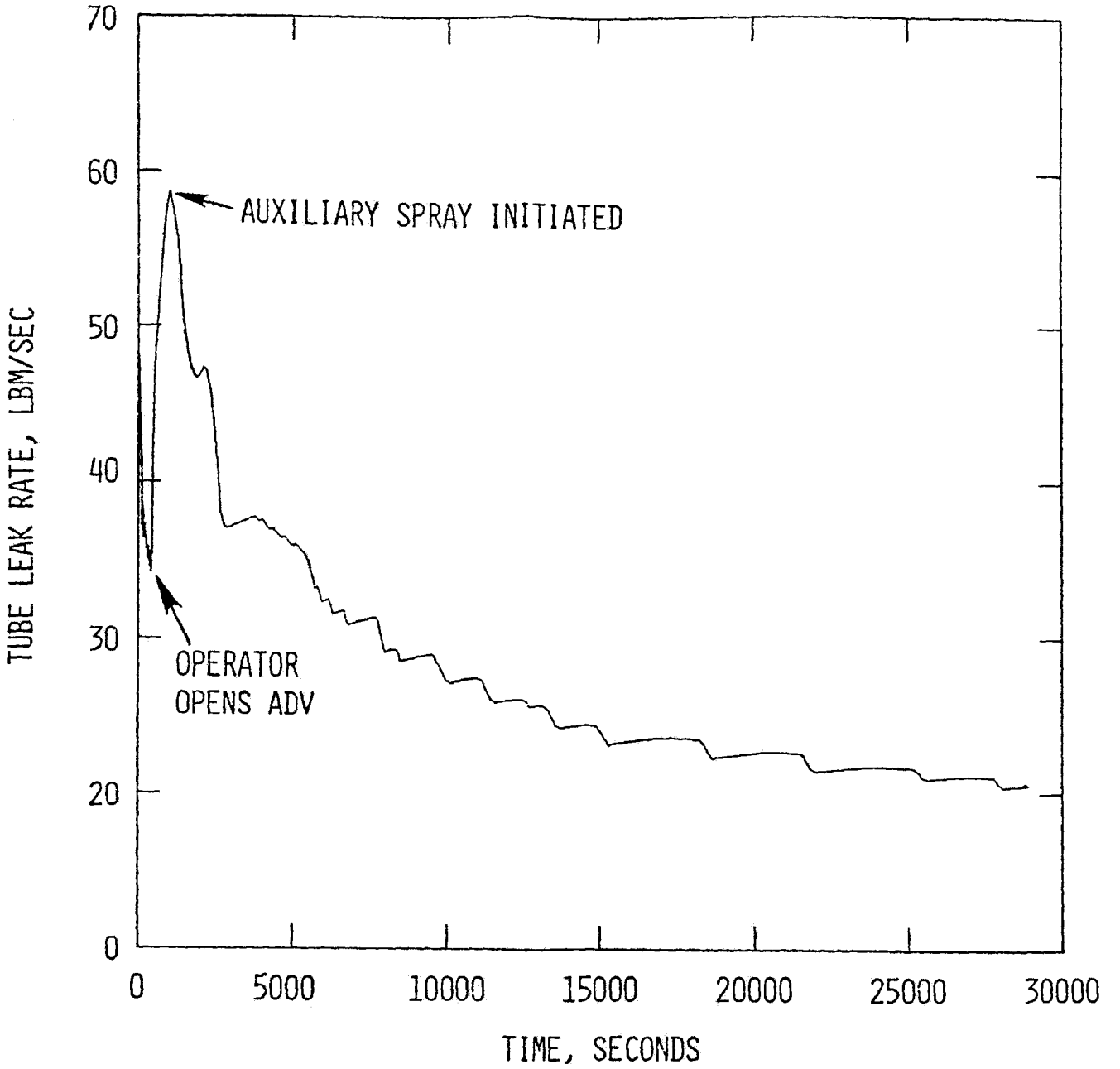


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
TUBE LEAK RATE VS TIME

FIGURE 15A-11 SHEET 1 OF 2

JUNE 2001 REVISION 11

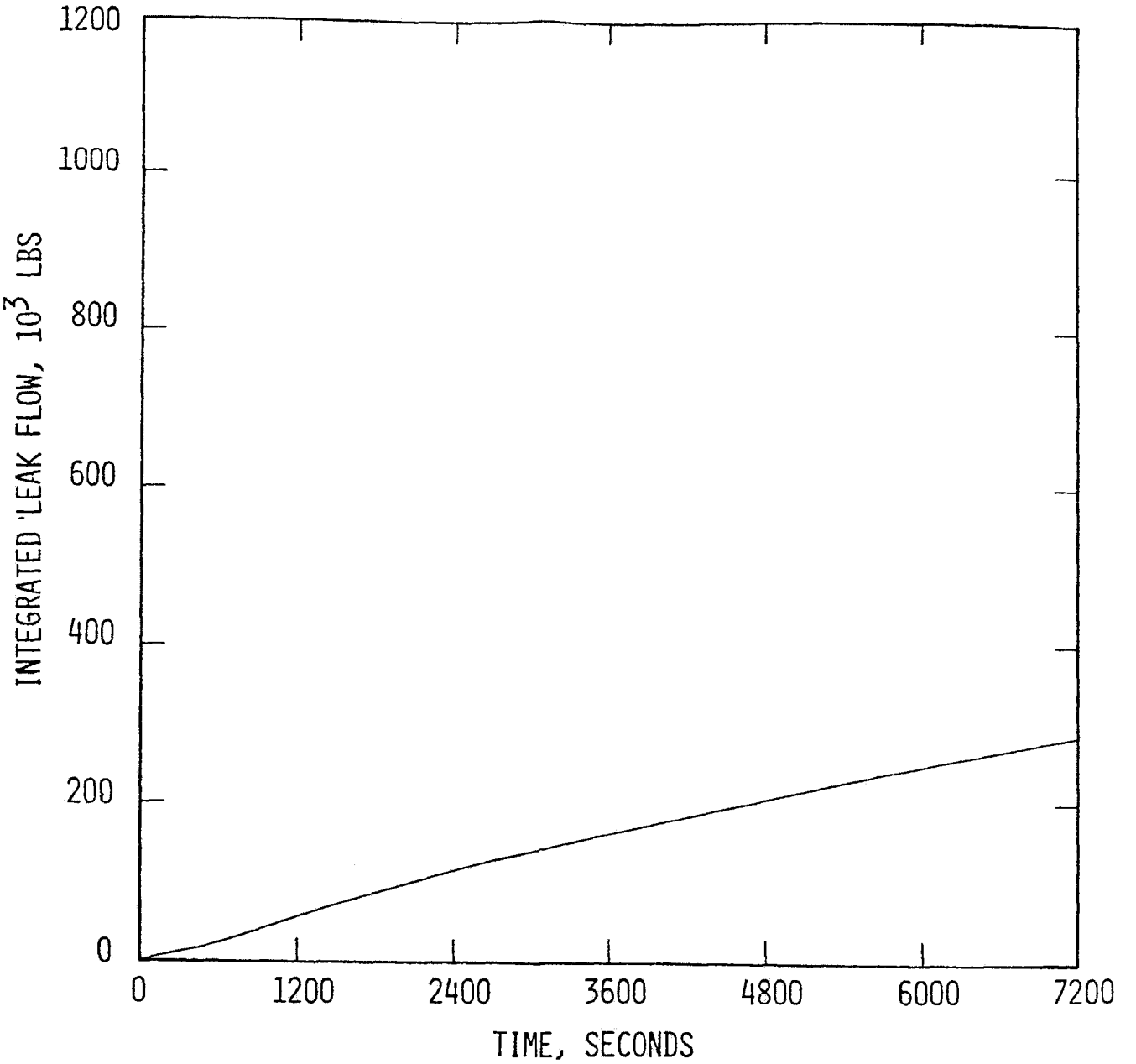


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
TUBE LEAK RATE VS TIME

FIGURE 15A-11 SHEET 2 OF 2

JUNE 2001 REVISION 11

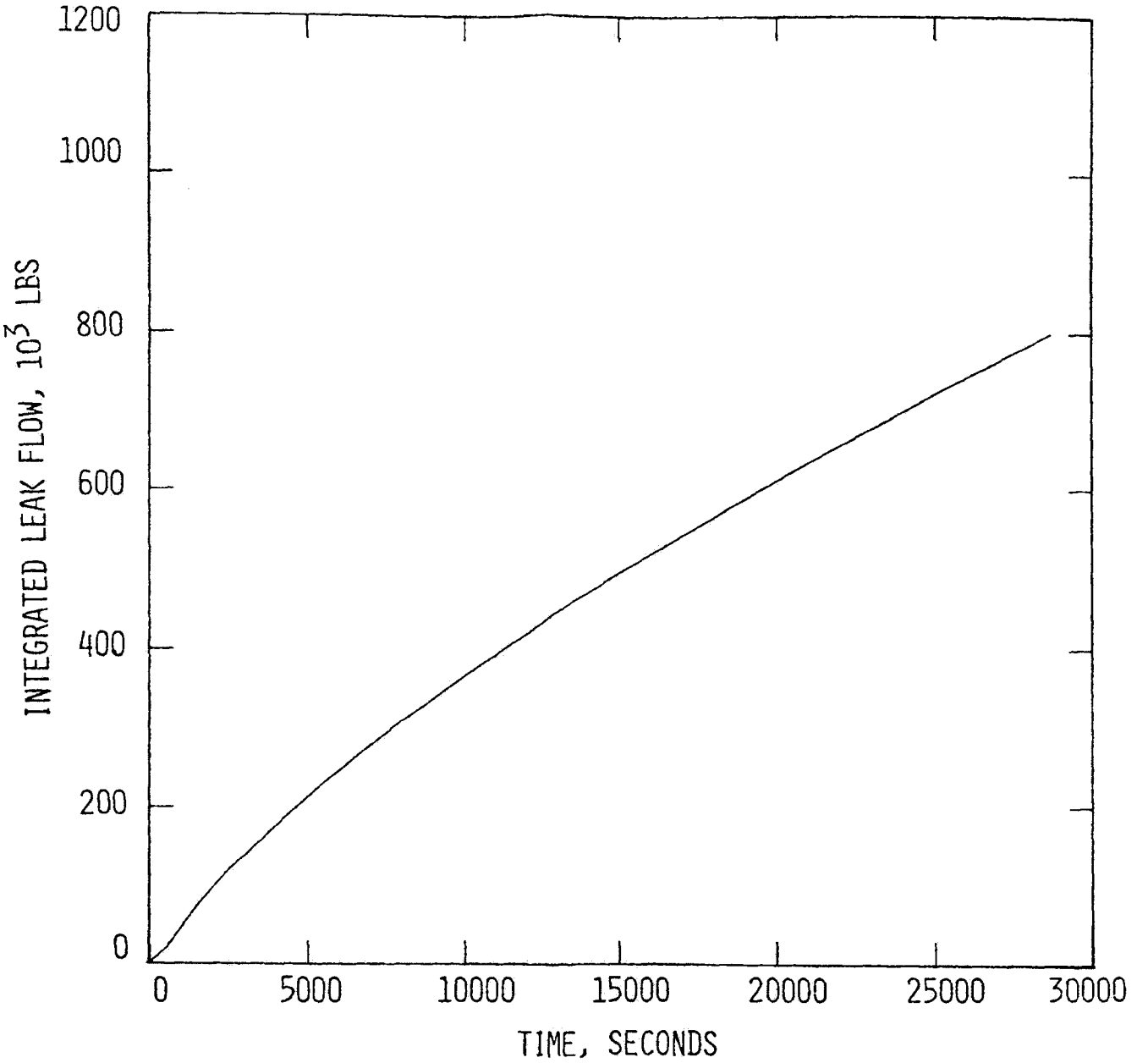


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
INTEGRATED LEAK FLOW VS TIME

FIGURE 15A-12 SHEET 1 OF 2

JUNE 2001 REVISION 11

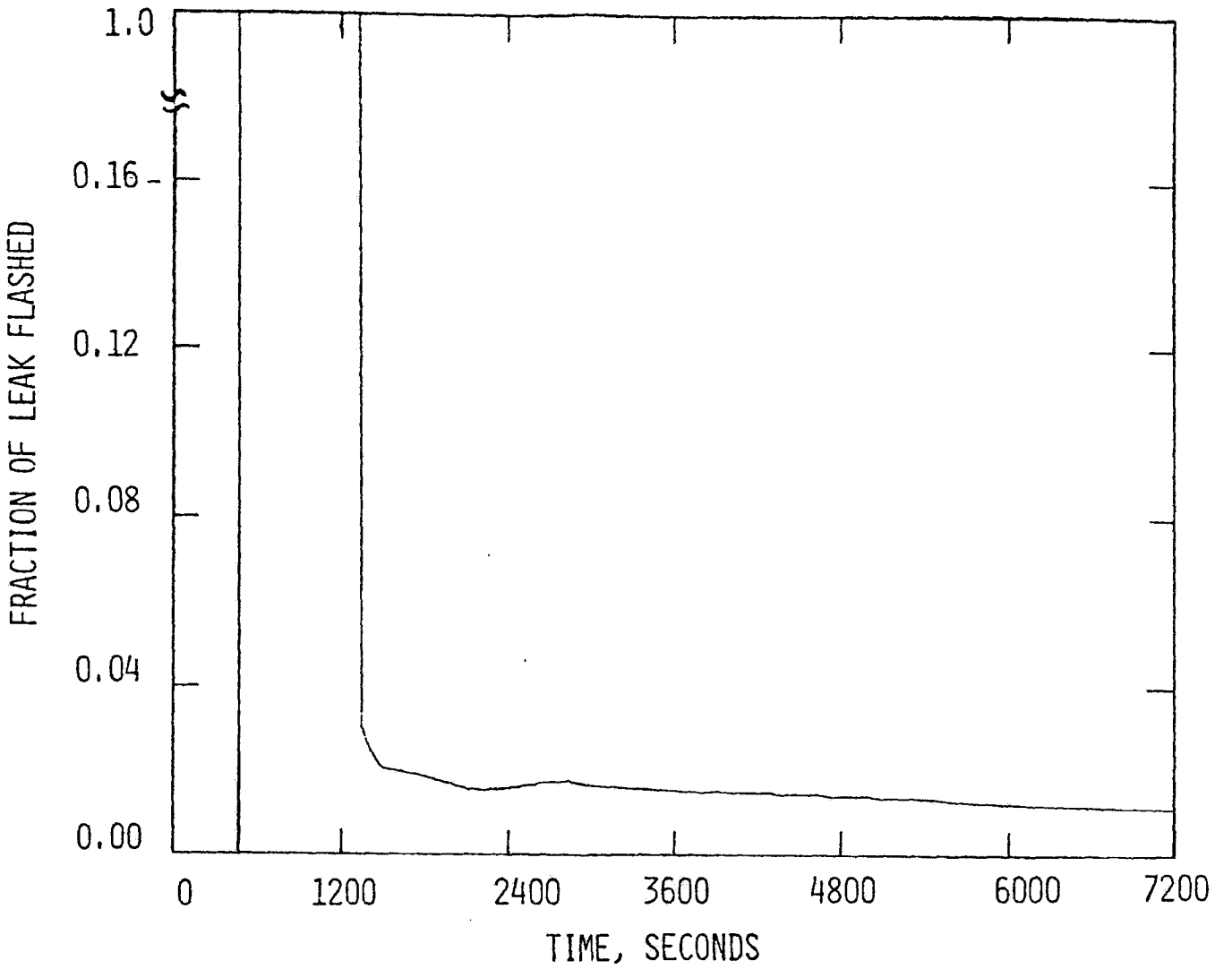


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
INTEGRATED LEAK FLOW VS TIME

