REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8401160068 DOC.DATE: 84/01/10 NOTARIZED: NO DOCKET #.
FACIL:STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528
STN-50-529 Palo Verde Nuclear Station, Unit 2, Arizona Publi 05000529
STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530
AUTH.NAME AUTHOR AFFILIATION
VAN BRUNT,E.E. Arizona Public Service Co.
RECIP.NAME RECIPIENT AFFILIATION
KNIGHTON,G. Licensing Branch 3

SUBJECT: Forwards responds to Questions 640.01,640.02 & 640.03 re procedure generation package.

DISTRIBUTION CODE: B001S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 12
TITLE: Licensing Submittal: PSAR/FSAR Amdts & Related Correspondence

NOTES:Standardized plant. 05000528
Standardized plant. 05000529
Standardized plant. 05000530

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
	NRR/DL/ADL		1	0	NRR LB3 BC		1	0
	NRR LB3 LA		1	0	LICITRA,E.	01	1	1
INTERNAL:	ELD/HDS3		1	0	IE FILE		1	1
	IE/DEPER/EPB	36	3	3	IE/DEPER/IRB	35	1	1
	IE/DEQA/QAB	21	1	1	NRR/DE/AEAB		1	0
	NRR/DE/CEB	11	1	1	NRR/DE/EHEB		1	1
	NRR/DE/EQB	13	2	2	NRR/DE/GB	28	2	2
	NRR/DE/MEB	18	1	1	NRR/DE/MTEB	17	1	1
	NRR/DE/SAB	24	1	1	NRR/DE/SGEB	25	1	1
	NRR/DHFS/HFEB	40	1	1	NRR/DHFS/LQB	32	1	1
	NRR/DHFS/PSRB		1	1	NRR/DL/SSPB		1	0
	NRR/DSI/AEB	26	1	1	NRR/DSI/ASB		1	1
	NRR/DSI/CPB	10	1	1	NRR/DSI/CSB	09	1	1
	NRR/DSI/ICSB	16	1	1	NRR/DSI/METB	12	1	1
	NRR/DSI/PSB	19	1	1	NRR/DSI/RAB	22	1	1
	NRR/DSI/RSB	23	1	1	REG FILE	04	1	1
	RGN5		3	3	RM/DDAMI/MIB		1	0
EXTERNAL:	ACRS	41	6	6	BNL(AMDTS ONLY)		1	1
	DMB/DSS (AMDTS)		1	1	FEMA-REP DIV	39	1	1
	LPDR	03	1	1	NRC PDR	02	1	1
	NSIC	05	1	1	NTIS		1	1

TOTAL NUMBER OF COPIES REQUIRED: LTTR 53 ENCL 46

| | | |

Arizona Public Service Company
P.O. BOX 21666 • PHOENIX, ARIZONA 85036

January 10, 1984
ANPP 28584-WFQ/TFQ

Director of Nuclear Reactor Regulation
Attention: Mr. George Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. STN-50-528/529/530
File: 84-056-026; G.1.01.10

Reference: Letter from G. W. Knighton, NRC, to E. E. Van Brunt, Jr., APS, dated November 8, 1983.

Dear Mr. Knighton:

Attached for your review are APS' responses to questions transmitted by the referenced letter. These questions, 640.01 640.02 and 640.03, are in regard and to the PVNGS Procedure Generation Package.

Please contact me if you have any further questions on this matter.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
APS Vice President
Nuclear Projects Management
ANPP Project Director

EEVB/TFQ/sp
Attachment

cc: E. A. Licitra (w/a)
A. C. Gehr "

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Vice President, Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

Edwin E. Van Brunt

Edwin E. Van Brunt, Jr.

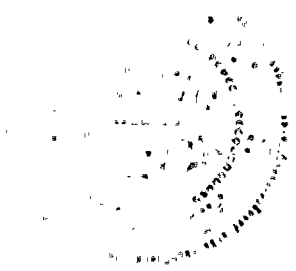
Sworn to before me this 9th day of January, 1984.

