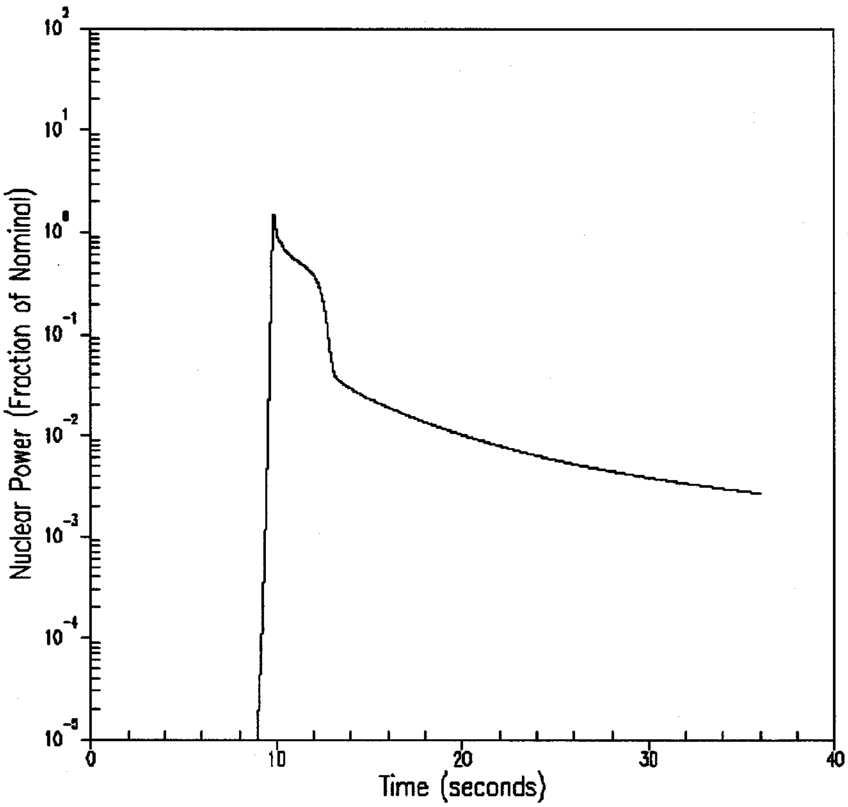
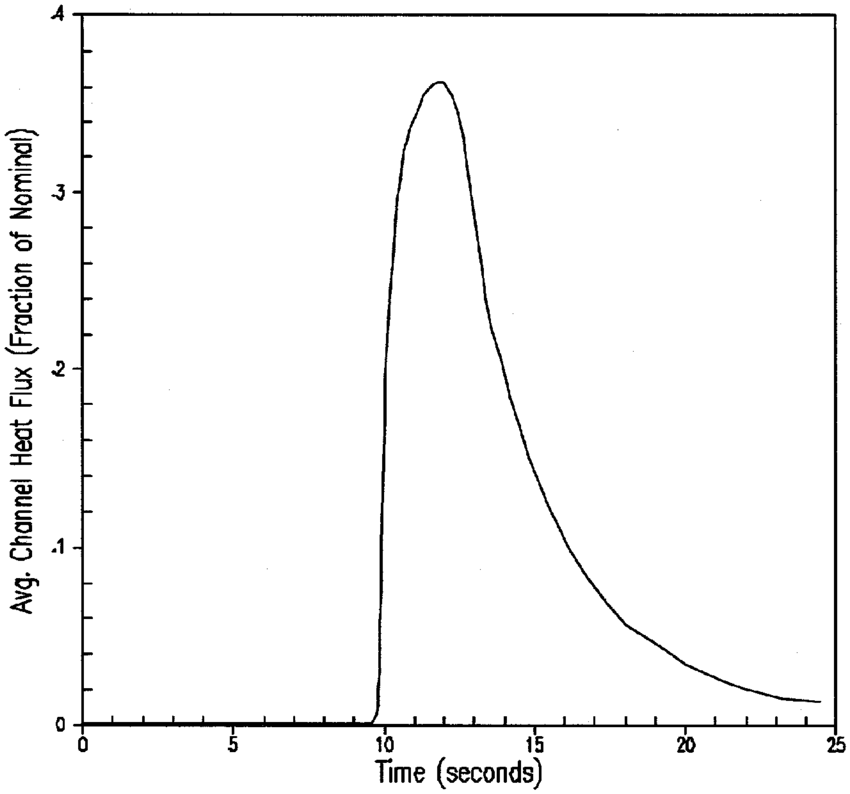


INDIAN POINT UNIT No. 3

UNCONTROLLED RCCA BANK WITHDRAWAL
FROM A SUBCRITICAL CONDITION
NUCLEAR POWER VERSUS TIME

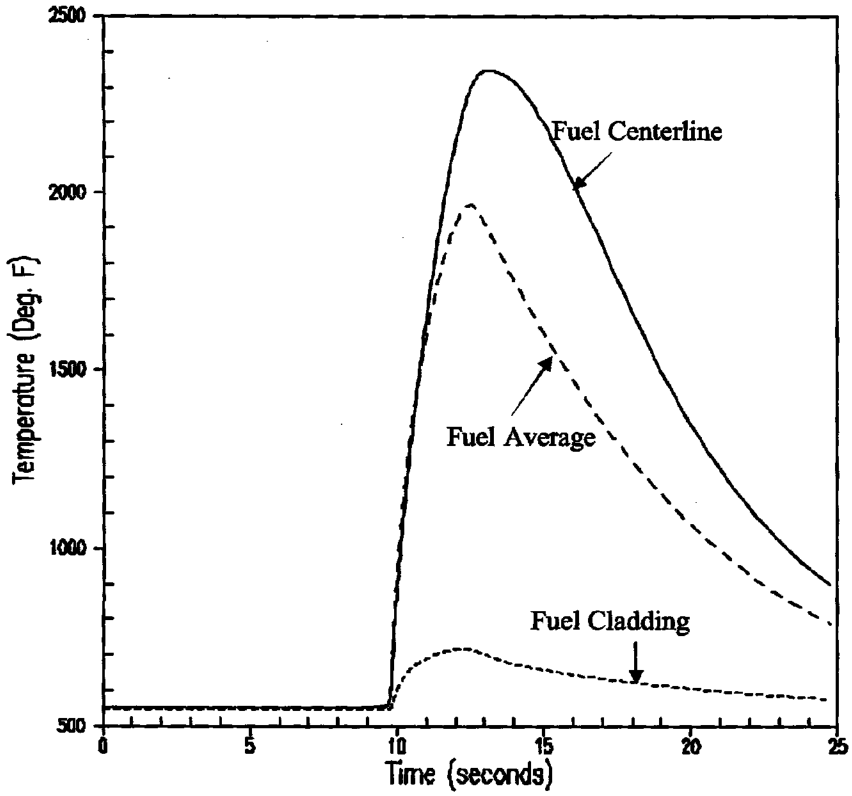
UFSAR FIGURE 14.1–2	REV. No. 01



INDIAN POINT UNIT No. 3

UNCONTROLLED RCCA BANK WITHDRAWAL FROM A SUBCRITICAL CONDITION AVERAGE HEAT FLUX VERSUS TIME

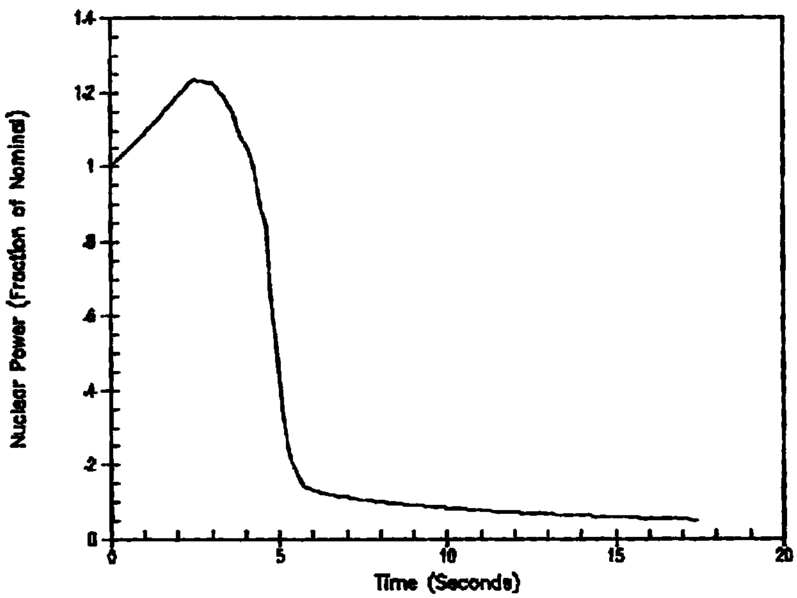
UFSAR FIGURE 14.1-3	REV. No. 01



INDIAN POINT UNIT No. 3

UNCONTROLLED RCCA BANK WITHDRAWAL FROM A SUBCRITICAL CONDITION HOT SPOT FUEL AND CLAD TEMPERATURES VERSUS TIME

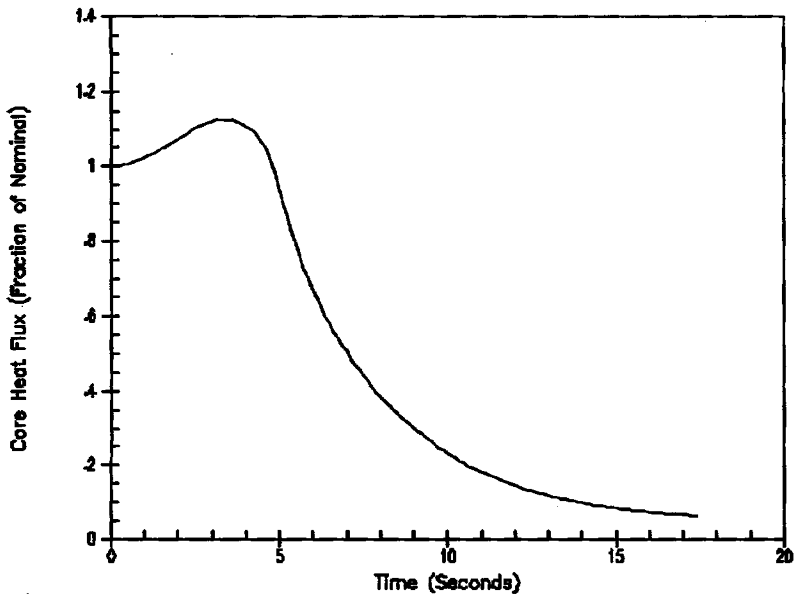
UFSAR FIGURE 14.1–4	REV. No. 01



INDIAN POINT UNIT No. 3

NUCLEAR POWER TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 66PCM/SEC WITHDRAWAL RATE

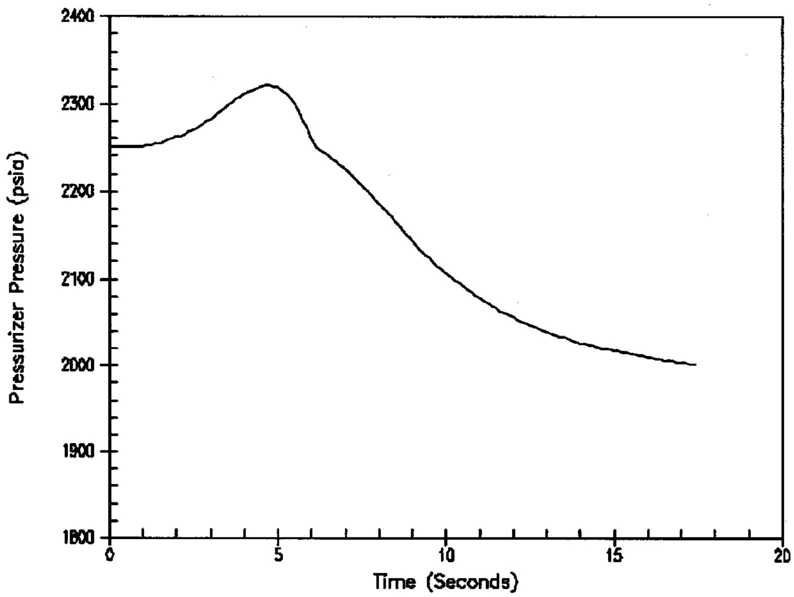
UFSAR FIGURE 14.1-5	REV. No. 01



INDIAN POINT UNIT No. 3

CORE HEAT FLUX TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 66PCM/SEC WITHDRAWAL RATE

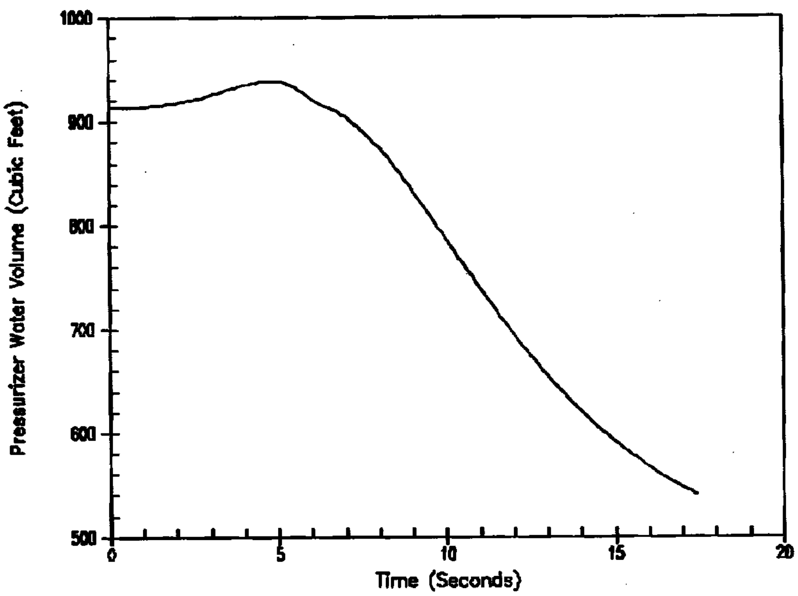
UFSAR FIGURE 14.1-6	REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER PRESSURE TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 66PCM/SEC WITHDRAWAL RATE

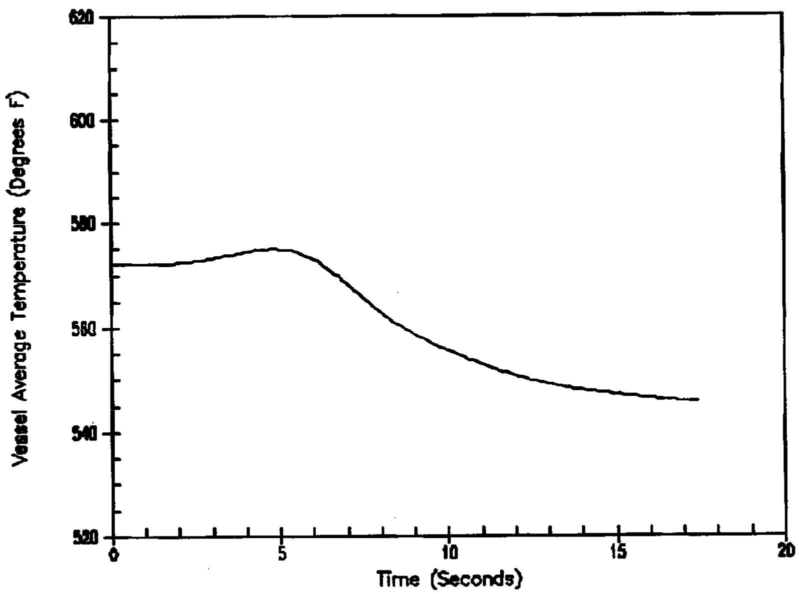
UFSAR FIGURE 14.1-7	REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER WATER VOLUME TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 66PCM/SEC WITHDRAWAL RATE

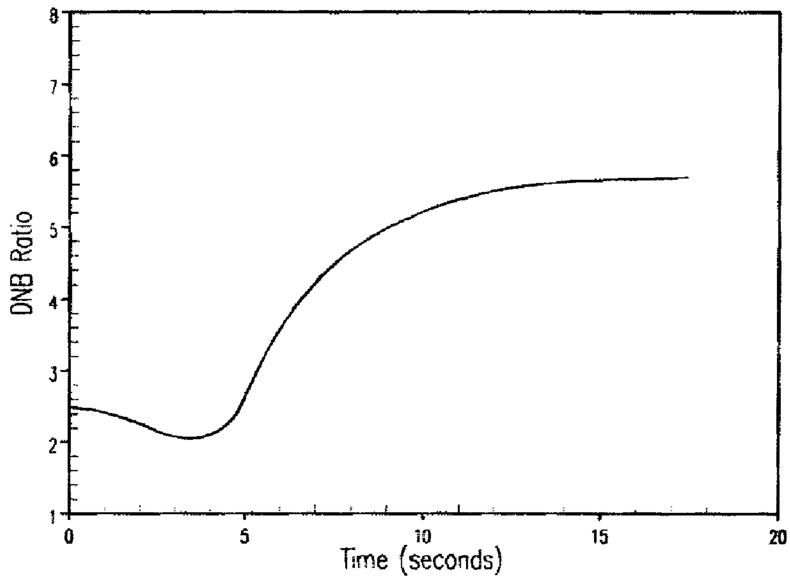
UFSAR FIGURE 14.1–8	REV. No. 01



INDIAN POINT UNIT No. 3

CORE AVERAGE WATER TEMPERATURE TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 66PCM/SEC WITHDRAWAL RATE

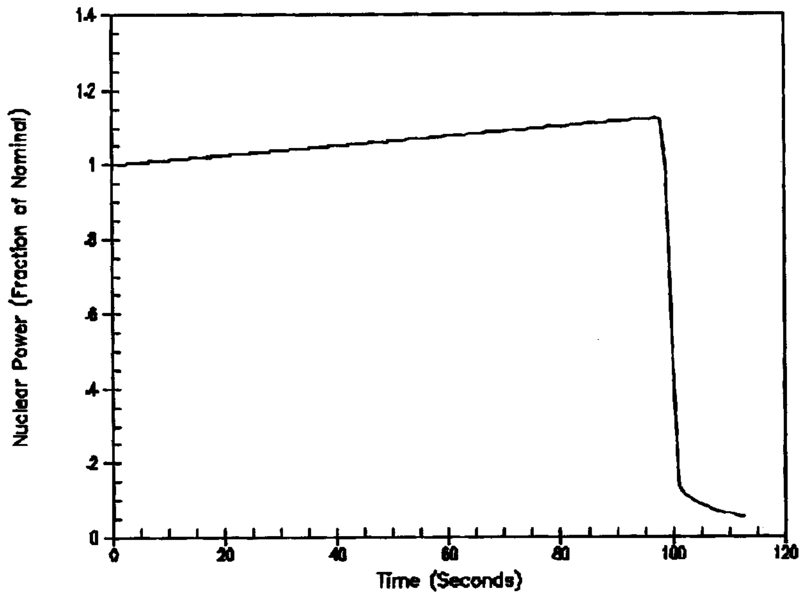
UFSAR FIGURE 14.1-9	REV. No. 01



INDIAN POINT UNIT No. 3

DNB RATIO VERSUS TIME FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 66PCM/SEC WITHDRAWAL RATE

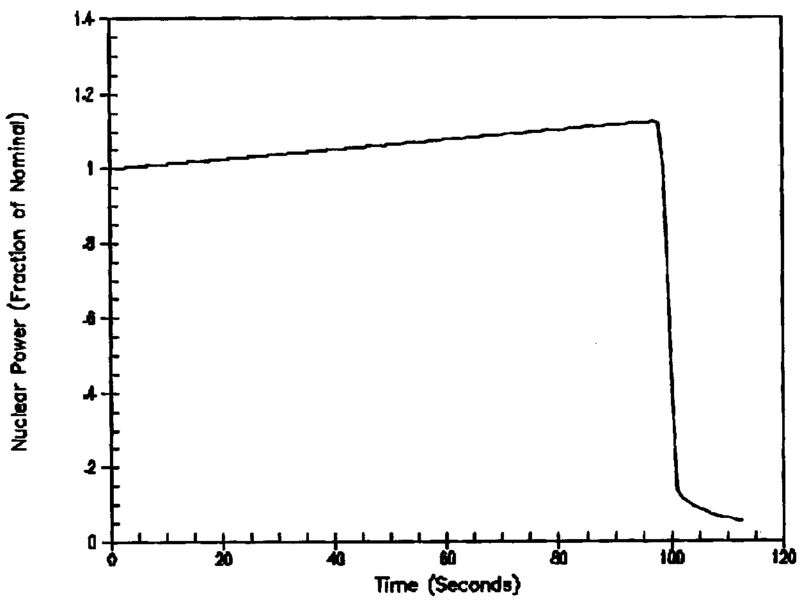
UFSAR FIGURE 14.1-10	REV. No. 02



INDIAN POINT UNIT No. 3

NUCLEAR POWER TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 1 PCM/SEC WITHDRAWAL RATE

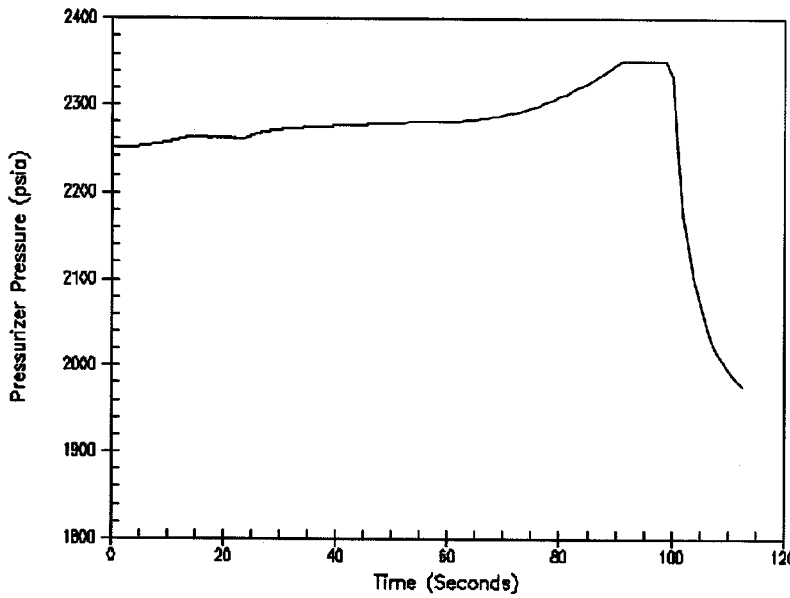
UFSAR FIGURE 14.1-11	REV. No. 01



INDIAN POINT UNIT No. 3

CORE HEAT FLUX TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 1 PCM/SEC WITHDRAWAL RATE

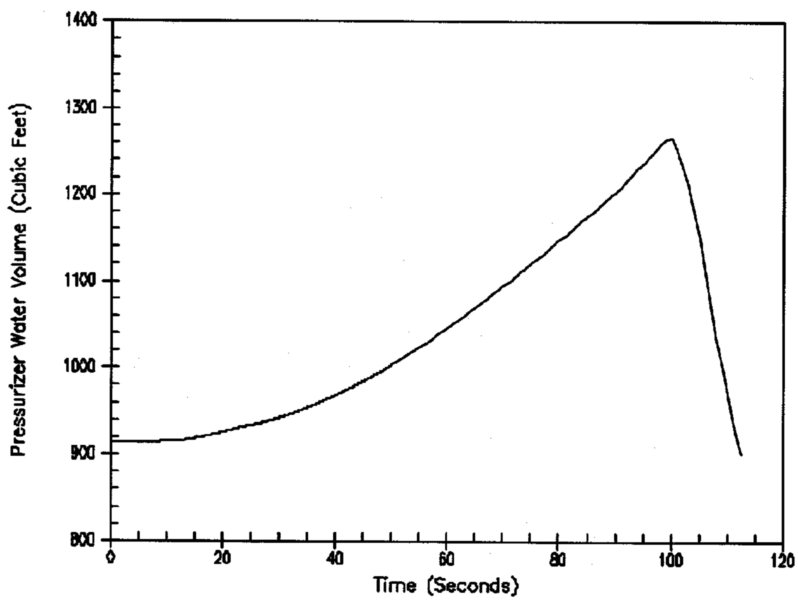
UFSAR FIGURE 14.1-12	REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER PRESSURE TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 1 PCM/SEC WITHDRAWAL RATE

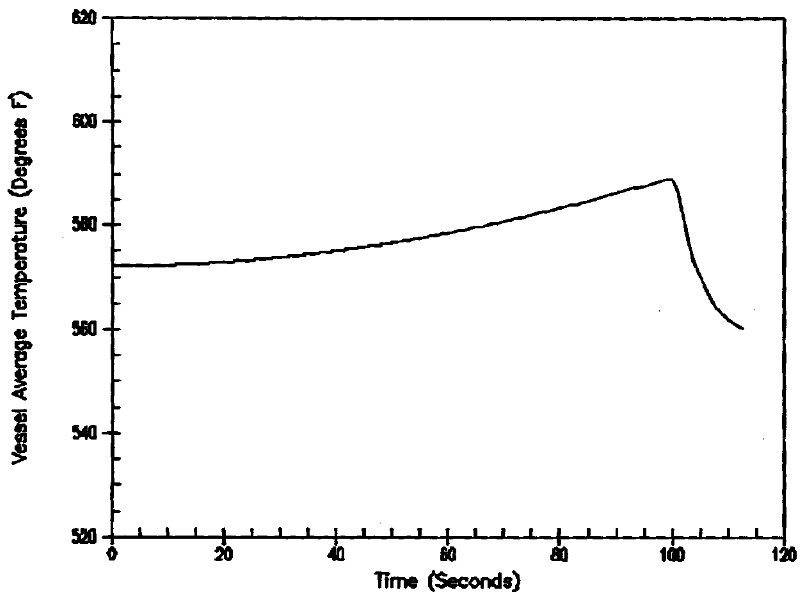
UFSAR FIGURE 14.1-13	REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER WATER VOLUME TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 1 PCM/SEC WITHDRAWAL RATE

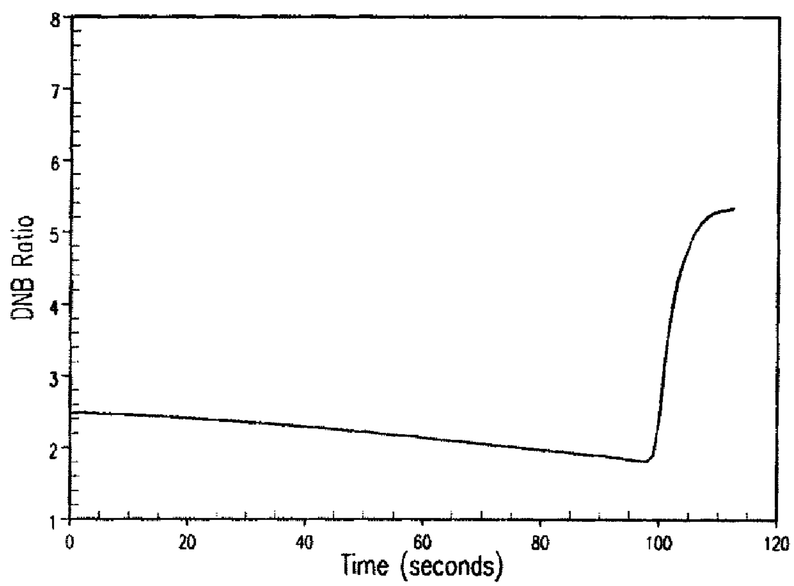
UFSAR FIGURE 14.1-14	REV. No. 01



INDIAN POINT UNIT No. 3

CORE AVERAGE WATER TEMPERATURE TRANSIENT FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 1 PCM/SEC WITHDRAWAL RATE

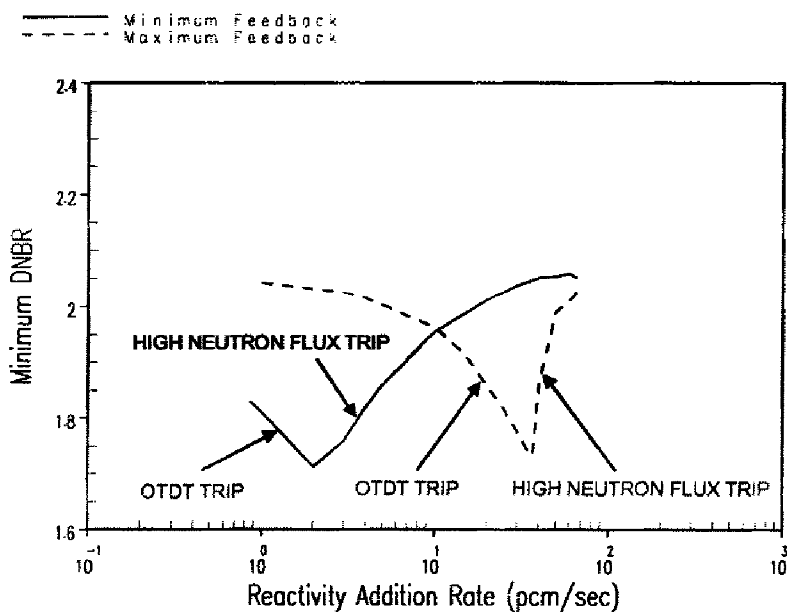
UFSAR FIGURE 14.1-15	REV. No. 01



INDIAN POINT UNIT No. 3

DNB RATIO VERSUS TIME FOR AN UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK. 1 PCM/SEC WITHDRAWAL RATE

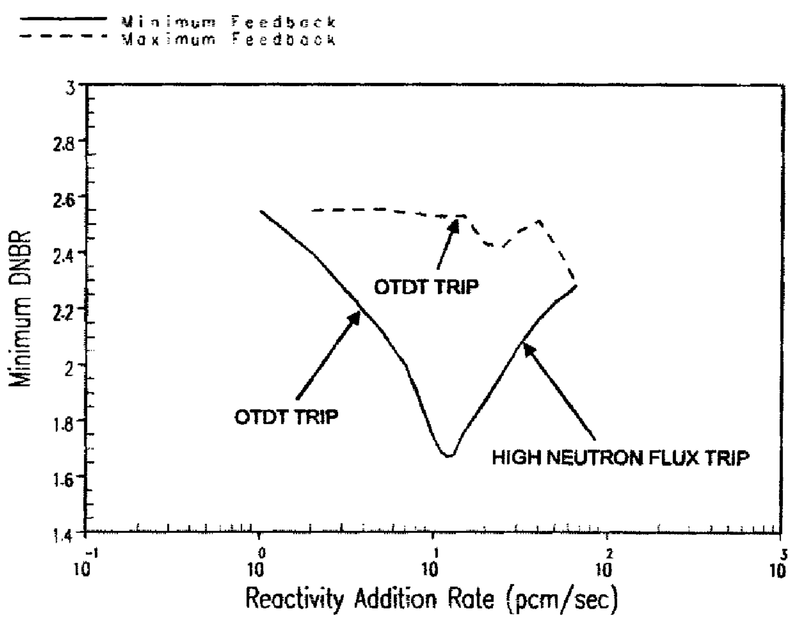
UFSAR FIGURE 14.1-16 | REV. No. 02



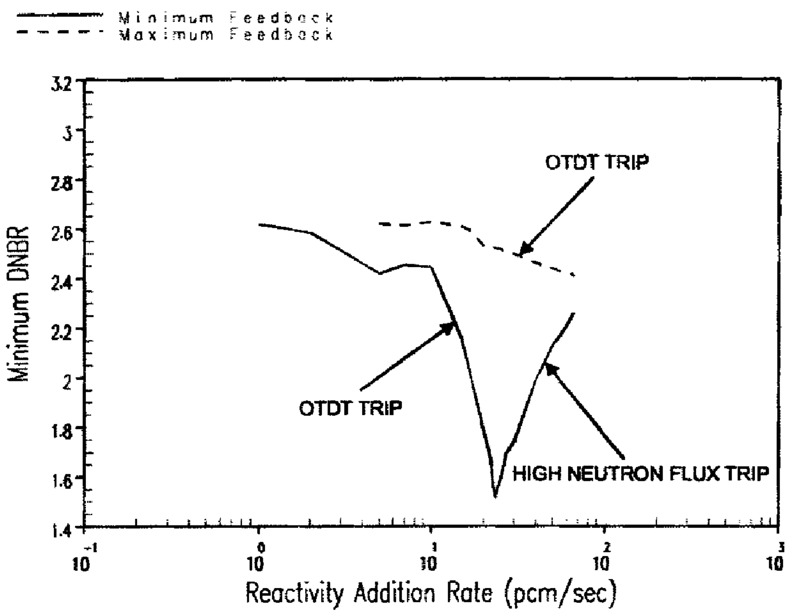
INDIAN POINT UNIT No. 3

MINIMUM DNBR VERSUS REACTIVITY INSERTION RATE FOR AN UNCONTROLLED RCA BANK WITHDRAWAL FROM FULL POWER

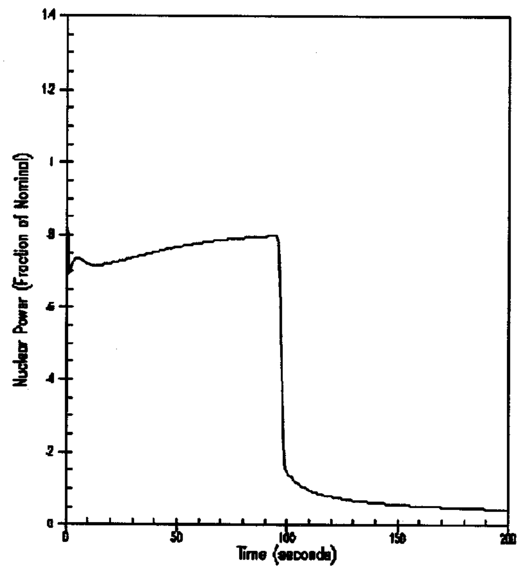
UFSAR FIGURE 14.1-17 | REV. No. 02

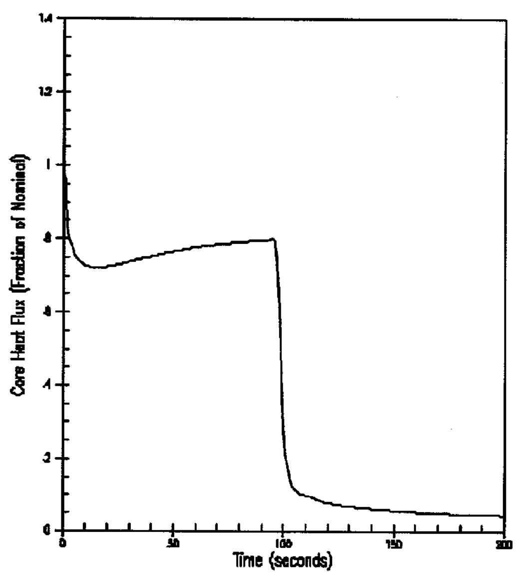


INDIAN POINT UNIT No. 3	
MINIMUM DNBR VERSUS REACTIVITY INSERTION RATE FOR AN UNCONTROLLED RCA BANK WITHDRAWAL FROM 60% POWER	
UFSAR FIGURE 14.1-18	REV. No. 02



INDIAN POINT UNIT No. 3	
MINIMUM DNBR VERSUS REACTIVITY INSERTION RATE FOR AN UNCONTROLLED RCA BANK WITHDRAWAL FROM 10% POWER	
UFSAR FIGURE 14.1-19	REV. No. 02

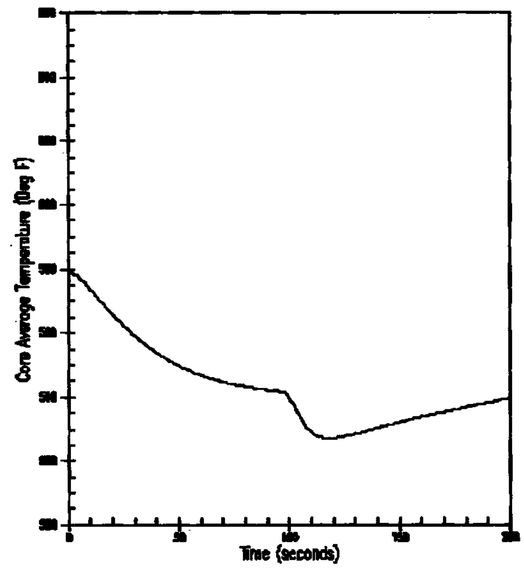


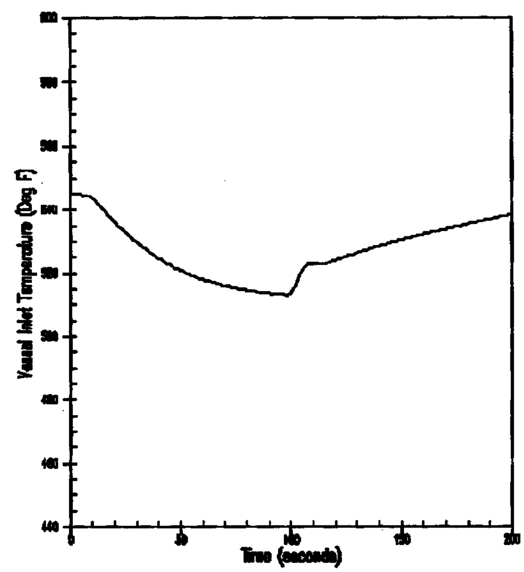


INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL NUCLEAR POWER AND CORE HEAT FLUX FOR DROPPED RCCA WORTH OF 400 PCM AT BOL (SMALL NEGATIVE MTC)

UFSAR FIGURE 14.1-20	REV. No. 01

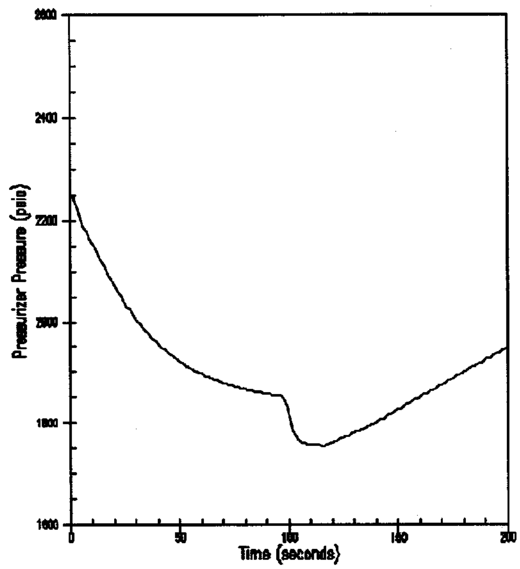




INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL
CORE AVERAGE AND VESSEL INLET TEMPERATURE FOR
DROPPED RCCA WORTH OF 400 PCM AT BOL
(SMALL NEGATIVE MTC)

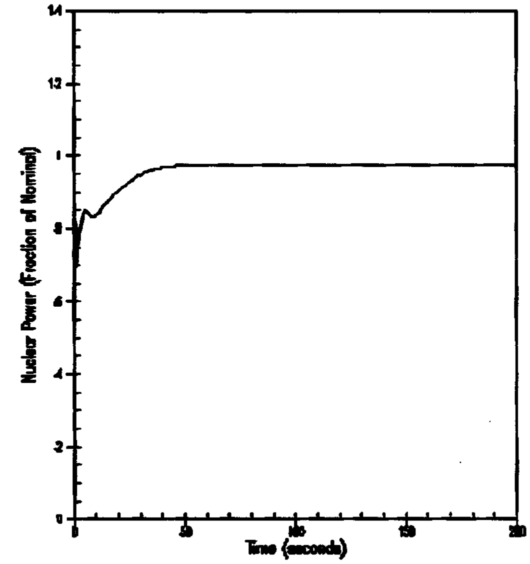
UFSAR FIGURE 14.1–21	REV. No. 01

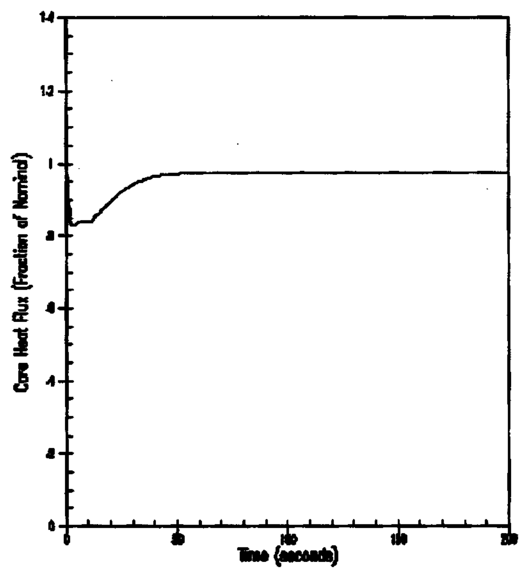


INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL
PRESSURIZER PRESSURE FOR
DROPPED RCCA WORTH OF 400 PCM AT BOL
(SMALL NEGATIVE MTC)

UFSAR FIGURE 14.1-22	REV. No. 01

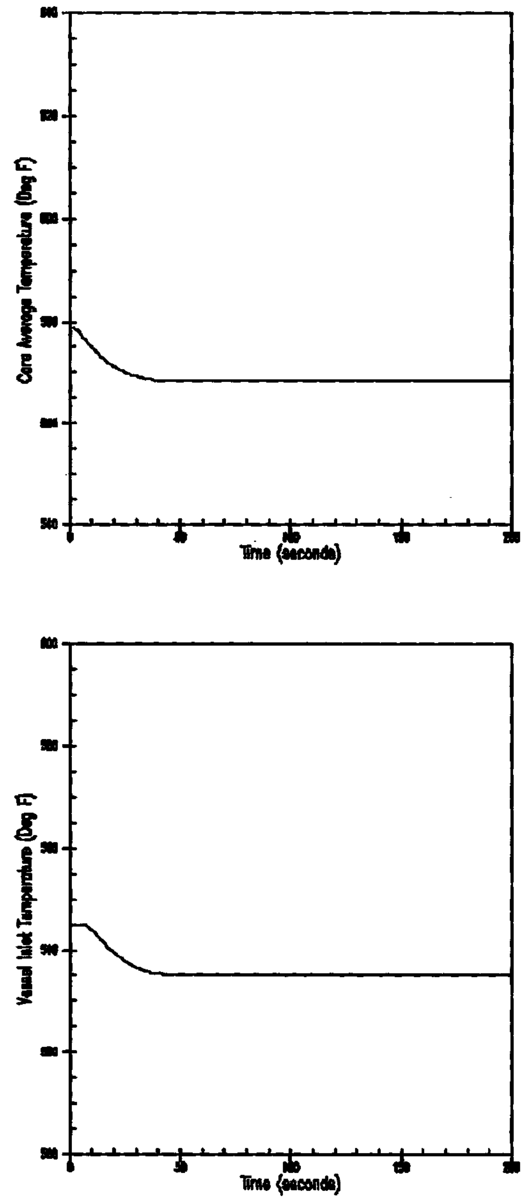




INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL
NUCLEAR POWER AND CORE HEAT FLUX FOR
DROPPED RCCA WORTH OF 400 PCM AT EOL
(LARGE NEGATIVE MTC)

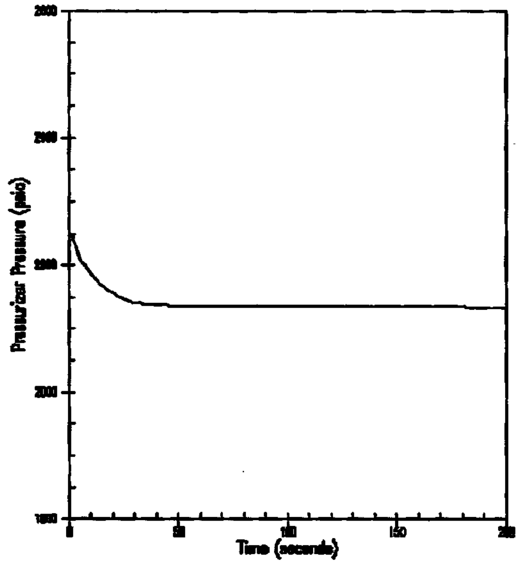
UFSAR FIGURE 14.1–23	REV. No. 01



INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL
CORE AVERAGE AND VESSEL INLET TEMPERATURE FOR
DROPPED RCCA WORTH OF 400 PCM AT EOL
(LARGE NEGATIVE MTC)

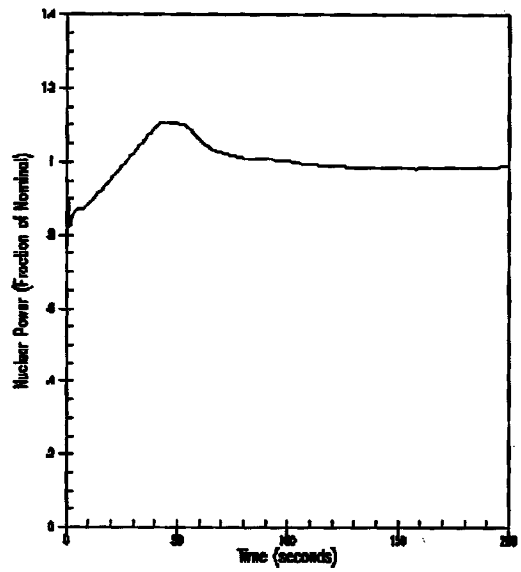
UFSAR FIGURE 14.1-24	REV. No. 01

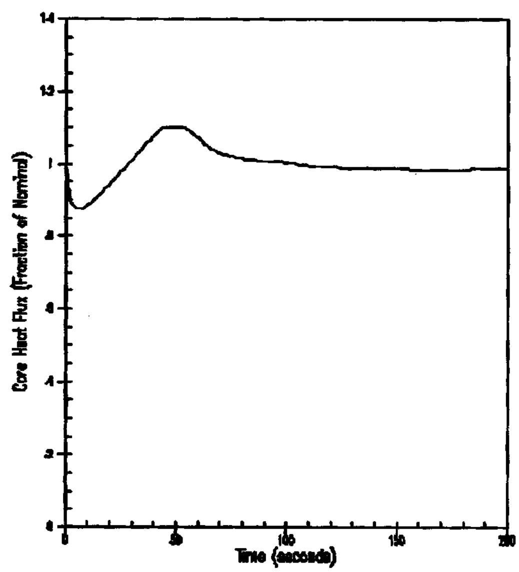


INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL
PRESSURIZER PRESSURE FOR
DROPPED RCCA WORTH OF 400 PCM AT EOL
(LARGE NEGATIVE MTC)

UFSAR FIGURE 14.1–25	REV. No. 01

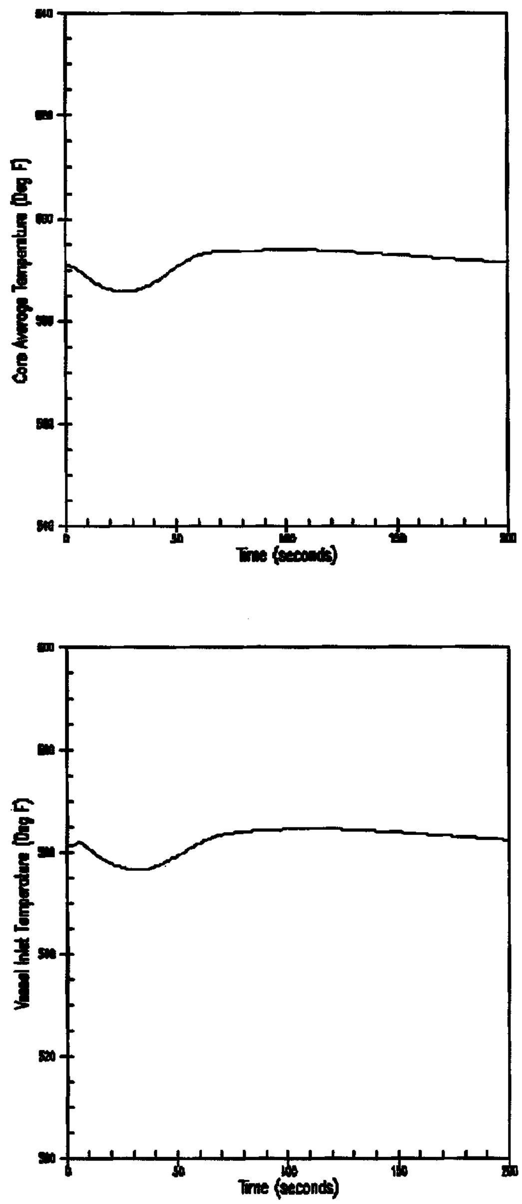




INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL
NUCLEAR POWER AND CORE HEAT FLUX FOR
DROPPED RCCA WORTH OF 200 PCM AT BOL
(SMALL NEGATIVE MTC)

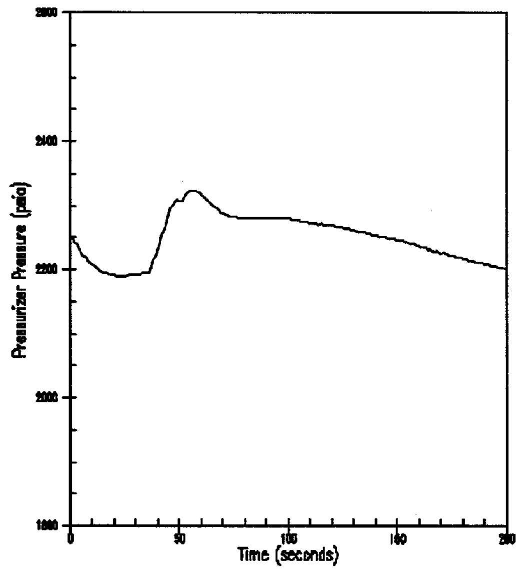
UFSAR FIGURE 14.1-26	REV. No. 01



INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL
CORE AVERAGE AND VESSEL INLET TEMPERATURE FOR
DROPPED RCCA WORTH OF 200 PCM AT BOL
(SMALL NEGATIVE MTC)

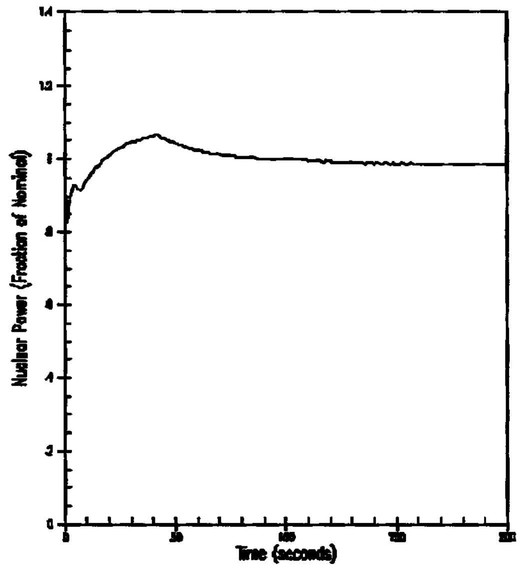
UFSAR FIGURE 14.1–27	REV. No. 01

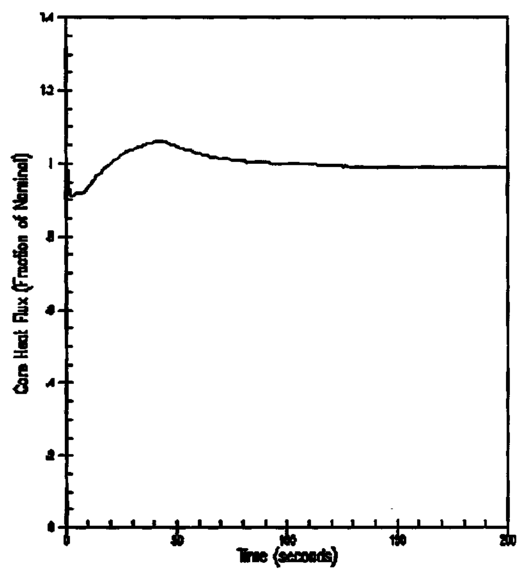


INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH MANUAL ROD CONTROL
PRESSURIZER PRESSURE FOR
DROPPED RCCA WORTH OF 200 PCM AT BOL
(SMALL NEGATIVE MTC)

UFSAR FIGURE 14.1-28 | REV. No. 01

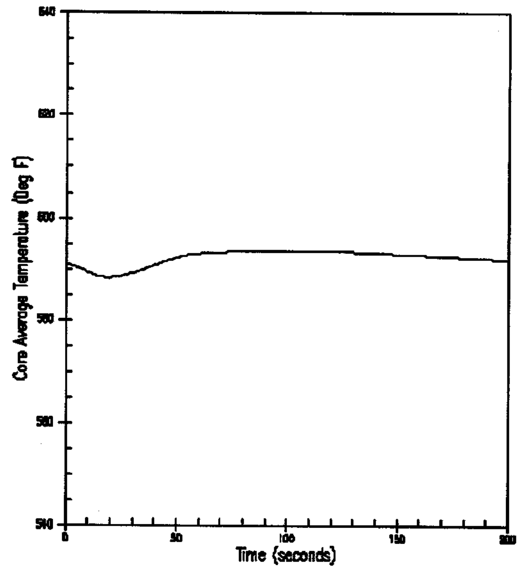


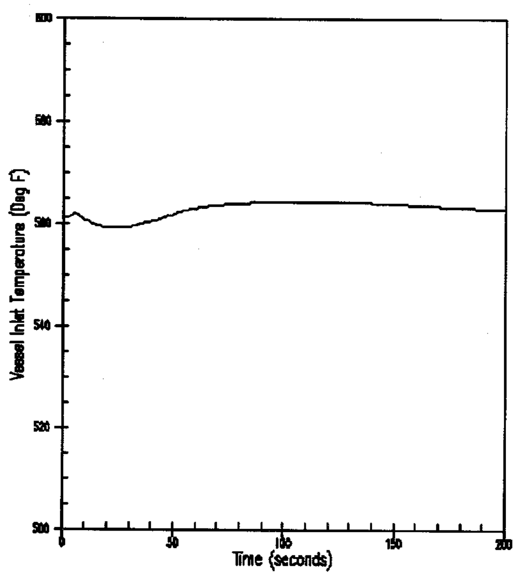


INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH AUTOMATIC ROD CONTROL
NUCLEAR POWER AND CORE HEAT FLUX FOR
DROPPED RCCA WORTH OF 200 PCM AT EOL
(LARGE NEGATIVE MTC)

UFSAR FIGURE 14.1−29	REV. No. 01

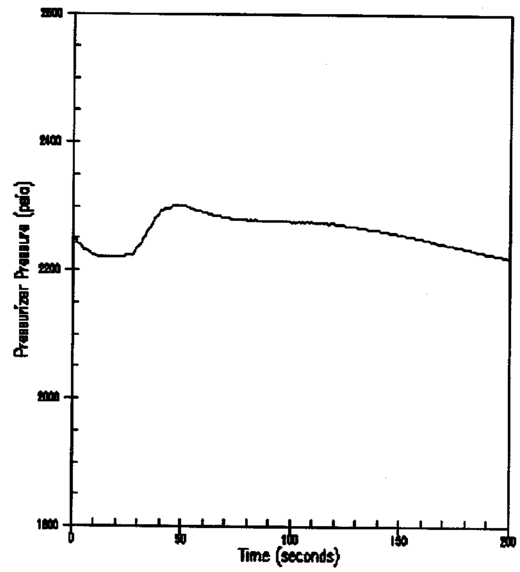




INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH AUTOMATIC ROD CONTROL CORE AVERAGE AND VESSEL INLET TEMPERATURE FOR DROPPED RCCA WORTH OF 200 PCM AT EOL (LARGE NEGATIVE MTC)

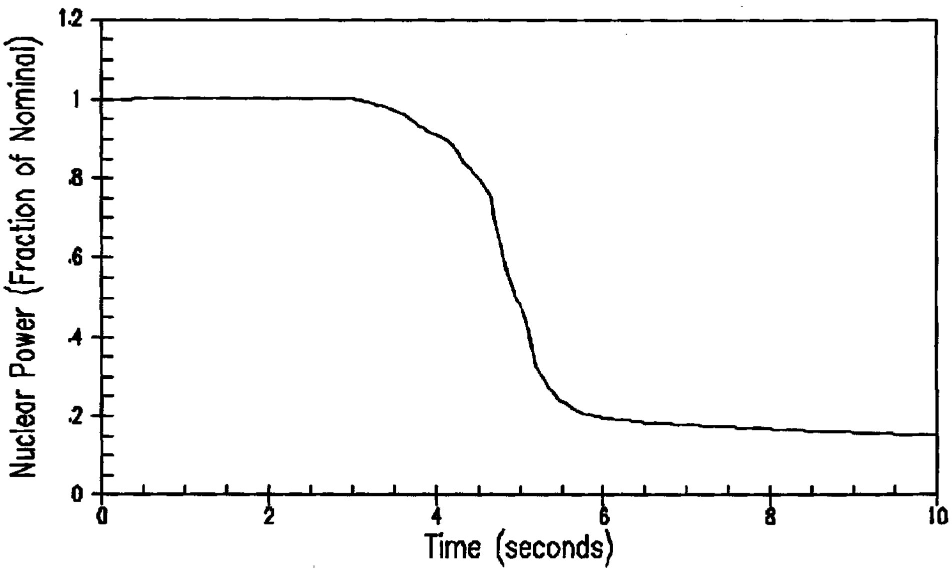
UFSAR FIGURE 14.1-30	REV. No. 01



INDIAN POINT UNIT No. 3

DROPPED ROD TRANSIENT WITH AUTOMATIC ROD CONTROL
PRESSURIZER PRESSURE FOR
DROPPED RCCA WORTH OF 200 PCM AT EOL
(LARGE NEGATIVE MTC)