FIGURE 15A-12 SHEET 2 OF 2

JUNE 2001 REVISION 11

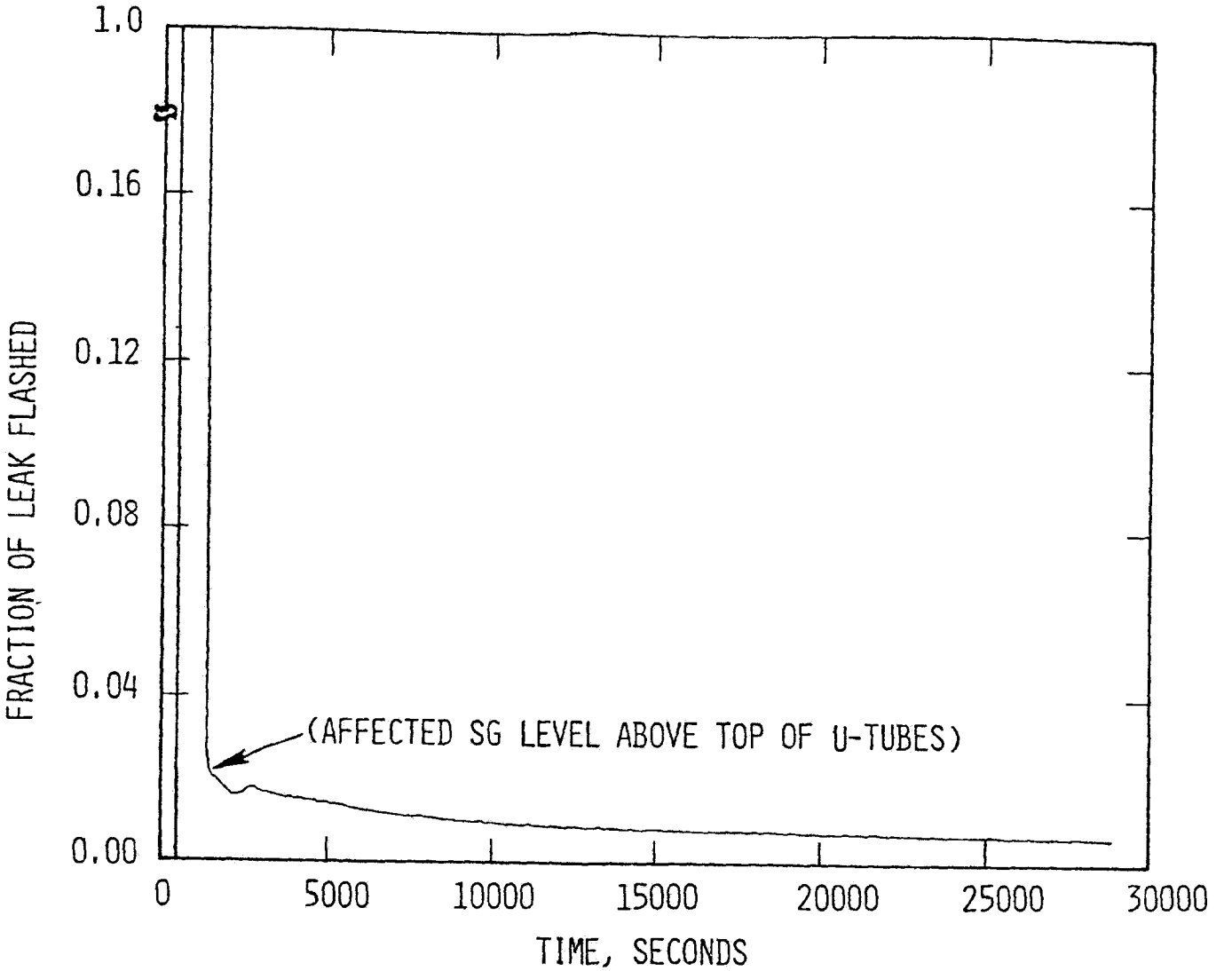


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS
OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
FRACTION OF LEAK FLASHED VS TIME

FIGURE 15A-13 SHEET 1 OF 2

JUNE 2001 REVISION 11

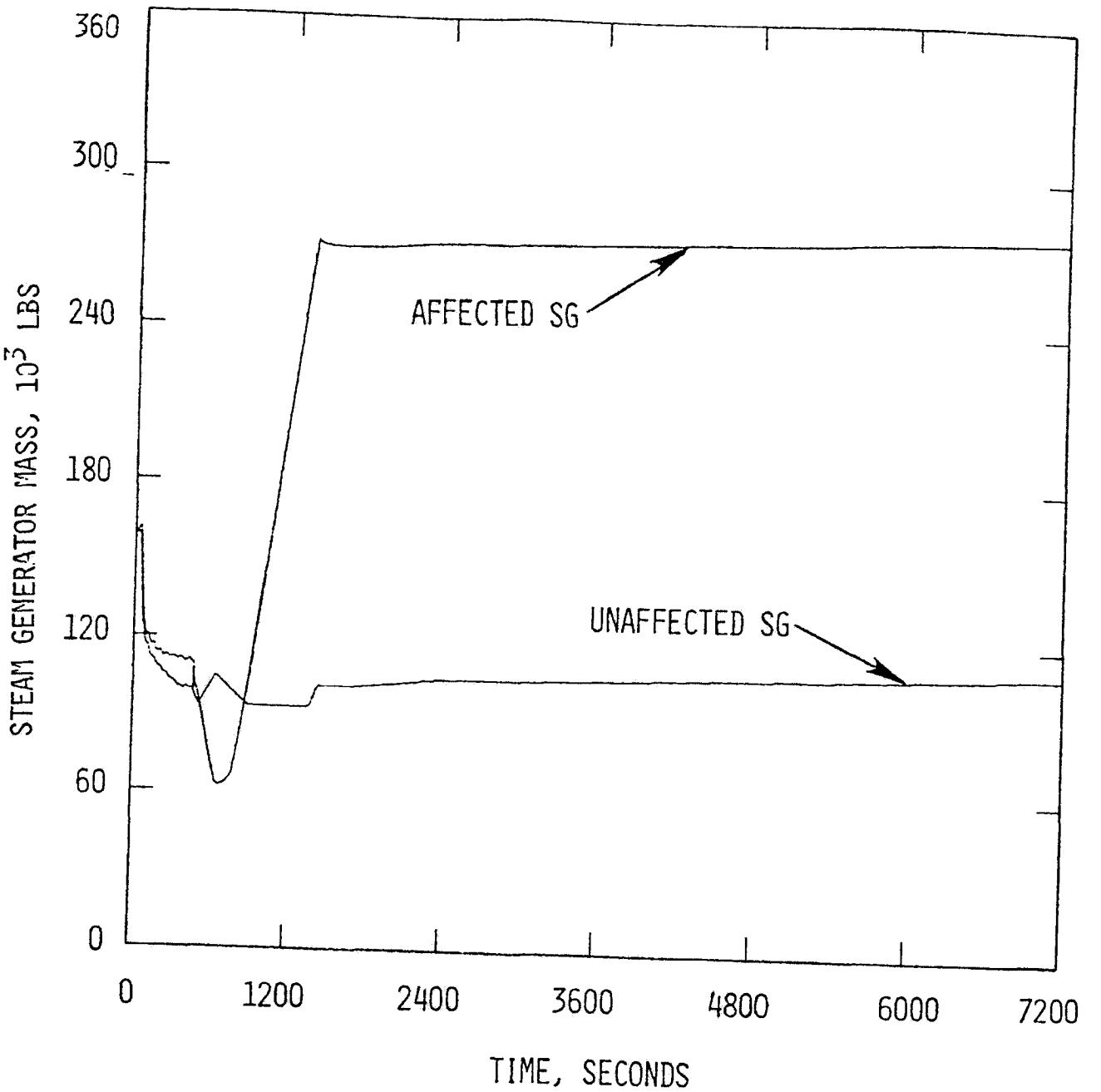


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
FRACTION OF LEAK FLASHED VS TIME

FIGURE 15A-13 SHEET 2 OF 2

JUNE 2001 REVISION 11

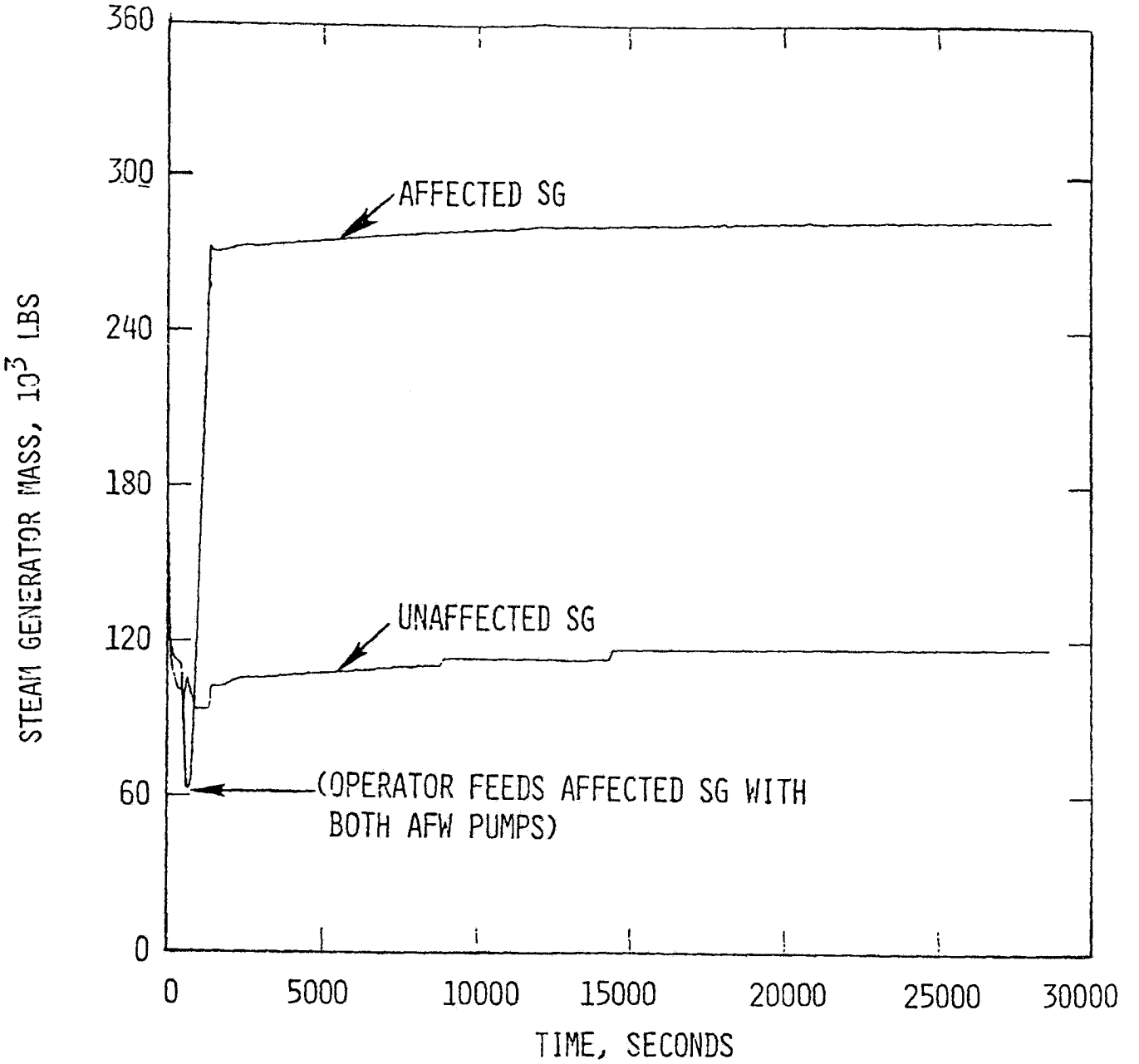


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
STEAM GENERATOR MASS VS TIME

FIGURE 15A-14 SHEET 1 OF 2

JUNE 2001 REVISION 11

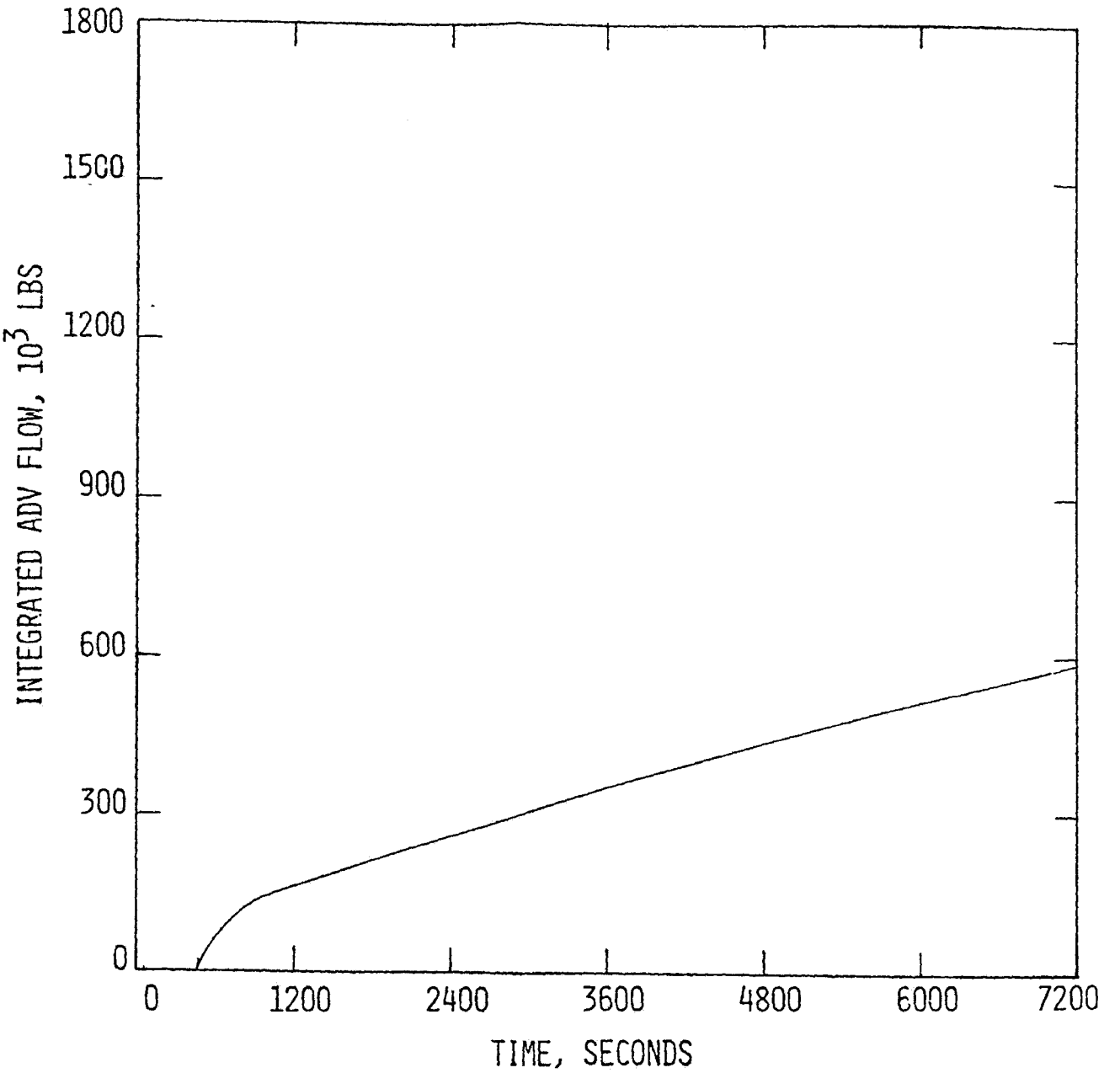


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS
OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
STEAM GENERATOR MASS VS TIME