Nora E. Nedor

Notary Public

My Commission Expires:

My Commission Expires April 6, 1987



640.01 On page 12 of Section III of PVNGS PGP, it states that CEN-152 LOCA Guidelines were broken down into two PVNGS documents, one for small LOCA and one for large LOCA. The reason given by PVNGS for developing specific guidelines for a small LOCA and a large LOCA is that the actions for the two are significantly different. A large LOCA is defined as a LOCA which raises the containment pressure to 5 psig or greater. A LOCA which does not raise the containment pressure above 5 psig is designated as a small LOCA.

Our concern is that the operator could be directed to the incorrect procedure if the 5 psig criterion is not valid. We request that you provide (1) or (2) below:

(1) A discussion that justifies the adequacy of using the PVNGS large LOCA guideline for a small LOCA, and vice versa, in terms of the effect of omitting steps required in one guideline and not the other.

(2) An analysis that supports using the large LOCA guidelines for containment pressure 5 psig and greater, and using the small LOCA guidelines for containment pressure less than 5 psig. Also, provide a detailed discussion of the model and assumptions used in the analysis for the primary systems, secondary system and containment.

640.01 Response

If the operator uses the small break LOCA procedure in a large LOCA situation, sufficient second checks are incorporated into the procedure to direct the operator to the proper (large LOCA) procedure. This ensures the actions required during a large LOCA are performed. These checks include the following:

Step 3.0 - If 800 psia primary pressure is encountered within 15 minutes of SI procede to large LOCA procedure.

Step 9.0 - If a RAS signal is generated proceed to large LOCA procedure.

Step 22.3- If the plant is incapable of supporting 538 psia, SDC criteria, proceed to large LOCA procedure.

The checks are based on FSAR Analysis and indicated that an inadequate RCS inventory is available to provide core cooling. The steps from CEN-152 that are identified in the Technical Guidelines as not incorporated (section III, page 199), affect this procedure as follows:

Step 30 & 31 - These steps describe actions to be taken upon receipt of a RAS signal. They are omitted from the small LOCA procedure because a RAS signal is not anticipated in a small LOCA condition. If a RAS is received, step 7.0 of the small LOCA procedure will direct the operator to the procedure for a large LOCA that includes instructions for a RAS. This insures proper operation for plant conditions.

Step 23 & 35 - These describe actions to reset and bypass the MSIS setpoint during cooldown. These are omitted from the small LOCA procedure because they are provided in the plant cooldown procedure and this referenced in the small LOCA procedure.

Step 37 - 44 - These steps concern shutdown cooling, SIT operations and LTOP. These direct plant cooldown and address shutdown cooling, SIT isolation and LTOP protection as plant conditions warrant alterations in these systems. The small LOCA procedure provides guidance to the operator with special consideration for plant cooldown with a LOCA situation.

If, the operator implemented the large break LOCA procedure in a small LOCA situation, the large LOCA procedure provides the operator with sufficient guidance in both procedures for maintaining adequate core

640.02 In the PVNGS guidelines for the LOCA, step 22 on page 169 isolates the safety injection tanks (SIT) regardless of the pressure in the RCS. The CE guideline, CEN-152, requires that the SIT be isolated at a specific RCS pressure. The typical RCS pressure given in CEN-152 is 250 psia. To justify the removal of the pressure restrictions on the SIT isolation, provide the following:

(1) Demonstrate over a spectrum of large breaks that the effect of injecting a noncondensible gas (nitrogen) into the primary system is negligible.

(2) Show that premature SIT isolation is not likely, or provide an analysis (considering a range of large breaks) that shows that the effect of prematurely isolating the SIT is not a safety concern.

640.02 Response

The original DRAFT of CEN-152 did not identify any criteria for SIT Isolation other than time. Rev-1 of CEN-152 identifies RCS/SIT pressure as the criteria for isolating SIT. PVNGS will establish SIT isolation criteria to prevent premature SIT isolation. This criteria will then be incorporated into the Technical Guidelines and Recovery Procedures by the time the procedures are issued.

640.03 In the PVNGS Plant Specific Guideline, the safety functions as defined by PVNGS differ from CEN-152 in that RCS inventory and RCS pressure control have been combined and all safety functions dealing with containment have been combined. This change affects the safety function status check, Figure 10-3 in CEN-152, the resource assessment trees, and the specific function recovery guidelines for RCS inventory control, RCS pressure control, containment isolation, containment temperature and pressure, and containment combustible gas control. Provide sufficient information to show that the function recovery guidelines have been combined in such a manner that they reflect CEN-152 generic guidelines, or provide the technical basis, including supporting analysis, for the differences from the generic guidelines.