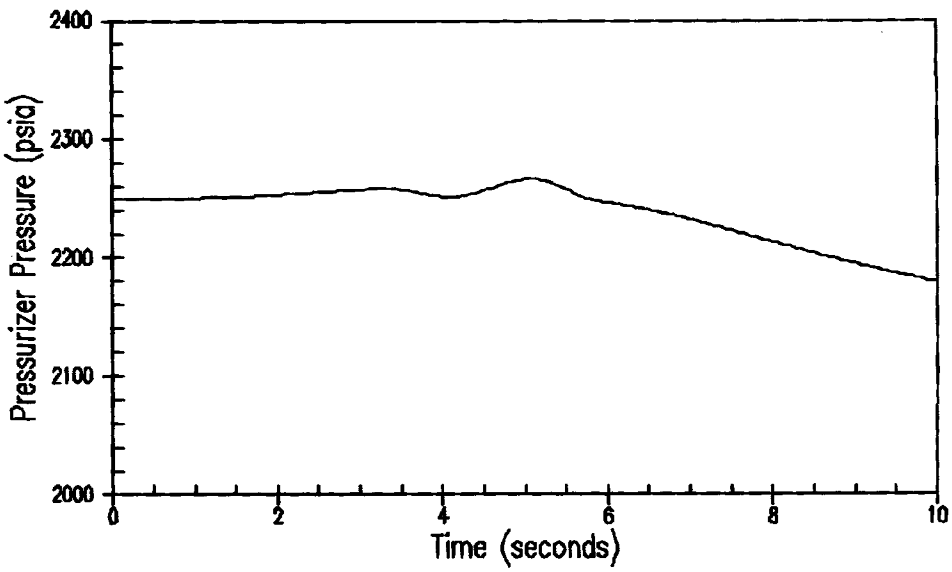
UFSAR FIGURE 14.1–31	REV. No. 01



INDIAN POINT UNIT No. 3

NUCLEAR POWER FOR PARTIAL LOSS OF FLOW
FOUR LOOPS IN OPERATION
ONE PUMP COASTING DOWN

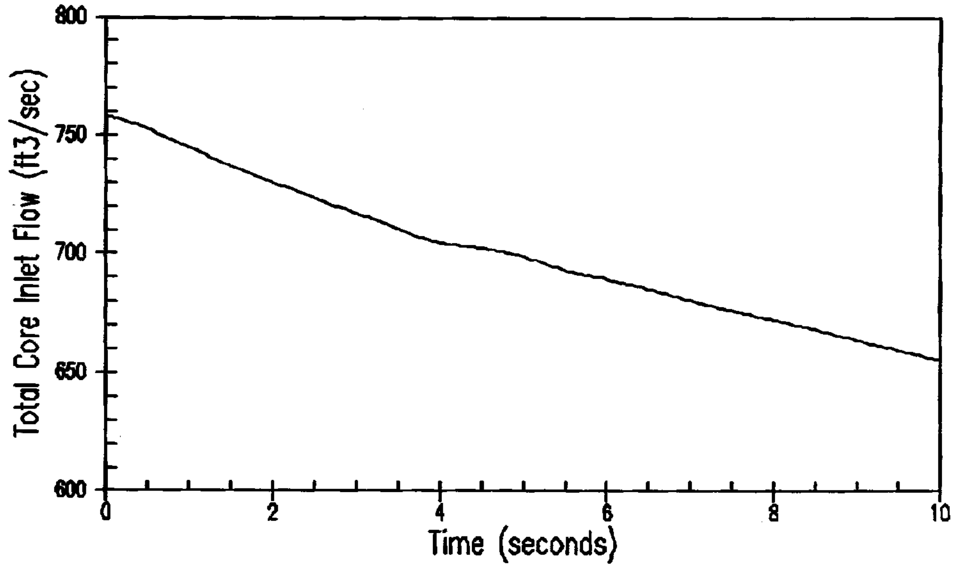
UFSAR FIGURE 14.1-44 | REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER PRESSURE FOR PARTIAL LOSS OF FLOW
FOUR LOOPS IN OPERATION
ONE PUMP COASTING DOWN

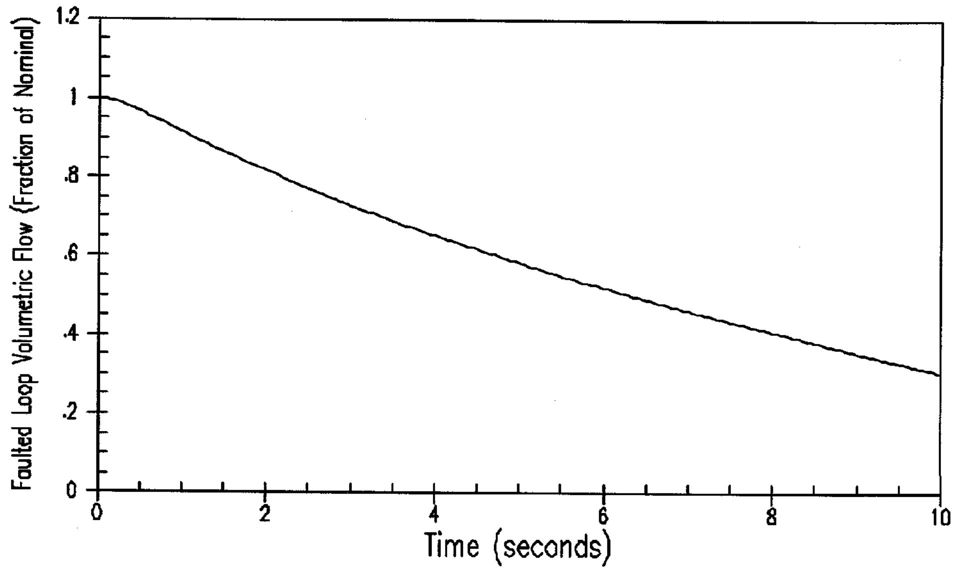
UFSAR FIGURE 14.1-45 | REV. No. 01



INDIAN POINT UNIT No. 3

TOTAL CORE FLOW FOR PARTIAL LOSS OF FLOW
FOUR LOOPS IN OPERATION
ONE PUMP COASTING DOWN

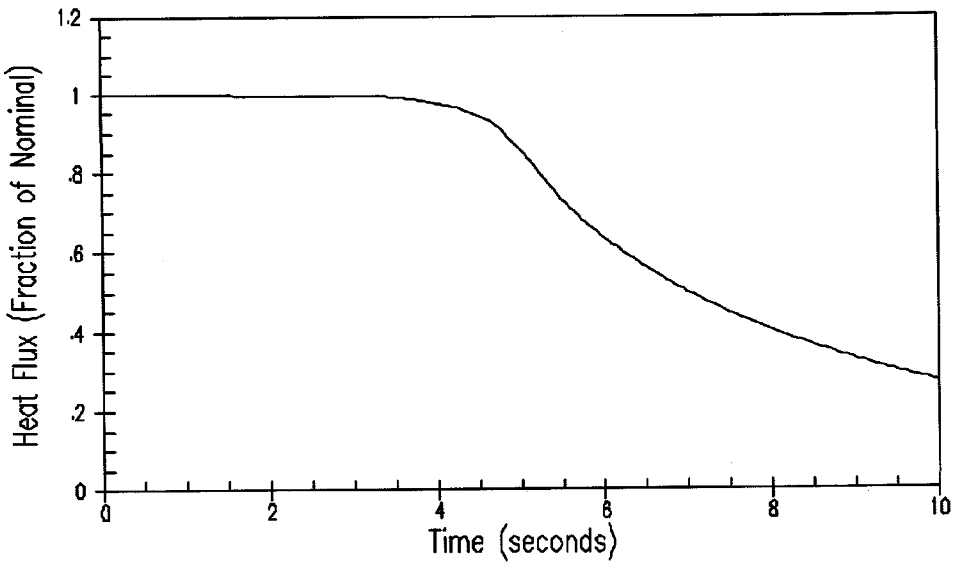
UFSAR FIGURE 14.1-46	REV. No. 01



INDIAN POINT UNIT No. 3

FAULTED LOOP FLOW FOR PARTIAL LOSS OF FLOW
FOUR LOOPS IN OPERATION
ONE PUMP COASTING DOWN

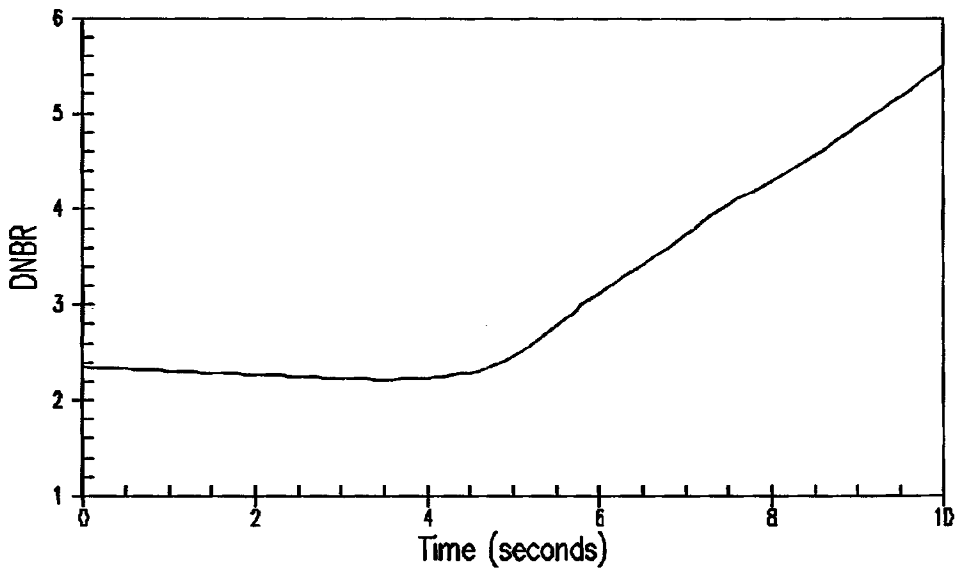
UFSAR FIGURE 14.1-47 | REV. No. 01



INDIAN POINT UNIT No. 3

HEAT FLUX FOR PARTIAL LOSS OF FLOW
FOUR LOOPS IN OPERATION
ONE PUMP COASTING DOWN

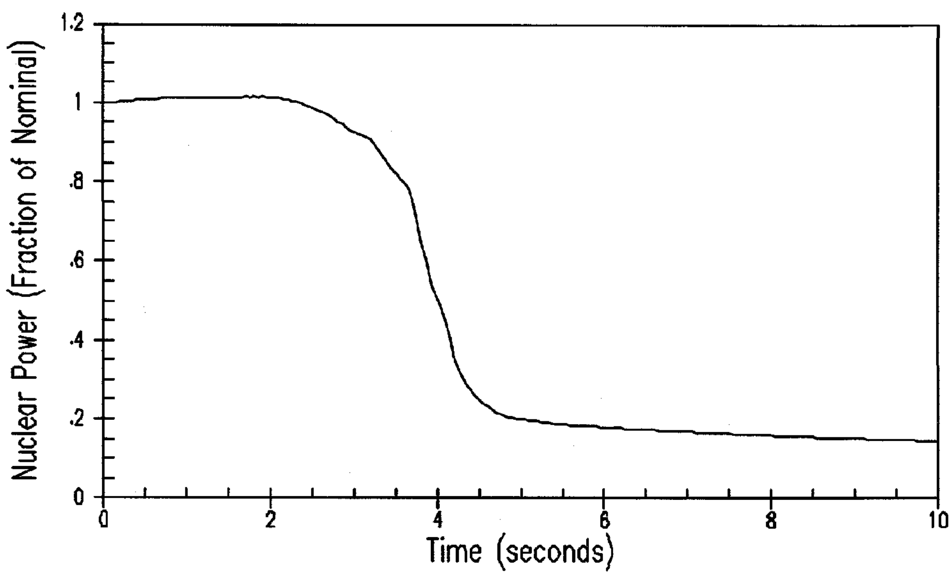
UFSAR FIGURE 14.1-48 | REV. No. 01



INDIAN POINT UNIT No. 3

DNBR FOR PARTIAL LOSS OF FLOW
FOUR LOOPS IN OPERATION
ONE PUMP COASTING DOWN

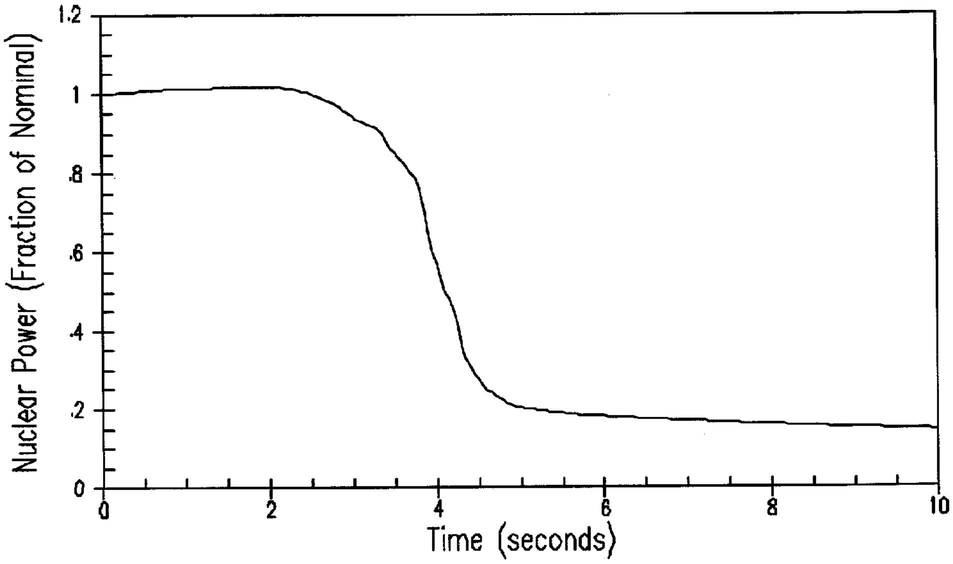
UFSAR FIGURE 14.1-49	REV. No. 01



INDIAN POINT UNIT No. 3

NUCLEAR POWER FOR COMPLETE LOSS OF FLOW
UNDERVOLTAGE
FOUR LOOPS IN OPERATION
FOUR PUMPS COASTING DOWN

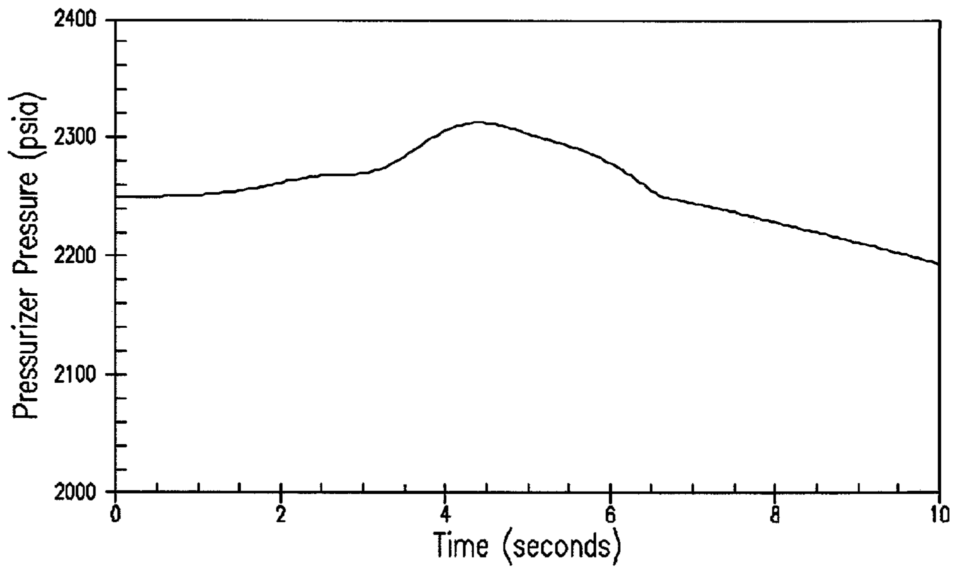
UFSAR FIGURE 14.1–50 | REV. No. 01



INDIAN POINT UNIT No. 3

NUCLEAR POWER FOR COMPLETE LOSS OF FLOW
UNDERFREQUENCY
FOUR LOOPS IN OPERATION

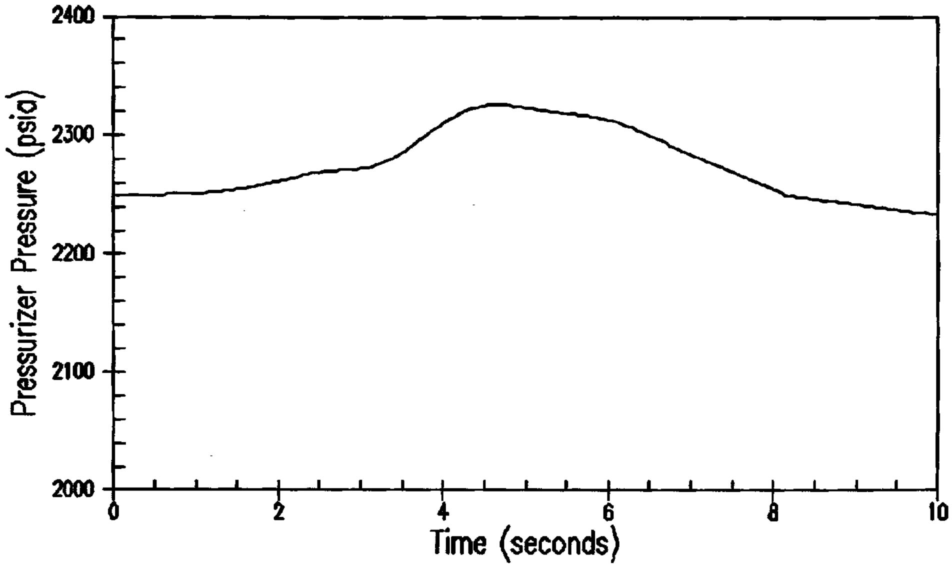
UFSAR FIGURE 14.1–50A	REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER PRESSURE FOR COMPLETE LOSS OF FLOW
UNDERVOLTAGE
FOUR LOOPS IN OPERATION
FOUR PUMPS COASTING DOWN

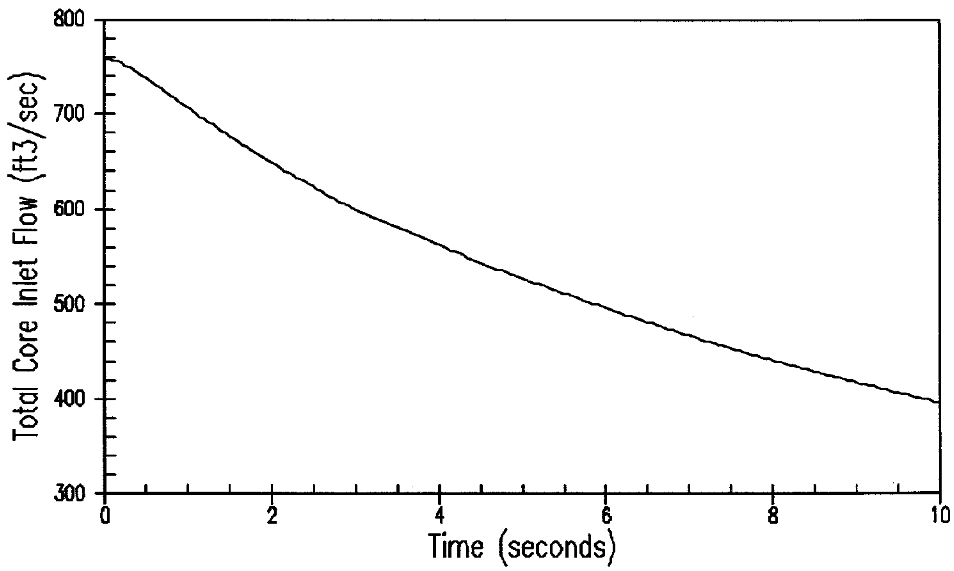
UFSAR FIGURE 14.1-51 | REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER PRESSURE FOR COMPLETE LOSS OF FLOW
UNDERFREQUENCY
FOUR LOOPS IN OPERATION

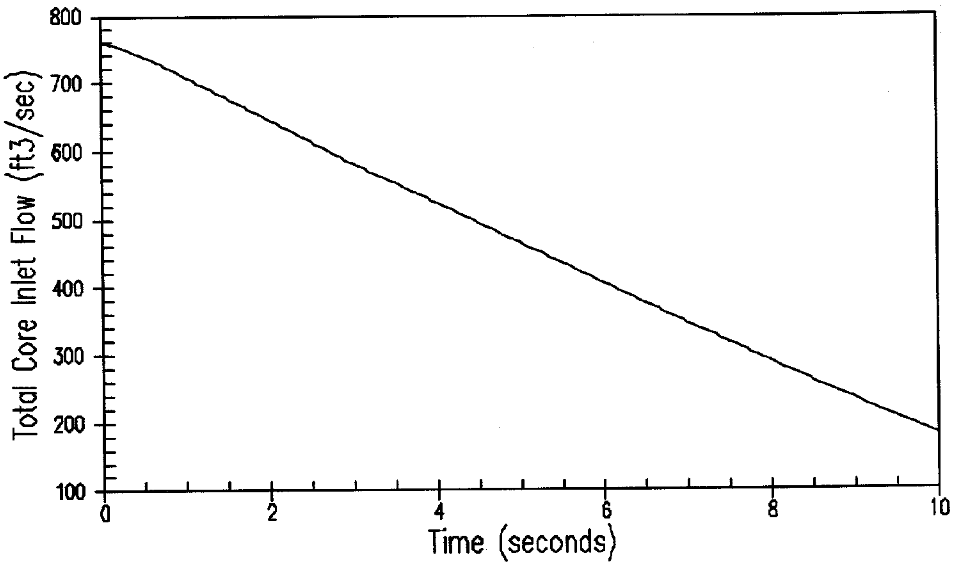
UFSAR FIGURE 14.1–51A | REV. No. 01



INDIAN POINT UNIT No. 3

TOTAL CORE FLOW FOR COMPLETE LOSS OF FLOW
UNDERVOLTAGE
FOUR LOOPS IN OPERATION
FOUR PUMPS COASTING DOWN

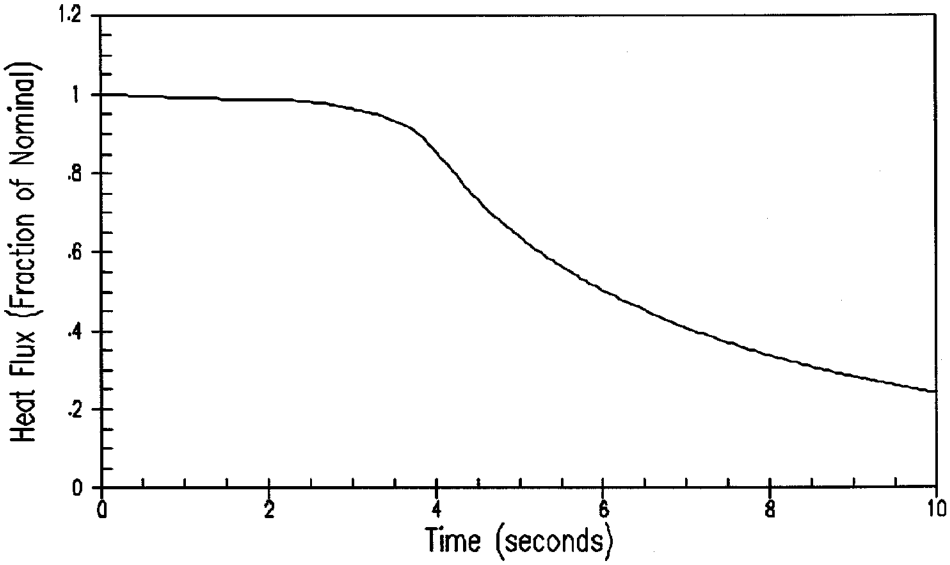
UFSAR FIGURE 14.1-52	REV. No. 01



INDIAN POINT UNIT No. 3

TOTAL CORE FLOW FOR COMPLETE LOSS OF FLOW
UNDERFREQUENCY
FOUR LOOPS IN OPERATION

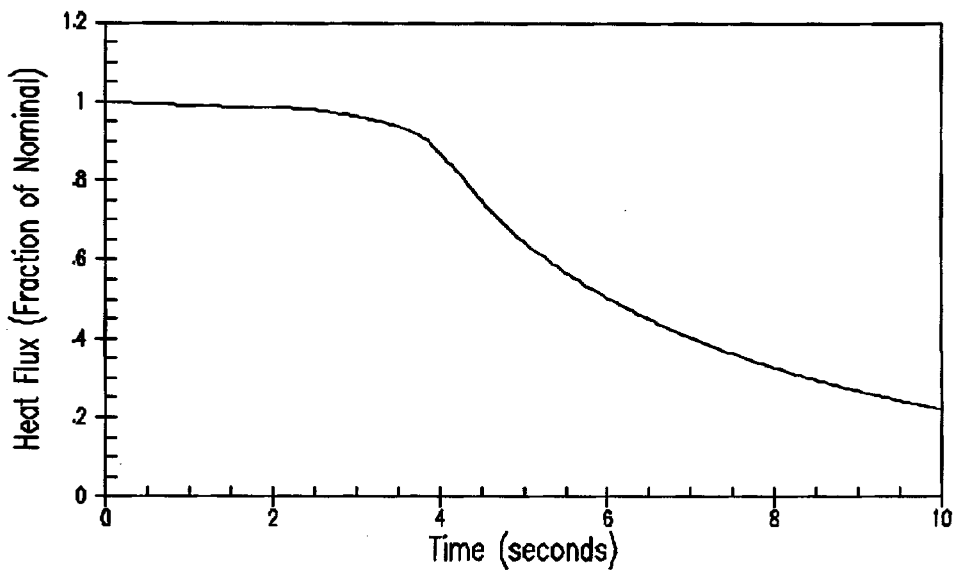
UFSAR FIGURE 14.1-52A | REV. No. 01



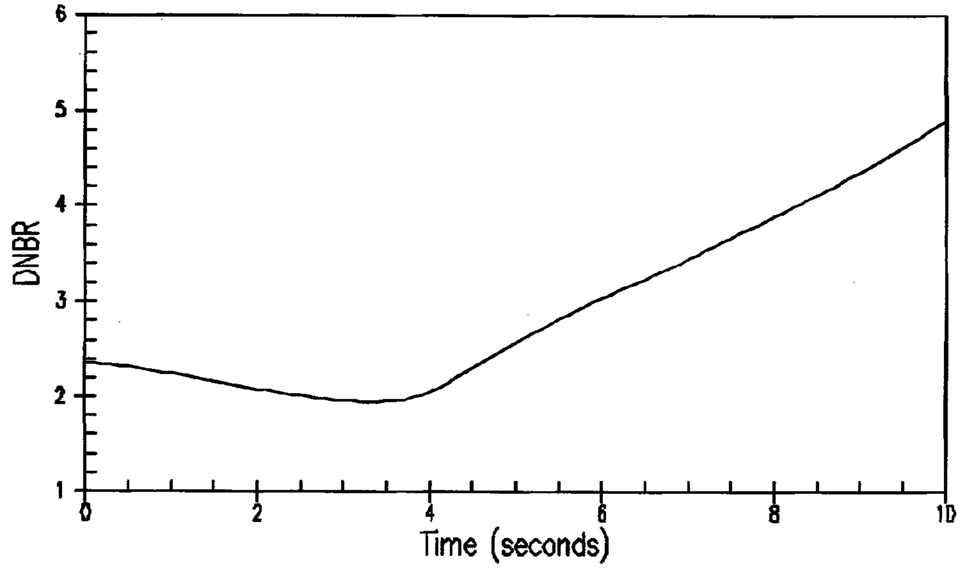
INDIAN POINT UNIT No. 3

HEAT FLUX FOR COMPLETE LOSS OF FLOW
UNDERVOLTAGE
FOUR LOOPS IN OPERATION
FOUR PUMPS COASTING DOWN

UFSAR FIGURE 14.1-53	REV. No. 01



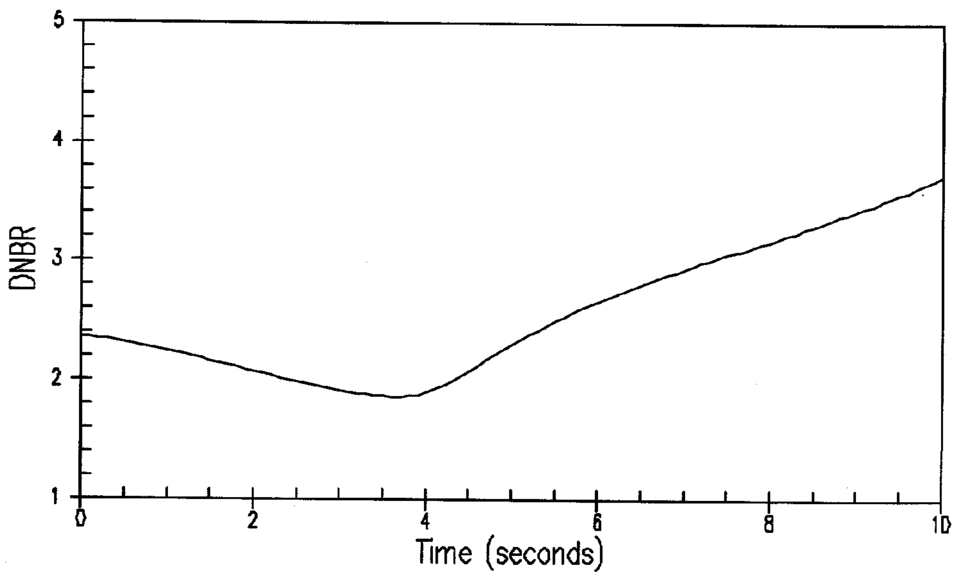
INDIAN POINT UNIT No. 3	
HEAT FLUX FOR COMPLETE LOSS OF FLOW UNDERFREQUENCY FOUR LOOPS IN OPERATION	
UFSAR FIGURE 14.1-53A	REV. No. 01



INDIAN POINT UNIT No. 3

DNBR FOR COMPLETE LOSS OF FLOW
UNDERVOLTAGE
FOUR LOOPS IN OPERATION
FOUR PUMPS COASTING DOWN

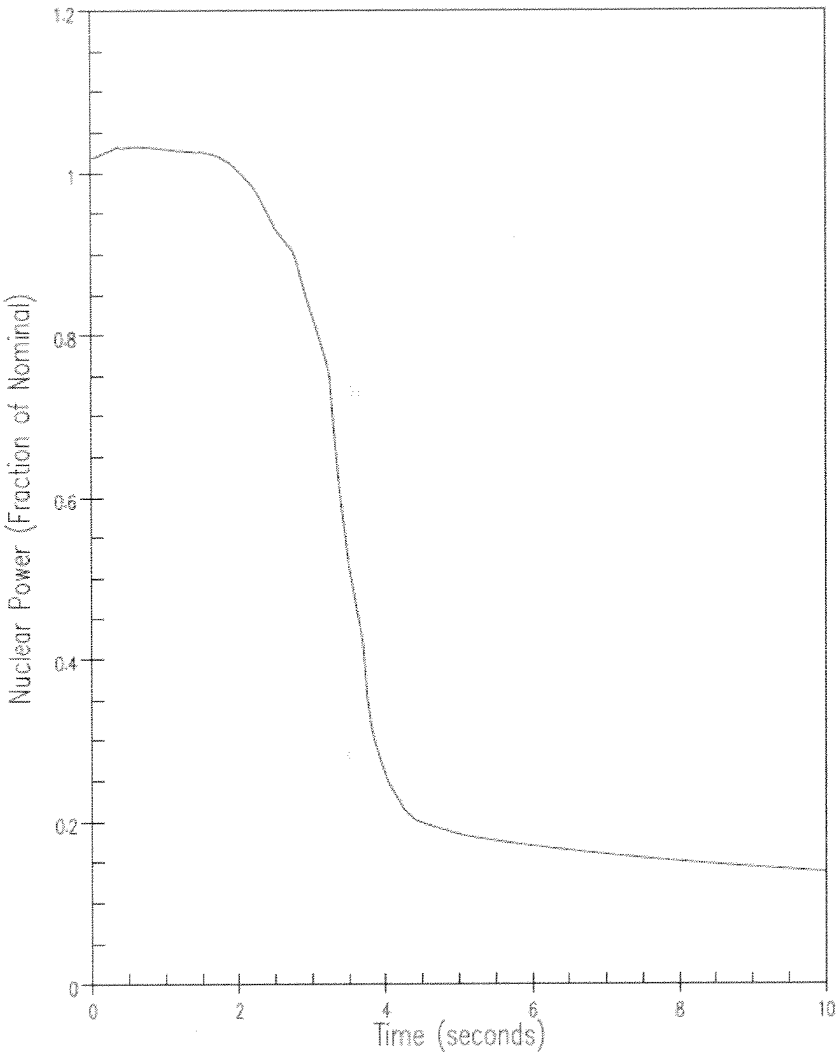
UFSAR FIGURE 14.1-54	REV. No. 01



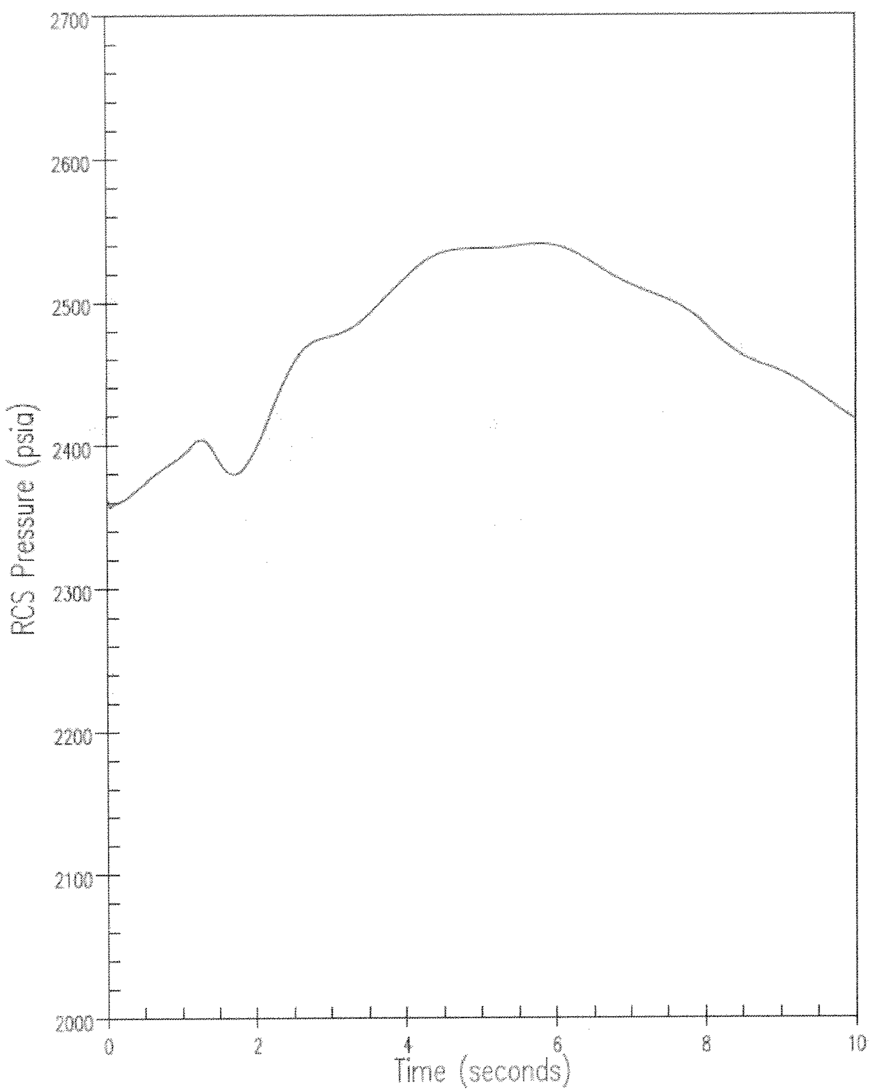
INDIAN POINT UNIT No. 3

DNBR FOR COMPLETE LOSS OF FLOW
UNDERFREQUENCY
FOUR LOOPS IN OPERATION

UFSAR FIGURE 14.1–54A | REV. No. 01



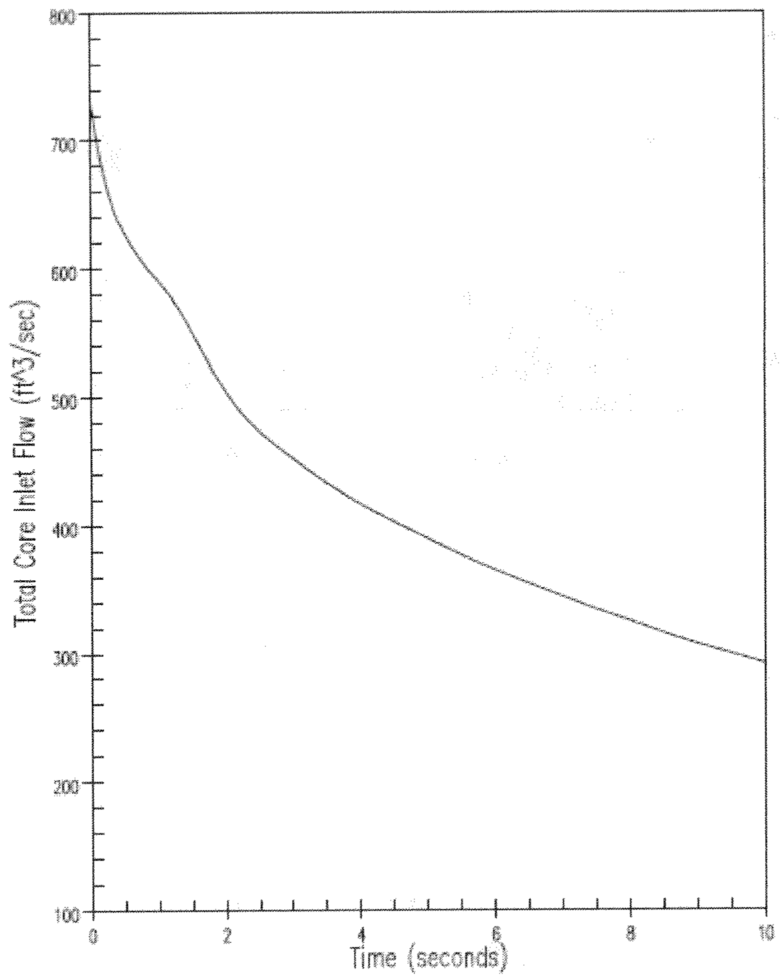
INDIAN POINT UNIT No. 3	
NUCLEAR POWER FOR RCP SHAFT SEIZURE FOUR LOOPS IN OPERATION	
UFSAR FIGURE 14.1–55	REV. No. 03



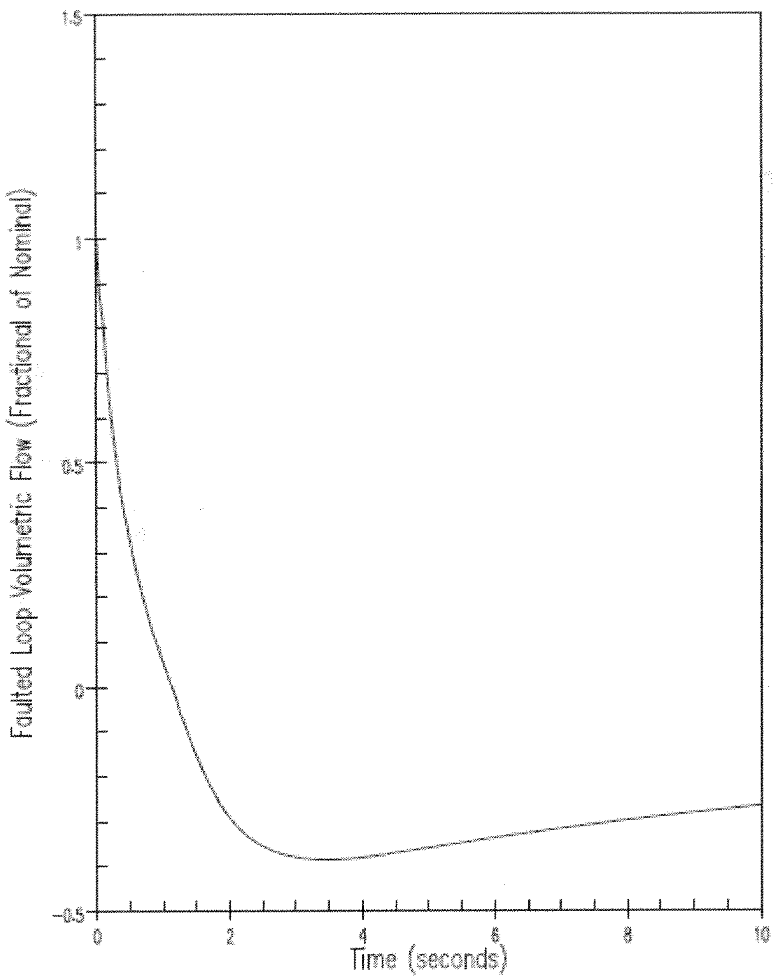
INDIAN POINT UNIT No. 3

RCS PRESSURE FOR RCP SHAFT SEIZURE
FOUR LOOPS IN OPERATION

UFSAR FIGURE 14.1–56	REV. No. 03



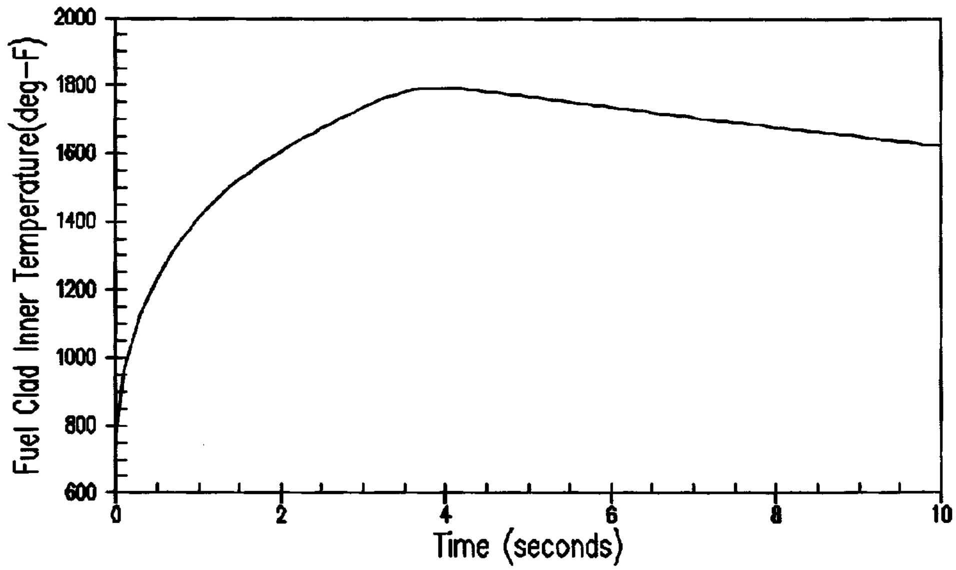
INDIAN POINT UNIT No. 3	
TOTAL CORE FLOW FOR RCP SHAFT SEIZURE FOUR LOOPS IN OPERATION	
UFSAR FIGURE 14.1–57	REV. No. 03



INDIAN POINT UNIT No. 3

FAULTED LOOP FLOW FOR RCP SHAFT SEIZURE FOUR LOOPS IN OPERATION

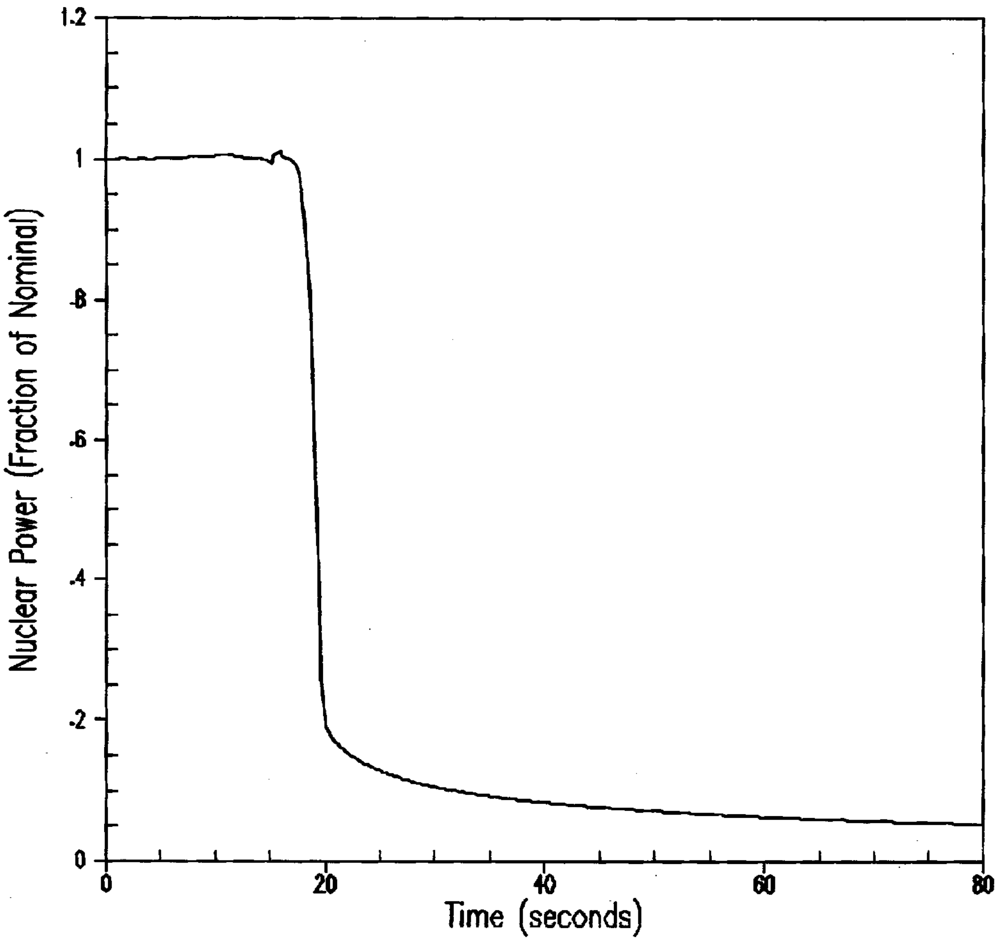
UFSAR FIGURE 14.1–58	REV. No. 03



INDIAN POINT UNIT No. 3

CLAD INNER TEMPERATURE FOR RCP SHAFT SEIZURE
FOUR LOOPS IN OPERATION

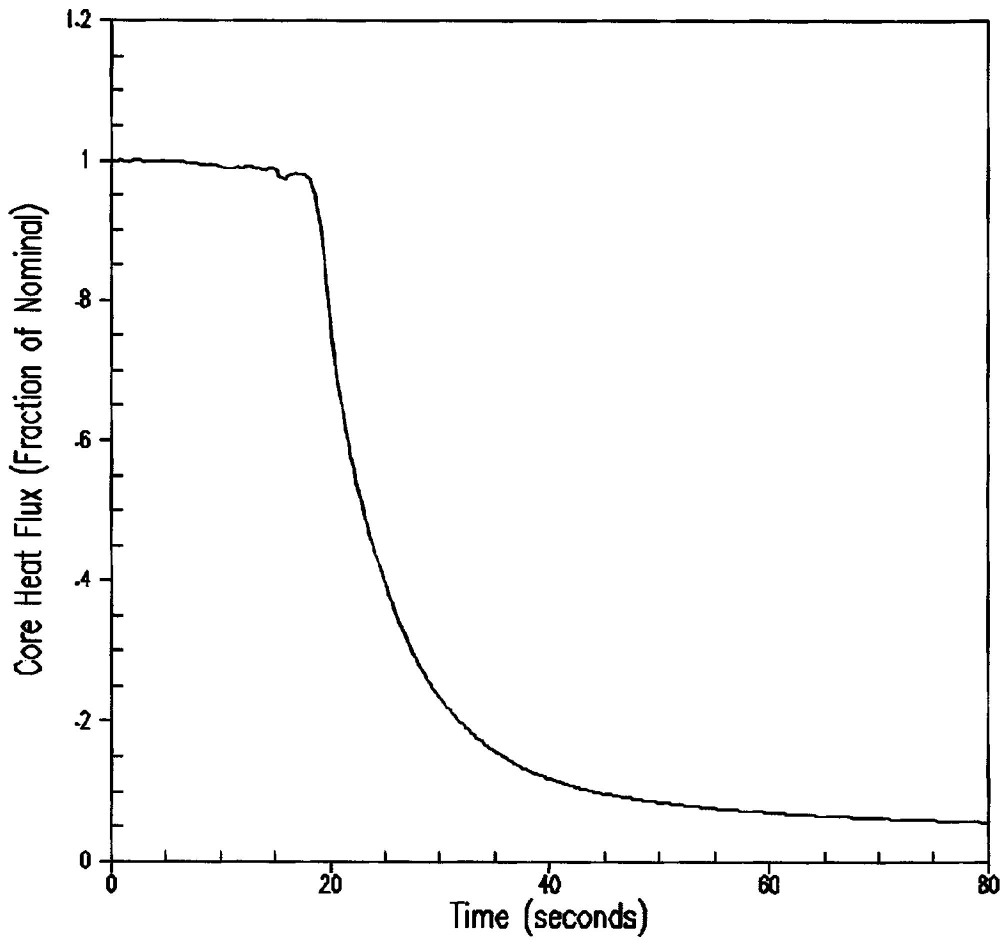
UFSAR FIGURE 14.1-59	REV. No. 01



INDIAN POINT UNIT No. 3

NUCLEAR POWER TRANSIENT FOR LOSS OF EXTERNAL LOAD,
MINIMUM REACTIVITY FEEDBACK,
WITH PRESSURE CONTROL

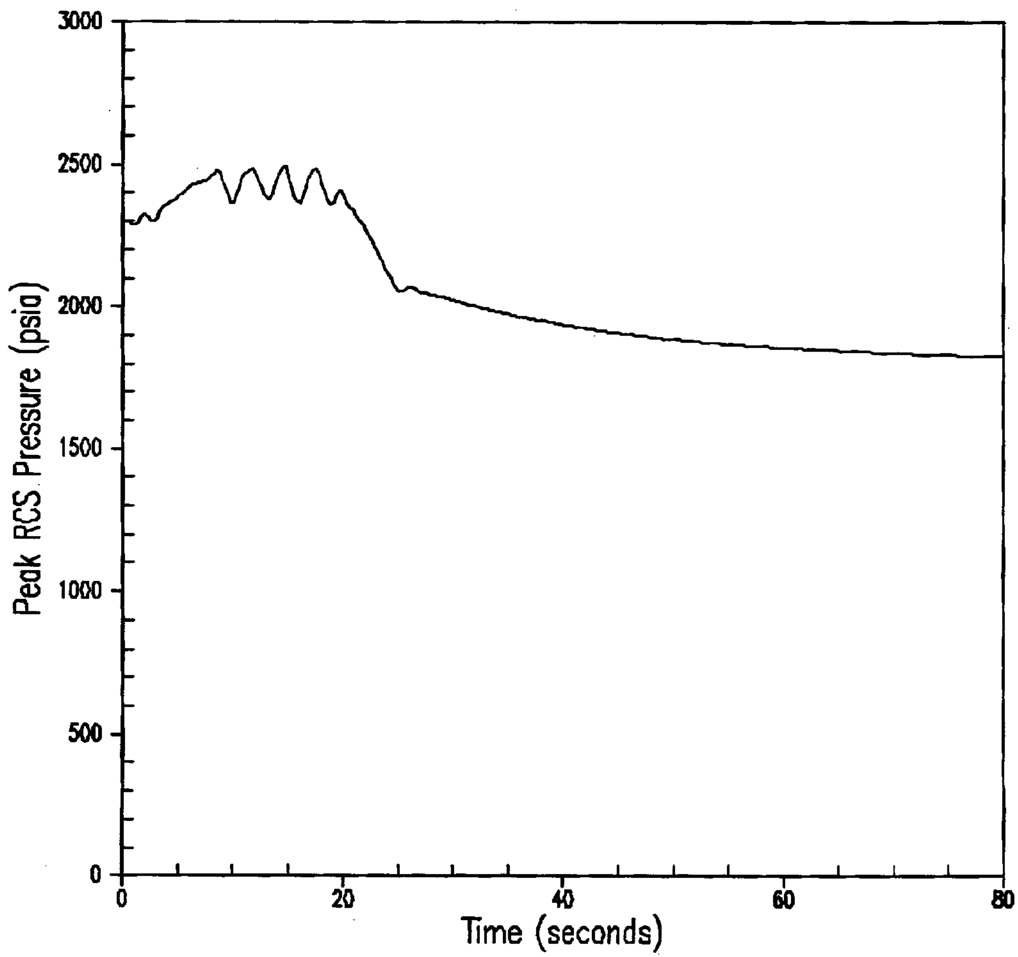
UFSAR FIGURE 14.1-62 | REV. No. 01



INDIAN POINT UNIT No. 3

CORE HEAT FLUX TRANSIENT FOR LOSS OF EXTERNAL LOAD,
MINIMUM REACTIVITY FEEDBACK,
WITH PRESSURE CONTROL

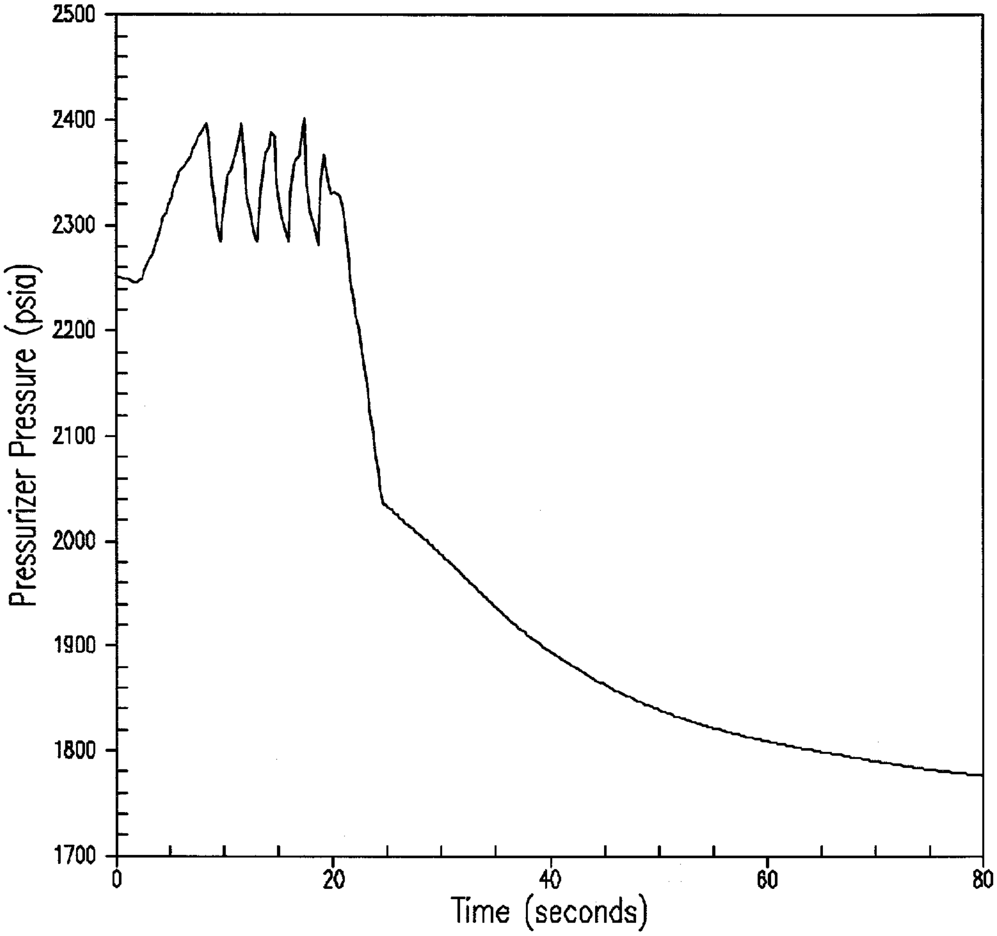
UFSAR FIGURE 14.1-63 | REV. No. 01



INDIAN POINT UNIT No. 3

PEAK RCS PRESSURE TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITH PRESSURE CONTROL

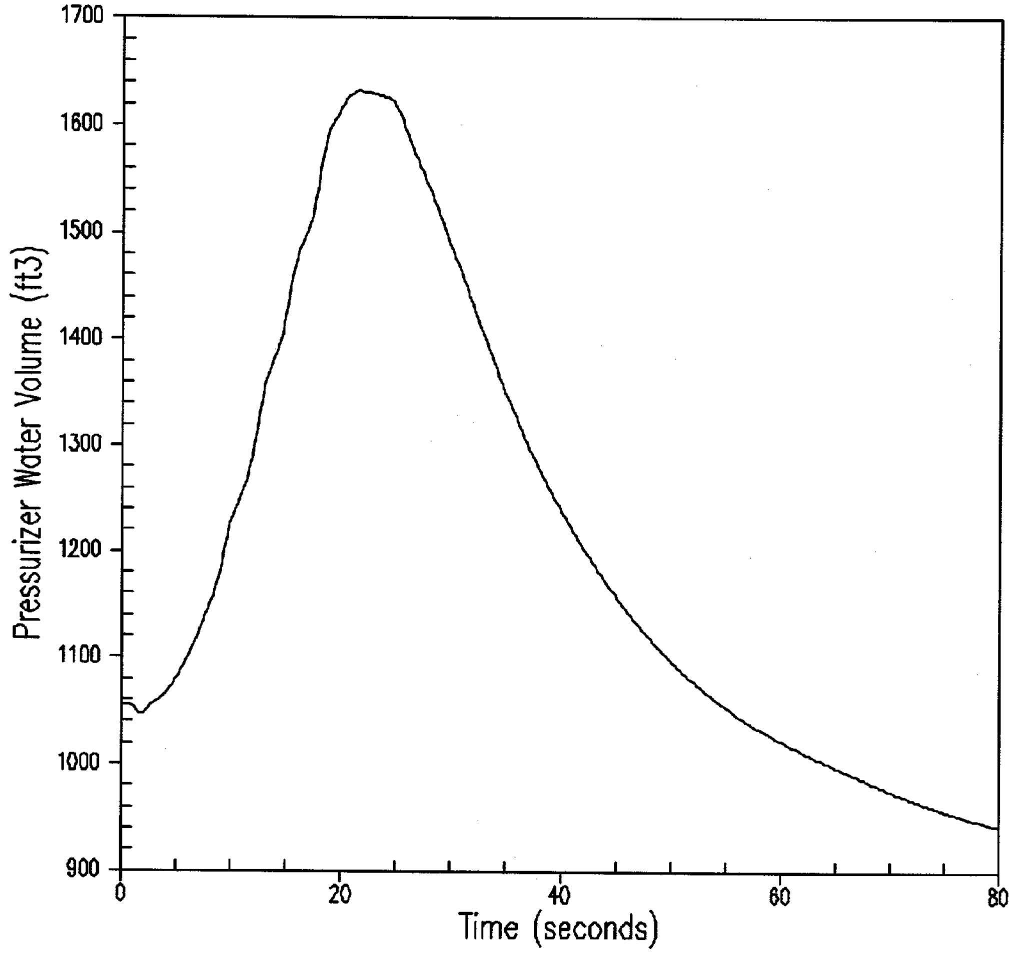
UFSAR FIGURE 14.1-64	REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER PRESSURE TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITH PRESSURE CONTROL

