ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 03 Group 06 Engineering Limit and Bases

PARAMETER: COLD LEG TEMPERATURE

PREPARED BY: Paul B. Kramarchyk
Cognizant Engineer (Print Name)

Paul B. Kramarchyk
Cognizant Engineer (Signature) Date: 11/23/92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

STEVEN C RYDER — Steven C Ryder — 11/23/92
Name — Signature — Date
Independent Reviewer

APPROVED BY: JOSEPH R. CONGDON
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon
Cognizant Engineering Manager (Signature) Date 11/30/92

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 03 **Group:** 06

Parameter: COLD LEG TEMPERATURE

Step Value(s):	**Use(s):**
ALL < 470°F	To verify criteria for letdown restoration is met (Tc < 470°F).

Engineering Limit(s):

HIGH LIMIT less than 494°F

Bases for Engineering Limit(s):

Less than 494°F is based on engineering judgement. The rational is:

Restricting RCS cold leg temperature to less than 494°F will prevent exceeding the design pressure for the intermediate pressure letdown piping.

Intermediate Pressure Letdown Design Data:
Design pressure: 650 psi (ref. 1)
Design temperature: 550°F (ref. 1)

Saturation temperature for 650 psia is 494.89°F (ref. 2).

Assumptions:
None

References:

1) SONGS P&ID, REACTOR COOLANT CHEMICAL AND VOLUME CONTROL SYSTEM, DWG #40123B-21 (coord. C-7)

3) ABB STEAM TABLES, pg. 12
SEVENTEENTH PRINTING

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: ØØ9-OPS92-166 Rev. ØØ

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?	✓	
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?	✓	
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

Document No. 009-OPS92-166 Rev. 00

		OK	N/A
17.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		
18.	Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19.	Are adequate handling, storage, cleaning and shipping requirements specified?		
20.	Are adequate identification requirements specified?		
21.	Has an appropriate title page been used?	✓	
22.	Are all pages sequentially numbered and marked with a valid number?	✓	
23.	Is the presentation legible and reproducible?	✓	
24.	Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?		✓
25.	Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: Checklist 1 was not applicable to this review

STEVEN C RYDER / [signature] / 11/23/92

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 03 Group 07 Engineering Limit and Bases

PARAMETER: COLD LEG TEMPERATURE (1A, 1B, 2A, 2B)

PREPARED BY: Paul B. Kramarchyk
Cognizant Engineer (Print Name)
Paul B Kramarchyk Date: 11/24/92
Cognizant Engineer (Signature)

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Kenneth E. Faulkner Kenneth E. Faulkner 11/23/92
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)
Joseph R. Congdon 11/30/92
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 03 **Group:** 07

Parameter: COLD LEG TEMPERATURE (1A, 1B, 2A, 2B)

Step Value(s):	**Use(s):**
LOWEST LOOP Tc (1A,1B,2A,2B)	To determine which cold leg has the lowest delta T with respect to S/G temperature (S/G temp - Tc), to determine which RCP should be started first.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

There are no associated engineering limits for the comparison of parameters. Since no value is specified in the comparison, no value will be assigned to the engineering limit.

"LOWEST LOOP Tc" is a comparative value. Therefore, an engineering limit is not assigned.

Assumptions:
None

References:
None

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Mod. 3 Group 7 Cold Leg Temperature/ 009-OPS92-165 / Rev. 00

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?		✓
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		
20. Are adequate identification requirements specified?		
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention. etc., adequately specified?		✓

Comments/Remarks: None. Checklist 1 is N/A.

Kenneth E. Faulkner / Kenneth E. Faulkner / 11/27/92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 03 Group 08 Engineering Limit and Bases

PARAMETER: COLD LEG TEMPERATURE (1A, 1B, 2A, 2B)

PREPARED BY: Paul B. Kramarchyk
Cognizant Engineer (Print Name)

Paul B. Kramarchyk
Cognizant Engineer (Signature) Date: 11/30/92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Kenneth E. Faulkner — Name
Independent Reviewer

Kenneth E. Faulkner — Signature

12/1/92 — Date

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon
Cognizant Engineering Manager (Signature) Date 12/01/92

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 03 **Group:** 08

Parameter: COLD LEG TEMPERATURE (1A, 1B, 2A, 2B)

Step Value(s):	**Use(s):**
< S/G E-088 TEMP	To identify the most affected S/G.
< S/G E-089 TEMP	To identify the most affected S/G.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

There are no associated engineering limits for the comparison of parameters. Since no value is specified in the comparison, no value will be assigned to the engineering limit.

"Less than steam generator E-88 (89)" is a comparative value. Therefore, an engineering limit is not assigned.

Assumptions:
None

References:
None

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Mod. 3 Group 8 Cold Leg Temperature / 009-OP592-164 / Rev. 00

		OK	N/A
1.	Were the inputs correctly selected and incorporated into the design?		✓
2.	Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3.	Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4.	Are the appropriate quality and quality assurance requirements specified?		✓
5.	Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6.	Have applicable construction and operating experience been considered?		✓
7.	Have the design interface requirements been satisfied?		✓
8.	Was an appropriate design method used?		✓
9.	Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10.	Is the output (results and conclusions) reasonable compared to inputs?	✓	
11.	Are the specified parts, equipment, and processes suitable for the required application?		✓
12.	Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13.	Have adequate maintenance features and requirements been specified?		✓
14.	Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15.	Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16.	Has the design properly considered radiation exposure to the public and plant personnel?		✓

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?		✓

Comments/Remarks: As marked on Document Comments Sheet.
Checklist 1 is N/A.

Kenneth E. Faulkner / Kenneth E. Faulkner / 12/1/92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 03 Group 09 Engineering Limit and Bases

PARAMETER: COLD LEG TEMPERATURE

PREPARED BY: Paul B. Kramarchyk
Cognizant Engineer (Print Name)

Paul B Kramarchyk
Cognizant Engineer (Signature) Date: 4/10/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN Martin Green 4/10/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Compton
Cognizant Engineering Manager (Print Name)

Joseph R Compton
Cognizant Engineering Manager (Signature) Date 4/25/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 03 **Group:** 09

Parameter: COLD LEG TEMPERATURE

Step Value(s):	**Use(s):**
>=SDM REQUIREMENT	To ensure RCS temperature is equal to or greater than the temperature required for shutdown margin based on last boron sample.

Engineering Limit(s):

Tcold limit is per: SONGS Surveillance Operating Instructions, SO23-3-3.29, Calculation of SDM Boron Concentration Using Curves - Plant Heatup Or Cooldown (reference 1)

Bases for Engineering Limit(s):

The limiting temperature is a function of the current boron concentration, the method used to calculate SDM, and the current plant physics condition.

> NOTE: Plant physics curves that rely on real-time RCS temperature as a coordinate should be adjusted for instrument uncertainties.

Assumptions:

The stated limit assumes the SDM is calculated per ref. 1 and 2.

| rev. 01

In accordance with NES&L Quality Procedure SO23-XXVV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license.

Ref: 1, 2

References:

1) SONGS SURVEILLANCE OPERATING INSTRUCTIONS, SO23-3-3.29
ATTACHMENT 8, REV. 6
CALCULATION OF SDM BORON CONCENTRATION USING CURVES - PLANT HEATUP OR COOLDOWN

2) OPERATIONS PHYSICS SUMMARY
SONGS UNIT 2 CYCLE 6, M38100 REV. 25
FIGURE 2.2 MINIMUM BORON TO ASSURE SHUTDOWN MARGIN

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-168 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?		✓
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS92-168 Rev-01

		OK	N/A
17.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18.	Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19.	Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20.	Are adequate identification requirements specified?	✓	
21.	Has an appropriate title page been used?	✓	
22.	Are all pages sequentially numbered and marked with a valid number?	✓	
23.	Is the presentation legible and reproducible?	✓	
24.	Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25.	Are requirements for record preparation review, approval, retention, etc., adequately specified?		✓

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/16/92

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

File No: 009-OPS92-089
Revision: 03
Page: 1 of ~~12~~ 10 JAL 4/29/93

ABB COMBUSTION ENGINEERING
INSTRUMENT USE AND BASES TABLE COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

MODULE: 04 Containment Emergency Sump Level
Containment H/R Radiation Level
Containment Hydrogen Concentration
Containment Humidity
RWST Level

PREPARED BY: L.A. Wild
Cognizant Engineer (Print Name)
L. A. Wild
Cognizant Engineer (Signature) Date: 4/28/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GRAER — Martin Graer — 4/29/93
Name — Signature — Date
Independent Reviewer

APPROVED BY: J.R. Congdon
Cognizant Engineering Manager (Print Name)
Joseph R. Congdon
Cognizant Engineering Manager (Signature) Date 4/29/93

RECORD OF REVISIONS

Rev	Date	Pages	Prepared by	Reviewed	Approved by
00	11/02/92	ALL	L.A Wild	P.B.Kramarchyk	J.R.Congdon
01	11/19/92	3,4,5	L.A.Wild	S.C.Ryder	J.R.Congdon
02	01/12/93	9,10	L.A.Wild	J.Flaherty	J.R.Congdon
03	04/28/93	5,8	L.A.wild	J.Flaherty	J.R.Congdon

GRP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
01	CONTMT EMERG SUMP LEVEL	> 18 FT 8 IN LL 18.359 FT	Based on ensuring that the level in the CONTMT EMERG SUMP will provide sufficient NPSH for the CS and HPSI pumps after shutting the RWST isolation valves. The limit is conservative based on assumed pump combinations, flow rates and head losses.	To determine if adequate level exists in the Containment Emergency Sump (e.g. 18 feet 8 inches) to supply the Containment Spray Pumps.
01	CONTMT EMERG SUMP LEVEL	> 18 FT 8 IN LL 18.359 FT	Based on ensuring that the level in the CONTMT EMERG SUMP will provide sufficient NPSH for the CS and HPSI pumps after shutting the RWST isolation valves. The limit is conservative based on assumed pump combinations, flow rates and head losses.	To verify proper conditions exist prior to isolating the RWST following a RAS.
02	CONTMT EMERG SUMP LEVEL	RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify the emergency sump level increases as the RWST level decreases.
02	CONTMT EMERG SUMP LEVEL	RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify RWST is feeding SI, which is spilling onto the containment floor.
02	CONTMT EMERG SUMP LEVEL	RISES NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify the emergency sump level increases as the RWST level decreases.

GRP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
03	CONTMT EMERG SUMP LEVEL	NORMAL NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To determine if containment conditions indicate an event other than SGTR is in progress.
04	CONTMT EMERG SUMP LEVEL	NOT RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify Containment Emergency Sump not rising and re-diagnose the event if it is.
04	CONTMT EMERG SUMP LEVEL	NOT RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To determine that Containment Emergency Sump level is not rising as RWST level decreases and evaluate methods to maintain RWST level > 19%.
05	CONTMT EMERG SUMP LEVEL	NOT RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify conditions inside containment to be normal.
06	CONTMT EMERG SUMP LEVEL	> 17 FT LL 18.359 FT	Based on ensuring that the level in the CONTMT EMERG SUMP will provide sufficient NPSH for the CS and HPSI pumps after shutting the RWST isolation valves. The limit is conservative based on assumed pump combinations, flow rates and head losses.	To ensure adequate ECCS inventory in the Containment Emergency Sump if RWST level is below the RAS setpoint.

SONGS 2/3 ISOP II PHASE II
INSTRUMENT USE AND BASES TABLE

A. APPROVED TABLE

Module #: 04

Q.A. APPROVED TABLE

P	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
1	CONTMT H/R RAD MONITORS	< 40 R/HR LL 20 R/HR	This limit is based on engineering judgement. In the event of a LOCA in containment, 20R/HR is > the expected dose rate, assuming 100% realease of maximum RCS activity. This would be indication that some fuel failure had occurred with the LOCA.	To evaluate initiating CSAS for iodine removal if containment High Range Area Radiation Monitor is NOT reading < 40R/HR.
1	CONTMT HUMIDITY	NOT RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify conditions inside containment to be normal.
1	CONTMT HYDROGEN CONC	< 0.5% LL 0% UL 4%	The LL is based on keeping the H2 concentration as low as possible by placing the H2 recombiners in service when it is first detected. The UL is based on ensuring that a H2 burn or explosion does not take place when the recombiner is placed in service.	To determine if the hydrogen recombiners need to be operating (H2 concentration > or = 0.5%).
2	CONTMT HYDROGEN CONC	< 4% < 4%	4% is based on the flammability limit of hydrogen in dry air. Energizing the recombiners when hydrogen concentration is <= 2% ensures that the hydrogen concentration will not reach 4%. 4% is also the limit at which the recombiners must be secured.	To determine if containment hydrogen concentration is low enough to permit energization of the hydrogen recombiners (< 4%).
03	CONTMT HYDROGEN CONC	< 4% 4%	4% is based on the flammability limit of hydrogen in dry air. Energizing the recombiners when hydrogen concentration is <= 2% ensures that the hydrogen concentration will not reach 4%. 4% is also the limit at which the recombiners must be secured.	To determine if the present CG control success path is adequate (hydrogen < 4%) or a different one must be used.

Q.A. APPROVED TABLE

SONGS 2/3 ISOP II PHASE II
INSTRUMENT USE AND BASES TABLE

Module #: 04

Q.A. APPROVED TABLE

GRP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
03	CONTMT HYDROGEN CONC	< 4% 4%	4% is based on the flammability limit of hydrogen in dry air. Energizing the recombiners when hydrogen concentration is <= 2% ensures that the hydrogen concentration will not reach 4%. 4% is also the limit at which the recombiners must be secured.	To determine if the hydrogen concentration requires the operator to go to the Functional Recovery EOI (>4%).
03	CONTMT HYDROGEN CONC	< 4% 4%	4% is based on the flammability limit of hydrogen in dry air. Energizing the recombiners when hydrogen concentration is <= 2% ensures that the hydrogen concentration will not reach 4%. 4% is also the limit at which the recombiners must be secured.	To determine if hydrogen concentration requires the event to be re-diagnosed (>=4.0%).
04	CONTMT HYDROGEN CONC	< 0.5% 0%	0% (actual) hydrogen is the normally expected concentation in containment. An event resulting in an increase in hydrogen concentration above the minimum detectible level (0.5%) is indication that an event other than a LOFW (i.e. LOCA) is occurring.	To confirm that an event other than an LOFW is not taking place.
05	CONTMT HYDROGEN CONC	< 2% 3.5%	3.5% is based on a design requirment that a single train of hydrogen removal equipment will be able to remove hydrogen at a rate such that actuation of the system is not required until hydrogen is within 0.5% by volume of the flammability limit (4.0%).	To determine if use of the Hydrogen Recombiners is required to satisfy the present combustible gas (CG) control success path.