Upon event initiation the operators are directed to maintain safety functions. These actions are outlined in the form of primary and secondary operator flow charts Figures 1 and 2, which defines the criteria to be met to insure functions are maintained. The criteria outlined in CEN-152 Figure 10-3 is the same criteria utilized during performance of the steps of the flow charts, with the following exceptions:

- Due to plant specific design T_c is used vice T_{AVE}; CET readings are addressed, first by maintaining subcooling, then specific readings are taken in all Recovery Procedures.
- CET readings are one of the criteria used to maintain adequate core cooling. CET readings are taken during plant statusing at various points in the Recovery Procedures.
- H_2 control is addressed in the LOCA and Functional Recovery Procedures as plant conditions warrant.

These flow charts, do not identify or name the Safety Function to be monitored, but prescribe the criteria to be verified or established, as the preferred method of stabilizing plant parameters. This method is also used as a second check of parameters and criteria by the Supervisor while performing the steps of the diagnostic flow charts. These flow charts are not dependent on how the safety functions are defined but directly address the basic criteria which will indicate the status of the safety functions. This method allows for a symptomatic approach to acccident mitigation. If diagnosis is not possible the Functional Recovery Procedure will be implemented. The criteria for evaluating plan response in the Functional Recovery Procedure is identical to the criteria listed in CEN-152, Figure 10-3. When any of these criteria cannot be met the appropriate actions will be directed. This method does define which safety function is to be monitored. However, where the safety functions, as defined by CE, have been combined the criteria for verfiying those safety functions have also been combined. Operator actions are then directed based on this criteria.

FIGURE 10-3 SAFETY FUNCTION STATUS CHECK

THE SAFETY FUNCTIONS LISTED BELOW AND THEIR RESPECTIVE CRITERIA ARE THOSE USED TO CONFIRM THE ADEQUACY OF THE EVENTS' MITIGATION. ADDITIONAL SAFETY FUNCTIONS SHOULD BE MONITORED AS APPROPRIATE TO EVALUATE OVERALL PLANT STATUS

