PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-4502

1881 - 1981

JOHN S. KEMPER
VICE-PRESIDENT
ENGINEERING AND RESEARCH

October 3, 1983

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Limerick Generating Station, Units 1 and 2
Safety Evaluation Report Open Issue #19
Reclassification of Events

Reference: Telecon, J. T. Robb and D. F. Ciarlone (PECO) to B. Hardin (NRC), September 20, 1983

File: GOVT 1-1 (NRC)

Dear Mr. Schwencer:

The subject open item was discussed during the reference telecon. In the discussion the NRC Reviewer restated the NRC position regarding the frequency classification of the generator load rejection with bypass failure event and of the turbine trip with bypass failure event. The PECO Engineer then described the calculational procedure actually used to analyze the two transients in question.

At the conclusion of the telecon, it was agreed that PECO would continue to impose the moderate-frequency-event safety criteria upon these two transients pending completion of the review of this generic question by the NRC staff. It was further agreed that PECO would document the information and positions conveyed by making the appropriate revisions to the Limerick FSAR.

Attached are draft revisions to FSAR Table 15.0-1, and FSAR Sections 15.2.2.1.2.2 and 15.2.3.1.2.2. These draft FSAR revisions will be incorporated into the FSAR exactly as they appear on the attachments in the revision scheduled for November 1983.

Sincerely,

John S. Kemper

DFC/mjb 9/30/83-1
Copy to: See Attached Service List

A001
1/1

cc: Judge Lawrence Brenner (w/o enclosure)
Judge Richard F. Cole (w/o enclosure)
Judge Peter A. Morris (w/o enclosure)
Troy B. Conner, Jr., Esq. (w/o enclosure)
Ann P. Hodgdon, Esq. (w/o enclosure)
Mr. Frank R. Romano (w/o enclosure)
Mr. Robert L. Anthony (w/o enclosure)
Mr. Marvin I. Lewis (w/o enclosure)
Judith A. Dorsey, Esq. (w/o enclosure)
Charles W. Elliott, Esq. (w/o enclosure)
Jacqueline I. Ruttenberg (w/o enclosure)
Thomas Y. Au, Esq. (w/o enclosure)
Mr. Thomas Gerusky (w/o enclosure)
Director, Pennsylvania Emergency Management Agency (w/o enclosure)
Mr. Steven P. Hershey (w/o enclosure)
Angus Love, Esq. (w/o enclosure)
Mr. Joseph H. White, III (w/o enclosure)
David Wersan, Esq. (w/o enclosure)
Robert J. Sugarman, Esq. (w/o enclosure)
Martha W. Bush, Esq. (w/o enclosure)
Spence W. Perry, Esq. (w/o enclosure)
Atomic Safety and Licensing Appeal Board (w/o enclosure)
Atomic Safety and Licensing Board Panel (w/o enclosure)
Docket and Service Section (w/o enclosure)
Jay M. Gutierrez (w/o enclosure)

TABLE 15.0-1

RESULTS SUMMARY OF TRANSIENT EVENTS APPLICABLE TO BWRs

PARAGRAPH NO.	FIGURE NO.	DESCRIPTION	MAXIMUM NEUTRON FLUX % NBR	MAXIMUM DOME PRESSURE (psig)	MAXIMUM VESSEL PRESSURE (psig)	MAXIMUM STEAM LINE PRESSURE (psig)	MAXIMUM CORE AVERAGE SURFACE HEAT FLUX % OF INITIAL	ΔCPR[2]	FREQUENCY CATEGORY[1]	NO. OF VALVES 1ST BLOW-DOWN	DURATION OF BLOW-DOWN (sec)
15.1		DECREASE IN CORE COOLANT TEMPERATURE									
15.1.1	15.1-1	Loss of Feedwater Heater, Automatic Flow Control	119.1	1024.0	1060.0	1014.0	113.5	<0.16[4]	a	0	0.0
15.1.1	15.1-2	Loss of Feedwater Heater, Manual Flow Control	127.7	1030.0	1069.0	1016.0	119.4	0.16	a	0	0.0
15.1.2	15.1-3	Feedwater Controller Failure, Maximum Demand, 127% Flow[3]	156.3	1168	1194	1165	105.0	0.06	a	14	6.0
15.1.3	15.1-4	Pressure Regulator Failure - Open	104.3	1149.0	1165.0	1148.0	100.3	<0.06[4]	a	5	3.2
15.1.4	-	Inadvertent Opening of Safety or Relief Valve	See Text						b		
15.1.6	-	Inadvertent RHR Shutdown Cooling Operation	See Text						a		
15.2	-	INCREASE IN REACTOR PRESSURE									
15.2.1	-	Pressure Regulator Failure - Closed	See 15.2.2 and 15.2.3 (Bypass on)						a		
15.2.2	15.2-1	Generator Load Rejection, Trip Scram, Bypass, and RPT - On[3]	178.5	1169	1193	1164	101.2	0.03	a	14	6.0
15.2.2	15.2-2	Generator Load Rejection, Trip Scram, Bypass - Off, RPT - On[3]	222.5	1200	1225.0	1196.0	106.2	0.06	a[6]	14	12.7
15.2.3	15.2-3	Turbine Trip, Trip Scram, and RPT - On	163.3	1174.0	1196.0	1169.0	102.0	<0.16[4]	a	14	5.8