GRP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
06	CONTMT HYDROGEN CONC	< 2% 3.5%	3.5% is based on maintaining the containment hydrogen concentration below the flammability limit (4%). The Hydrogen Purge system is only used if the recombiners fail. In this case, starting to purge at 3.5% will maintain the hydrogen concentration < 4%.	To evaluate the need to continue hydrogen purge operation.
06	CONTMT HYDROGEN CONC	> 2% 3.5%	3.5% is based on maintaining the containment hydrogen concentration below the flammability limit (4%). The Hydrogen Purge system is only used if the recombiners fail. In this case, starting to purge at 3.5% will maintain the hydrogen concentration < 4%.	To evaluate the need to continue hydrogen purge operation.
06	CONTMT HYDROGEN CONC	< 4% 3.5%	3.5% is based on maintaining the containment hydrogen concentration below the flammability limit (4%). The Hydrogen Purge system is only used if the recombiners fail. In this case, starting to purge at 3.5% will maintain the hydrogen concentration < 4%.	To evaluate the need to continue hydrogen purge operation.
06	CONTMT HYDROGEN CONC	< 2% 3.5%	3.5% is based on maintaining the containment hydrogen concentration below the flammability limit (4%). The Hydrogen Purge system is only used if the recombiners fail. In this case, starting to purge at 3.5% will maintain the hydrogen concentration < 4%.	To determine if use of the Hydrogen Purge System is required to satisfy the present CG control succes path.
07	CONTMT HYDROGEN CONC	RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To evaluate the need for hydrogen purge of containment.

GRP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
01	RWST LEVEL	< 19% UL=26.8%,LL=11.0%	The UL ensures that sufficient volume is transferred from the RWST and that 20 min of volume remains in the RWST prior to RAS. The LL ensures that sufficient volume remains in RWST to prevent air entrainment during transfer from RWST to Contmt sump.	To verify RWST level < RAS accuation set point (19% specified in EOIs).
01	RWST LEVEL	> 19% UL=26.8%,LL=11.0%	The UL ensures that sufficient volume is transferred from the RWST and that 20 min of volume remains in the RWST prior to RAS. The LL ensures that sufficient volume remains in RWST to prevent air entrainment during transfer from RWST to Contmt sump.	To verify RWST level is above the RAS actuation setpoint (19% specified in EOIs).
02	RWST LEVEL	> 2% LL >4.65%	The lower limit of > 4.65% is based on ensuring that the RWST has sufficient inventory to provide a source of water to the suction of the charging pumps. The level specified is expressed as a percent of tap to tap span.	To determine when charging pump suction should be transferred to another borated water source, or to determine that they should be stopped.
03	RWST LEVEL	FALLING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify the emergency sump level increases as the RWST level decreases.
03	RWST LEVEL	LOWERING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify the emergency sump level increases as the RWST level decreases.

IRP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
03	RWST LEVEL	LOWERING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify that RWST level is falling.
04	RWST LEVEL	> 6% LL 4.65% OF SPAN	The Eng Limit is based on having sufficient water in the RWST to provide suction to the SI and/or chg pumps. The water level at the top of the ECCS suction nozzle is 0.26% of span. The water level to the top of the CVCS suction line is 4.65% of span.	To determine when charging pump suction should be transferred to another borated water source, or to determine that they should be stopped.
04	RWST LEVEL	> 6% LL 4.65% OF SPAN	The Eng Limit is based on having sufficient water in the RWST to provide suction to the SI and/or chg pumps. The water level at the top of the ECCS suction nozzle is 0.26% of span. The water level to the top of the CVCS suction line is 4.65% of span.	To verify RWST level is available (> 6%) as a water source for the charging pumps or ECCS pumps.
04	RWST LEVEL	> 6% LL 4.65% OF SPAN	The Eng Limit is based on having sufficient water in the RWST to provide suction to the SI and/or chg pumps. The water level at the top of the ECCS suction nozzle is 0.26% of span. The water level to the top of the CVCS suction line is 4.65% of span.	To determine the availability of alternate borated water sources.
05	RWST LEVEL	> 19% LL 0.26%	The lower limit is applied to ensure that adequate suction is maintained to ECCS pumps. The Engineering limit is based on the water level at the top of the ECCS suction nozzle in the RWST. This level equates to 0.26% of span.	To determine if the RWST level is adequate to supply the containment spray pumps (> 19%).

RP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
05	RWST LEVEL	MAINTAIN > 19% LL 0.26%	The lower limit is applied to ensure that adequate suction is maintained to ECCS pumps. The Engineering limit is based on the water level at the top of the ECCS suction nozzle in the RWST. This level equates to 0.26% of span.	To determine if the RWST level is adequate to supply the containment spray pumps (> 19%).
05	RWST LEVEL	> 19% LL 0.26%	The lower limit is applied to ensure that adequate suction is maintained to ECCS pumps. The Engineering limit is based on the water level at the top of the ECCS suction nozzle in the RWST. This level equates to 0.26% of span.	To verify sufficient RWST level to start emergency boration with ECCS pumps.
06	RWST LEVEL	> 6% LL 0.26%	The lower limit is applied to ensure that adequate suction is maintained to ECCS pumps. The Engineering limit is based on the water level at the top of the ECCS suction nozzle in the RWST. This level equates to 0.26% of span.	To determine if it is necessary (at 6% level) to initiate makeup water to the RWST.
07	RWST LEVEL	> 2% LL 0.26%	The lower limit is applied to ensure that adequate suction is maintained to ECCS pumps. The Engineering limit is based on the water level at the top of the ECCS suction nozzle in the RWST. This level equates to 0.26% of span.	To determine if RWST level is adequate when the ECCS pumps are alligned to take suction on the RWST.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-89-Rev-03

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-089 Rev-03

		OK	N/
17.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18.	Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19.	Are adequate handling, storage, cleaning and shipping requirements specified?	✓	
20.	Are adequate identification requirements specified?	✓	
21.	Has an appropriate title page been used?	✓	
22.	Are all pages sequentially numbered and marked with a valid number?	✓	
23.	Is the presentation legible and reproducible?	✓	
24.	Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25.	Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 01 Engineering Limit and Bases

PARAMETER: Containment Emergency Sump Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/22/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Martin Greer — 4/29/93
Name — Signature — Date
Independent Reviewer

APPROVED BY: J. R. Campbell
Cognizant Engineering Manager (Print Name)

J. R. Campbell
Cognizant Engineering Manager (Signature) Date 4/29/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 01

Parameter: Containment Emergency Sump Level

Step Value(s):	**Use(s):**
> 18 ft 8 in	To determine if adequate level exists in the Containment Emergency Sump (e.g. 18 feet 8 inches) to supply the Containment Spray Pumps. To verify proper conditions exist prior to isolating the Refueling Water Storage Tank (RWST) following a Recirculation Actuation Signal (RAS).

Engineering Limit(s):

HPSI 16.999 feet

CS 18.359 feet

Bases for Engineering Limit(s):

The engineering limits for containment sump level are based on ensuring that the level in the containment sump will provide sufficient net positive suction head (NPSH) for the Containment Spray (CS) and High Pressure Safety Injection (HPSI) Pumps after shutting the RWST isolation valves. The engineering limits are conservative in that the pump combinations assumed in Reference 5 produce flow rates and associated head losses in excess of those that should exist (Ref. 3 Design Assumptions III. A and B, page 4 of 25).

<u>Level Required for HPSI</u>

The net positive suction head required ($NPSH_R$) for the HPSI pumps is 23 feet (Reference 3, page 3 of 25). The minimum calculated net positive suction head available ($NPSH_A$) for the HPSI pump per Ref. 3 (page 5 of 25) is 26.501 feet. Therefore there is a margin of 3.501 feet of head for the HPSI pump. Subtracting the margin from the assumed level (Reference 3, page 6 of 25) gives a minimum level to provide the $NPSH_R$ of 16.999 feet (level assumed of 20.5 feet minus 3.501 feet margin).

Level Required for CS

The $NPSH_R$ for the containment spray (CS) pumps is 24 feet (Reference 1 & 2). The minimum calculated $NPSH_A$ for the CS pump per Reference 3 (page 5 of 25) is 26.141 feet. Therefore there is a margin of 2.141 feet of head for the CS pumps. Subtracting the margin from the assumed level (Reference 3, page 6 of 25) gives a minimum level to provide the $NPSH_R$ of 18.359 feet (level assumed of 20.5 feet minus 2.141 feet margin).

Vortexing

Reference 4 indicates that for design basis flow rates expected after RAS (3200 gpm per sump, Ref. 4, page 9) and the expected flood level (1.47 feet above the containment floor level per Reference 5, page 5) vortexing will not occur (Ref. 4, page 5, 6 and 7).

Assumptions:

1. The Bases for the Engineering Limits uses the worst case numbers from the references to calculate the required level in the sump. For the HPSI, the $NPSH_R$ from Reference 3 was used. For the CS, the $NPSH_R$ from Reference 1 & 2 was used.

2. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

Ref: 1 and 2 | rev. 01

References:

1. Updated FSAR, through revision 8, Table 6.2-29.

2. Updated FSAR, through revision 8, Section 6.2.1.1.2.4.

3. Calculation M-12.1D, "NPSH of ESF Pumps," dated 5/23/84, SONGS File No. S023-451-A.

4. Nonconformance Report G-1002, Revision 0, November 29, 1989, "Containment Emergency Sump."

5. SONGS Calculation DC# N-0240-006 R/O, issue date November 29, 1989, "RWST Volume Tech Spec Requirement."

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-637

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-037 Rev-01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/29/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 02 Engineering Limit and Bases

PARAMETER: Containment Emergency Sump Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/22/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Omgdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/29/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 02

Parameter: Containment Emergency Sump Level

Step Value(s):	**Use(s):**
Rising	To verify the emergency sump level increases as the Refueling Water Storage Tank (RWST) level decreases.
Rising	To verify RWST is feeding Safety Injection, which is spilling onto the containment floor.
Rises	To verify the emergency sump level increases as the RWST level decreases.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

There are no associated Engineering Limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limit are evaluated for their engineering limits. | rev. 01

If the RWST level reaches the Recirculation Actuation Signal (RAS) setpoint, then the valves from the containment sump will be opened by the RAS signal. Upon confirmation that the sump level is sufficient to provide adequate suction head, the operators are directed to shut the supply from the RWST (Ref. 1). Confirmation that the Containment Sump Level is RISING or RISES as RWST level decreases ensures that the water removed from the RWST by the Safety Injection and/or Containment Spray pump(s) is being transferred to the containment sump to eventually provide the required suction head upon RAS. If the Step Value is not

observed, then the operators are directed to ensure that adequate level is maintained in the RWST to provide suction to the running pumps. | rev. 01

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1 | rev. 01

References:

1. Updated FSAR, through revision 8, Section 6.2.2.1.2.3.B. | rev. 01

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-038 Rev-01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-38 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

File No: 009-OPS92-039
Revision: 01
Page: 1 of 2

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 03 Engineering Limit and Bases

PARAMETER: Containment Emergency Sump Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/22/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon 4/29/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 03

Parameter: Containment Emergency Sump Level

Step Value(s):	**Use(s):**
NORMAL	To determine if containment conditions indicate an event other than Steam Generator Tube Rupture (SGTR) is in progress.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

There are no associated Engineering Limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limit are evaluated for their engineering limits. | rev. 01

If only a SGTR has occurred, there should be no increase in the Containment Emergency Sump Level. An increase in the sump level would indicate that an event other than or in addition to a SGTR was in progress. Verification that the sump level is NORMAL, in concert with other parameters verified in the procedure, provides assurance that the diagnosis of a SGTR is correct.

Assumptions:

None

References:

None

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-039 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-039 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/28/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 04 Engineering Limit and Bases

PARAMETER: Containment Emergency Sump Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/28/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN Martin Green 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Condon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/29/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 04

Parameter: Containment Emergency Sump Level

Step Value(s):	**Use(s):**
NOT RISING	To verify Containment Emergency Sump not rising and re-diagnose the event if it is.
NOT RISING	To determine that Containment Emergency Sump Level is not rising as RWST level decreases and evaluate methods to maintain RWST level >19%.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

There are no associated Engineering Limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action based on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limit are evaluated for their engineering limits. | rev. 01

Verification that the Containment Emergency Sump Level is NOT RISING provides assurance that only a SGTR is in progress. This parameter is used in concert with monitoring of RWST level to determine that only a SGTR event is occurring.

Assumptions:

None

References:

None

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-040 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-040 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/29/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 05 Engineering Limit and Bases

PARAMETER: Containment Emergency Sump Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)
L. A. Wild Date: 4/23/93
Cognizant Engineer (Signature)

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Condon
Cognizant Engineering Manager (Print Name)
James R. Condon 4/29/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 05

Parameter: Containment Emergency Sump Level

Step Value(s):	**Use(s):**
NOT RISING	To verify conditions inside containment to be normal.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

There are no associated Engineering Limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action based on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limit are evaluated for their engineering limits. | rev. 01

This step value noted is used to determine whether a Loss of Feedwater as a result of a feedline break is occurring inside the containment. The verification that the Containment Emergency Sump Level is NOT RISING in addition to verification that other containment environment parameters (i.e., temperature, pressure and humidity) have not been affected will indicate that any feedline break which may exist is outside of the containment.