SAFETY FUNCTION		SUCCESS PATH CURRENTLY IN USE		CRITERIA	IF CRITERIA NOT MET IMPLIED PLANT CONDITIONS	RESOURCE TREE
1. REACTIVITY CONTROL	1A	CEA TRIP	1a	NO MORE THAN 1 CEA BOTTOM LIGHT NOT LIT AND RX POWER DECREASING OR RX POWER < 10^[X]% AND CONSTANT OR DECREASING	RX NOT SHUTDOWN AND EXCESSIVE HEAT PRODUCTION	TREE A
			1b	RX POWER < 10^[X]% AND CONSTANT OR DECREASING		
	1B	BORATION USING CHARGING PUMPS	1c	BORON ADDITION RATE > [40] GPM AND CORE POWER DECREASING OR RX POWER < 10^[X]% AND CONSTANT OR DECREASING		
	1C	BORATION USING ECCS PUMPS		BORON ADDITION RATE > [40] GPM AND CORE POWER DECREASING OR NO MORE THAN 1 CEA BOTTOM LIGHT NOT LIT AND RX POWER DECREASING OR RX POWER < 10^[X]% AND CONSTANT OR DECREASING		
	1D	CEA DRIVE DOWN				
2. RCS INVENTORY CONTROL A) LOW INVENTORY	2A	CHARGING PUMPS	2a	PRESSURIZER LEVEL > [36"] AND CONSTANT OR INCREASING AND SUBCOOLING > [20]°F (BY CET)	PLCS MALFUNCTIONING OR RCS BOUNDARY BREACH OR EXCESSIVE RCS COOLING	TREE B
	2B	ECCS PUMPS	2b 2c	ECCS DELIVERY CONSISTENT WITH FIGURE 10-11		
B) HIGH INVENTORY	2C	MANUAL CONTROL OF LETDOWN		[36"] < PRESSURIZER LEVEL < [246"] AND SUBCOOLING > [20]°F (BY CET)	EXCESSIVE WATER ADDITIONS OR EXCESSIVE HEAT ADDITION	
3. RCS PRESSURE CONTROL A) LOW PRESSURE	3A	PRESSURIZER HEATERS	3a	[20]°F < RCS SUBCOOLING < [200]°F RCS SUBCOOLED > [20]°F (BY CET) AND RCS PRESSURE WITHIN LIMITS P-T CURVE (FIGURE 10-10) AND ECCS DELIVERY CONSISTENT WITH FIGURE 10-11	PPCS MALFUNCTIONING OR RCS BOUNDARY BREACH OR EXCESSIVE RCS COOLING	TREE C
	3B	CVCS CHARGING, NO ECCS	3b			
	3C	ECCS PUMPS	3c			
	3D	MANUAL CONTROL OF PRESSURIZER SPRAY				
B) HIGH PRESSURE	3E	RCP'S RUNNING WITH STEAM DISCHARGE THROUGH ADV'S OR TBS	3b	RCS PRESSURE < [2340] PSIA AND CONSTANT OR DECREASING WITHIN P-T CURVE LIMITS (FIGURE 10-10)	PPCS MALFUNCTIONING OR EXCESSIVE RCS INVENTORY OR EXCESSIVE RCS HEAT ADDITION	
	3F	NATURAL CIRC. STEAM DISCHARGE THROUGH ADV'S OR TBS				
	3G	PORVs WITH ECCS OPERATING				
4. RCS AND CORE HEAT REMOVAL		PVNGS HAS NO PORV.	4a	AT LEAST ONE S/G LEVEL IS EITHER A) WITHIN THE ZERO POWER LEVEL BAND WITH FEEDWATER AVAILABLE TO MAINTAIN THE LEVEL OR B) BEING RESTORED BY A FEEDWATER FLOW > [150] GPM	LOSS OF FORCED CIRCULATION OR INADEQUATE NATURAL CIRC OR COOLANT SATURATED OR VOIDS OR INADEQUATE S/G HEAT SINK	TREE D
	4A	RCP's RUNNING, NO ECCS	4b	T_H-T_C < [10]°F AND		
			4g	T_{AVE} < [545]°F AND		
			4c	[20]°F < RCS SUBCOOLING < [200]°F [20]°F < SUBCOOLING < [200]°F (BY CET) AND T_H-TC < [50]°F AND AT LEAST ONE S/G LEVEL IS EITHER A) WITHIN THE ZERO POWER LEVEL BAND WITH FEEDWATER AVAILABLE TO MAINTAIN THE LEVEL OR B) BEING RESTORED BY A FEEDWATER FLOW > [150] GPM		
	4B	NATURAL CIRCULATION, NO ECCS	4d	ECCS DELIVERY CONSISTENT WITH FIGURE 10-11 AND CET < [800]°F OR DECREASING AND AT LEAST ONE S/G LEVEL IS EITHER A) WITHIN THE ZERO POWER LEVEL BAND WITH FEEDWATER AVAILABLE TO MAINTAIN THE LEVEL OR B) BEING RESTORED BY A FEEDWATER FLOW > [150] GPM		
	4C	STEAM GENERATORS AND ECCS				
		PVNGS HAS NO PORV				
	4D	ECCS AND PORVs		ECCS DELIVERY CONSISTENT WITH FIGURE 10-11 AND CET < [800]°F OR DECREASING		
			4e	AND RCS PRESS < [1300] PSIG OR DECREASING		
	4E	SHUTDOWN COOLING SYSTEM	4f	SCS PARAMETERS NORMAL		
5. CONTAINMENT ISOLATION	5A	MANUAL ISOLATION	5a	NO STEAM PLANT ACTIVITY ALARMS AND NO CONTAINMENT RADIATION ALARMS AND CONTAINMENT PRESSURE < [4] PSIG OR AT LEAST ONE CONTAINMENT ISOLATION VALVE FOR EACH CONTAINMENT PENETRATION NOT REQUIRED IS CLOSED	LARGE STEAM BREAK IN CNTMNT OR LARGE RCS BREAK IN CNTMNT	TREE E
			5b			
			5c			
6. CONTAINMENT TEMPERATURE & PRESSURE	6A	CONTAINMENT FAN COOLING SYSTEM NO CONTAINMENT SPRAY	6a	CONTAINMENT PRESSURE < [.5] PSIG AND CONTAINMENT TEMPERATURE < [215]°F AND CONTAINMENT SPRAY FLOW > [1500] GPM AND CONTAINMENT TEMPERATURE & PRESSURE CONSTANT OR DECREASING	LARGE STEAM BREAK IN CNTMNT OR LARGE RCS BREAK IN CNTMNT	TREE F
	6B	CONTAINMENT SPRAY AND/OR CONTAINMENT FANS	6b			
			6c			
7. CONTAINMENT COMBUSTIBLE GAS CONTROL	7A	[PLANT SPECIFIC INFO]	7a	H_2 < [X]%	RCS BOUNDARY BREAK	TREE G

