

**EVENT TREE INFORMATION
FROM NORTH ANNA IPE**

**TABLE 3.1.2-2
EVENT TREE HEADINGS**

<u>Abbreviation</u>	<u>Headings</u>	<u>Description of Event</u>
A	Large LOCA	Initiating Event-large LOCA
B	Offsite Power Recovery	Failure to recover an ESF bus following station black-out by recovering offsite power.
Ch	Containment Heat Removal	Failure of Service Water to an operable Recirculation Spray heat exchanger.
DG	EDG 1H or 1J Available	Failure of at least one diesel generator to start and run following loss of offsite power leading to station blackout.
Dh	Hot Leg Recirculation	Failure of the operator to switch to hot leg recirculation following a large LOCA.
D1	High Pressure Injection	Failure of Charging Pumps to inject in the appropriate mode.
D2	Accumulators Inject	Failure of Accumulators to inject in the appropriate mode.
D3	Low Head SI	Failure of low head SI pumps to inject.
D4	Emergency Boration	Failure to shutdown following ATWS by boron addition.
Fm	Break Size Partition	Percentage of small breaks not causing a CDA Hi Hi signal.
Hv	ESGR Cooling	Failure to provide HVAC to the ESGR using 1/2 AHUs and 1/3 chillers.
H1	Low Head Recirculation	Failure of low head pumps in the recirculation mode.

TABLE 3.1.2-2 (Continued)
EVENT TREE HEADINGS

<u>Abbreviation</u>	<u>Headings</u>	<u>Description of Event</u>
H2	High Head Recirculation	Failure of low head and charging pumps in the high pressure recirculation mode.
K	Reactor Subcritical	Failure of control rods to insert as result of Reactor Protection System failure.
L	Auxiliary Feedwater System Available	Failure of Auxiliary Feedwater System for transients or small or medium LOCAs with reactor trip.
Lt	Turbine-Driven AFW available	Failure of the Turbine-Driven Auxiliary Feedwater Pump to start and run following station blackout.
M	Main Feedwater System Available	Failure of Main Feedwater.
MS1	Manual Scram	Failure of the operator to remove power from the control rod drive mechanisms.
O	Cooldown and Depressurize	Operator fails to cooldown and depressurize the reactor after a small break or in response to a loss of RCP seal cooling.
O2	Late Cooldown	Failure of operator to cooldown and depressurize in response to a ruptured steam generator.
P	Pressurizer PORVs	Failure of the operator to open 1/2 pressurizer PORVs to cause RCS feed and bleed.
Pr	Pressure Relief	Failure of adequate pressure relief following an ATWS event.

TABLE 3.1.2-2 (Continued)
EVENT TREE HEADINGS

<u>Abbreviation</u>	<u>Headings</u>	<u>Description of Event</u>
Q	RCS Boundary Intact	Failure of pressurizer PORV to close after opening during a transient.
Qs	Quench Spray	Failure of 1/2 trains of Quench Spray.
Rc	Room Cooling Restored	Recovery of ESGR cooling or SW (resulting in reactor trip and loss of emergency power) prior to core uncover and vessel failure, or containment failure.
Rs	Recirculation Sprays Operable	Failure of at least one train of Recirculation Sprays to remove heat from Containment.
Rv	Reactor Vessel Integrity	Consideration of PTS following a rapid RCS cooldown.
RX	Reactor Vessel Rupture	Initiating event is a Reactor Vessel rupture.
SGI	Steam Generator Isolation	Failure to isolate the ruptured Steam Generator.
Slc	No Potential for RCP Seal Failure	Failure to establish seal cooling from operable Unit 2 CC pumps.
S1	Medium LOCA	Initiating event is a medium LOCA (2" to 6").
S2	Small LOCA	Initiating event is a small LOCA (3/8" to 2").
T	Transients	Representative initiating event for general transient event tree.
Tt	Turbine Trip	Turbine fails to trip.

TABLE 3.1.2-2 (Continued)
EVENT TREE HEADINGS

<u>Abbreviation</u>	<u>Headings</u>	<u>Description of Event</u>
T1	Loss of Offsite Power	Initiating event is Loss of of all Offsite Power.
T1A	Station Blackout	Loss of diesel generators 1H and 1J leading to station blackout at Unit 1.
T1Tr	Loss of ESGR Cooling Transfer from T1 Event Tree	Transfer of T1Hv sequence, Loss of Offsite Power with consequential loss of Emergency Switchgear Room Cooling.
T2	Loss of MFW	Initiating event is non-recoverable loss of Main Feed-water.
T2A	Recoverable Loss of MFW	Initiating event is recoverable loss of Main Feedwater following Feedwater isolation.
T2ATr	Loss of ESGR Cooling Transfer from T2A Event Tree	Transfer of T2AHv sequence, recoverable loss of Main Feedwater with coincidental loss of Emergency Switchgear Room Cooling.
T2Tr	Loss of ESGR Cooling Transfer from T2 Event Tree	Transfer of T2Hv sequence, non-recoverable loss of Main Feedwater with coincidental loss of Emergency Switchgear Room Cooling.
T3	Transient with MFW Available	Initiating event is Transient with Main Feedwater available.
T3Tr	Loss of ESGR Cooling Transfer from T3 Event Tree	Transfer of T3Hv sequence, transient with Main Feedwater available, with coincidental loss of Emergency Switchgear Room Cooling.
T4	Loss of RC Pump Seal Cooling	Initiating event is loss of RCP seal injection and thermal barrier cooling.

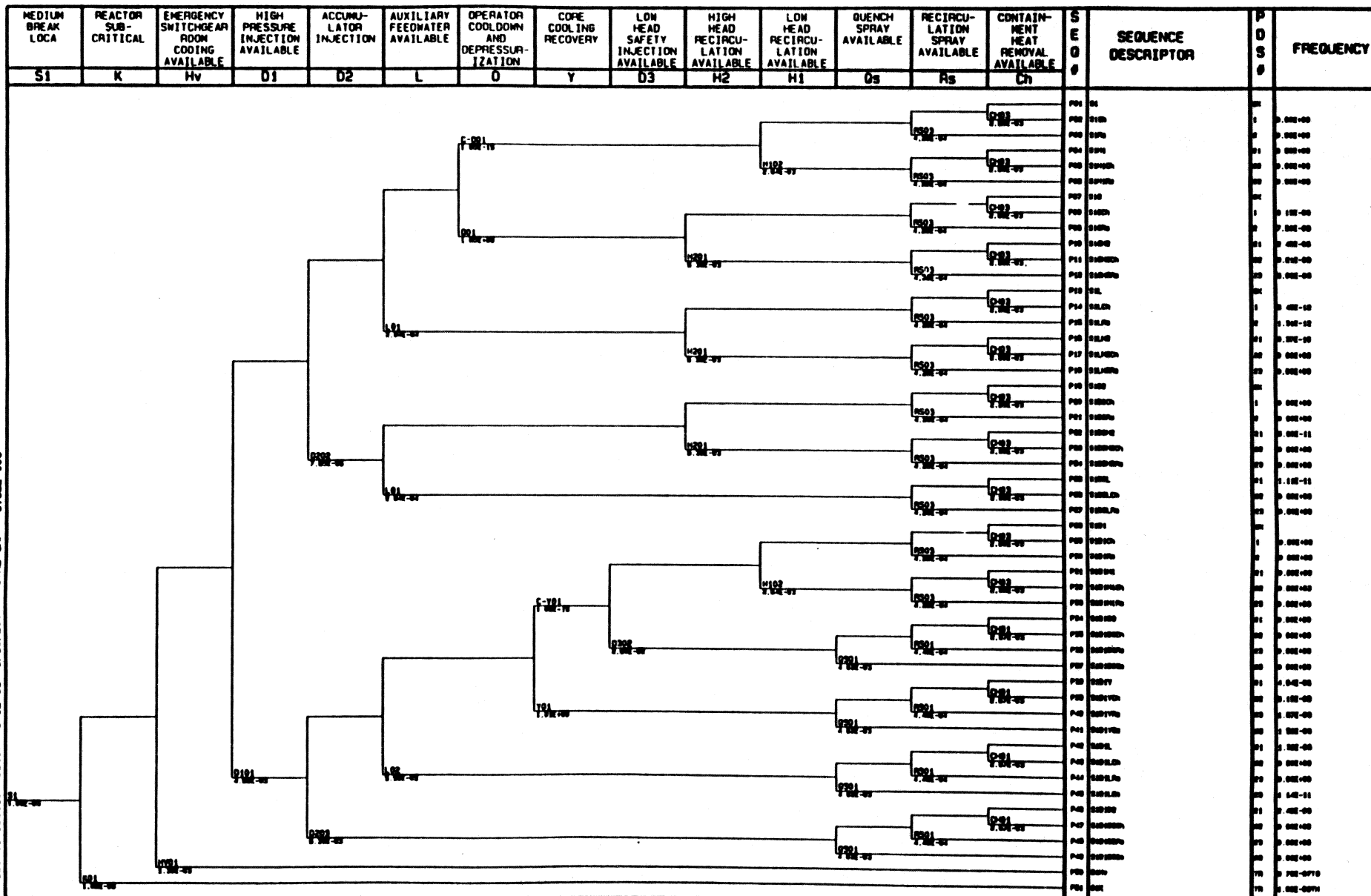
TABLE 3.1.2-2 (Continued)
EVENT TREE HEADINGS

<u>Abbreviation</u>	<u>Headings</u>	<u>Description of Event</u>
T5A	Loss of DC Bus I	Initiating event is loss of DC Bus 1-I.
T5B	Loss of DC Bus III	Initiating event is loss of DC Bus 1-III.
T6	Loss of Service Water	Service Water is lost from both the reservoir and Lake Anna.
T7	Steam Generator Tube Rupture	Initiating event is a steam generator tube rupture.
T8	Loss of Emergency Switch- gear Room Cooling	Loss of HVAC to the Emergency Switchgear Room.
T9A	Loss of Power from 4160 V Emergency Bus 1H	Loss of feeder power to or failure of 4160 V emergency bus 1H.
T9ATr	Loss of ESGR Cooling Transfer from T9A Event Tree	Transfer of T9AHv sequence, loss of feeder power to or failure of 4160 V Emergency Bus 1H, with consequential loss of Emergency Switchgear Room Cooling.
T9B	Loss of Power from 4160 V Emergency Bus 1J	Loss of feeder power to or failure of 4160V emergency bus 1J.
T9BTr	Loss of ESGR Cooling Transfer from T9B Event Tree	Transfer of T9BHv sequence, loss of feeder power to or failure of 4160 V Emergency Bus 1J, with consequential loss of Emergency Switchgear Room Cooling.
TL	Low power transients (for ATWS)	Initiating event is all transients at power lower than or equal to 40 percent.
TH	High power transients (for ATWS)	Initiating event is all transients at power greater than or equal to 40 percent.