TABLE 15.0-1 (Cont'd)

PARAGRAPH NO.	FIGURE NO.	DESCRIPTION	MAXIMUM NEUTRON FLUX % NBR	MAXIMUM DOME PRESSURE (psig)	MAXIMUM VESSEL PRESSURE (psig)	MAXIMUM STEAM LINE PRESSURE (psig)	MAXIMUM CORE AVERAGE SURFACE HEAT FLUX % OF INITIAL	ΔCPR(2)	FREQUENCY CATEGORY(1)	NO. OF VALVES 1ST BLOWDOWN	DURATION OF BLOWDOWN (sec)
15.2.3	15.2-4	Turbine Trip, Trip Scram, Bypass - Off, BTP - On(3)	198.4	1198	1223.0	1195.0	104.5	0.06	a(6)	14	12.6
15.2.4	15.2-5	MSIV Closure, Position Switch Scram	190.9	1187.0	1220.0	1185.0	100.0	<0.06(4)	a	14	11.5
15.2.5	15.2-6	Loss of Condenser Vacuum	160.9	1172.0	1194.0	1168.0	101.9	<0.06(4)	a	14	10.8
15.2.6	15.2-7	Loss of Auxiliary Power Transformer	104.3	1180.0	1194.0	1179.0	100.1	<0.06(4)	a	14	7.5
15.2.6	15.2-8	Loss of All Grid Connections	109.3	1173.0	1190.0	1169.0	100.0	<0.06(4)	a	14	11.6
15.2.7	15.2-9	Loss of All Feedwater Flow	104.3	1144.0	1155.0	1144.0	100.0	<0.06(4)	a	5	2.2
15.2.8	-	Feedwater Line Break	See Table 15.0-3, event 15.6.6								
15.2.9	-	Failure of RHR Shutdown Cooling	See Text								
15.3	-	DECREASE IN REACTOR COOLANT SYSTEM FLOW RATE									
15.3.1	15.3-1	Trip of One Recirculation Pump Motor	104.3	1021.0	1057.0	1011.0	100.0	<0.06(4)	a	0	0.0
15.3.1	15.3-2	Trip of Both Recirculation Pump Motors	104.3	1149.0	1100.0	1148.0	100.1	<0.06(4)	a	5	3.0
15.3.2	-	Recirculation Flow Control Failure - Decreasing Flow	See 15.3.1						a		
15.3.3	15.3-3	Seizure of One Recirculation Pump	104.3	1023.0	1057.0	1013.0	102.2	<0.16(4)	c	0	0.0
15.3.4	-	Recirculating Pump Shaft Break	See 15.3.3						c		

TABLE 15.0-1 (Cont'd)

PARAGRAPH NO.	FIGURE NO.	DESCRIPTION	MAXIMUM NEUTRON FLUX % NBR	MAXIMUM DOME PRESSURE (psig)	MAXIMUM VESSEL PRESSURE (psig)	MAXIMUM STEAM LINE PRESSURE (psig)	MAXIMUM CORE AVERAGE SURFACE HEAT FLUX % OF INITIAL	ΔCPR(2)	FREQUENCY CATEGORY(1)	NO. OF VALVES 1ST BLOWDOWN	DURATION OF BLOWDOWN (sec)
15.4	-	REACTIVITY AND POWER DISTRIBUTION ANOMALIES									
15.4.1.1	-	Rod Withdrawal Error (RWE) - Refueling	See Text						b		
15.4.1.2	-	RWE - Startup	See Text						b		
15.4.2	-	RWE - At Power	See Text						b		
15.4.3	-	Control Rod Misoperation	See 15.4.1 and 15.4.2						b		
15.4.4	15.4-6	Abnormal Startup of Idle Recirculation Loop	454.9	981.0	996.0	977.0	150.8	(5)	a	0	0.0
15.4.5	15.4-7	Recirculation Flow Control Failure - Increasing Flow	382.3	982.0	1001.0	928.0	145.1	(5)	a	0	0.0
15.4.7	-	Misplaced Bundle Accident	See Text						b		
15.4.9	-	Rod Drop Accident	See Text						c		
15.5	-	INCREASE IN REACTOR COOLANT INVENTORY									
15.5.1	15.5-1	Inadvertent HPCI Pump Start	127.0	1023.0	1060.0	1013.0	107.7	<0.16(4)	a	0	0.0
15.5.3	-	BWR Transients	See appropriate events in 15.1 and 15.2								

(1) a = Incidents of moderate frequency
b = Infrequent incidents
c = Limiting faults

(2) ΔCPRs are based on initial CPR that would yield a MCPR of 1.06.

(3) Results do not include adjustment factors and utilize EOC parameters (Reference 15.0-8).