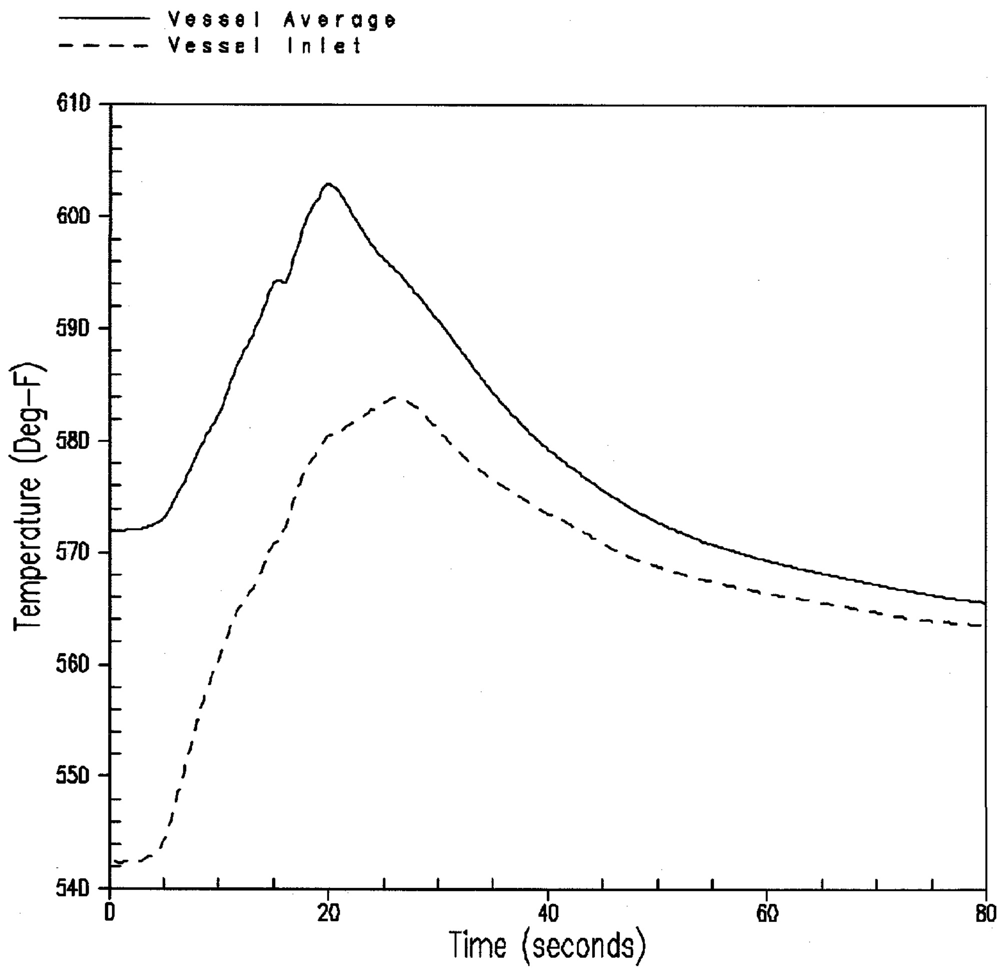
UFSAR FIGURE 14.1-65 | REV. No. 01



INDIAN POINT UNIT No. 3

PRESSURIZER WATER VOLUME TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITH PRESSURE CONTROL

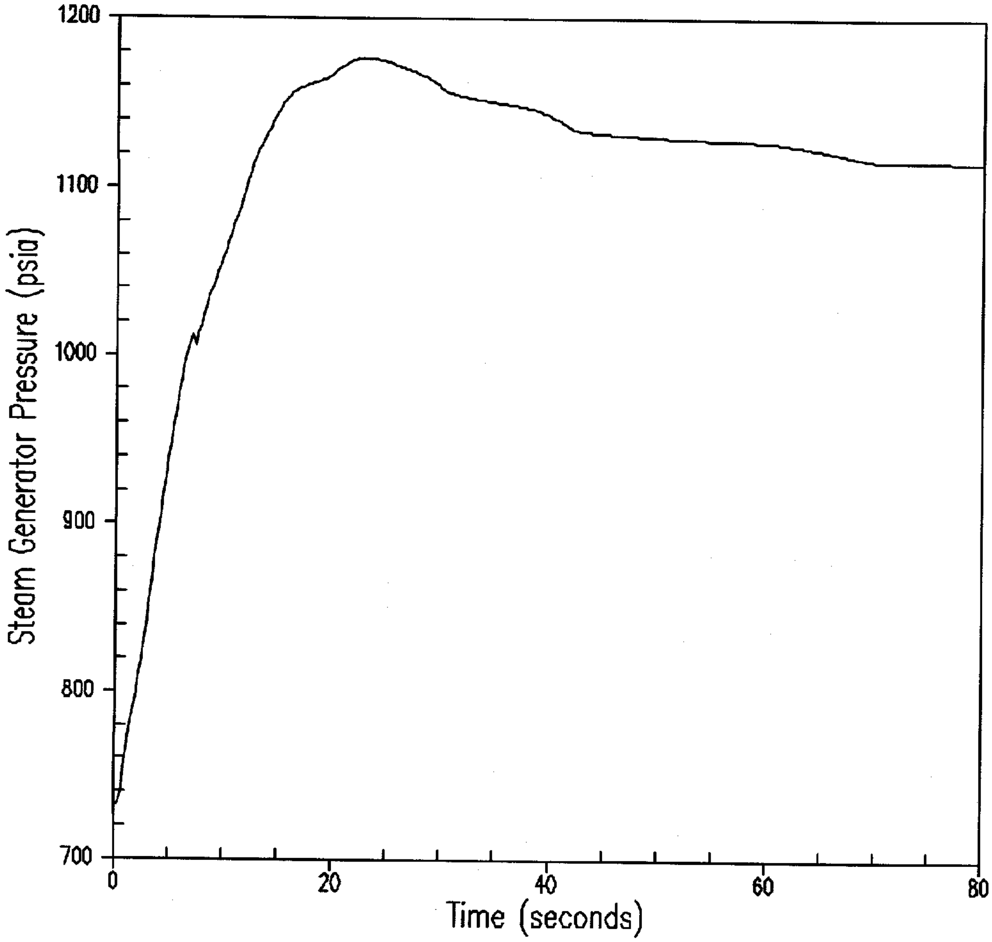
UFSAR FIGURE 14.1-66 | REV. No. 01



INDIAN POINT UNIT No. 3

VESSEL AVERAGE & VESSEL INLET TEMPERATURE TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITH PRESSURE CONTROL

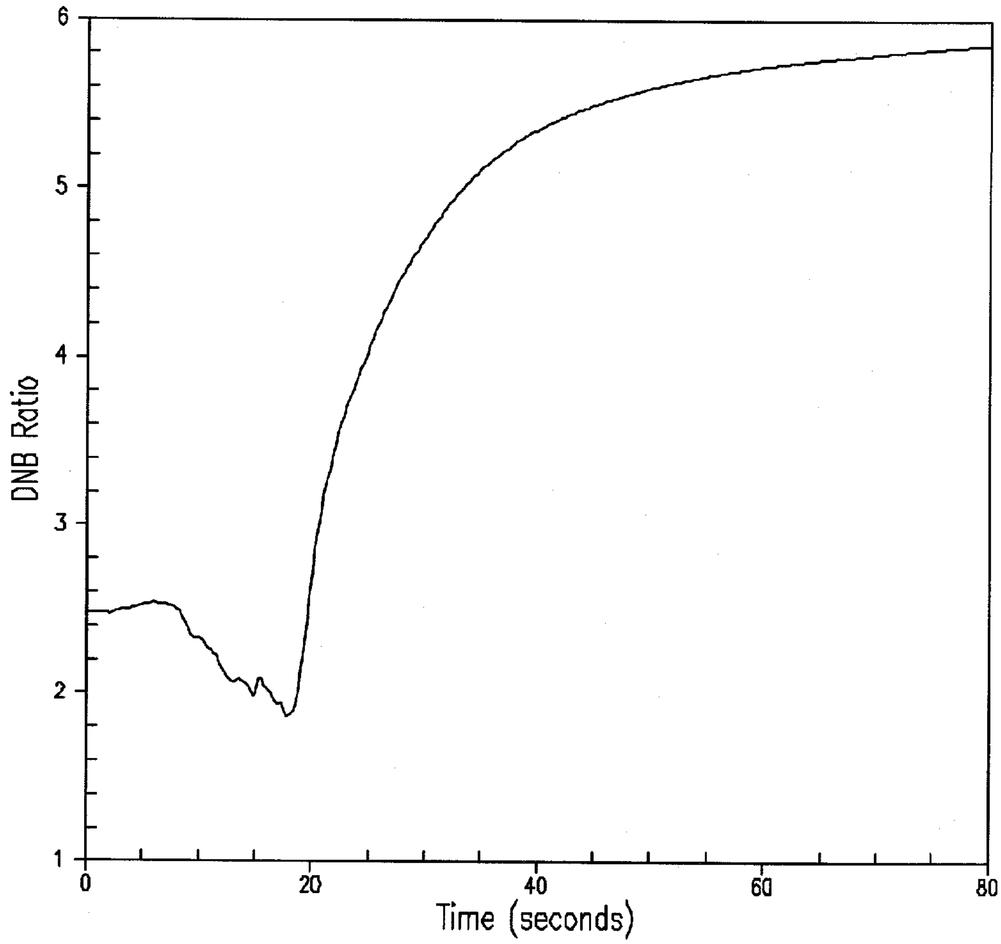
UFSAR FIGURE 14.1-67 | REV. No. 01



INDIAN POINT UNIT No. 3

STEAM GENERATOR PRESSURE TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITH PRESSURE CONTROL

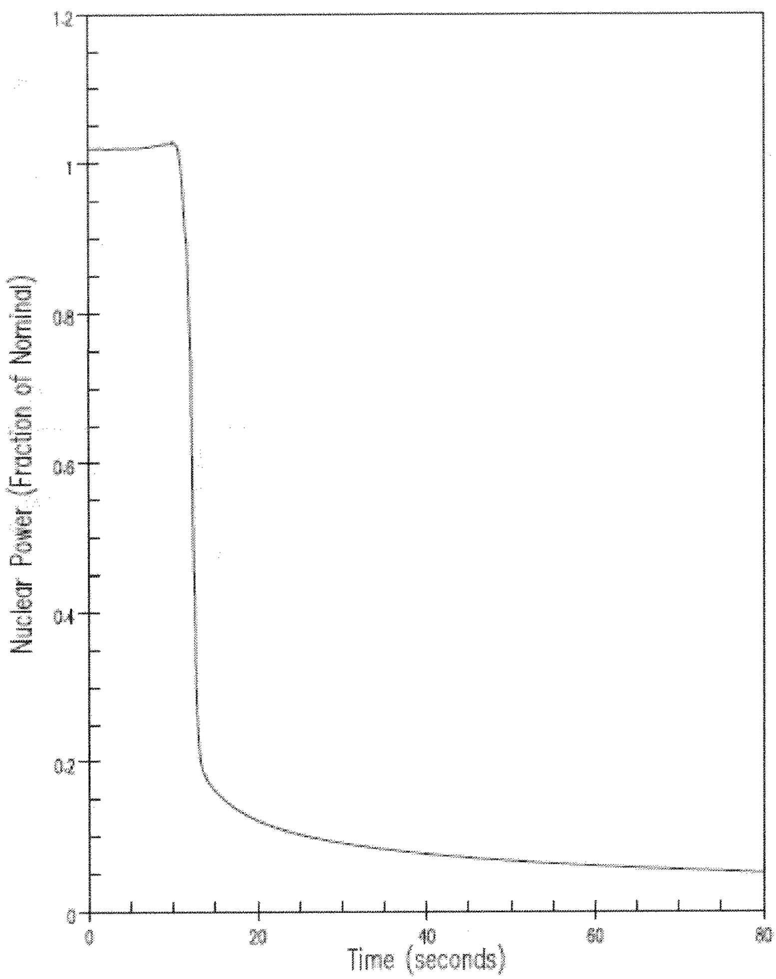
UFSAR FIGURE 14.1-68	REV. No. 01



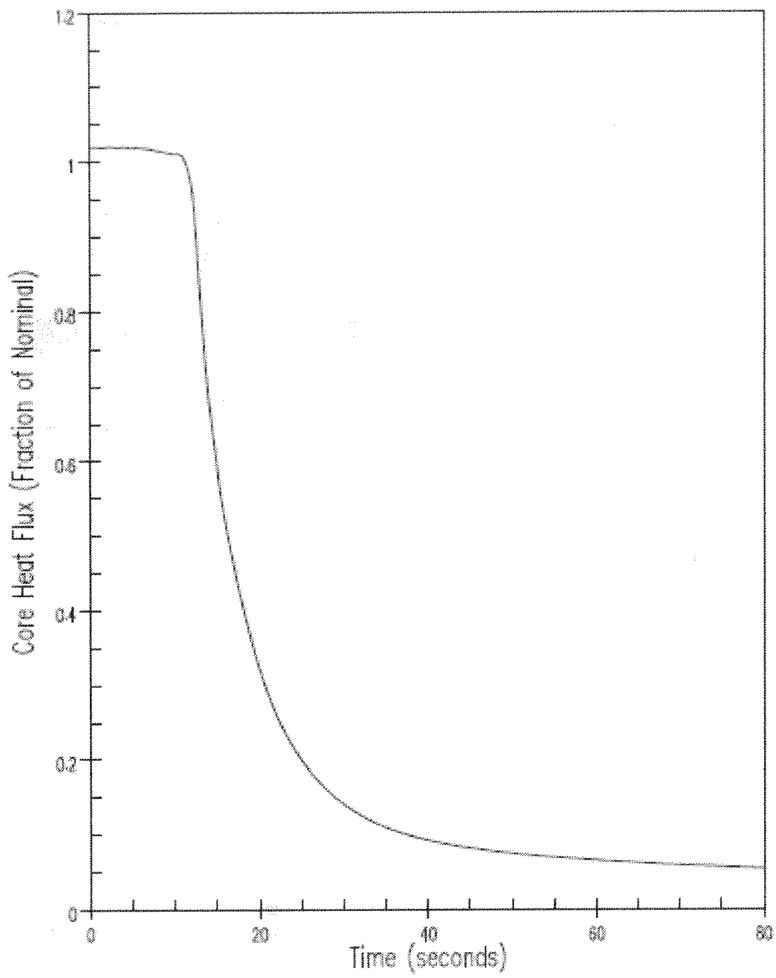
INDIAN POINT UNIT No. 3

DNB RATIO TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITH PRESSURE CONTROL

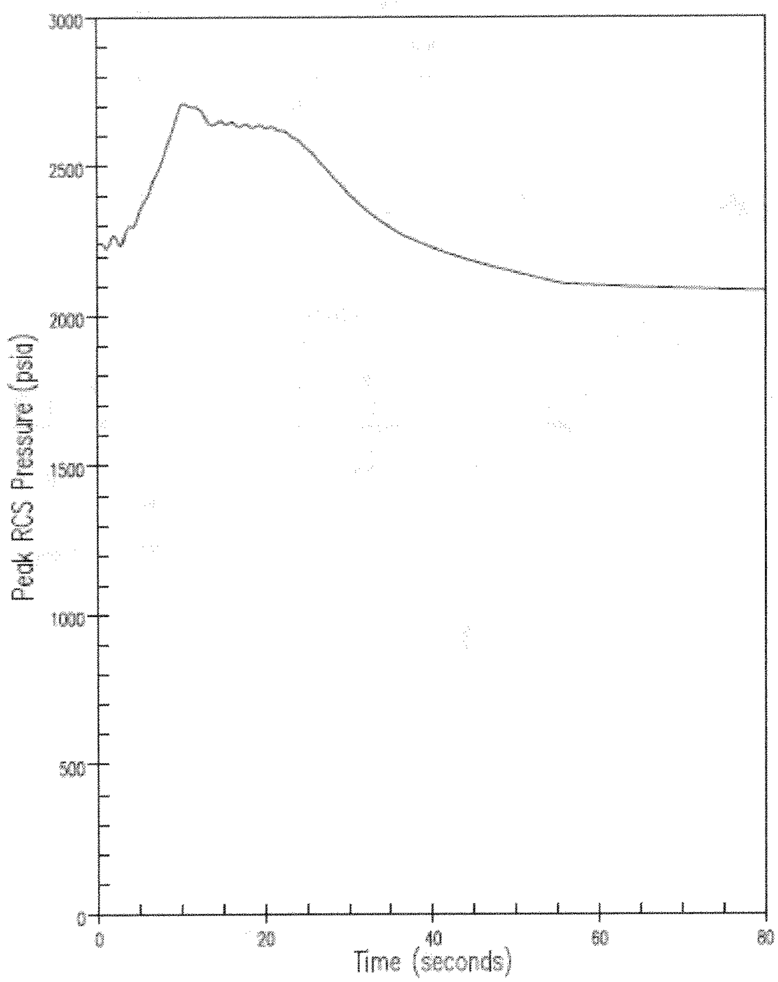
UFSAR FIGURE 14.1-69	REV. No. 01



INDIAN POINT UNIT No. 3	
NUCLEAR POWER TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITHOUT PRESSURE CONTROL	
UFSAR FIGURE 14.1–70	REV. No. 03



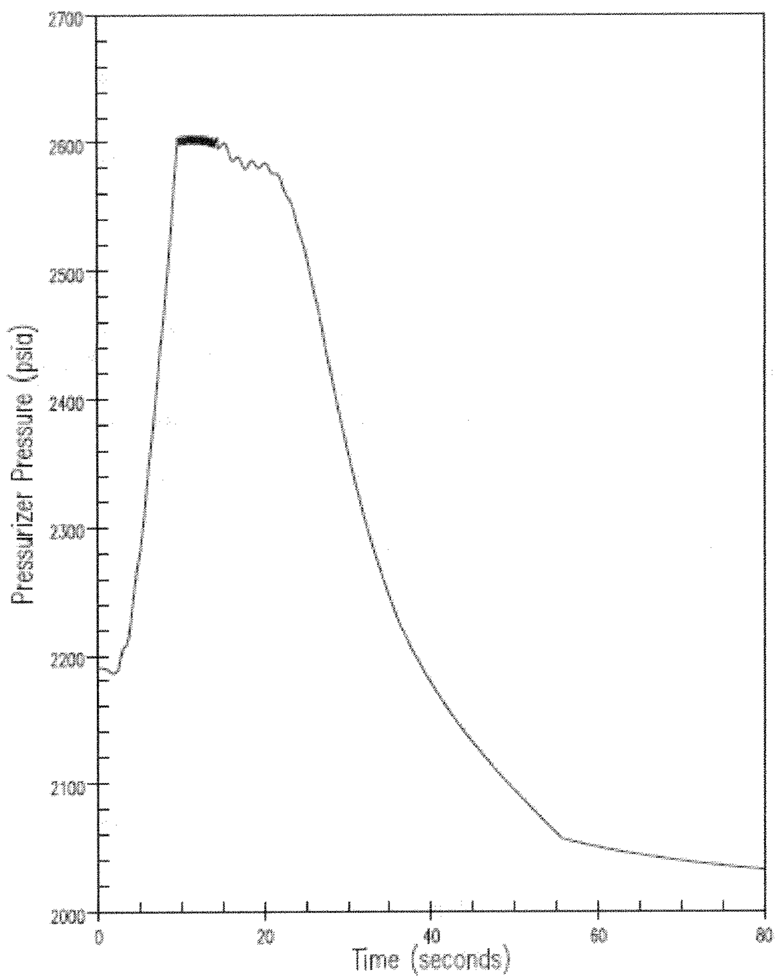
INDIAN POINT UNIT No. 3	
CORE HEAT FLUX TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITHOUT PRESSURE CONTROL	
UFSAR FIGURE 14.1–71	REV. No. 03



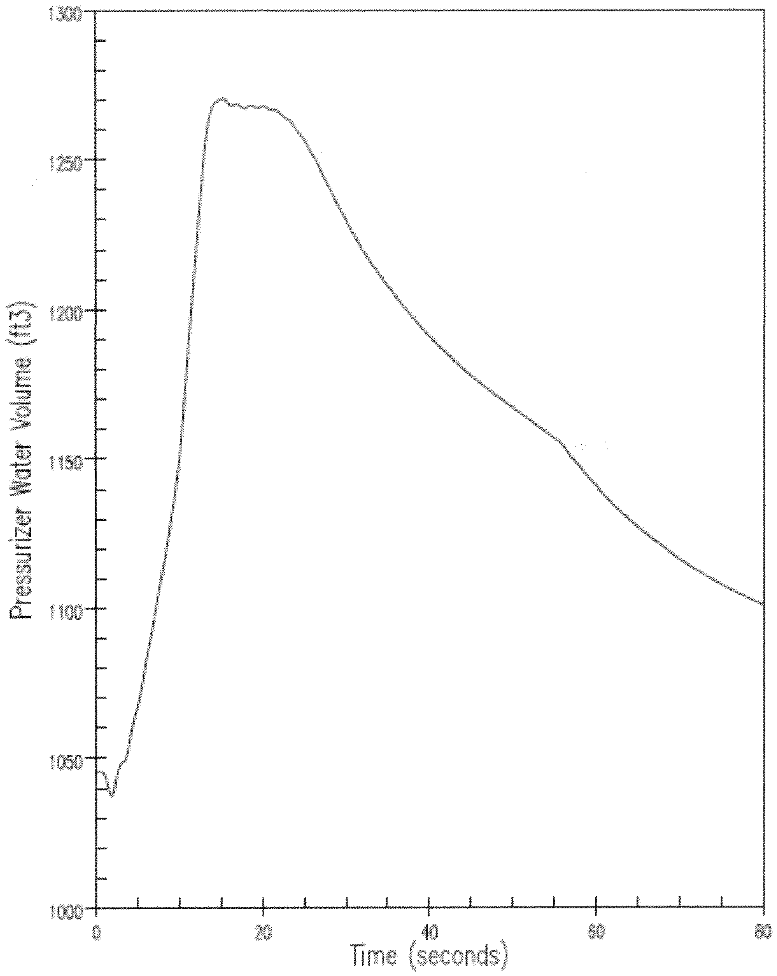
INDIAN POINT UNIT No. 3

PEAK RCS PRESSURE TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITHOUT PRESSURE CONTROL

UFSAR FIGURE 14.1–72	REV. No. 03



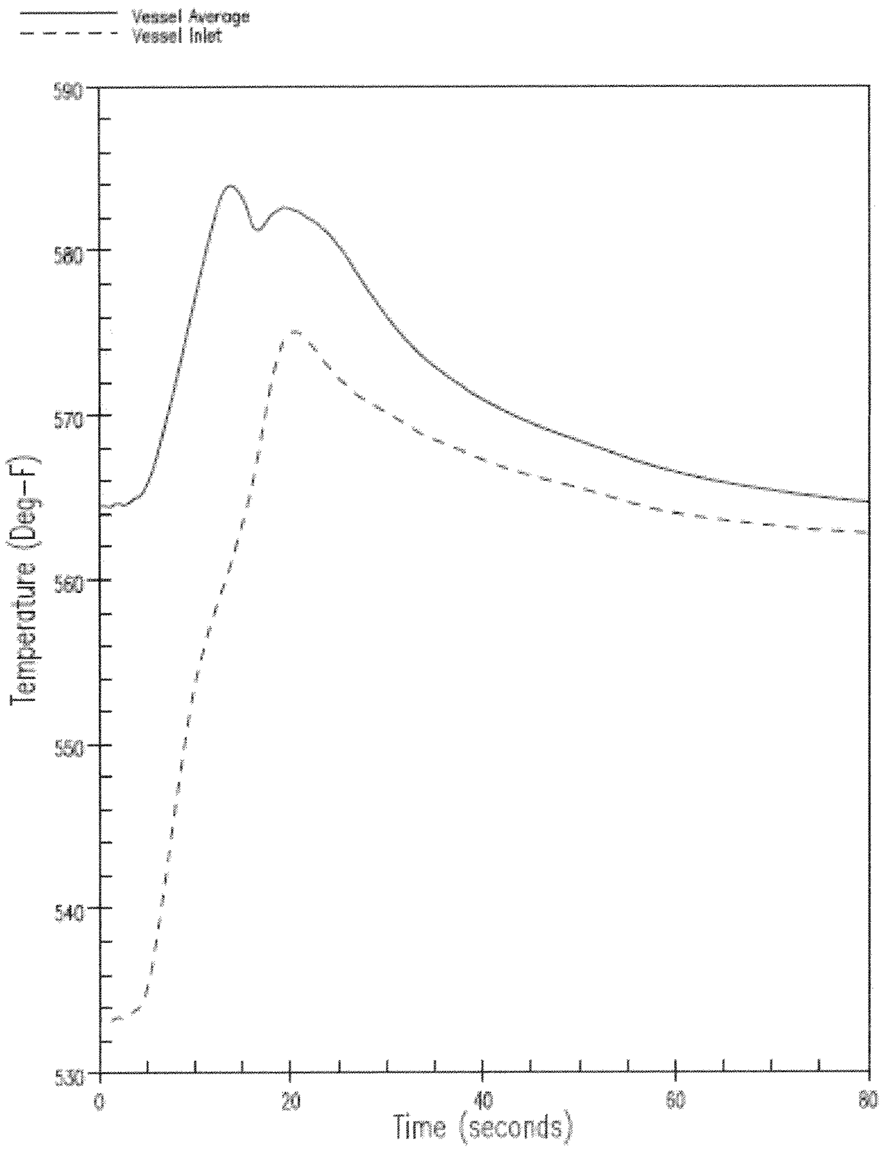
INDIAN POINT UNIT No. 3	
PRESSURIZER PRESSURE TRANSIENT FOR LOSS OF EXTERNAL LOAD MINIMUM REACTIVITY FEEDBACK, WITHOUT PRESSURE CONTROL	
UFSAR FIGURE 14.1–73	REV. No. 03



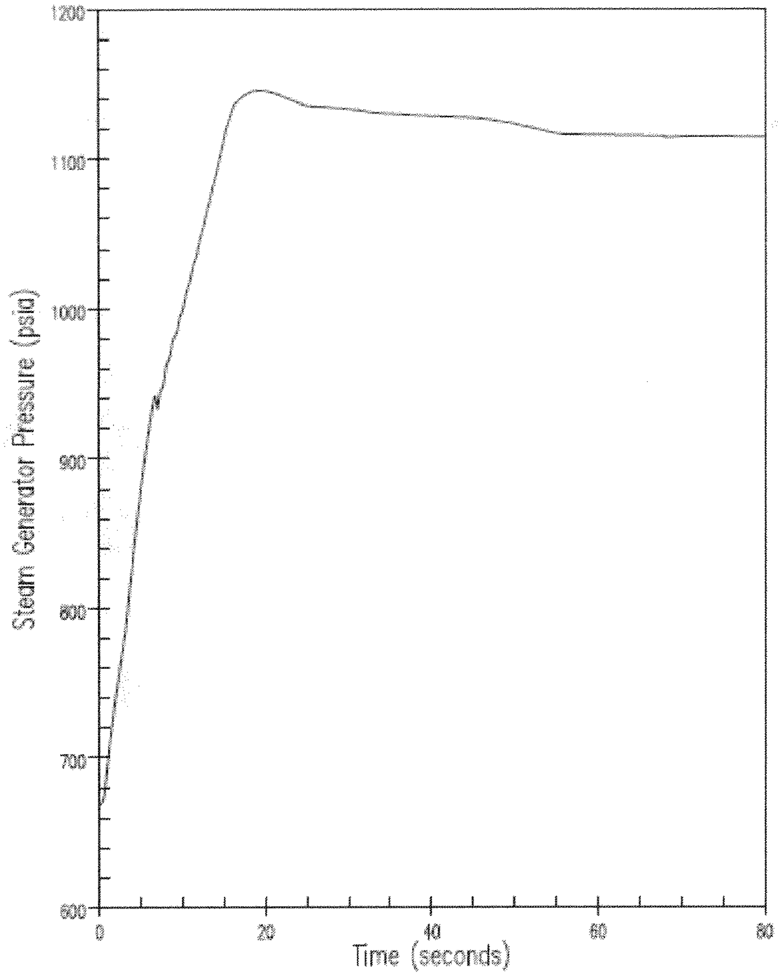
INDIAN POINT UNIT No. 3

PRESSURIZER WATER VOLUME TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITHOUT PRESSURE CONTROL

UFSAR FIGURE 14.1–74 | REV. No. 03



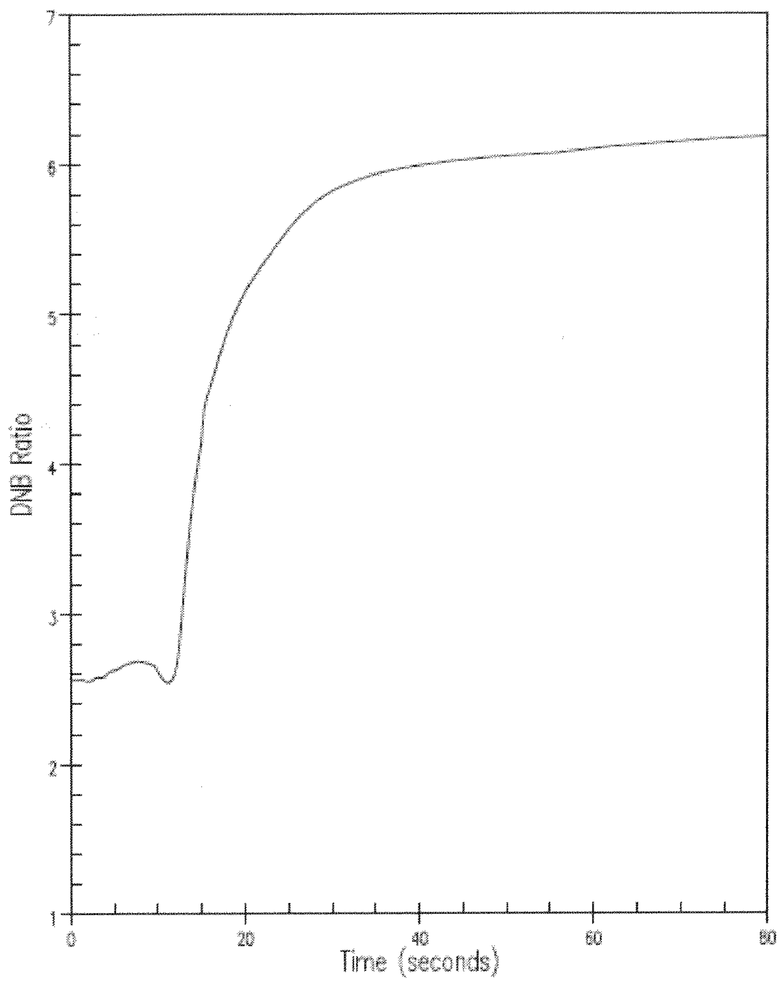
INDIAN POINT UNIT No. 3	
VESSEL AVERAGE & VESSEL INLET TEMPERATURE TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITHOUT PRESSURE CONTROL	
UFSAR FIGURE 14.1–75	REV. No. 03



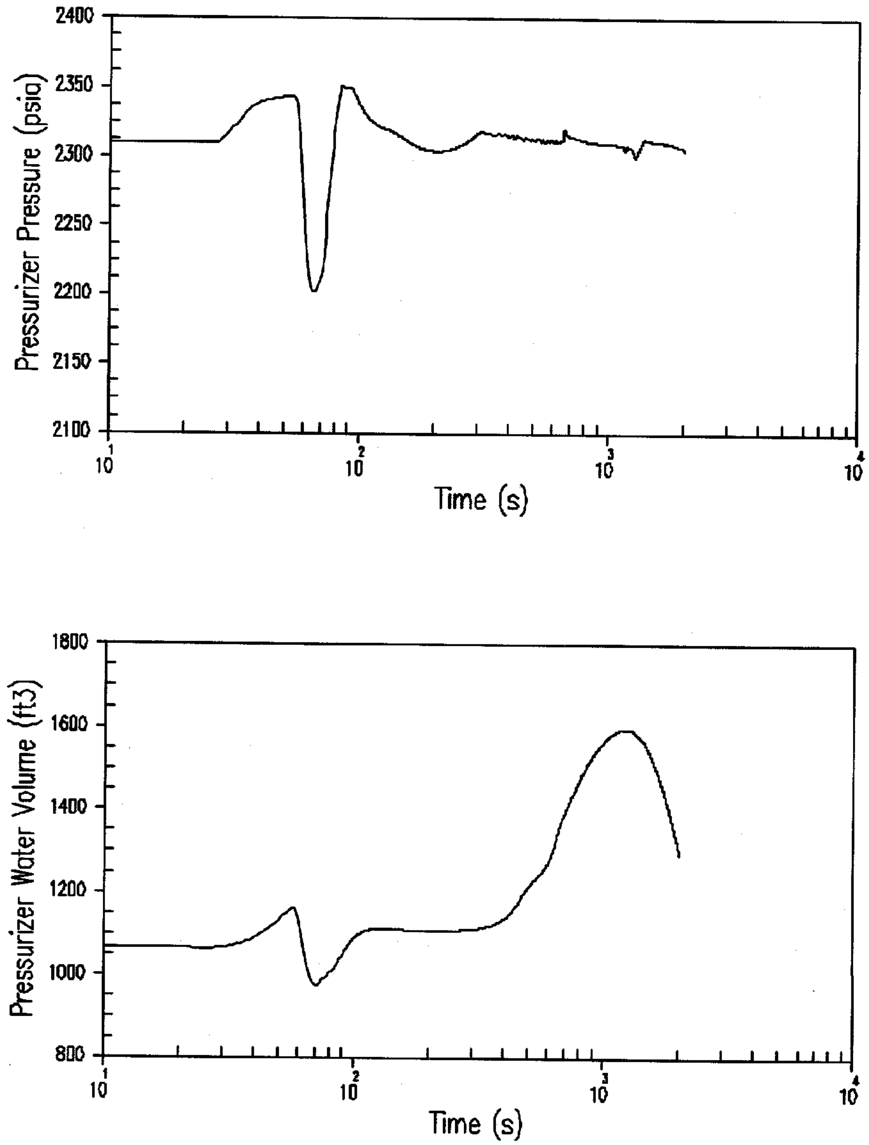
INDIAN POINT UNIT No. 3

STEAM GENERATOR PRESSURE TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITHOUT PRESSURE CONTROL

UFSAR FIGURE 14.1–76 | REV. No. 03



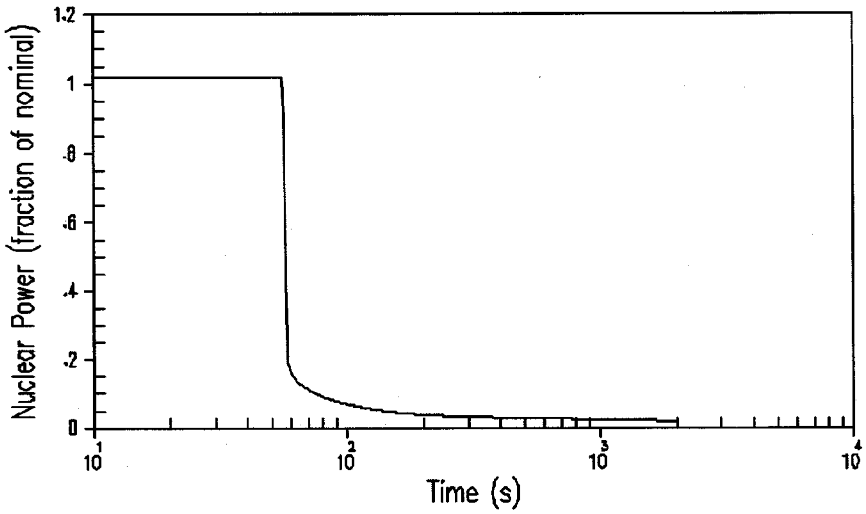
INDIAN POINT UNIT No. 3	
DNB RATIO TRANSIENT FOR LOSS OF EXTERNAL LOAD, MINIMUM REACTIVITY FEEDBACK, WITHOUT PRESSURE CONTROL	
UFSAR FIGURE 14.1–77	REV. No. 03

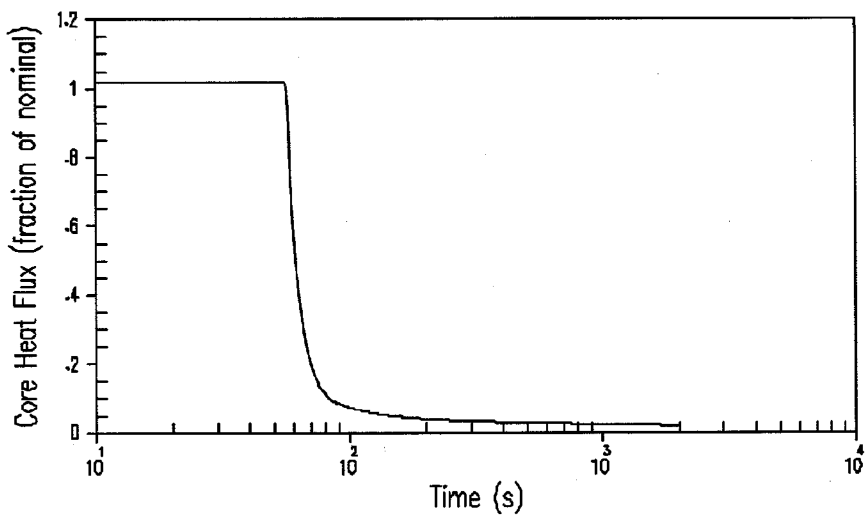


INDIAN POINT UNIT No. 3

LOSS OF NORMAL FEEDWATER
OFFSITE POWER AVAILABLE
PRESSURIZER PRESSURE AND PRESSURIZER
WATER VOLUME

UFSAR FIGURE 14.1-90 | REV. No. 01

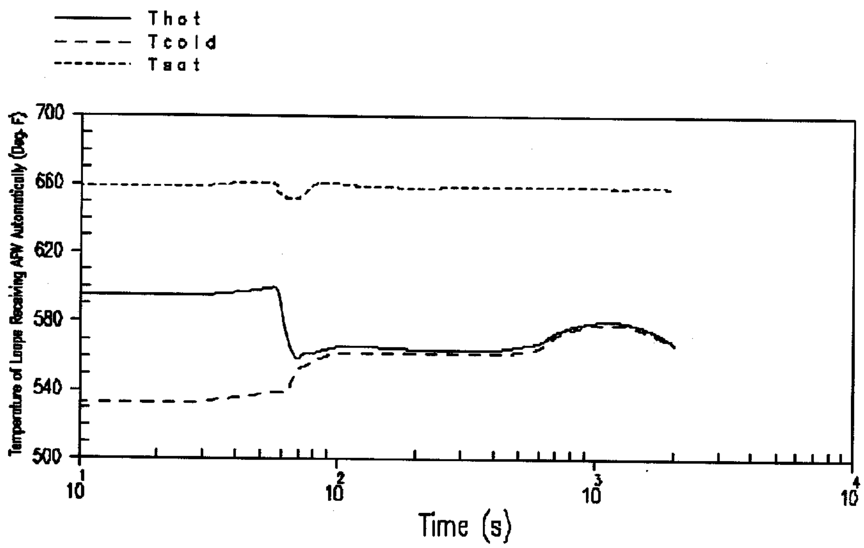


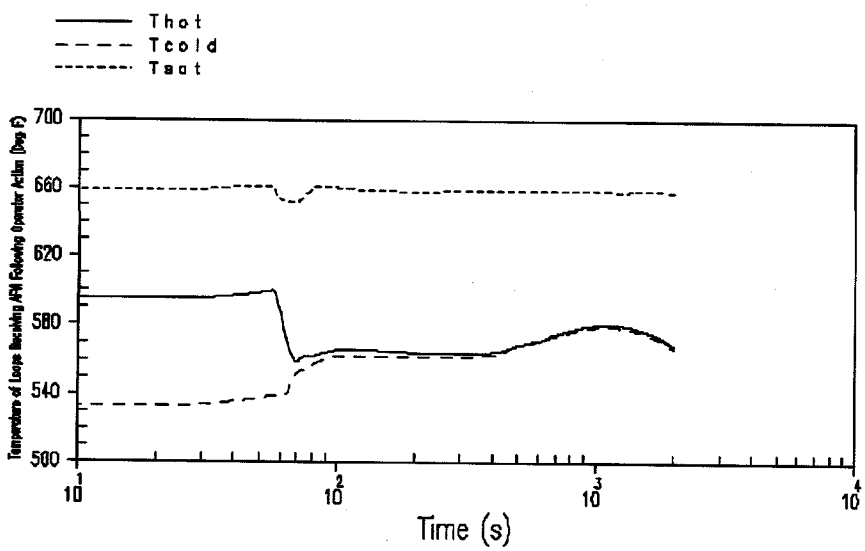


INDIAN POINT UNIT No. 3

LOSS OF NORMAL FEEDWATER
OFFSITE POWER AVAILABLE
NUCLEAR POWER AND CORE HEAT FLUX

UFSAR FIGURE 14.1-91	REV. No. 01

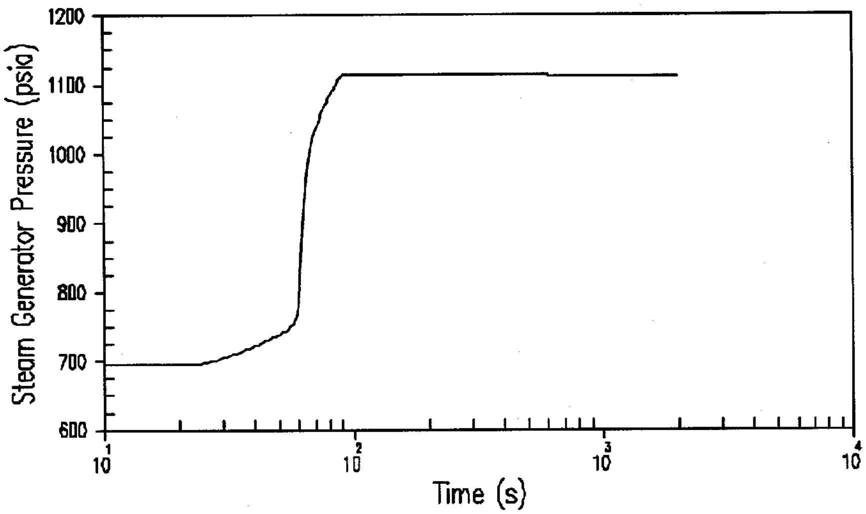


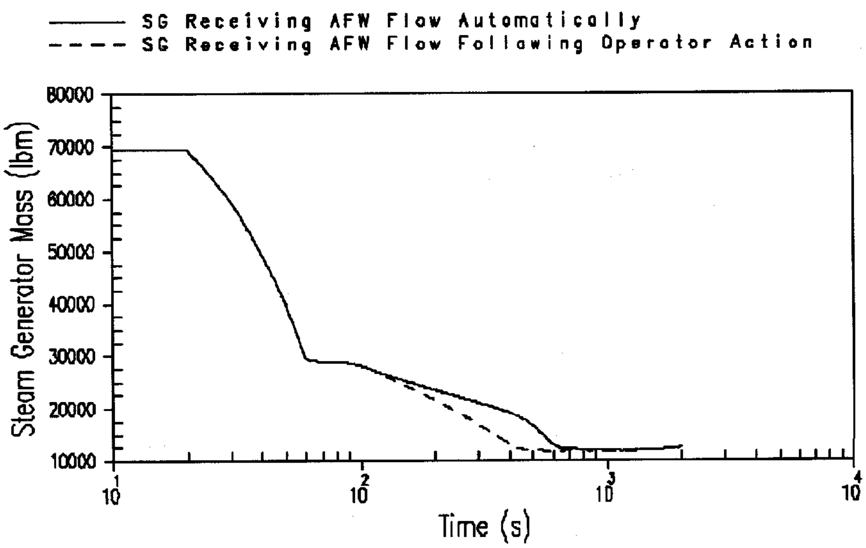


INDIAN POINT UNIT No. 3

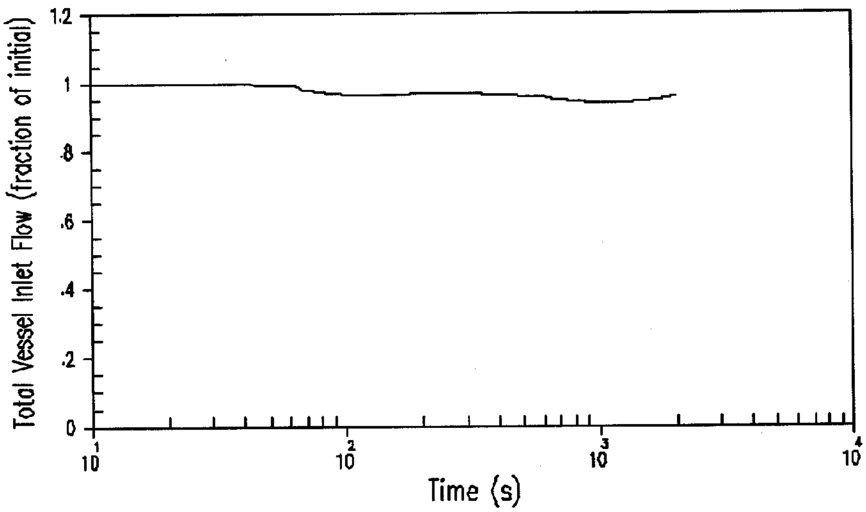
LOSS OF NORMAL FEEDWATER
OFFSITE POWER AVAILABLE
AUTOMATIC AFW LOOP TEMPERATURES AND
MANUAL AFW LOOP TEMPERATURES

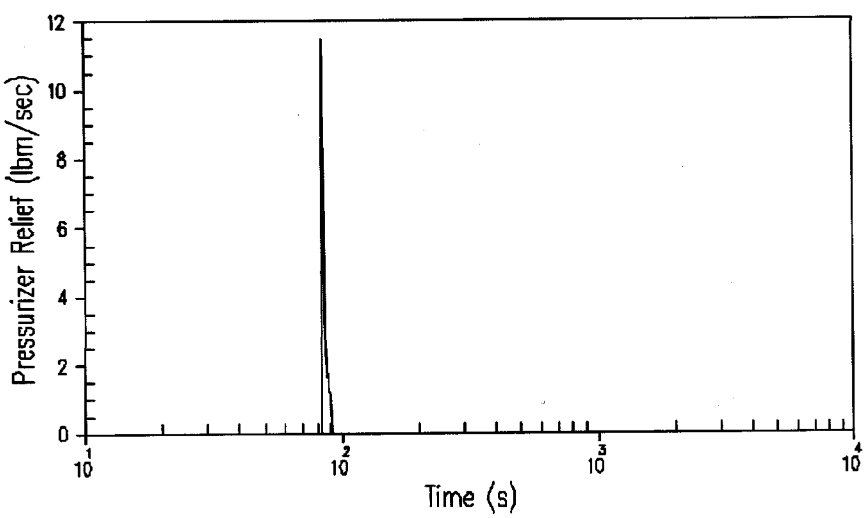
UFSAR FIGURE 14.1-92	REV. No. 01



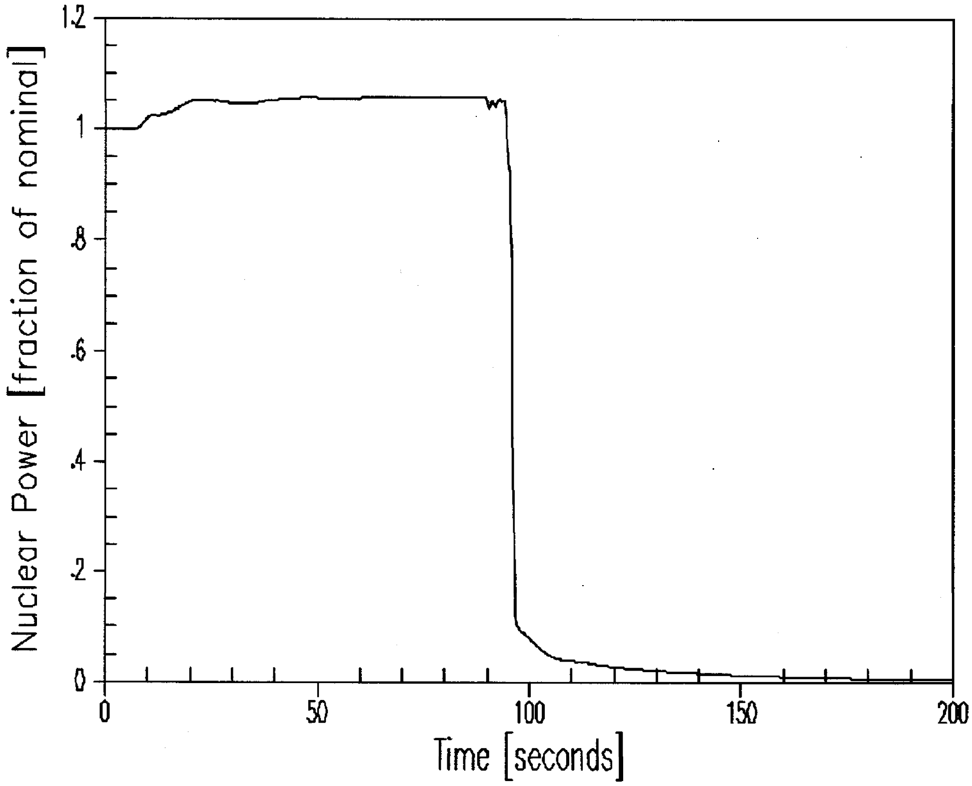


INDIAN POINT UNIT No. 3	
LOSS OF NORMAL FEEDWATER OFFSITE POWER AVAILABLE STEAM GENERATOR PRESSURE AND STEAM GENERATOR MASS	
UFSAR FIGURE 14.1-93	REV. No. 01

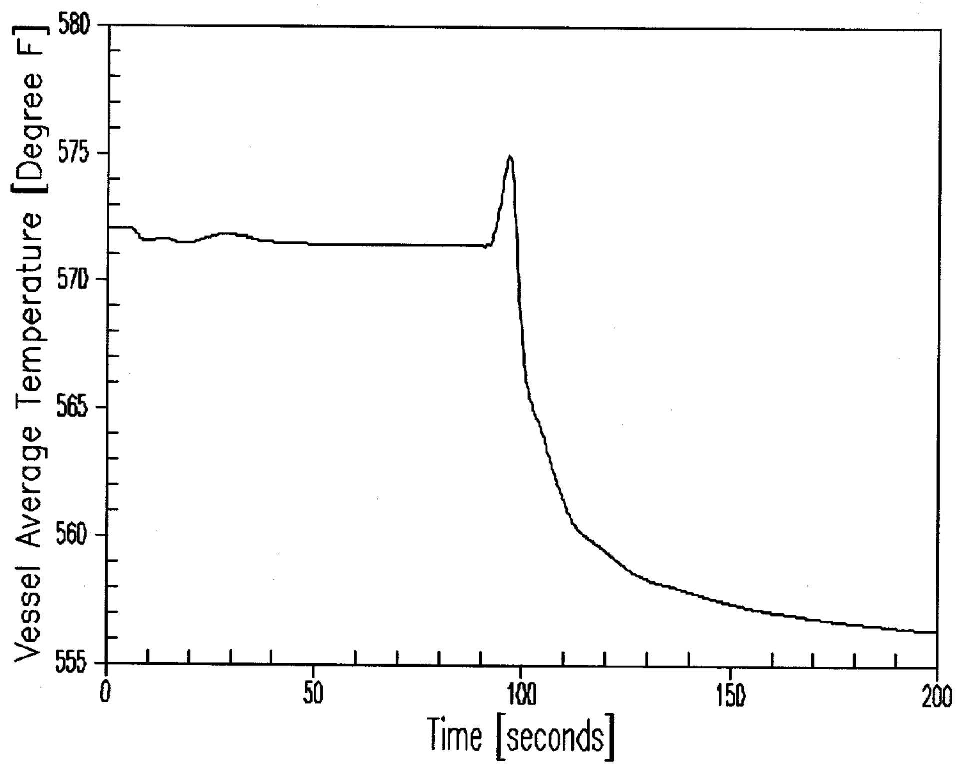




INDIAN POINT UNIT No. 3	
LOSS OF NORMAL FEEDWATER OFFSITE POWER AVAILABLE TOTAL VESSEL INLET FLOW AND PRESSURIZER RELIEF	
UFSAR FIGURE 14.1-94	REV. No. 01



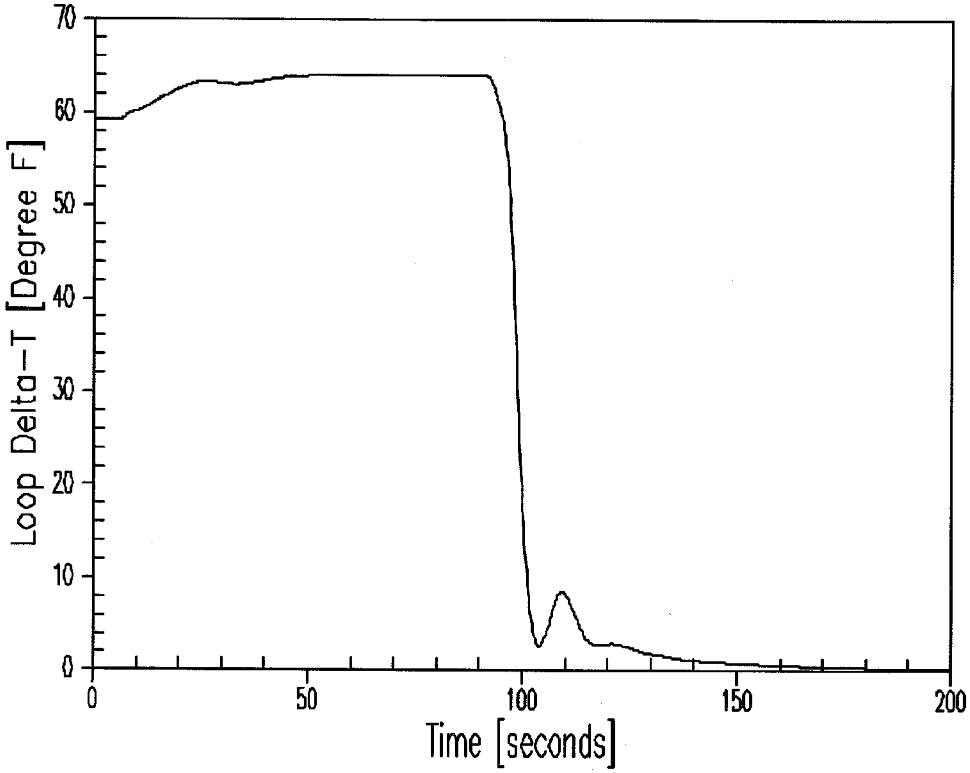
INDIAN POINT UNIT No. 3	
FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH AUTOMATIC ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING NUCLEAR POWER VERSUS TIME	
UFSAR FIGURE 14.1-95	REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH AUTOMATIC ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING REACTOR VESSEL AVERAGE TEMPERATURE VERSUS TIME

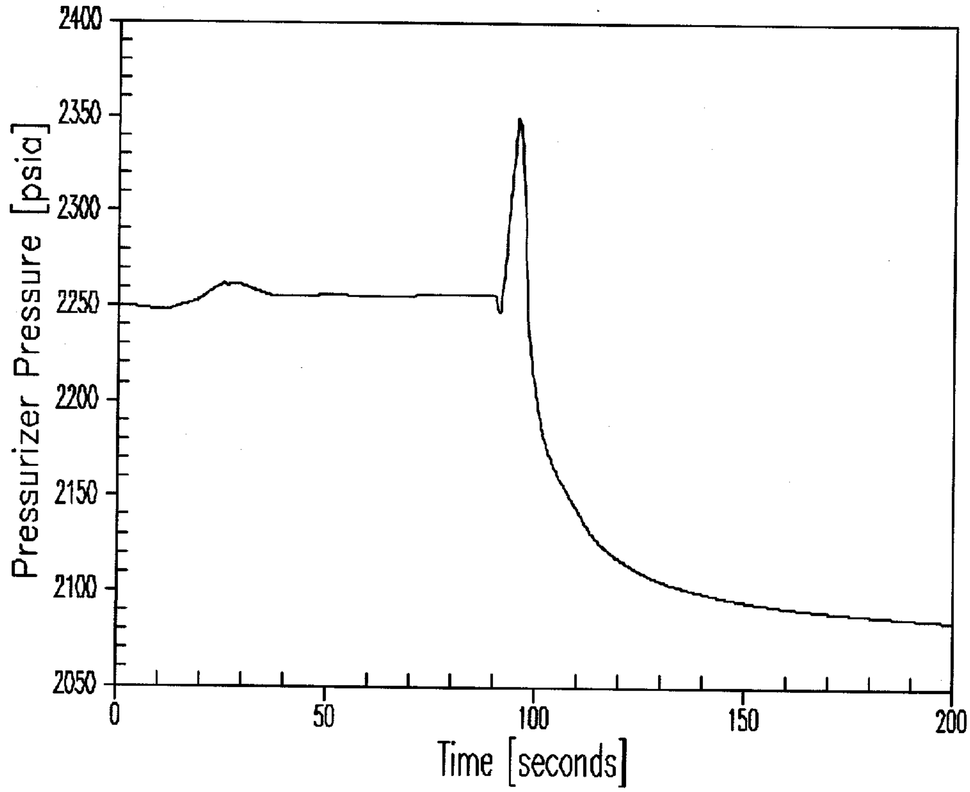
UFSAR FIGURE 14.1-96	REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH AUTOMATIC ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING AFFECTED LOOP DELTA-T VERSUS TIME