TABLE 3.1.2-2 (Continued)
EVENT TREE HEADINGS

<u>Abbreviation</u>	<u>Headings</u>	<u>Description of Event</u>
VX	Interfacing System LOCA	Initiating event is an Inter- facing System LOCA.
Vi	Isolation of LOCA	Failure to isolate interfacing LOCA.
W	RHR Cooling	Failure of 1/2 Residual Heat Removal Trains.
Y	Core Cooling Recovery	Failure of the operator to use steam to rapidly cooldown and depressurize the RCS as directed by 1-FR-C.1 or C.2.

C:\VAPOR\ETRES\QLOTTRES\S1.EVT 1:00:02am 12-15-92 NUPRA 2.1a VPMR
 Quantification Date: 3-12-93 9:30:26am TOTAL CDF = 6.65E-006



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

S1: MEDIUM BREAK LOSS OF COOLANT ACCIDENT EVENT TREE

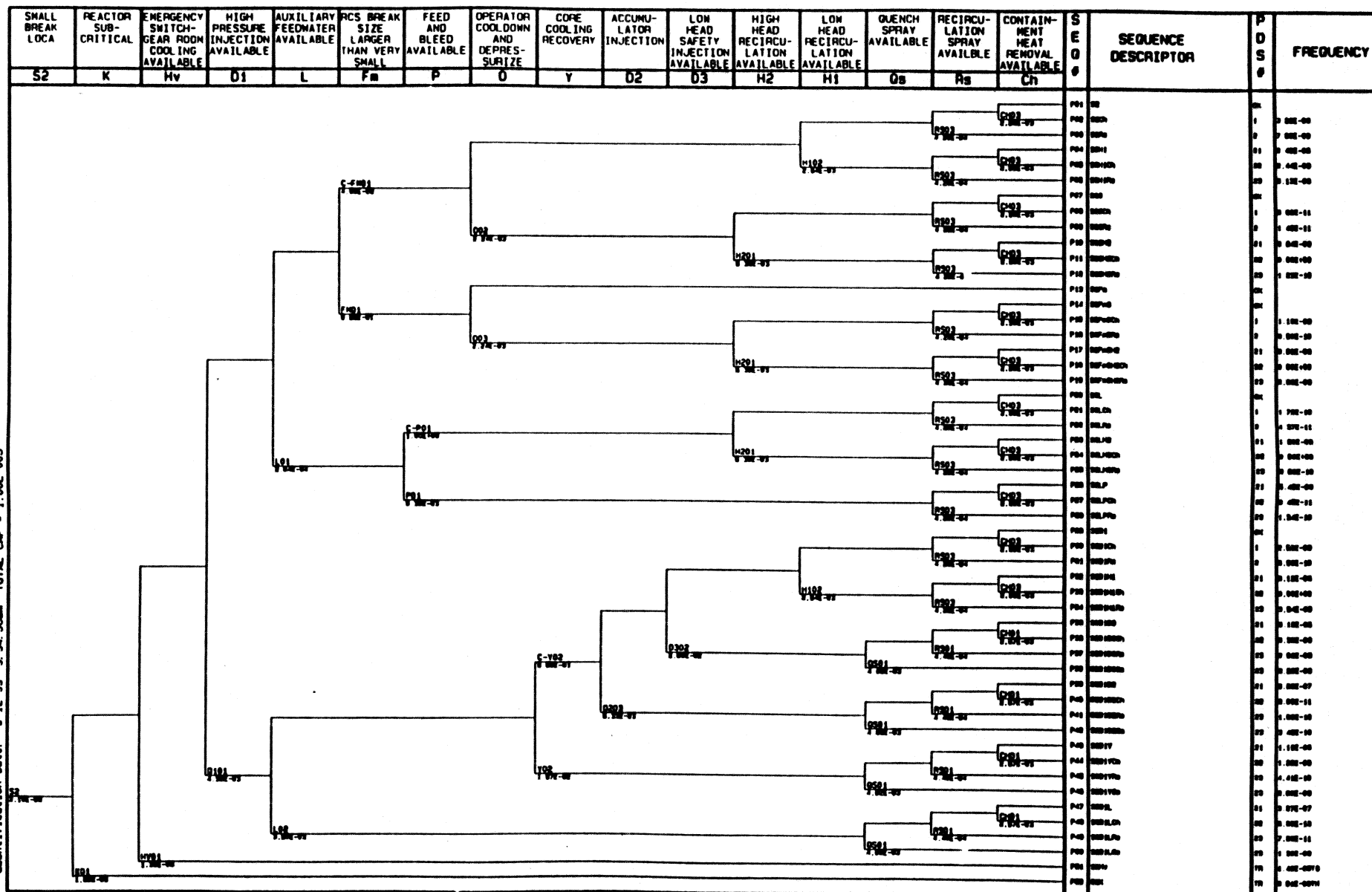
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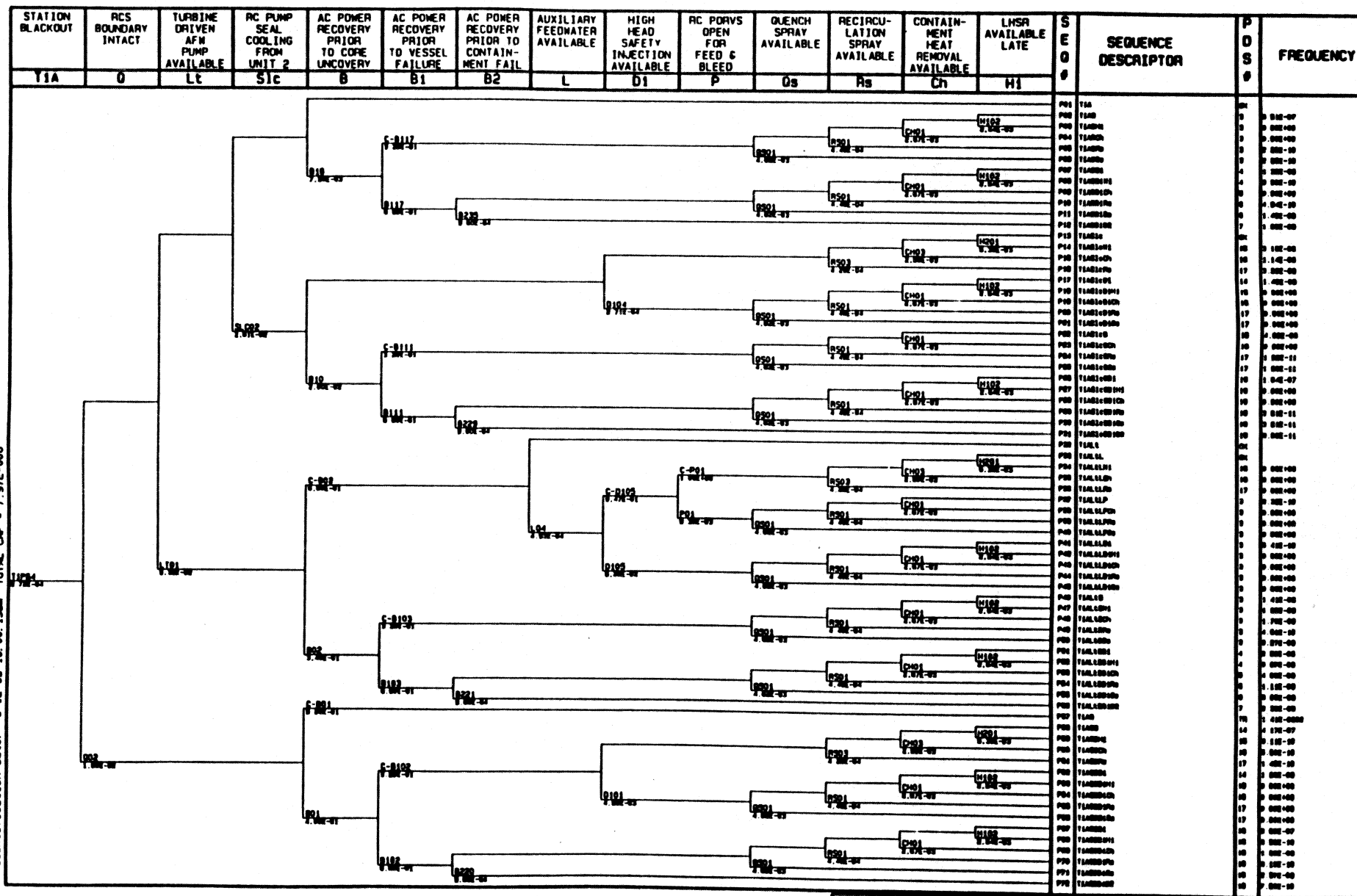
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5-1-93