(4) Estimated value, based on comparison with the most severe transient in the pressurization or nonpressurization category.

(5) These events are postulated to occur at low power and low flow conditions; a larger thermal margin is maintained above the safety limit prior to the event occurrence. Therefore, the resulting MCPR is well above 1.06.

(6) These events are classified as moderate frequency events for analysis purposes pending the final resolution of this generic issue as discussed in section 15.2.2.1.2.2 and 15.2.3.1.2.2.

15.2.1.5 Radiological Consequences

Because this transient does not result in any fuel failures, or any release of primary coolant to either the secondary containment or to the environment, there are no radiological consequences associated with this transient.

15.2.2 GENERATOR LOAD REJECTION

15.2.2.1 Identification of Causes and Frequency Classification

15.2.2.1.1 Identification of Causes

Fast closure of the TCVs is initiated whenever electrical grid disturbances occur that result in significant loss of electrical load on the generator. The TCVs are required to close as rapidly as possible to prevent excessive overspeed of the turbine-generator (T-G). Closure of the main turbine control valves will cause a sudden reduction in steam flow that results in an increase in system pressure and a reactor shutdown.

15.2.2.1.2 Frequency Classification

DRAFT

15.2.2.1.2.1 Generator Load Rejection

This transient is categorized as an incident of moderate frequency.

15.2.2.1.2.2 Generator Load Rejection with Bypass Failure

This transient is categorized as an infrequent incident with a freque[illegible] en failure (MTBE) [illegible]

SEE INSERT A

Frequency Basis: Thorough searches of domestic plant operating records have revealed three instances of bypass failure during 628 bypass system operations. This gives a probability of bypass failure of 0.0048. Combining the actual frequency of a generator load rejection with the failure rate of the bypass yields an event frequency of a generator load rejection with bypass failure of 0.0036/plant year.

15.2.2.2 Sequence of Events and System Operation

15.2.2.2.1 Sequence of Events

15.2.2.2.1.1 Generator Load Rejection - Turbine Control Valve Fast Closure

A loss of generator electrical load from high power conditions produces the sequence of events listed in Table 15.2-1.

Insert A

DRAFT

The frequency basis presented below, which is based upon operating plant data, provides a sound basis for this event to be categorized as an infrequent incident with a frequency of 0.0036/plant year, and a mean time between failure (MTBF) of 278 years. However, this basis is currently under review by the NRC. As a result, this transient has been classified as an incident of moderate frequency, and it has been included as such in the analysis of plant transients subject to the corresponding safety criteria, i.e. MCPR. This event will remain classified as an incident of moderate frequency until the NRC approves the frequency basis given below, or another similar to it.

15.2.2.5 Radiological Consequences

While the consequence of this transient does not result in fuel failure, it does result in the discharge of normal coolant activity to the suppression pool via MSRV operation. Because this activity is restricted to the primary containment, there is no exposure to operating personnel. This transient does not result in an uncontrolled release to the environment, so the plant operator can choose to leave the activity bottled up in the containment or discharge it to the environment under controlled release conditions. If purging of the containment is chosen, the release will be in accordance with established technical specifications and, at the worst, would only result in a small increase in the yearly integrated exposure level.

15.2.3 TURBINE TRIP

15.2.3.1 Identification of Causes and Frequency Classification

15.2.3.1.1 Identification of Causes

A variety of turbine or nuclear system malfunctions will initiate a turbine trip. Some examples are: moisture separator and heater drain tank high levels, large vibrations, operational lockout, loss of control fluid pressure, low condenser vacuum, and reactor high water level.

15.2.3.1.2 Frequency Classification

15.2.3.1.2.1 Turbine Trip

This transient is categorized as an incident of moderate frequency. In defining the frequency of this transient, turbine trips that occur as a by-product of other transients, such as loss of condenser vacuum or reactor high level trip events, are not included. However, spurious low vacuum or high level trip signals, which cause an unnecessary turbine trip, are included in defining the frequency. In order to get an accurate event-by-event frequency breakdown, this division of initiating causes is required.

15.2.3.1.2.2 Turbine Trip with Failure of the Bypass

This transient disturbance is categorized as an infrequent incident. Fr SEE INSERT B ows:

Frequency: 0.0064/plant year MTBE: 156 years

Frequency Basis: As discussed in Section 15.2.2.1.2.2, the failure rate of the bypass is 0.0048. Combining this with the turbine trip frequency of 1.33 events/plant year yields the frequency of 0.0064/plant year.

Insert B

DRAFT

In a manner similar to that of the Generator Load Rejection with Bypass Failure event, this disturbance could also be categorized as an infrequent incident with a frequency of 0.0064/plant year and a MTBF of 156 years. However, since the frequency basis below is not currently approved by the NRC, this event has been classified as an incident of moderate frequency, and it has been analyzed against the appropriate safety criteria, i.e. MCPR. This event will remain classified as an incident of moderate frequency until the NRC approves the frequency basis given below, or another similar to it.