FIGURE 15A-14 SHEET 2 OF 2

JUNE 2001 REVISION 11

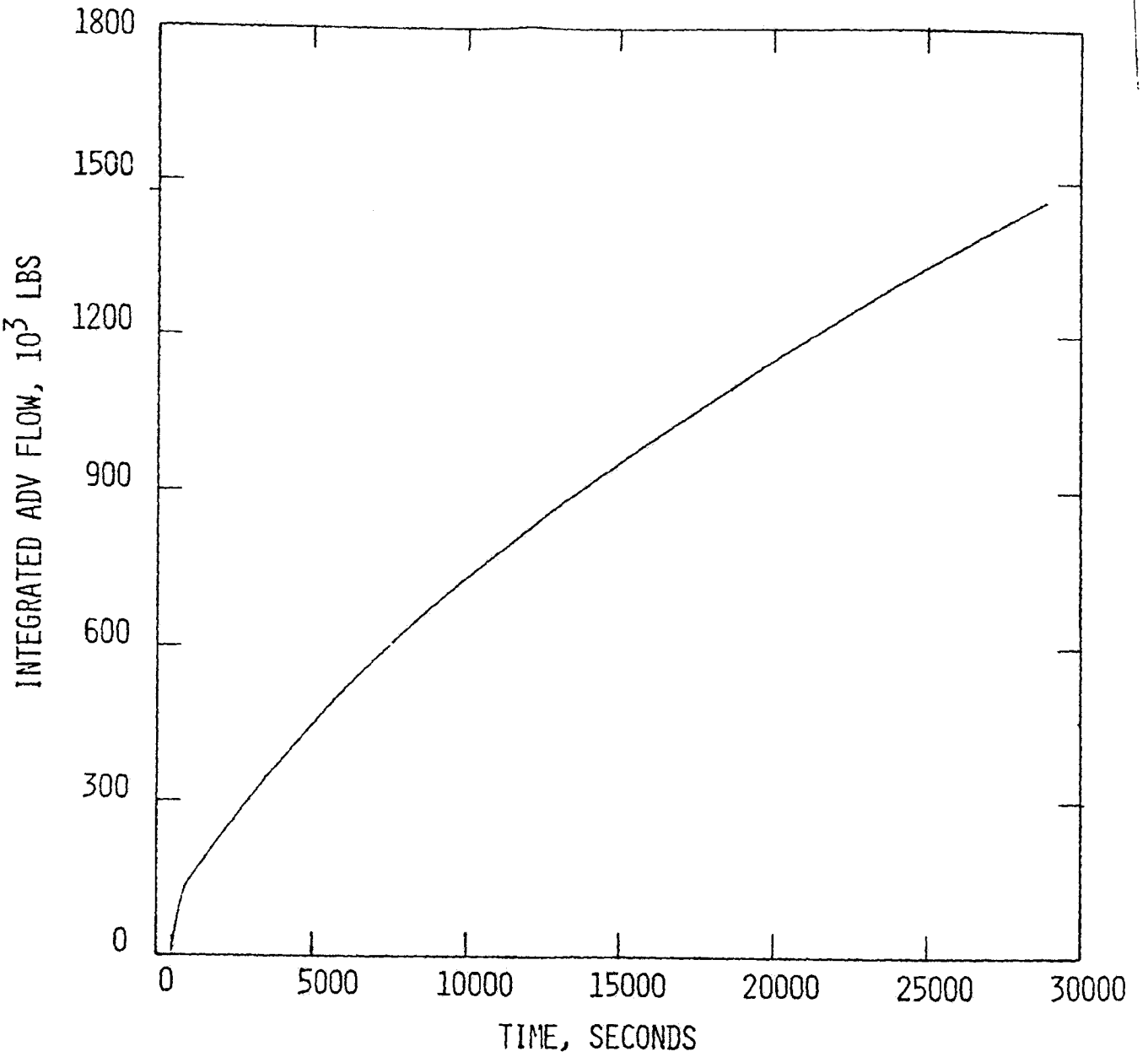


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV INTEGRATED ADV FLOW VS TIME

FIGURE 15A-15 SHEET 1 OF 2

JUNE 2001 REVISION 11

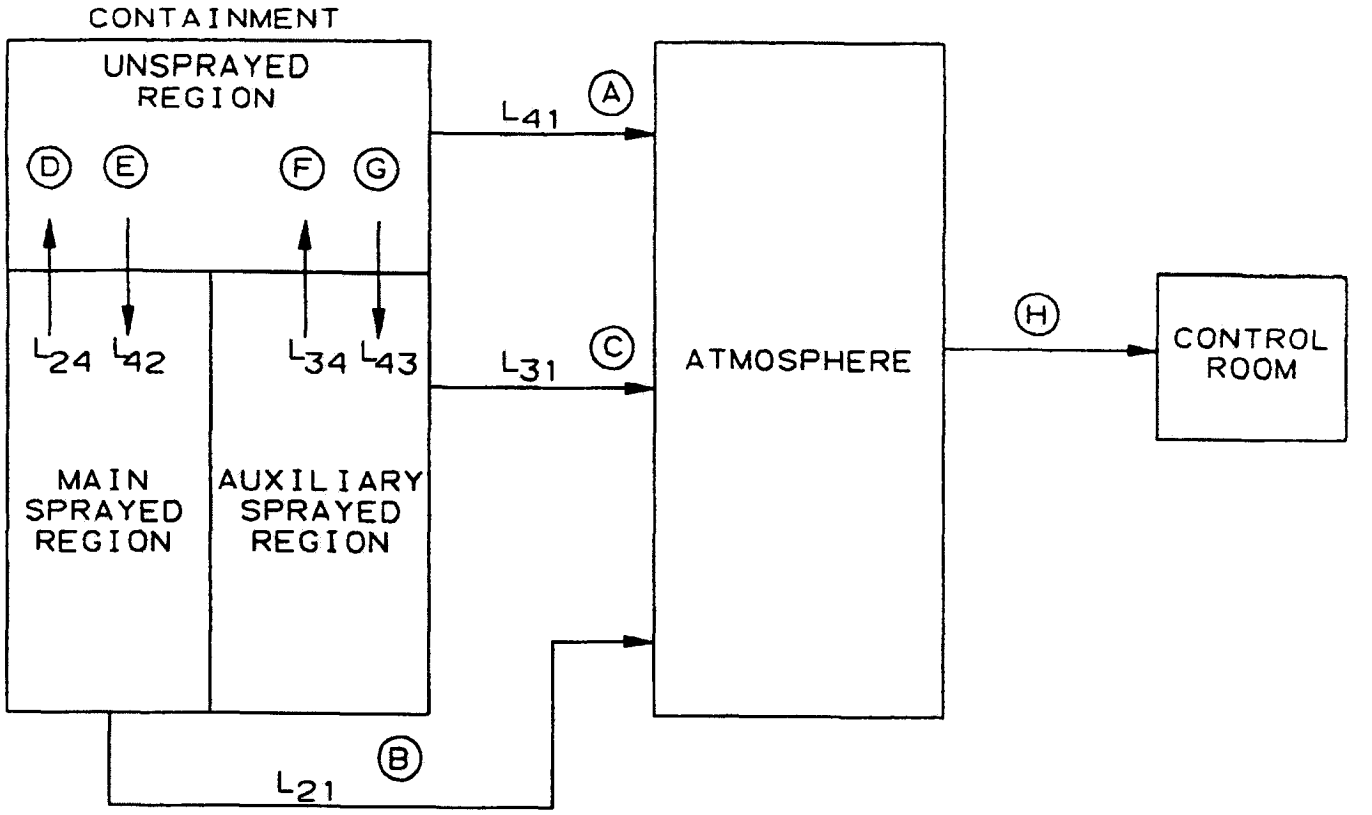


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

STEAM GENERATOR TUBE RUPTURE WITH LOSS OF OFFSITE POWER AND A FULLY STUCK OPEN ADV
INTEGRATED ADV FLOW VS TIME

FIGURE 15A-15 SHEET 2 OF 2

JUNE 2001 REVISION 11



(A) DIRECT UNFILTERED LEAKAGE FRACTION FROM UNSPRAYED REGION.

(B) DIRECT UNFILTERED LEAKAGE FRACTION FROM MAIN SPRAYED REGION.

(C) DIRECT UNFILTERED LEAKAGE FRACTION FROM AUXILIARY SPRAYED REGION.

(D) TRANSFER RATE FROM MAIN SPRAYED REGION TO UNSPRAYED REGION.

(E) TRANSFER RATE FROM UNSPRAYED REGION TO MAIN SPRAYED REGION.

(F) TRANSFER RATE FROM AUXILIARY SPRAYED REGION TO UNSPRAYED REGION.

(G) TRANSFER RATE FROM UNSPRAYED REGION TO AUXILIARY SPRAYED REGION.

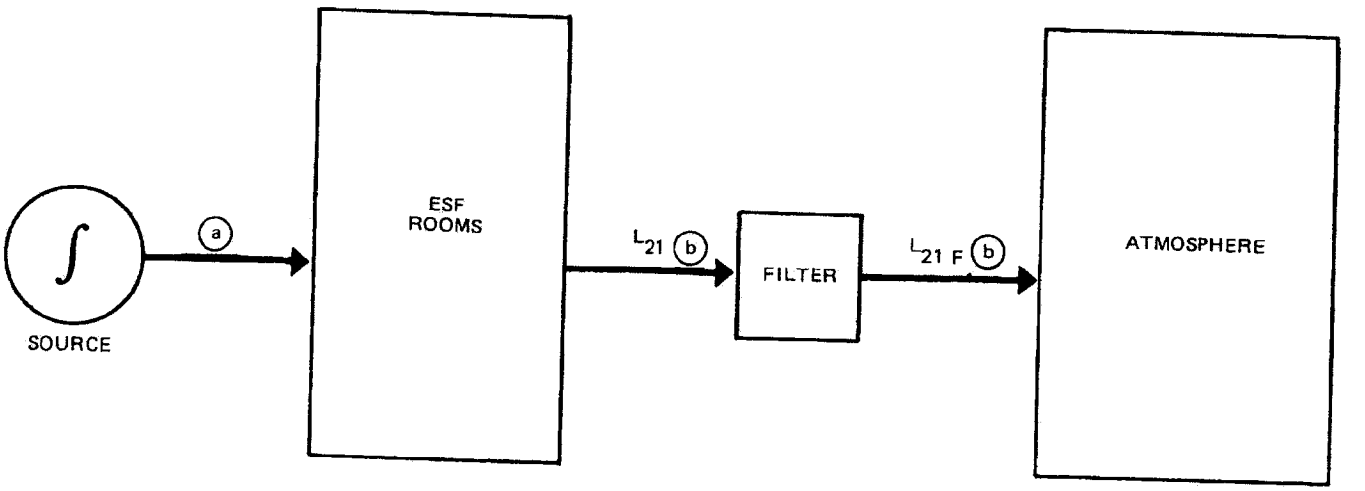
(H) ATMOSPHERIC DISPERSION BETWEEN CONTAINMENT AND CONTROL ROOM.