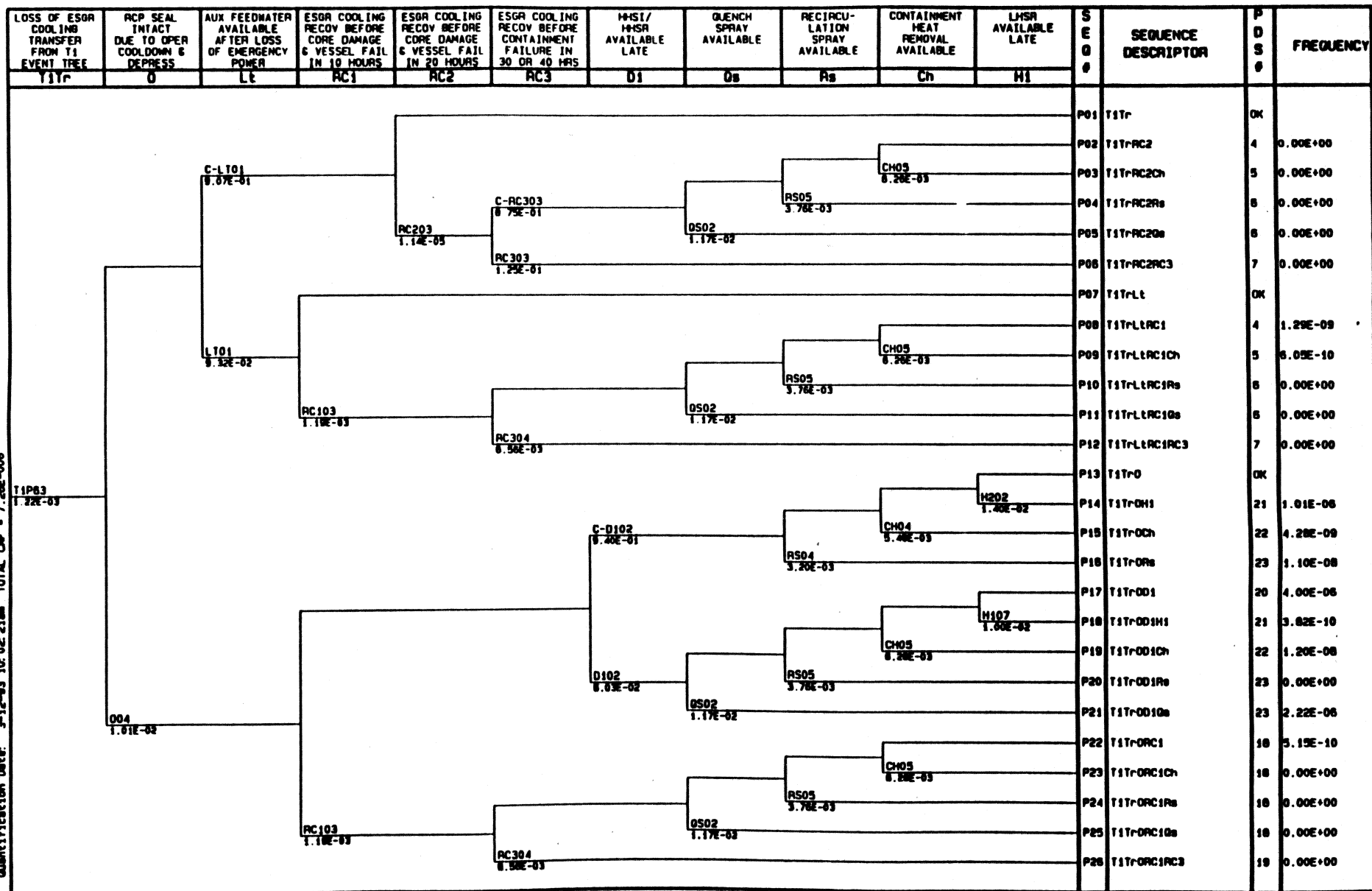
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C:\MAPS\NETRES\OLDTRES\TIA.EVT 1:00:02am 12-15-92 NUPRA 2.1a VPMR
Quantification Date: 3-12-93 10:00:19am TOTAL Cdf = 7.97E-006



C:\VAP\ETRES\OLDTRES\T1TR.EVT 1:00:02am 12-15-92 MUPRA 2.1a
 Quantification Date: 3-12-93 10:02:21am TOTAL CF = 7.28E-006



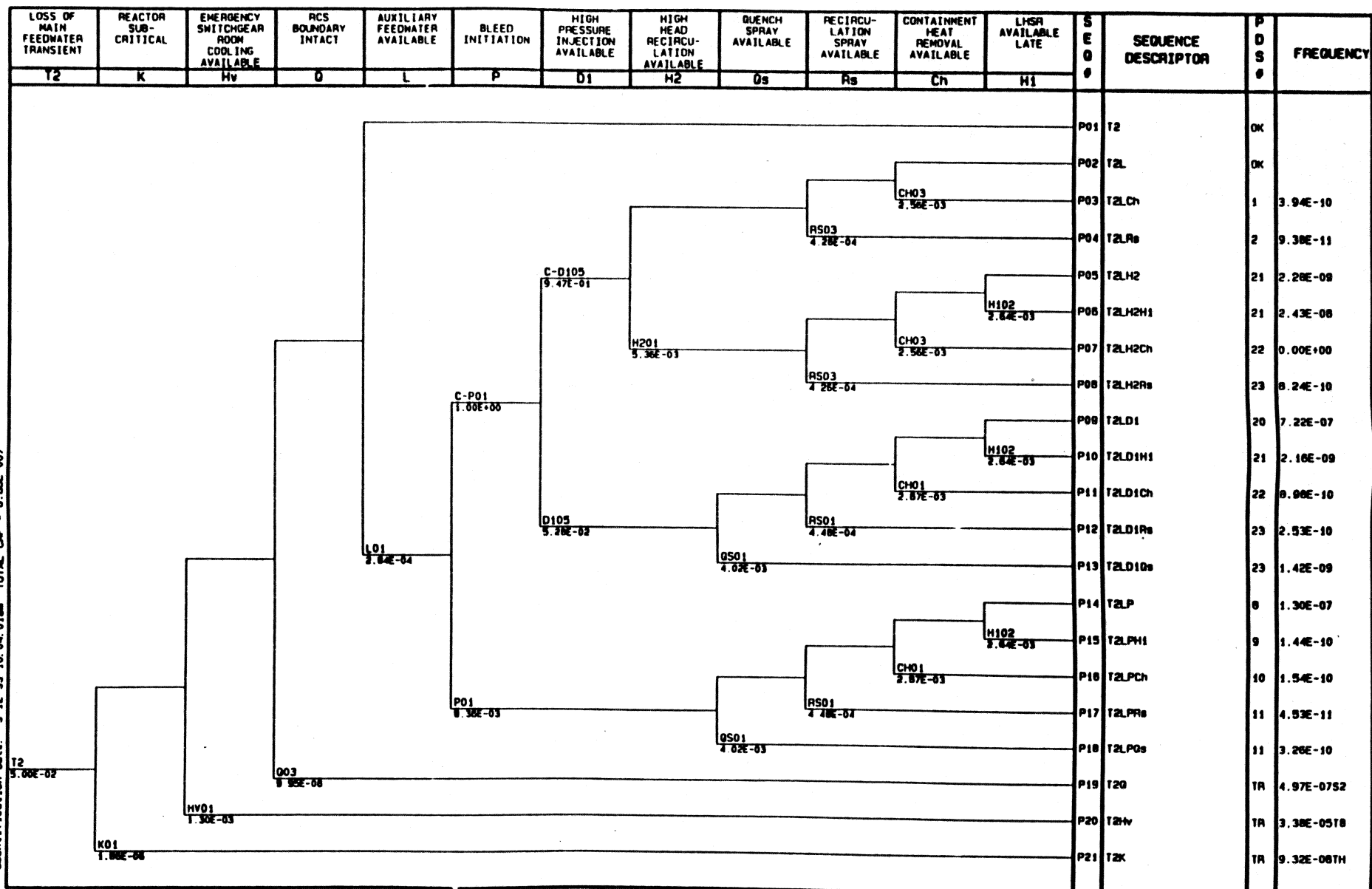
NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T1Tr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T1 LOSS OF OFFSITE POWER EVENT TREE

NAP

-1-93

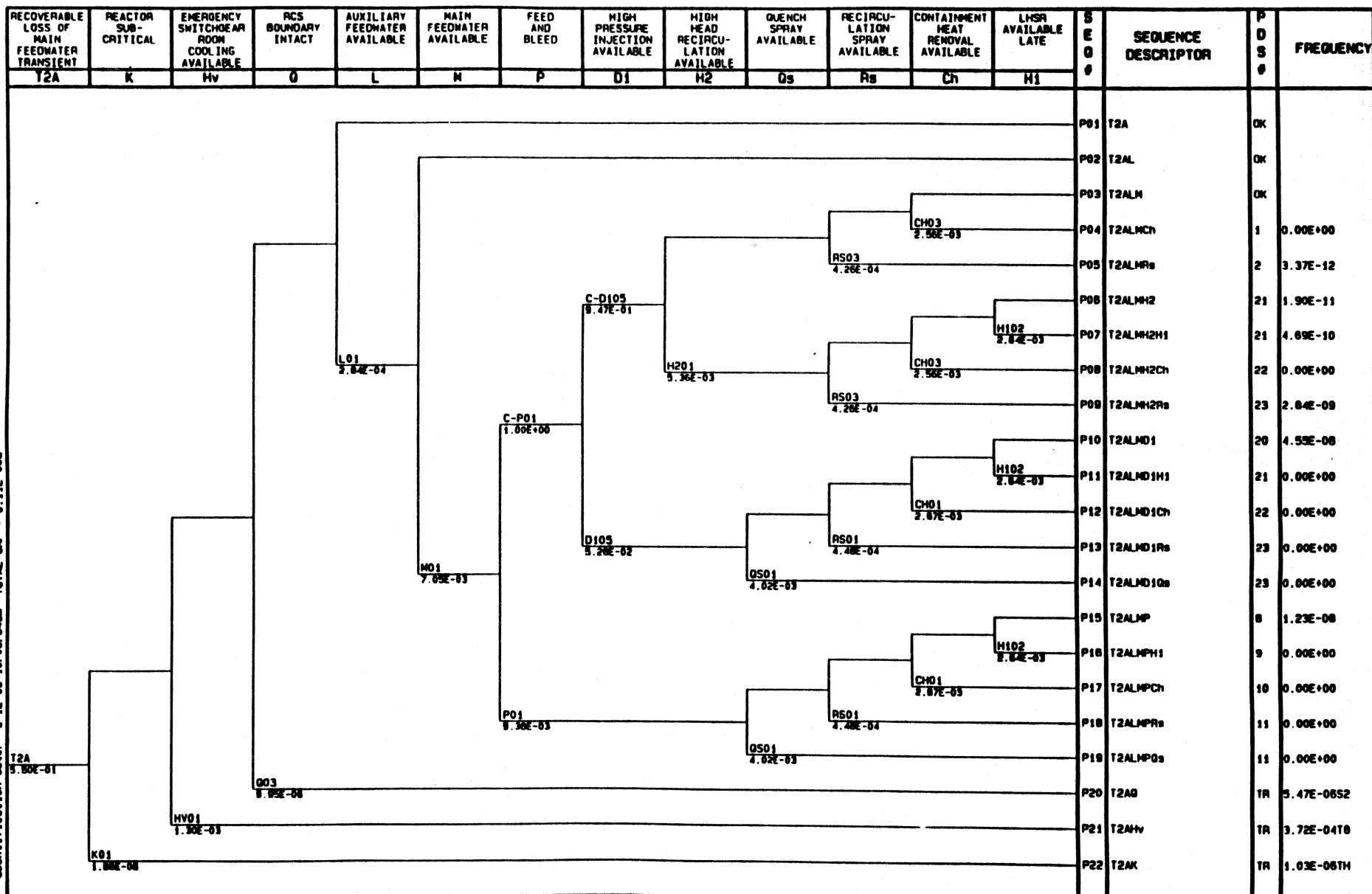
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NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T2: LOSS OF MAIN FEEDWATER EVENT TREE