FIGURE 10-3
SAFETY FUNCTION STATUS CHECK

* These Success Paths are addressed in the Functional Recevory Operating Procedure as alternates as appropriate.

7a H_2 is addressed in every Recovery Procedure as a check of containment parameters

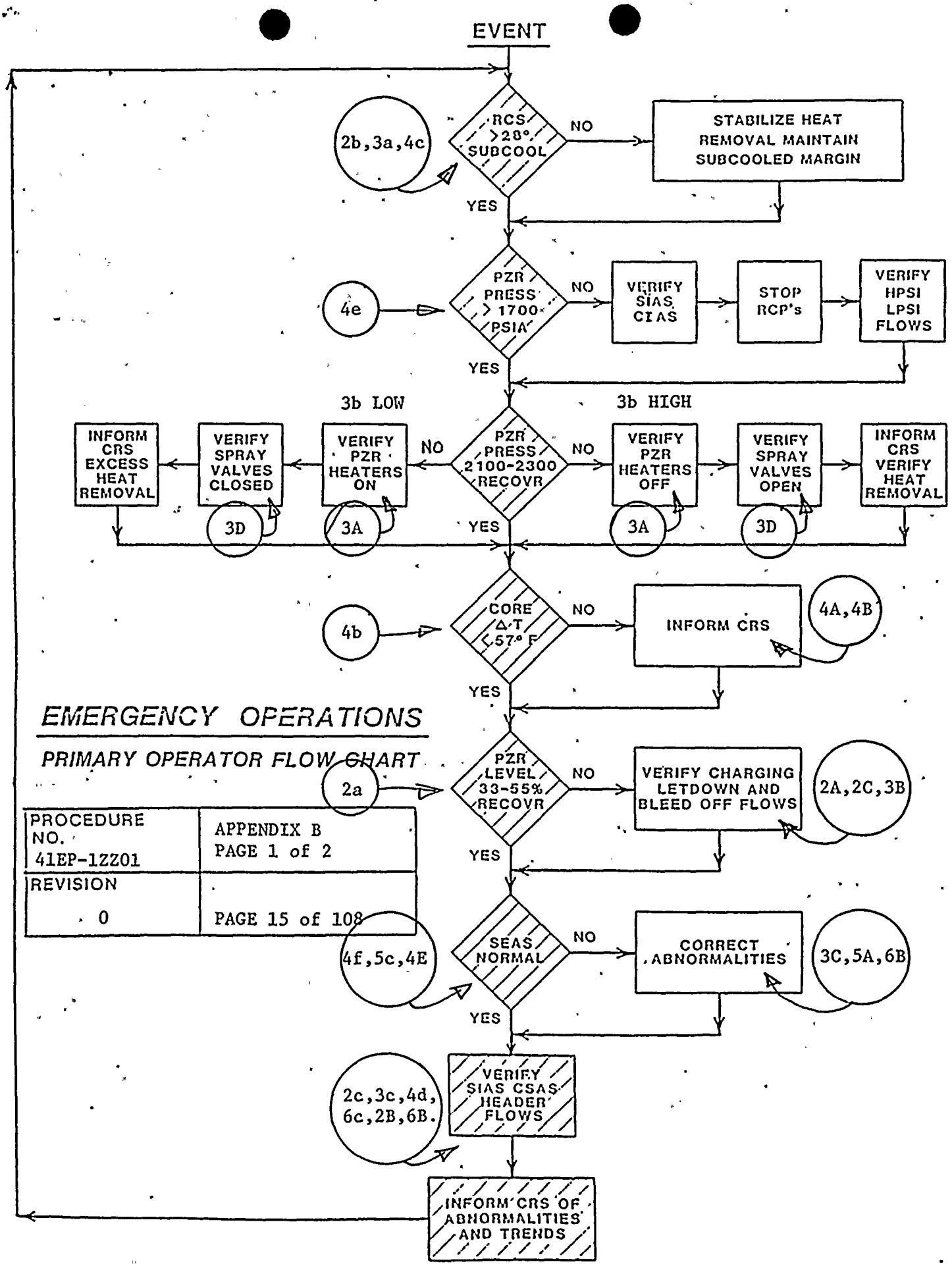
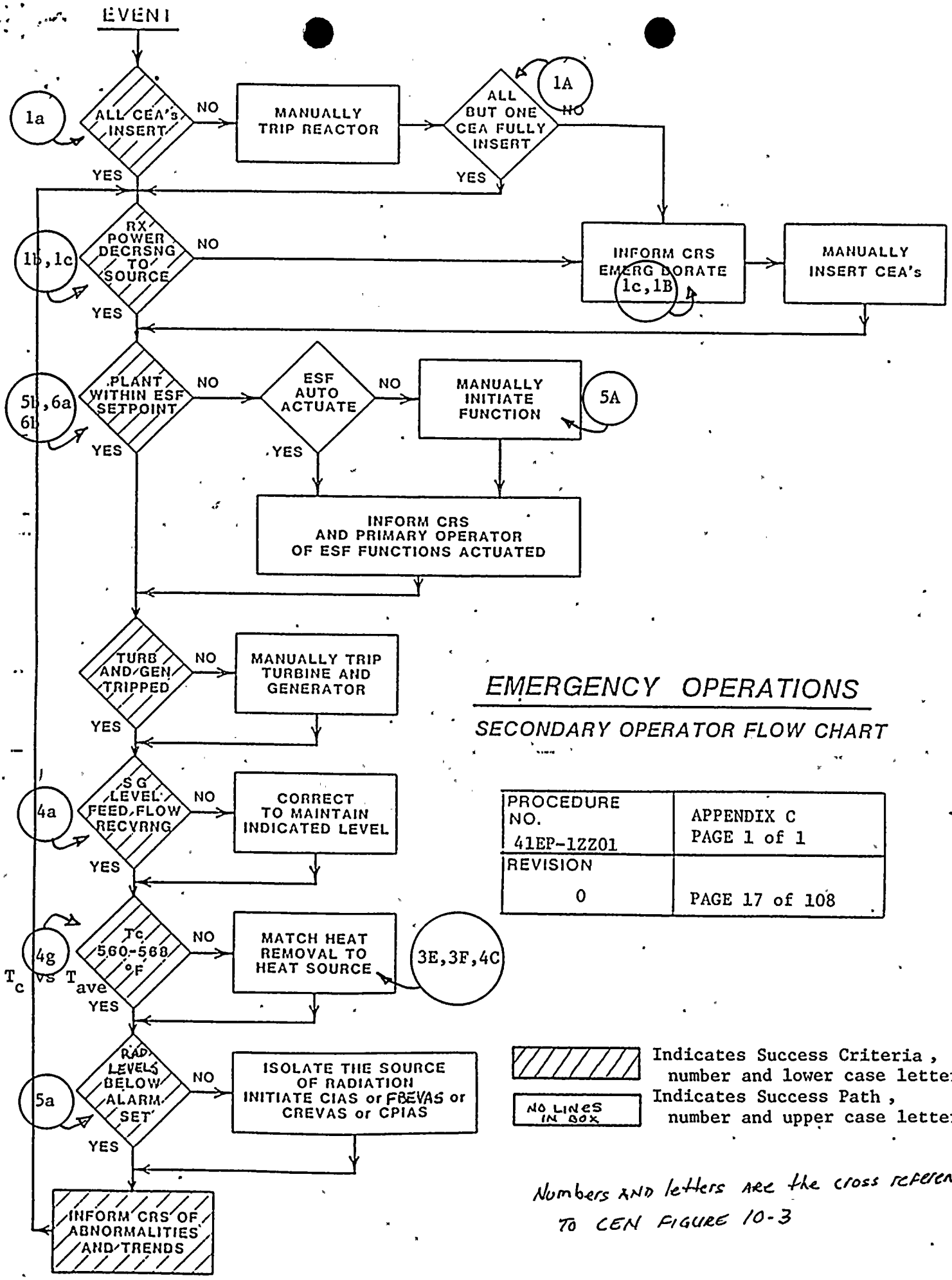