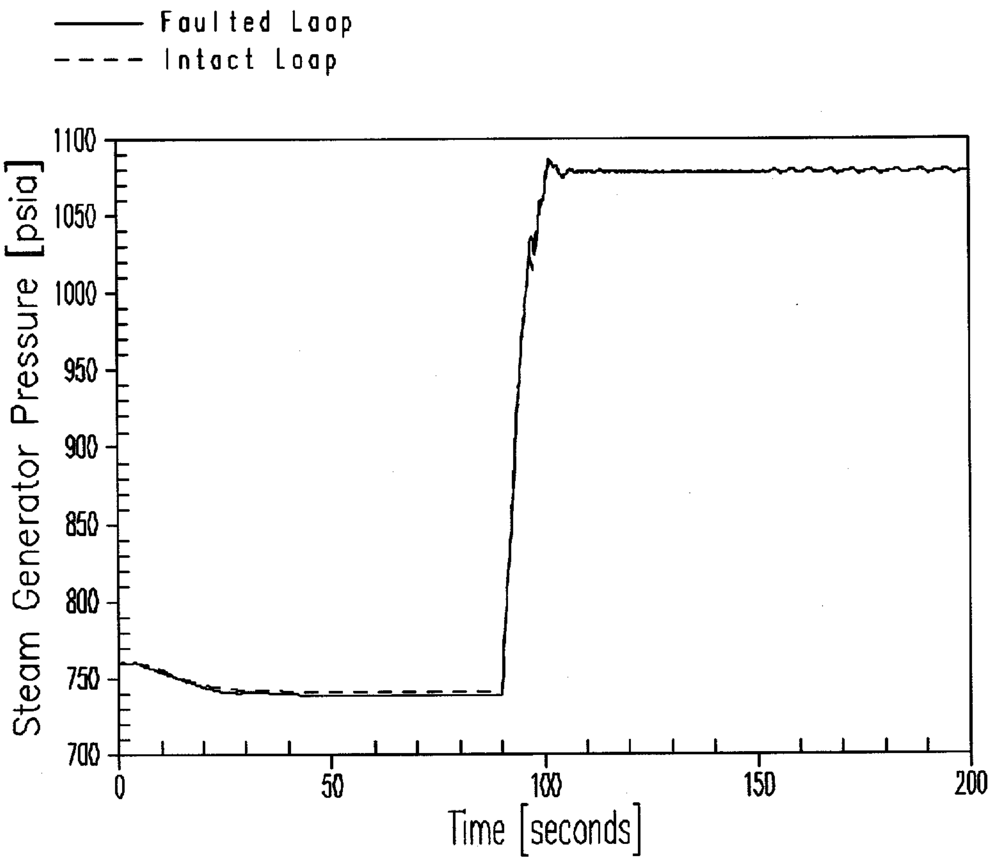
UFSAR FIGURE 14.1-97	REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH AUTOMATIC ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING PRESSURIZER PRESSURE VERSUS TIME

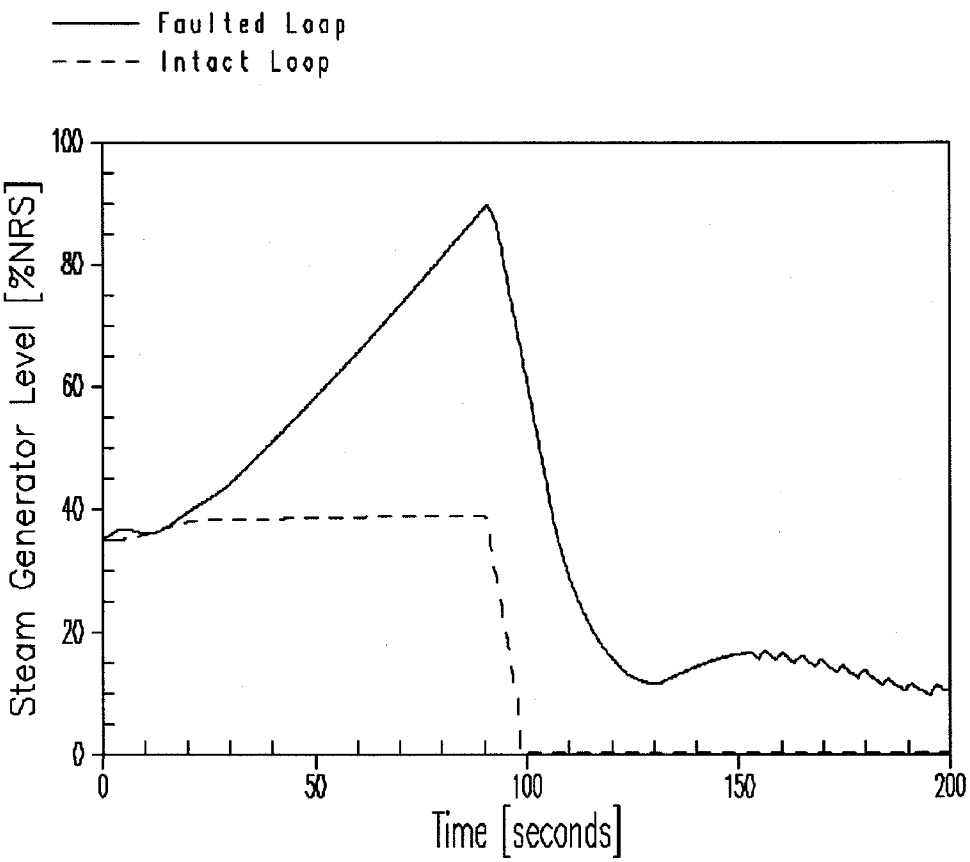
UFSAR FIGURE 14.1-98 | REV. No. 01



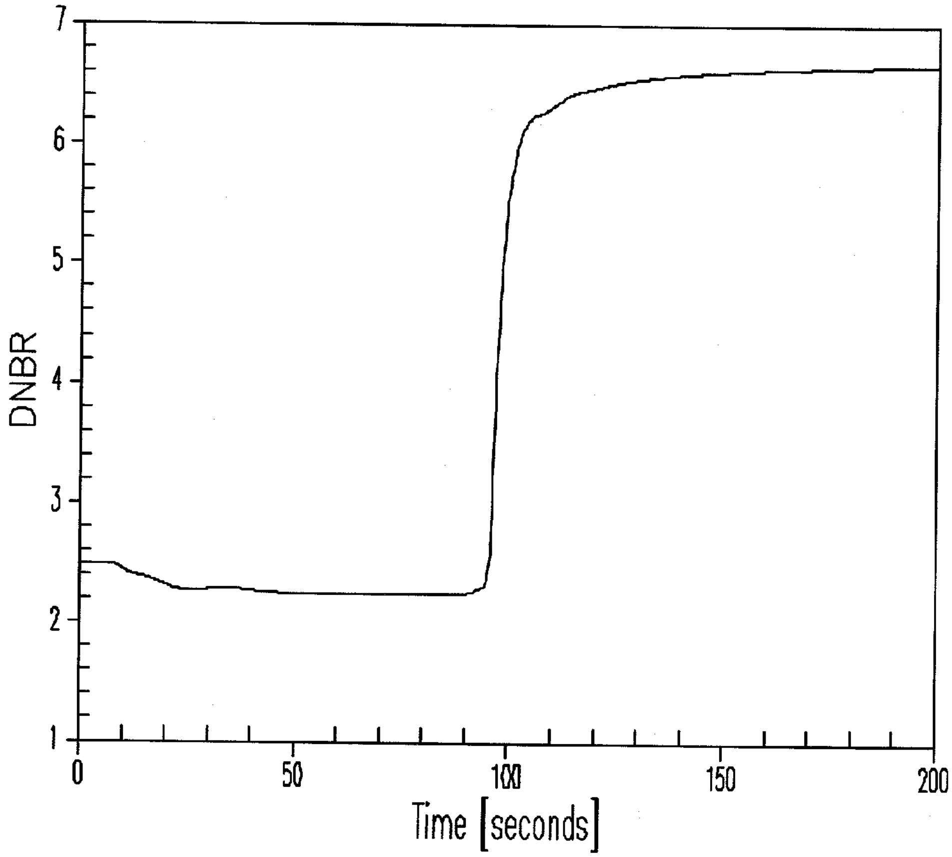
INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH AUTOMATIC ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING STEAM GENERATOR PRESSURE VERSUS TIME

UFSAR FIGURE 14.1-99 | REV. No. 01



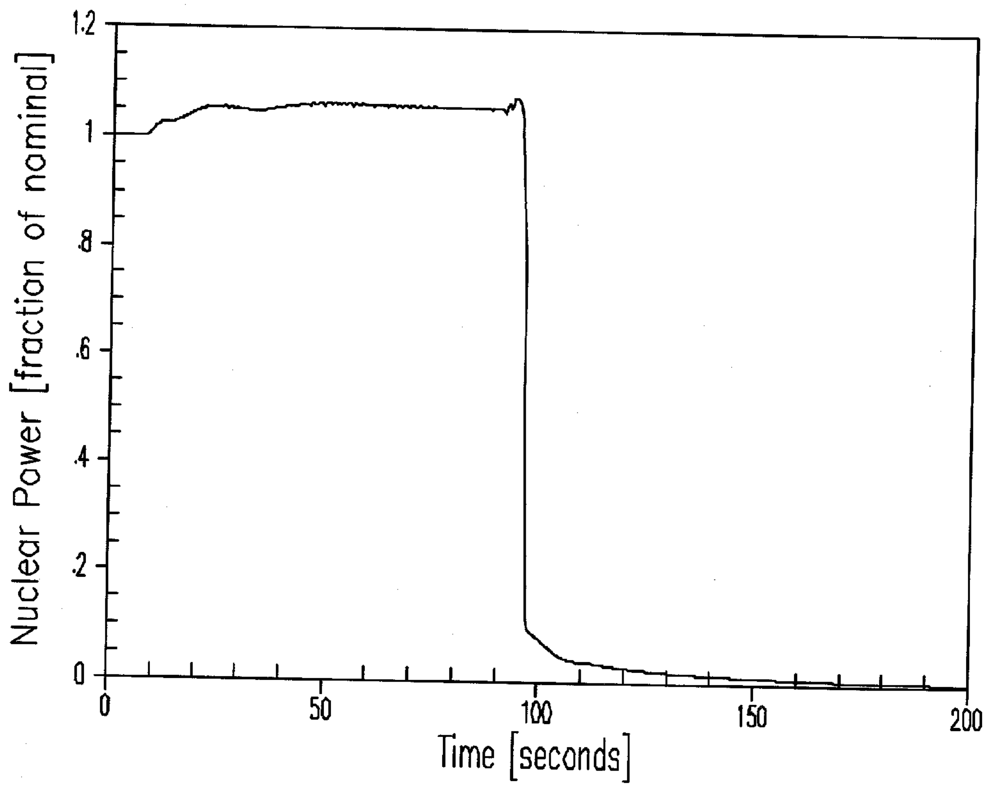
INDIAN POINT UNIT No. 3	
FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH AUTOMATIC ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING STEAM GENERATOR LEVEL VERSUS TIME	
UFSAR FIGURE 14.1–100	REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH AUTOMATIC ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING DNBR VERSUS TIME

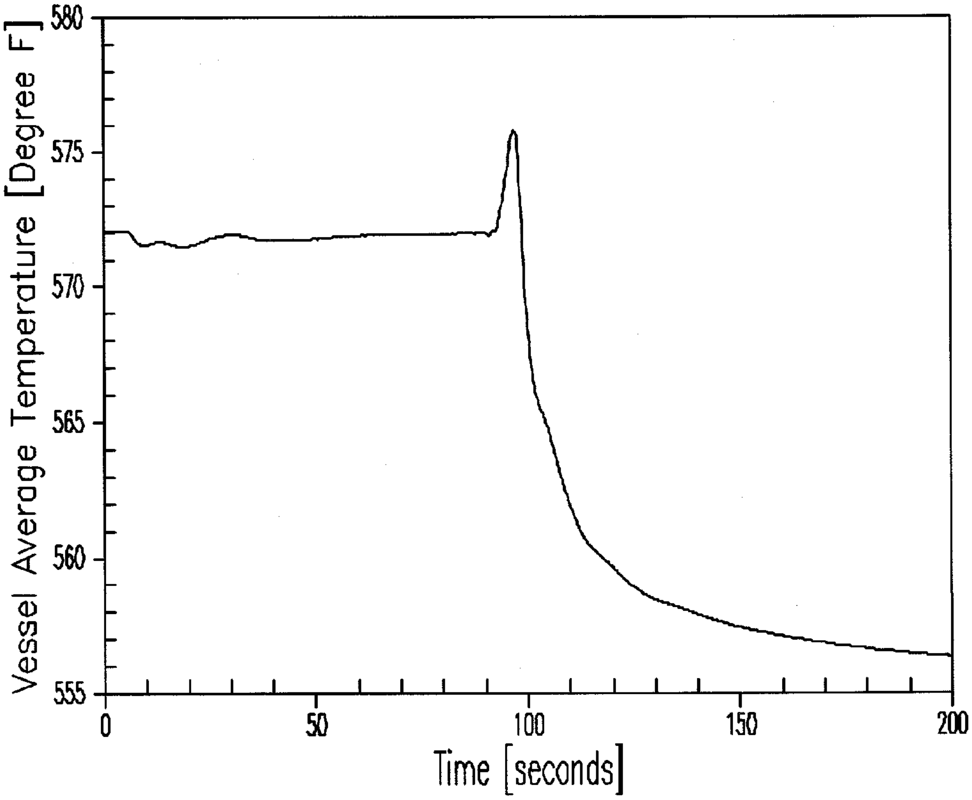
UFSAR FIGURE 14.1-101	REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH MANUAL ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING NUCLEAR POWER VERSUS TIME

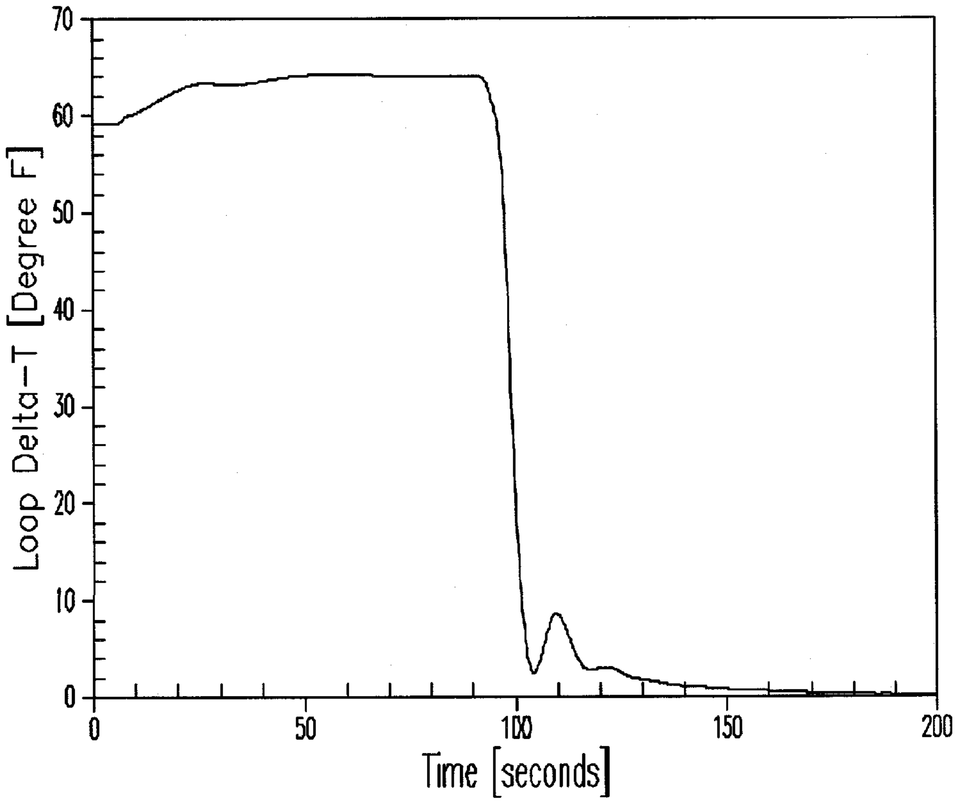
UFSAR FIGURE 14.1-102 | REV. No. 01



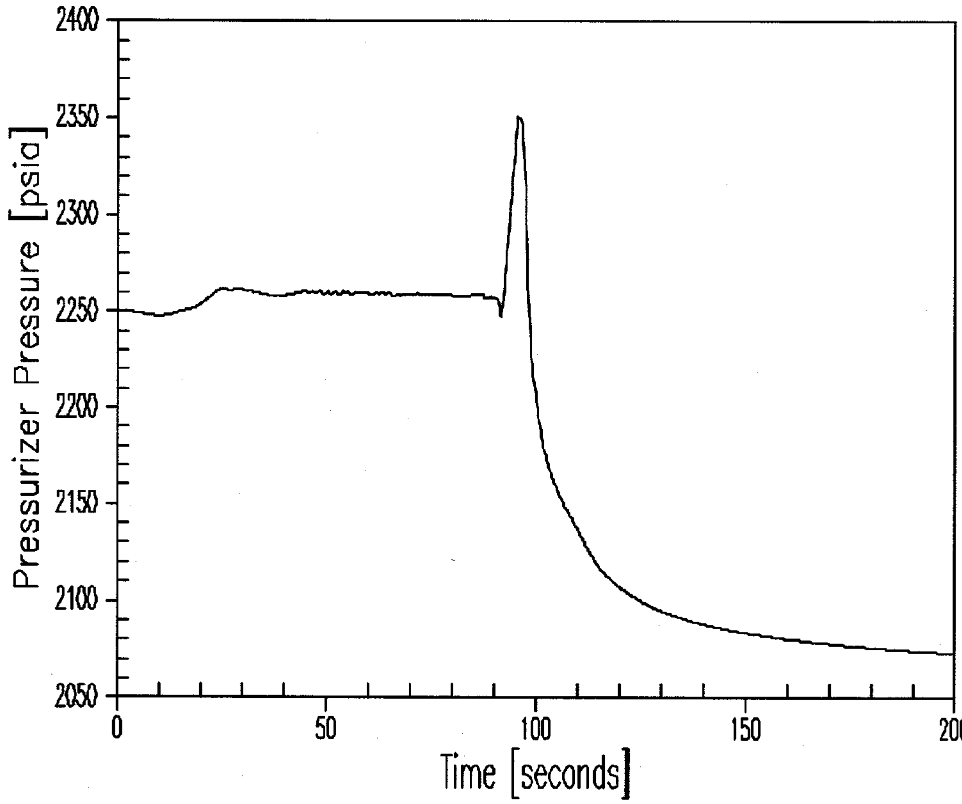
INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH MANUAL ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING REACTOR VESSEL AVERAGE TEMPERATURE VERSUS TIME

UFSAR FIGURE 14.1-103	REV. No. 01



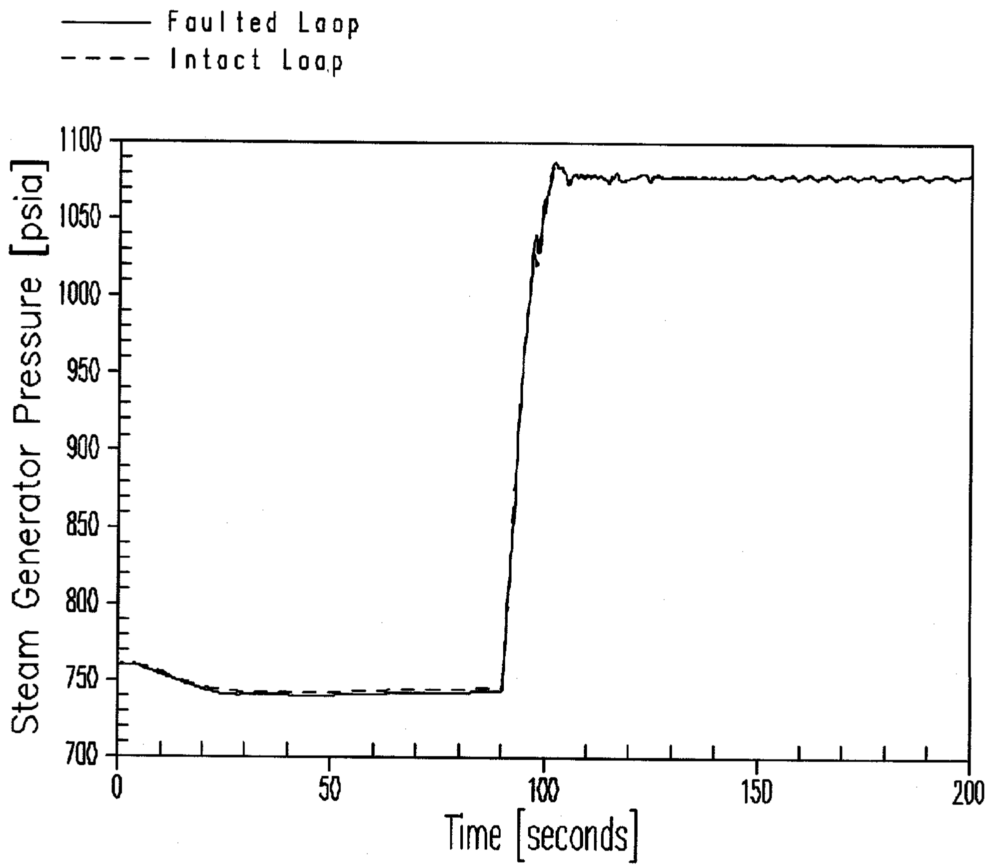
INDIAN POINT UNIT No. 3	
FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH MANUAL ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING AFFECTED LOOP DELTA-T VERSUS TIME	
UFSAR FIGURE 14.1-104	REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH MANUAL ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING PRESSURIZER PRESSURE VERSUS TIME

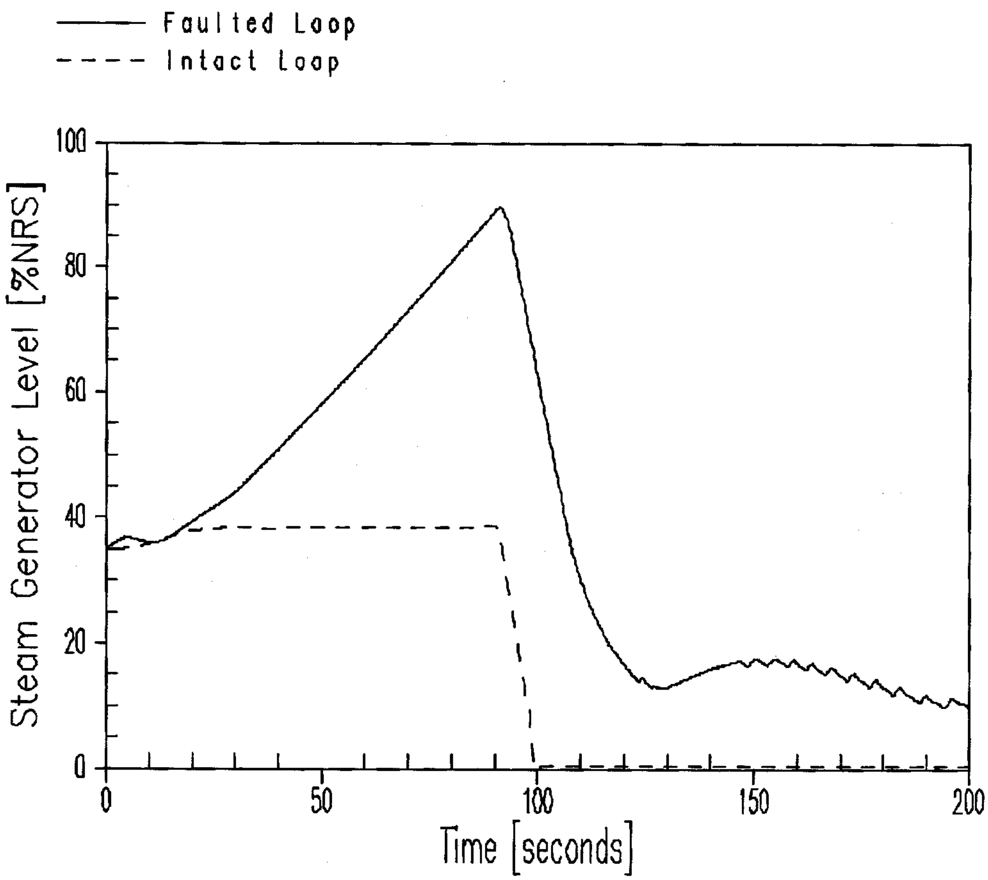
UFSAR FIGURE 14.1-105 | REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH MANUAL ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING STEAM GENERATOR PRESSURE VERSUS TIME

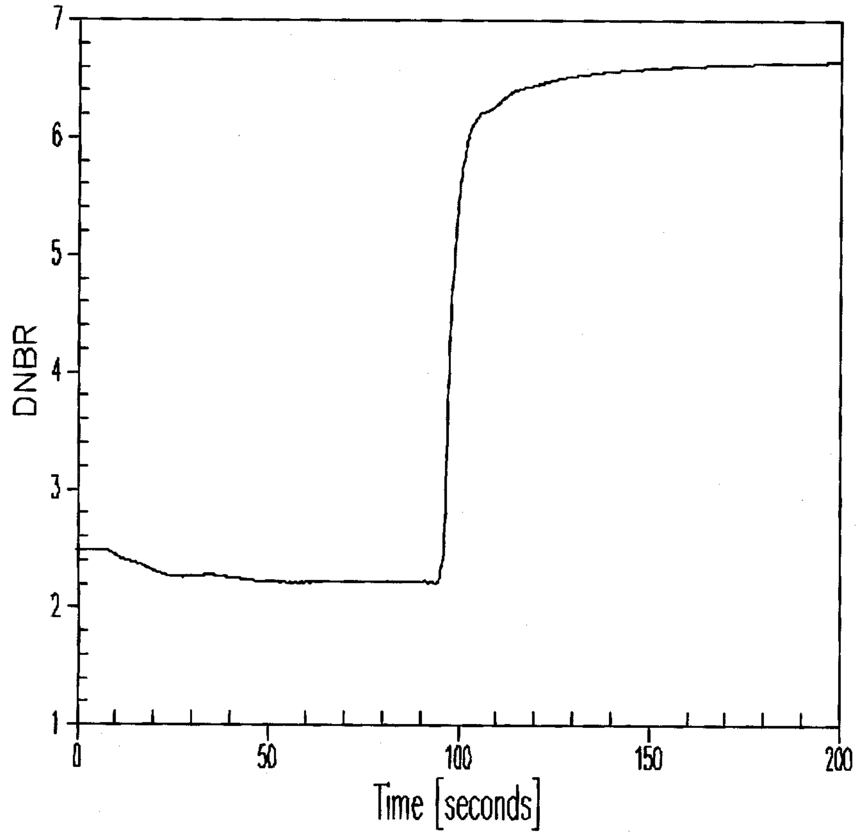
UFSAR FIGURE 14.1-106	REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH MANUAL ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING STEAM GENERATOR LEVEL VERSUS TIME

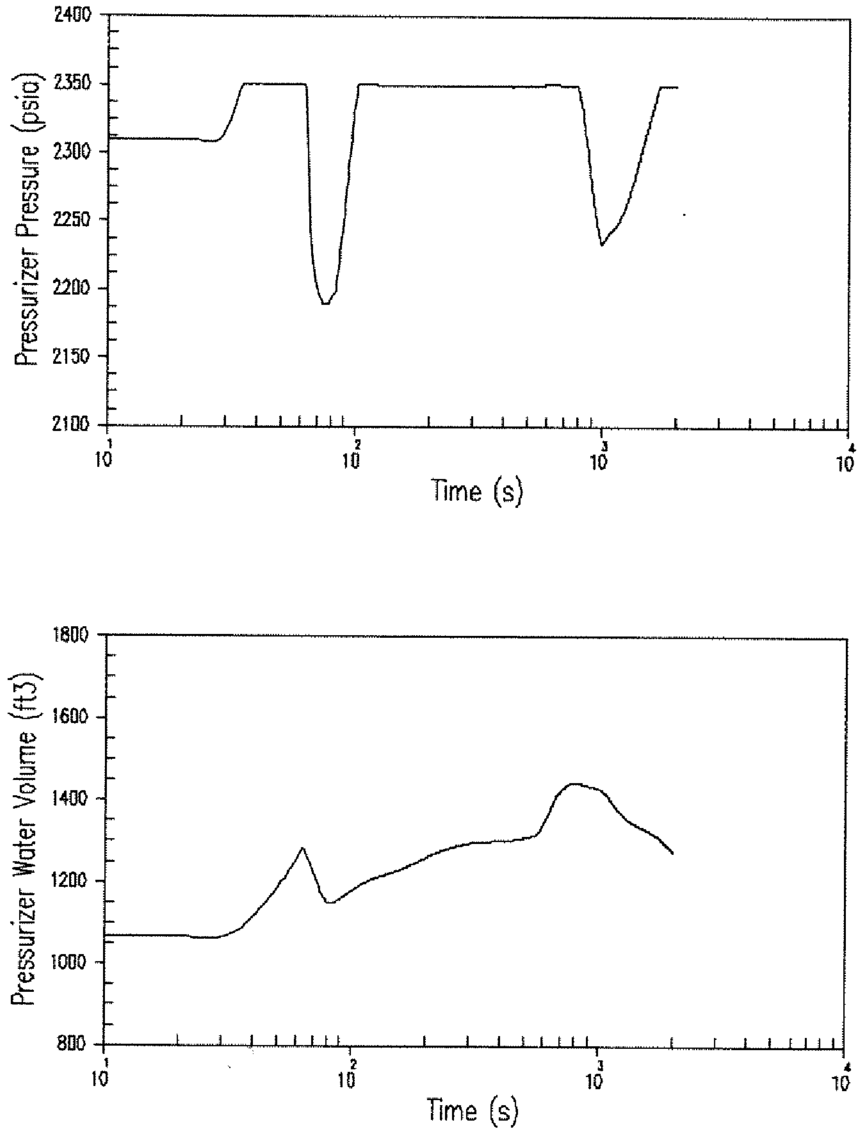
UFSAR FIGURE 14.1-107	REV. No. 01



INDIAN POINT UNIT No. 3

FEEDWATER SYSTEM MALFUNCTION FROM HOT FULL POWER WITH MANUAL ROD CONTROL UNIFORM STEAM GENERATOR TUBE PLUGGING DNBR VERSUS TIME

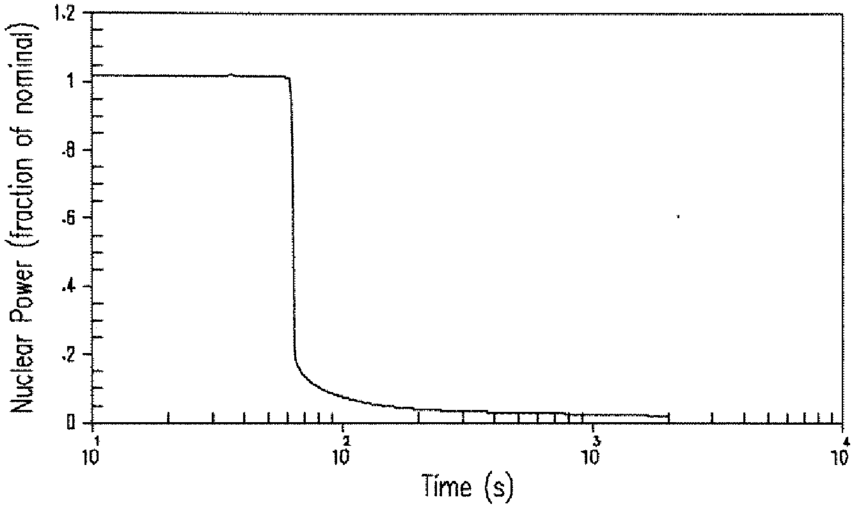
UFSAR FIGURE 14.1-108 | REV. No. 01

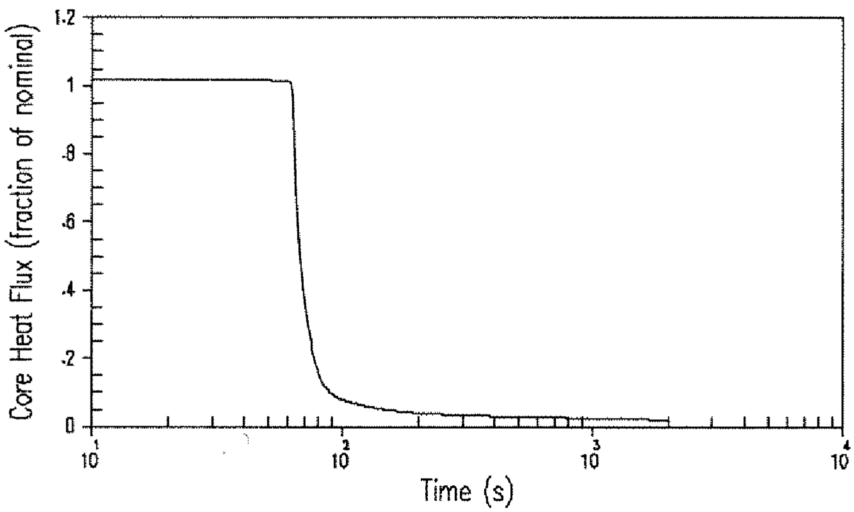


INDIAN POINT UNIT No. 3

LOSS OF ALL POWER TO THE STATION AUXILIARIES PRESSURIZER PRESSURE AND PRESSURIZER WATER VOLUME

UFSAR FIGURE 14.1-143 | REV. No. 01

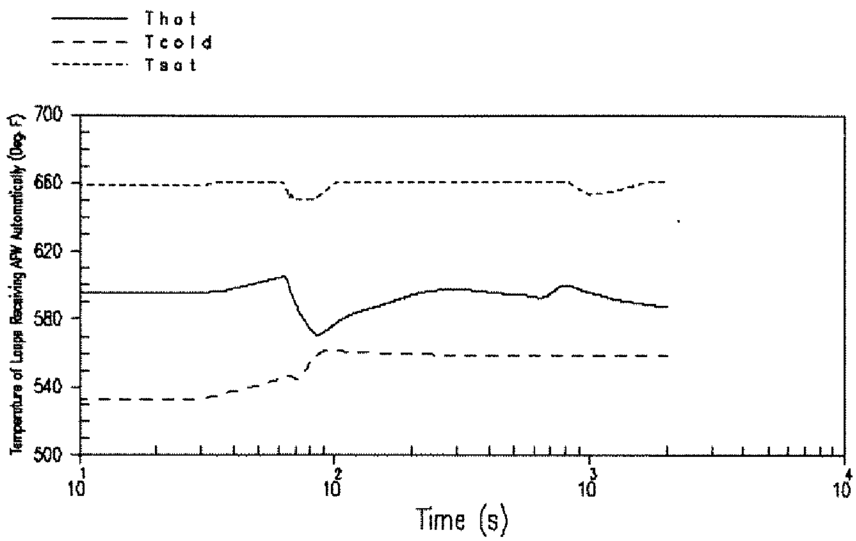


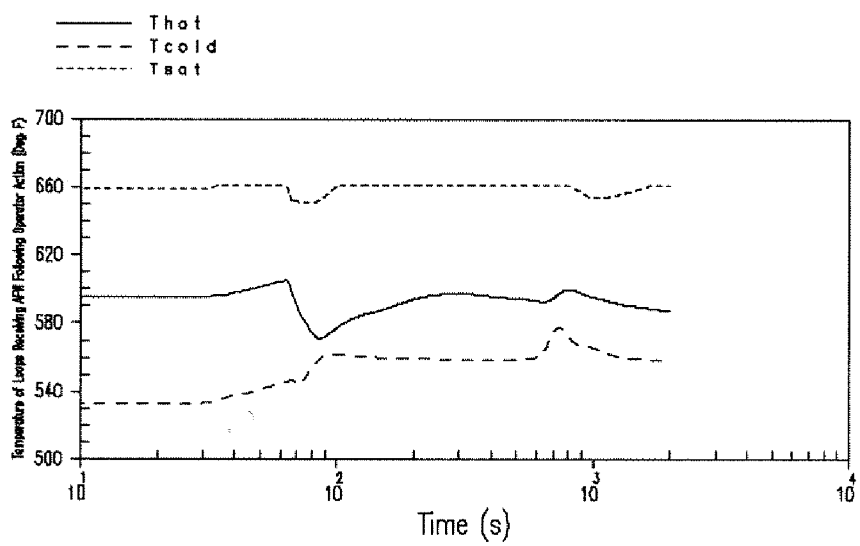


INDIAN POINT UNIT No. 3

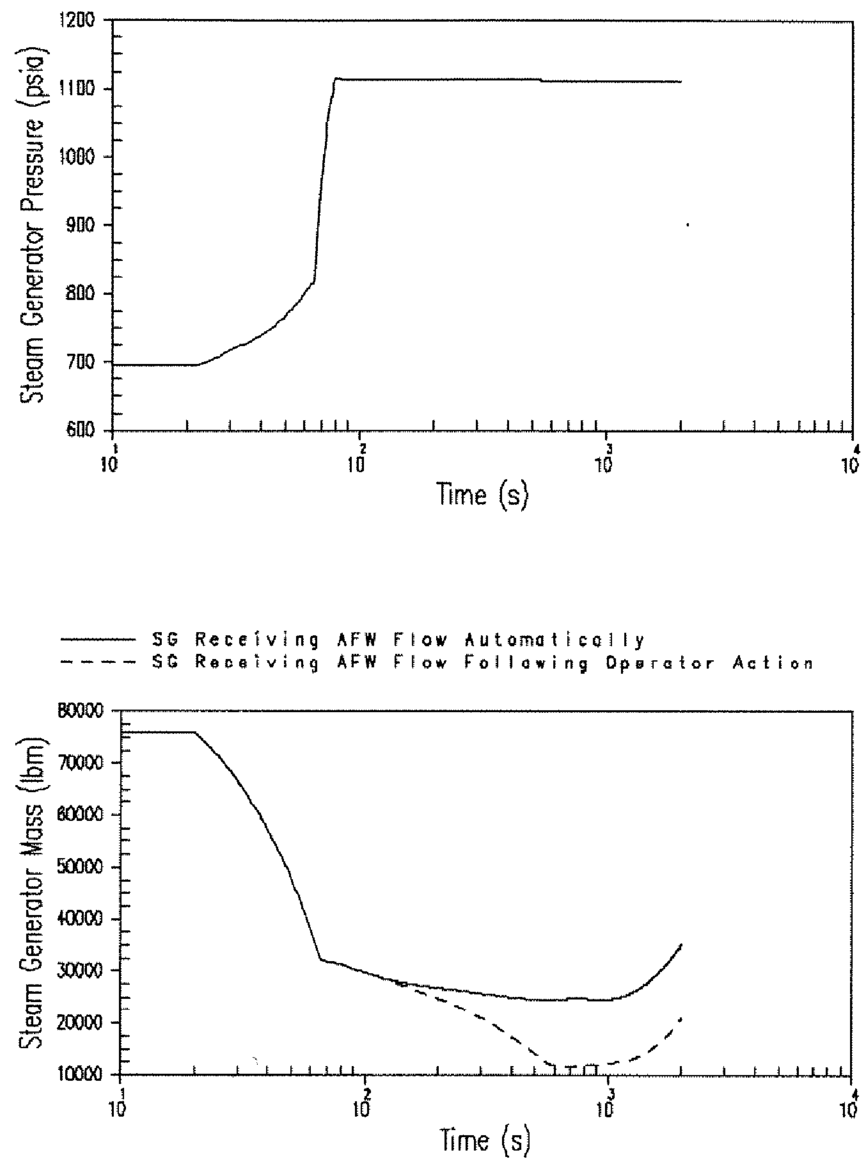
LOSS OF ALL POWER TO THE STATION AUXILIARIES NUCLEAR POWER AND CORE HEAT FLUX

UFSAR FIGURE 14.1–144 | REV. No. 01





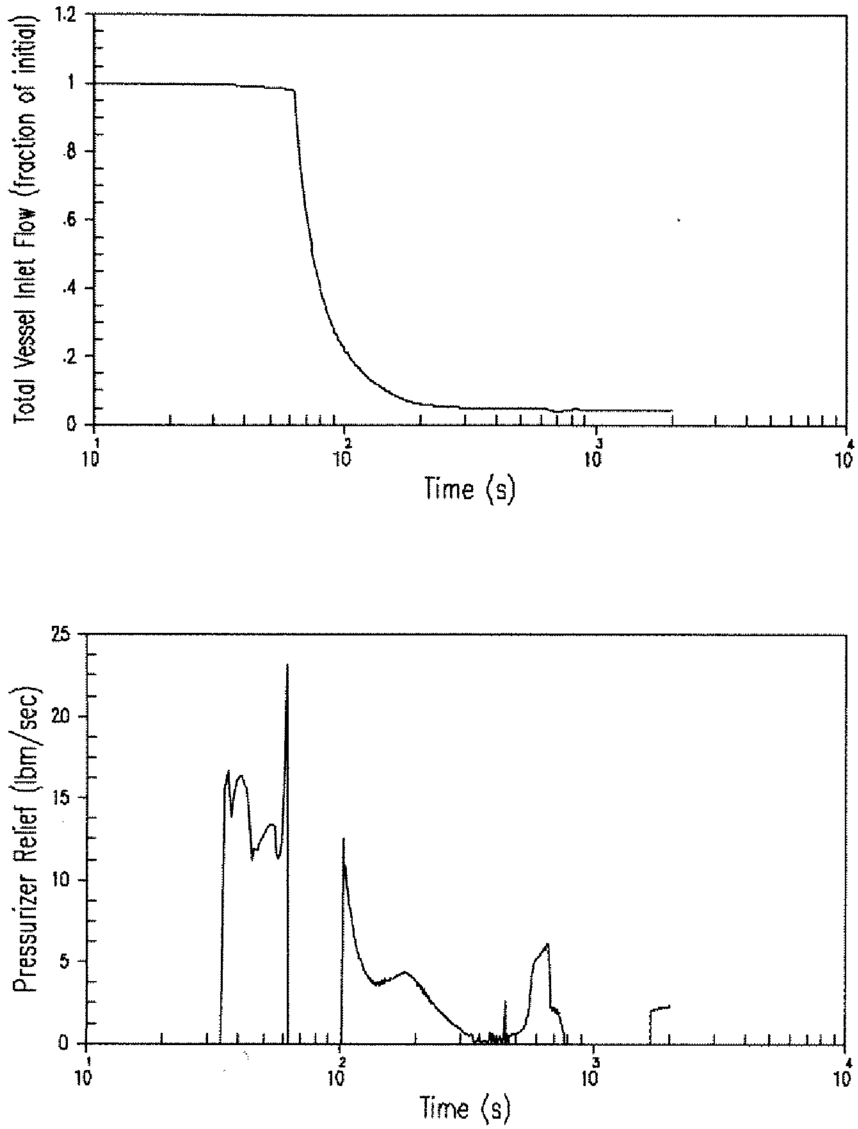
INDIAN POINT UNIT No. 3	
LOSS OF ALL POWER TO THE STATION AUXILIARIES AUTOMATIC AFW LOOP TEMPERATURES AND MANUAL AFW LOOP TEMPERATURES	
UFSAR FIGURE 14.1-145	REV. No. 01



INDIAN POINT UNIT No. 3

LOSS OF ALL POWER TO THE STATION AUXILIARIES STEAM GENERATOR PRESSURE AND STEAM GENERATOR MASS

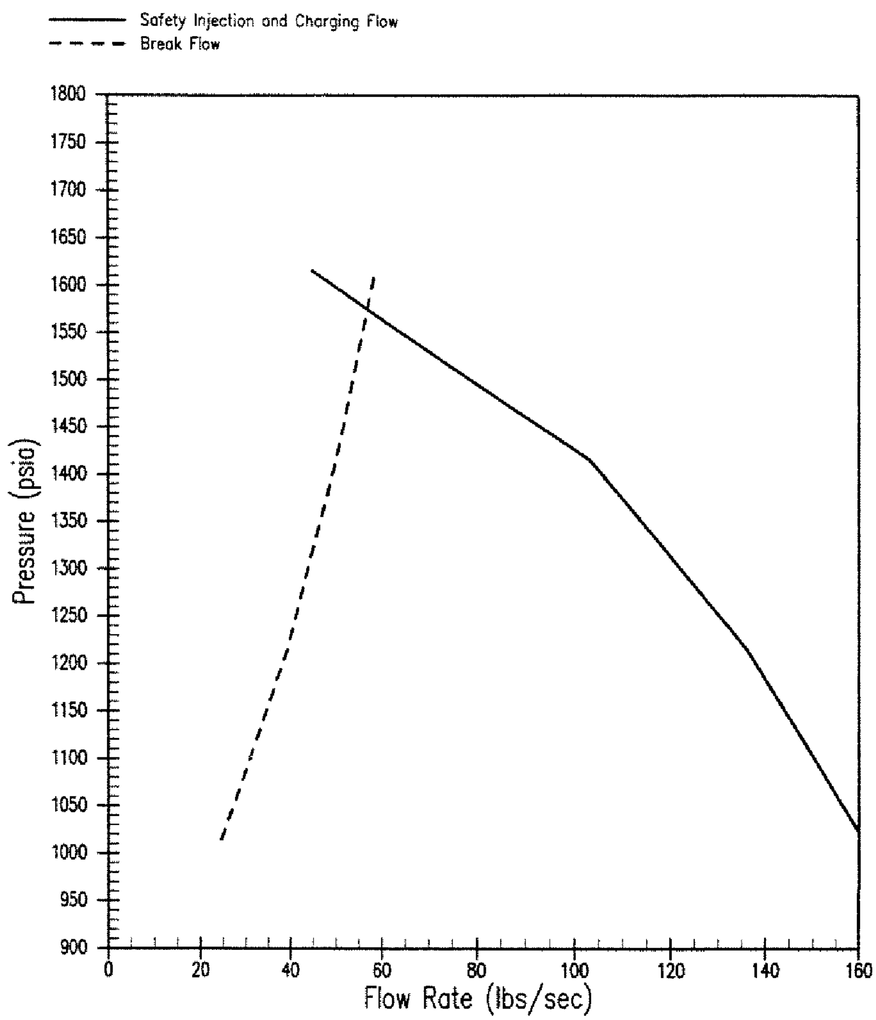
UFSAR FIGURE 14.1–146 | REV. No. 01



INDIAN POINT UNIT No. 3

LOSS OF ALL POWER TO THE STATION AUXILIARIES TOTAL VESSEL INLET FLOW AND PRESSURIZER RELIEF

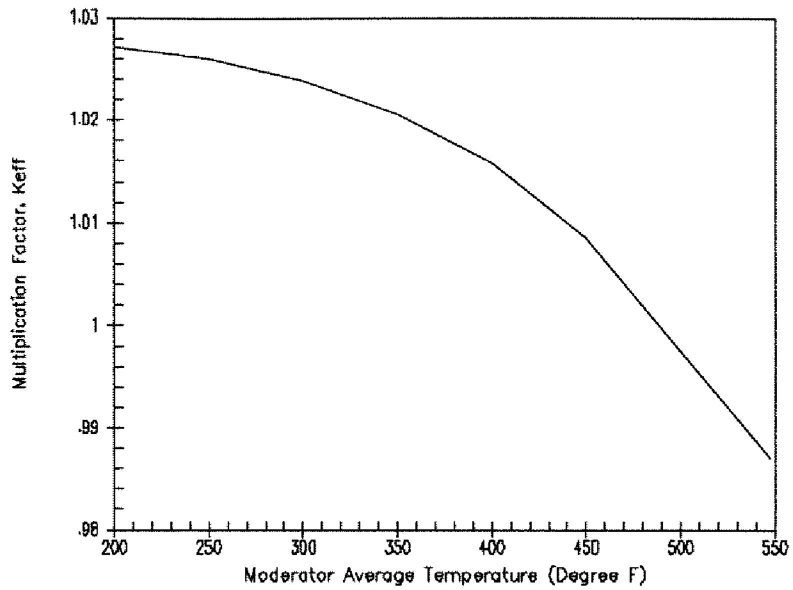
UFSAR FIGURE 14.1–147	REV. No. 01



INDIAN POINT UNIT No. 3

SAFETY INJECTION AND CHARGING FLOW AND BREAK FLOW DURING RUPTURE OF ONE PUMP COASTING DOWN

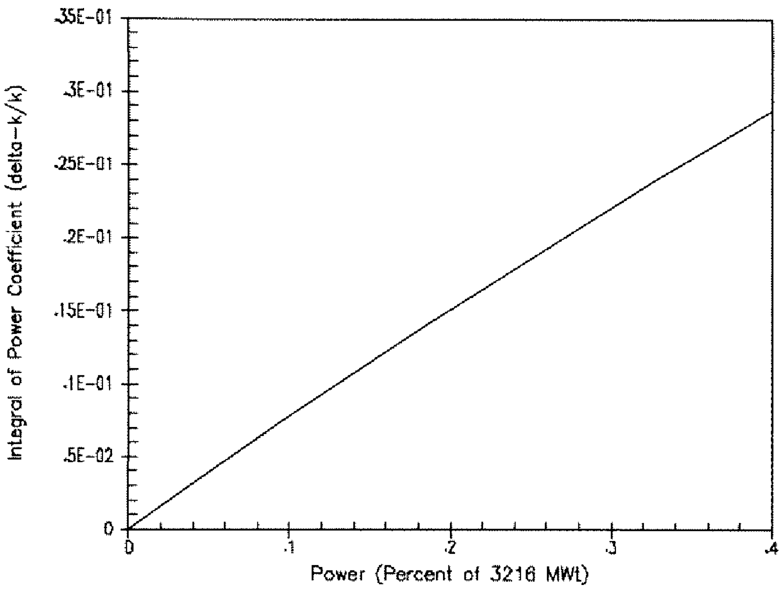
UFSAR FIGURE 14.2-1 | REV. No. 01



INDIAN POINT UNIT No. 3

RUPTURE OF A STEAM PIPE EVENTS
VARIATION OF REACTIVITY WITH CORE
TEMPERATURE AT 1050 PSIA FOR THE END
OF LIFE RODDED CORE WITH ONE RCCA STUCK

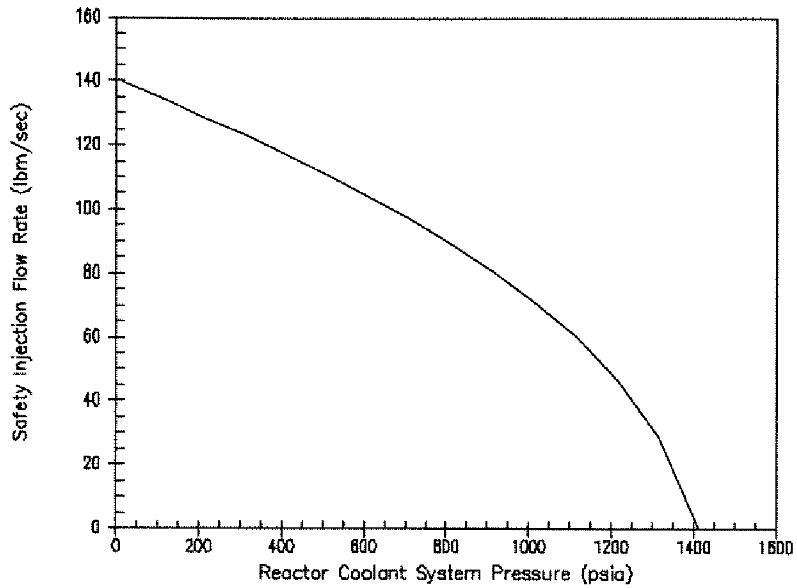
UFSAR FIGURE 14.2-2	REV. No. 01



INDIAN POINT UNIT No. 3

RUPTURE OF A STEAM PIPE EVENTS
VARIATION OF REACTIVITY WITH POWER
AT CONSTANT MODERATOR AVERAGE
TEMPERATURE

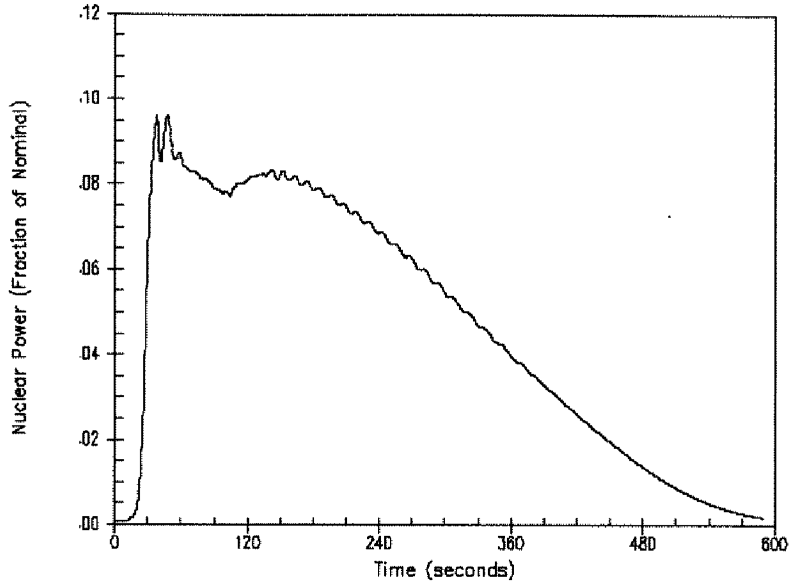
UFSAR FIGURE 14.2-3 | REV. No. 01



INDIAN POINT UNIT No. 3

RUPTURE OF STEAM PIPE EVENTS
SAFETY INJECTION FLOW
VERSUS RCS PRESSURE

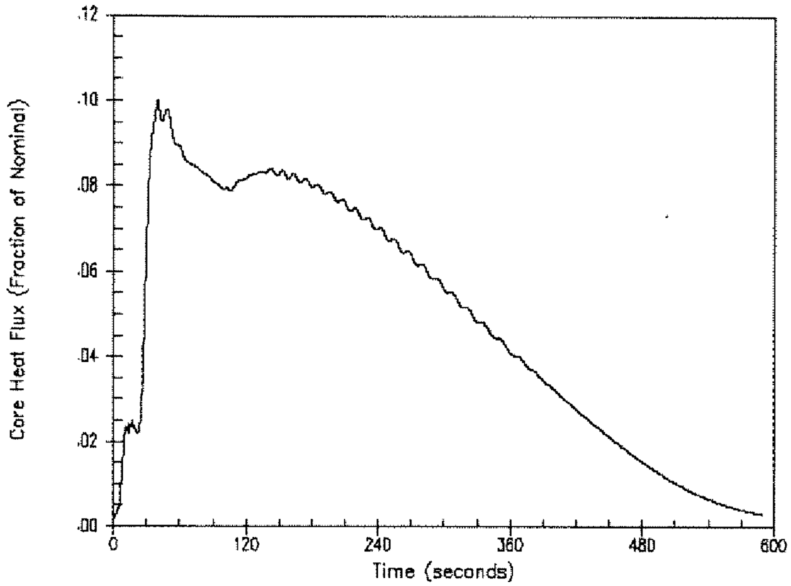
UFSAR FIGURE 14.2-4 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
NUCLEAR POWER VERSUS TIME

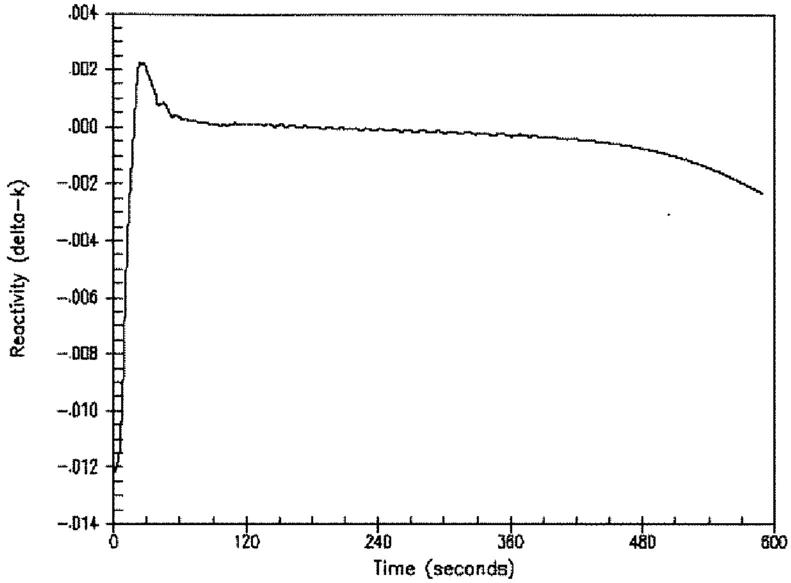
UFSAR FIGURE 14.2-5	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
CORE HEAT FLUX VERSUS TIME

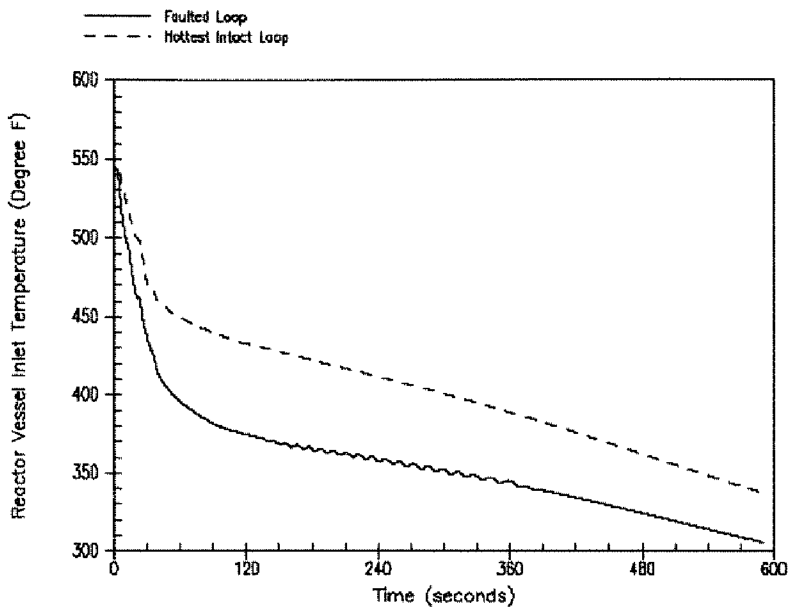
UFSAR FIGURE 14.2-6	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
REACTIVITY VERSUS TIME