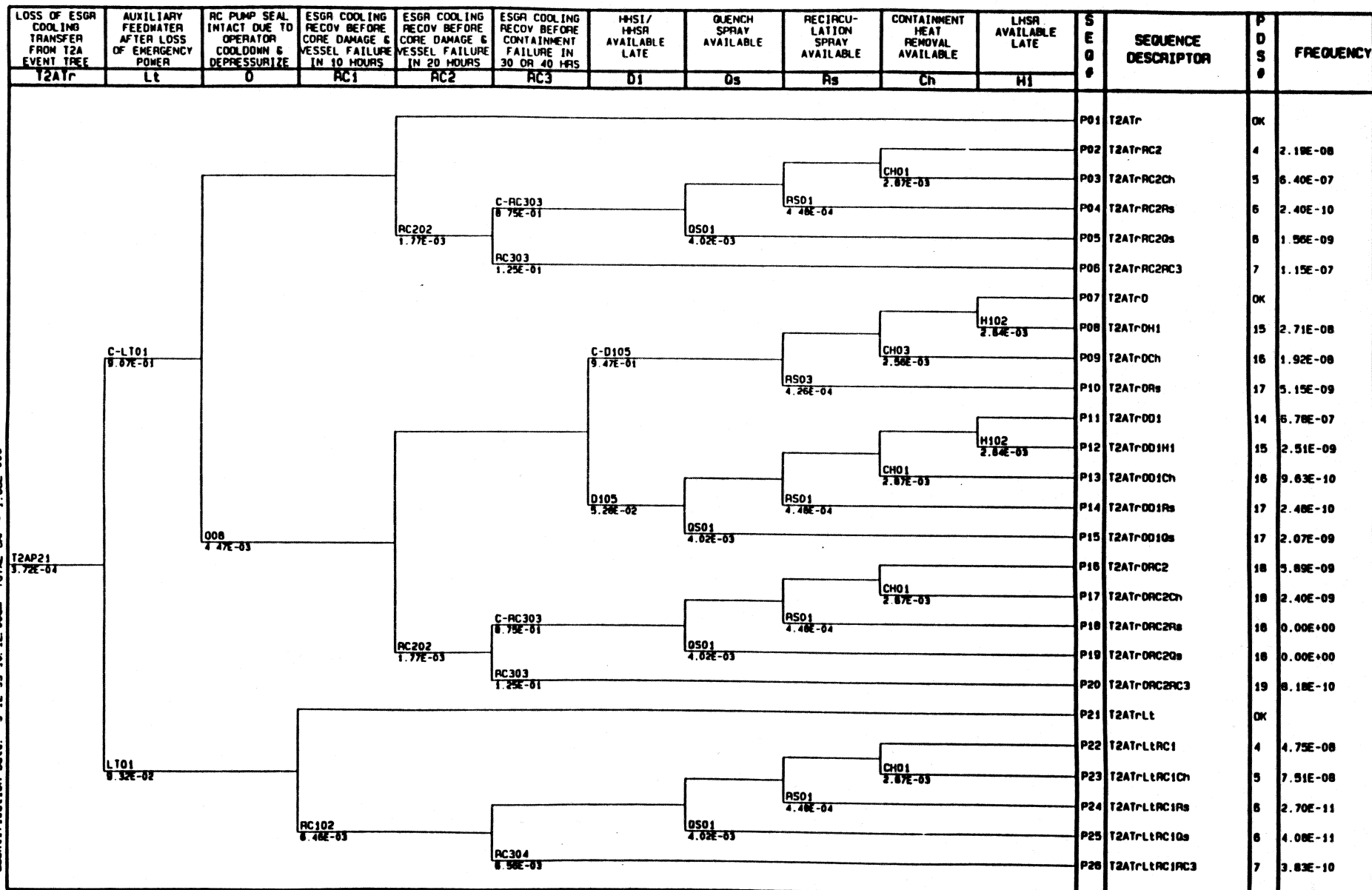
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NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T2A: RECOVERABLE LOSS OF MAIN FEEDWATER EVENT TREE

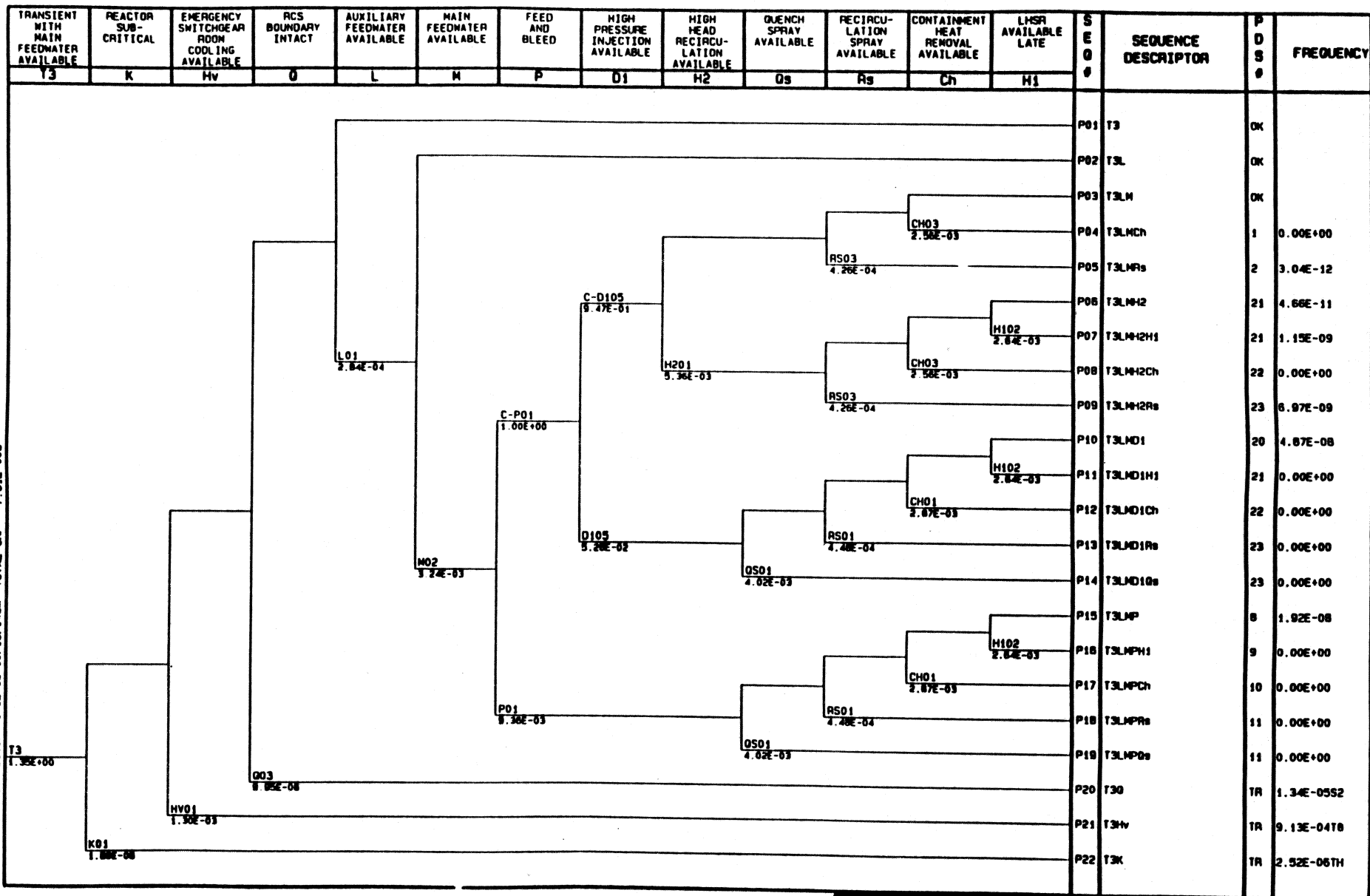
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Quantification Date: 3-12-93 10:12:00am TOTAL CDF = 1.65E-006



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T2ATr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING
TRANSFER FROM T2A RECOVERABLE LOSS OF MAIN FM EVENT TREE