Assumptions:

None

References:

None

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-041 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-041 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 06 Engineering Limit and Bases

PARAMETER: Containment Emergency Sump Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Gordon
Cognizant Engineering Manager (Print Name)

Joseph R. Gordon 4/29/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 06

Parameter: Containment Emergency Sump Level

Step Value(s):	**Use(s):**
> 17 FT	To ensure adequate ECCS inventory in containment sump if RWST level is below the RAS setpoint.

| rev. 01

Engineering Limit(s):

HPSI 16.999 feet

CS 18.359 feet

Bases for Engineering Limit(s):

The engineering limits for containment sump level are based on ensuring that the level in the containment sump will provide sufficient net positive suction head (NPSH) for the Containment Spray (CS) and High Pressure Safety Injection (HPSI) Pumps after shutting the RWST isolation valves. The engineering limits are conservative in that the pump combinations assumed in Reference 5 produce flow rates and associated head losses in excess of those that should exist (Ref. 3 Design Assumptions III. A and B, page 4 of 25).

<u>Level Required for HPSI</u>

The net positive suction head required ($NPSH_R$) for the HPSI pumps is 23 feet (Reference 3, page 3 of 25). The minimum calculated net positive suction head available ($NPSH_A$) for the HPSI pump per Ref. 3 (page 5 of 25) is 26.501 feet. Therefore there is a margin of 3.501 feet of head for the HPSI pump. Subtracting the margin from the assumed level (Reference 3, page 6 of 25) gives a minimum level to provide the $NPSH_R$ of 16.999 feet (level assumed of 20.5 feet minus 3.501 feet margin).

Level Required for CS

The $NPSH_R$ for the containment spray (CS) pumps is 24 feet (Reference 1 & 2). The minimum calculated $NPSH_A$ for the CS pump per Reference 3 (page 5 of 25) is 26.141 feet. Therefore there is a margin of 2.141 feet of head for the CS pumps. Subtracting the margin from the assumed level (Reference 3, page 6 of 25) gives a minimum level to provide the $NPSH_R$ of 18.359 feet (level assumed of 20.5 feet minus 2.141 feet margin).

Vortexing

Reference 4 indicates that for design basis flow rates expected after RAS (3200 gpm per sump, Ref. 4, page 9) and the expected flood level (1.47 feet above the containment floor level per Reference 5, page 5) vortexing will not occur (Ref. 4, page 5, 6 and 7).

Assumptions:

1. The Bases for the Engineering Limits uses the worst case numbers from the references to calculate the required level in the sump. For the HPSI, the $NPSH_R$ from Reference 3 was used. For the CS, the $NPSH_R$ from Reference 1 & 2 was used.

2. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1 and 2 | rev. 01

References:

1. Updated FSAR, through revision 8, Table 6.2-29.

2. Updated FSAR, through revision 8, Section 6.2.1.1.2.4.

3. Calculation M12.1D, "NPSH of ESF Pumps," dated 5/23/84, SONGS File No. S023-451-A.

4. Nonconformance Report G-1002, Revision 0, November 29, 1989, "Containment Emergency Sump."

5. SONGS Calculation DC# N-0240-006 R/O, issue date November 29, 1989, "RWST Volume Tech Spec Requirement."

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-042 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/29/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 01 Engineering Limit and Bases

PARAMETER: Containment H/R Monitors

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild Date: 4/22/93
Cognizant Engineer (Signature)

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J.R. Conizdor
Cognizant Engineering Manager (Print Name)

Joseph R Conizdor 4/29/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 01

Parameter: Containment High Radiation Monitors

Step Value(s):	**Use(s):**
< 40 R/HR	To evaluate initiating CSAS for iodine removal if containment radiation monitor is NOT reading < 40 R/HR.

Engineering Limit(s):

Upper Limit 20 R/hr

Bases for Engineering Limit(s):

The limit is based on engineering judgement. One function of the Iodine Removal System (IRS) is to remove radioactive iodine from the containment atmosphere following a design basis loss-of-coolant accident (LOCA) (Ref. 1). The high range containment radiation detectors have a high-high alarm of 20 R/hr (Ref. 2). Figures 12.3-68 and 12.3-69 (Ref. 3) indicate that a dose rate of 20 R/hr is above the expected radiation level in the containment for the "RCS Maximum". Reference 4 indicates that the "RCS Maximum" curve is the expected radiation level which would exist if 100% of the maximum concentration of reactor coolant isotopes were released to the containment (Ref. 4 pages 6 and 47). In the event of a LOCA, the containment radiation level is used to determine whether the IRS should be placed in service. Considering the references above, a level ≥ 20 R/hr is higher than the expected dose rate that would exist and is an indication that some fuel failure has occurred. Initiation or continued use of the Containment Spray system for iodine removal would be considered prudent for such cases.

Note, the RCS maximum as specified in Reference 3 and 4 should not be confused with the 1% failed fuel condition in the same references. As indicated in Reference 4, the RCS maximum assumes the concentrations specified in FSAR Table 11.1-2 (Reference 5) are released while the 1% failed fuel assumes the release of concentrations per Regulatory Guide 1.4 (See Reference 4, pages 6, 47, and 48).

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1, 2, 3 and 5 | rev. 01

References:

1. Updated FSAR, through revision 8, Section 6.5.2.
2. Updated FSAR, through revision 8, Section 12.3.4.3.2.
3. Updated FSAR, through revision 8, Figures 12.3-68 and 69.
4. Calculation N-4098-3, "Post Accident Radiation."
5. Updated FSAR, through revision 8, Table 11.1-2, "Maximum Reactor Coolant Radioisotope Concentration One Percent Failed Fuel, No Gas Stripping."

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-081 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-081 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/29/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 01 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild Date: 4/22/93
Cognizant Engineer (Signature)

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN Martin Green 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: T. R. Congdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/29/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 01

Parameter: Containment Hydrogen Concentration

Step Value(s):	**Use(s):**
< 0.5%	To determine if the hydrogen recombiners need to be operating (H_2 concentration ≥ 0.5%).

Engineering Limit(s):

Lower Limit 0 % | rev. 01

Upper Limit 4 % | rev. 01

Bases for Engineering Limit(s):

The accuracy of the hydrogen monitoring subsystem is ± 5% of the full scale reading of 10% (Ref 1). Therefore if there is any indication of hydrogen concentration the actual reading could be 0.5% higher (e.g., a reading of 0.1% could be an indication of up to 0.6% actual concentration; an actual concentration of 4% could read as low as 3.5%). | rev. 01

The lower limit is based on maintaining the hydrogen concentration as low as possible. As noted in the EPG Bases (Ref. 2), although hydrogen is not flammable until it achieves a concentration of at least 4% in air, it is prudent to reduce hydrogen to as low a concentration as possible (i.e., less than the minimum detectable concentration). Therefore the hydrogen recombiners are placed in service at any concentration greater than 0% to ensure that a further buildup of hydrogen does not occur. | rev. 01

The upper limit is based on ensuring that a hydrogen burn or explosion does not take place when the recombiner is placed in service. The recombination process occurs as a result of heating the process gases to an elevated temperature (Ref. 3). As this is not a catalytic process but a burn process, the elevated temperature could cause a hydrogen burn or an explosion if a recombiner was energized with a high hydrogen concentration in the containment. Reference 4 specifies that the hydrogen recombiner should not be energized with a hydrogen level at or above 3.5% as verified by chemical analysis. This reference also

reaches 3.5%. The use of 3.5% in the reference is apparently based on the given accuracy of the hydrogen analyzer (5 % of Full Scale 1 - 10 %, i.e., 0.5% Therefore a level of 3.5% by hydrogen analyzer reading could actually be as high as 4%.) (Ref. 1) and/or a margin to the burnable level of 4%. A level 4% H_2 is generally accepted to be the level at which hydrogen becomes burnable in dry air and is the actual engineering limit as specified above. | rev. 01

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1 and 3 | rev. 01

2. The reference noted below is assumed to be Secondary Design documents. This assumption is justified based on the fact that they describe strategies which have been reviewed and commented on by the NRC. | rev. 01

   Ref: 2 | rev. 01

3. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, documents that are not Primary or Secondary Design documents may be used as reference documents if justification is provided. The reference noted below is formal engineering correspondence between the design principals (e.g., NSSS vendor architect, etc,) and SCE. Its use as reference material is justified when the basis for the engineering limit is "operational experience" or "engineering judgement", and no Primary or Secondary Design Document exists. | rev. 01

   Ref: 4 | rev. 01

References:

1. Updated FSAR, through Revision 8, Table 6.2-36. | rev. 01

2. Emergency Procedure Guidelines, CEN-152, Revision 3, Bases page 5-95.

3. Updated FSAR, through revision 8, Section 6.2.5.3.A. | rev. 01

4. Operating Instruction SO23-3-2.28, Revision 6, dated April 5, 1985. | rev. 01

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-055 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-055 Rev 01

	OK	N/
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 02 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/23/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Name
Independent Reviewer
Signature
4/29/93 — Date

APPROVED BY: T. R. Compton
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/29/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 06

Parameter: Containment Emergency Sump Level

Step Value(s):	**Use(s):**
> 17 FT	To ensure adequate ECCS inventory in containment sump if RWST level is below the RAS setpoint.

| rev. 01

Engineering Limit(s):

HPSI 16.999 feet

CS 18.359 feet

Bases for Engineering Limit(s):

The engineering limits for containment sump level are based on ensuring that the level in the containment sump will provide sufficient net positive suction head (NPSH) for the Containment Spray (CS) and High Pressure Safety Injection (HPSI) Pumps after shutting the RWST isolation valves. The engineering limits are conservative in that the pump combinations assumed in Reference 5 produce flow rates and associated head losses in excess of those that should exist (Ref. 3 Design Assumptions III. A and B, page 4 of 25).

Level Required for HPSI

The net positive suction head required ($NPSH_R$) for the HPSI pumps is 23 feet (Reference 3, page 3 of 25). The minimum calculated net positive suction head available ($NPSH_A$) for the HPSI pump per Ref. 3 (page 5 of 25) is 26.501 feet. Therefore there is a margin of 3.501 feet of head for the HPSI pump. Subtracting the margin from the assumed level (Reference 3, page 6 of 25) gives a minimum level to provide the $NPSH_R$ of 16.999 feet (level assumed of 20.5 feet minus 3.501 feet margin).

Level Required for CS

The $NPSH_R$ for the containment spray (CS) pumps is 24 feet (Reference 1 & 2). The minimum calculated $NPSH_A$ for the CS pump per Reference 3 (page 5 of 25) is 26.141 feet. Therefore there is a margin of 2.141 feet of head for the CS pumps. Subtracting the margin from the assumed level (Reference 3, page 6 of 25) gives a minimum level to provide the $NPSH_R$ of 18.359 feet (level assumed of 20.5 feet minus 2.141 feet margin).

Vortexing

Reference 4 indicates that for design basis flow rates expected after RAS (3200 gpm per sump, Ref. 4, page 9) and the expected flood level (1.47 feet above the containment floor level per Reference 5, page 5) vortexing will not occur (Ref. 4, page 5, 6 and 7).

Assumptions:

1. The Bases for the Engineering Limits uses the worst case numbers from the references to calculate the required level in the sump. For the HPSI, the $NPSH_R$ from Reference 3 was used. For the CS, the $NPSH_R$ from Reference 1 & 2 was used.

2. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1 and 2 | rev. 01

References:

1. Updated FSAR, through revision 8, Table 6.2-29.

2. Updated FSAR, through revision 8, Section 6.2.1.1.2.4.

3. Calculation M12.1D, "NPSH of ESF Pumps," dated 5/23/84, SONGS File No. S023-451-A.

4. Nonconformance Report G-1002, Revision 0, November 29, 1989, "Containment Emergency Sump."

5. SONGS Calculation DC# N-0240-006 R/O, issue date November 29, 1989, "RWST Volume Tech Spec Requirement."

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-042 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 01 Engineering Limit and Bases

PARAMETER: Containment H/R Monitors

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/22/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER
Name
Independent Reviewer

Martin Greer
Signature

4/29/93
Date

APPROVED BY: J. R. Conizdor
Cognizant Engineering Manager (Print Name)

Joseph R. Conizdor
Cognizant Engineering Manager (Signature) Date 4/29/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 01

Parameter: Containment High Radiation Monitors

Step Value(s):	**Use(s):**
< 40 R/HR	To evaluate initiating CSAS for iodine removal if containment radiation monitor is NOT reading < 40 R/HR.

Engineering Limit(s):

Upper Limit 20 R/hr

Bases for Engineering Limit(s):

The limit is based on engineering judgement. One function of the Iodine Removal System (IRS) is to remove radioactive iodine from the containment atmosphere following a design basis loss-of-coolant accident (LOCA) (Ref. 1). The high range containment radiation detectors have a high-high alarm of 20 R/hr (Ref. 2). Figures 12.3-68 and 12.3-69 (Ref. 3) indicate that a dose rate of 20 R/hr is above the expected radiation level in the containment for the "RCS Maximum". Reference 4 indicates that the "RCS Maximum" curve is the expected radiation level which would exist if 100% of the maximum concentration of reactor coolant isotopes were released to the containment (Ref. 4 pages 6 and 47). In the event of a LOCA, the containment radiation level is used to determine whether the IRS should be placed in service. Considering the references above, a level ≥ 20 R/hr is higher than the expected dose rate that would exist and is an indication that some fuel failure has occurred. Initiation or continued use of the Containment Spray system for iodine removal would be considered prudent for such cases.

Note, the RCS maximum as specified in Reference 3 and 4 should not be confused with the 1% failed fuel condition in the same references. As indicated in Reference 4, the RCS maximum assumes the concentrations specified in FSAR Table 11.1-2 (Reference 5) are released while the 1% failed fuel assumes the release of concentrations per Regulatory Guide 1.4 (See Reference 4, pages 6, 47, and 48).