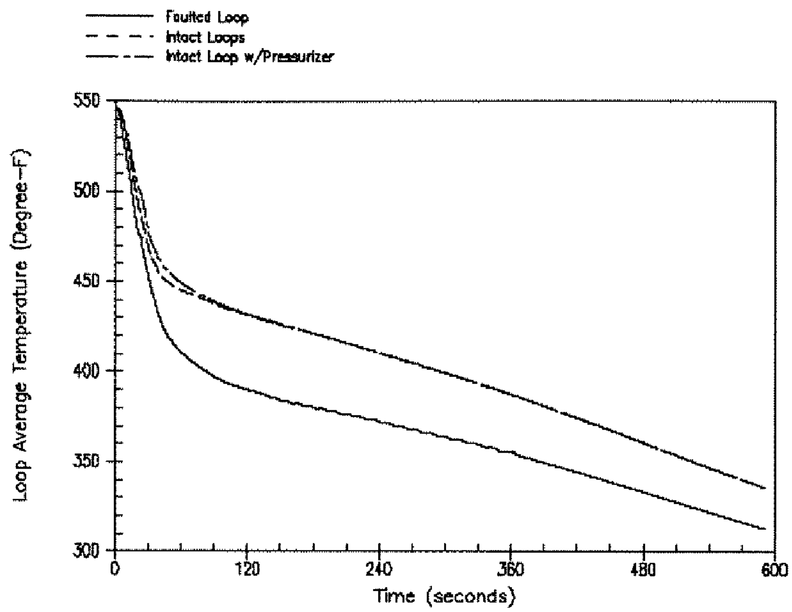
UFSAR FIGURE 14.2-7	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
REACTOR VESSEL INLET TEMPERATURES
VERSUS TIME

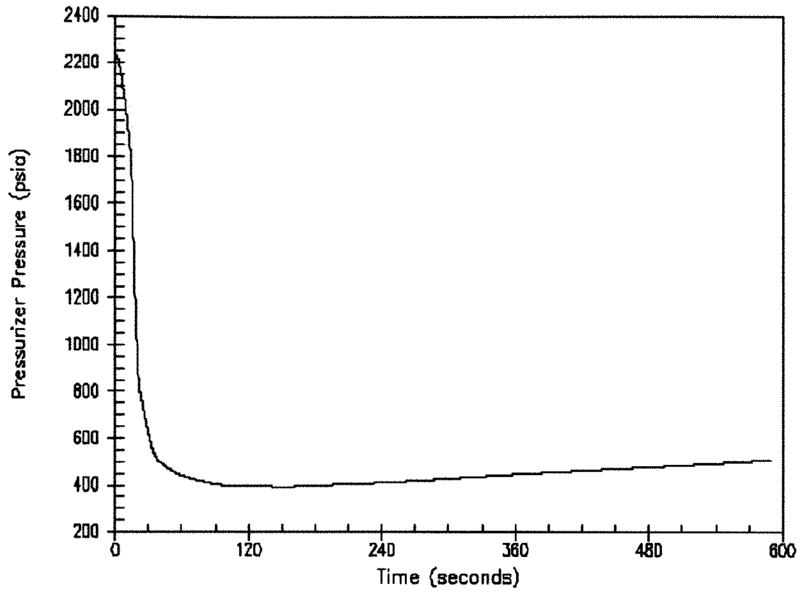
UFSAR FIGURE 14.2-8	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK WITH OFFSITE POWER AVAILABLE LOOP AVERAGE TEMPERATURES VERSUS TIME

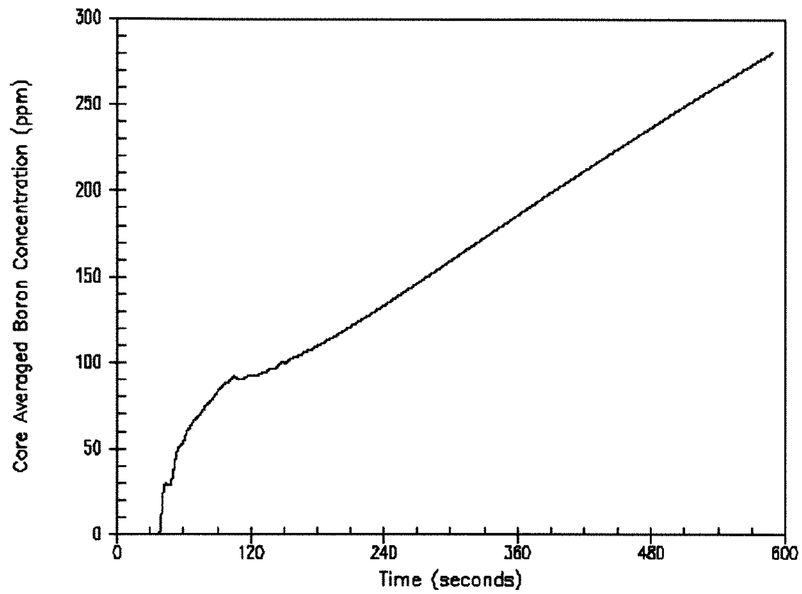
UFSAR FIGURE 14.2-9 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
PRESSURIZER PRESSURE
VERSUS TIME

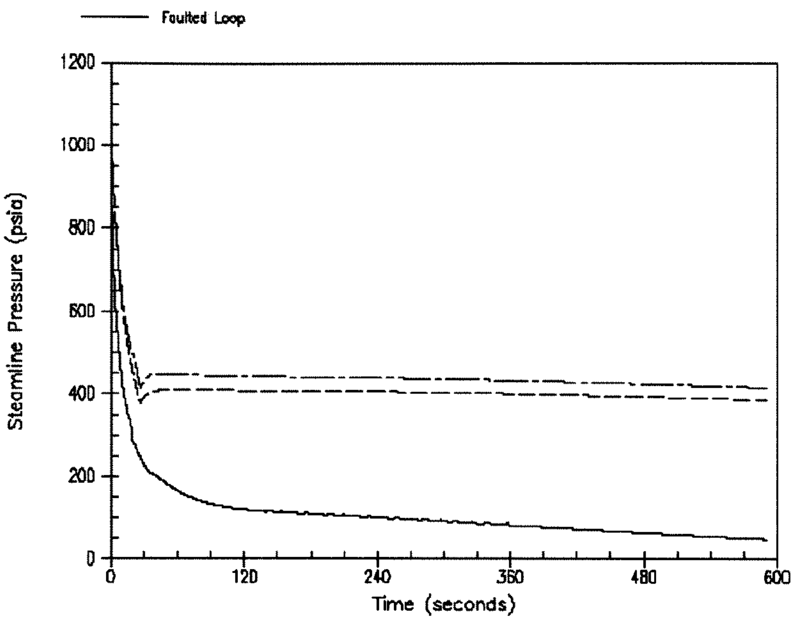
UFSAR FIGURE 14.2-10 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
CORE AVERAGED BORON CONCENTRATION
VERSUS TIME

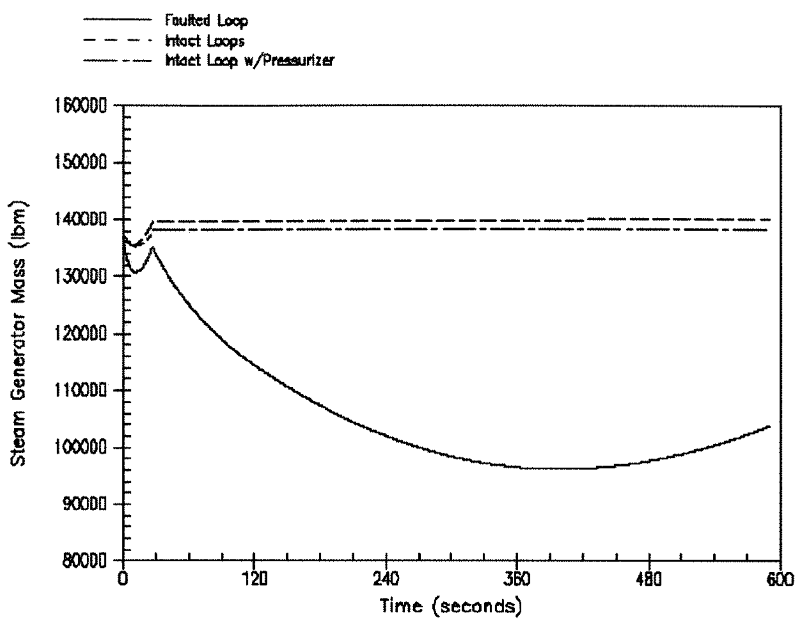
UFSAR FIGURE 14.2-11 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
STEAMLINE PRESSURE
VERSUS TIME

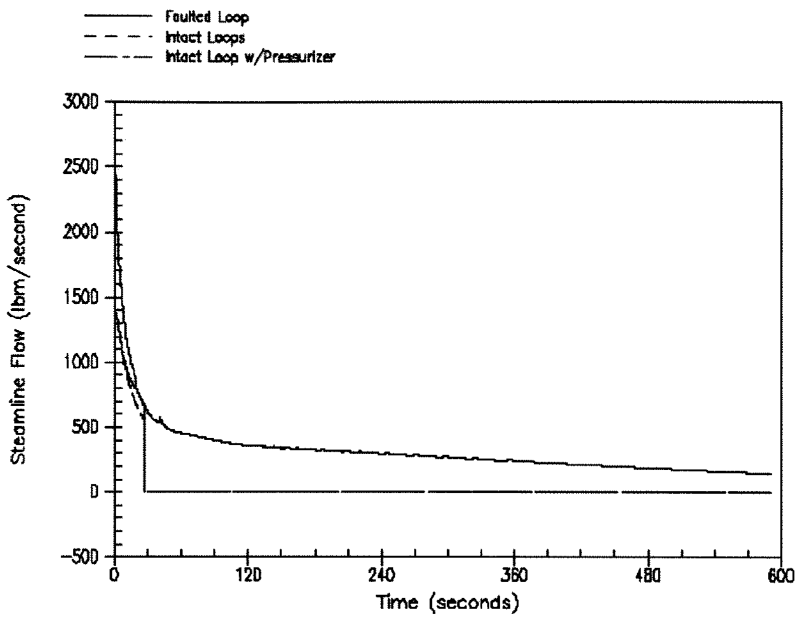
UFSAR FIGURE 14.2-12	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
STEAM GENERATOR MASS
VERSUS TIME

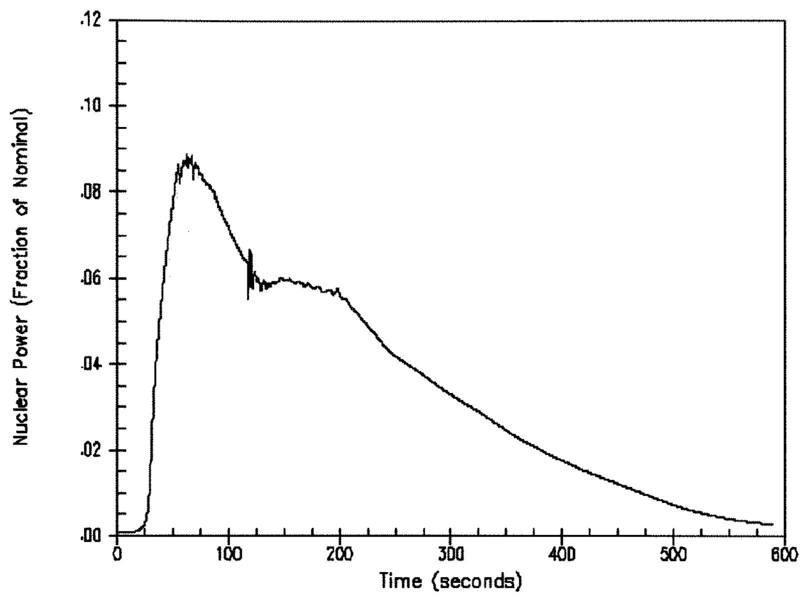
UFSAR FIGURE 14.2-13 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH OFFSITE POWER AVAILABLE
STEAMLINE FLOW
VERSUS TIME

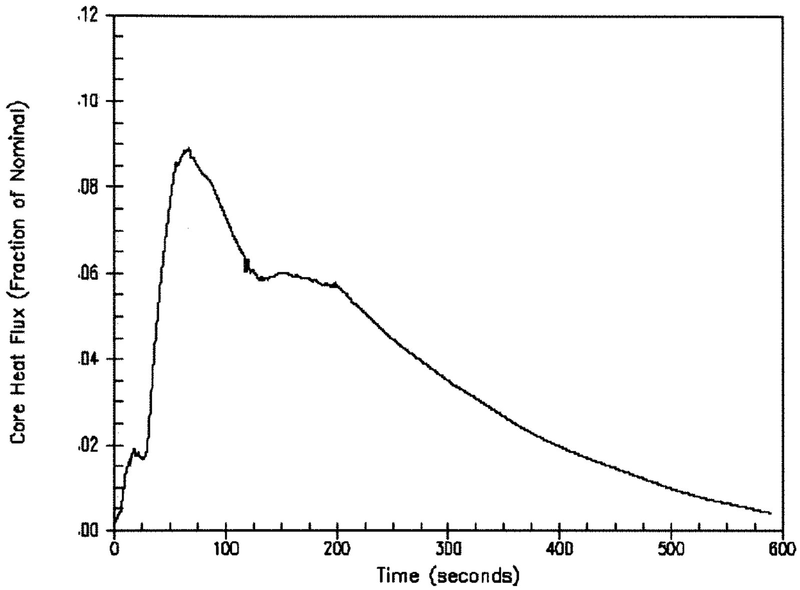
UFSAR FIGURE 14.2-14	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
NUCLEAR POWER
VERSUS TIME

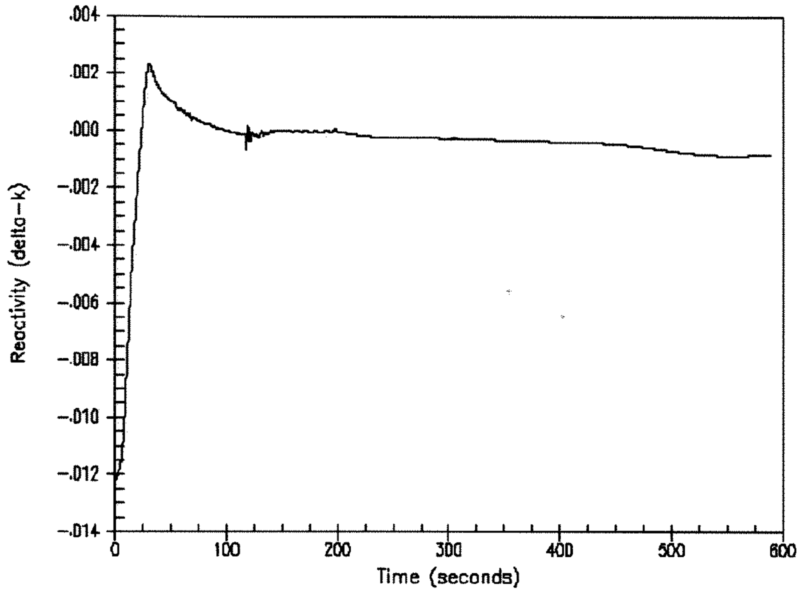
UFSAR FIGURE 14.2-15 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
CORE HEAT FLUX
VERSUS TIME

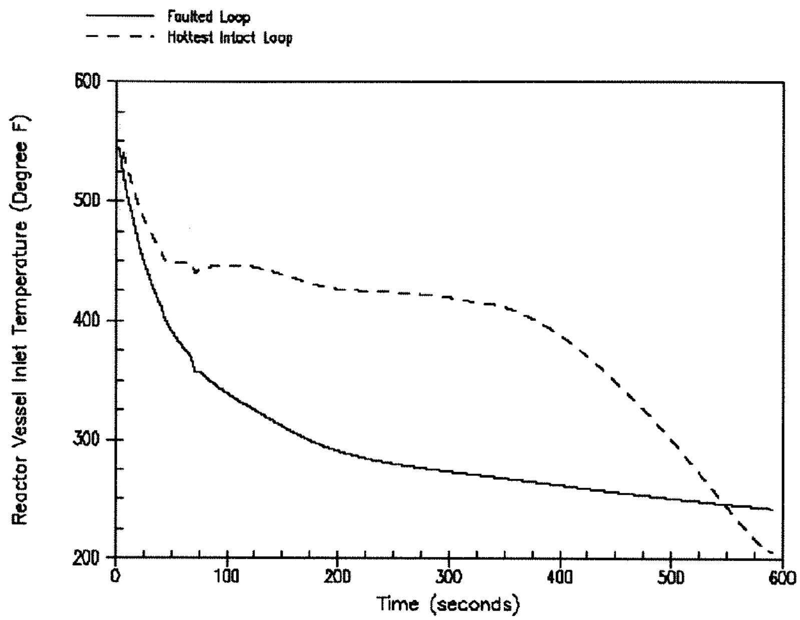
UFSAR FIGURE 14.2-16	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
REACTIVITY
VERSUS TIME

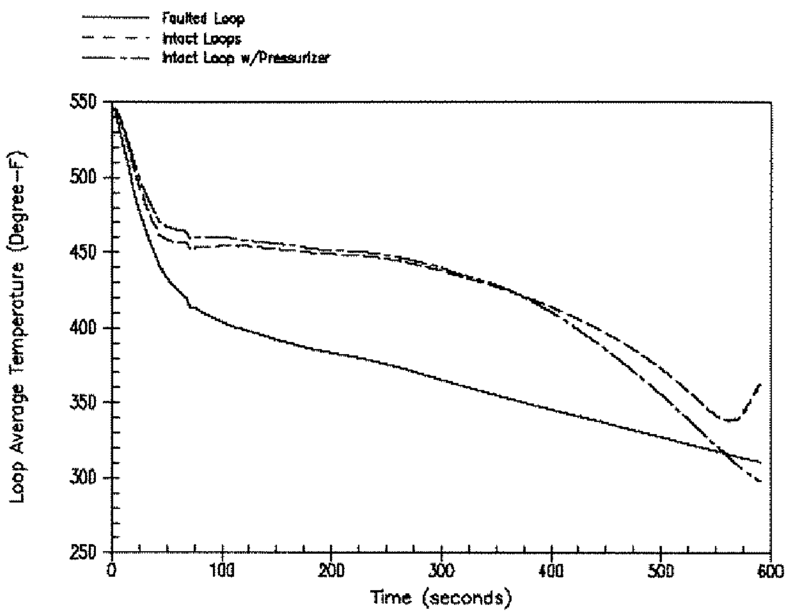
UFSAR FIGURE 14.2-17	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
REACTOR VESSEL INLET TEMPERATURE
VERSUS TIME

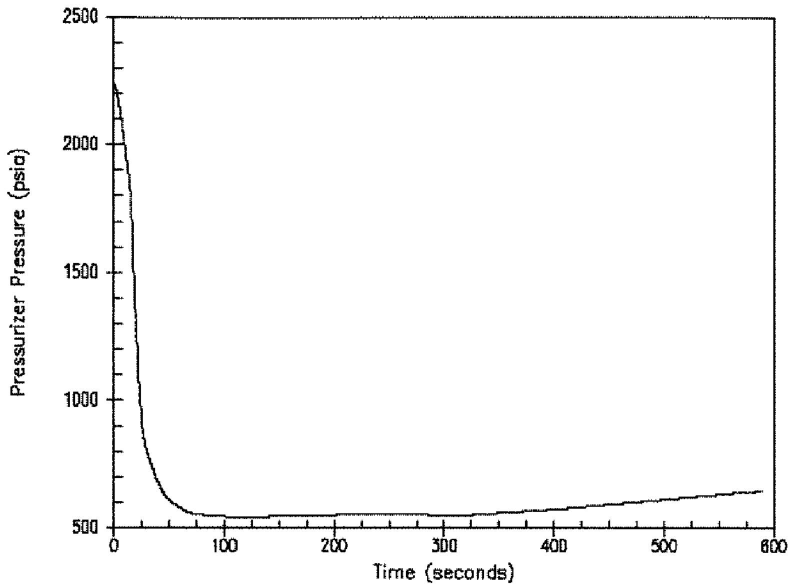
UFSAR FIGURE 14.2–18	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK WITH LOSS OF OFFSITE POWER LOOP AVERAGE TEMPERATURES VERSUS TIME

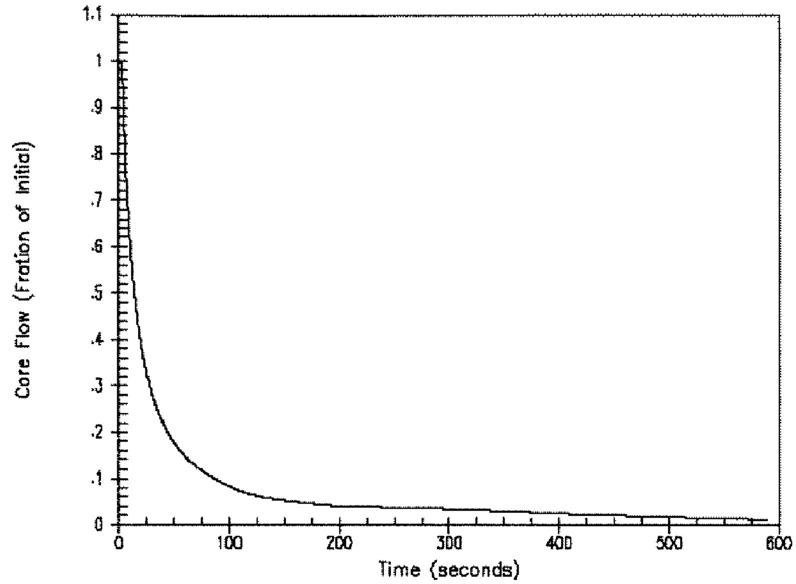
UFSAR FIGURE 14.2-19 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
PRESSURIZER PRESSURE
VERSUS TIME

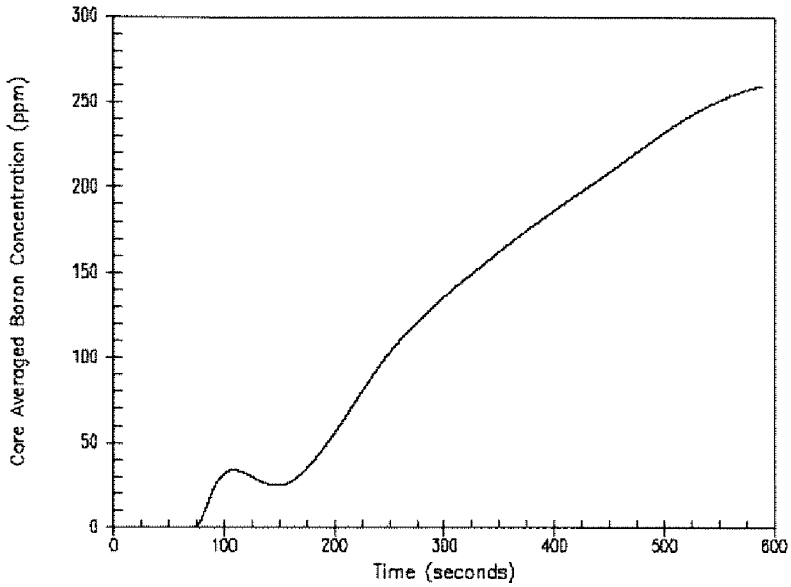
UFSAR FIGURE 14.2-20	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
CORE FLOW
VERSUS TIME

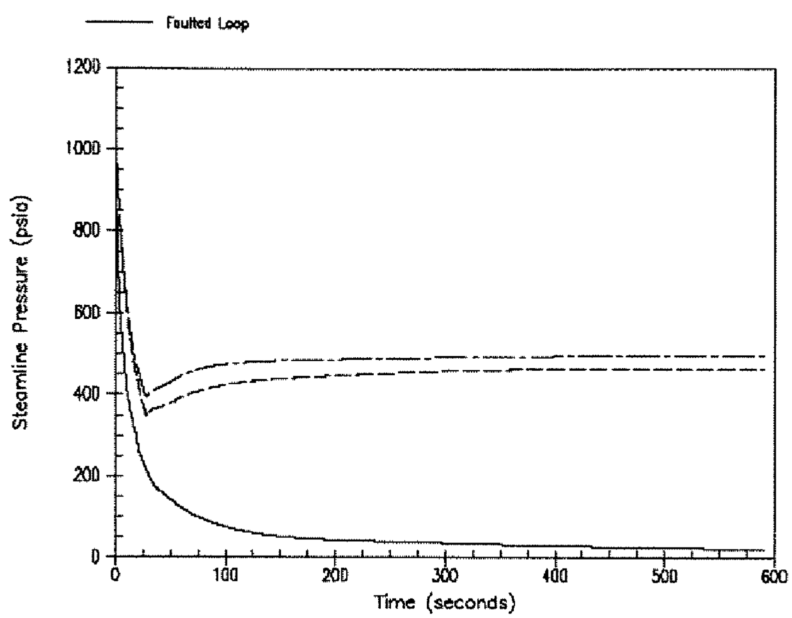
UFSAR FIGURE 14.2-21 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
CORE AVERAGED BORON CONCENTRATION
VERSUS TIME

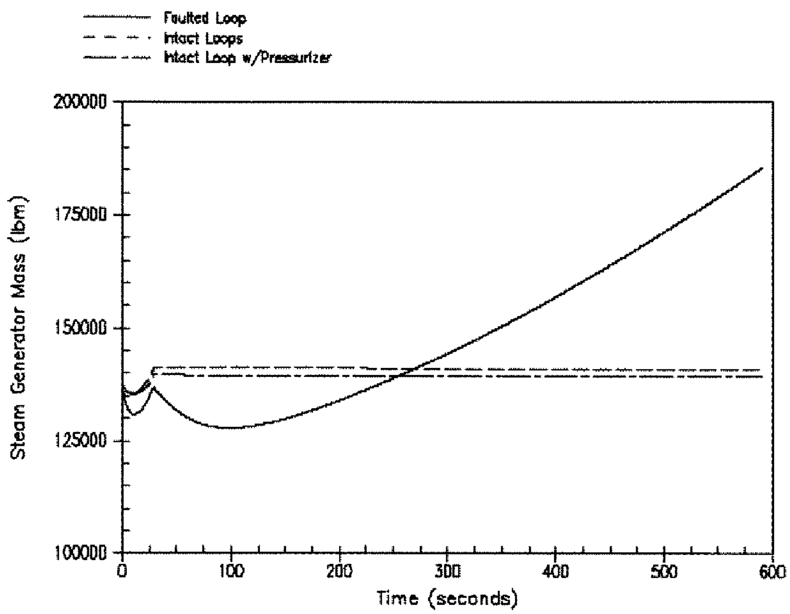
UFSAR FIGURE 14.2-22 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
STEAMLINE PRESSURE
VERSUS TIME

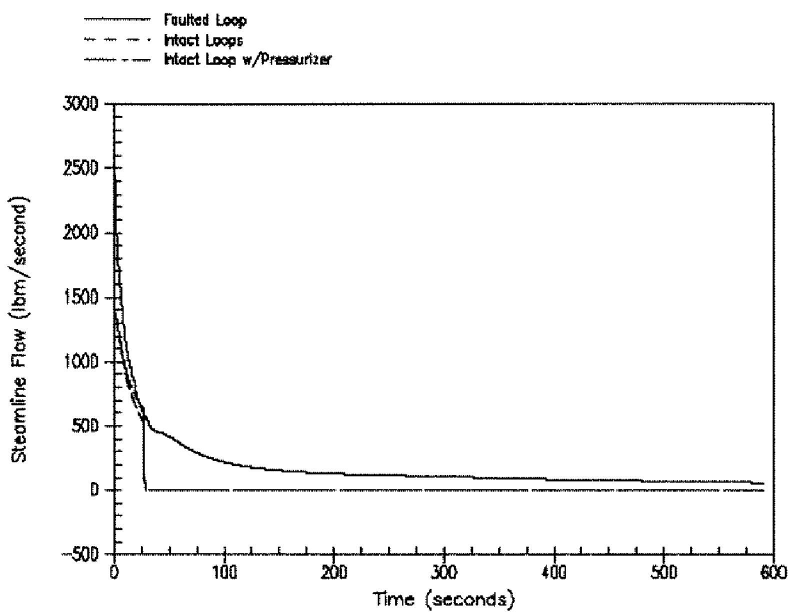
UFSAR FIGURE 14.2-23 | REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
STEAM GENERATOR MASS
VERSUS TIME

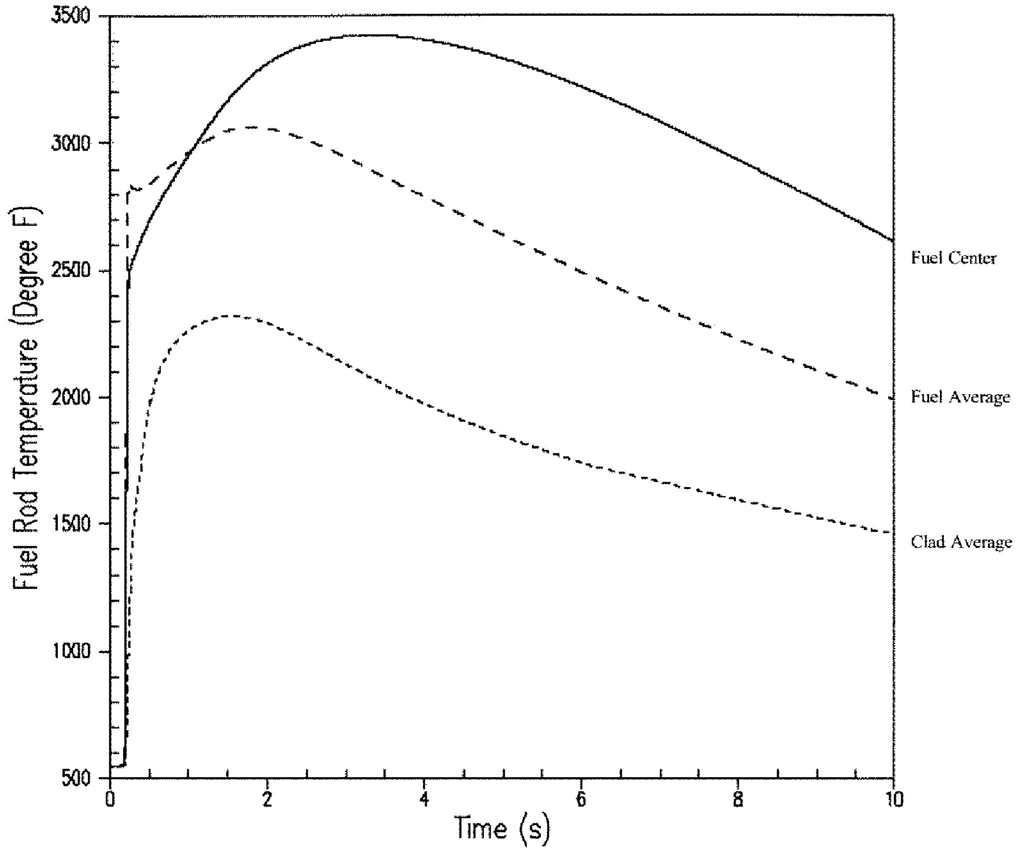
UFSAR FIGURE 14.2-24	REV. No. 01



INDIAN POINT UNIT No. 3

HYPOTHETICAL STEAMLINE BREAK
WITH LOSS OF OFFSITE POWER
STEAMLINE FLOW
VERSUS TIME

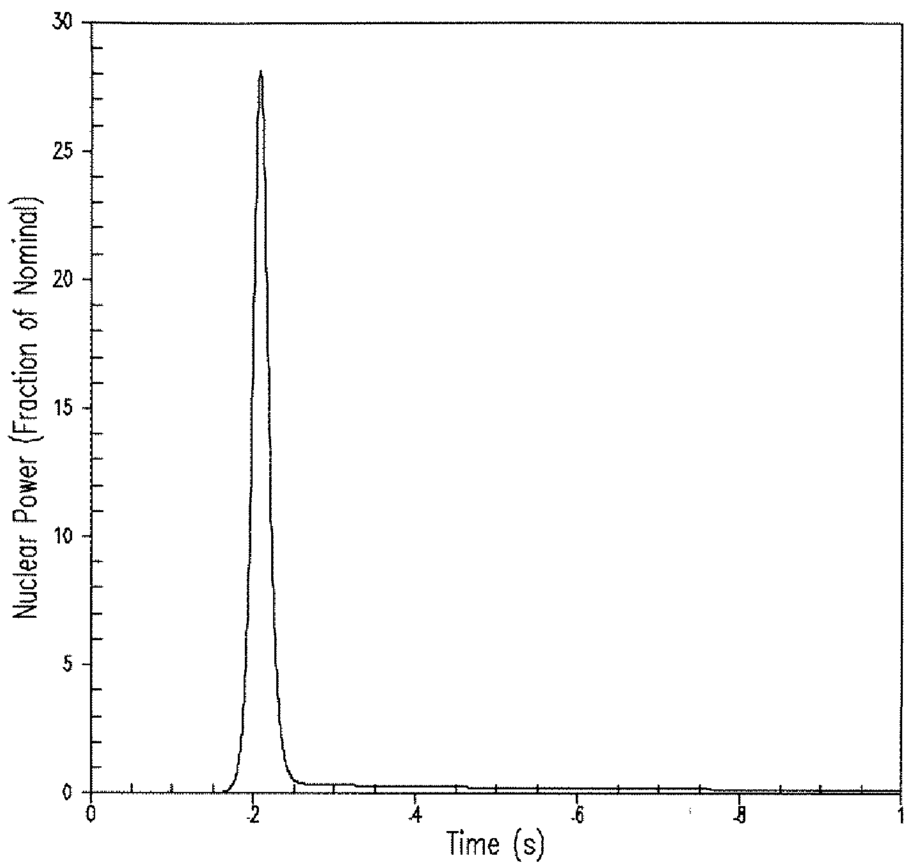
UFSAR FIGURE 14.2-25	REV. No. 01



INDIAN POINT UNIT No. 3

FUEL ROD TEMPERATURE FOR ROD EJECTION
END OF LIFE-HOT ZERO POWER

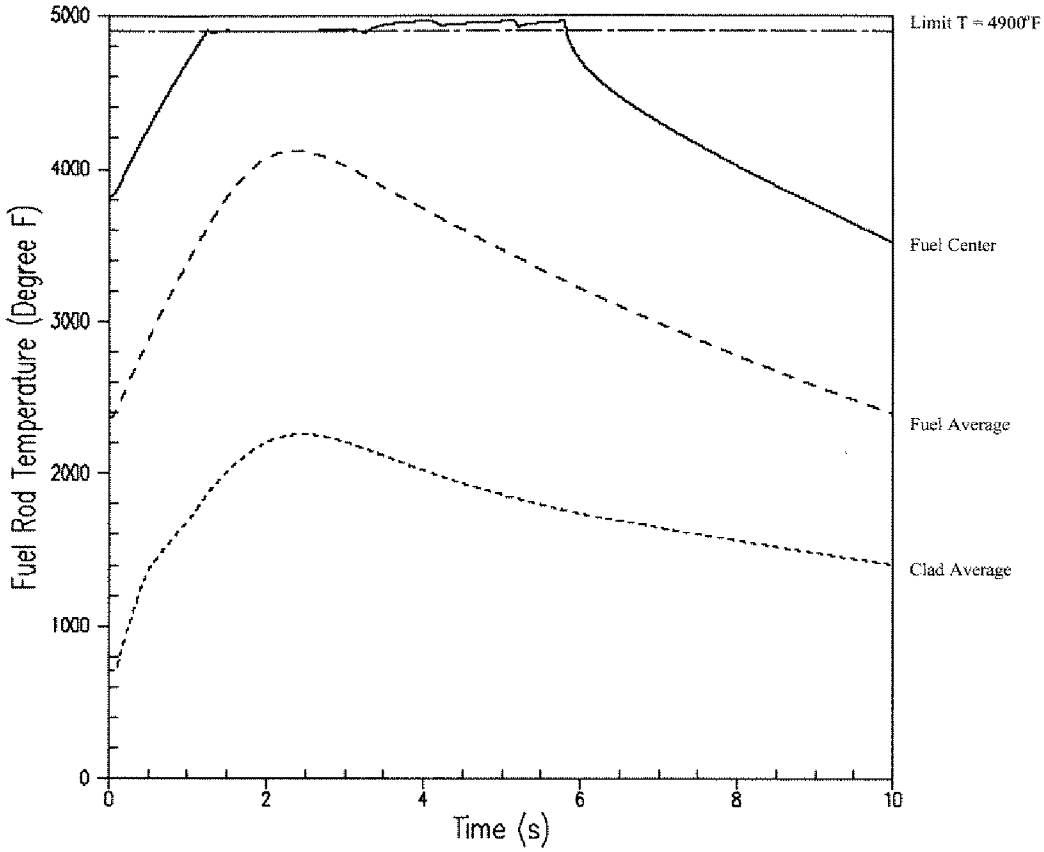
UFSAR FIGURE 14.2-48 | REV. No. 01



INDIAN POINT UNIT No. 3

NUCLEAR POWER FOR ROD EJECTION
END OF LIFE-HOT ZERO POWER

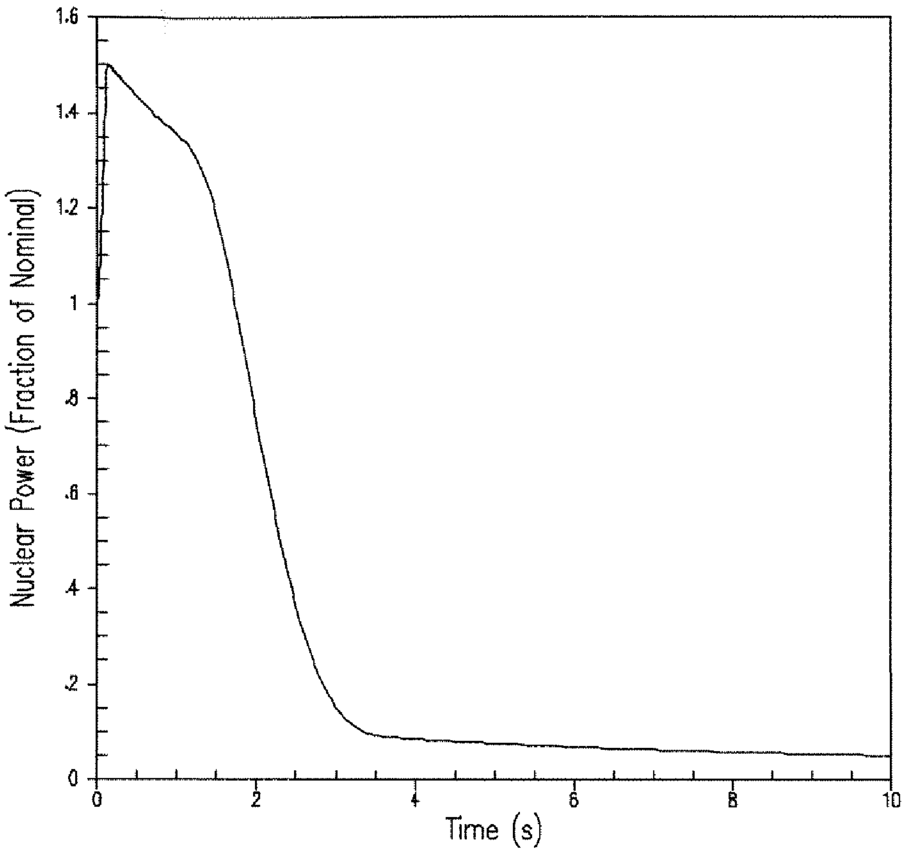
UFSAR FIGURE 14.2-49 | REV. No. 01



INDIAN POINT UNIT No. 3

FUEL ROD TEMPERATURE FOR ROD EJECTION
BEGINNING OF LIFE-HOT FULL POWER

UFSAR FIGURE 14.2-50 | REV. No. 01



INDIAN POINT UNIT No. 3

NUCLEAR POWER FOR ROD EJECTION
BEGINNING OF LIFE–HOT FULL POWER

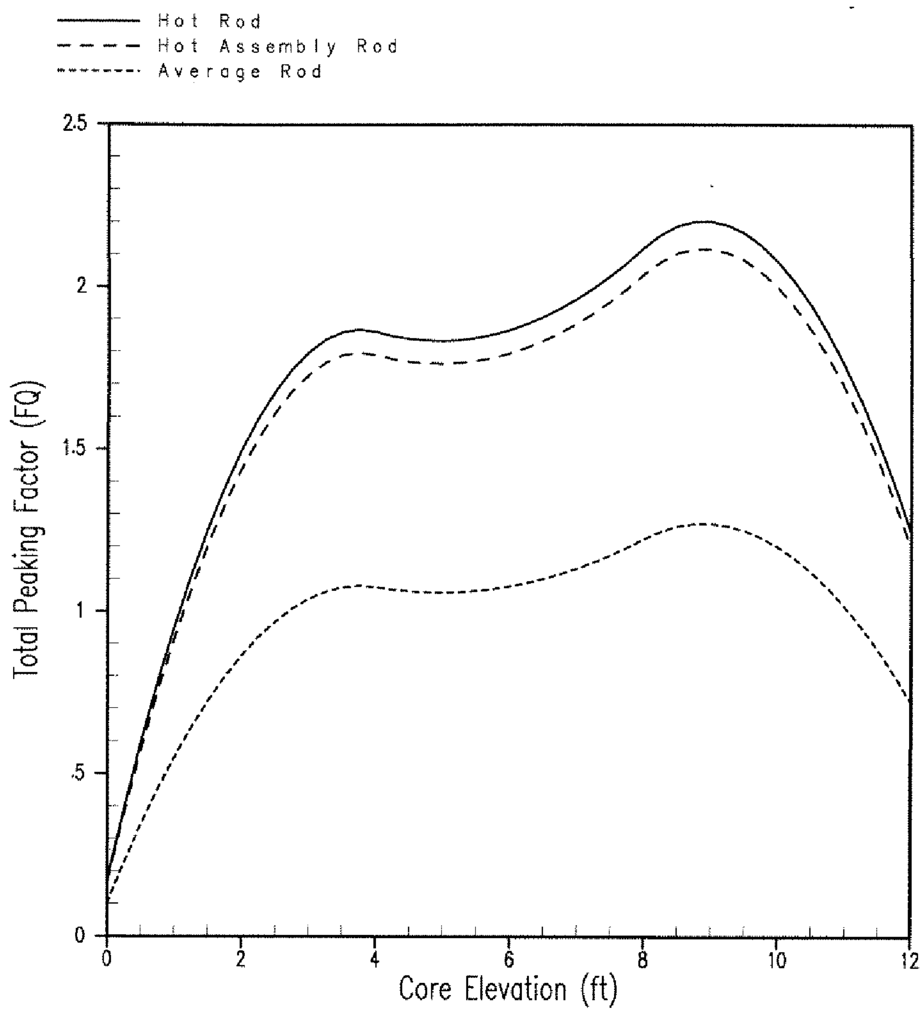
UFSAR FIGURE 14.2–51	REV. No. 01

BLOWDOWN	0 second	BREAK OCCURS
	~24.5 seconds	PUMP SI SIGNAL (LOW PRESSURIZER PRESSURE)
		ACCUMULATOR INJECTION BEGINS
		END OF BLOWDOWN
REFILL	~24.5 – 36.5 seconds	PUMPED ECCS INJECTION BEGINS
		BOTTOM OF CORE RECOVERY
REFLOOD	~36.5 - 250 seconds	ACCUMULATOR EMPTIES
		CORE QUENCHED
LONG TERM CORE COOLING	24 hours	SWITCH TO COLD LEG RECIRCULATION ON RWST LOW LEVEL ALARM
		SWITCH TO HOT LEG/COLD LEG RECIRCULATION

INDIAN POINT UNIT No. 3

TYPICAL TIME SEQUENCE OF EVENTS FOR THE INDIAN POINT 3 NUCLEAR POWER PLANT BEST ESTIMATE LARGE BREAK LOCA ANALYSIS

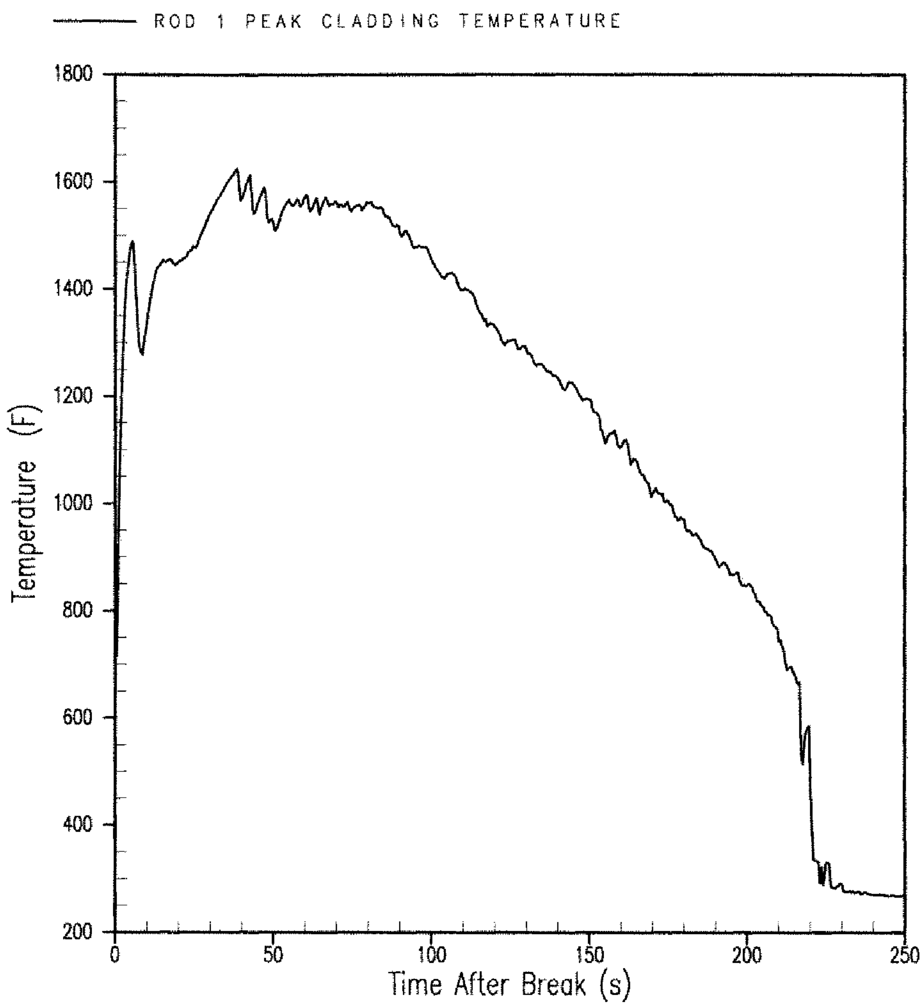
UFSAR FIGURE 14.3-1 | REV. No. 01



INDIAN POINT UNIT No. 3

AXIAL POWER DISTRIBUTION FOR
INDIAN POINT 3 NUCLEAR POWER PLANT
REFERENCE TRANSIENT–BEST ESTIMATE LBLOCA

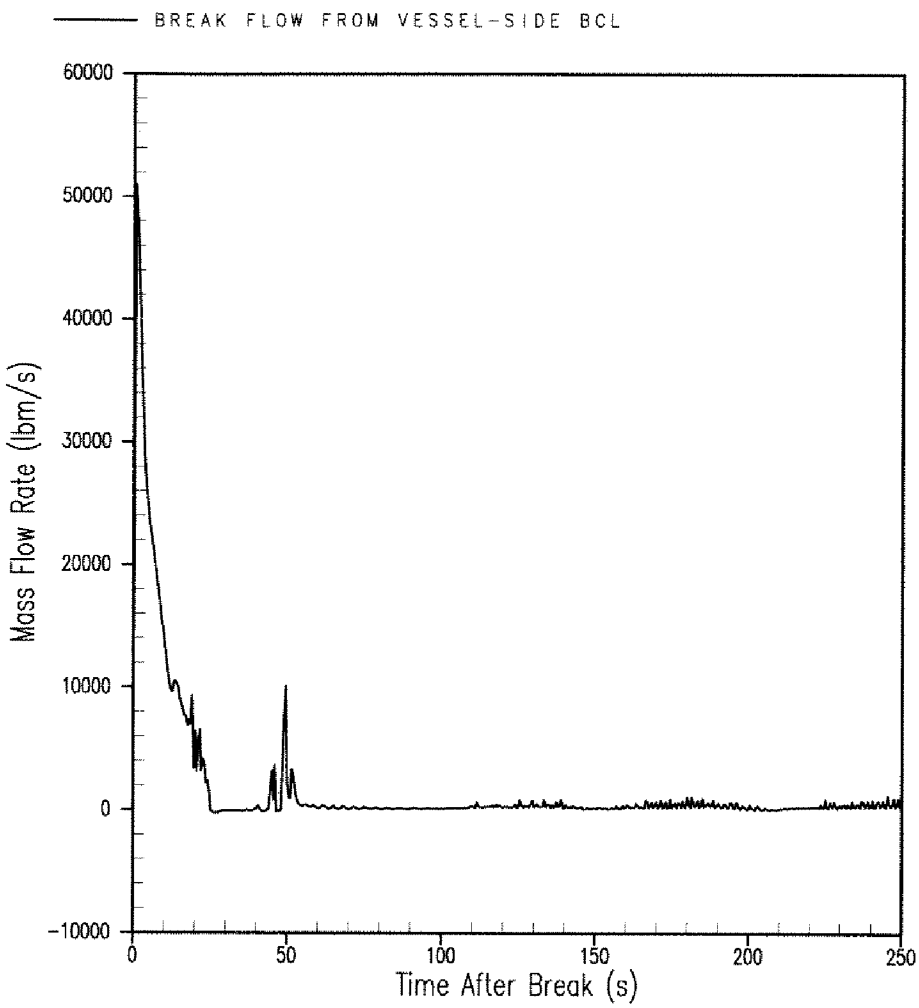
UFSAR FIGURE 14.3–2 | REV. No. 01



INDIAN POINT UNIT No. 3

PEAK CLADDING TEMPERATURE FOR
INDIAN POINT 3 NUCLEAR POWER PLANT
REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

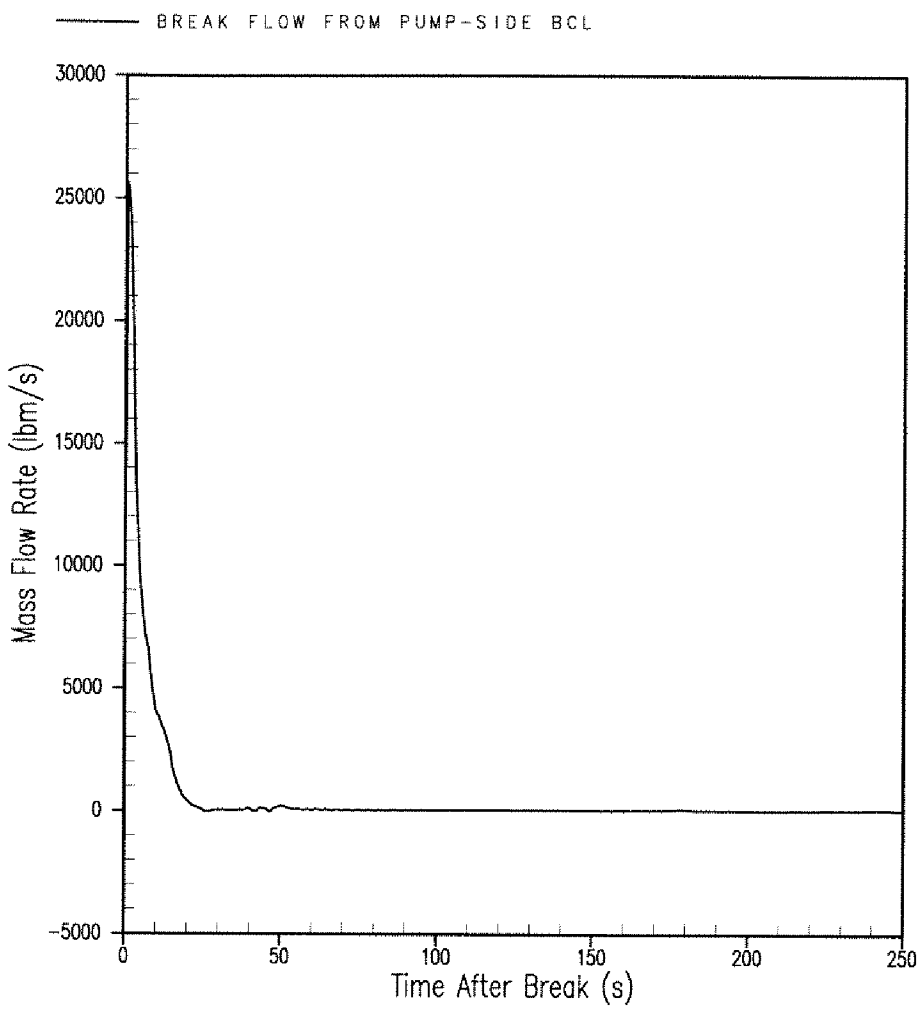
UFSAR FIGURE 14.3-4 | REV. No. 01



INDIAN POINT UNIT No. 3

BREAK FLOW FROM BCL VESSEL SIDE FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

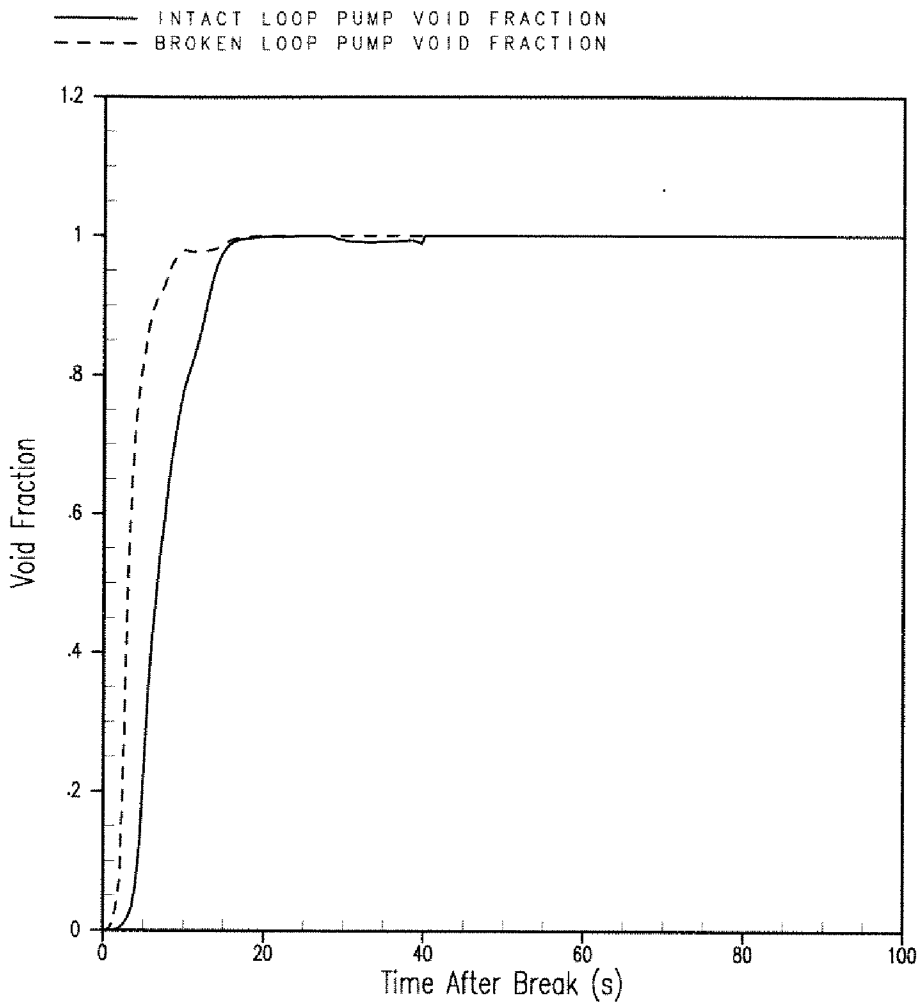
UFSAR FIGURE 14.3-5a	REV. No. 01



INDIAN POINT UNIT No. 3

BREAK FLOW FROM BCL PUMP-SIDE FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