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

CONTAINMENT LEAKAGE
DOSE MODEL

FIGURE 15B-1

JUNE 2001 REVISION 11



a RECIRCULATION OF SUMP WATER TO ESF COMPONENTS

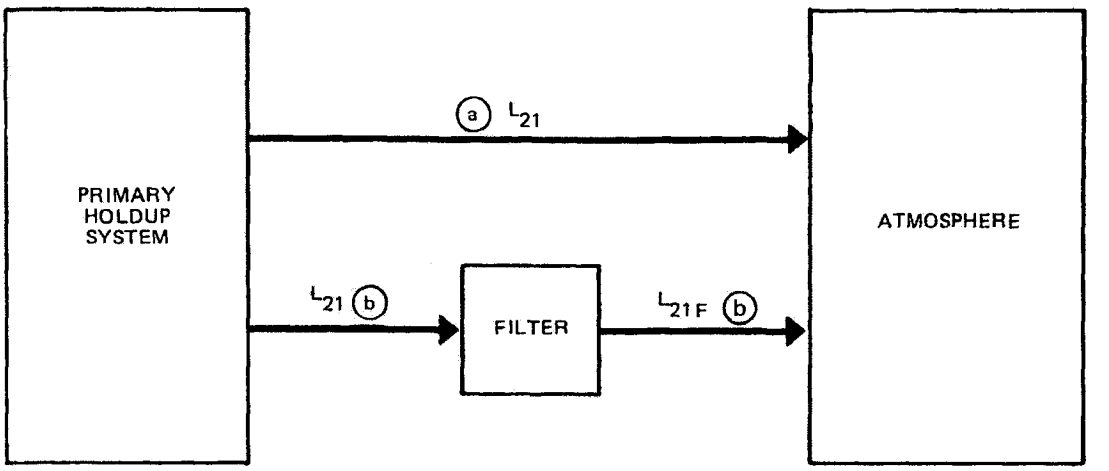
b DIRECT FILTERED LEAKAGE FRACTION FROM ESF ROOM

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

ESF ROOM LEAKAGE
DOSE MODEL

FIGURE 15B-2

JUNE 2001 REVISION 11



a DIRECT UNFILTERED LEAKAGE FRACTION FROM PRIMARY HOLD-UP SYSTEM

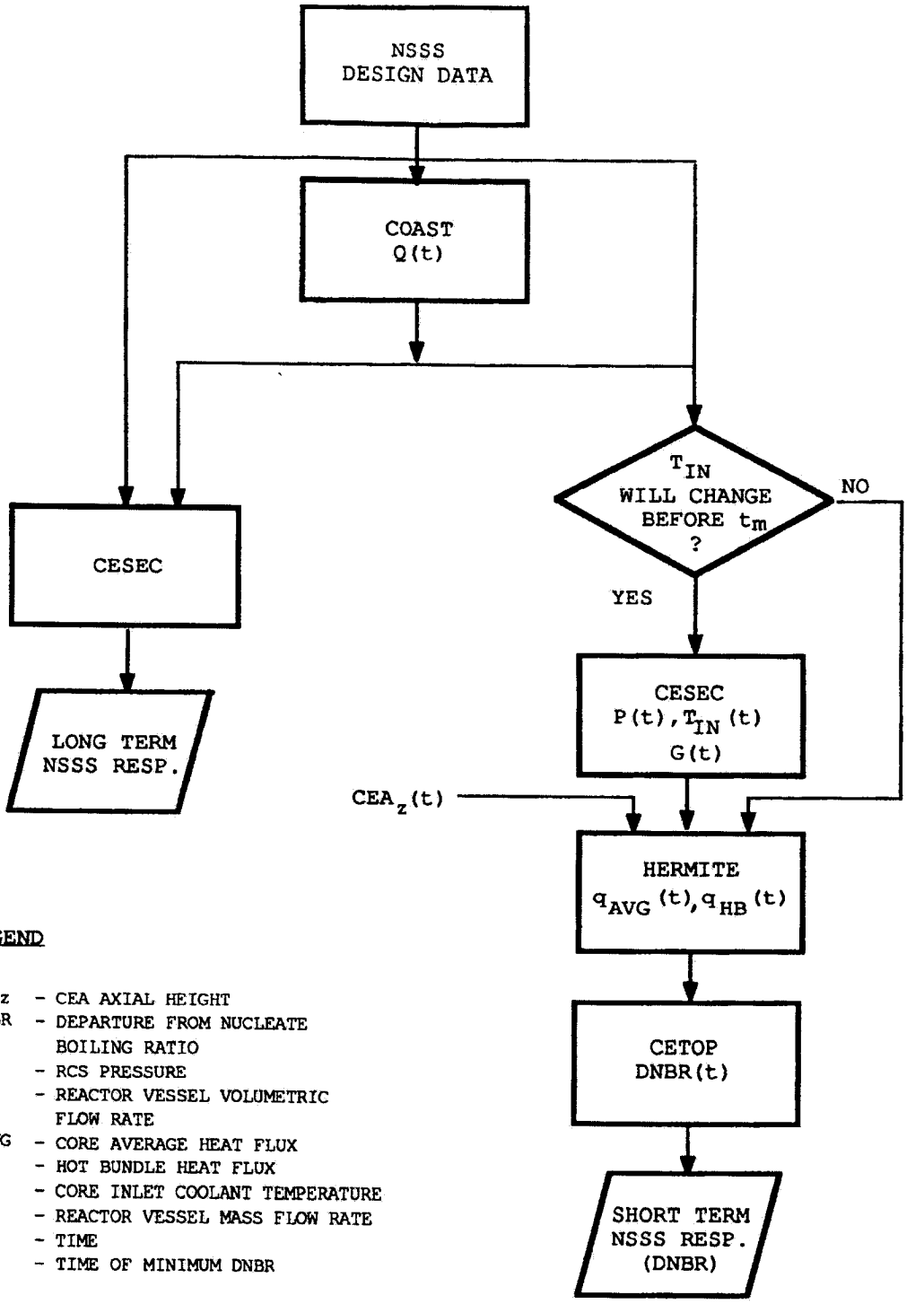
b DIRECT FILTERED LEAKAGE FRACTION FROM PRIMARY HOLDUP SYSTEM

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

OTHER ACCIDENT
DOSE MODEL

FIGURE 15B-3

JUNE 2001 REVISION 11



LEGEND

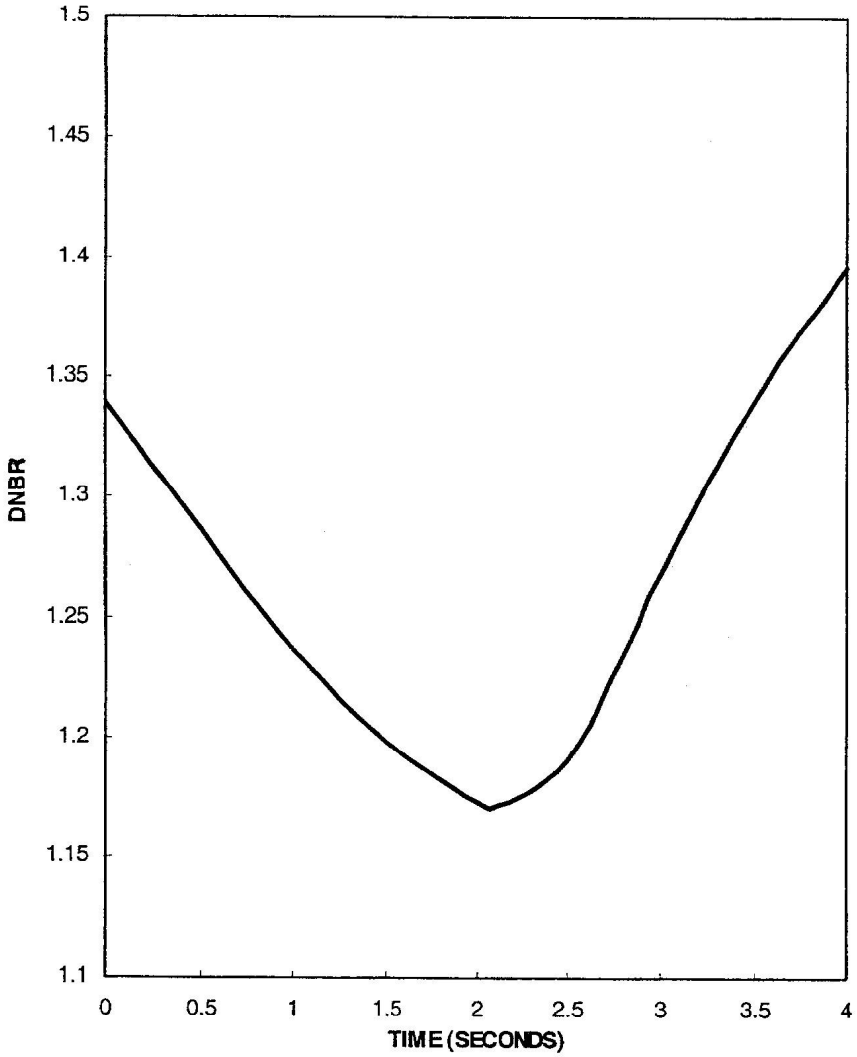
CEA_z	- CEA AXIAL HEIGHT
DNBR	- DEPARTURE FROM NUCLEATE BOILING RATIO
P	- RCS PRESSURE
Q	- REACTOR VESSEL VOLUMETRIC FLOW RATE
q_{AVG}	- CORE AVERAGE HEAT FLUX
q_{HB}	- HOT BUNDLE HEAT FLUX
T_{IN}	- CORE INLET COOLANT TEMPERATURE
G	- REACTOR VESSEL MASS FLOW RATE
t	- TIME
t_m	- TIME OF MINIMUM DNBR

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

DATA TRANSER BETWEEN COMPUTER
CODES FOR THE ST-LOF METHOD

FIGURE 15D-1

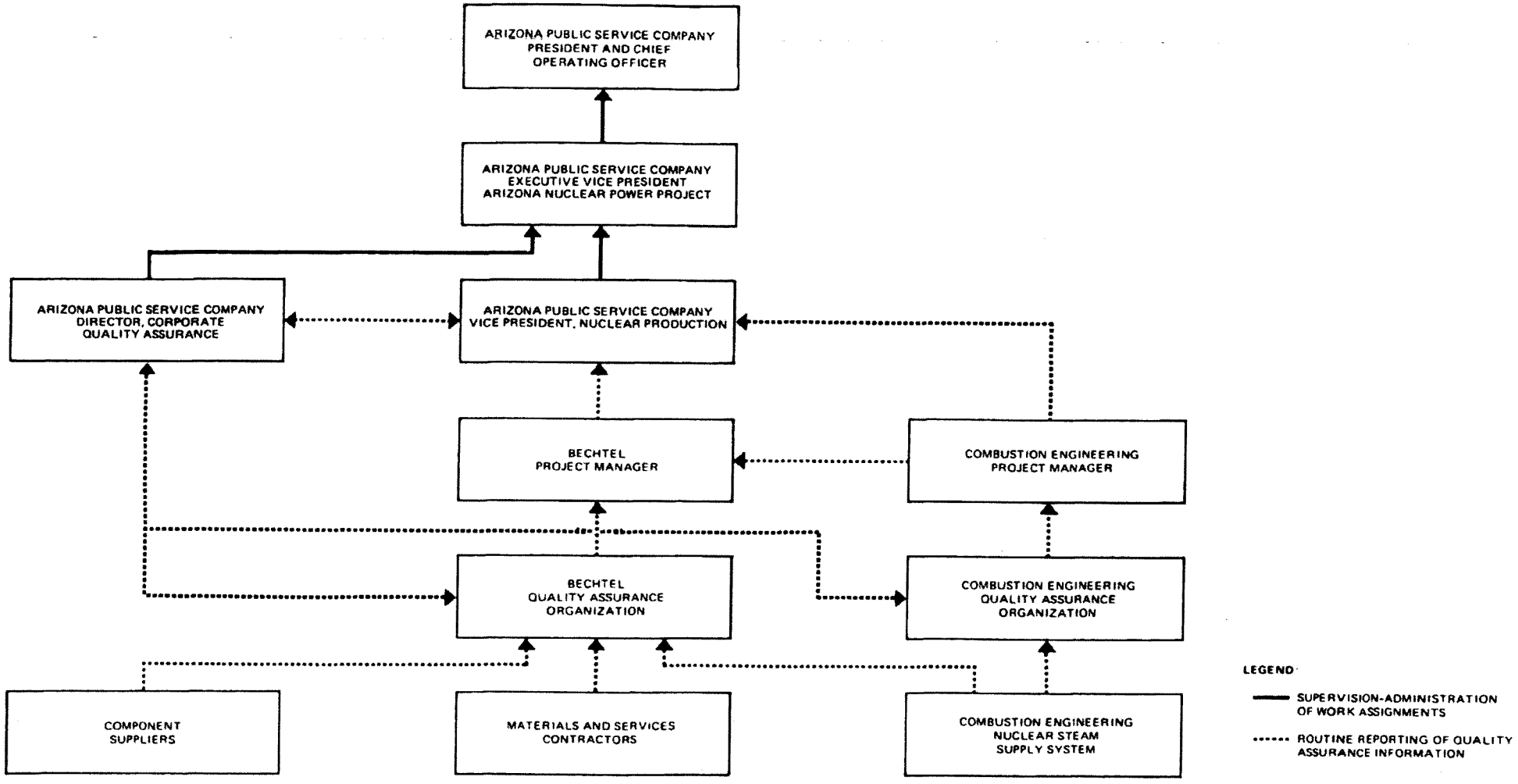
JUNE 2001 REVISION 11



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

LIMITING INFREQUENT EVENTS
(i.e. AOOs WITH SINGLE FAILURE)