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1, 2, 3 and 5 | rev. 01

References:

1. Updated FSAR, through revision 8, Section 6.5.2.
2. Updated FSAR, through revision 8, Section 12.3.4.3.2.
3. Updated FSAR, through revision 8, Figures 12.3-68 and 69.
4. Calculation N-4098-3, "Post Accident Radiation."
5. Updated FSAR, through revision 8, Table 11.1-2, "Maximum Reactor Coolant Radioisotope Concentration One Percent Failed Fuel, No Gas Stripping."

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-087 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-081 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 01 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/22/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN Martin Green 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon 4/29/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 01

Parameter: Containment Hydrogen Concentration

Step Value(s):	**Use(s):**
< 0.5%	To determine if the hydrogen recombiners need to be operating (H_2 concentration ≥ 0.5%).

Engineering Limit(s):

Lower Limit 0 % | rev. 01

Upper Limit 4 % | rev. 01

Bases for Engineering Limit(s):

The accuracy of the hydrogen monitoring subsystem is ± 5% of the full scale reading of 10% (Ref 1). Therefore if there is any indication of hydrogen concentration the actual reading could be 0.5% higher (e.g., a reading of 0.1% could be an indication of up to 0.6% actual concentration; an actual concentration of 4% could read as low as 3.5%). | rev. 01

The lower limit is based on maintaining the hydrogen concentration as low as possible. As noted in the EPG Bases (Ref. 2), although hydrogen is not flammable until it achieves a concentration of at least 4% in air, it is prudent to reduce hydrogen to as low a concentration as possible (i.e., less than the minimum detectable concentration). Therefore the hydrogen recombiners are placed in service at any concentration greater than 0% to ensure that a further buildup of hydrogen does not occur. | rev. 01

The upper limit is based on ensuring that a hydrogen burn or explosion does not take place when the recombiner is placed in service. The recombination process occurs as a result of heating the process gases to an elevated temperature (Ref. 3). As this is not a catalytic process but a burn process, the elevated temperature could cause a hydrogen burn or an explosion if a recombiner was energized with a high hydrogen concentration in the containment. Reference 4 specifies that the hydrogen recombiner should not be energized with a hydrogen level at or above 3.5% as verified by chemical analysis. This reference also

reaches 3.5%. The use of 3.5% in the reference is apparently based on the given accuracy of the hydrogen analyzer (5 % of Full Scale 1 - 10 %, i.e., 0.5% Therefore a level of 3.5% by hydrogen analyzer reading could actually be as high as 4%.) (Ref. 1) and/or a margin to the burnable level of 4%. A level 4% H_2 is generally accepted to be the level at which hydrogen becomes burnable in dry air and is the actual engineering limit as specified above. | rev. 01

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1 and 3 | rev. 01

2. The reference noted below is assumed to be Secondary Design documents. This assumption is justified based on the fact that they describe strategies which have been reviewed and commented on by the NRC. | rev. 01

   Ref: 2 | rev. 01

3. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, documents that are not Primary or Secondary Design documents may be used as reference documents if justification is provided. The reference noted below is formal engineering correspondence between the design principals (e.g., NSSS vendor architect, etc,) and SCE. Its use as reference material is justified when the basis for the engineering limit is "operational experience" or "engineering judgement", and no Primary or Secondary Design Document exists. | rev. 01

   Ref: 4 | rev. 01

References:

1. Updated FSAR, through Revision 8, Table 6.2-36. | rev. 01

2. Emergency Procedure Guidelines, CEN-152, Revision 3, Bases page 5-95.

3. Updated FSAR, through revision 8, Section 6.2.5.3.A. | rev. 01

4. Operating Instruction SO23-3-2.28, Revision 6, dated April 5, 1985. | rev. 01

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-055 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-055 Rev-01

	OK	N/
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 02 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/23/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Name
Independent Reviewer
Signature
4/29/93 — Date

APPROVED BY: T. R. Compton
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/29/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 02

Parameter: Containment Hydrogen Concentration

Step Value(s):	**Use(s):**
< 4%	To determine if containment hydrogen concentration is low enough to permit energization of the hydrogen recombiners (< 4%).

Engineering Limit(s): < 4%

Bases for Engineering Limit(s):

The recombination process occurs as a result of heating the process gases to an elevated temperature (Ref. 1). As this is not a catalytic process but a burn process, the elevated temperature could cause a hydrogen burn or an explosion if a recombiner was energized with a high hydrogen concentration in the containment.

Reference 3 specifies that the hydrogen recombiner should not be energized with a hydrogen level at or above 3.5% as verified by chemical analysis. This procedure also specifies that the recombiners must be secured if concentration reaches 3.5%. The selection of 3.5% is apparently based on the given accuracy of the hydrogen analyzer (5 % of Full Scale 1 - 10 %, i.e., 0.5% Therefore a level of 3.5% by hydrogen analyzer reading could actually be as high as 4%.) (Ref. 2) and/or the 3.5% provides a margin to the burnable level of 4%. In addition, it is noted that there is a warmup time associated with the hydrfen recombiner during which the hydrogen level can be expected to increase. The 3.5% procedural limit of Reference 3 may have also been set to take this into account in providing a margin for buildup while the recombiner comes on the line.

A level 4% H_2 is generally accepted to be the level at which hydrogen becomes burnable in dry air and therefore this value has been specified as the engineering limit.

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1 and 2 | rev. 01

References:

1. Updated FSAR, through revision 8, Section 6.2.5.3.A.
2. Updated FSAR, through revision 8, Table 6.2-36.
3. Operating Instruction SO23-3-2.28, Revision 6, dated April 5, 1985.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-062 Rev-01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-062 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks:

MARTIN GREEN / Martin Green 4/29/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 03 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/23/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Compton
Cognizant Engineering Manager (Print Name)

Joseph R. Compton 4/29/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 03

Parameter: Containment Hydrogen Concentration

Step Value(s):	**Use(s):**
< 4%	To determine if the hydrogen concentration requires the operator to go to the Functional Recovery EOI (> 4%).
< 4%	To determine if hydrogen concentration requires the event to be re-diagnosed (≥ 4.0%).
< 4%	To determine if the present CG control success path is adequate (hydrogen < 4%) or a different one must be used.

Engineering Limit(s):

4%

Bases for Engineering Limit(s):

The 4% limit is based on the flammability limit of hydrogen (conservatively assuming a dry air environment), and the strategy for combustible gas control presented in References 1 and 2. The FSAR requires that the hydrogen recombiners be actuated at a hydrogen concentration of 2%. The EPGs recommend that the hydrogen recombiners be placed in service at a hydrogen concentration of 0.5%. The FSAR demonstrates that energization of the recombiners when the hydrogen concentration is at or below 2% ensures that the hydrogen concentration will not reach the flammable limit of 4%. Therefore, if containment hydrogen concentration reaches 4%, the current strategy for controlling combustible gases is not successful and further actions are required. Additionally, 4% is the limit at which the hydrogen recombiners must be secured. The recombination process occurs as a result of heating the process gases to an elevated temperature (reference 3). As this is not a catalytic process but a burn process, the elevated temperature could cause a hydrogen burn or an explosion if a recombiner is operated with a high hydrogen concentration in the containment. Therefore, at or above a containment hydrogen concentration of 4%, a combustible control method other than the hydrogen recombiners must be employed. | rev. 01

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1 and 3 | rev. 01

2. The reference noted below is assumed to be Secondary Design documents. This assumption is justified based on the fact that they describe strategies which have been reviewed and commented on by the NRC. | rev. 01

   Ref: 2 | rev. 01

References:

1. Updated FSAR, through revision 8, Section 6.2.5.2.3.2.
2. "Emergency Procedure Guidelines," CEN-152, Revision 3, Bases for LOCA Steps 15, 17, 18 and SFSC 9 (EPG pages 5-95 through 98, 142 and 143).
3. Updated FSAR, through revision 8, Section 6.2.5.3.A.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-095 Rev-01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-95 Rev-01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/29/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 04 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/23/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN
Name
Independent Reviewer

Martin Green
Signature

4/29/93
Date

APPROVED BY: J. R. Cowden
Cognizant Engineering Manager (Print Name)

Joseph R. Cowden
Cognizant Engineering Manager (Signature) Date 4/29/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 04

Parameter: Containment Hydrogen Concentration

Step Value(s):	**Use(s):**
< 0.5%	To confirm that an event other than an LOFW is not taking place.

Engineering Limit(s):

0%

Bases for Engineering Limit(s):

0% (actual) hydrogen is the normally expected concentration in containment. An event resulting in an increase in hydrogen concentration above the minimum detectible level is an indication that an event other than a LOFW (i.e. LOCA) is occurring (Ref. 1). The accuracy of the hydrogen monitoring subsystem is ± 5% of the full scale reading of 10% (Ref 2). Therefore a concentration of ≥ 0.5% would be a reliable indication that some hydrogen is present in the containment. 0.5% is therefore used in the LOFW EOI as the point for re-diagnosing the event.

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, documents that are not Primary or Secondary Design documents may be used as reference documents if justification is provided. The reference noted below is formal engineering correspondence between the design principals (e.g., NSSS vendor architect, etc,) and SCE. Its use as reference material is justified when the basis for the engineering limit is "operational experience" or "engineering judgement", and no Primary or Secondary Design Document exists. | rev. 01

   Ref: 1 | rev. 01

2. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on

ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

Ref: 2 | rev. 01

References:

1. SONGS "Emergency Procedure Technical Guidelines," Revision 01, June 1984, LOF Guideline, page 8-25.

2. Updated FSAR, through Revision 8, Table 6.2-36, page 6.2-277.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-096 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-096 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 05 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/28/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists N09 of QAM-101.

MARTIN GREER — Martin Greer — 4/29/93
Name — Signature — Date
Independent Reviewer

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon
Cognizant Engineering Manager (Signature) Date 4/29/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 05

Parameter: Containment Hydrogen Concentration

Step Value(s):	**Use(s):**
< 2%	To determine if use of Hydrogen Recombiners is required to satisfy the present combustible gas (CG) control success path.

Engineering Limit(s):

3.5%

| rev. 01

Bases for Engineering Limit(s):

The engineering limit is based on ensuring that a single train of hydrogen removal equipment can remove hydrogen at a rate such that actuation of the system is not required until hydrogen is within 0.5% by volume of the limit (4.0%). This value is specified as 3.5%. (Reference 3.) While the FSAR (Ref.1) requires that the H_2 recombiners be actuated at a hydrogen concentration of 2% and the EPGs (Ref. 2) recommends that the H_2 recombiners be placed in service at a hydrogen concentration of 0.5%, placing the recombiners in service is not required until hydrogen concentration reaches 3.5 % (Ref. 3). | rev. 01

Assumptions:

1. In accordance with NES&L Quality Procedure S023-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1

| rev. 01

2. The reference noted below is assumed to be Secondary Design documents. This assumption is justified based on the fact that it describes strategies which have been reviewed and commented on by the NRC. | rev. 01

   Ref: 2 | rev. 01

References:

1. Updated FSAR, through revision 8, Section 6.2.5.2.3.2.

2. "Emergency Procedure Guidelines," CEN-152, Revision 3, Bases for LOCA Steps 15, 17, 18 and SFSC 9 (EPG pages 5-95 through 98, 142 and 143).

3. Southern California Edison calculation, Calculation Number N-4059-004, "Post LOCA Hydrogen Generation," including ICCN No. C-1, dated 2/5/93. | rev. 01

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-088 Rev 1

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-088 Rev 0/1

		OK	N/A
17.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18.	Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19.	Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20.	Are adequate identification requirements specified?	✓	
21.	Has an appropriate title page been used?	✓	
22.	Are all pages sequentially numbered and marked with a valid number?	✓	
23.	Is the presentation legible and reproducible?	✓	
24.	Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25.	Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/29/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 06 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/29/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN Martin Green 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Conydon
Cognizant Engineering Manager (Print Name)

Joseph R. Conydon 4/29/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 06

Parameter: Containment Hydrogen Concentration

Step Value(s):	**Use(s):**
< 2%	To evaluate the need to continue hydrogen purge operation.
> 2%	To evaluate the need to continue hydrogen purge operation.
< 2%	To determine if use of the Hydrogen Purge System is required to satisfy the present CG control success path.
< 4%	To evaluate the need to continue hydrogen purge operation.

Engineering Limit(s):

3.5%

Bases for Engineering Limit(s):

The Engineering Limit is based on establishing the containment hydrogen concentration below the flammability limit of 4% (conservatively assuming a dry air environment). The FSAR (Ref.1) states, "In the extremely unlikely event that a LOCA occurs, and the redundant recombiners fail to function properly, the hydrogen purge subsystem may be utilized to control hydrogen concentration inside containment." It further states, "Calculations show that the hydrogen concentration will reach 3.5 vol % at approximately 14 days and that a 50 ft^3/min (design flowrate) purge initiated at that time would ensure that the hydrogen concentration would remain below the 4 vol % level." Therefore, since the purging of any amount of containment atmosphere is undesirable, the operation of the hydrogen purge subsystem should only be required when it has been determined that the recombiners are inoperable and only then if hydrogen readout in the control room indicates that a hydrogen content of 3.5 vol % is exceeded. (Ref. 1)

Assumptions:

1. The Engineering Limit provides a reasonable target level for securing the purge system. The target level is low enough to ensure that levels are within the capability of the hydrogen recombiner. The target allows a margin to the combustible level to determine if the recombiner is can now effectively maintain hydrogen concentration. And, the level is high enough to minimize the amount of discharge to the environment necessary to lower hydrogen concentration to less than the combustible level. | rev. 01

2. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1

| rev. 01

References:

1. Updated FSAR, through revision 8, Section 6.2.5.3.B

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-097 Rev-01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-097 Rev-01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

File No: 009-OPS92-099
Revision: 01
Page: 1 of 2

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 07 Engineering Limit and Bases

PARAMETER: Containment Hydrogen Concentration

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/23/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Amsden
Cognizant Engineering Manager (Print Name)

Joseph R. Amsden 4/29/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 07

Parameter: Containment Hydrogen Concentration

Step Value(s):	**Use(s):**
RISING	To evaluate the need for hydrogen purge of containment.