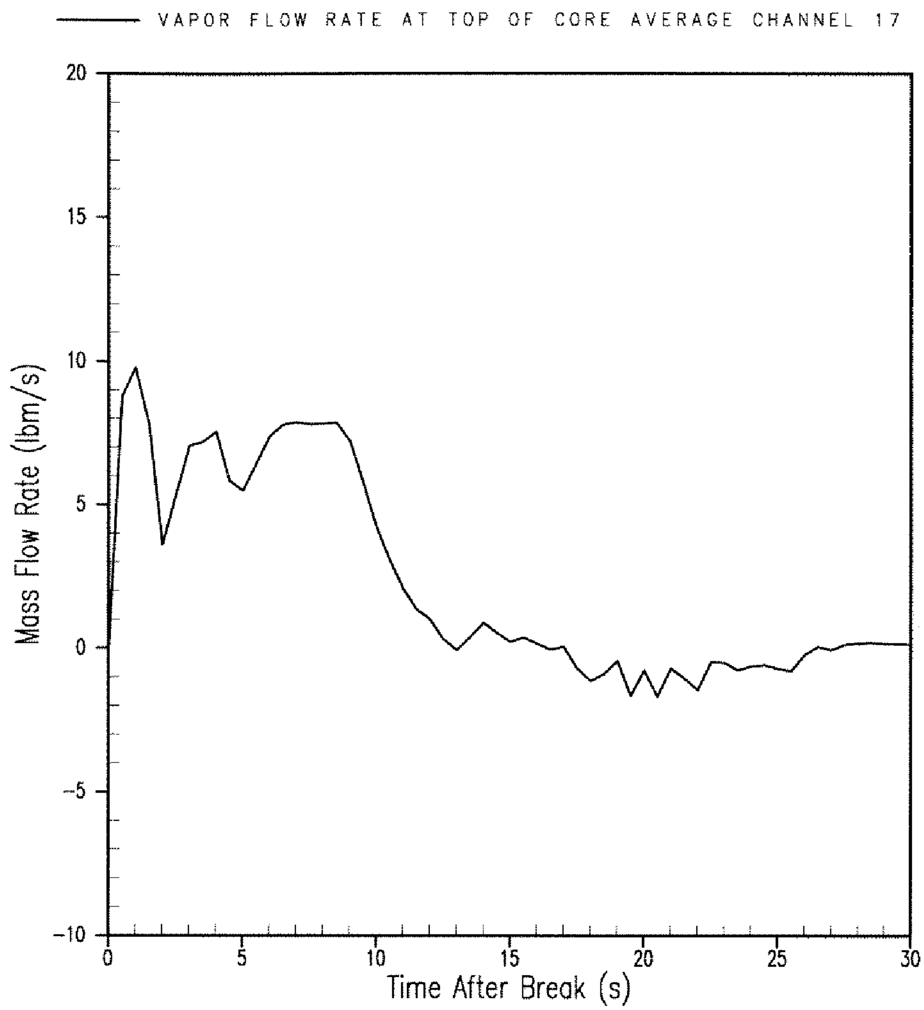
UFSAR FIGURE 14.3-5b | REV. No. 01



INDIAN POINT UNIT No. 3

VOID FRACTION AT THE INTACT AND BROKEN LOOP PUMP INLET FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

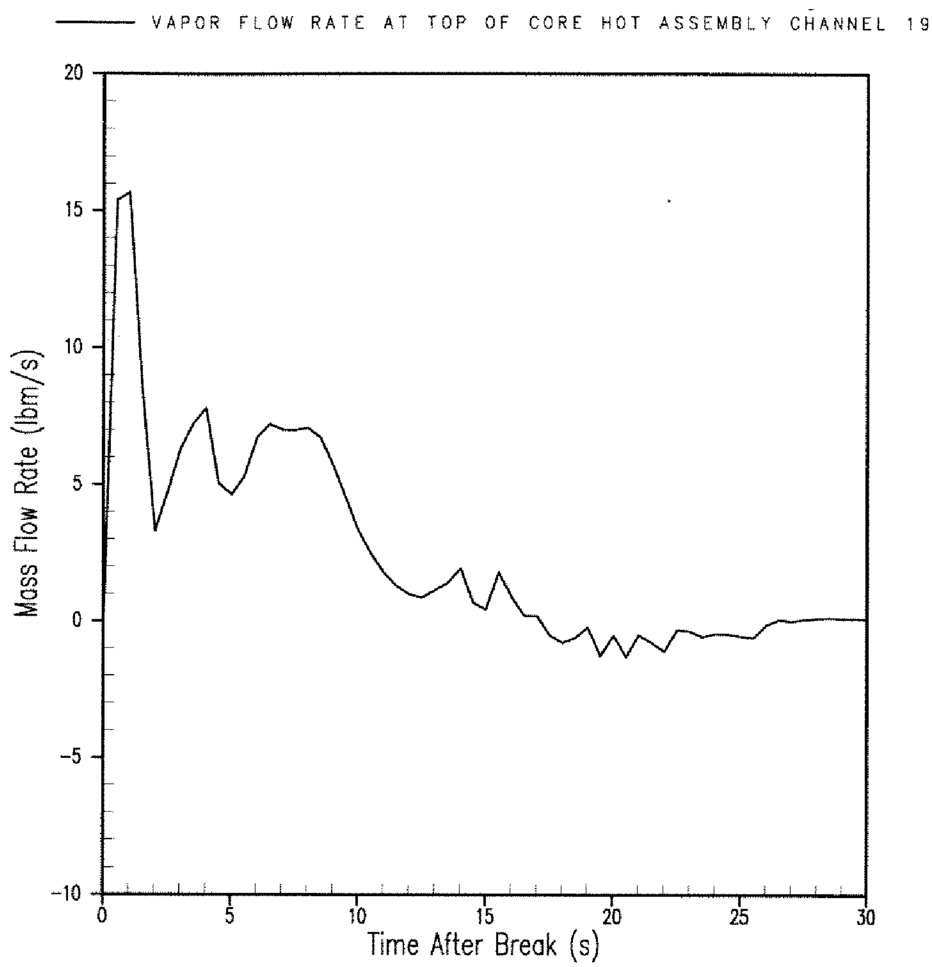
UFSAR FIGURE 14.3-6	REV. No. 01



INDIAN POINT UNIT No. 3

VAPOR FLOW RATE PER ASSEMBLY AT NEAR TOP OF CORE CHANNEL 17 DURING BLOWDOWN FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

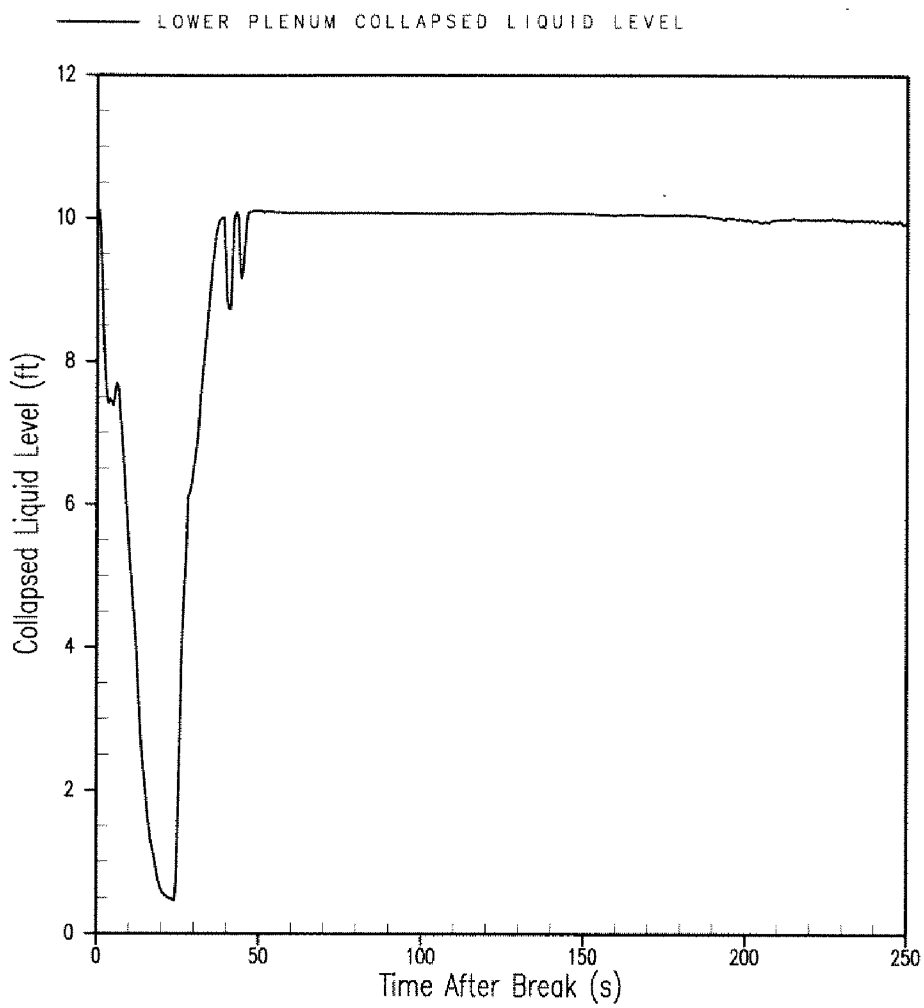
UFSAR FIGURE 14.3-7	REV. No. 01



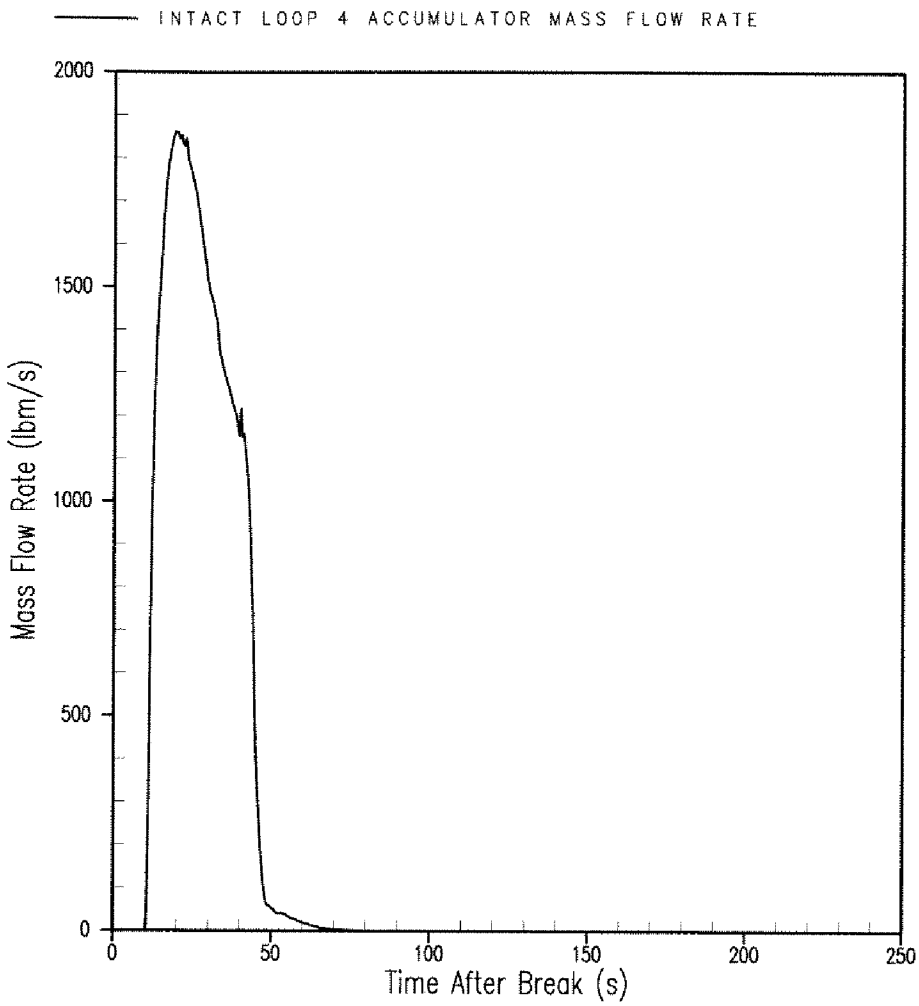
INDIAN POINT UNIT No. 3

VAPOR FLOW RATE AT NEAR TOP OF CORE CHANNEL 19 DURING BLOWDOWN FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

UFSAR FIGURE 14.3-8	REV. No. 01



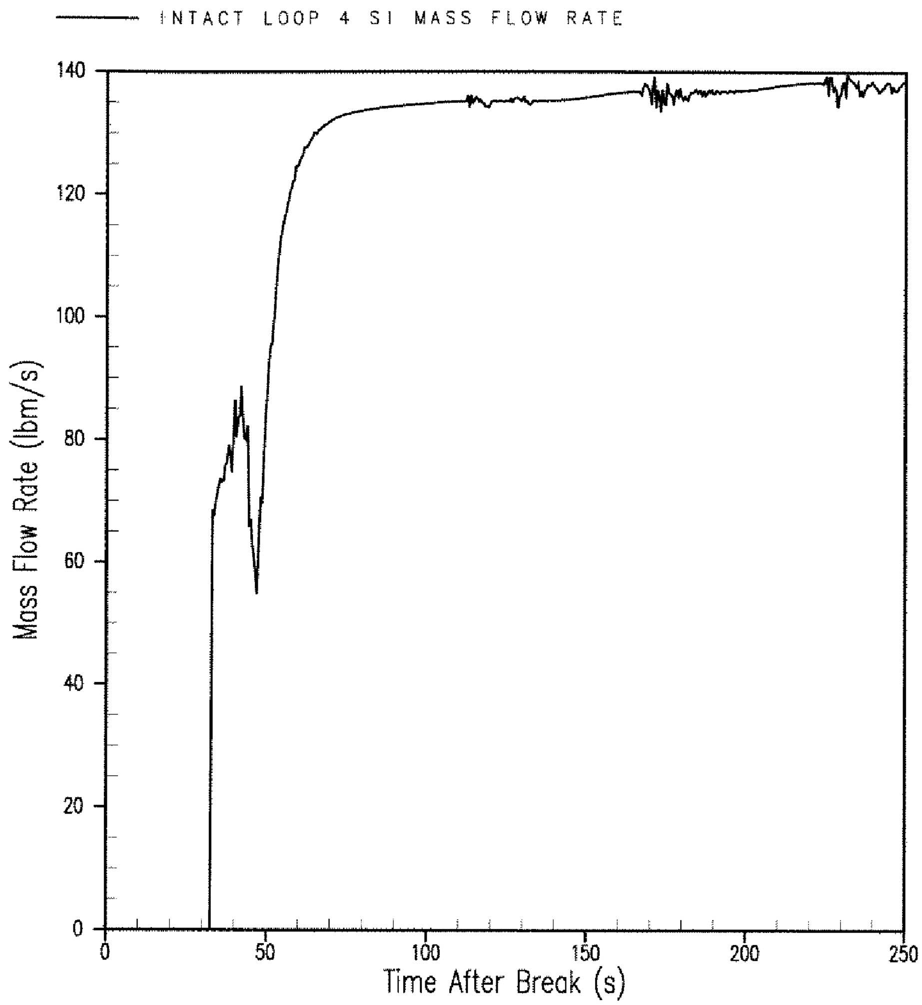
INDIAN POINT UNIT No. 3	
COLLAPSED LIQUID LEVEL IN LOWER PLENUM FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA	
UFSAR FIGURE 14.3-9	REV. No. 01



INDIAN POINT UNIT No. 3

ACCUMULATOR MASS FLOW RATE FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT–BEST ESTIMATE LBLOCA

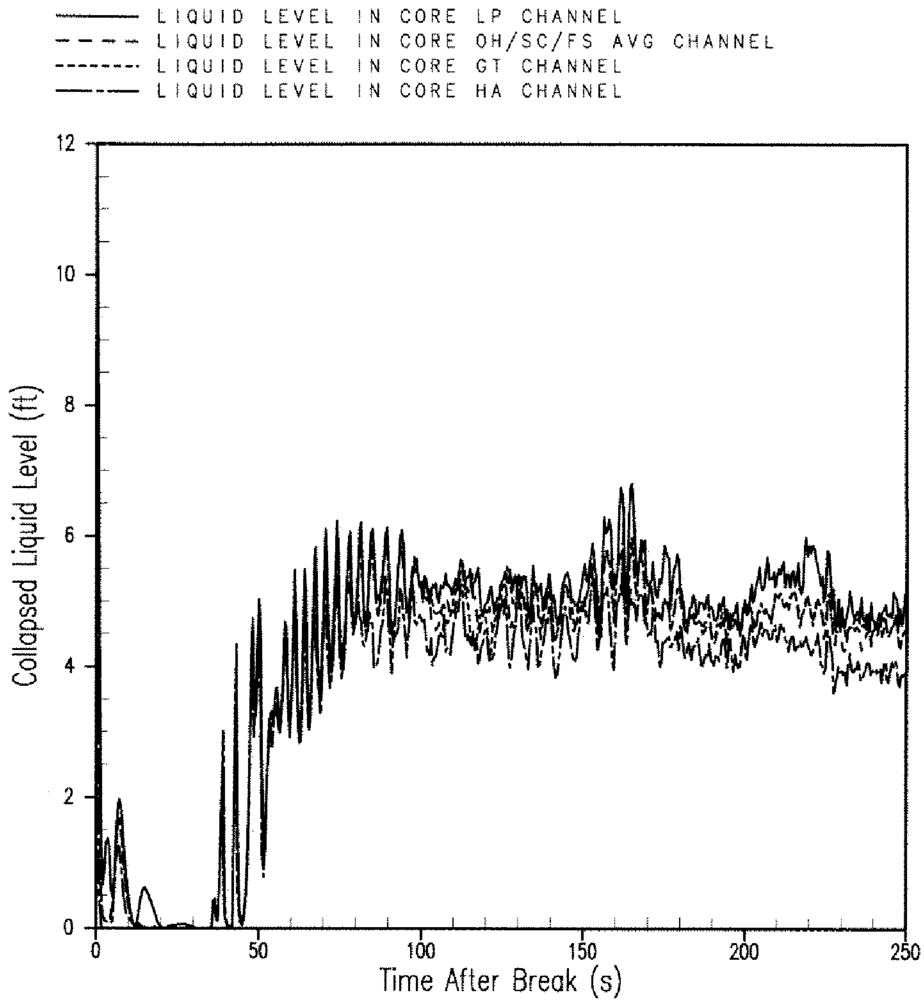
UFSAR FIGURE 14.3–10	REV. No. 01



INDIAN POINT UNIT No. 3

SI MASS FLOW RATE FOR
INDIAN POINT 3 NUCLEAR POWER PLANT
REFERENCE TRANSIENT–BEST ESTIMATE LBLOCA

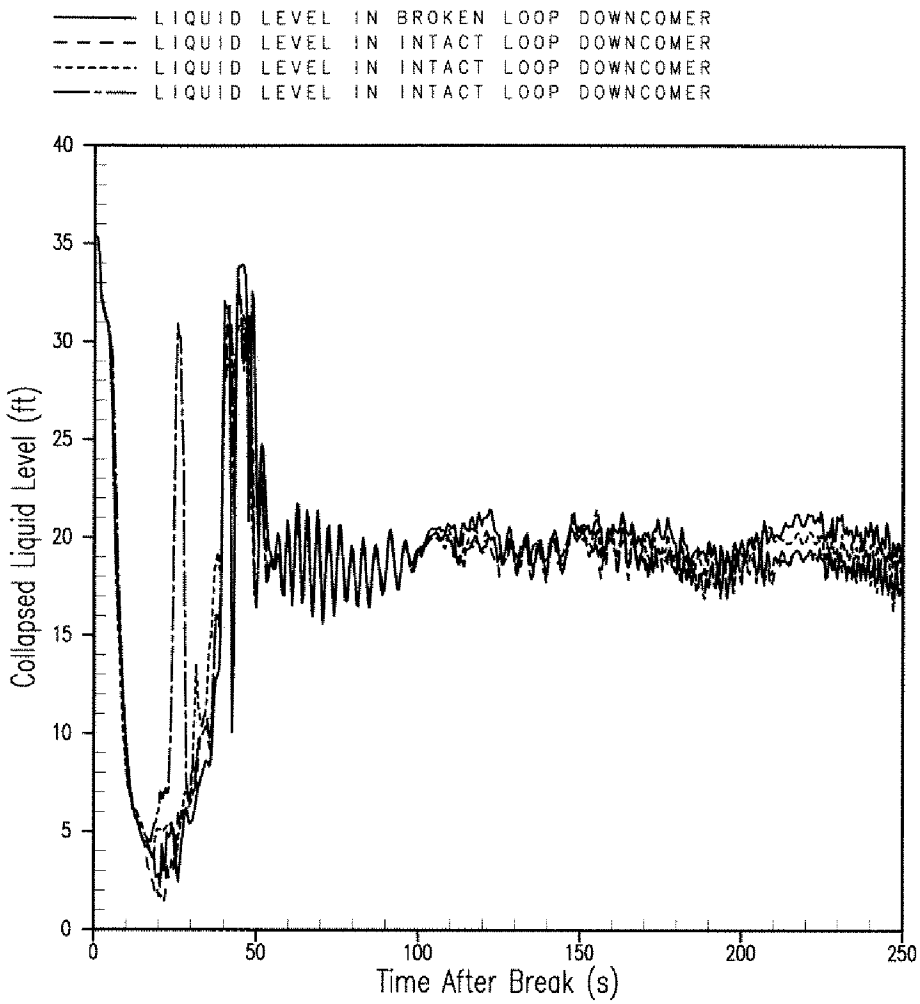
UFSAR FIGURE 14.3–11	REV. No. 01



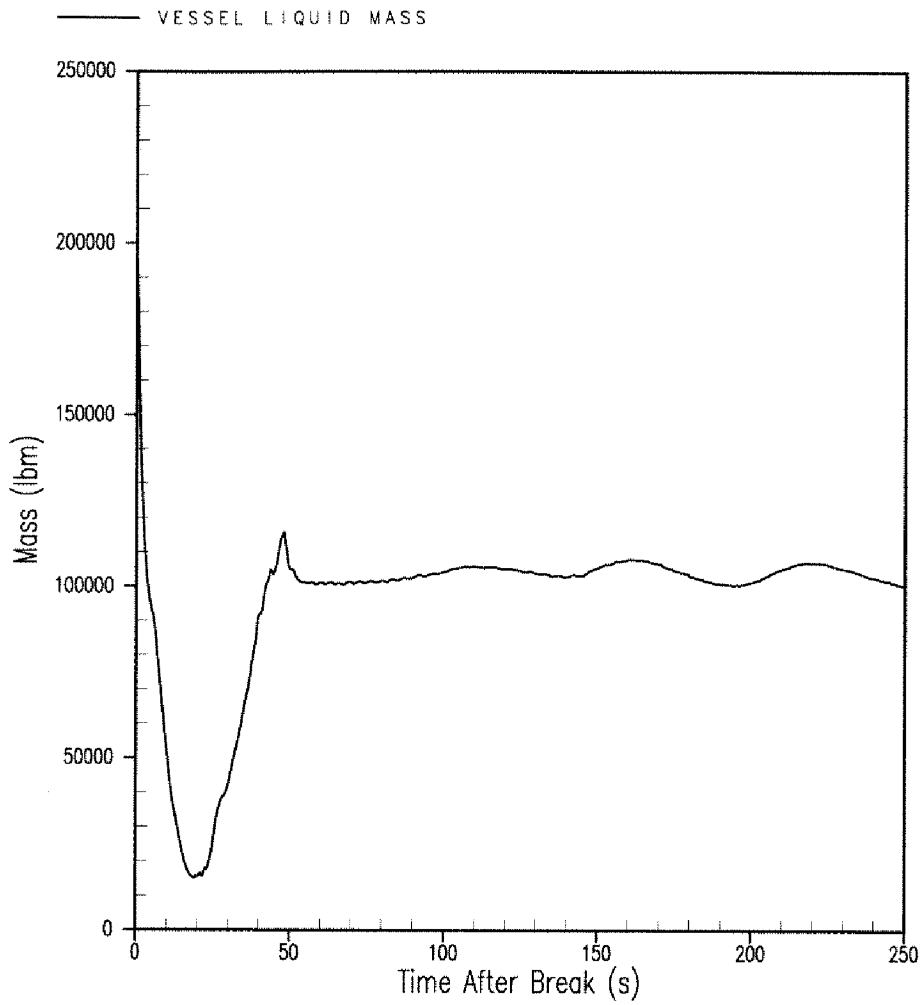
INDIAN POINT UNIT No. 3

COLLAPSED LIQUID LEVEL IN CORE CHANNELS FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

UFSAR FIGURE 14.3-12 | REV. No. 01



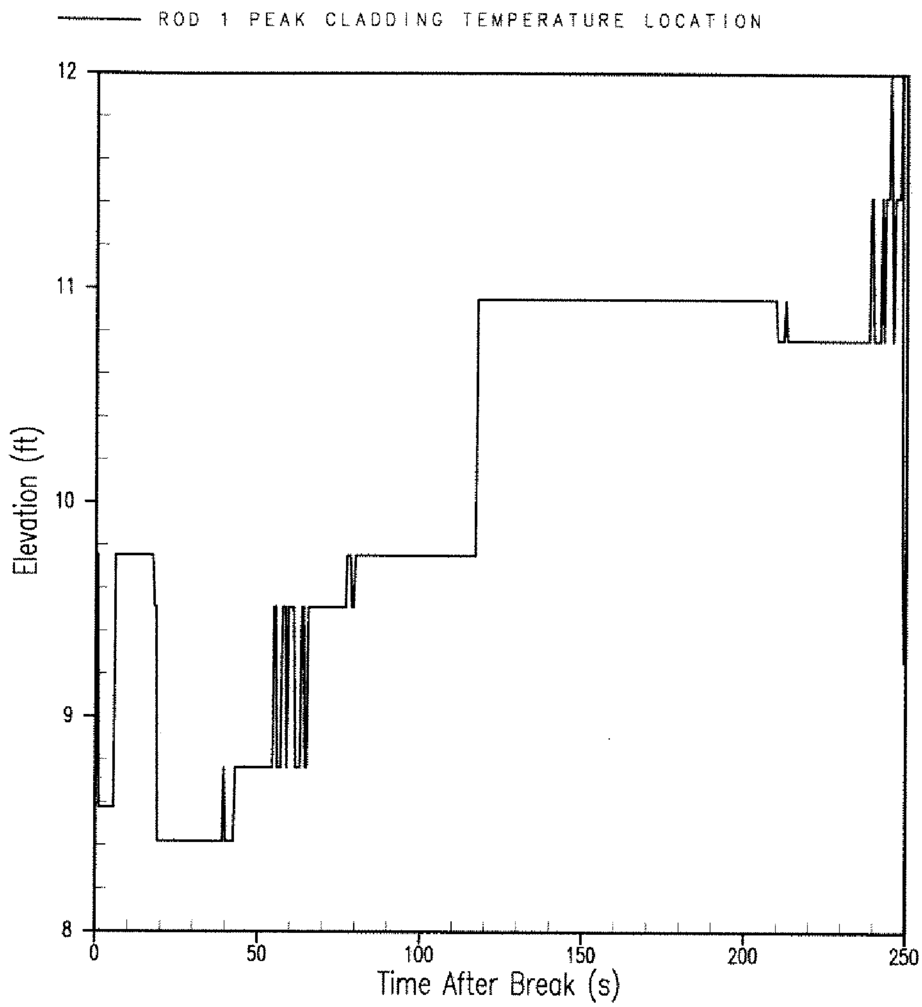
INDIAN POINT UNIT No. 3	
COLLAPSED LIQUID LEVEL IN DOWNCOMER CHANNELS FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT–BEST ESTIMATE LBLOCA	
UFSAR FIGURE 14.3–13	REV. No. 01



INDIAN POINT UNIT No. 3

VESSEL FLUID MASS FOR
INDIAN POINT 3 NUCLEAR POWER PLANT
REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

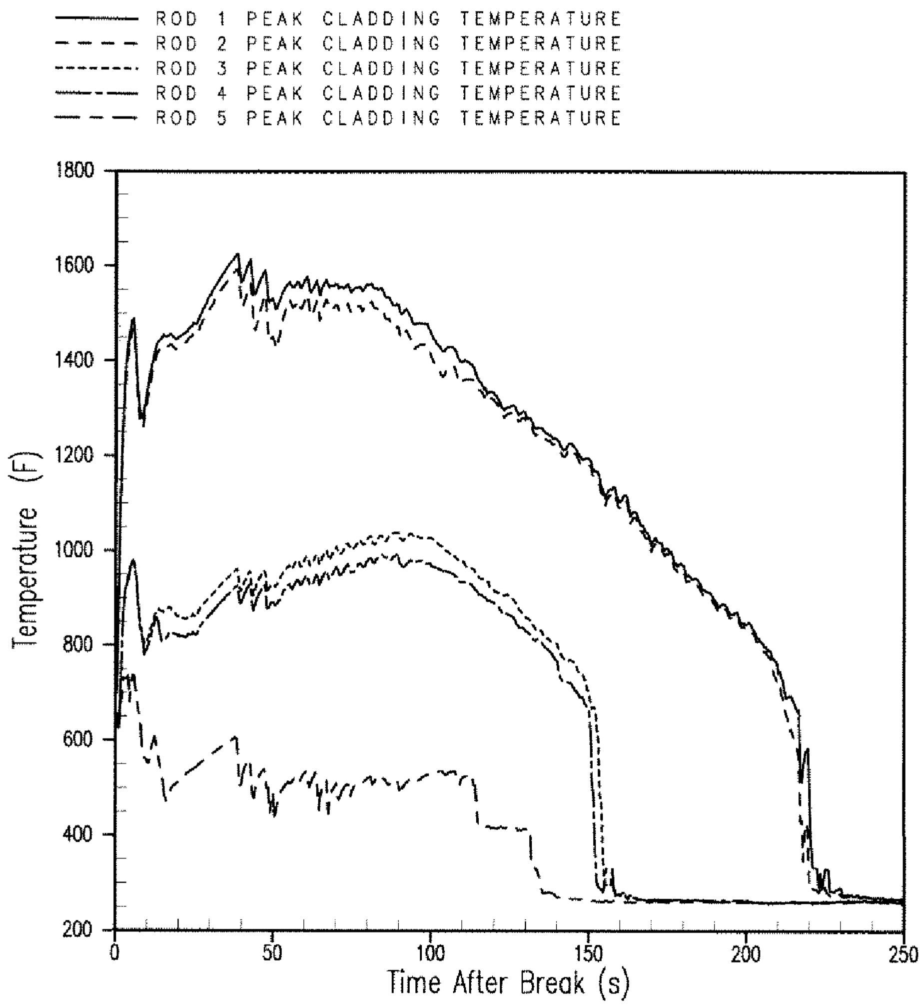
UFSAR FIGURE 14.3-14	REV. No. 01



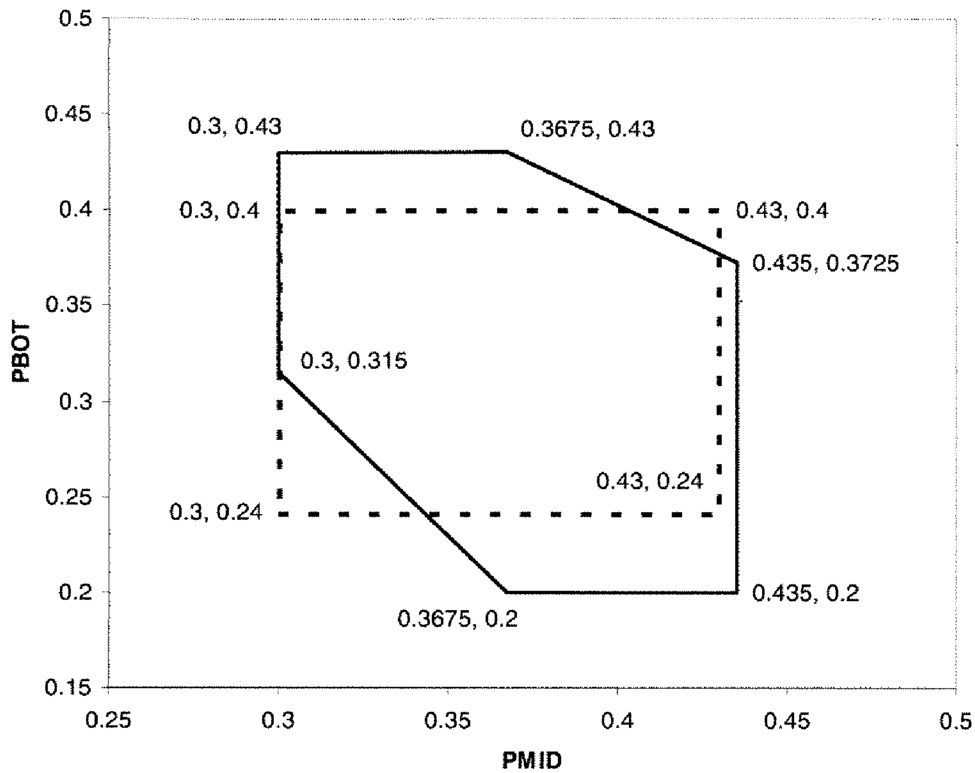
INDIAN POINT UNIT No. 3

PEAK CLADDING TEMPERATURE LOCATION FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA

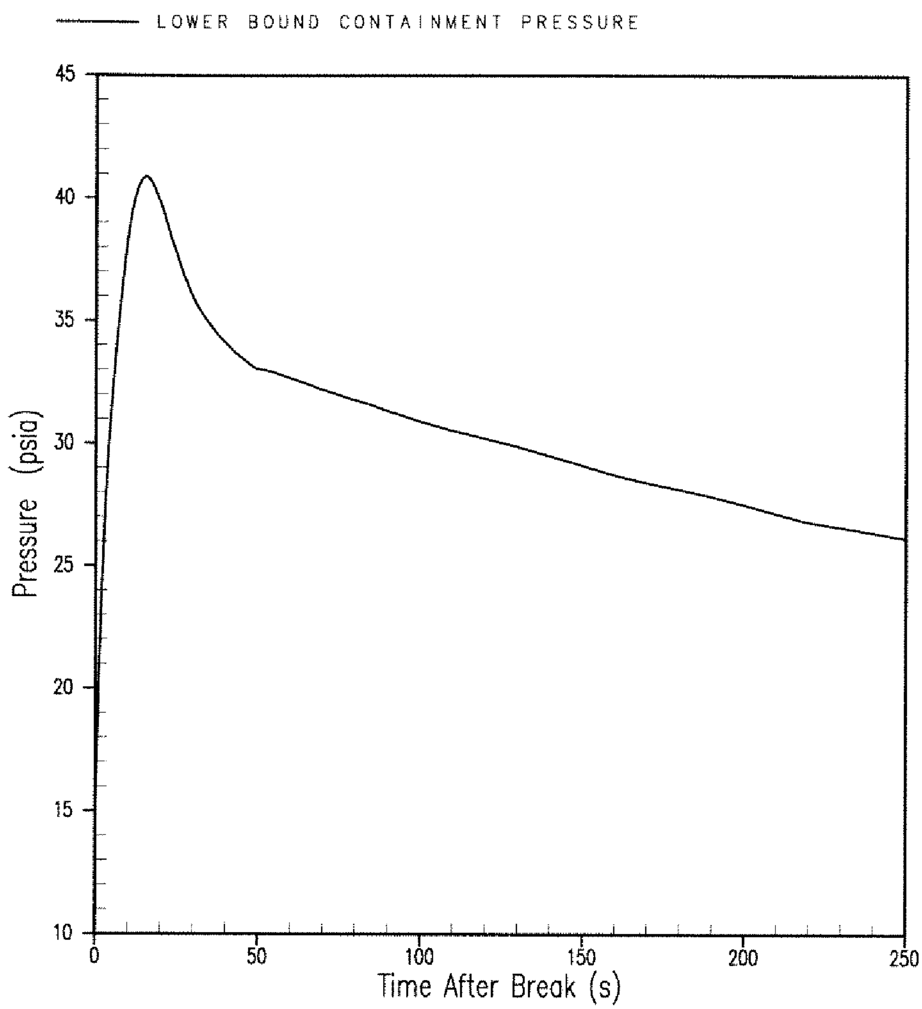
UFSAR FIGURE 14.3-15	REV. No. 01



INDIAN POINT UNIT No. 3	
PEAK CLADDING TEMPERATURE COMPARISION FOR FIVE RODS FOR INDIAN POINT 3 NUCLEAR POWER PLANT REFERENCE TRANSIENT-BEST ESTIMATE LBLOCA	
UFSAR FIGURE 14.3-16	REV. No. 01



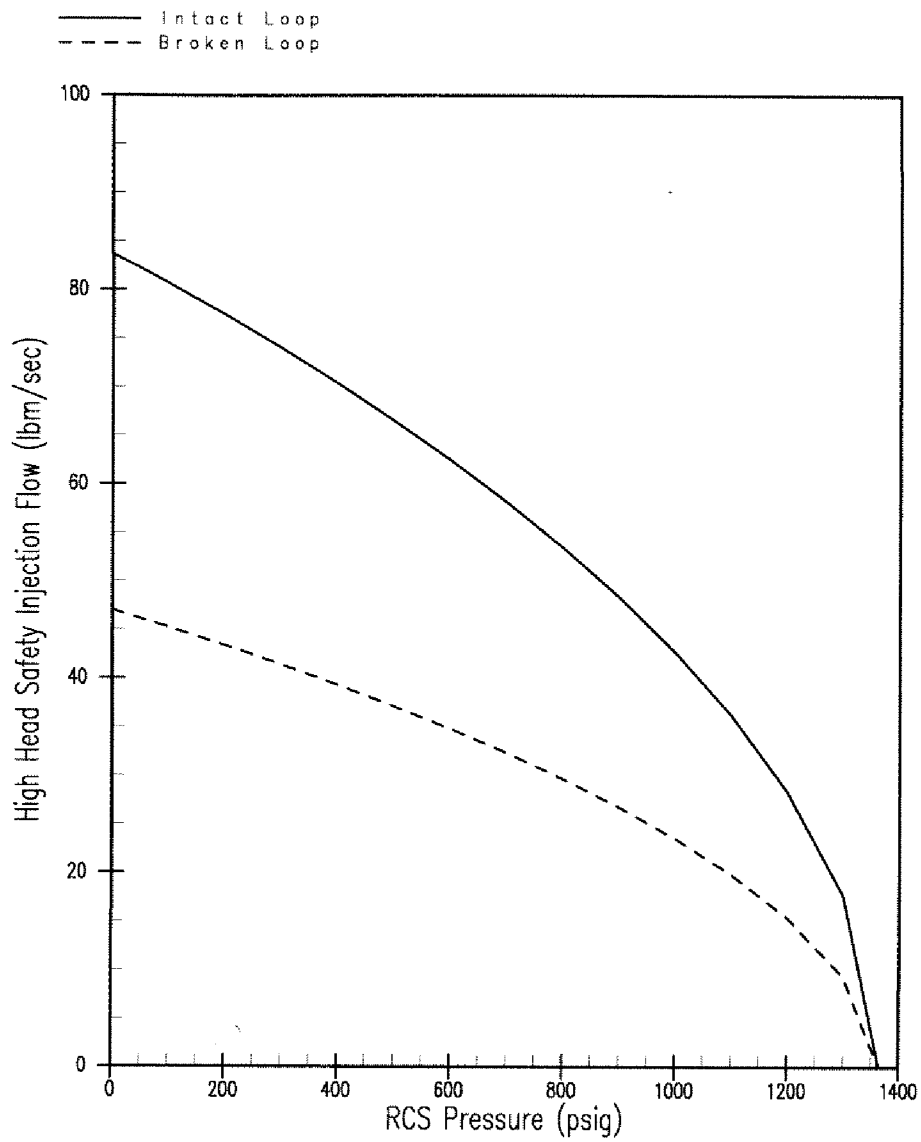
INDIAN POINT UNIT No. 3	
PBOT/PMID SAMPLING LIMITS (PLANT OPERATING RANGE INDICATED BY DASHED LINE; WCOBRA/TRAC RESPONSE SURFACE RANGE INDICATED BY SOLID LINE.) FOR INDIAN POINT 3 NUCLEAR POWER PLANT-BEST ESTIMATE LBLOCA	
UFSAR FIGURE 14.3-17	REV. No. 01



INDIAN POINT UNIT No. 3

LOWER BOUND CONTAINMENT PRESSURE
FOR INDIAN POINT 3 NUCLEAR POWER PLANT
BEST ESTIMATE LBLOCA

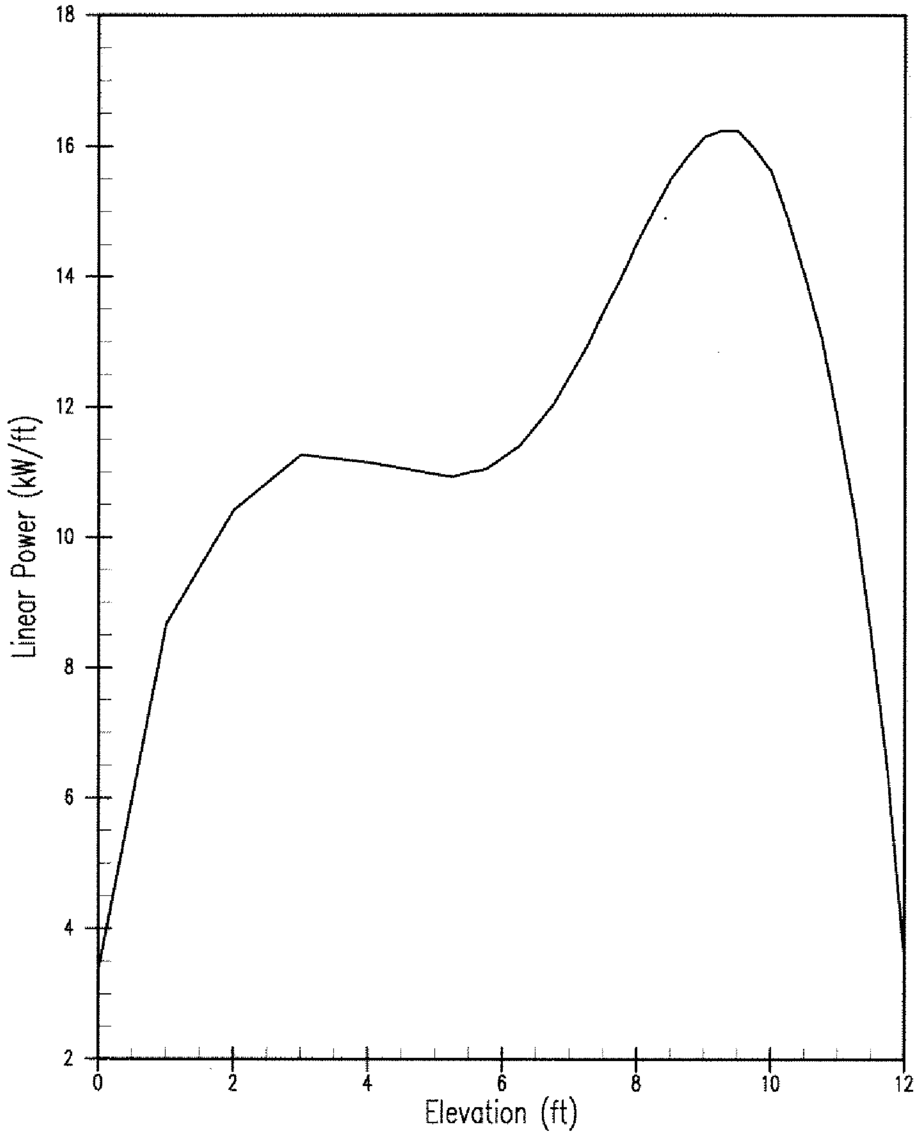
UFSAR FIGURE 14.3-18	REV. No. 01



INDIAN POINT UNIT No. 3

HIGH HEAD SAFETY INJECTION FLOW RATE

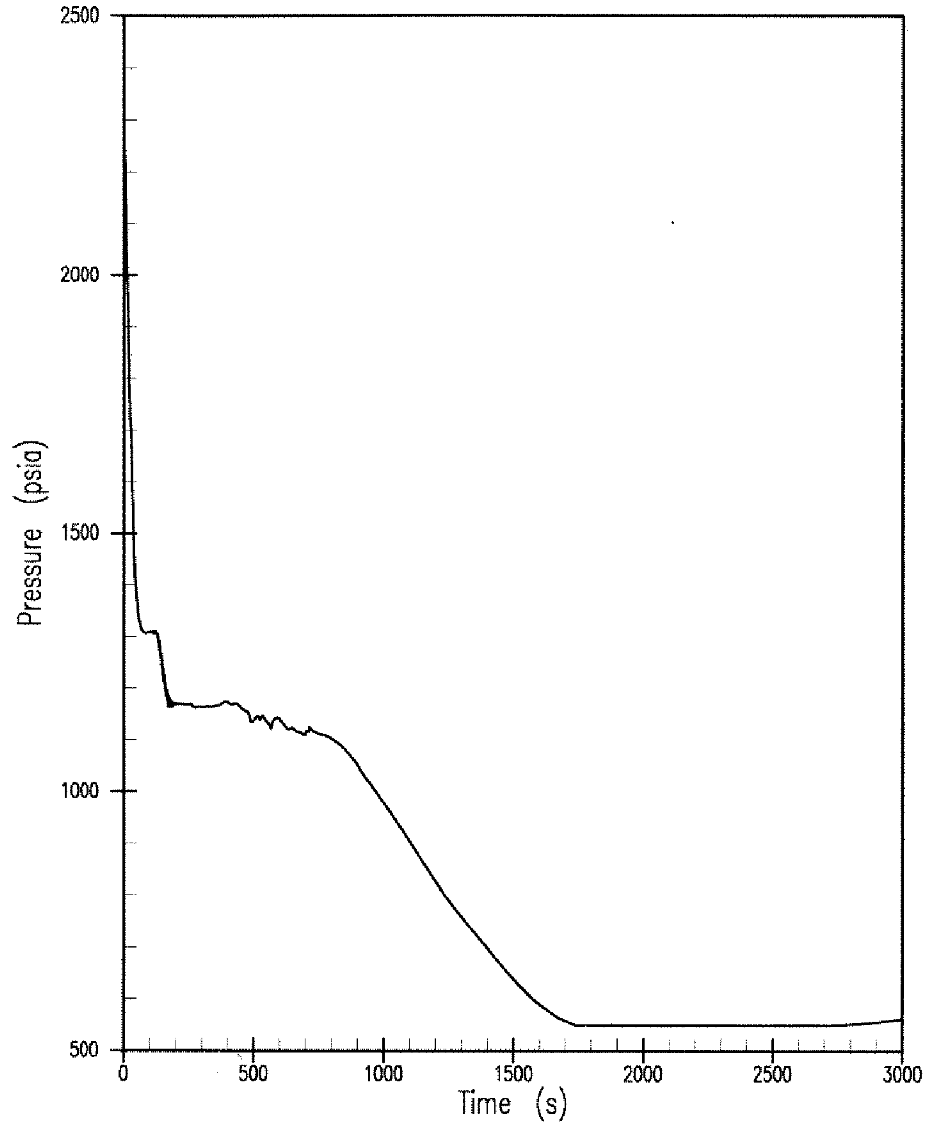
UFSAR FIGURE 14.3-51 | REV. No. 01



INDIAN POINT UNIT No. 3

SMALL BREAK LOCA AXIAL POWER SHAPE

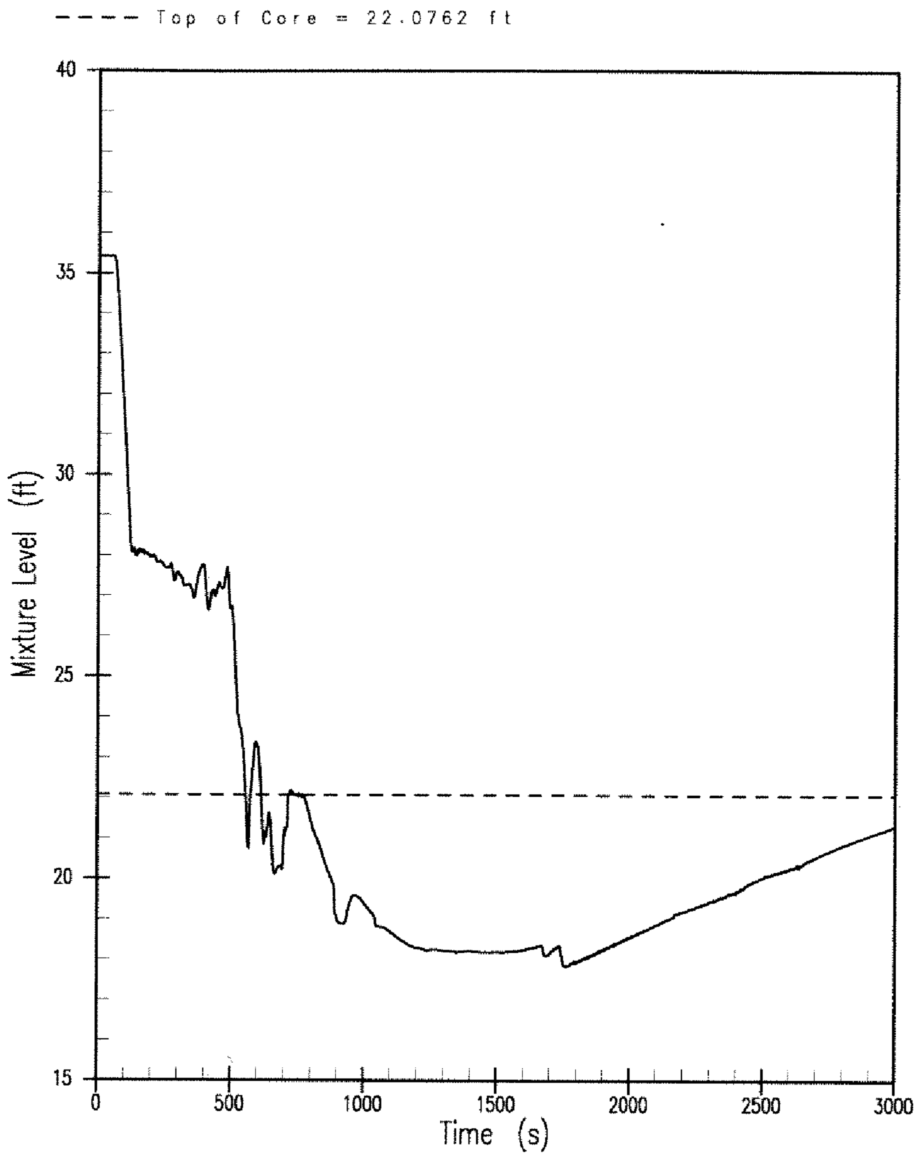
UFSAR FIGURE 14.3-52 | REV. No. 01



INDIAN POINT UNIT No. 3

3" SMALL BREAK LOCA RCS PRESSURE

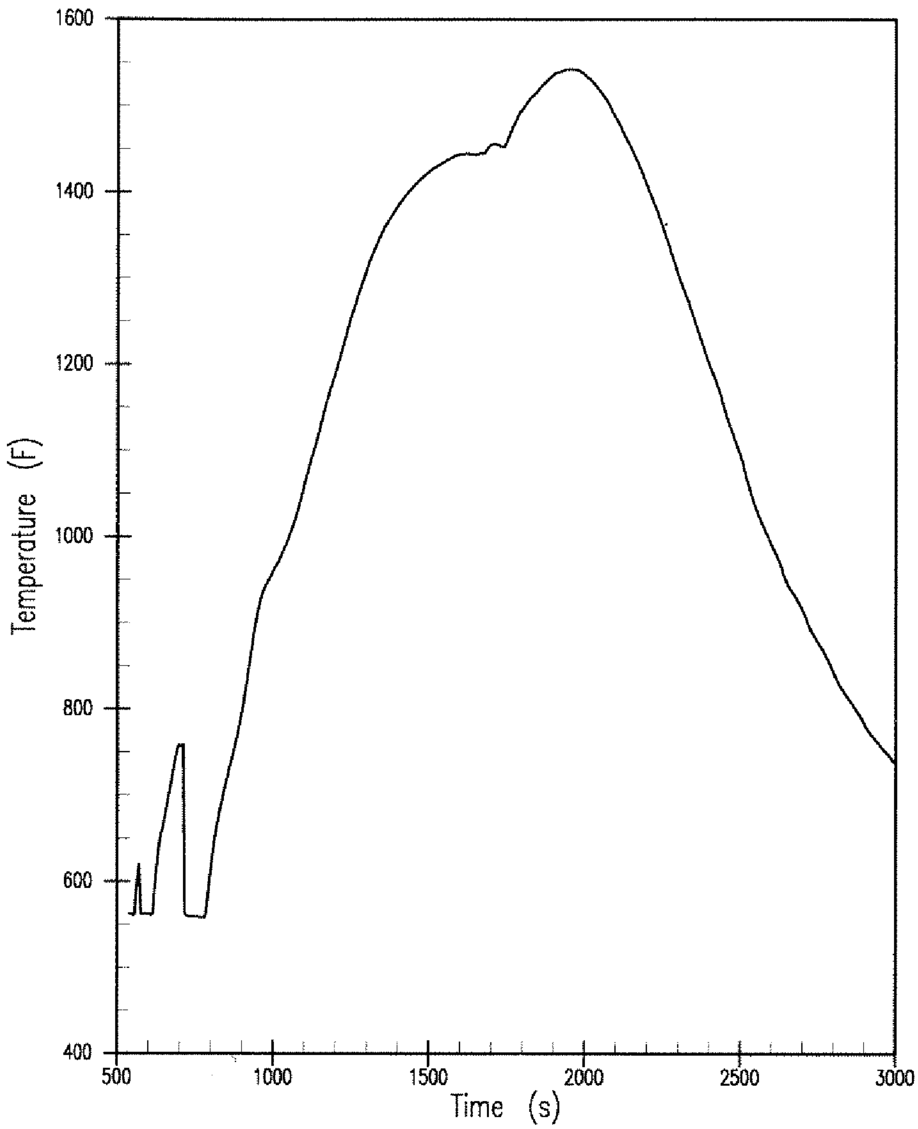
UFSAR FIGURE 14.3-53 | REV. No. 01



INDIAN POINT UNIT No. 3

3" SMALL BREAK LOCA CORE MIXTURE LEVEL

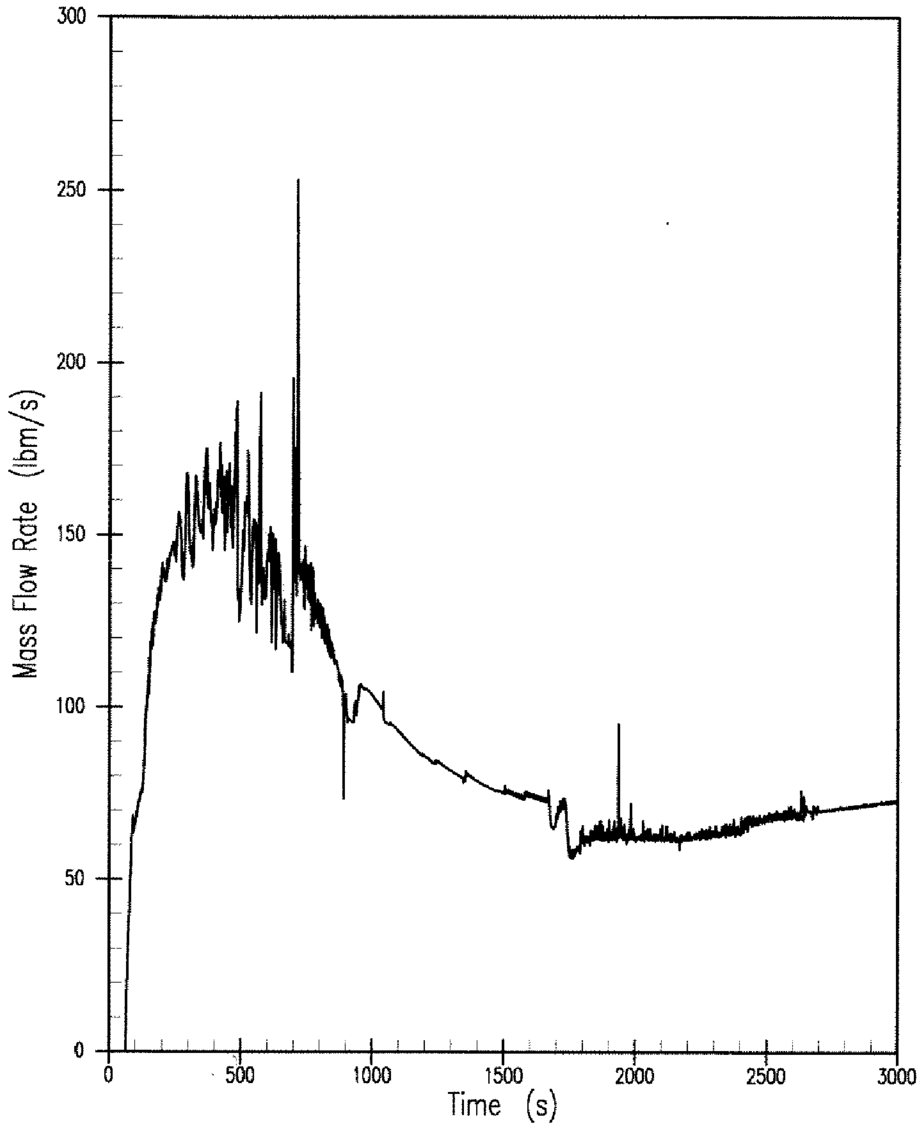
UFSAR FIGURE 14.3-54 | REV. No. 01



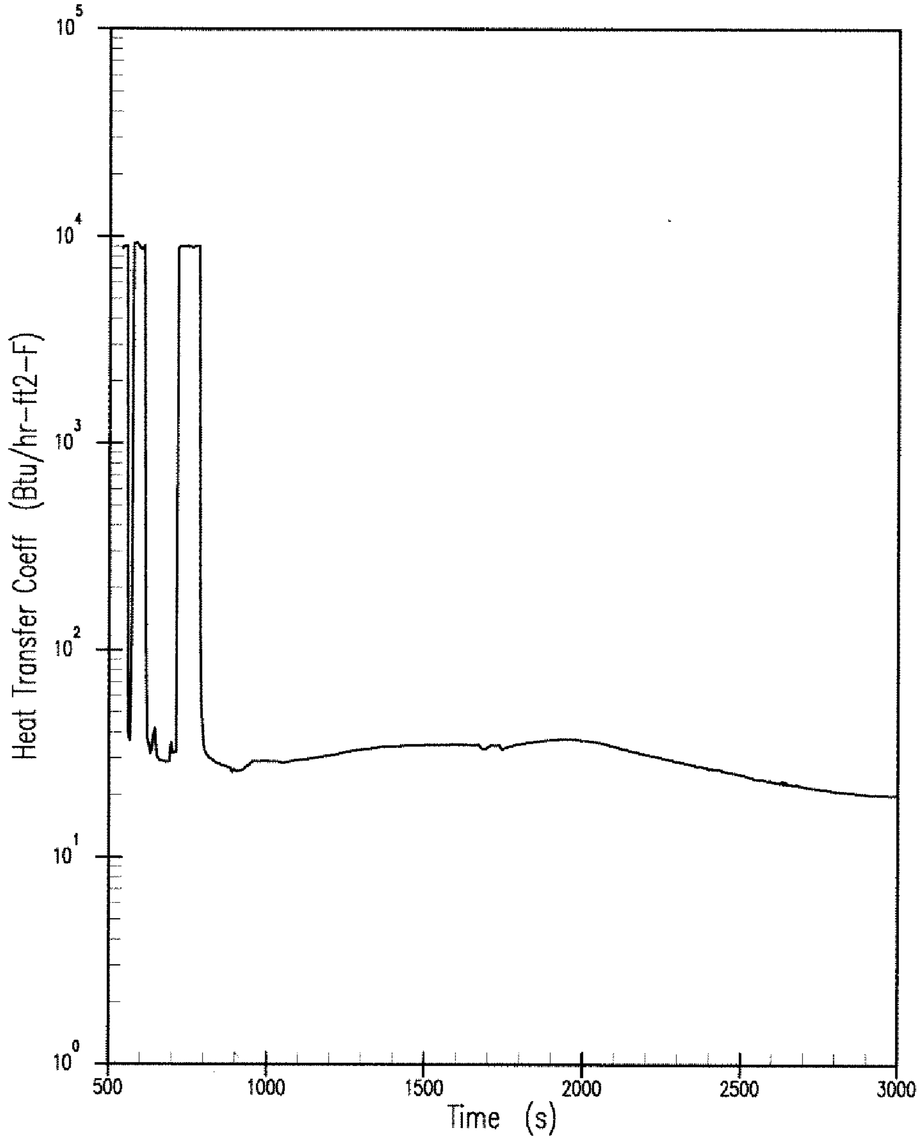
INDIAN POINT UNIT No. 3

3" SMALL BREAK LOCA HOT ROD CLADDING TEMPERATURE

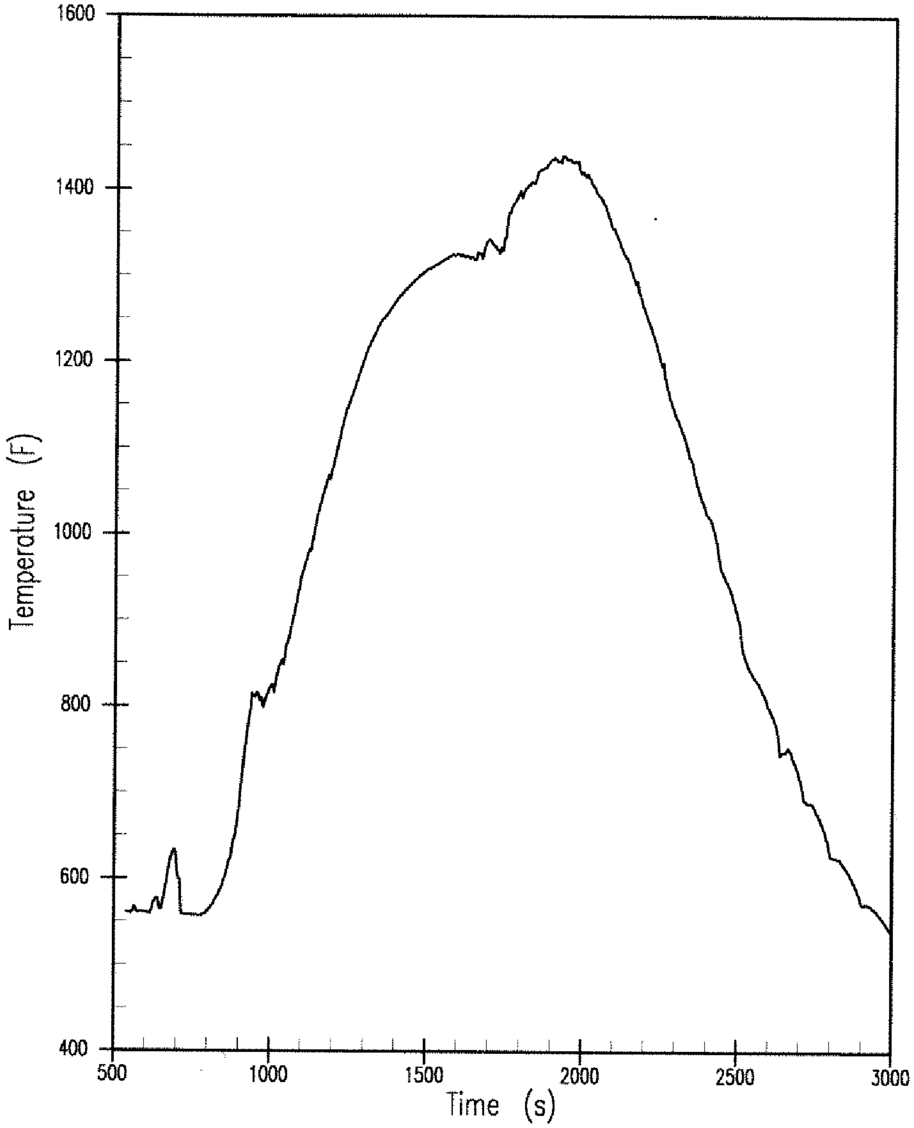
UFSAR FIGURE 14.3-55	REV. No. 01



INDIAN POINT UNIT No. 3	
3" SMALL BREAK LOCA CORE OUTLET STEAM FLOW RATE	
UFSAR FIGURE 14.3-56	REV. No. 01



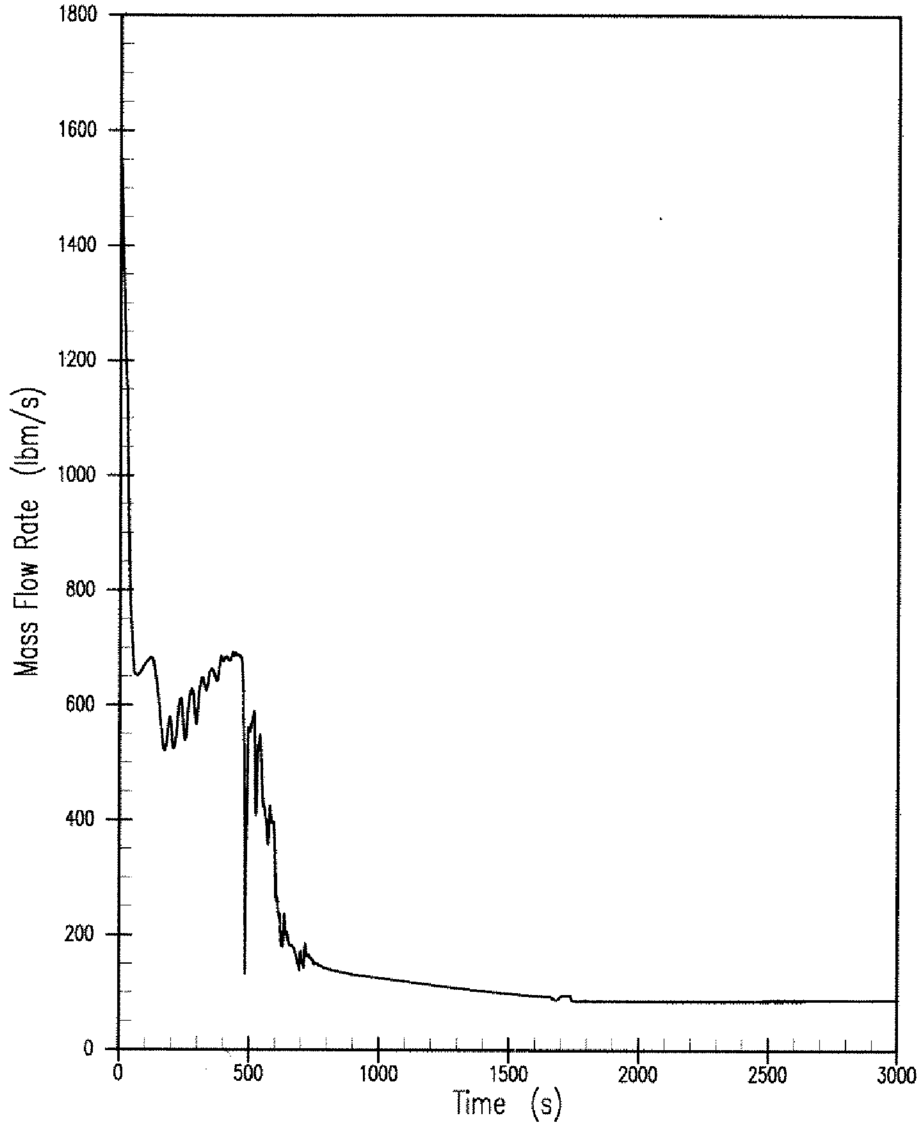
INDIAN POINT UNIT No. 3	
3" SMALL BREAK LOCA HOT ASSEMBLY ROD SURFACE HEAT TRANSFER COEFFICIENT	
UFSAR FIGURE 14.3-57	REV. No. 01