FIGURE 15E-1

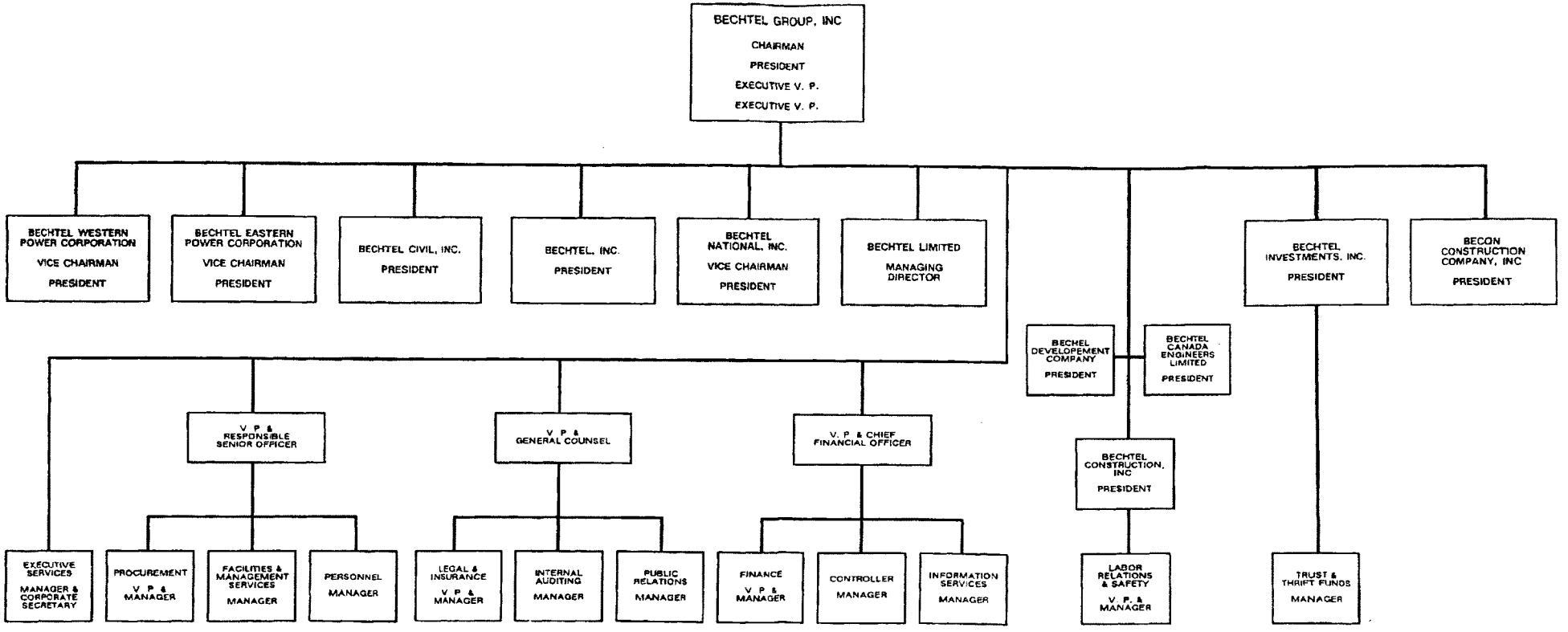


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

INTERFACE ORGANIZATION CHART

FIGURE 17.1A-1

JUNE 2001 REVISION 11

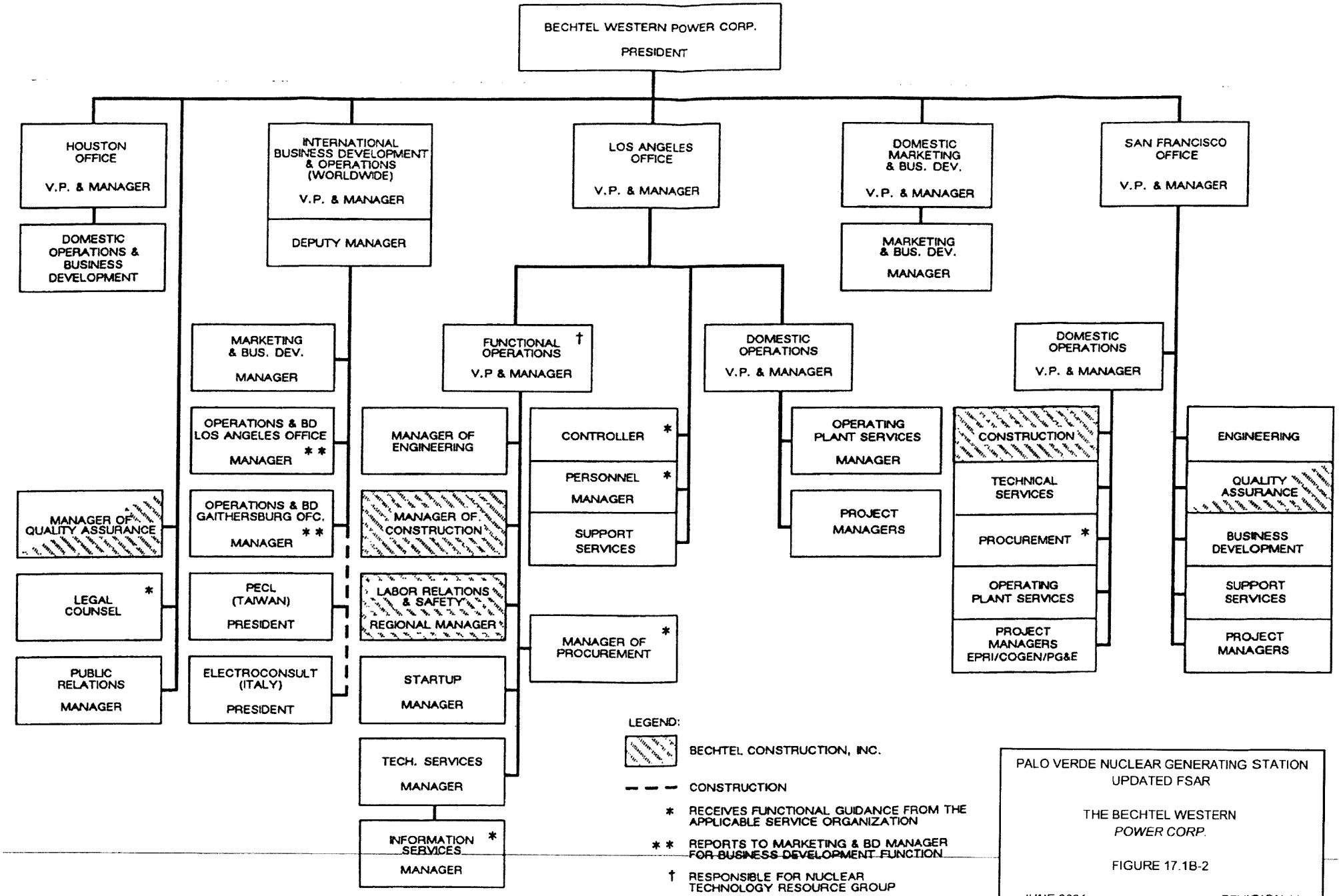


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

\THE BECHTEL GROUP

FIGURE 17.1B-1

JUNE 2001 REVISION 11

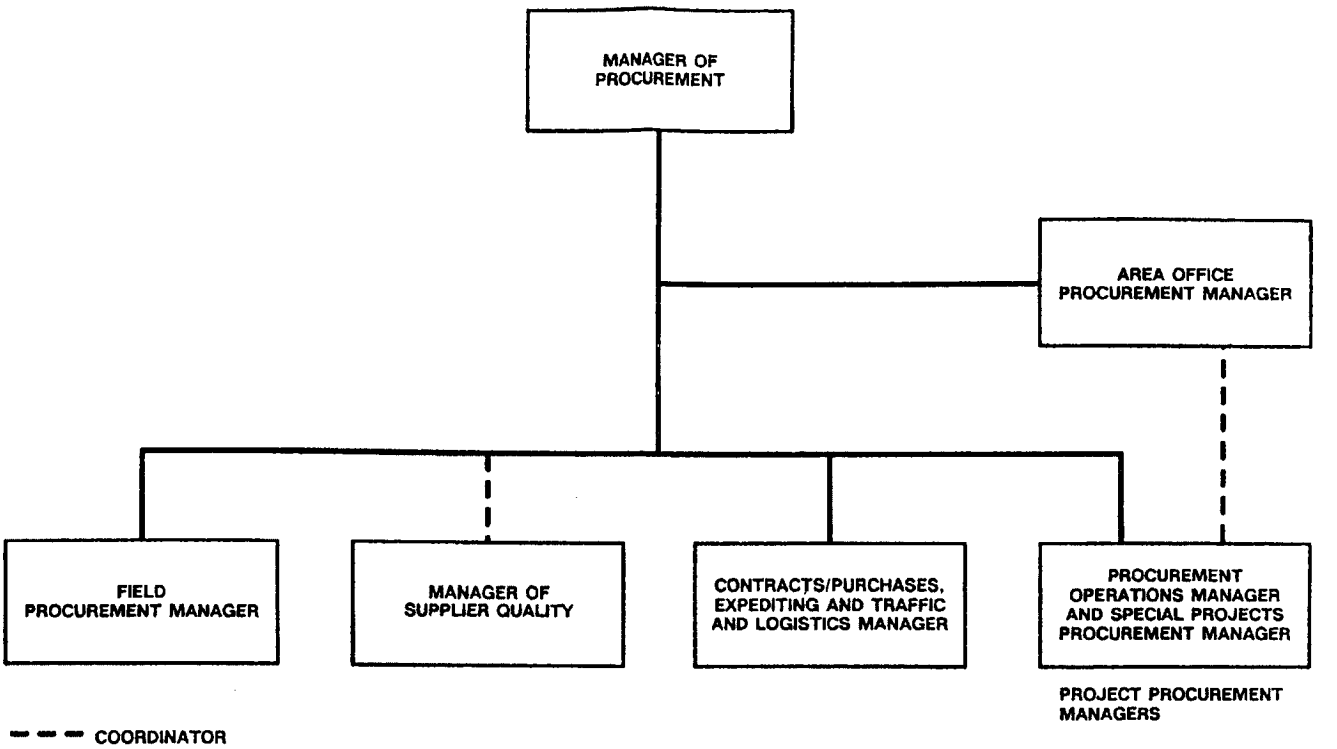


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

THE BECHTEL WESTERN
POWER CORP.