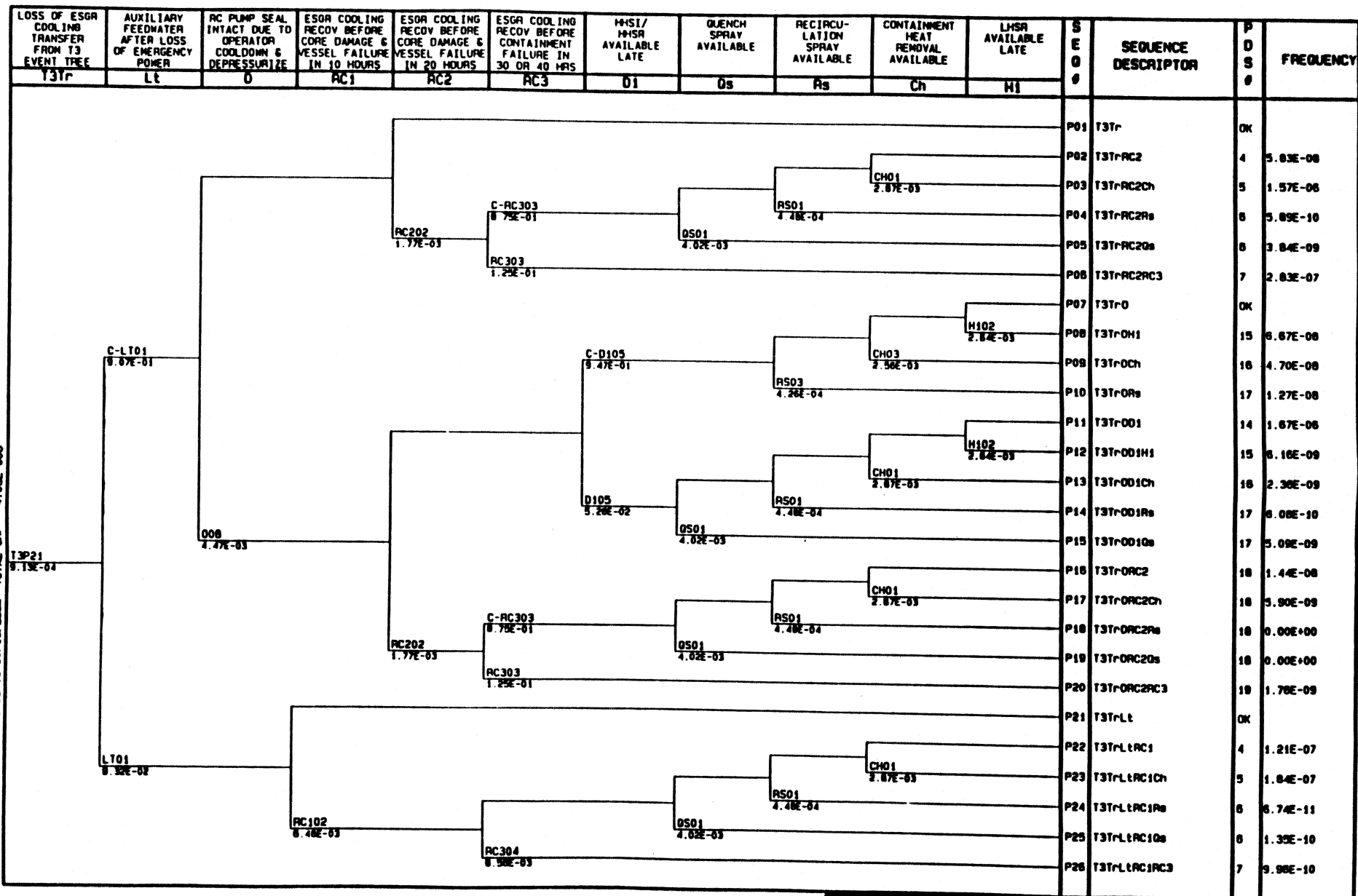
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NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T3: TRANSIENT WITH MAIN FEEDWATER AVAILABLE EVENT TREE

C:\NAPS\ETRES\OLDTREES\T3TR.EVT 3:00:02pm 12-15-92 MUPRA 2.1a VPMR
Quantification Date: 3-12-93 10:18:23am TOTAL CDF = 4.03E-06

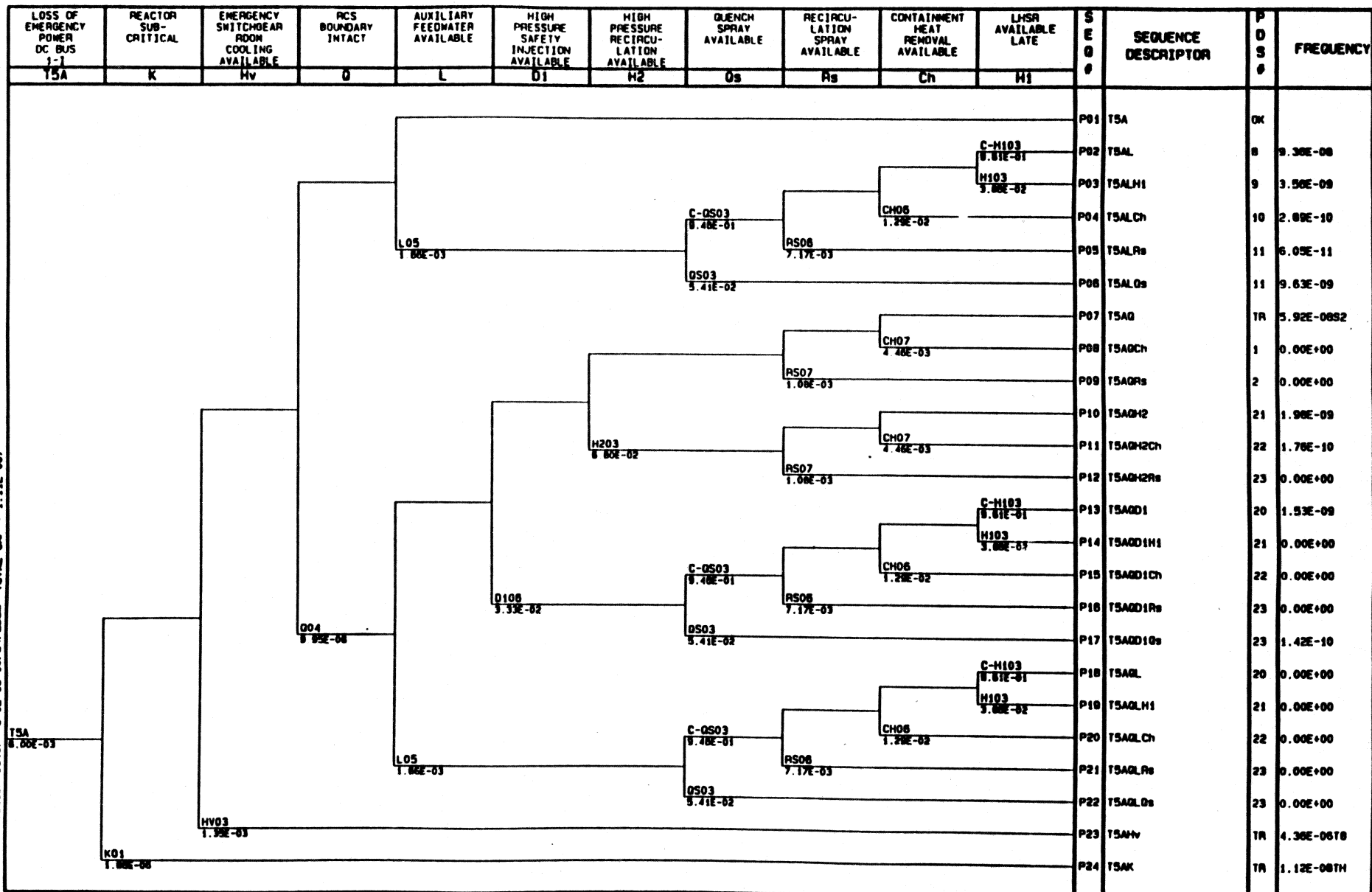


NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T3Tr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T3 TRANSIENT WITH MFW AVAILABLE EVENT TREE

NAP

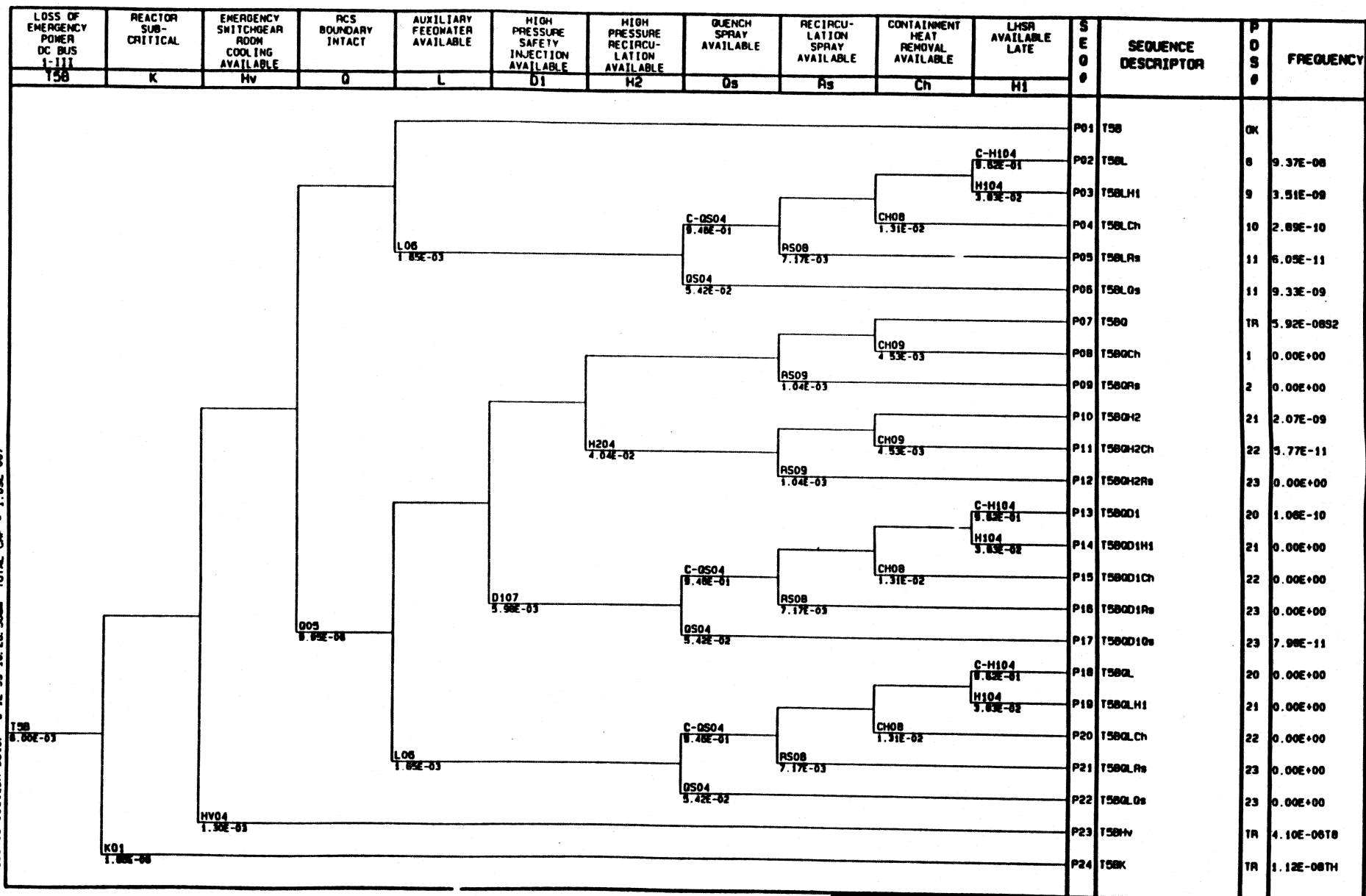
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Quantification Date: 3-12-93 10:24:25am TOTAL CDF = 1.11E-07