INDIAN POINT UNIT No. 3

3" SMALL BREAK LOCA HOT SPOT FLUID TEMPERATURE

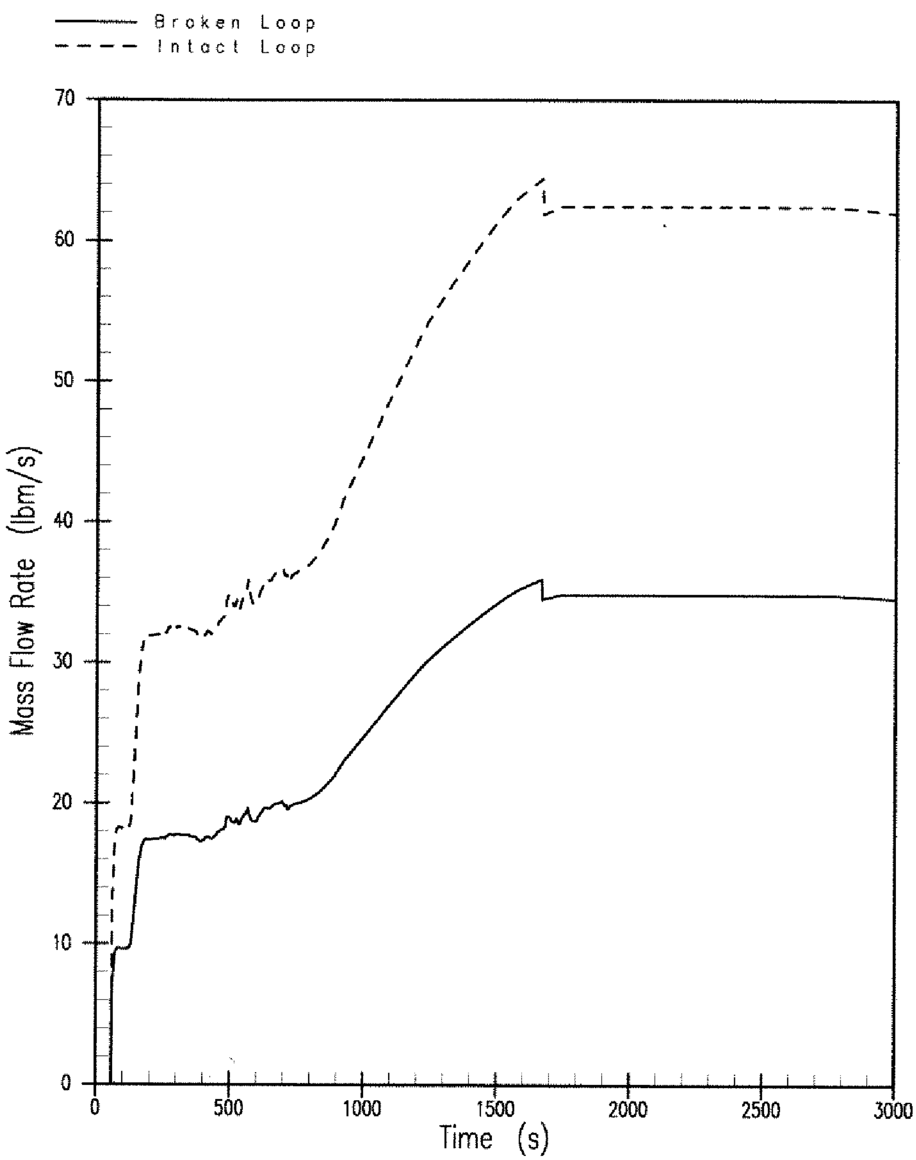
UFSAR FIGURE 14.3-58 | REV. No. 01



INDIAN POINT UNIT No. 3

3" SMALL BREAK LOCA BREAK FLOW RATE

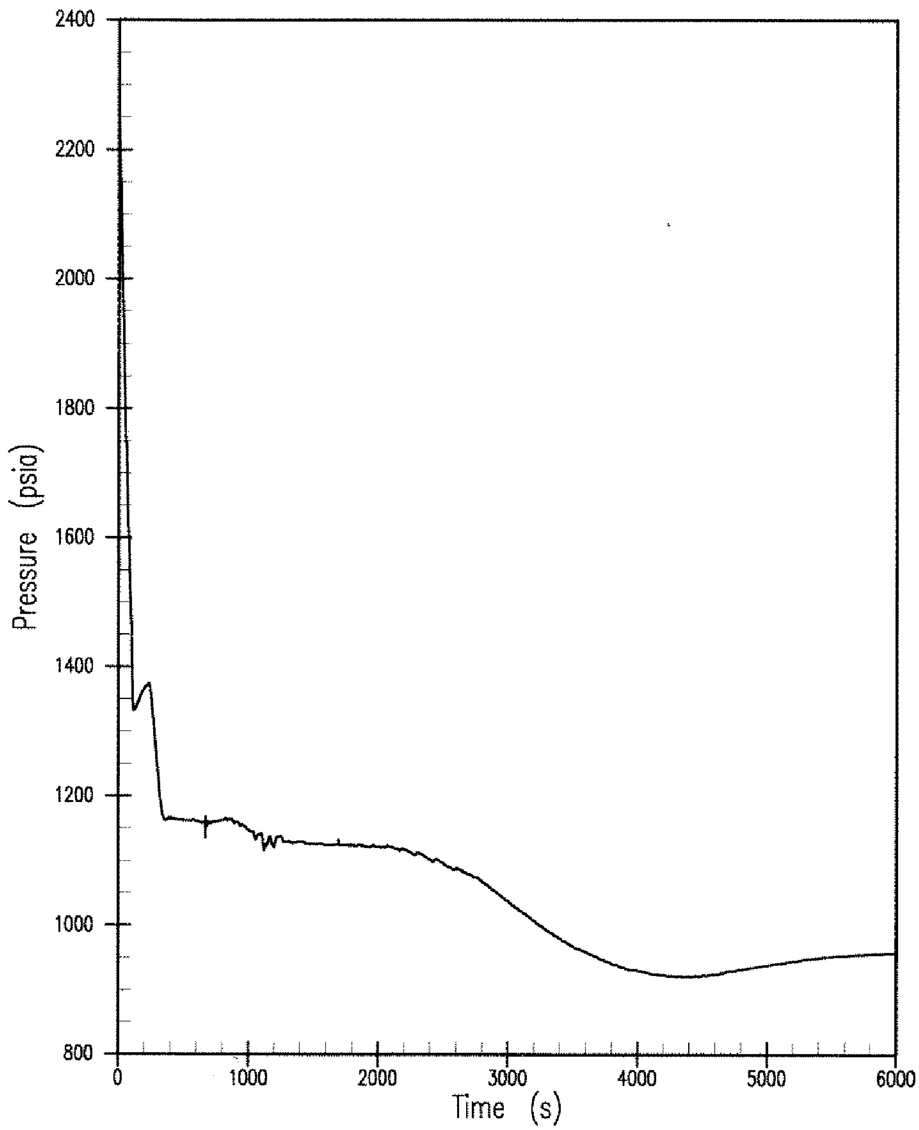
UFSAR FIGURE 14.3-59	REV. No. 01



INDIAN POINT UNIT No. 3

3" SMALL BREAK LOCA SAFETY INJECTION MASS FLOW RATE

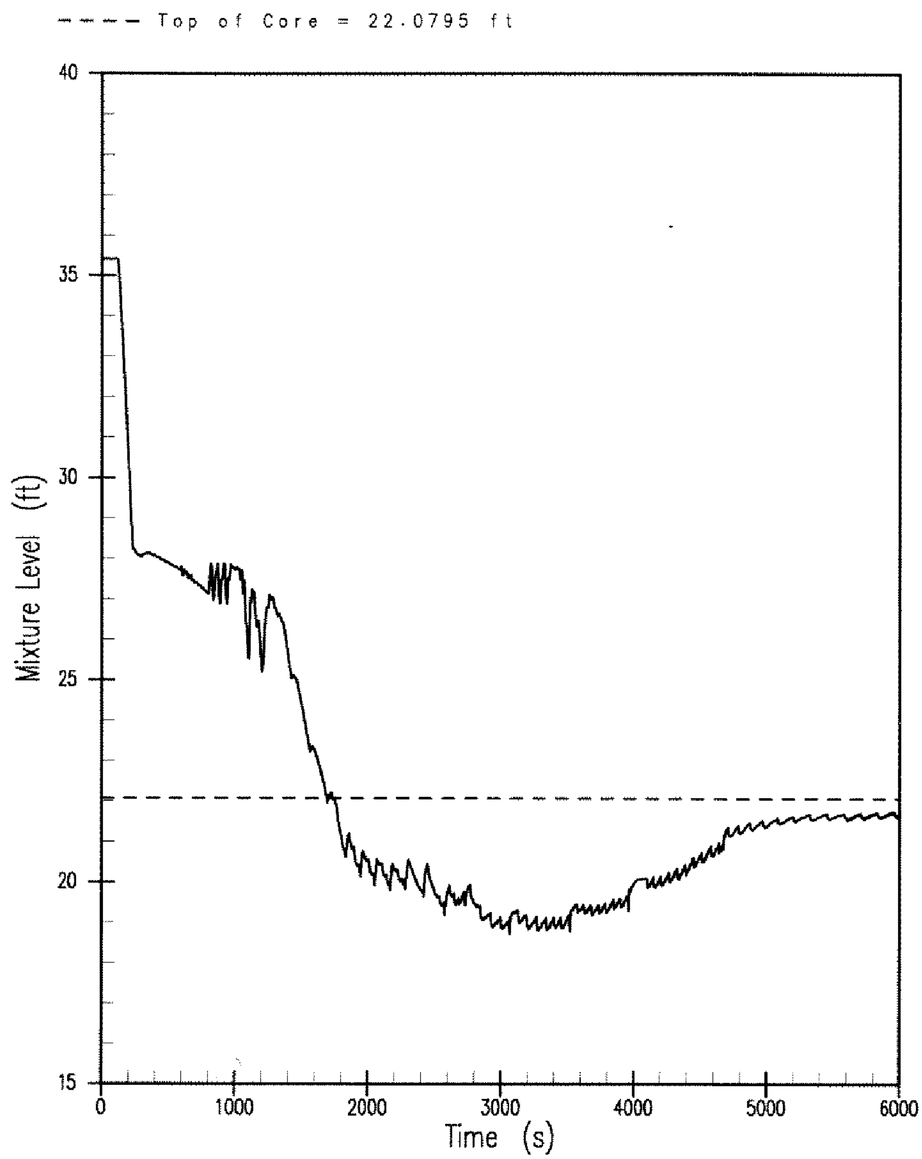
UFSAR FIGURE 14.3-60 | REV. No. 01



INDIAN POINT UNIT No. 3

2" SMALL BREAK LOCA RCS PRESSURE

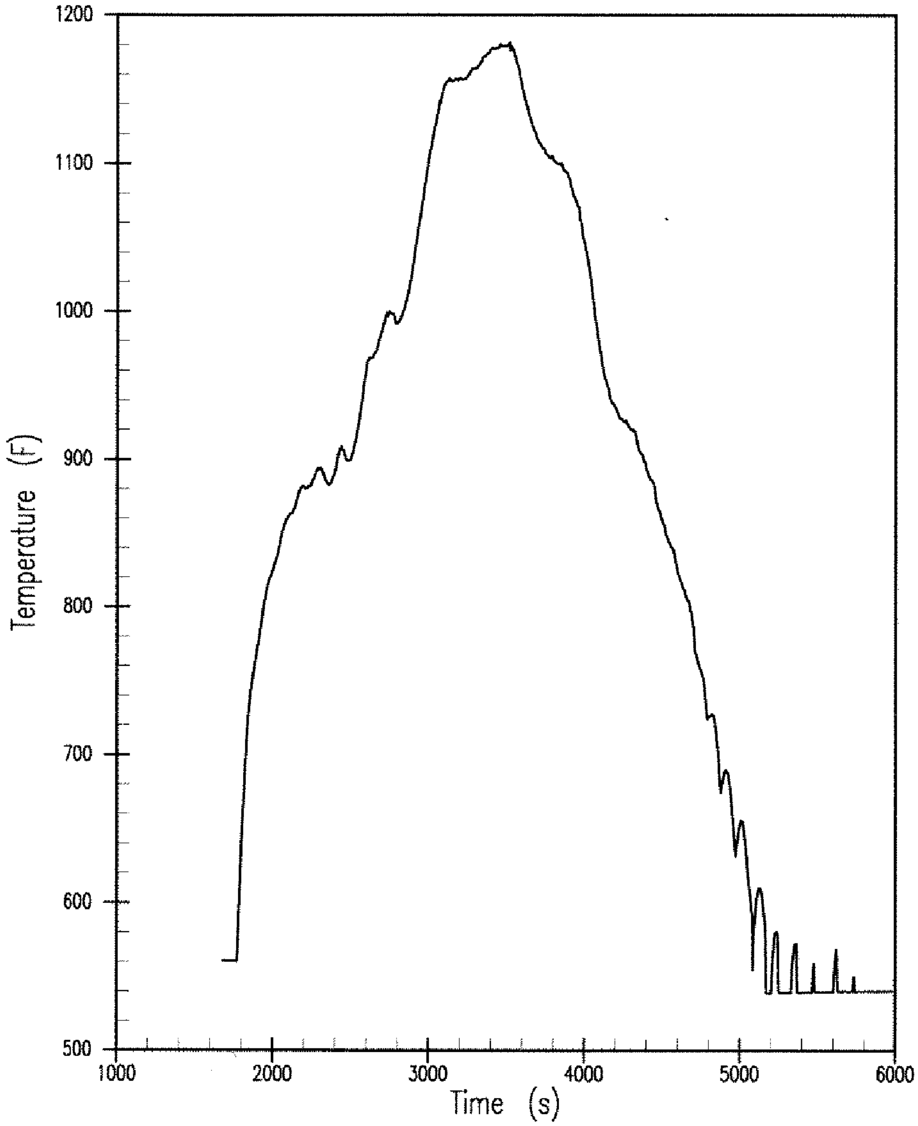
UFSAR FIGURE 14.3-61 | REV. No. 01



INDIAN POINT UNIT No. 3

2" SMALL BREAK LOCA CORE MIXTURE LEVEL

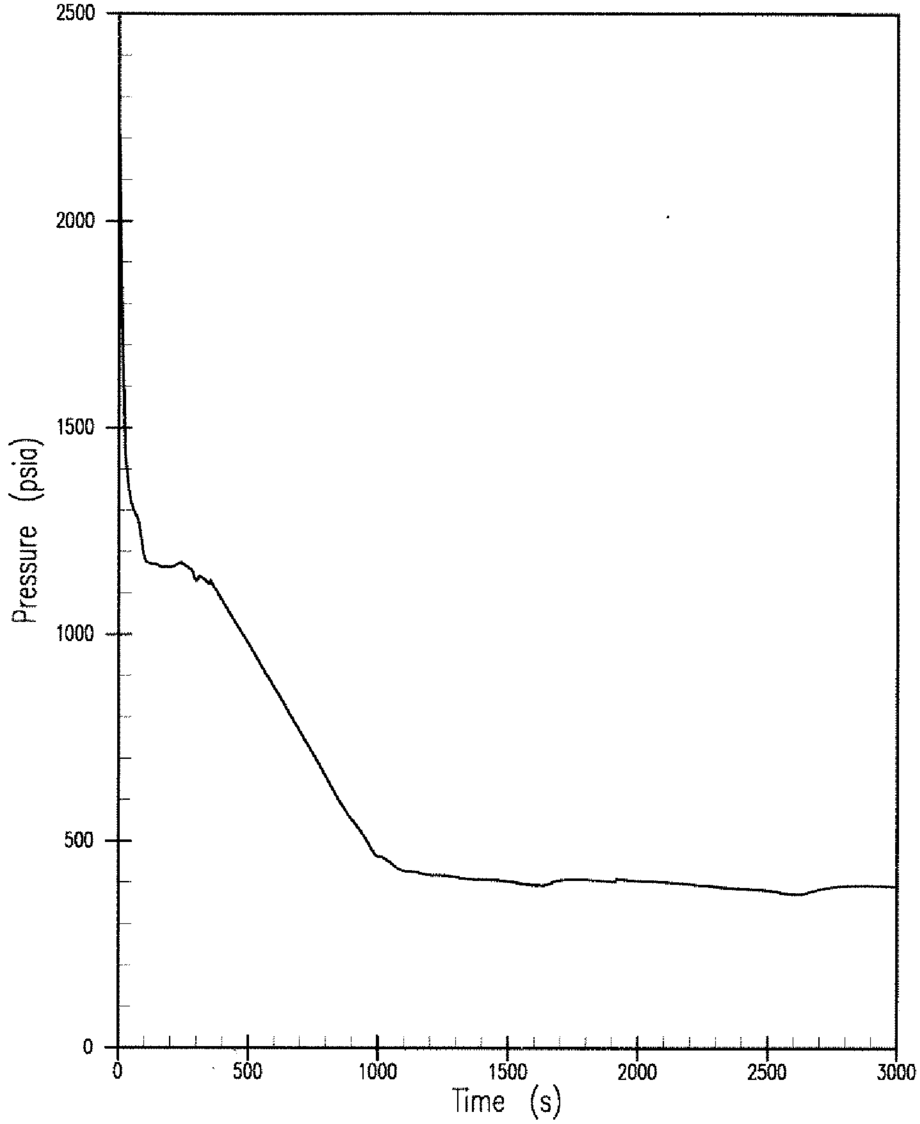
UFSAR FIGURE 14.3-62	REV. No. 01



INDIAN POINT UNIT No. 3

2" SMALL BREAK LOCA HOT ROD CLADDING TEMPERATURE

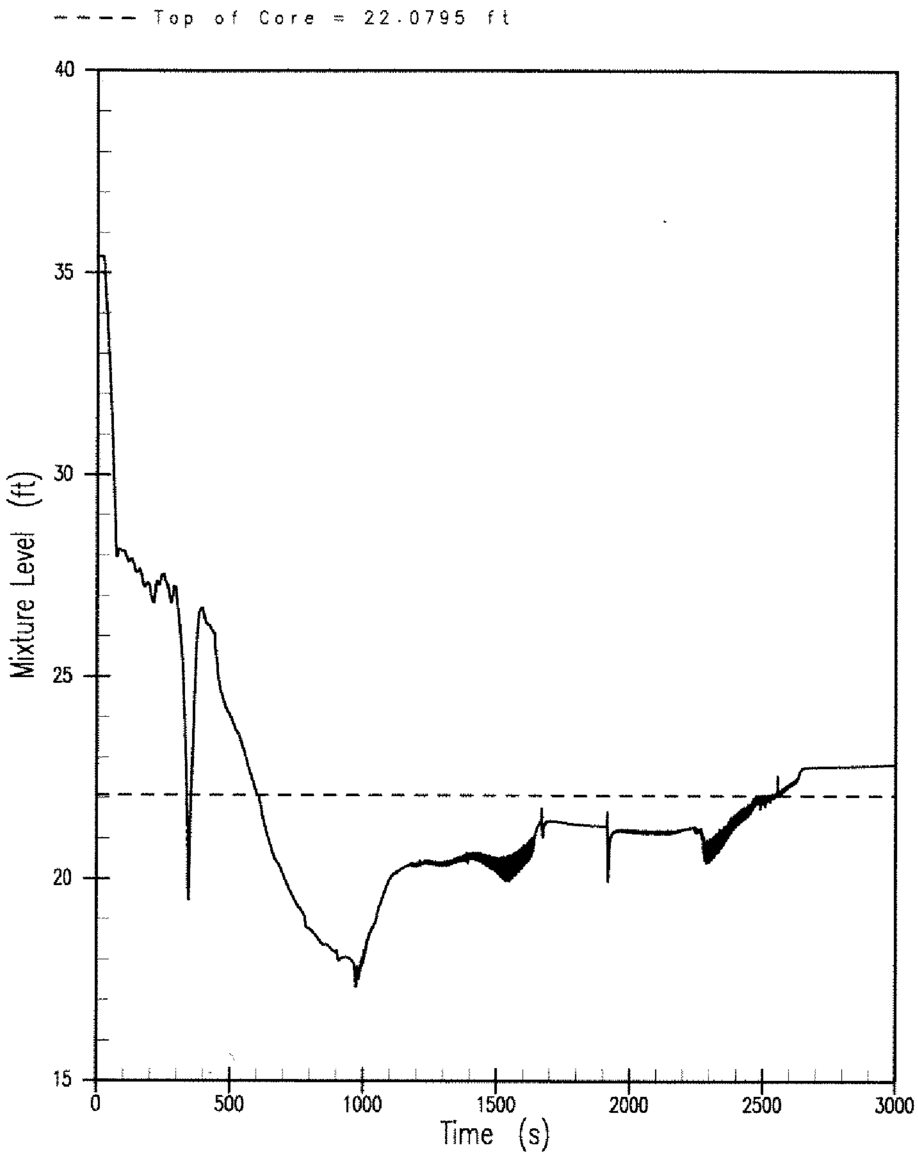
UFSAR FIGURE 14.3-63 | REV. No. 01



INDIAN POINT UNIT No. 3

4" SMALL BREAK LOCA RCS PRESSURE

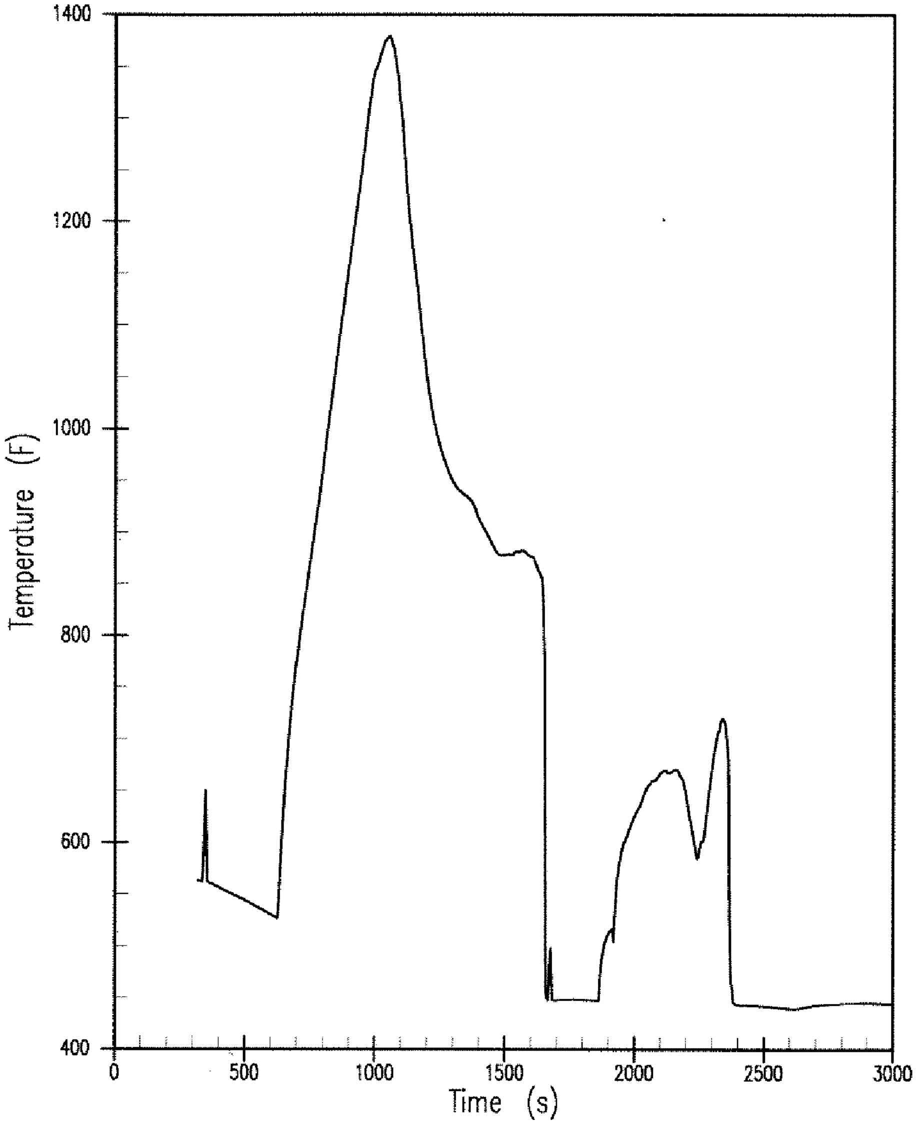
UFSAR FIGURE 14.3-64 | REV. No. 01



INDIAN POINT UNIT No. 3

4" SMALL BREAK LOCA CORE MIXTURE LEVEL

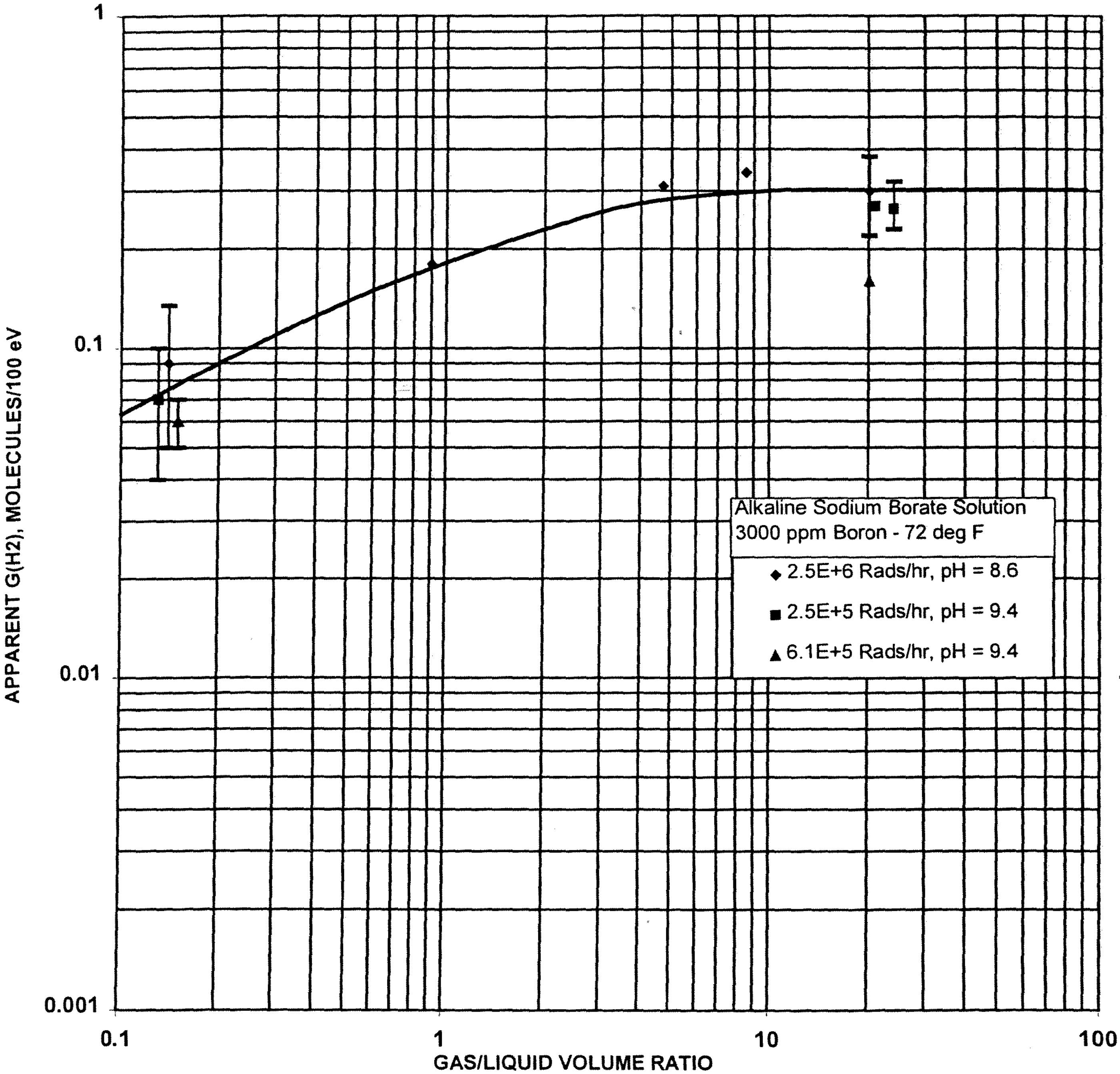
UFSAR FIGURE 14.3-65 | REV. No. 01



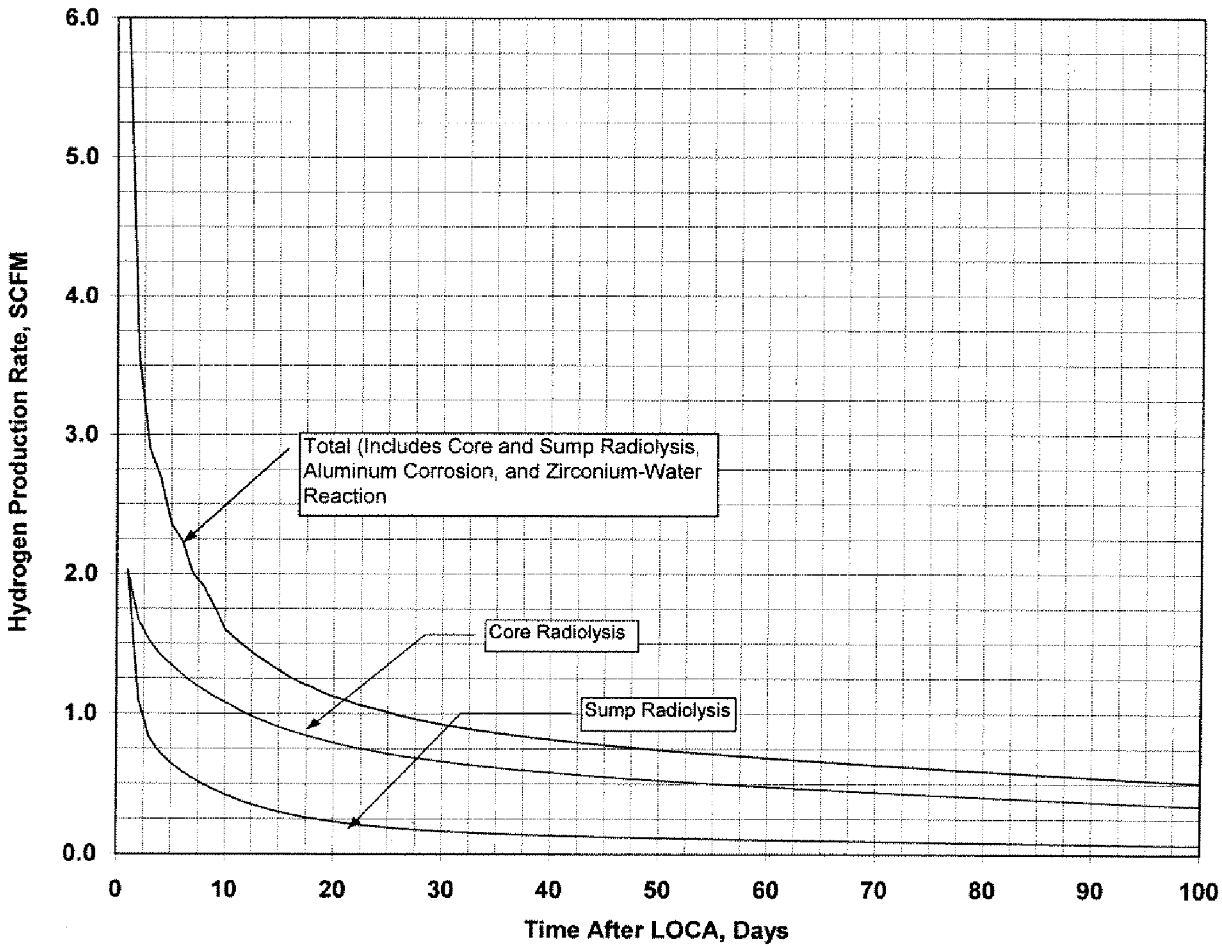
INDIAN POINT UNIT No. 3

4" SMALL BREAK LOCA HOT ROD CLADDING TEMPERATURE

UFSAR FIGURE 14.3-66 | REV. No. 01



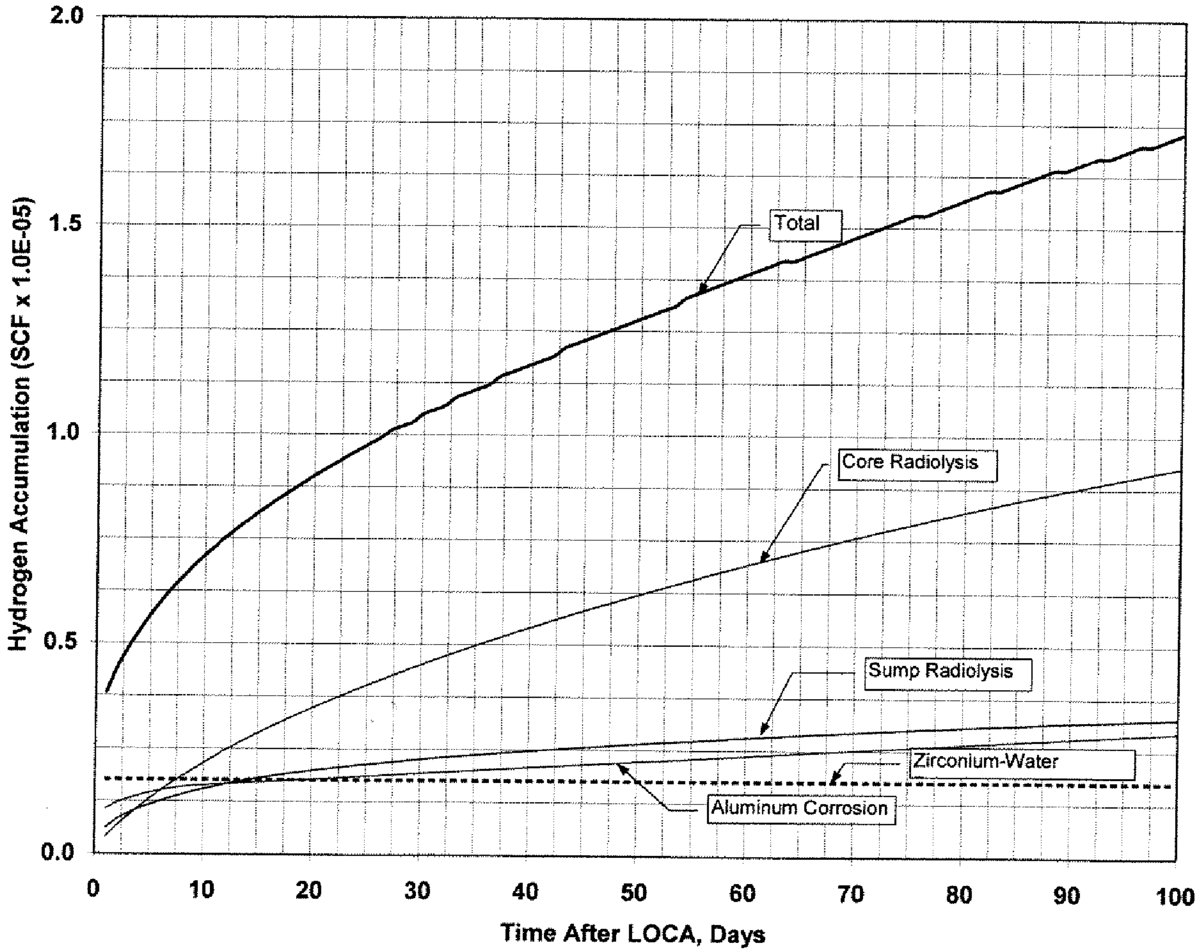
INDIAN POINT 3 FSAR UPDATE	
RESULTS OF WESTINGHOUSE CAPSULE IRRADIATION TESTS	
REV. 3 NOV 2001	FIG. NO. 14.3-74