FIGURE 17.1B-2

JUNE 2001 *REVISION 11*

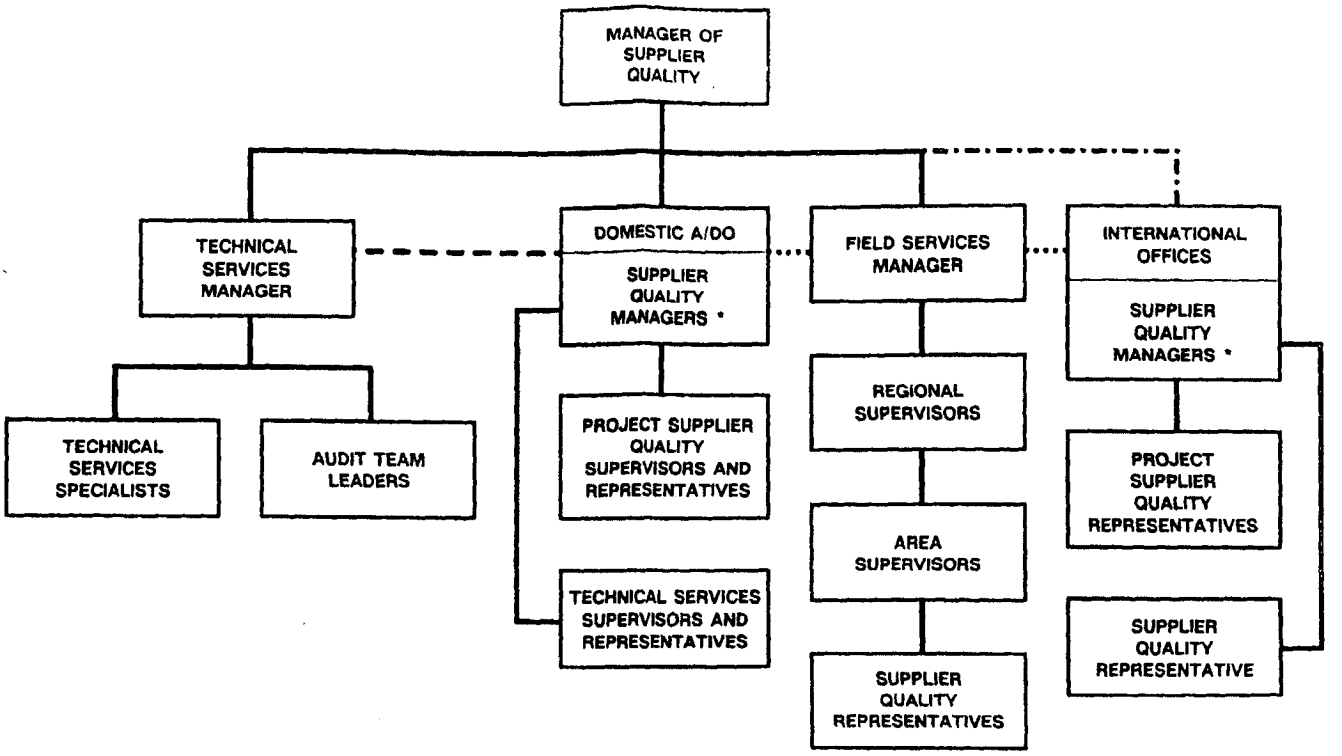


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

BECHTEL WESTERN POWER CORP.
PROCUREMENT ORGANIZATION

FIGURE 17.1B-3

JUNE 2001 REVISION 11



ADMINISTRATIVE AND TECHNICAL DIRECTION

TECHNICAL DIRECTION

FIELD COORDINATION

TECHNICAL DIRECTION AND PROGRAM COORDINATION

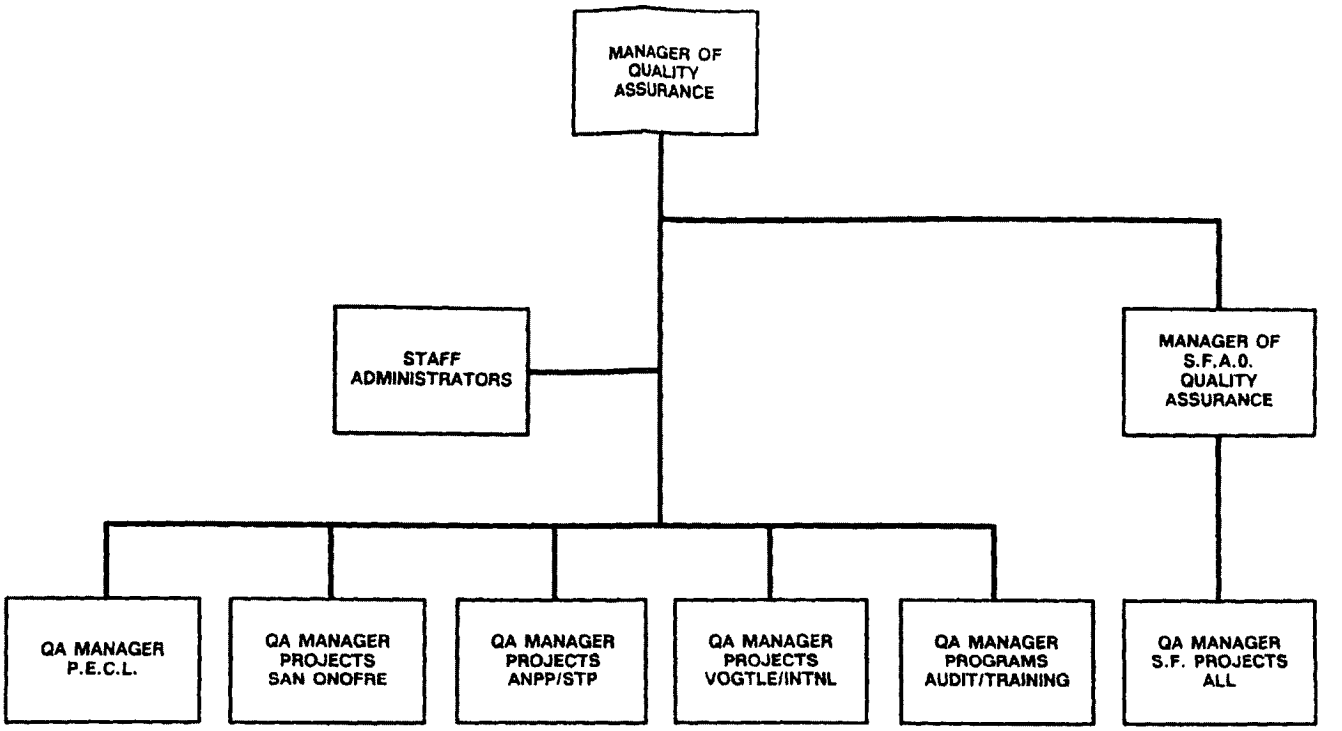
* REPORTS TO A/DO PROCUREMENT MANAGER FOR ADMINISTRATIVE DIRECTION

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

SUPPLIER QUALITY DEPARTMENT

FIGURE 17.1B-4

JUNE 2001 REVISION 11

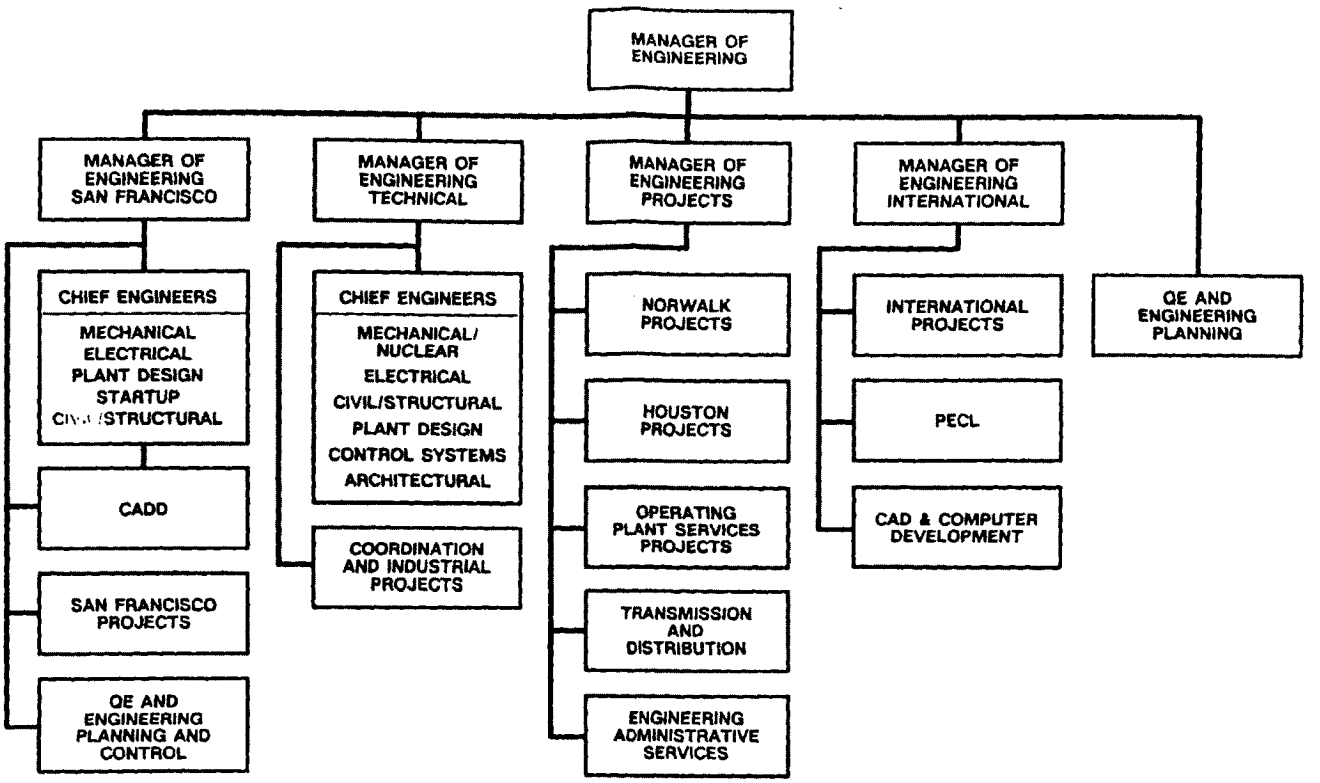


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

BECHTEL WESTERN POWER CORP.
QUALITY ASSURANCE ORGANIZATION

FIGURE 17.1B-5

JUNE 2001 REVISION 11

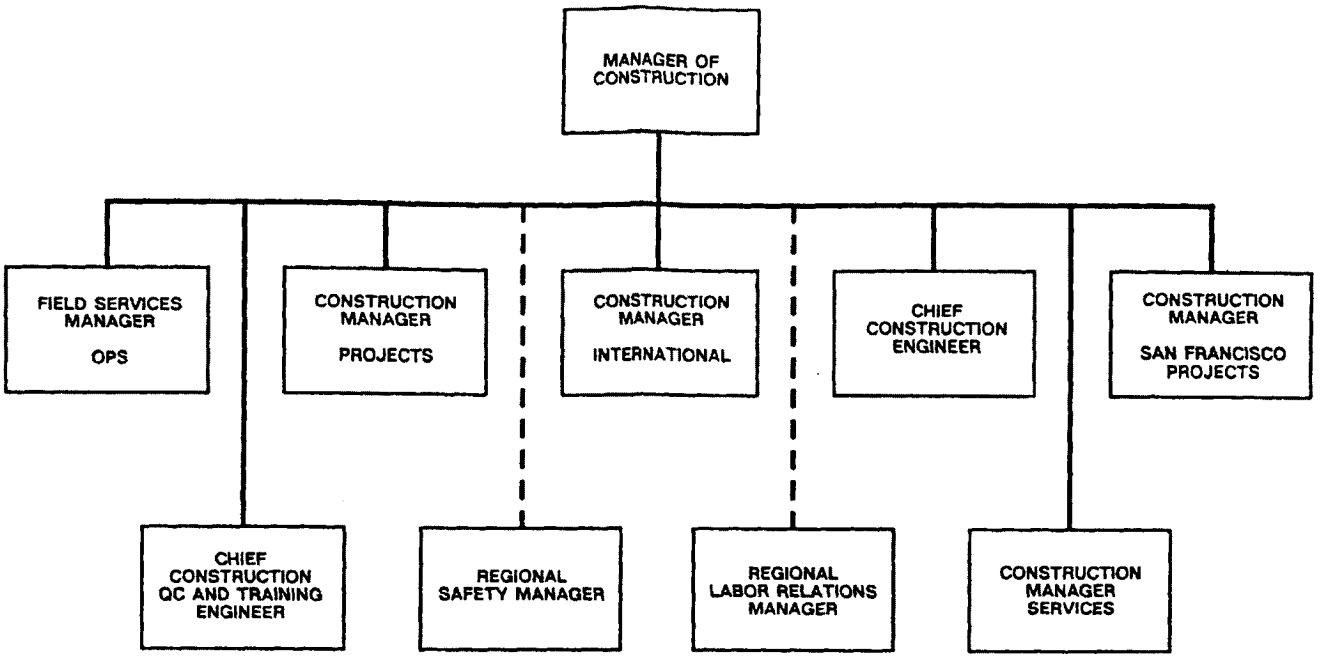


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

BECHTEL WESTERN POWER CORP.
ENGINEERING ORGANIZATION

FIGURE 17.1B-6

JUNE 2001 REVISION 11



LEGEND:

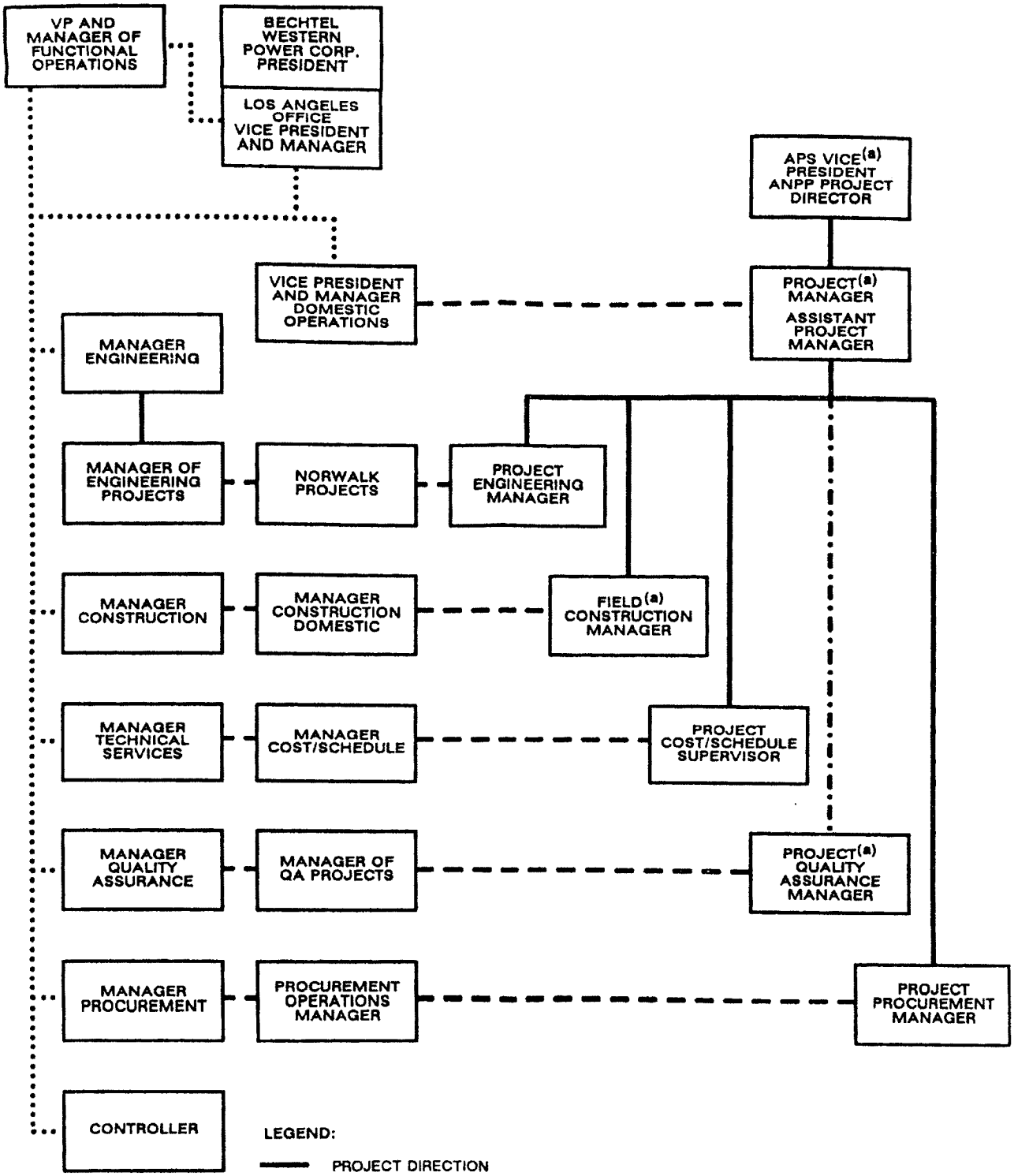
— — — COORDINATION

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

BECHTEL CONSTRUCTION, INC.
ORGANIZATION

FIGURE 17.1B-7

JUNE 2001 REVISION 11

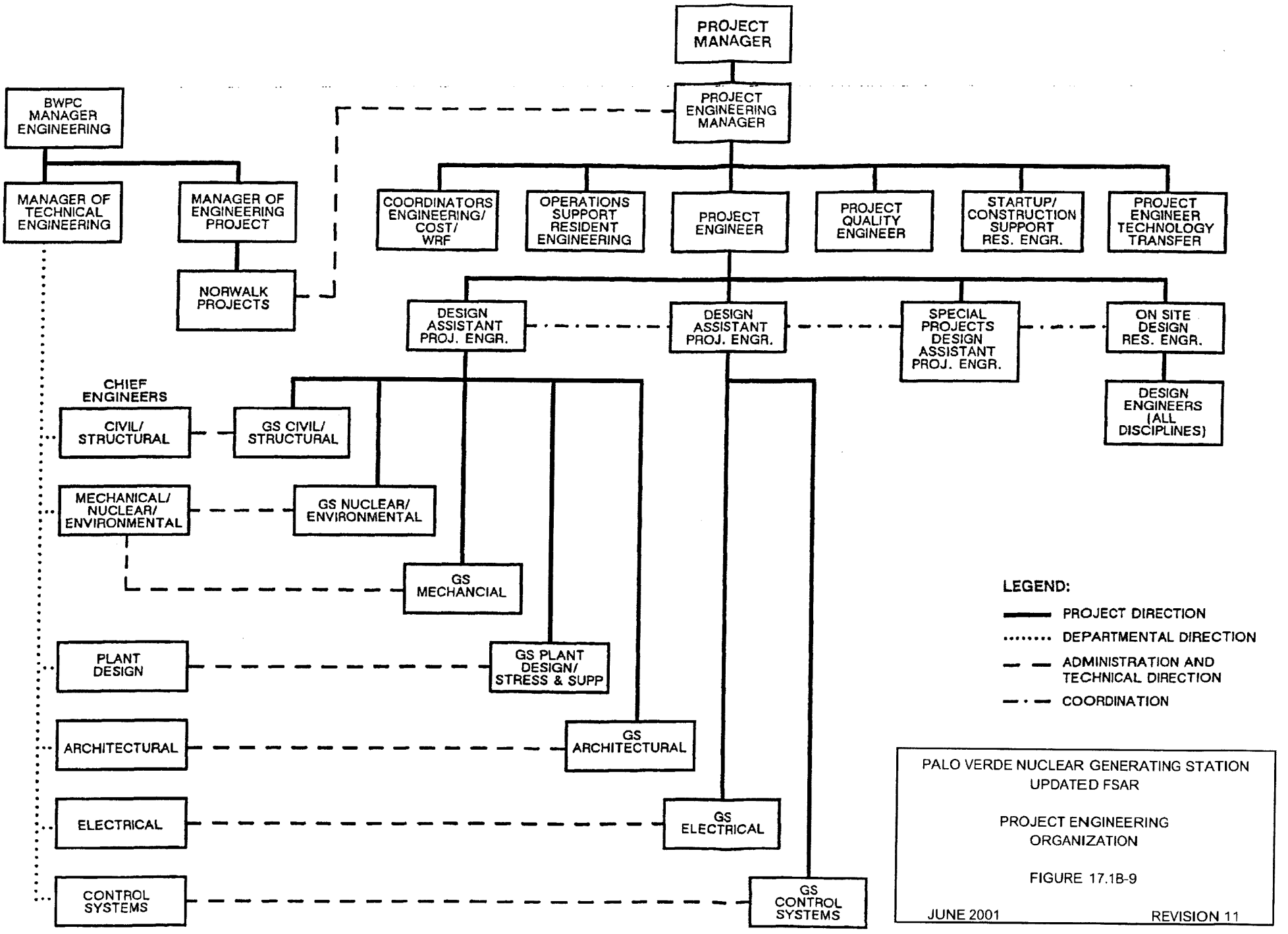


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PROJECT MANAGEMENT ORGANIZATION