Engineering Limit(s):

NONE

Bases for Engineering Limit(s):

There are no associated engineering limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually, when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action based on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limits are evaluated for their engineering limits. | rev. 01

Assumptions:

NONE

References:

NONE

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-099 Rev 1

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-099 Rev-01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks:

MARTIN GREEN / Martin Green 4/28/93

Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 01 Engineering Limit and Bases

PARAMETER: Containment Humidity

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 10/30/92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Kenneth E. Faulkner — Kenneth E. Faulkner — 10/30/92
Name — Signature — Date
Independent Reviewer

APPROVED BY: Joseph R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon 10/30/92
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 01

Parameter: Containment Humidity

Step Value(s):	**Use(s):**
NOT RISING	To verify conditions inside containment to be normal.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

There are no associated Engineering Limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action based on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limit are evaluated for their engineering limits.

Assumptions:

None

References:

None

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Mod. 4 Group 1, Containment Humidity / 009-OPS92-091 / Rev. 00

		OK	N/A
1.	Were the inputs correctly selected and incorporated into the design?		✓
2.	Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3.	Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4.	Are the appropriate quality and quality assurance requirements specified?		✓
5.	Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6.	Have applicable construction and operating experience been considered?		✓
7.	Have the design interface requirements been satisfied?		✓
8.	Was an appropriate design method used?		✓
9.	Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10.	Is the output (results and conclusions) reasonable compared to inputs?	✓	
11.	Are the specified parts, equipment, and processes suitable for the required application?		✓
12.	Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13.	Have adequate maintenance features and requirements been specified?		✓
14.	Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15.	Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16.	Has the design properly considered radiation exposure to the public and plant personnel?		✓

EXHIBIT 3.10-1

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention. etc., adequately specified?		✓

Comments/Remarks: None

Kenneth E. Faulkner / Kenneth E. Faulkner / 10/30/92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 01 Engineering Limit and Bases

PARAMETER: Refueling Water Storage Tank Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/28/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/29/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. A. Cowgdon
Cognizant Engineering Manager (Print Name)

Joseph A. Cowgdon
Cognizant Engineering Manager (Signature) Date 4/29/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 01

Parameter: Refueling Water Storage Tank Level (RWST)

Step Value(s):	**Use(s):**
> 19%	To verify RWST level is above the RAS actuation setpoint (19% specified in the EOI, 18.5% nominal per Ref. 1 & 2).
< 19%	To verify RWST level is less than the RAS actuation setpoint (19% specified in the EOI, 18.5% nominal per Ref. 1 & 2).

Engineering Limit(s):

Upper limit 26.8 % span

Lower limit 11.0 % span

Bases for Engineering Limit(s):

The upper Engineering limit ensures that sufficient volume is transferred from the RWST and that 20 minutes of volume available in the RWST prior to RAS. The lower Engineering Limit ensures that sufficient volume remains to prevent air entrainment during the transfer of the pump suction from the RWST to the Containment Sump (Ref 1 & 2). Vortexing is not addressed by Reference 1. The calculation states that vortexes should not be a concern, but that this should be evaluated (Ref. 1, page 16).

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 2 | rev. 01

References:

1. Calculation 709783-MPS-5CALC-001, Rev. 00, dated 8/31/89, "SIS: RWST Volumes for Safety Injection and Containment Spray Modes of Operation"

2. Updated FSAR, through revision 8, Section 6.2.2.1.2.3.B. | rev. 01

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-046 Rev-01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-046 Rev.01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 02 Engineering Limit and Bases

PARAMETER: Refueling Water Storage Tank Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/26/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Martin Greer — 4/28/93
Name — Signature — Date
Independent Reviewer

APPROVED BY: J.R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon
Cognizant Engineering Manager (Signature) Date 4/29/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 02

Parameter: Refueling Water Storage Tank Level

Step Value(s):	**Use(s):**
> 2%	To determine when charging pump suction should be transferred to another borated water source, or to determine that they should be stopped.

Engineering Limit(s):

> 4.65% | rev. 01

Bases for Engineering Limit(s):

The Engineering Limit is based on ensuring that the RWST has a sufficient inventory to supply a source of water to the suction of the charging pumps. The level of the charging suction (CVCS gravity feed) from the RWST is 2 feet 1 inch above the tank bottom (Ref. 3). The piping is a nominal 6", therefore the top of the pipe would be 2 feet 4 inches or 2.333 feet. Unlike the safety injection pump suction, the CVCS suction line is flush with the inside tank wall (Ref. 4) The RWST bottom level tap is shown as 0.833 feet above the tank bottom (Ref. 1 and 5). The span of the level instrument is 32.25 feet (Ref. 1 and 2). Therefore the minimum level for the charging pumps would be 4.65% of span ([2.333 - 0.833] ÷ 32.25 X 100). | rev. 01

Assumptions:

None

References:

1. Calculation M12.1D, dated 5-23-84, "NPSH of ESF Pumps," SONGS File No. S023-451-A. | rev. 01

2. Calculation N-0240-006 R/O, dated 11-6-89, "RWST TECH SPEC REQUIREMENT." | rev. 01

3. Brown-Minneapolis Tank drawing 76-D108501-2, Revision 6, "Refueling Water Tank Orientation & Elevation", SONGS file #S023-407-13-54-7 SCE #0447. | rev. 01

4. Brown-Minneapolis Tank drawing 76-B108501-18, Revision 0, "6" CVCS Gravity Feed", SONGS file #S023-407-13-98-1 SCE #0447 | rev. 01

5. Calculation S-PEC-393, Revision 00, 8/19/82, "SIS: RWST Volume Required for Safety Injection and Containment Spray Modes of Operation" (CDCC #39507, Category 3, not releasable to SCE). | rev. 01

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-047 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 03 Engineering Limit and Bases

PARAMETER: Refueling Water Storage Tank Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Martin Greer — 4/29/93
Name — Signature — Date
Independent Reviewer

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/29/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 03

Parameter: Refueling Water Storage Tank Level

Step Value(s):	**Use(s):**
FALLING	To verify the emergency sump level increases as the RWST level decreases.
LOWERING	To verify the emergency sump level increases as the RWST level decreases.
LOWERING	To verify that RWST level is falling.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

There are no associated Engineering Limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limit are evaluated for their engineering limits.

If the RWST level reaches the Recirculation Actuation Signal (RAS) setpoint, then the valves from the containment sump will be opened. Upon confirmation that the sump level is sufficient to provide adequate suction head, the operators will shut the supply from the RWST (Ref. 1). Confirmation that the RWST Level is FALLING or LOWERING as Containment Sump level increases ensures that the water removed from the RWST by the Safety Injection and/or Containment Spray pump(s) is being transferred to the Containment Sump to eventually provide the required suction head upon RAS. If the Step Value is not observed, then the operators are directed to ensure that adequate level is maintained in the RWST to provide suction to the running pumps.

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1 | rev. 01

References:

1. Updated FSAR, through revision 8, Section 6.2.2.1.2.3.B.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-048 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-048 Rev-01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/29/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 04 Engineering Limit and Bases

PARAMETER: Refueling Water Storage Tank Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 1/5/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Paul B. Kramarczyk — Name
Independent Reviewer

Paul B. Kramarczyk — Signature

1-5-93 — Date

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon
Cognizant Engineering Manager (Signature) Date 1/5/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 04

Parameter: Refueling Water Storage Tank Level

Step Value(s):	**Use(s):**
> 6%	To determine when charging pump suction should be transferred to another borated water source, or to determine that they should be stopped.
> 6%	To verify RWST level is available (> 6%) as a water source for the charging pumps or ECCS pumps.
> 6%	To determine the availability of alternate borated water sources.

Engineering Limit(s):

Lower Limit Safety Injection Pumps > 0.26%

Lower Limit Charging Pumps > 4.65%

Bases for Engineering Limit(s):

The Engineering limit is based on having sufficient water in the RWST to provide suction to the SI and/or charging pumps.

Safety Injection Pumps

Reference 1 (page 12 of 25) specifies that the water level in the RWST can be drawn down to the top of the grating on the ECCS suction nozzle when supplying the ESF pumps. This level is indicated as being 0.917 feet above the tank bottom. The RWST bottom level tap is shown as 0.833 feet above the tank bottom. The span of the level instrument is 32.25 feet (Ref. 1 and 2). Therefore the minimum level for the safety injection pumps would be 0.26% of span ([0.917 - 0.833] ÷ 32.25 X 100).

Charging Pumps

The level of the charging suction (CVCS gravity feed) from the RWST is 2 feet 1 inch above the tank bottom (Ref. 3). The piping

is a nominal 6", therefore the top of the pipe would be 2 feet 4 inches or 2.333 feet. Unlike the safety injection pump suction, the CVCS suction line is flush with the inside tank wall (Ref. 4) The RWST bottom level tap is shown as 0.833 feet above the tank bottom (Ref. 1 and 5). The span of the level instrument is 32.25 feet (Ref. 1 and 2). Therefore the minimum level for the charging pumps would be 4.65% of span ([2.333 - 0.833] ÷ 32.25 X 100).

Assumptions:

1. The suction to the CVCS pumps will be maintained down to the top of the CVCS gravity feed line.

References:

1. Calculation M12.1D, dated 5-23-84, "NPSH of ESF Pumps," SONGS File No. S023-451-A.

2. Calculation N-0240-006 R/O, dated 11-6-89, "RWST TECH SPEC REQUIREMENT."

3. Brown-Minneapolis Tank drawing 76-D108501-2, Revision 6, "Refueling Water Tank Orientation & Elevation", SONGS file #S023-407-13-54-7 SCE #0447.

4. Brown-Minneapolis Tank drawing 76-B108501-18, Revision 0, "6" CVCS Gravity Feed", SONGS file #S023-407-13-98-1 SCE #0447.

5. Calculation S-PEC-393, Revision 00, 8/19/82, "SIS: RWST Volume Required for Safety Injection and Containment Spray Modes of Operation" (CDCC #39507, Category 3, not releasable to SCE)

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: ISOPS Module Ø8, Group Ø4
File # 009-OPS92-100 (Rev 01)

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?	✓	
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?	✓	
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?	✓	
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		
19. Are adequate handling, storage, cleaning and shipping requirements specified?		
20. Are adequate identification requirements specified?		
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

Paul B. Kramarchyk / Paul B. Kramarchyk / 1-5-93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 05 Engineering Limit and Bases

PARAMETER: Refueling Water Storage Tank Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Martin Green — 4/29/93
Name — Signature — Date
Independent Reviewer

APPROVED BY: J. R. Longdon
Cognizant Engineering Manager (Print Name)

Joseph R. Longdon
Cognizant Engineering Manager (Signature) Date 4/29/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 05

Parameter: Refueling Water Storage Tank Level

Step Value(s):	**Use(s):**
> 19%	To determine if the RWST level is adequate to supply the containment spray pumps (> 19%).
MAINTAIN > 19%	To determine if the RWST level is adequate to supply the containment spray pumps (> 19%).
> 19%	To verify sufficient RWST level to start emergency boration with ECCS pumps. | rev. 01

Engineering Limit(s):

> 0.26%

Bases for Engineering Limit(s):

Reference 1 (page 12 of 25) specifies that the water level in the RWST can be drawn down to the top of the grating on the ECCS suction nozzle. This level is indicated as being 0.917 feet above the tank bottom. The RWST bottom level tap is shown as 0.833 feet above the tank bottom. The span of the level instrument is 32.25 feet (Ref. 1 and 2). Therefore the minimum level for the safety injection pumps would be 0.26% of span ([0.917 - 0.833] ÷ 32.25 X 100).

The step value specified in the procedure is the nominal RAS setpoint (Ref. 3) conservatively rounded off in the EOIs (Ref. 4). When RAS occurs, the suction source is shifted to the containment sump. The EOIs indicate that suction should not be shifted to the sump if sufficient level does not exist in the sump to provide a net positive suction head to the pumps. Ensuring or maintaining the level in the RWST provides a suction to the Containment Spray pump(s) while they are taking a suction from this source until suction from another source is available. However, as noted above the level in the RWST can be as low as 0.26% (0.917 feet) and still maintain suction to the pumps.

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the reference noted below is considered to be Secondary Design documents. Its use as a reference document for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 3 | rev. 01

2. The reference noted below is assumed to be Secondary Design documents. This assumption is justified based on the fact that it describes strategies which have been reviewed and commented on by the NRC. | rev. 01

   Ref: 4 | rev. 01

References:

1. Calculation M12.1D, dated 5-23-84, "NPSH of ESF Pumps," SONGS File No. S023-451-A.

2. Calculation N-0240-006 R/O, dated 11-6-89, "RWST TECH SPEC REQUIREMENT."

3. Table 3.3-4 of SONGS 2 Technical Specifications, through Amendment 94, June 3, 1991, and SONGS 3 Technical Specifications, through Amendment 84, June 3, 1991.

4. Operating Instruction SO23-14-9, Bases for Success Path IC-2, Step 1.a and CTP-3, Step 1.c.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-101 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-101 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks:

MARTIN GREGER / Martin Greger 4/29/93

Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 06 Engineering Limit and Bases

PARAMETER: Refueling Water Storage Tank Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)
L. A. Wild
Cognizant Engineer (Signature) Date: 11/2/92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Kenneth E. Faulkner — Kenneth E. Faulkner — 11/2/92
Name — Signature — Date
Independent Reviewer

APPROVED BY: JOSEPH A. CONGDON
Cognizant Engineering Manager (Print Name)
Joseph A. Congdon
Cognizant Engineering Manager (Signature) Date 11/2/92

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 06

Parameter: Refueling Water Storage Tank Level

Step Value(s):	**Use(s):**
> 6%	To determine if it is necessary (at 6% level) to initiate makeup water to the RWST.

Engineering Limit(s):

> 0.26%

Bases for Engineering Limit(s):

Reference 1 (page 12 of 25) specifies that the water level in the RWST can be drawn down to the top of the grating on the ECCS suction nozzle. This level is indicated as being 0.917 feet above the tank bottom. The RWST bottom level tap is shown as 0.833 feet above the tank bottom. The span of the level instrument is 32.25 feet (Ref. 1 and 2). Therefore the minimum level for the safety injection pumps would be 0.26% of span ([0.917 - 0.833] ÷ 32.25 X 100).