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

TSA: LOSS OF EMERGENCY POWER DC BUS 1-1 EVENT TREE

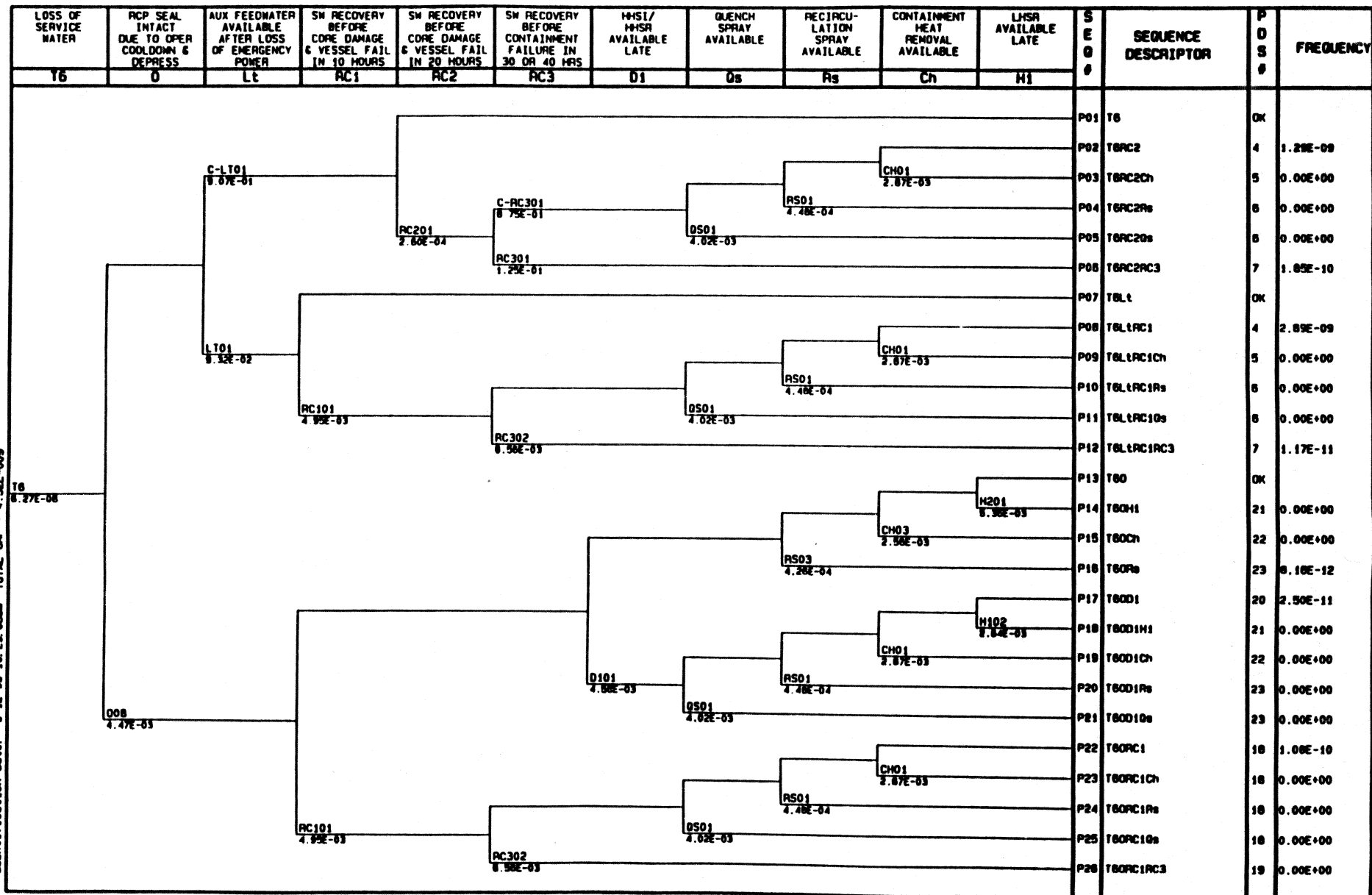
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Quantification Date: 3-12-93 10:28:36am TOTAL CDF = 1.09E-007



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T5B: LOSS OF EMERGENCY POWER DC BUS 1-III EVENT TREE

C:\NAPS\ETRES\OLDTRES\T6.EVT 1:00:02am 12-15-92 NUPRA 2.1a VPMR
Quantification Date: 3-12-93 10:26:03am TOTAL CDF = 4.93E-009



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T6: LOSS OF SERVICE WATER EVENT TREE

NAP

F

8

-1-93

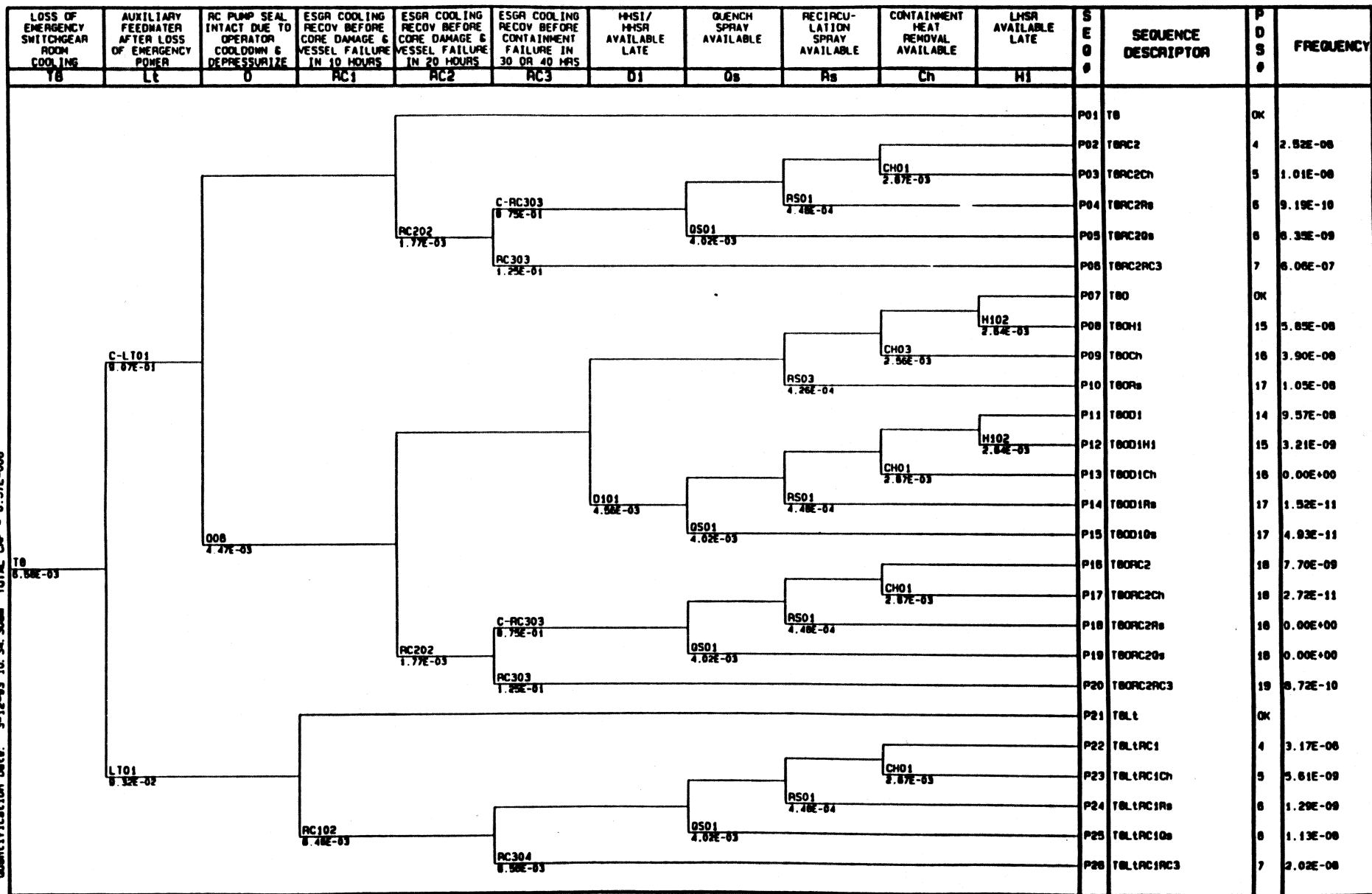
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 Quantification Date: 3-12-93 10:31:32am TOTAL CDF = 7.01E-006