FIGURE 17.1B-8

JUNE 2001 REVISION 11

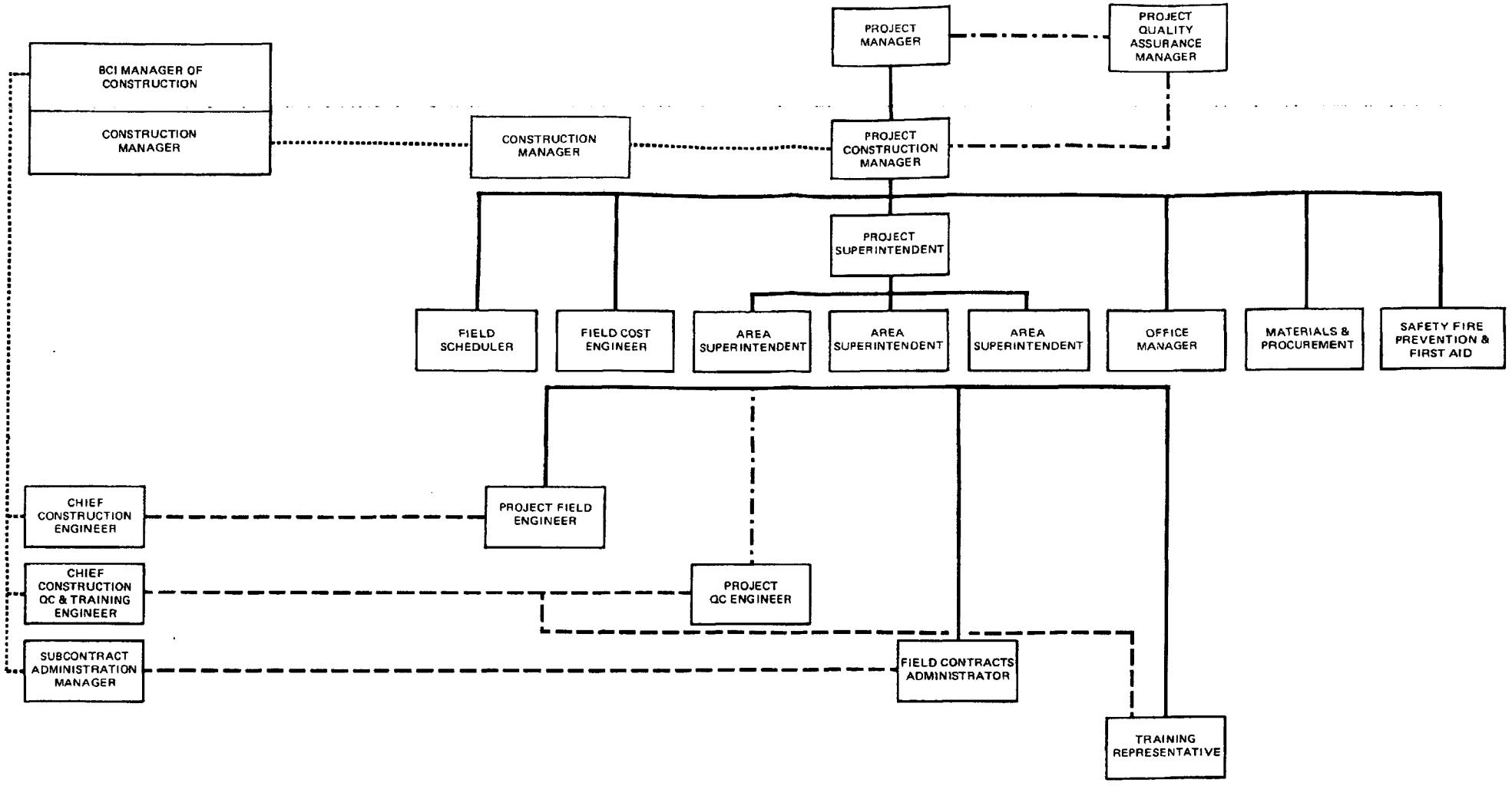


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PROJECT ENGINEERING ORGANIZATION

FIGURE 17.1B-9

JUNE 2001 REVISION 11



LEGEND

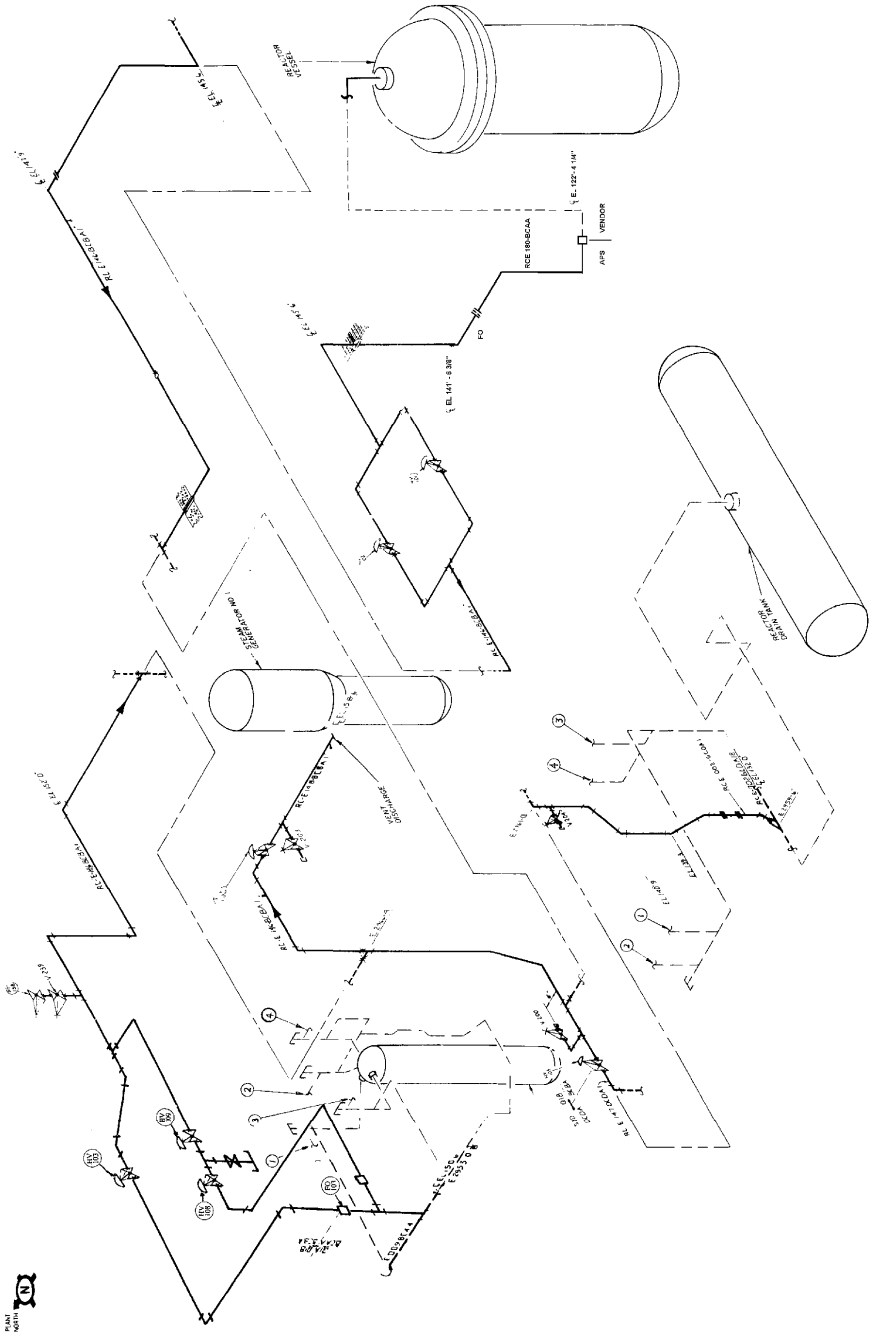
- PROJECT DIRECTION
- DEPARTMENTAL DIRECTION
- ADMINISTRATION AND TECHNICAL DIRECTION
- COORDINATION

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

PROJECT - CONSTRUCTION ORGANIZATION

FIGURE 17.1B-10

JUNE 2001 REVISION 11

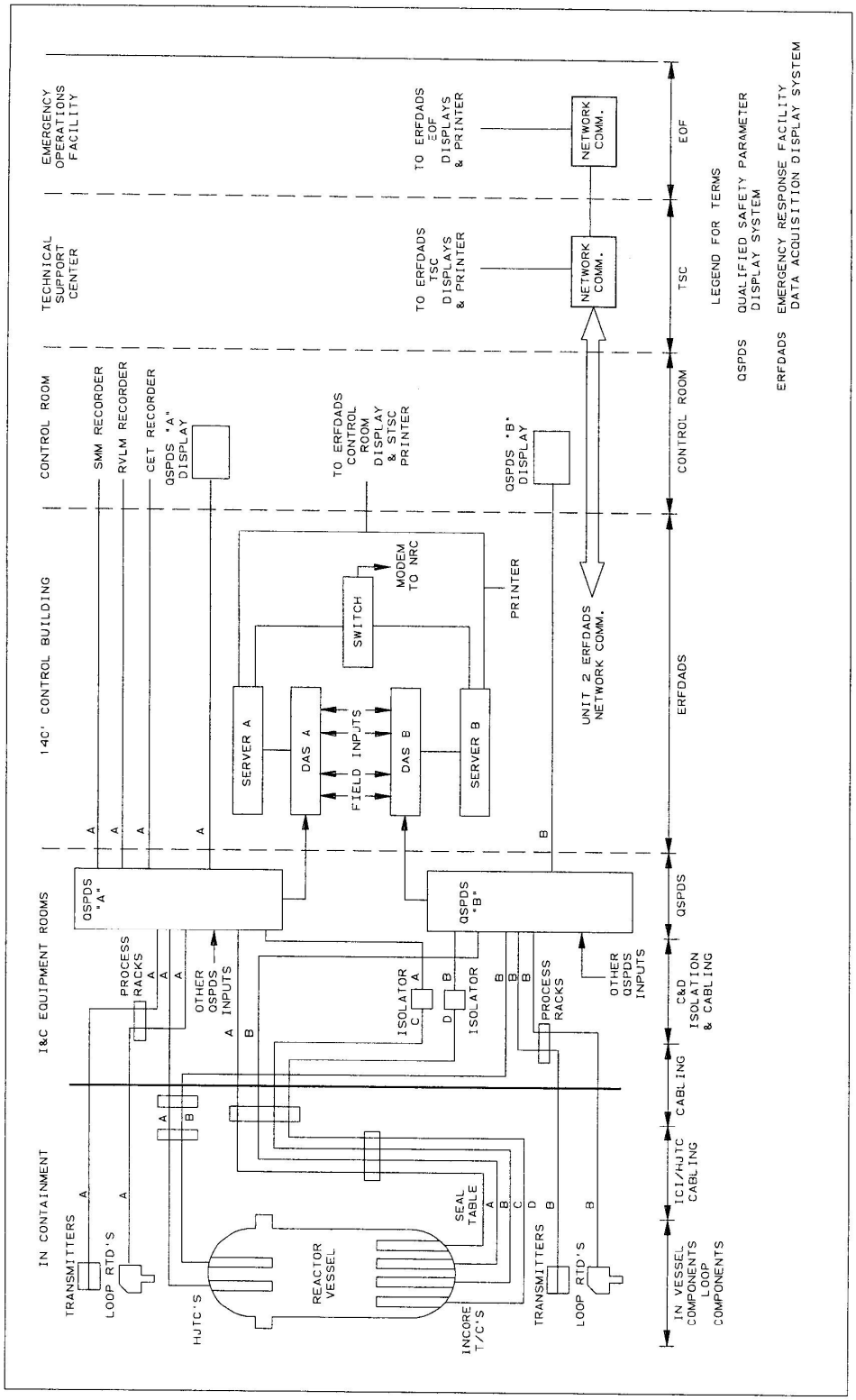


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

REACTOR COOLANT GAS
VENT SYSTEM SIMPLIFIED ISOMETRIC

FIGURE 18.II.B-1

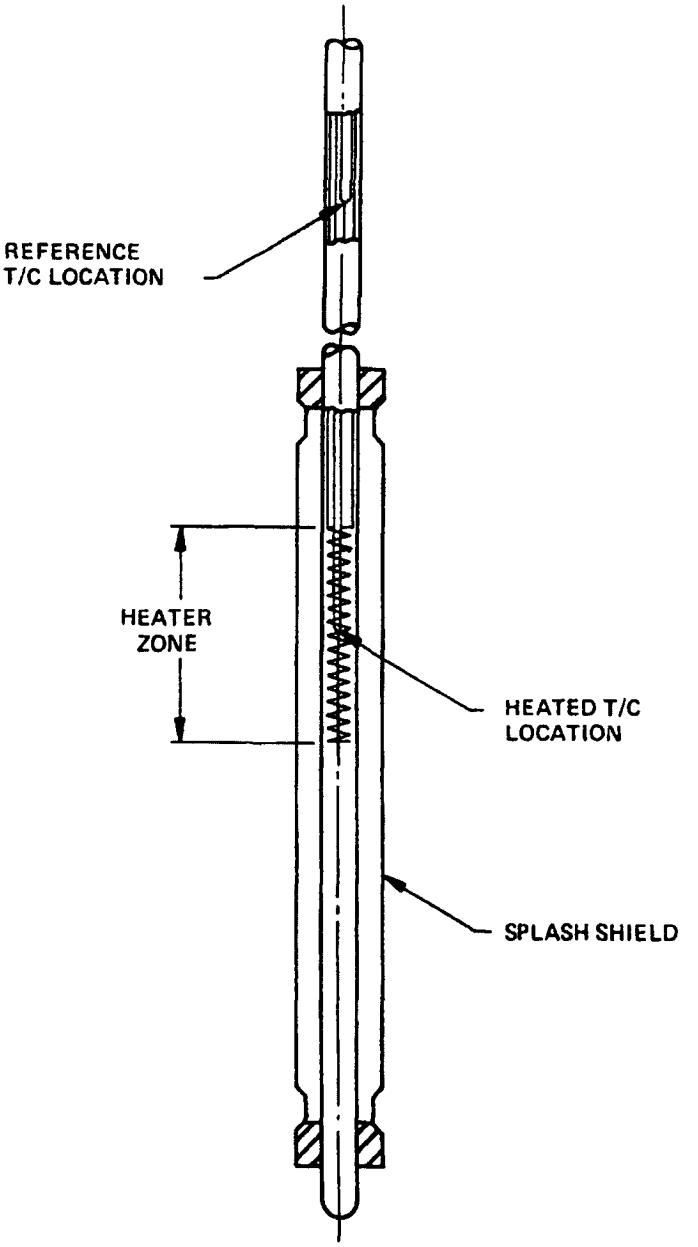
JUNE 2011 REVISION 16



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

ACCIDENT MONITORING SYSTEM
(QSPDS/ERFDADS)