The EOI steps which use this value involve ensuring that adequate suction is maintained to ESF pumps. As noted above, level above the grating is sufficient to meet this criteria.

Assumptions:

None

References:

1. Calculation M12.1D, dated 5-23-84, "NPSH of ESF Pumps," SONGS File No. S023-451-A.

2. Calculation N-0240-006 R/0, dated 11-6-89, "RWST TECH SPEC REQUIREMENT."

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Mod 4 Group 6 RWST Level / 004-OPS92-102/Rev.00

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?		✓
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?	✓	
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?		✓

Comments/Remarks: As marked on Document Comments Sheet.

Kenneth E. Faulkner / Kenneth E. Faulkner / 11/2/92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 04 Group 07 Engineering Limit and Bases

PARAMETER: Refueling Water Storage Tank Level

PREPARED BY: L. A. Wild
Cognizant Engineer (Print Name)

L. A. Wild
Cognizant Engineer (Signature) Date: 11/2/92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Kenneth E. Faulkner — Name
Independent Reviewer

Kenneth E. Faulkner — Signature

11/2/92 — Date

APPROVED BY: Joseph R Congdon
Cognizant Engineering Manager (Print Name)

Joseph R Congdon
Cognizant Engineering Manager (Signature) 11/2/92 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 04 **Group:** 07

Parameter: Refueling Water Storage Tank Level

Step Value(s):	**Use(s):**
> 2%	To determine if RWST level is adequate when the ECCS pumps are aligned to take suction from the RWST.

Engineering Limit(s):

> 0.26%

Bases for Engineering Limit(s):

Reference 1 (page 12 of 25) specifies that the water level in the RWST can be drawn down to the top of the grating on the ECCS suction nozzle. This level is indicated as being 0.917 feet above the tank bottom. The RWST bottom level tap is shown as 0.833 feet above the tank bottom. The span of the level instrument is 32.25 feet (Ref. 1 and 2). Therefore the minimum level for the safety injection pumps would be 0.26% of span ([0.917 - 0.833] ÷ 32.25 X 100).

The EOI steps which use this value involve ensuring that adequate suction is maintained to ECCS pumps. As noted above, level above the grating is sufficient to meet this criteria.

Assumptions:

None

References:

1. Calculation M12.1D, dated 5-23-84, "NPSH of ESF Pumps," SONGS File No. S023-451-A.

2. Calculation N-0240-006 R/O, dated 11-6-89, "RWST TECH SPEC REQUIREMENT."

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Mod. 4 Group 7 RWST Level / 009-OPS92-098 / Rev. 00

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?		✓
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?.		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?	✓	
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention. etc., adequately specified?		✓

Comments/Remarks: As marked on Document Comments Sheet.

Kenneth E. Faulkner / Kenneth E. Faulkner / 11/2/92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
INSTRUMENT USE AND BASES TABLE COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

MODULE: 05 Containment Pressure
Containment Temperature
Containment Spray Flow

PREPARED BY: John Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/28/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN
Name
Independent Reviewer

Signature

4/28/93
Date

APPROVED BY: J.R. Congdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/28/93
Date

RECORD OF REVISIONS

Rev	Date	Pages	Prepared by	Reviewed by	Approved by
00	11/06/92	ALL	W. Dawes	P.Kramarchyk	J.R.Congdon
01	04/28/93	ALL	J. Flaherty	M.Greer	J.R.Congdon

RP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
01	CONTMT PRESSURE	< 1.5 PSIG 1.5 PSIG	This value was selected to verify that contmt pressure remains below the upper limit for normal contmt pressure. 1.5 PSIG coincides with the upper limit for T.S. 3.6.1.4 LCO for contmt pressure, which along with CR alarms, defines normal contmt pressure	To verify expected post-trip containment pressure conditions.
01	CONTMT PRESSURE	< 1.5 PSIG 1.5 PSIG	This value was selected to verify that contmt pressure remains below the upper limit for normal contmt pressure. 1.5 PSIG coincides with the upper limit for T.S. 3.6.1.4 LCO for contmt pressure, which along with CR alarms, defines normal contmt pressure	To confirm that an event other than an LOFW is not taking place.
01	CONTMT PRESSURE	< 1.5 PSIG 1.5 PSIG	This value was selected to verify that contmt pressure remains below the upper limit for normal contmt pressure. 1.5 PSIG coincides with the upper limit for T.S. 3.6.1.4 LCO for contmt pressure, which along with CR alarms, defines normal contmt pressure	To verify Containment Pressure < 1.5 PSIG and direct event re-diagnoses if it is not.
02	CONTMT PRESSURE	> 14 PSIG UL 14 PSIG	14 psig is based on the ESFAS trip value for the CSAS. The trip value was established based on the 20 psig setpoint used in the safety analysis, with a 6 psi channel accuracy factor included.	To verify CSAS actuation.
02	CONTMT PRESSURE	< 14 PSIG UL 14 PSIG	14 psig is based on the ESFAS trip value for the CSAS. The trip value was established based on the 20 psig setpoint used in the safety analysis, with a 6 psi channel accuracy factor included.	To determine if CSAS has actuated or should have actuated.

?P	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
)2	CONTMT PRESSURE	> 14 PSIG UL 14 PSIG	14 psig is based on the ESFAS trip value for the CSAS. The trip value was established based on the 20 psig setpoint used in the safety analysis, with a 6 psi channel accuracy factor included.	To determine if CSAS has actuated or should have actuated.
)2	CONTMT PRESSURE	< 14 PSIG NOT INC UL 14 PSIG	14 psig is based on the ESFAS trip value for the CSAS. The trip value was established based on the 20 psig setpoint used in the safety analysis, with a 6 psi channel accuracy factor included.	To verify Containment Pressure < 14 PSIG and not increasing and rediagnose the event if it is not.
)2	CONTMT PRESSURE	< 14 PSIG UL 14 PSIG	14 psig is based on the ESFAS trip value for the CSAS. The trip value was established based on the 20 psig setpoint used in the safety analysis, with a 6 psi channel accuracy factor included.	To evaluate the need to initiate containment spray operation.
)2	CONTMT PRESSURE	STABLE OR LOWRNG NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To evaluate the need to initiate containment spray operation.
)2	CONTMT PRESSURE	< 14 PSIG UL 14 PSIG	14 psig is based on the ESFAS trip value for the CSAS. The trip value was established based on the 20 psig setpoint used in the safety analysis, with a 6 psi channel accuracy factor included.	To determine if event re-diagnosis is required.

RP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
02	CONTMT PRESSURE	CONSTNT OR LOWRNG NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To determine if containment pressure is constant or lowering and if it is not, to direct use of another success path.
03	CONTMT PRESSURE	> 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To verify CIAS actuation if containment pressure is >3.4 PSIG.
03	CONTMT PRESSURE	> 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To verify CCAS actuation if containment pressure is >3.4 PSIG.
03	CONTMT PRESSURE	< 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To determine if containment pressure < CIAS setpoint or verify CIAS actuation if > setpoint.
03	CONTMT PRESSURE	< 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To determine if containment pressure < SIAS setpoint or verify SIAS actuation if > setpoint.
03	CONTMT PRESSURE	< 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To verify CIAS actuation if containment pressure is >3.4 PSIG.
03	CONTMT PRESSURE	> 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To determine if containment pressure < CIAS setpoint or verify CIAS actuation if > setpoint.

Module #: 05

P	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
3	CONTMT PRESSURE	< 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To determine if containment pressure is less than the CIAS setpoint and determine the appropriate success path to be used.
3	CONTMT PRESSURE	> 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To evaluate the need for manual containment isolation.
3	CONTMT PRESSURE	< 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To evaluate the need for containment isolation.
4	CONTMT PRESSURE	< 14 PSIG UL 15 PSIG	15 PSIG is based on the T.S. ALLOWABLE VALUE for CSAS. The CS system may be secured, and the CSAS reset when contmt pressure is reduced to <=25% (15 PSIG) of design contmt pressure (60 psig). The fan coolers are then capable of further lowering pressure	To evaluate containment spray termination.
5	CONTMT PRESSURE	INCREASING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To identify the type of event and location when Pressurizer Pressure is rapidly decreasing, using the "Break Identification Chart".
6	CONTMT PRESSURE	< 1.5 PSIG UL 1.5 PSIG	This pressure coincides with the T.S limit on containment pressure. It defines the upper limit for normal containment pressure. 1.5 psig is based on engineering judgement as the maximum pressure which will be observed with no energy release to contmt.	To determine if containment conditions indicate an event other than SGTR is in progress.

RP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
07	CONTMT PRESSURE	< CCW PRESSURE NONE	There are no associated engineering limits for the comparison of parameters. Since no value is specified in the comparison, no value can be assigned to the engineering limit.	To compare containment pressure with CCW pressure prior to, or after restoring CCW to the containment.
08	CONTMT PRESSURE	< 3.4 PSIG Limit Not Entered	Bases data not yet available.	To confirm that an event other than an LOFW is not taking place.
09	CONTMT PRESSURE	NOT RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify conditions inside containment to be normal.
10	CONTMT PRESSURE	> 14 PSIG N/A	Use of the Mini-Purge System to vent containment in the event that the CS system does not operate is no longer applicable to the EOIs. SCE has directed that ABB-CE need not address this issue in this study.	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
10	CONTMT PRESSURE	RISING N/A	Use of the Mini-Purge System to vent containment in the event that the CS system does not operate is no longer applicable to the EOIs. SCE has directed that ABB-CE need not address this issue in this study.	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
10	CONTMT PRESSURE	STABLE OR LOWRNG N/A	Use of the Mini-Purge System to vent containment in the event that the CS system does not operate is no longer applicable to the EOIs. SCE has directed that ABB-CE need not address this issue in this study.	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.

STEP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
11	CONTMT PRESSURE	< 14 PSIG UL 14 PSIG	14 PSIG is determined to be the engineering limit because it coincides with the ESFAS trip value. 14 psig is sufficiently high to prevent inadvertent actuation of the CS system, but low enough to minimize starting delay time.	To indicate if containment spray (and/or emergency fans) should be operating based on containment pressure.
12	CONTMT PRESSURE	< 3.4 PSIG UL 3.4 PSIG	3.4 PSIG is coincident with and therefore based on the ESFAS trip value.	To verify expected post-trip containment pressure conditions.
13	CONTMT PRESSURE	CONSTANT OR LOWER N/A	Use of the Mini-Purge System to vent containment in the event that the CS system does not operate is no longer applicable to the EOIs. SCE has directed that ABB-CE need not address this issue in this study.	To determine if the containment purge success path is performing adequately by observing containment pressure constant or lowering.
14	CONTMT PRESSURE	STABLE OR LOWERIN NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To determine if containment pressure is stable or lowering in order to allow continued use of the present success path, or direct the operator to a different success path.
15	CONTMT PRESSURE	CONSTNT,STBL,LWRG NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.

SONGS 2/3 ISOP II PHASE II
INSTRUMENT USE AND BASES TABLE

Module #: 05

RP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
16	CONTMT PRESSURE	< 3.4 PSIG 9.2 PSIG	The engineering limit is based on the maximum expected containment pressure during a SBO with a four hour duration. In this case, containment pressure increasing to > 9.2 PSIG is an indication that an event other than an SBO is occurring.	To determine if event re-diagnosis is required during performance of the SBO procedure.
01	CONTMT SPRAY FLOW	> 1750 GPM 1750 GPM	1750 GPM is the value of CS flow assumed in the Containment Peak Pressure Analysis for the containment design basis accident. This value is the minimum acceptable value for a single train of CS. 1750 gpm CS + two containment Fan Coolers is acceptable.	To determine if containment spray flow is adequate to meet SFSC criteria (> 1750 gpm per train).
01	CONTMT SPRAY FLOW	> 1750 GPM 1750 GPM	1750 GPM is the value of CS flow assumed in the Containment Peak Pressure Analysis for the containment design basis accident. This value is the minimum acceptable value for a single train of CS. 1750 gpm CS + two containment Fan Coolers is acceptable.	To determine if containment spray flow is adequate to meet the containment cooling requirements.
01	CONTMT SPRAY FLOW	> 1750 GPM 1750 GPM	1750 GPM is the value of CS flow assumed in the Containment Peak Pressure Analysis for the containment design basis accident. This value is the minimum acceptable value for a single train of CS. 1750 gpm CS + two containment Fan Coolers is acceptable.	To verify that 50% of the required containment heat removal capability is being provided by one train of containment spray (> 1750 gpm).

RP	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
01	CONTMT TEMP	< 120 deg F UL 120 deg F	120 deg F is based on engineering judgement as the max temp which will be observed without an energy release to the contmt. This value coincides with the contmt temp limit specified in T.S. 3.6.1.5 LCO.	To verify expected post-trip containment temperature conditions.
01	CONTMT TEMP	< 120 deg F UL 120 deg F	120 deg F is based on engineering judgement as the max temp which will be observed without an energy release to the contmt. This value coincides with the contmt temp limit specified in T.S. 3.6.1.5 LCO.	To determine if containment conditions indicate an event other than SGTR is in progress.
01	CONTMT TEMP	< 120 deg F UL 120 deg F	120 deg F is based on engineering judgement as the max temp which will be observed without an energy release to the contmt. This value coincides with the contmt temp limit specified in T.S. 3.6.1.5 LCO.	To verify containment temperature < 120 deg F and direct event re-diagnoses if it is not.
01	CONTMT TEMP	< 120 deg F UL 120 deg F	120 deg F is based on engineering judgement as the max temp which will be observed without an energy release to the contmt. This value coincides with the contmt temp limit specified in T.S. 3.6.1.5 LCO.	To confirm that an event other than an LOFW is not taking place.
02	CONTMT TEMP	< 215 deg F Limit Not Entered	Bases data not yet available.	To determine if event re-diagnosis is required during performance of the SBO procedure.
03	CONTMT TEMP	< 215 deg F Limit Not Entered	Bases data not yet available.	To determine if CSAS has actuated or should have actuated.