STEAM GENERATOR TUBE RUPTURE	REACTOR SUB-CRITICAL	EMERGENCY SWITCH-GEAR ROOM COOLING AVAILABLE	HIGH PRESSURE INJECTION AVAILABLE	AUXILIARY FEEDWATER AVAILABLE	FEED AND BLEED	AFFECTED STEAM GENERATOR ISOLATION	OPERATOR COOLDOWN AND DEPRESSURIZE	OPERATOR COOLDOWN LATE	ACCUMULATOR INJECTION LATE	LOW HEAD SAFETY INJECTION AVAILABLE	HIGH HEAD RECIRCULATION AVAILABLE	RESIDUAL HEAT REMOVAL COOLING	QUENCH SPRAY AVAILABLE	RECIRCULATION SPRAY AVAILABLE	CONTAINMENT HEAT REMOVAL AVAILABLE	SEQ #	SEQUENCE DESCRIPTOR	POS #	FREQUENCY	
Y7	K	Hv	D1	L	P	SG1	O	O2	O2	O3	H2	W	Os	Rs	Ch					
																	P01	Y7	01	
																	P02	Y7O	02	
																	P03	Y7O2	03	1.00E-06
																	P04	Y7O2O	04	9.00E-08
																	P05	Y7O2O1	05	
																	P06	Y7O2O1O	06	1.10E-06
																	P07	Y7O2O1O2	07	1.00E-07
																	P08	Y7L	08	
																	P09	Y7LCH	09	1.10E-06
																	P10	Y7LCH2	10	1.04E-06
																	P11	Y7LCH2O	11	9.00E-08
																	P12	Y7LCH2O2	12	9.00E-09
																	P13	Y7LCH2O2O	13	1.70E-10
																	P14	Y7LCH2O2O2	14	9.00E-09
																	P15	Y7LCH2O2O2O	15	9.00E-09
																	P16	Y7LCH2O2O2O2	16	9.00E-11
																	P17	Y7LCH2O2O2O2O	17	9.00E-12
																	P18	Y7LCH2O2O2O2O2	18	9.00E-13
																	P19	Y7LCH2O2O2O2O2O	19	9.00E-14
																	P20	Y7O1	20	
																	P21	Y7O1O	21	
																	P22	Y7O1O2	22	9.00E-06
																	P23	Y7O1O2O	23	1.00E-07
																	P24	Y7O1O2O2	24	1.00E-08
																	P25	Y7O1O2O2O	25	9.00E-09
																	P26	Y7O1O2O2O2	26	9.00E-09
																	P27	Y7O1O2O2O2O	27	9.00E-07
																	P28	Y7O1O2O2O2O2	28	9.00E-10
																	P29	Y7O1O2O2O2O2O	29	9.00E-09
																	P30	Y7O1O2O2O2O2O2	30	1.00E-09

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

17: STEAM GENERATOR TUBE RUPTURE EVENT TREE

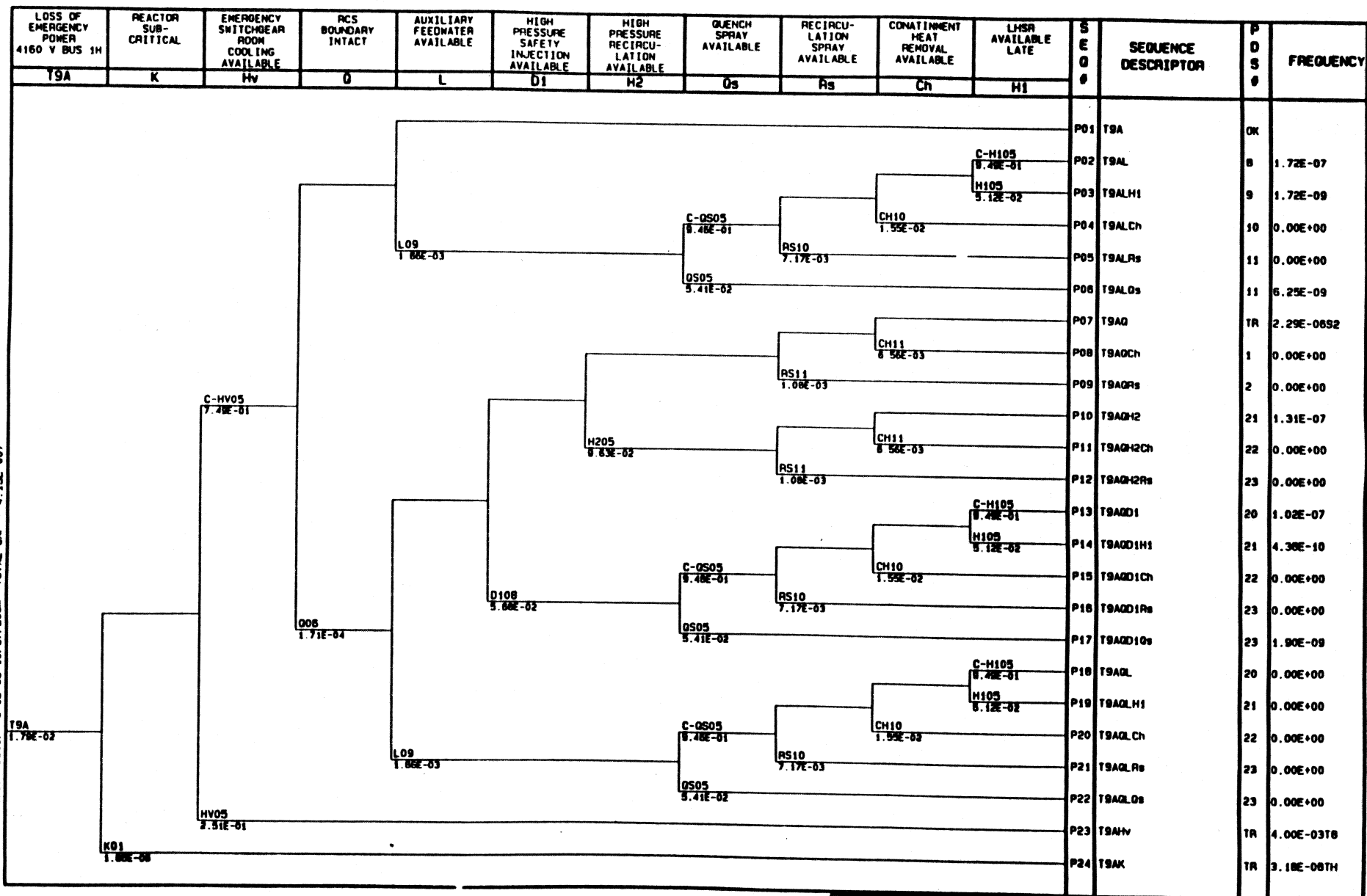
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Quantification Date: 3-12-93 10:34:30am TOTAL Cdf = 6.57E-006



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

TB: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING EVENT TREE

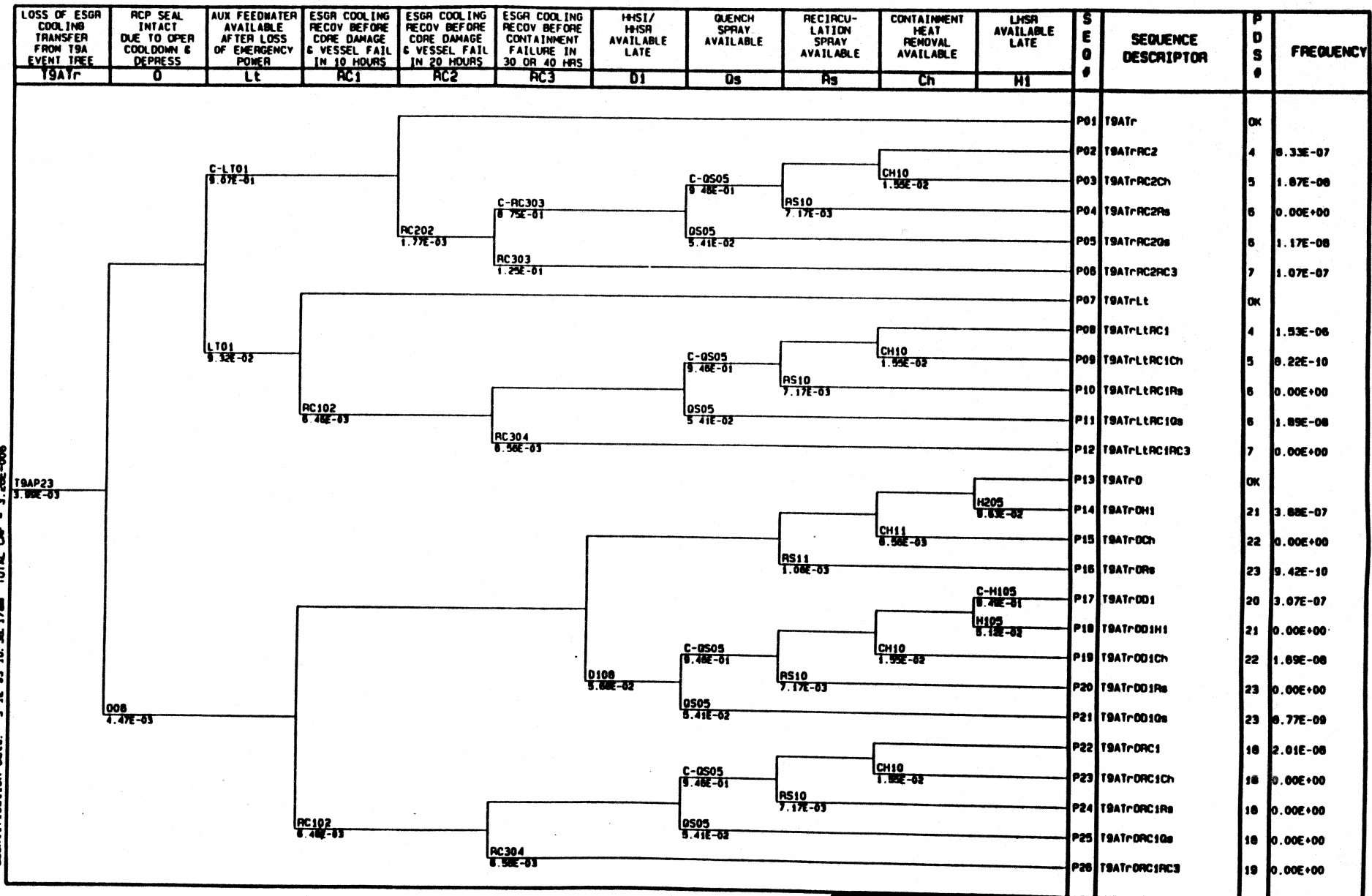
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 Quantification Date: 3-12-93 10:37:26am TOTAL CF = 4.15E-07



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T9A: LOSS OF EMERGENCY POWER 4160 V BUS 1H EVENT TREE

C:\NAPS\ETRES\OLDTREES\T9ATR.EVT 1:00:02pm 12-15-92 NUPRA 2.1a VPR
Quantification Date: 3-12-93 10:38:17am TOTAL CDF = 3.28E-06