FIGURE 18B-1

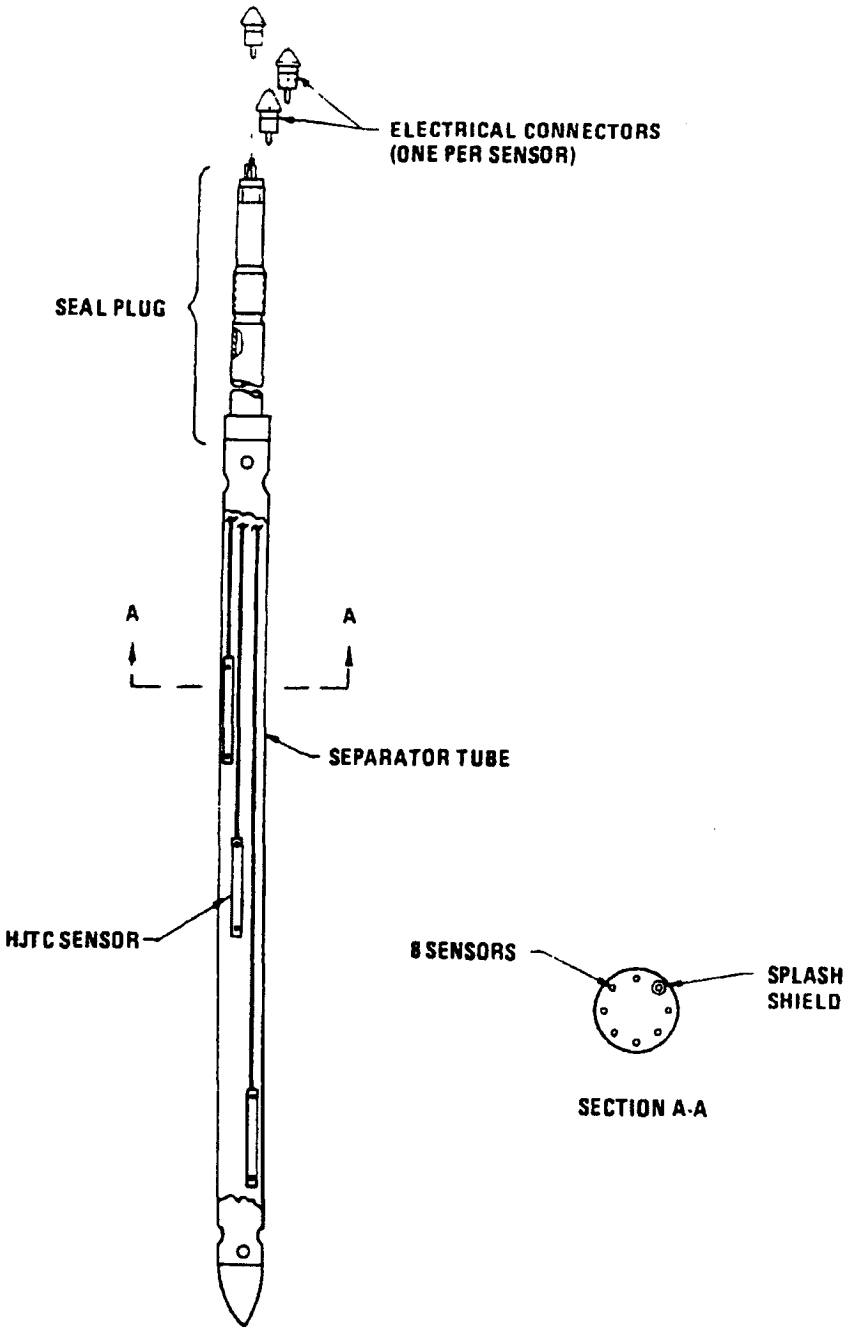


PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HJTC SENSOR - HJTC/SPLASH SHIELD

FIGURE 18B-2

JUNE 2001 REVISION 11



PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HEATED JUNCTION THERMOCOUPLE
PROBE ASSEMBLY

FIGURE 18B-3

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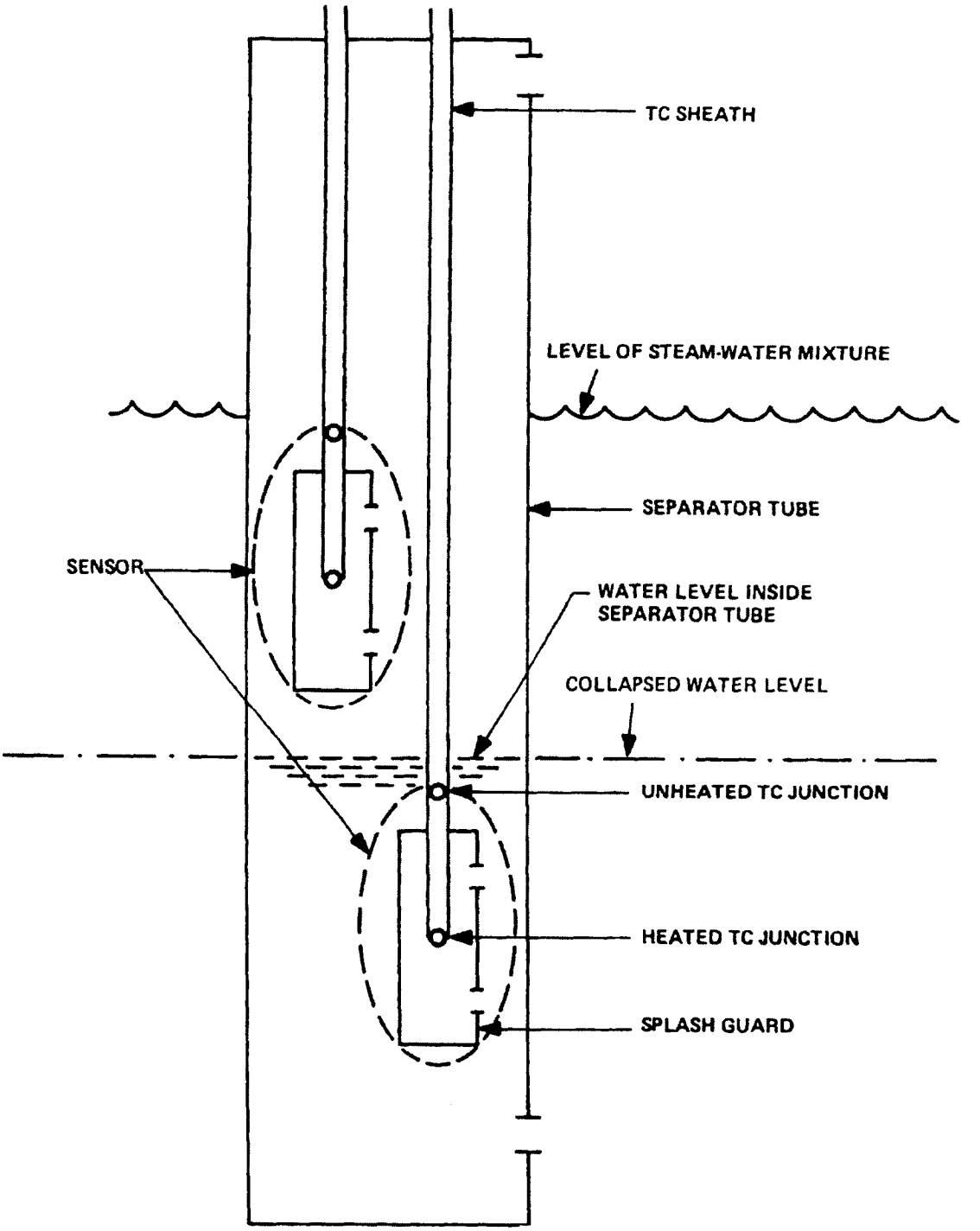

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HJTC SENSOR AND SEPARATOR TUBE

FIGURE 18B-4

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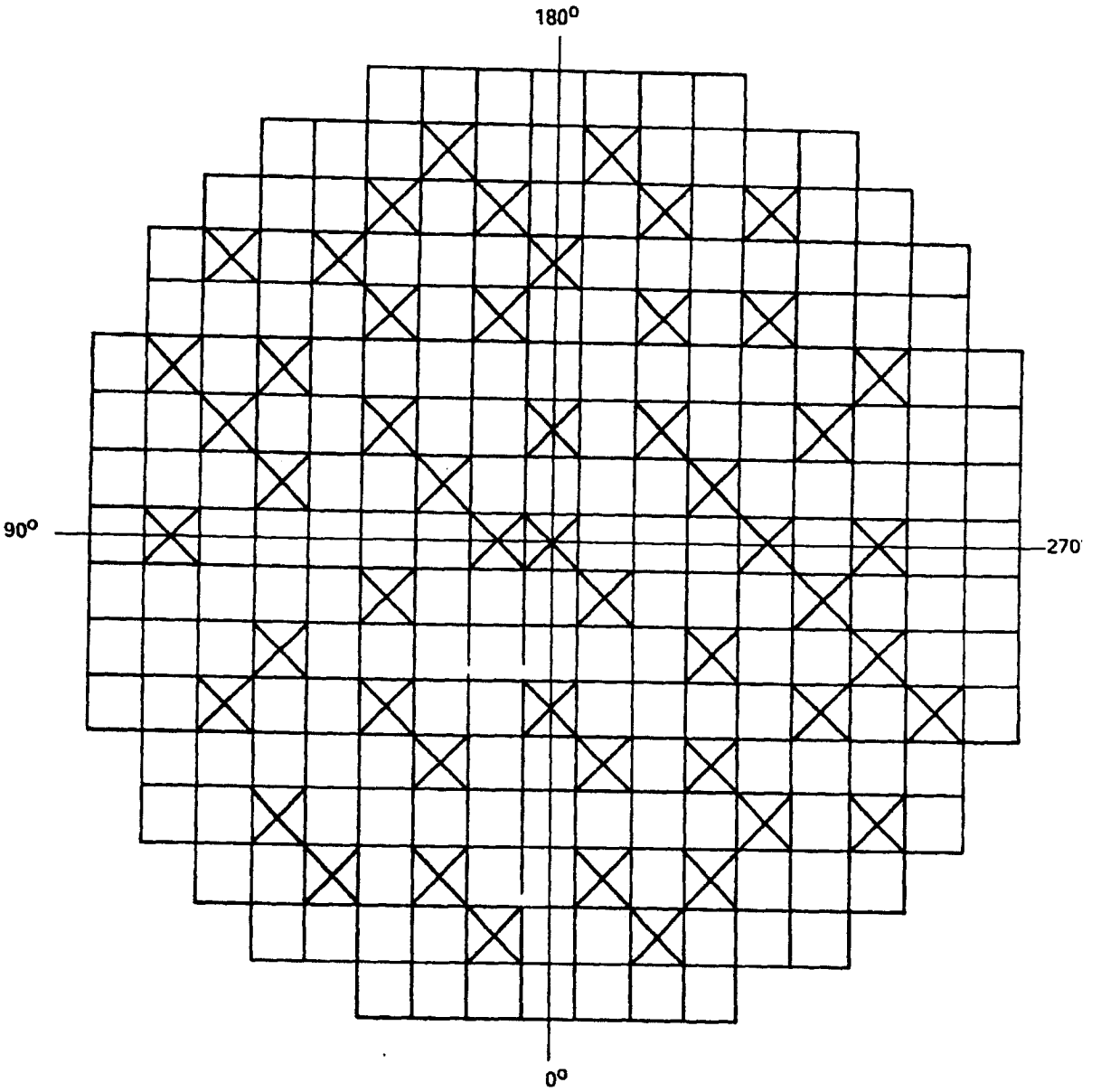

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

INCORE INSTRUMENTATION LOCATIONS\

FIGURE 18B-5

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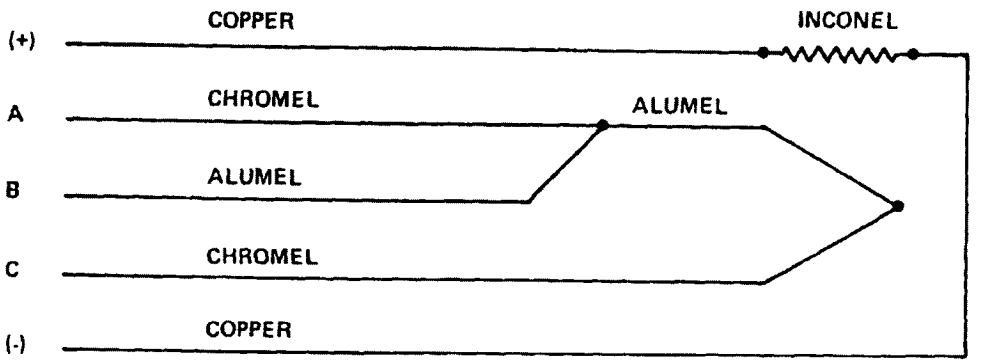

½

V (A - B) = ABSOLUTE TEMPERATURE, UNHEATED JUNCTION
V (C - B) = ABSOLUTE TEMPERATURE, HEATED JUNCTION
V (A - C) = DIFFERENTIAL TEMPERATURE

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

ELECTRICAL DIAGRAM OF HJTC

FIGURE 18B-6

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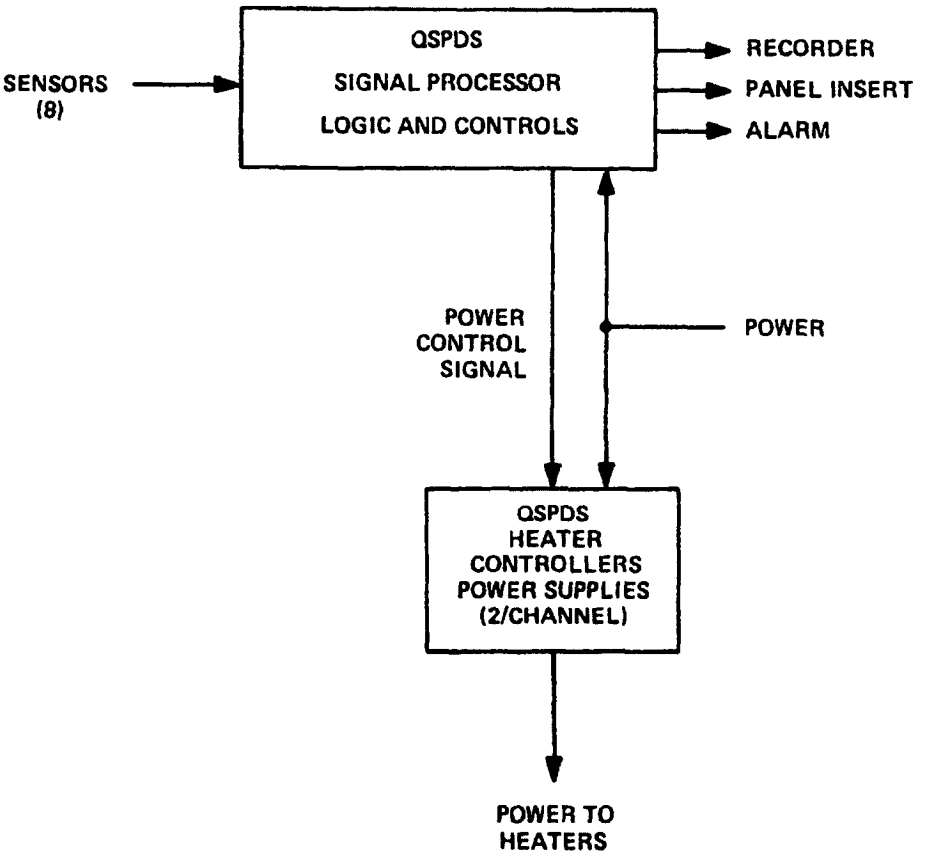

PALO VERDE NUCLEAR GENERATING STATION
UPDATED FSAR

HJTC SYSTEM PROCESSING CONFIGURATION
(ONE CHANNEL SHOWN)

FIGURE 18B-7

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