EVENT
RCS >28° SUBCOOL
NO
STABILIZE HEAT REMOVAL MAINTAIN SUBCOOLED MARGIN
YES
2b,3a,4c
PZR PRESS > 1700 PSIA
NO
VERIFY SIAS CIAS
STOP RCP's
VERIFY HPSI LPSI FLOWS
YES
4e
3b LOW
3b HIGH
PZR PRESS 2100-2300 RECOVR
NO
VERIFY PZR HEATERS ON
VERIFY SPRAY VALVES CLOSED
INFORM CRS EXCESS HEAT REMOVAL
VERIFY PZR HEATERS OFF
VERIFY SPRAY VALVES OPEN
INFORM CRS VERIFY HEAT REMOVAL
3D
3A
3A
3D
YES
CORE ΔT <57° F
NO
INFORM CRS
4A,4B
4b
YES
EMERGENCY OPERATIONS
PRIMARY OPERATOR FLOW CHART
PZR LEVEL 33-55% RECOVR
NO
VERIFY CHARGING LETDOWN AND BLEED OFF FLOWS
2A,2C,3B
2a
YES
PROCEDURE NO. 41EP-1ZZ01
APPENDIX B PAGE 1 of 2
REVISION 0
PAGE 15 of 108
SEAS NORMAL
NO
CORRECT ABNORMALITIES
3C,5A,6B
4f,5c,4E
YES
VERIFY SIAS CSAS HEADER FLOWS
2c,3c,4d, 6c,2B,6B.
INFORM CRS OF ABNORMALITIES AND TRENDS

FIGURE 1



EMERGENCY OPERATIONS

SECONDARY OPERATOR FLOW CHART

PROCEDURE NO. 41EP-1ZZ01	APPENDIX C PAGE 1 of 1
REVISION 0	PAGE 17 of 108

Indicates Success Criteria, number and lower case letter.

NO LINES IN BOX — Indicates Success Path, number and upper case letter.

Numbers AND letters are the cross reference TO CEN FIGURE 10-3

FIGURE 2

cooling and stabilizing plant parameters. The steps from CEN-152 identified in the Technical Guidelines as not incorporated (section III, page 174) are as follows:

Step 20 - Refers to restoring automatic pressure control.
Step 21 - Refers to restoring automatic level control.
Step 29 - Involves restoring pressurizer level and maintaining level in the indicated range.
Step 23 & 35 - Involves bypassing automatic initiated safety signals.

These steps affect the large break LOCA procedures's ability to mitigate a small LOCA as follows:

Step 20 21 & 29 - These parameters are not expected to be controlled due to loss of coolant inventory. However, included in the procedure are plant status points that insures plant awareness by the operators and directs maintenance of safety function. Each identified parameter is checked in each status point and checked in relation to maintaining the safety function. If action can be taken to restore the systems to automatic, the action would be performed as a result of safety function maintenance.

Step 23 & 35 - The safety signal bypass steps are not incorporated because MSIS and SIAS are generated as a result of 5 psig containment pressure. If this pressure has not occurred, the operator should be using the small LOCA procedure, If the large LOCA procedure is implemented, due to misdiagnosis, not resetting these signals would not adversely affect the procedure or plant response. However, additional operator actions to control pressurizer level with SI pumps and conduct the cooldown would be necessary. These extra actions and guidance are incorporated into the large LOCA procedure.

The diagnostic is expected to be performed within 20 minutes of the initiating event. Five pounds in containment within the time of performing the diagnostics is indicative of significant coolant inventory loss or a large break LOCA. Therefore, when performing the diagnostics 5 psig containment pressure is used for operator guidance in the determination of which Recovery Procedure to implement, the large or small LOCA. There is sufficient guidance in both procedures to either implement a more appropriate procedure or incorporate the appropriate operations to mitigate the full scale of LOCA casualties, regardless of contaiment pressure.