SONGS 2/3 ISOP II PHASE II
INSTRUMENT USE AND BASES TABLE

Module #: 05

P	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
3	CONTMT TEMP	< 215 deg F Limit Not Entered	Bases data not yet available.	To evaluate the need to initiate containment spray operation.
3	CONTMT TEMP	> 215 deg F Limit Not Entered	Bases data not yet available.	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
3	CONTMT TEMP	STABLE OR LOWRNG NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To evaluate the need to initiate containment spray operation.
3	CONTMT TEMP	< 215 deg F Limit Not Entered	Bases data not yet available.	To verify that CCAS is the appropriate success path (via containment temp < 215 F and stable) or direct the operator to a different success path.
3	CONTMT TEMP	STABLE OR LOWERIN NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify that CCAS is the appropriate success path (via containment temp < 215 F and stable) or direct the operator to a different success path.
3	CONTMT TEMP	< 215 deg F Not yet available	Bases data not yet available.	To determine if event re-diagnosis is required.
4	CONTMT TEMP	NOT RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To verify conditions inside containment to be normal.

P	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
5	CONTMT TEMP	< 145 deg F Limit Not Entered	Bases data not yet available.	To confirm that an event other than an LOFW is not taking place.
5	CONTMT TEMP	< 145 deg F Not yet available	Bases data not yet available.	To determine if event re-diagnosis is required.
5	CONTMT TEMP	< 145 deg F Limit Not Entered	Bases data not yet available.	To determine if the success path in use (containment temperature < 145 F) is acceptable, or direct the operator to a different success path.
6	CONTMT TEMP	CONSTNT OR LOWRNG NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
6	CONTMT TEMP	RISING NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
6	CONTMT TEMP	STABLE OR LOWRNG NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.

SONGS 2/3 ISOP II PHASE II
INSTRUMENT USE AND BASES TABLE

T A Q.A. DOCUMENT

Module #: 05

NOT A Q.A. DOCUMENT

P	PARAMETER	STEP VALUE/ ENG. LIMIT	BASES	USE
6	CONTMT TEMP	STABLE OR LOWERIN NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To determine if containment temperature is stable or lowering in order to allow continued use of the present success path, or direct the operator to a different success path.
7	CONTMT TEMP	CONSTNT OR LOWRNG NONE	There are no engineering limits for the trending or monitoring of parameters. Since no value is specified in the trend, no engineering limits apply.	To determine if containment pressure is less than the CIAS setpoint and determine the appropriate success path to be used.
7	CONTMT TEMP	< 145 deg F Limit Not Entered	Bases data not yet available.	To verify expected post-trip containment temperature conditions.
8	CONTMT TEMP	CONSTANT OR LOWER N/A	Use of the Mini-Purge System to vent containment in the event that the CS system does not operate is no longer applicable to the EOIs. SCE has directed that ABB-CE need not address this issue in this study.	To determine if the containment purge success path is performing adequately by observing containment temperature constant or lowering.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-146 Rev. 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-146 Rev.01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: Check List #1 N/A

MARTIN GREER / Martin Greer 4/28/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 01 Engineering Limit and Bases

PARAMETER: CONTAINMENT PRESSURE

PREPARED BY: John M. Flaherty | rev. 01
Cognizant Engineer (Print Name)
Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No. 9 of QAM-101.

MARTIN GREER — Name
Independent Reviewer
Signature
4/28/93 — Date

APPROVED BY: T. R. Congdon
Cognizant Engineering Manager (Print Name)
Cognizant Engineering Manager (Signature) Date 4/28/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 01

Parameter: CONTAIMMENT PRESSURE

Step Value(s):	**Use(s):**
< 1.5 PSIG	To verify expected post-trip containment pressure conditions.
< 1.5 PSIG	To confirm that an event other than a LOFW is not taking place.
< 1.5 PSIG	To verify Containment Pressure < 1.5 PSIG and direct event re-diagnosis if it is not.

Engineering Limit(s):

Upper Limit: 1.5 PSIG

Bases for Engineering Limit(s):

This value was selected to verify that containment pressure remains below the upper limit for normal containment pressure. In Standard Post Trip Actions, containment cooling and circulation are initiated if necessary, and CIAS and CCAS are actuated or verified actuated. In Loss of Forced Circulation/Loss of Offsite Power, and Loss of Feedwater, an energy release to containment is not expected, so a re-diagnosis of the plant conditions is directed, and this procedure is exited in favor of the proper event-based procedure, or the functional recovery procedure.

1.5 PSIG coincides with the upper limit for Technical Specification 3.6.1.4, Limiting Condition for Operation on

Containment Pressure (Ref 1 and 2), which, along with control room annunciation, defines normal operating containment pressure. The basis for the LCO is that 1.5 PSIG, combined with the maximum pressure generated by a Steam Line Break in containment, 55.7 PSIG, coincident with a loss of a train of containment cooling, will limit total pressure to 57.2 PSIG, which is less than the design pressure and consistent with the accident analyses (Ref 3).

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1,2,3

References:

1. San Onofre Technical Specifications, Unit 2 Amendment 94, Limiting Condition For Operation 3.6.1.4 and its Bases.

2. San Onofre Technical Specifications, Unit 3 Amendment 84, Limiting Condition For Operation 3.6.1.4 and its Bases.

3. San Onofre 2 & 3 Updated FSAR, Section 6.2.1.1.1.1, and Table 6.2-2, Rev 8.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-60

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-60

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/28/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 02 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/27/93

| rev. 01

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/28/93
Name Signature Date
Independent Reviewer

APPROVED BY: J.R. Langdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/25/93
Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 02

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
> 14 PSIG	To verify CSAS actuation.
< 14 PSIG	To determine if CSAS has actuated or should have actuated.
> 14 PSIG	To determine if CSAS has actuated or should have actuated.
<14 PSIG AND NOT INCREASING	To verify Containment Pressure < 14 PSIG and not increasing and re-diagnose the event if it is not.
< 14 PSIG	To evaluate the need to initiate containment spray operation.
STABLE OR LOWERING	To evaluate the need to initiate containment spray operation.
< 14 PSIG	To determine if event re-diagnosis is required.
CONSTANT OR LOWERING	To determine if containment pressure is constant or lowering and if it is not, to direct use of another success path.

Engineering Limit(s):

Upper Limit: 14 PSIG

Bases for Engineering Limit(s):

14 PSIG is based on the Engineered Safety Features Actuation System (ESFAS) trip value for the Containment Spray Actuation Signal (Ref 2 & 3). FSAR Table 7.3-3 (Ref 4) shows that the trip value was established based on the 20 PSIG setpoint used in the safety analysis, with a 6 PSI channel accuracy factor.

Proper actuation or manual intervention is required to provide the containment pressure and temperature reduction assumed available in the facility design for the protection and mitigation of accident and transient conditions (Ref 1).

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1,2,3,4

References:

1. San Onofre 2 & 3 Updated FSAR, Section 6.2.2.1.1, Containment Spray System Design Bases, Rev 8.
2. San Onofre Technical Specifications, Unit 2 Amendment 94, Limiting Condition For Operation 3.6.1.4 and its Bases.
3. San Onofre Technical Specifications, Unit 3 Amendment 84, Limiting Condition For Operation 3.6.1.4 and its Bases.
4. San Onofre 2 & 3 Updated FSAR, Table 7.3-3, Engineered Safety Features Actuation Systems Summary (Sheet 1), Rev 8.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-71

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-71

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks:

MARTIN GREEN / Martin Green 4/28/93

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 03 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: John M. Flaherty | rev. 01
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN Martin Green 4/28/93
Name Signature Date
Independent Reviewer

APPROVED BY: J.R. Gordon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/28/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 03

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
> 3.4 PSIG	To verify CIAS actuation if containment pressure is >3.4 PSIG.
> 3.4 PSIG	To verify CCAS actuation if containment pressure is >3.4 PSIG.
< 3.4 PSIG	To determine if containment pressure < CIAS setpoint or verify CIAS actuation if > than setpoint.
< 3.4 PSIG	To determine if containment pressure < SIAS setpoint or verify SIAS actuation if > setpoint.
< 3.4 PSIG	To verify CIAS actuation if containment pressure is >3.4 PSIG.
> 3.4 PSIG	To determine if containment pressure < CIAS setpoint or verify CIAS actuation if > setpoint.
< 3.4 PSIG	To determine if containment pressure is less than the CIAS setpoint and determine the appropriate success path to be used.
> 3.4 PSIG	To evaluate the need for manual containment isolation.
< 3.4 PSIG	To evaluate the need for containment isolation.

Engineering Limit(s):

Upper Limit: 3.4 PSIG

Bases for Engineering Limit(s):

Containment pressure is observed by the Operator to verify the proper actuation of Containment Isolation (CIAS) and Emergency Containment Cooling (CCAS) if above 3.4 PSIG, and that CIAS and CCAS have not actuated and are not needed if below 3.4 PSIG.

The proper operation of this actuation or manual intervention is required to provide the containment capability assumed available in the facility design for the protection and mitigation of accident and transient conditions. The engineering limit is therefore determined to be coincident with the ESFAS trip value.

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1,2

References:

1. San Onofre Technical Specifications, Unit 2 Amendment 94, Limiting Condition For Operation 3.6.1.4 and its Bases.

2. San Onofre Technical Specifications, Unit 3 Amendment 84, Limiting Condition For Operation 3.6.1.4 and its Bases.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-063

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-063

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/28/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 04 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: John M. Flaherty | rev. 01
Cognizant Engineer (Print Name)
Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Martin Greer — 4/28/93
Name — Signature — Date
Independent Reviewer

APPROVED BY: J. R. Landon
Cognizant Engineering Manager (Print Name)
Cognizant Engineering Manager (Signature) Date 4/28/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 04

Parameter: Containment Pressure

Step Value(s): **Use(s):**

< 14 PSIG To evaluate containment spray termination.

| rev. 01

Engineering Limit(s):

Upper Limit: 15 PSIG

Bases for Engineering Limit(s):

With containment spray isolated and containment pressure ≤25% of design (15 PSIG), the remaining containment heat removal systems (i.e., fan coolers) are capable of maintaining and further reducing containment pressure. Therefore, the containment spray system may be secured, and the Containment Spray Actuation Signal (CSAS) reset (Ref 1).

The engineering limit is based on the technical specification ALLOWABLE VALUE for CSAS (Ref 2). However, since the technical specification TRIP VALUE for CSAS is 14 PSIG, the value which is used in the Emergency Operating Instructions will have to allow for the fact that the reset of the CSAS trip signal cannot occur until the Engineered Safeguards Features Actuation System (ESFAS) "sees" containment pressure is less than the ESFAS trip setpoint.

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1,2

References:

1. San Onofre 2&3 FSAR, Updated, Rev. 8, Section 6 (Engineered Safety Features).

2. San Onofre Technical Specifications, Unit 2 Amendment 94, and Unit 3 Amendment 84, Limiting Condition For Operation 3.6.1.4 and its Bases.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-072

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS 92-

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/28/93

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 05 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: Will B. Dawes
Cognizant Engineer (Print Name)

Will B Dawes
Cognizant Engineer (Signature) Date: 10-14-92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Kenneth E. Faulkner	Kenneth E. Faulkner	10/16/92
Name	Signature	Date
Independent Reviewer		

APPROVED BY: JOSEPH R. LONGDON
Cognizant Engineering Manager (Print Name)

J R Longdon
Cognizant Engineering Manager (Signature) Date 10/19/92

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 05

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
INCREASING	To identify the type of event and location when Pressurizer Pressure is rapidly decreasing, using the "Break Identification Chart".

Engineering Limit(s):

None.

Bases for Engineering Limit(s):

There are no associated engineering limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually, when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limits are evaluated for their engineering limits.

Assumptions:

None.

References:

None.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Mod. 5 Group 5, Containment Pressure/ 009-0PS92-064 / Rev. 00.

		OK	N/A
1.	Were the inputs correctly selected and incorporated into the design?		✓
2.	Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3.	Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4.	Are the appropriate quality and quality assurance requirements specified?		✓
5.	Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6.	Have applicable construction and operating experience been considered?		✓
7.	Have the design interface requirements been satisfied?		✓
8.	Was an appropriate design method used?		✓
9.	Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10.	Is the output (results and conclusions) reasonable compared to inputs?	✓	
11.	Are the specified parts, equipment, and processes suitable for the required application?		✓
12.	Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13.	Have adequate maintenance features and requirements been specified?		✓
14.	Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15.	Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16.	Has the design properly considered radiation exposure to the public and plant personnel?		✓

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention. etc., adequately specified?		✓

Comments/Remarks: None

Kenneth E. Faulkner / Kenneth E. Faulkner / 10/16/92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 06 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/27/93

| rev. 01

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists NS 9 of QAM-101.

MARTIN GREEN
Name
Independent Reviewer

Signature

4/28/93
Date

APPROVED BY: J.R. Omsden
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/28/93
Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 06

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
< 1.5 PSIG	To determine if containment conditions indicate an event other than SGTR is in progress.

Engineering Limit(s):

Upper Limit: 1.5 PSIG

Bases for Engineering Limit(s):

This value was selected to verify that containment pressure remains below the upper limit for normal containment pressure. With a diagnosed Steam Generator Tube Rupture, an energy release to containment is not expected. If an energy release is indicated, a re-diagnosis of the plant conditions is directed, and this procedure is exited in favor of the proper event-based procedure, or the functional recovery procedure.

1.5 PSIG is based on engineering judgement as the maximum pressure which will be observed without an energy release to the containment. This pressure coincides with the upper limit for Technical Specification 3.6.1.4, Limiting Condition for Operation (LCO) on Containment Pressure (Ref 1 and 2). This limit defines the upper limit for normal containment pressure. The basis for the LCO is that 1.5 PSIG, combined with the maximum pressure generated by a Steam Line Break in containment, 55.7 PSIG, will limit total pressure to 57.2 PSIG. This is less than the design pressure of 60 PSIG and consistent with the accident analyses (Ref 3).