INDIAN POINT UNIT No. 3

HYDROGEN PRODUCTION RATE
VERSUS TIME AFTER LOCA

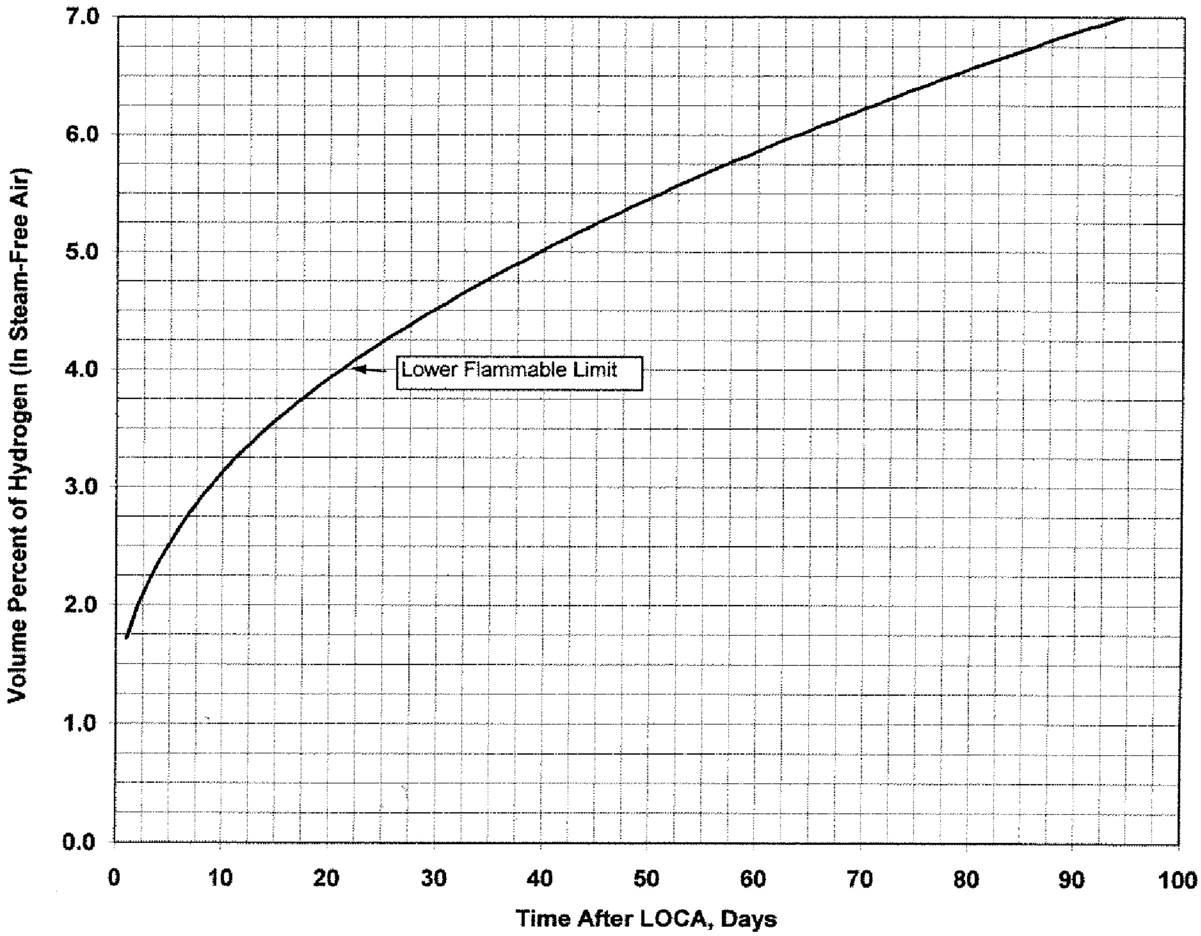
UFSAR FIGURE 14.3-75 | REV. No. 01



INDIAN POINT UNIT No. 3

TOTAL HYDROGEN ACCUMULATED FROM ALL SOURCES

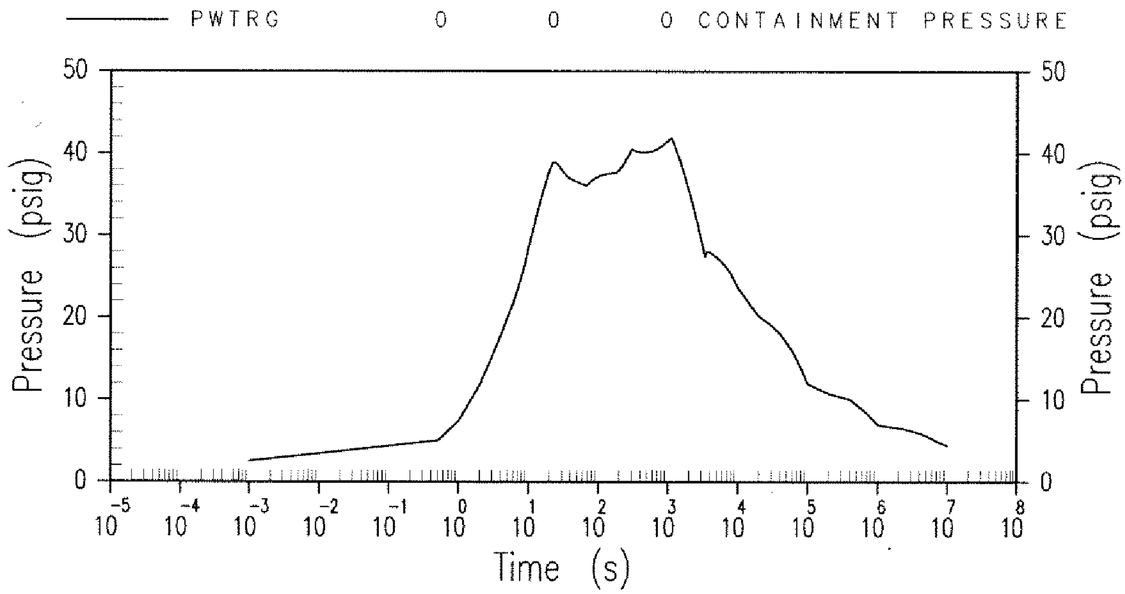
UFSAR FIGURE 14.3-77	REV. No. 01



INDIAN POINT UNIT No. 3

CONCENTRATION OF HYDROGEN IN CONTAINMENT

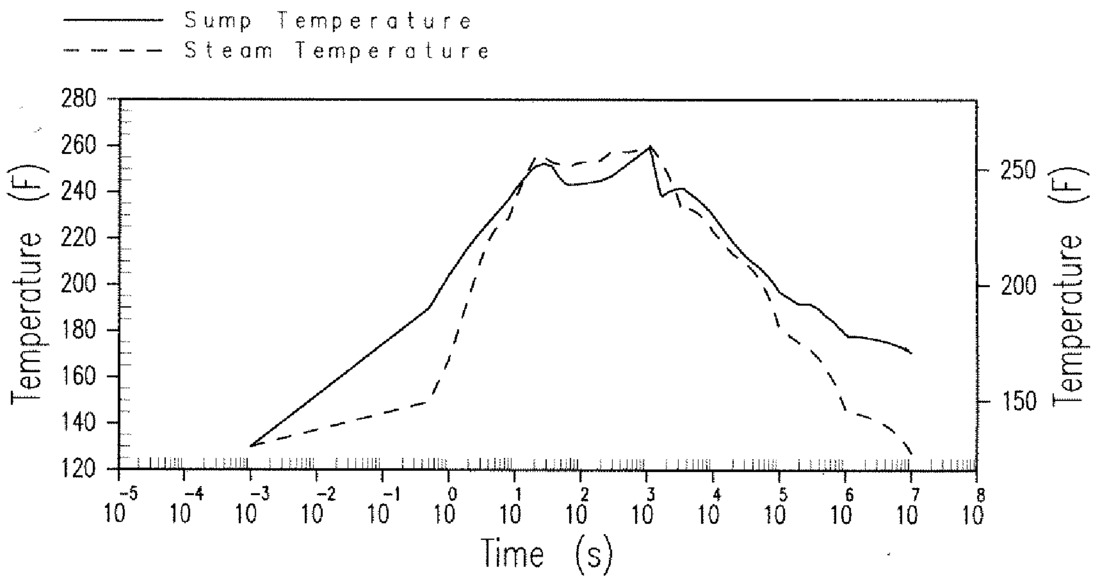
UFSAR FIGURE 14.3–79	REV. No. 01



INDIAN POINT UNIT No. 3

DOUBLE-ENDED PUMP SUCTION BREAK WITH MINIMUM SAFEGUARDS PRESSURE RESPONSE

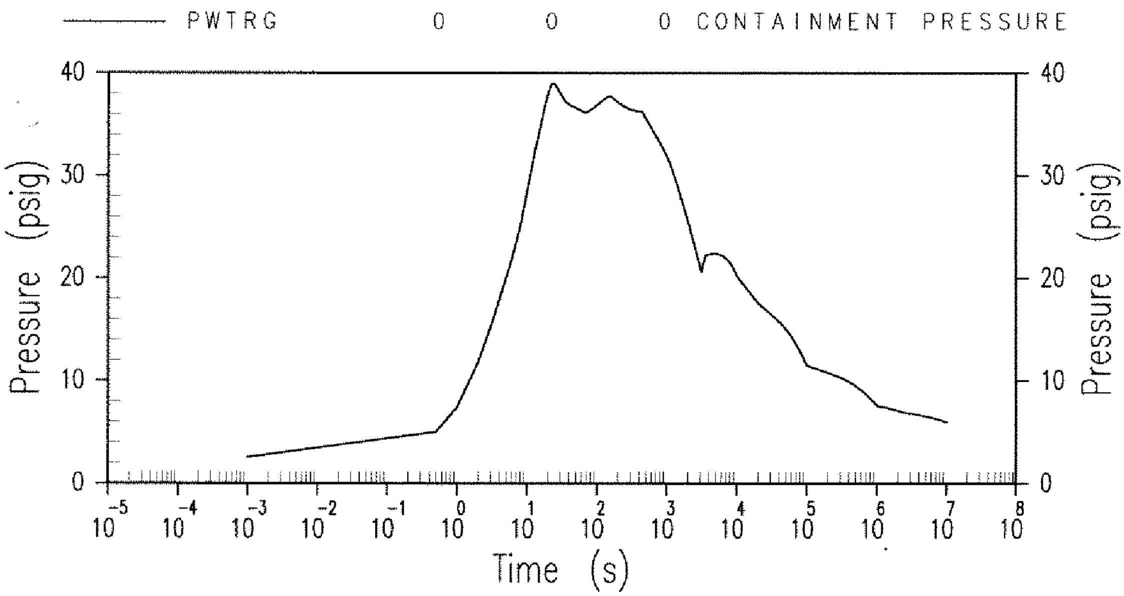
UFSAR FIGURE 14.3-83	REV. No. 01



INDIAN POINT UNIT No. 3

DOUBLE-ENDED PUMP SUCTION BREAK WITH MINIMUM SAFEGUARDS TEMPERATURE RESPONSE

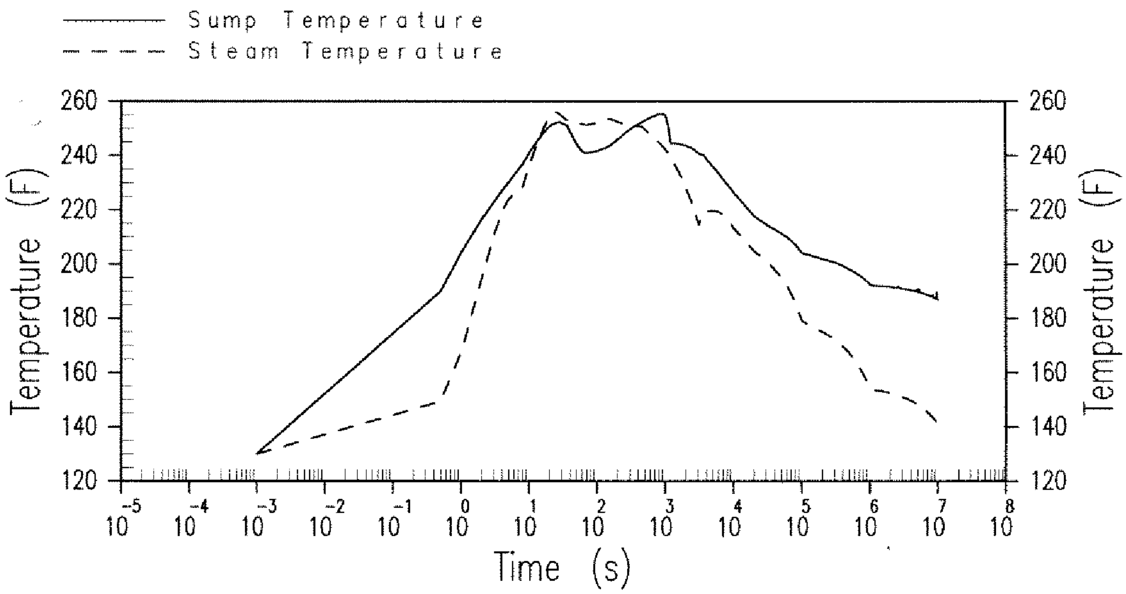
UFSAR FIGURE 14.3-84	REV. No. 01



INDIAN POINT UNIT No. 3

DOUBLE-ENDED PUMP SUCTION BREAK WITH MAXIMUM SAFEGUARDS PRESSURE RESPONSE

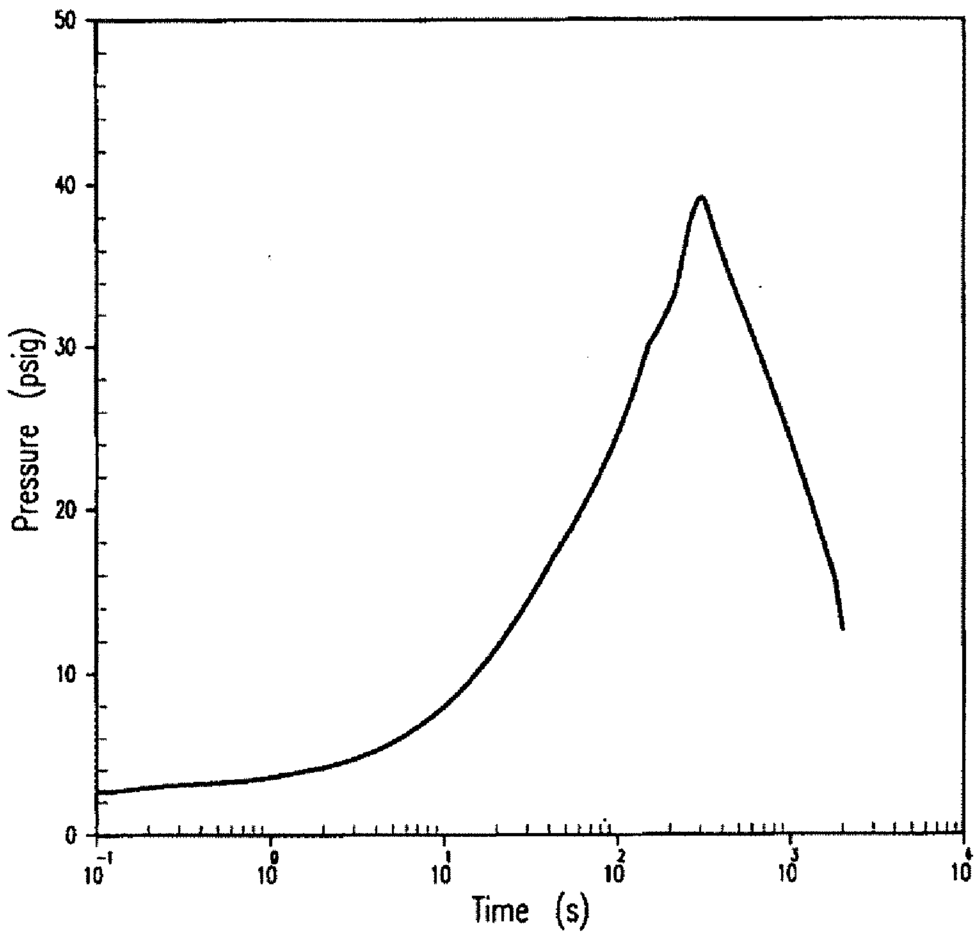
UFSAR FIGURE 14.3-85	REV. No. 01



INDIAN POINT UNIT No. 3

DOUBLE-ENDED PUMP SUCTION BREAK WITH MAXIMUM SAFEGUARDS TEMPERATURE RESPONSE

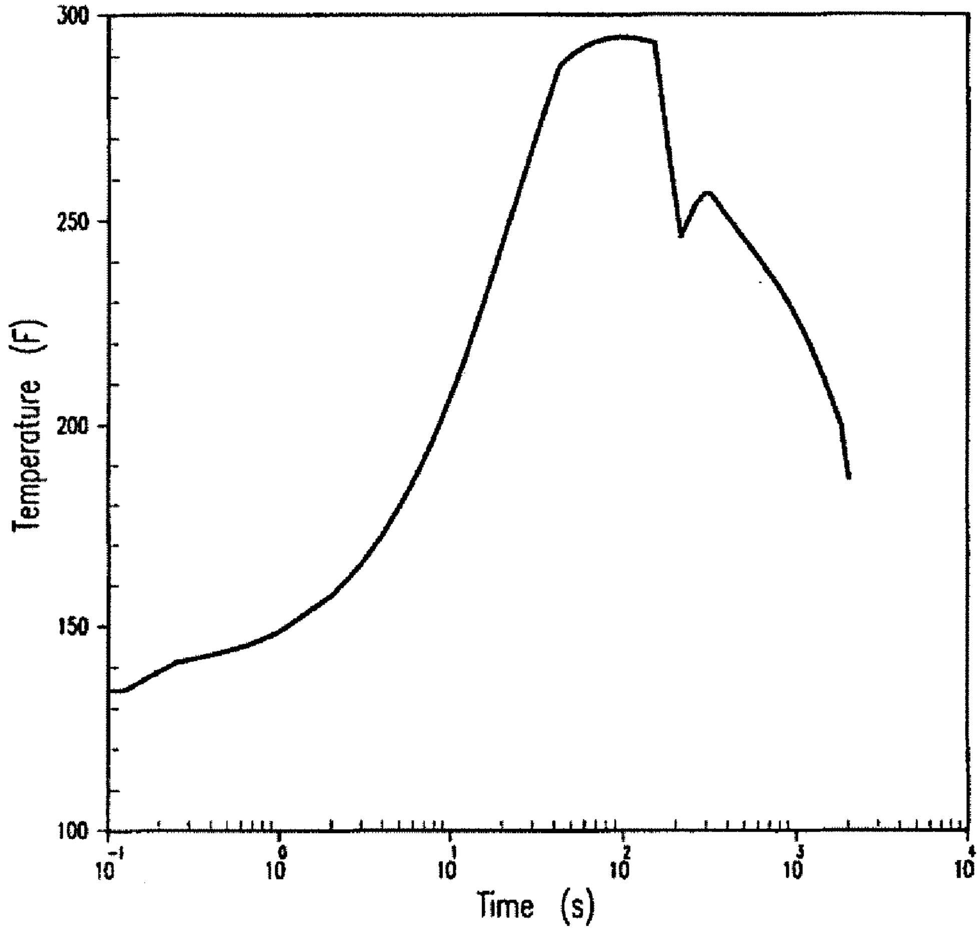
UFSAR FIGURE 14.3-86	REV. No. 01



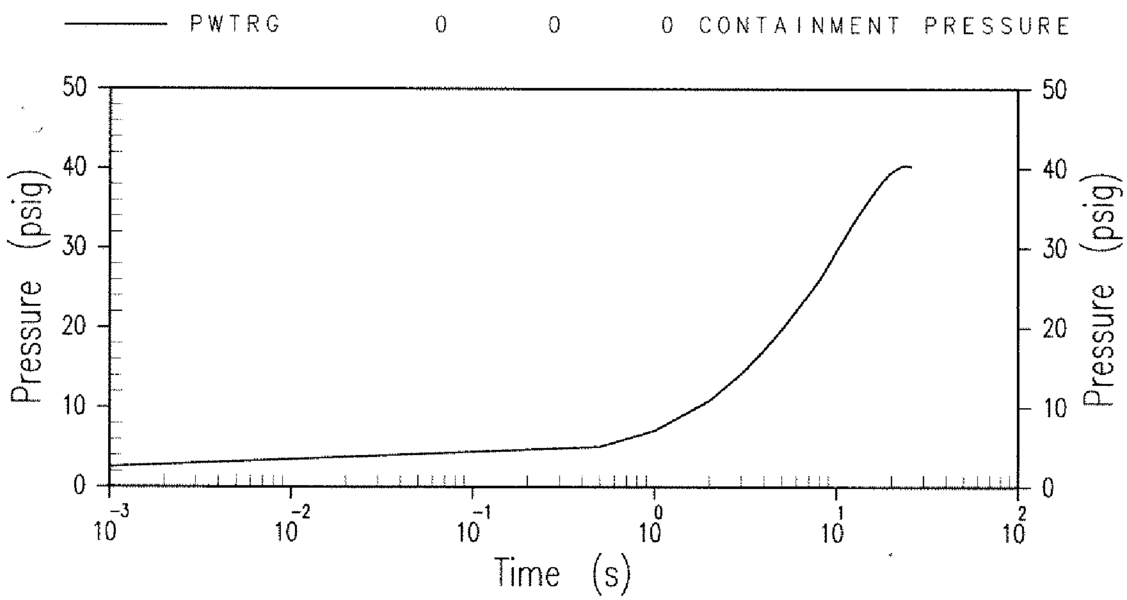
INDIAN POINT UNIT No. 3

CONTAINMENT PRESSURE FOR 70% POWER STEAMLINE BREAK WITH FCV FAILURE AND OFFSITE POWER

UFSAR FIGURE 14.3-87 | REV. No. 01



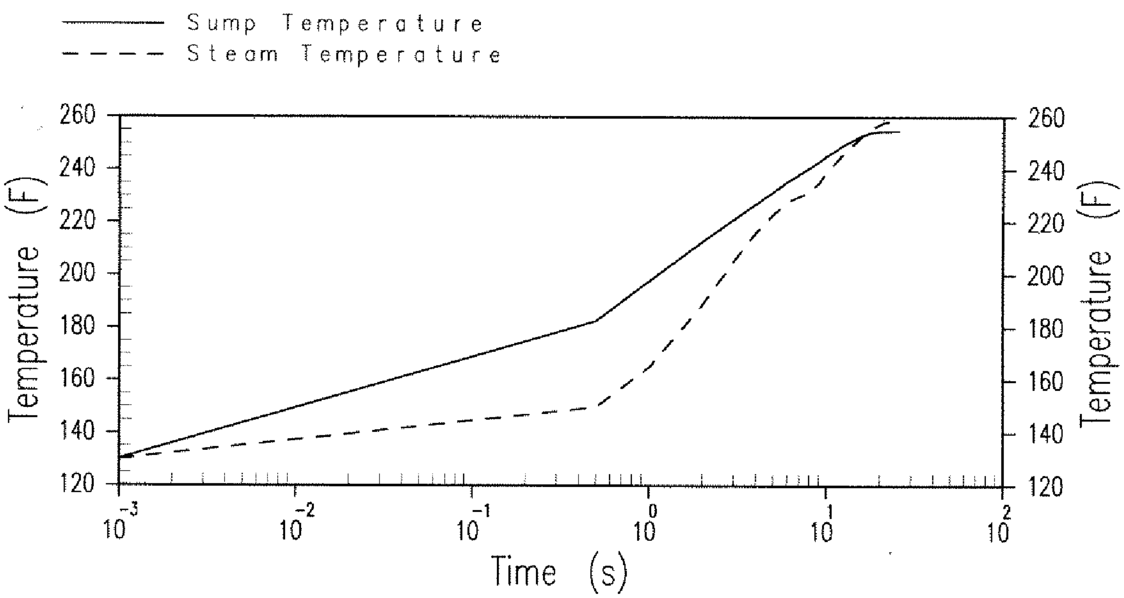
INDIAN POINT UNIT No. 3	
CONTAINMENT AIR TEMPERATURE FOR 70% POWER STEAMLINE BREAK WITH FCV FAILURE AND OFFSITE POWER	
UFSAR FIGURE 14.3-88	REV. No. 01



INDIAN POINT UNIT No. 3

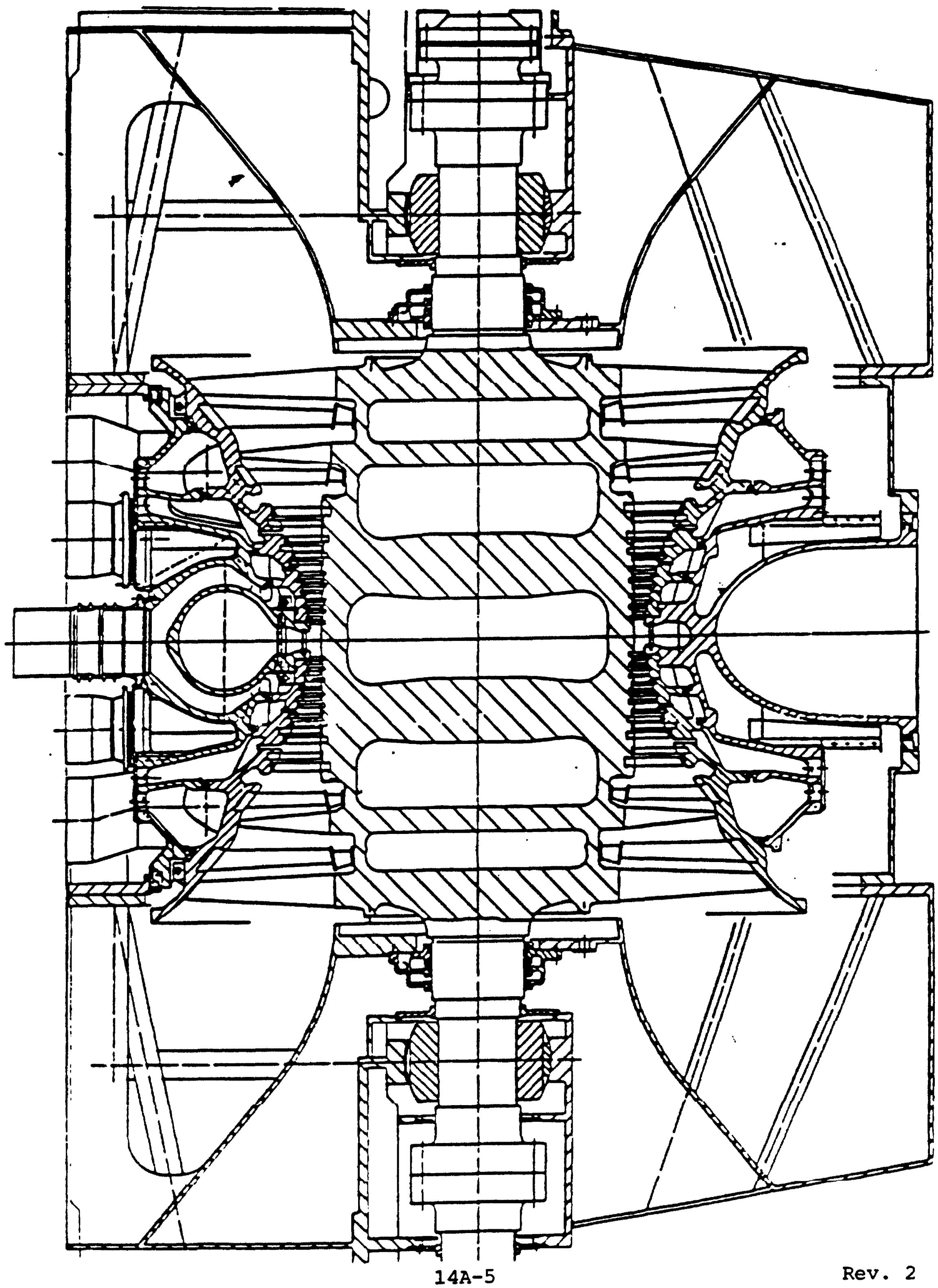
DOUBLE-ENDED HOT LEG BREAK PRESSURE RESPONSE

UFSAR FIGURE 14.3-100 | REV. No. 01



INDIAN POINT UNIT No. 3	
DOUBLE-ENDED HOT LEG BREAK TEMPERATURE RESPONSE	
UFSAR FIGURE 14.3-101	REV. No. 01

Cross Section of Standard LP-Rotor
(Nuclear Power Plant Indian Point Unit 3)
Figure 3.1



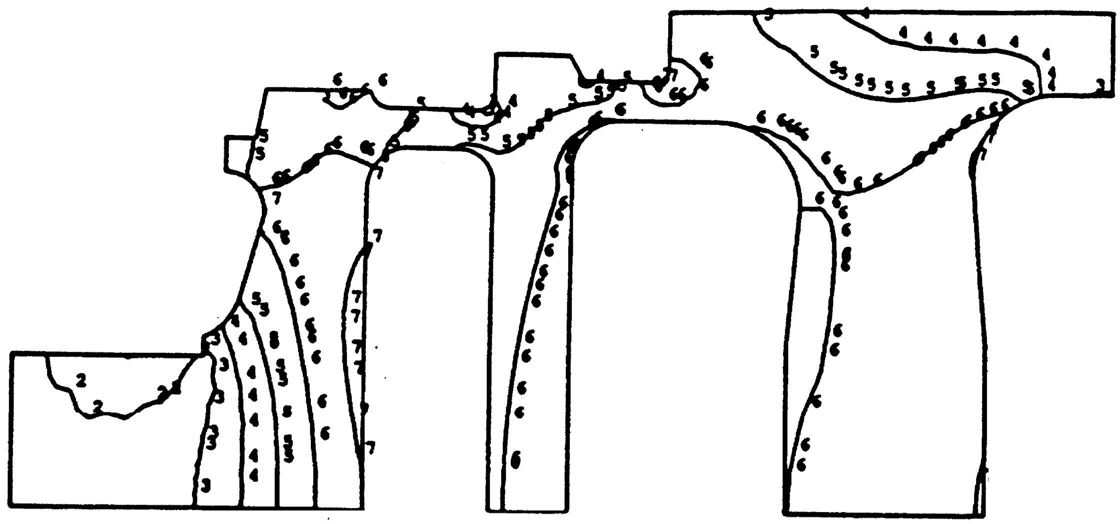


Fig. 3.2: Circumferential Stress in Welded LP-Rotor [8]
(Line Number -2) . 50 + σ /MPa 1ksi = 6,895 MPa

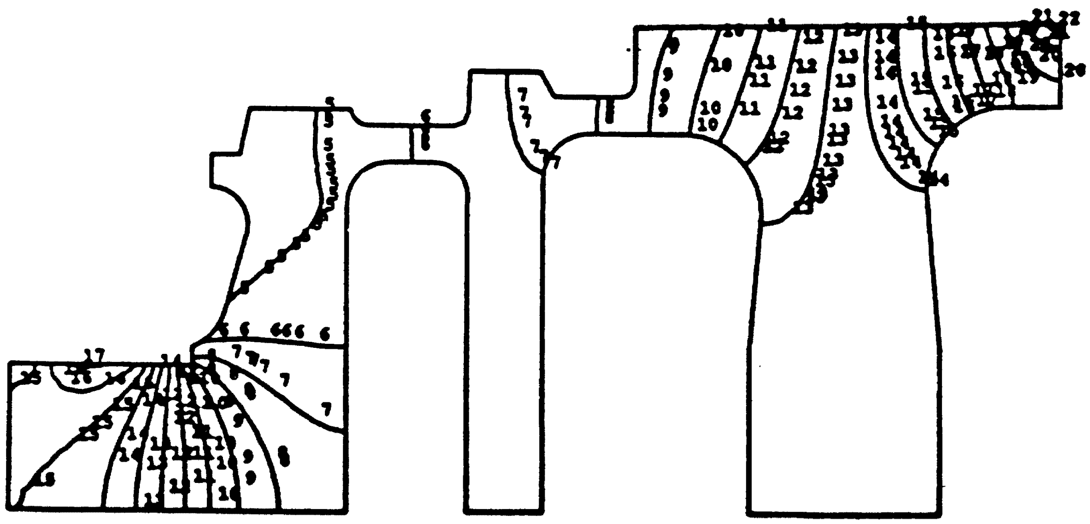
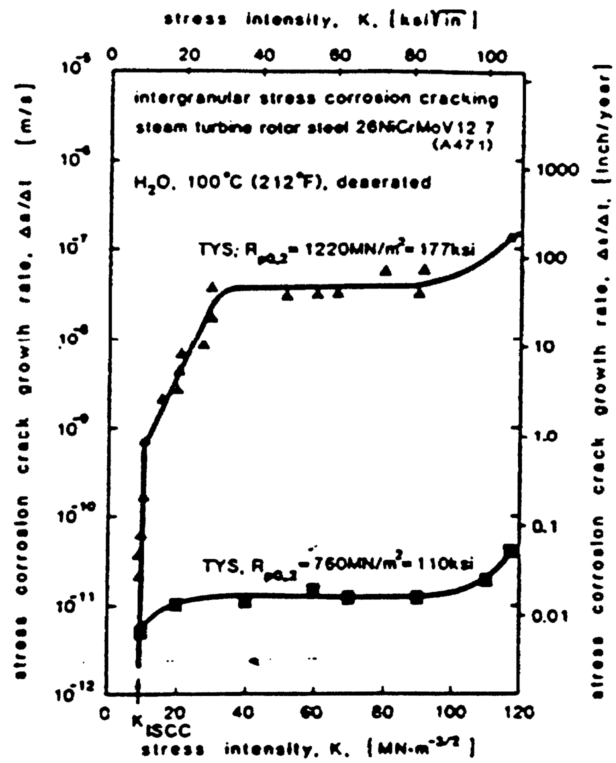
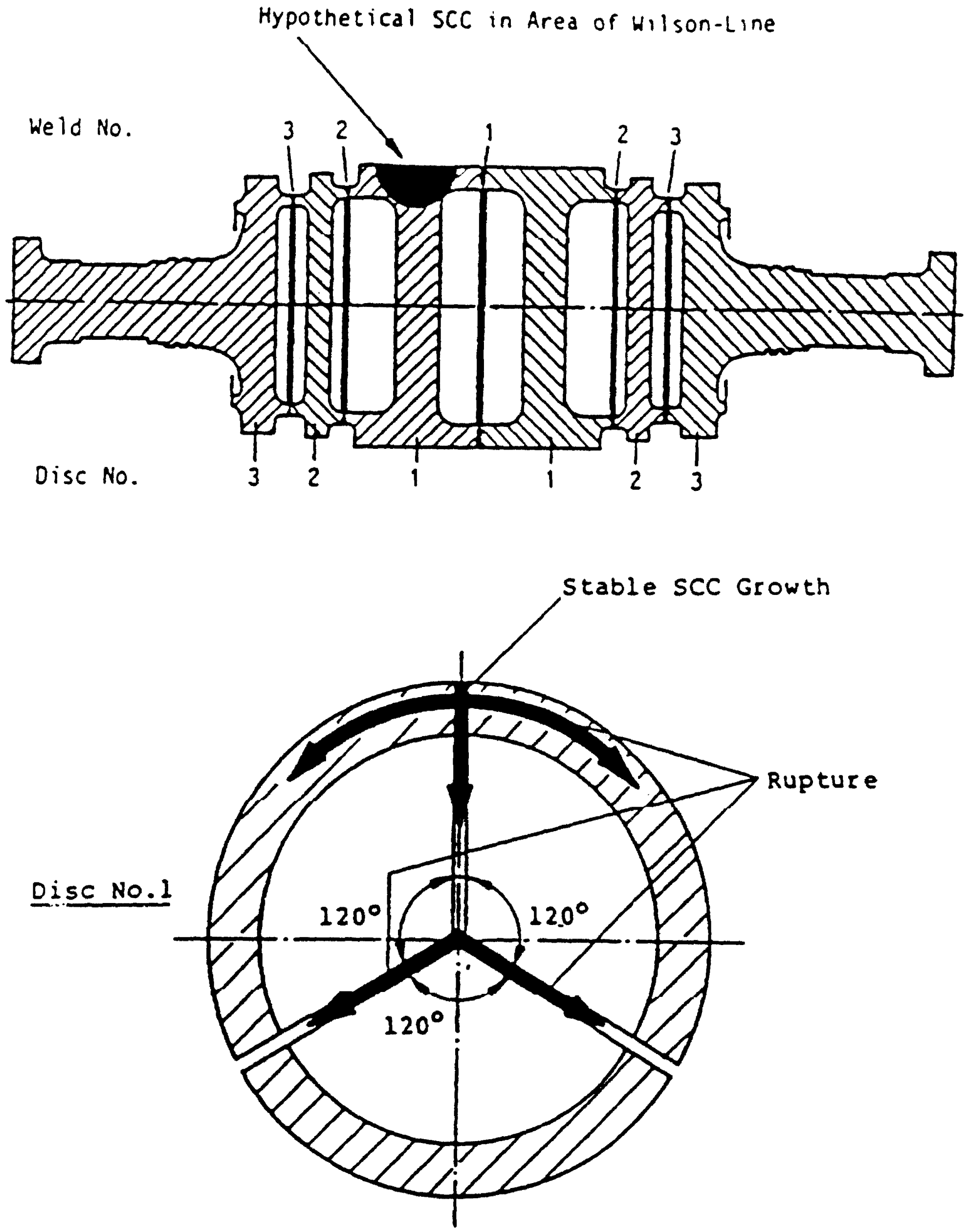


Fig. 3.3 Temperature in Welded LP-Rotor [8]
(Line Number -1) · 10 = T_c T_F = 1,8·T_c + 32
T_c = Temperature in °C, T_F = Temperature in °F

Figure 5.1



Effect of stress intensity and yield strength on the growth rate of stress corrosion cracks in a steam turbine rotor steel. Note that K_{ISCC} is not measurably influenced by the change in yield strength; the "plateau" stress corrosion crack growth rate, however, is strongly influenced by the yield strength.



Hypothetical Failure Mode of Welded LP-Rotor Due to SCC

Figure 5.2

Figure 5.3

Results of K_{IC} - and R_e - Measurements for the LP-Rotors of Indian Point Unit 3

The items and the test report number (MP.-No) of the forgings of the three LP Indian Point Unit 3 LP-rotors are summarized. The actual measures R_e - (yield strength) and K_{IC} - (fracture toughness) values at room temperature are also tabulated and the fracture toughness statistically analyzed.

Contents:
- Items and MP-numbers of the forgings
- Measured yield strength at room temperature
- Measured fracture toughness at room temperature
- Summary and statistical evaluation

<u>Items of Forgings</u>

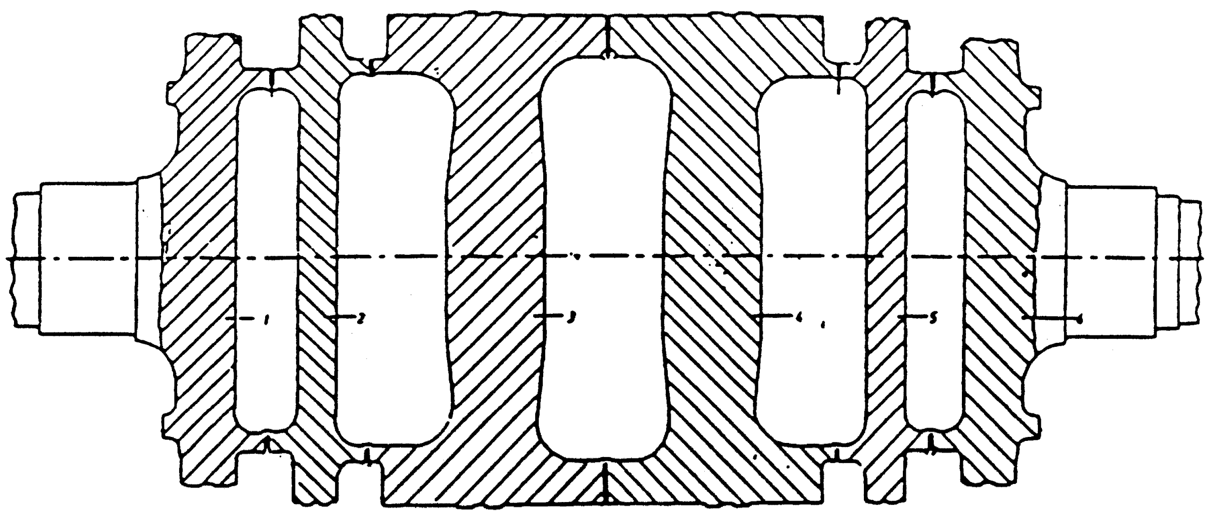
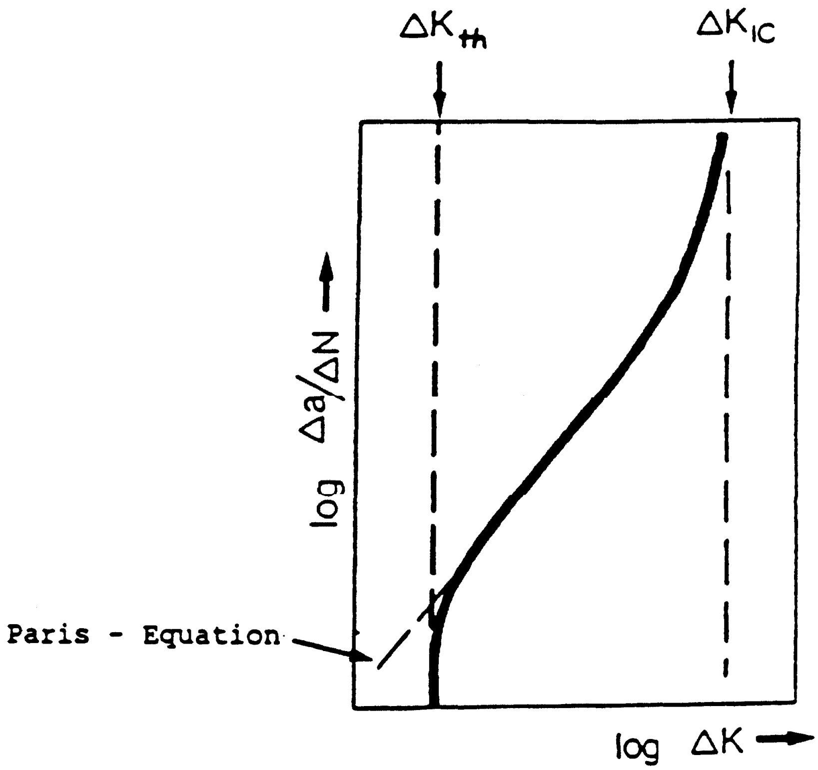


Figure 5.4
Fatigue Crack Growth



6.0 METHOD FOR CALCULATING TURBINE MISSILE GENERATION PROBABILITY (P_1)

The turbine missile generation probability (P_1) consists of two factors (1) the probability of shaft failure producing an internal tubine missile (P_1') and (2) the probability that this internal missile penetrates the casings and is ejected from out the turbine (P_1'').

$$P_{1Lcr}(N) = M \cdot \sum_{i=1}^{F} p_i(N) \qquad \text{Equ. 6.14}$$

Since one double flow LP-rotor of the Indian Point Unit 3 has six forgings (2 shaft-ends, 4 disks), three forgings per flow must be considered (F = 3), and so one obtains:

$$P_{1Lcr}(N) = M \cdot [p_1(N) + p_2(N) + p_3(N)] \qquad \text{Equ. 6.15}$$

The indices correspond to the forging (shaft-end, thin disc, thick disc) of a flow.

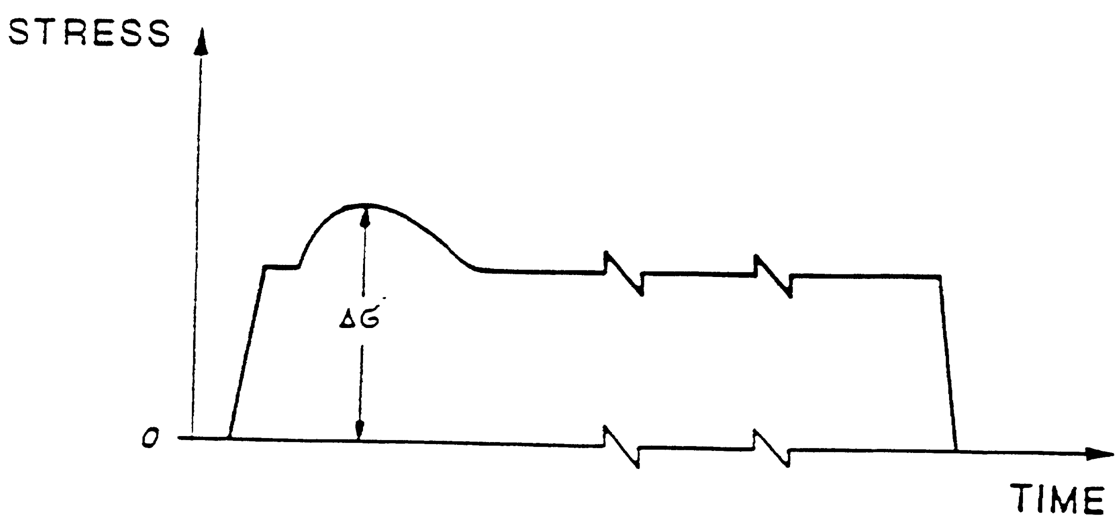


Figure 6.1: Normal Operation Cycle

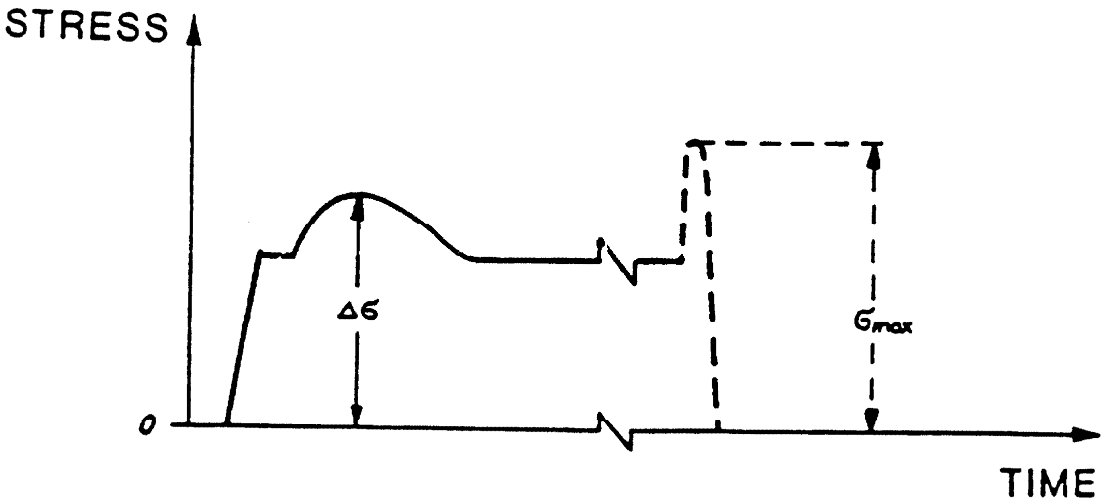


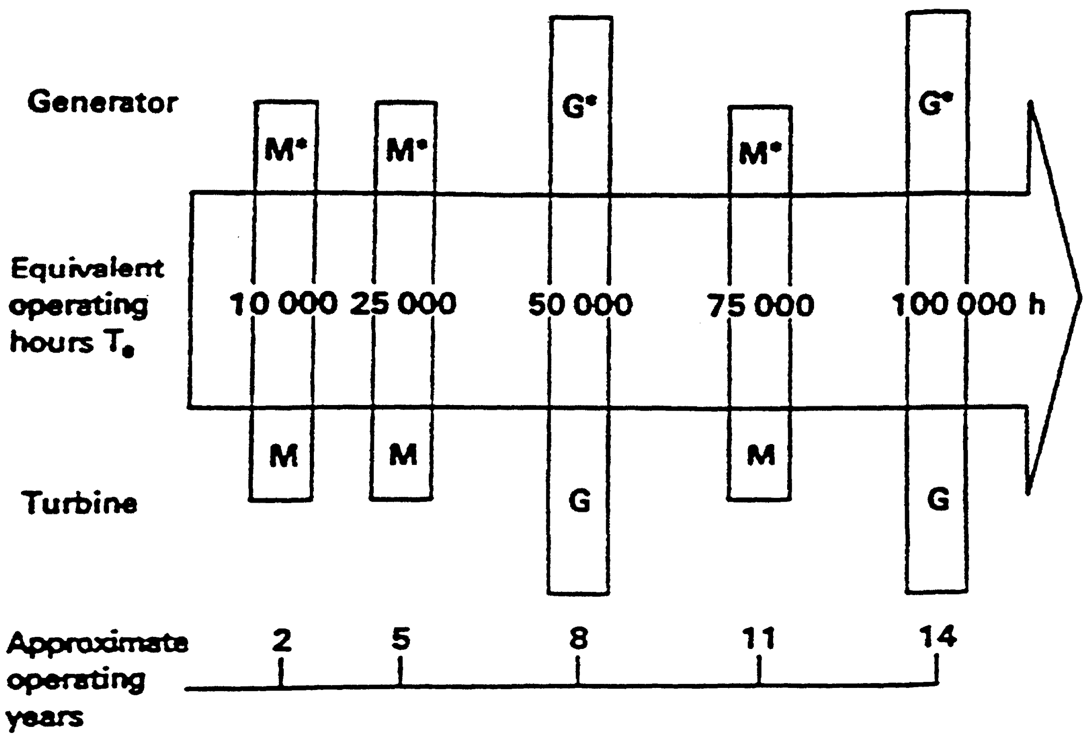
Fig. 6.2: Full Load Rejection With Overspeed

6.2.1 Probability of Missile Generation of an Individual LP-Rotor Forging p_1 (N)

The probability of missile generation due to Non-SCC for an individual LP-rotor forging is defined as the probability that an initial crack (crack length a_0) grows up to the critical crack length a_c for brittle fracture.

For the determination of this probability some assumptions are made:

- Each forging has an initial crack with the length a_0 at the location, where the highest transient stress appears.



G = Major overhaul
M = Minor overhaul
* With diagnosis

$T_e = T_{eff} + n_s \cdot T_s$
T_e = Equivalent operating hours
T_{eff} = Actual operating hours
T_s = Operating hours charged for one start
n_s = Number of starts

Figure 7.3
Recommendations for Inspection Intervals
of Large Turbine Generators

Figure 7.1
LP-Retrofit Indian Point 3
Assessment of the Probability of Steam Turbine
Rupture from Stress Corrosion Cracking

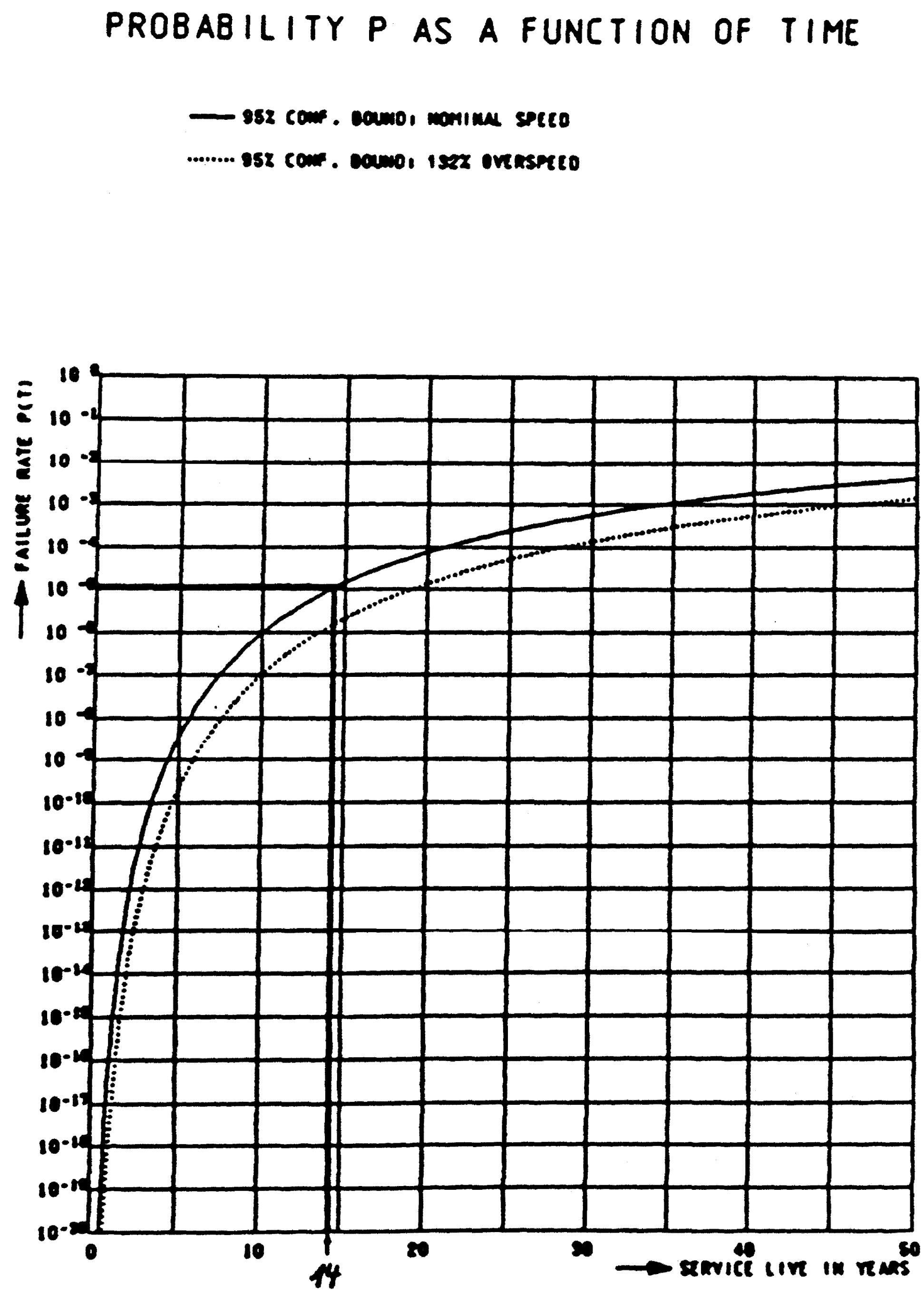
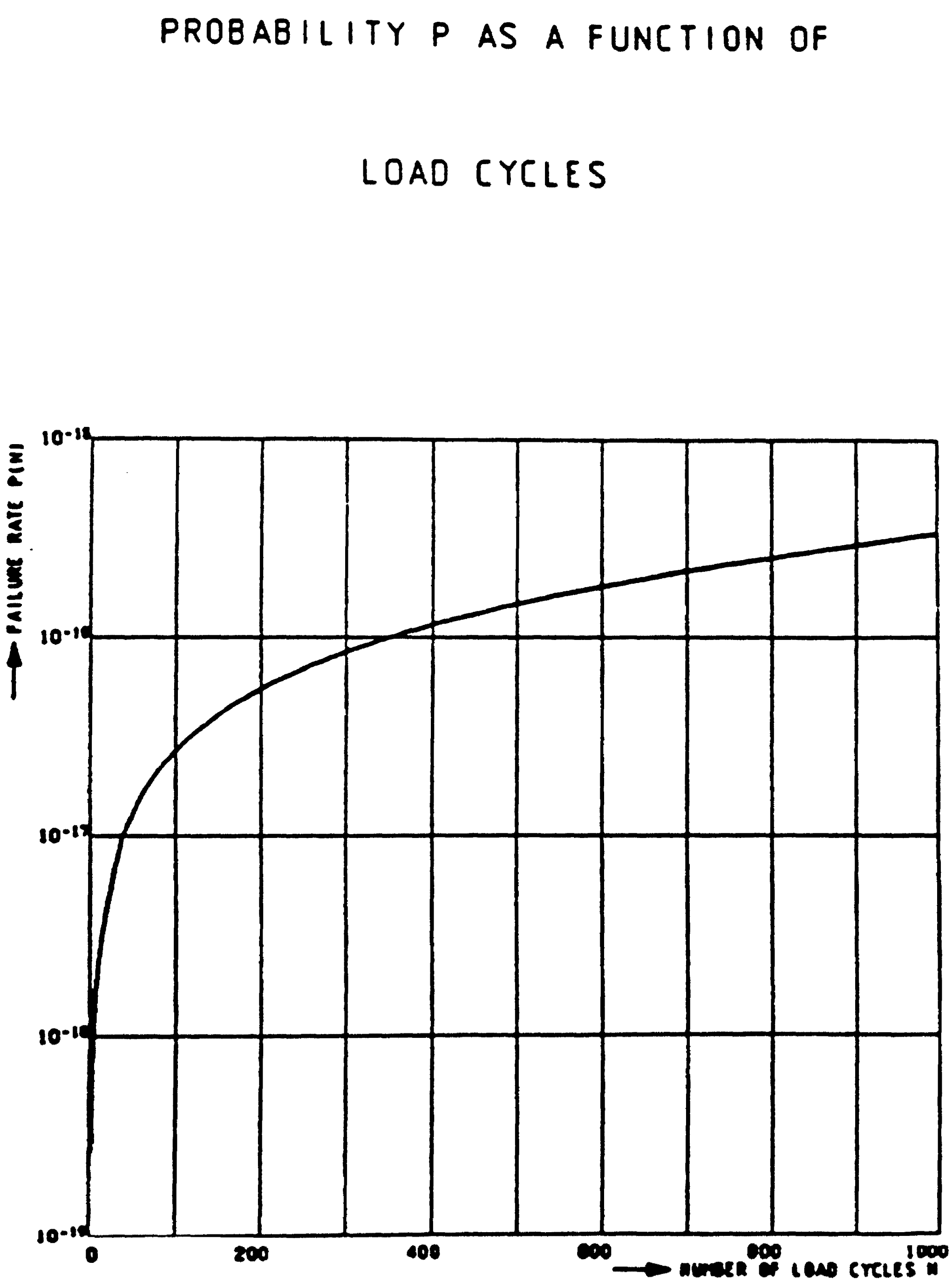
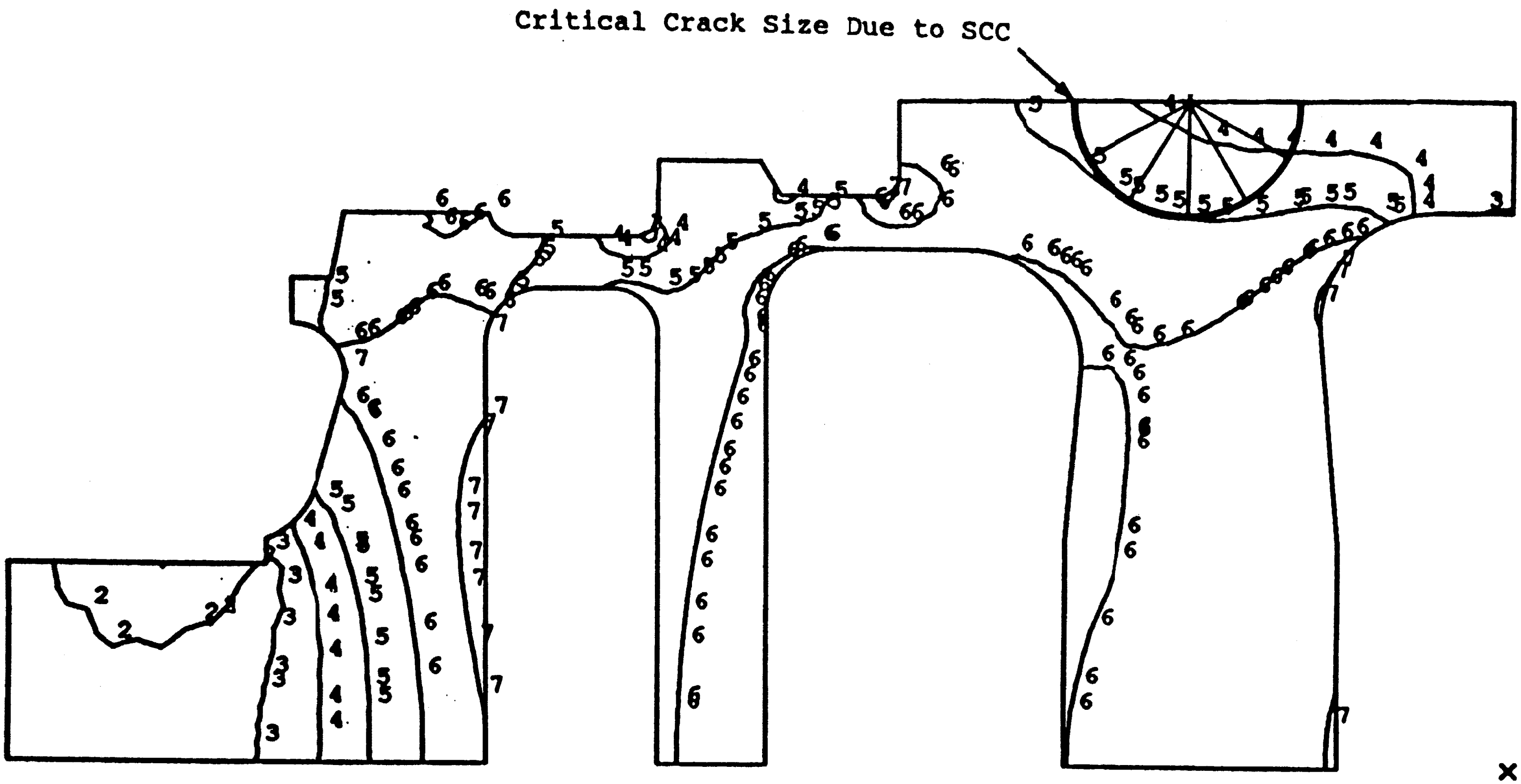


Figure 7.2
LP-Retrofit Indian Point 3
Assessment of the Probability of Steam Turbine
Rupture From Low Cycle Fatigue





(Line number -2) · 50 = σ/MPa
1ksi = 6,895MPa

Figure 7A
Hoop Stresses with Temperature Load
at Nominal Speed

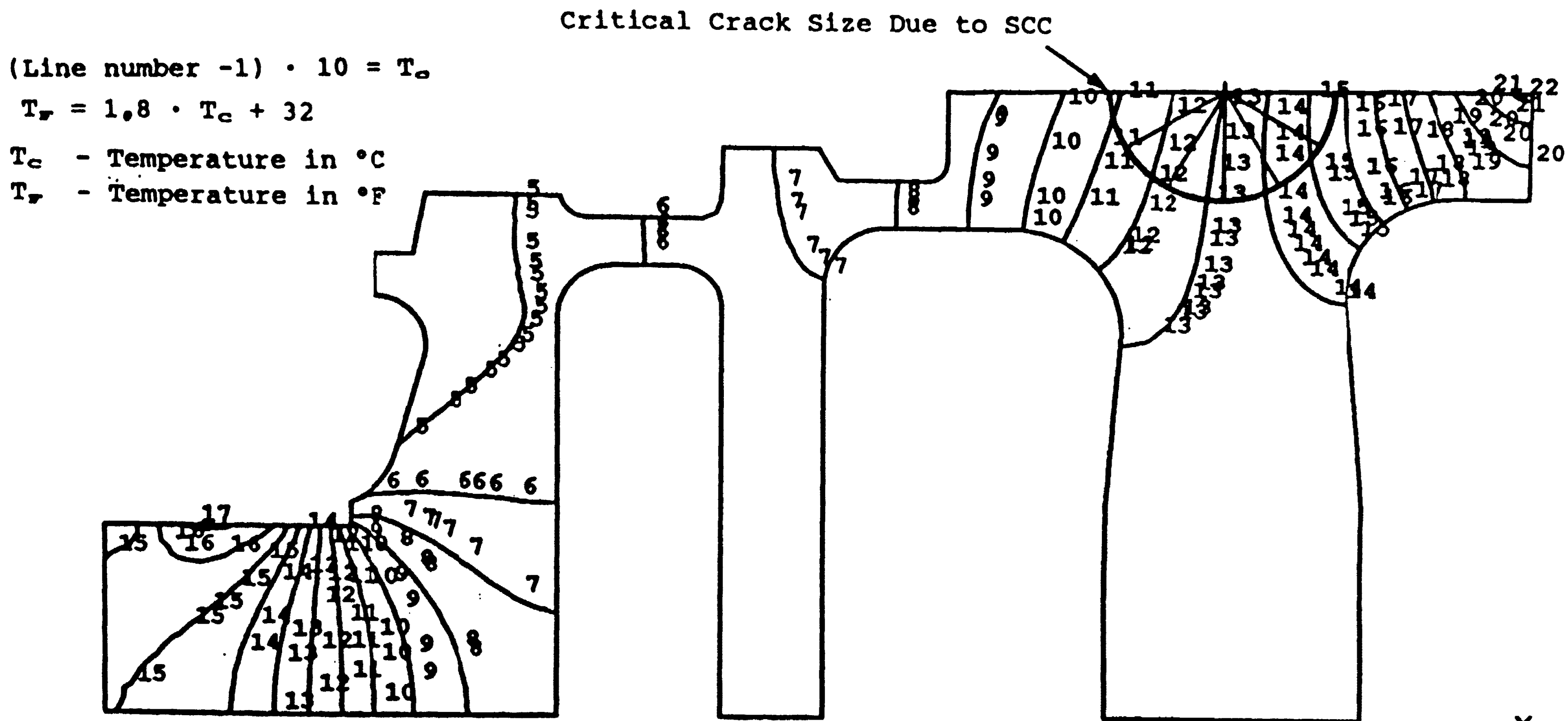
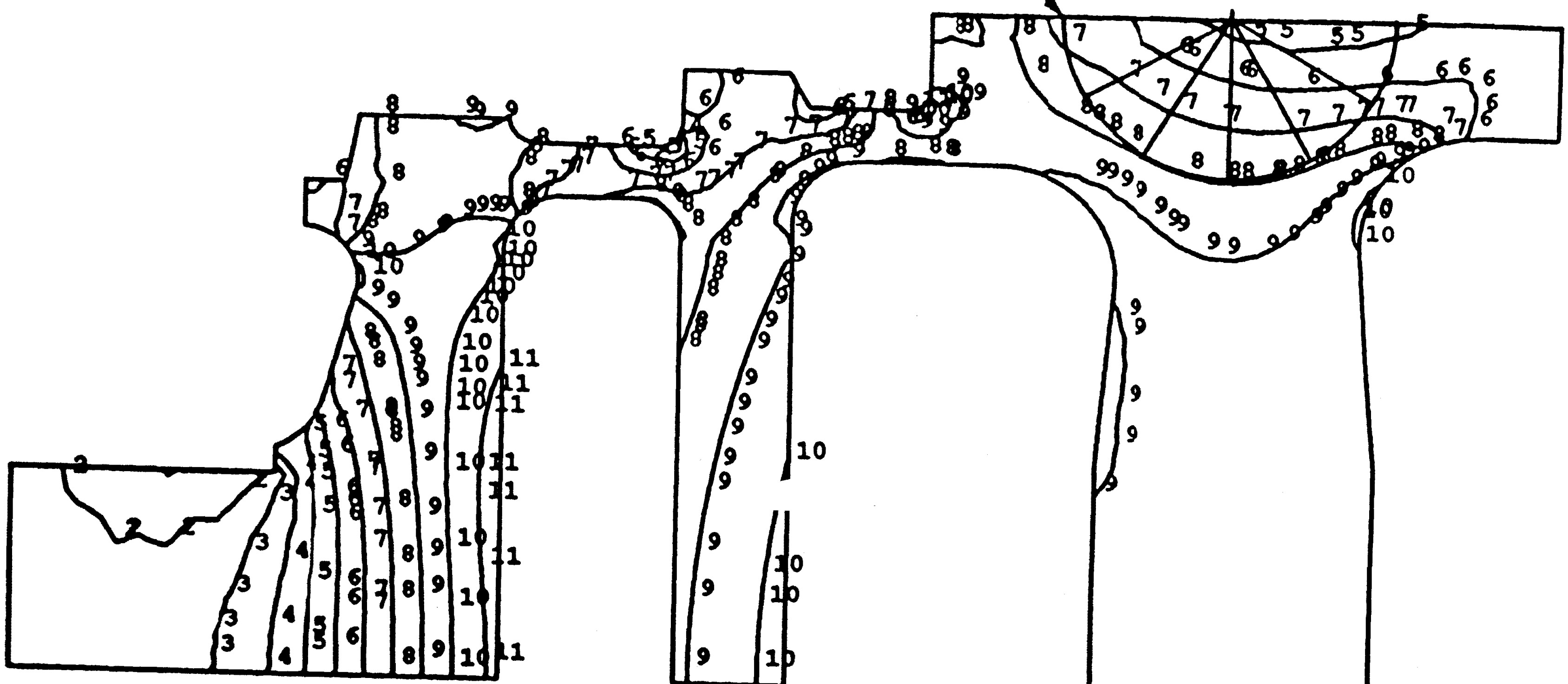


Figure 7B
Temperature Distribution (Stationary)



(Line number -2) · 50 = σ/MPa

1ksi = 6,895 MPa

Figure 7C
Hoop Stress Distribution at 132%
Overspeed and Stationary Temperature

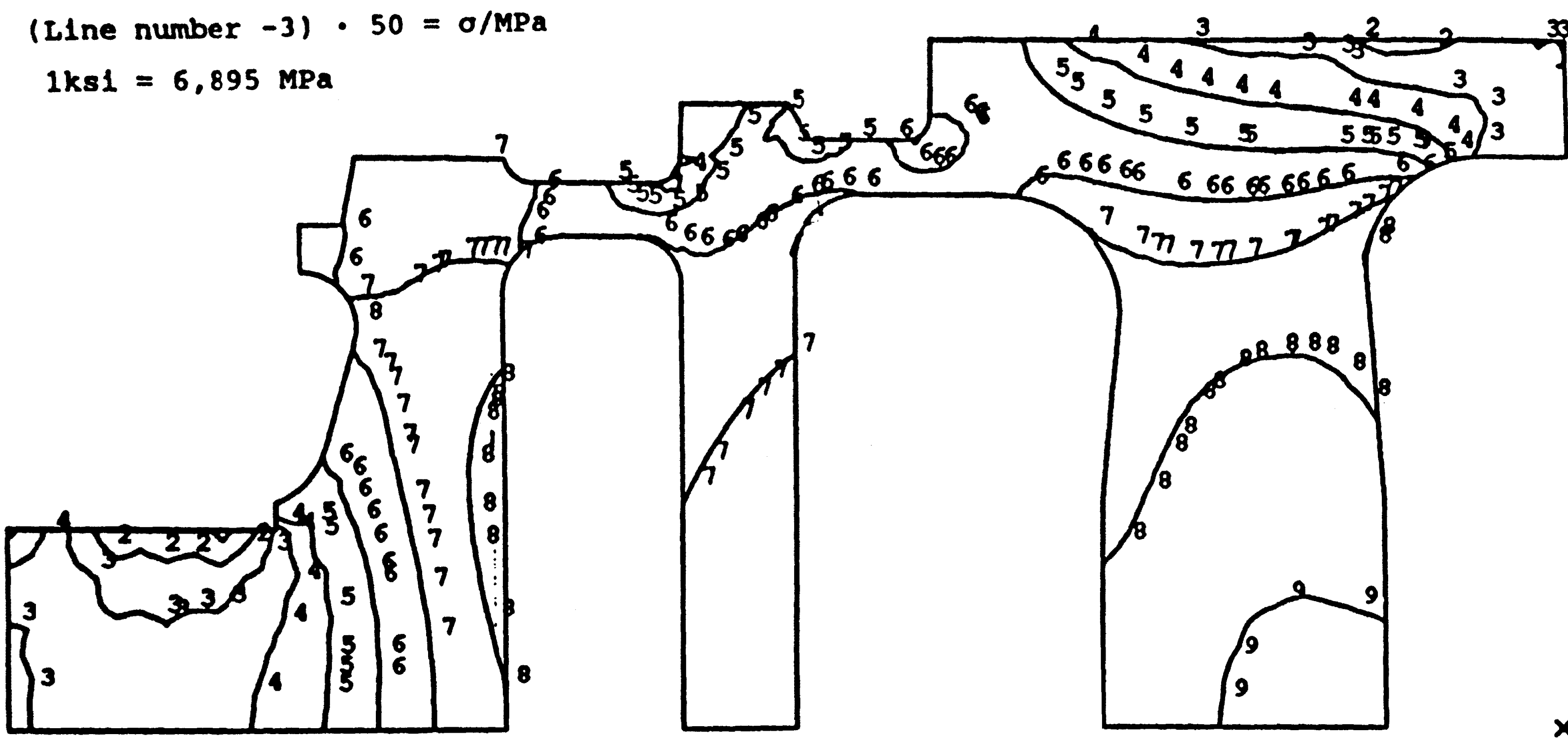


Figure 7D
Transient Hoop stress Distribution at
Nominal Speed and t = 19,200 Sec.