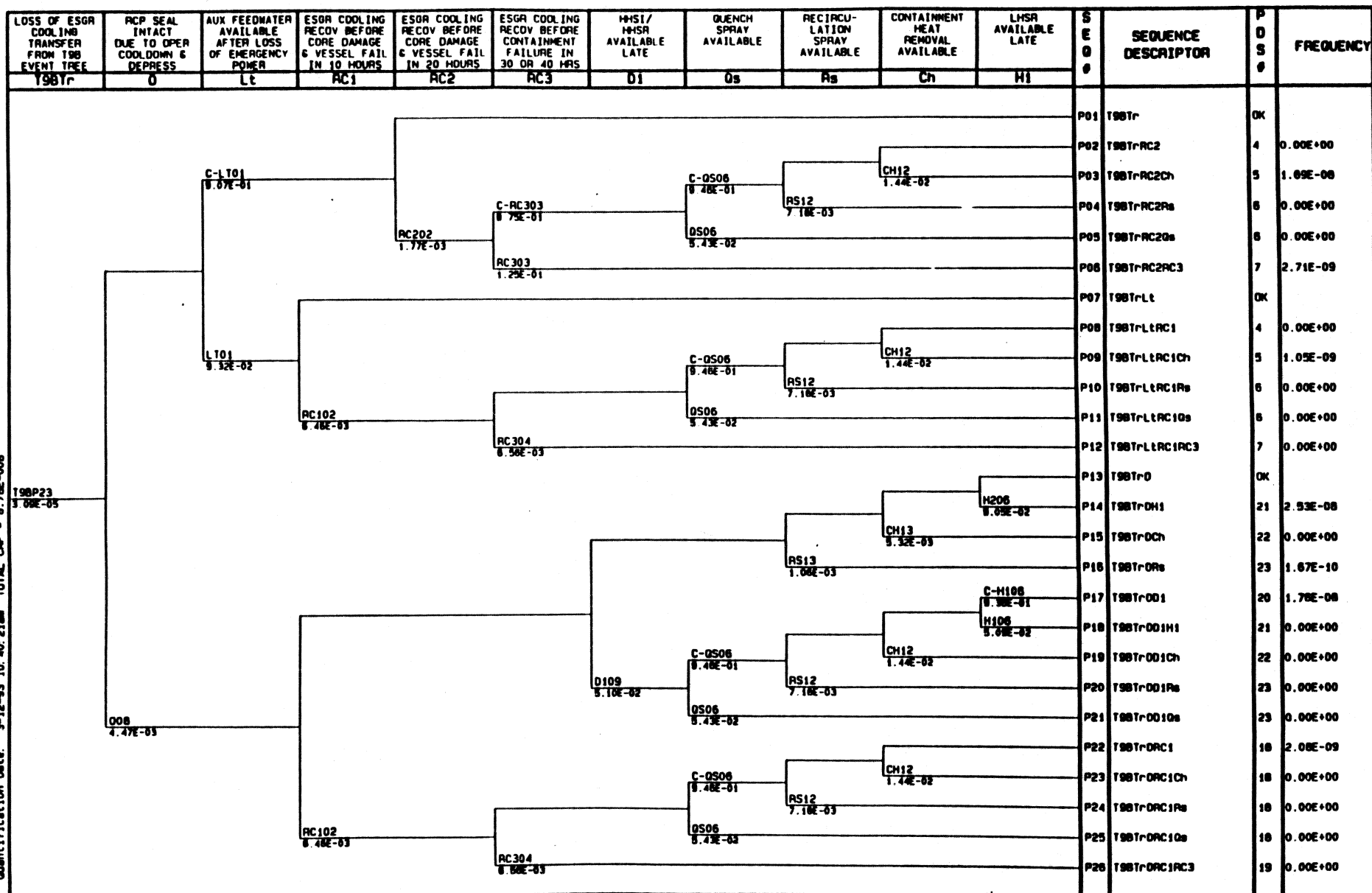


NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T9ATR: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING TRANSFER FROM T9A LOSS OF 4160 V BUS 1H EVENT TREE

NAP

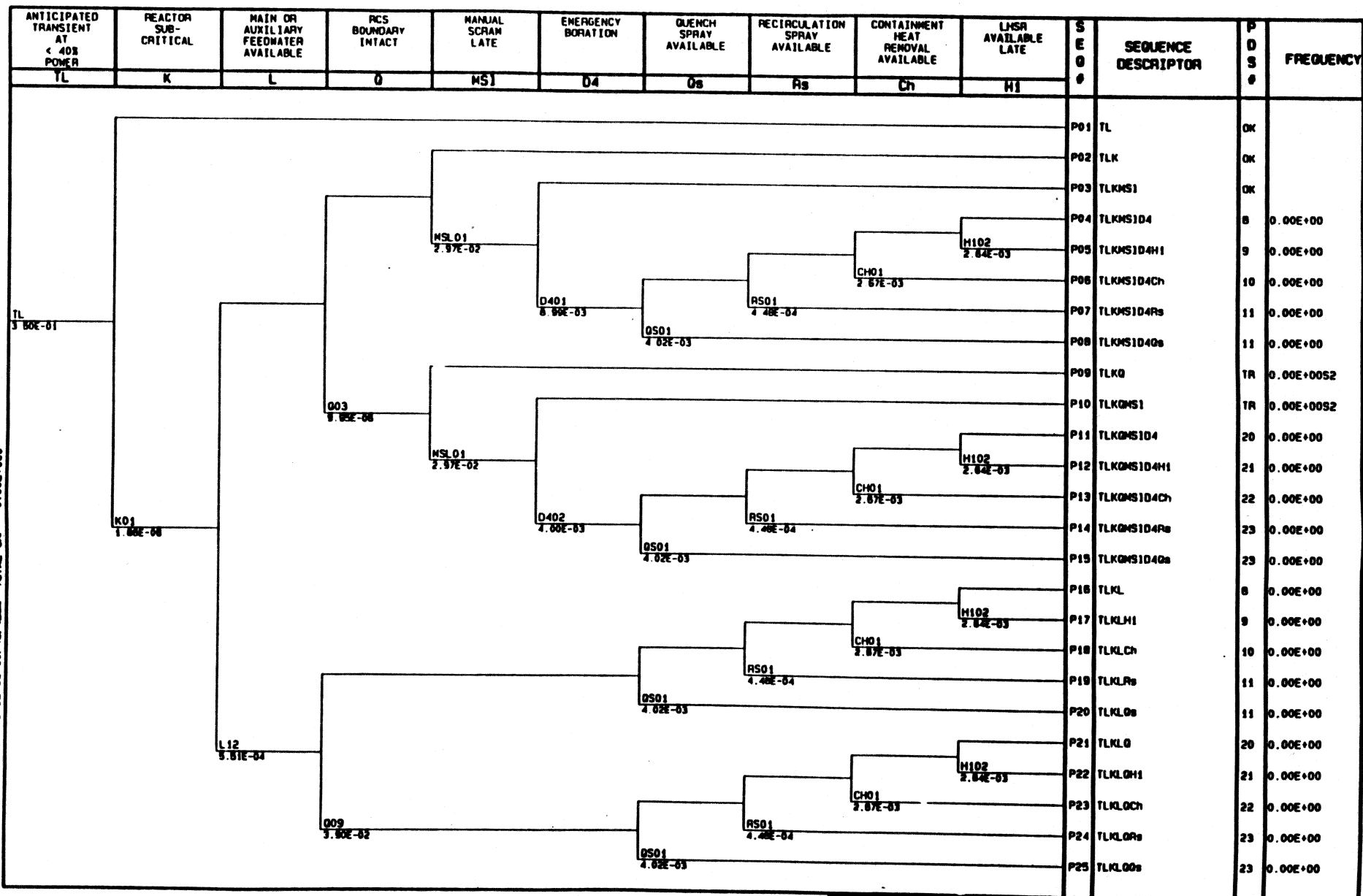
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 Quantification Date: 3-12-93 10:40:21am TOTAL CDF = 6.78E-008



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

T80Tr: LOSS OF EMERGENCY SWITCHGEAR ROOM COOLING
 TRANSFER FROM T80 LOSS OF 4160 V BUS 1J EVENT TREE

C:\NAPS\ETRES\OLDTRES\TL.EVT 1:00:02pm 12-15-92 NUPRA 2.1a VPMR
Quantification Date: 3-12-93 10:46:42am TOTAL CDF = 0.00E+000



NORTH ANNA INDIVIDUAL PLANT EXAMINATION

TL: LOW POWER ATMS EVENT TREE
(ANTICIPATED TRANSIENT WITHOUT SCRAM, LESS THW)

(WER)

NAF

C:\NAPS\ETREES\OLOTREES\VX.EVT 1:00:02am 12-15-92 NUPRA 2.1b VPMR
 Quantification Date: 3-12-93 10:48:58am TOTAL Cdf = 1.60E-006

INTERFACING SYSTEM LOCA	BREAK SIZE LARGER THAN VERY SMALL	EMERGENCY SWITCHGEAR ROOM COOLING AVAILABLE	HIGH PRESSURE INJECTION AVAILABLE	AUXILIARY FEEDWATER AVAILABLE	OPERATOR COOLDOWN AND DEPRES- SURIZATION	ISOLATION OF BREAK	S E Q	SEQUENCE DESCRIPTOR	P O S	FREQUENCY
VX	Fm	Hv	D1	L	O	V1				
<pre> graph LR VX[VX 1.80E-06] --> P01[C-FM01 4.80E-02] P01 --> P02[HV01 1.30E-03] P02 --> P03[D101 4.56E-03] P03 --> P04[L01 2.84E-04] P04 --> P05[C-001 1.00E-15] P05 --> P06[V101 1.00E+00] P06 --> P07[C-V101] </pre>							P01	VX	OK	
							P02	VXV1	24	0.00E+00
							P03	VXD	24	7.88E-08
							P04	VXL	24	1.34E-11
							P05	VXD1	24	2.70E-10
							P06	VXHV	24	1.97E-12
							P07	VXFa	24	1.52E-06

NORTH ANNA INDIVIDUAL PLANT EXAMINATION

VX: INTERFACING SYSTEM LOCA EVENT TREE