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1,2,3

References:

1. San Onofre Technical Specifications, Unit 2 Amendment 94 Limiting Condition For Operation 3.6.1.4 and its Bases.

2. San Onofre Technical Specifications, Unit 3 Amendment 84 Limiting Condition For Operation 3.6.1.4 and its Bases.

3. San Onofre 2 & 3 Updated FSAR, Section 6.2.1.1.1.1, and Table 6.2-2, Rev 8.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OP592-065 Rev 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Green 4/21/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 07 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: John M. Flaherty | rev. 01
Cognizant Engineer (Print Name)
Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Name
Independent Reviewer
Signature — Date 4/28/93

APPROVED BY: J.R. Congdon
Cognizant Engineering Manager (Print Name)
Cognizant Engineering Manager (Signature) Date 4/28/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 07

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
< CCW Pressure	To compare containment pressure with CCW pressure prior to, or after restoring CCW to the containment.

Engineering Limit(s):

None.

Bases for Engineering Limit(s):

There are no associated engineering limits for the comparison of parameters. Since no value is specified in the comparison, no value will be assigned to the engineering limit.

After a Containment Isolation Actuation Signal (CIAS) isolates the non-critical loop of Component Cooling Water (CCW), the RCPs must be secured (Ref 1). When conditions are suitable, CCW is returned to service and RCPs are started, because forced circulation is a more effecient means of core and Reactor Coolant System heat removal than is natural circulation.

One of the suitability checks is that containment pressure be less than CCW pressure, thus demonstrating that leakage across a CCW line break would be into the containment, not into the CCW system. Leakage into the CCW system constitutes a potential radiological release path (Ref 2).

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 1

2. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, documents that are not Primary or Secondary Design documents may be used as reference documents if justification is provided. The references noted below are formal engineering correspondence between the design principals (e.g., NSSS vendor architect, etc,) and SCE. Their use as reference material is justified when the basis for the engineering limit is "operational experience" or "engineering judgement", and no Primary or Secondary Design Document exists. | rev. 01

   Ref: 2

References:

1. San Onofre 2 & 3 Updated FSAR, Section 9.2.2.2.3.4, Rev 8.

2. Operating Instruction SO23-14-5, Bases and Deviation Document, Rev. 3.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-073 Rev. 0)

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/28/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 08 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/28/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Name
Independent Reviewer
Signature — Date 4/28/93

APPROVED BY: J.R. Conydon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) Date 4/28/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 08

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
< 3.4 PSIG	To confirm that an event other than an LOFW is not taking place.
< 3.4 PSIG	To determine if event re-diagnosis is required.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

No applicable basis/reference was found (See Ref. 1).

Assumptions:

None

References:

1. EMail Message, "Boiler Plate for References," Paul Curry (SCE) to Bill Watson (ABB C-E), 3/1/93.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-0P592-115

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/28/93

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 09 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: Will B. Dawes
Cognizant Engineer (Print Name)

Will B Dawes
Cognizant Engineer (Signature) Date: 10-12-92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Kenneth E. Faulkner — Name, Independent Reviewer
Kenneth E. Faulkner — Signature
10/14/92 — Date

APPROVED BY: Joseph R Congdon
Cognizant Engineering Manager (Print Name)

Joseph R Congdon
Cognizant Engineering Manager (Signature) Date 10/15/92

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 09

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
NOT RISING	To verify conditions inside containment are normal.

Engineering Limit(s):

None.

Bases for Engineering Limit(s):

There are no associated engineering limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually, when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limits are evaluated for their engineering limits.

Assumptions:

None.

References:

None.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Mod 5 Group 9 Containment Pressure / 009-OPS92-061 / Rev. 00

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?		✓
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

EXHIBIT 3.10-1

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention. etc., adequately specified?		✓

Comments/Remarks: None

Kenneth E. Faulkner / Kenneth E. Faulkner / 10/14/92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 11 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN Martin Green 4/28/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Powdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/28/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 11

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
< 14 PSIG	To indicate if containment spray (and/or emergency fans) should be operating based on containment pressure.

Engineering Limit(s):

Upper Limit: 14 PSIG

Bases for Engineering Limit(s):

14 PSIG is determined to be the upper engineering limit for the containment pressure parameter for this use because it coincides with the Engineered Safety Features Actuation System (ESFAS) trip value (Ref 1 & 2). 14 PSIG is sufficiently high to prevent inadvertent actuation of the Containment Spray System (CSS), but low enough to minimize starting delay time. This parameter is used as acceptance criterion for the Containment Temperature and Pressure (CTP) safety function status check following an energy release to containment that raises containment pressure above 3.4 PSIG. If pressure is greater than 14 PSIG, any of the following three equipment configurations is verified to assure satisfaction of the CTP safety function (Ref 3):

1. Two train operation of Containment Emergency Fan Coolers and Dome Air Circulators with containment temperature and pressure stable or lowering.

2. Two train operation of Containment Spray with containment temperature and pressure stable or lowering.

3. One train of Containment Spray and one train of Emergency Fan Coolers operating with containment temperature and pressure stable or lowering.

The Containment Spray system consists of two redundant trains that together provide 100% of the required heat removal capability following the containment design basis accident. The Emergency Fan Coolers are also redundant trains that together provide 100% capability (Ref 3).

The Containment Cooling Actuation Signal (CCAS) that starts the Fan Coolers and the Containment Spray pumps is generated by the (ESFAS) when containment pressure reaches 3.4 PSIG. Containment Spray valves are opened when ESFAS generates a Containment Spray Actuation Signal (CSAS) when containment pressure reaches 14 PSIG. Since one train of spray may be required to satisfy the safety function, the engineering limit is determined to be the trip value of CSAS (Ref 2).

Assumptions:

| rev. 01

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license.

   Ref: 1,2,3

References:

1. San Onofre Technical Specifications, Unit 2 Amendment 94, Limiting Condition For Operation 3.6.1.4 and its Bases.

2. San Onofre Technical Specifications, Unit 3 Amendment 84, Limiting Condition For Operation 3.6.1.4 and its Bases.

3. San Onofre 2 & 3 Updated FSAR, Section 6.2, Containment Systems.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-0P592-088

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OP592-085

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/20/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 12 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN Martin Green 4/28/93
Name Signature Date
Independent Reviewer

APPROVED BY: J.R. Congdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/28/93 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 12

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
< 3.4 PSIG	To verify expected post-trip containment pressure conditions.

Engineering Limit(s):

Upper Limit: 3.4 PSIG

Bases for Engineering Limit(s):

The step value is used to ensure that Safety Function Status Check acceptance criteria for Containment Isolation and Containment Temperature and Pressure Control are met, either through a success path that verifies containment pressure below the step value, or if above, through success paths that verify that Engineered Safety Features (ESFAS) components have been automatically or manually placed in service (Ref 1).

The proper operation of ESFAS or manual operation of ESFAS components is required to provide the containment capability assumed available in the facility design for the protection and mitigation of accident and transient conditions. The engineering limit is therefore determined to be coincident with the ESFAS trip value (Ref 2 & 3).

Assumptions:

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, documents that are not Primary or Secondary Design documents may be used as reference documents if justification is provided. The references noted below are formal engineering correspondence between the design principals (e.g., NSSS vendor architect, etc,) and SCE. Their use as reference material is justified when the basis for the engineering limit is "operational experience" or "engineering judgement", and no Primary or Secondary Design Document exists. | rev. 01

   Ref: 1

2. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license. | rev. 01

   Ref: 2,3

References:

1. Emergency Operating Instruction SO-23-12-9, Functional Recovery, Bases and Deviation Documents, Rev. 3.

2. San Onofre Technical Specifications, Unit 2 Amendment 94, Limiting Condition For Operation 3.6.1.4 and its Bases.

3. San Onofre Technical Specifications, Unit 3 Amendment 84, Limiting Condition For Operation 3.6.1.4 and its Bases.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-074 Rev. 01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OPS92-074 Rev. 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/28/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 14 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: Will B. Dawes
Cognizant Engineer (Print Name)

Will B Dawes
Cognizant Engineer (Signature) Date: 10 26 92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Patrick J Fennell Patrick J Fennell 10-26-92
Name Signature Date
Independent Reviewer

APPROVED BY: Joseph R Congdon
Cognizant Engineering Manager (Print Name)

Joseph R Congdon 10/27/92
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 14

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
STABLE OR LOWERING	To determine if containment pressure is stable or lowering in order to allow continued use of the present success path, or direct the operator to a different success path.

Engineering Limit(s):

None.

Bases for Engineering Limit(s):

There are no associated engineering limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually, when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limits are evaluated for their engineering limits.

Assumptions:

None.

References:

None.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Module 05 Group 14 / 009-0PS90-076 / 00

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?		✓
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?		✓
25. Are requirements for record preparation review, approval, retention. etc., adequately specified?		✓

Comments/Remarks: _____

Patrick J Ferrell / Patrick J Ferrell 10-26-92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 15 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: Will B. Dawes
Cognizant Engineer (Print Name)

Will B Dawes
Cognizant Engineer (Signature) Date: 10-20-92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Patrick J Fennell Patrick J Fennell 11-4-92
Name Signature Date
Independent Reviewer

APPROVED BY: J.R. Congdon
Cognizant Engineering Manager (Print Name)

Jonathan R Congdon 11/5/92
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 15

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
CONSTANT OR LOWERING	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
STABLE OR LOWERING	

Engineering Limit(s):

None.

Bases for Engineering Limit(s):

There are no associated engineering limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually, when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limits are evaluated for their engineering limits.

Assumptions:

None.

References:

None.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Module 05 Group 15 / 009-0P592-0093 / A

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?		✓
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

EXHIBIT 3.10-1

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?		✓
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?		✓

Comments/Remarks: _____

Patrick J Fennell / Patrick J Fennell / 11-4-92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 16 Engineering Limit and Bases

PARAMETER: Containment Pressure

PREPARED BY: Will B. Dawes
Cognizant Engineer (Print Name)

Will B Dawes
Cognizant Engineer (Signature) Date: 11-3-92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Kenneth E. Faulkner — Name
Independent Reviewer

Kenneth E. Faulkner — Signature

11/4/92 — Date

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R Congdon
Cognizant Engineering Manager (Signature) 11/5/92 Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 16

Parameter: Containment Pressure

Step Value(s):	**Use(s):**
< 3.4 PSIG	To determine if event re-diagnosis is required during performance of the SBO procedure.

Engineering Limit(s):

Upper Limit: 9.2 PSIG

Bases for Engineering Limit(s):

The limit is based on the maximum expected containment pressure during a Station Blackout (SBO) event with a four hour duration (Ref 1). Pressure greater than 9.2 PSIG is an indication that an event other than an SBO is occurring, and that transition to another event based procedure, or to the functional recovery procedure is required.

Assumptions:

1. 11 GPM RCS leak rate prior to the SBO event.
2. 100 GPM leak rate during the SBO event due to failure of all Reactor Coolant Pump seals.

References:

1. Memo from Paul Curry to Bill Watson, October 30, 1992, regarding unissued SCE Calculation N-4080-025, which determines peak containment pressure following a four hour station blackout.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Mod. 5 Group 16 Containment Pressure / 009-OPS92-106 / Rev. 00

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?		✓
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?	✓	
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

EXHIBIT 3.10-1

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?		✓

Comments/Remarks: As marked on Document Comments Sheet.

Kenneth E. Faulkner / Kenneth E. Faulkner / 11/4/92
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 01 Engineering Limit and Bases

PARAMETER: Containment Temperature

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/27/93

rev. 01

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Name
Independent Reviewer
Signature — Date 4/28/93

APPROVED BY: J. R. Ongdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) Date 4/28/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 01

Parameter: Containment Temperature

Step Value(s):	**Use(s):**
< 120°F	To verify expected post-trip containment temperature conditions.
< 120°F	To determine if containment conditions indicate an event other than SGTR is in progress.
< 120°F	To confirm that an event other than an LOFW is not taking place.
< 120°F	To verify containment temperature < 120°F and direct event re-diagnoses if it is not.

Engineering Limit(s):

Upper Limit: 120°F

Bases for Engineering Limit(s):

This value was selected to verify that containment temperature remains below the upper limit for normal containment temperature. In the absence of a loss of coolant accident or a steam or feed line break inside containment, an energy release to the containment is not expected (Ref 4). If an energy release is indicated, a re-diagnosis of the plant conditions is directed, and the in-use procedure is exited in favor of the proper event-based procedure, or the functional recovery procedure.

120°F is based on engineering judgement as the maximum temperature which will be observed without an energy release to containment. This value coincides with the containment

temperature limit specified in Technical Specification 3.6.1.5, Limiting Condition for Operation (LCO) on Containment Temperature (Ref 1 and 2). The limitation ensures that overall average containment air temperature does not exceed conditions assumed in the accident analyses, thus limiting component temperatures to their design temperatures or below (Ref 3).

Assumptions:

| rev. 01

1. In accordance with NES&L Quality Procedure SO23-XXIV-7-15, the references noted below are considered to be Secondary Design documents. Their use as reference documents for the engineering limit basis is assumed to be justified based on ensuring that the engineering limit is consistent with the current design basis and operating license.

   Ref: 1,2,3

| rev. 01

2. The references noted below are assumed to be Secondary Design documents. This assumption is justified based on the fact that they describe strategies which have been reviewed and commented on by the NRC.

   Ref: 4

References:

1. San Onofre Technical Specifications, Unit 2 Amendment 94, Limiting Condition For Operation 3.6.1.4 and its Bases.

2. San Onofre Technical Specifications, Unit 3 Amendment 84, Limiting Condition For Operation 3.6.1.4 and its Bases.

3. San Onofre 2 & 3 Updated FSAR, Section 6.2, Containment Systems, Rev 8.

4. CEN-152, Emergency Procedure Guidelines, Rev. 3.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OP592-692

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/28/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 02 Engineering Limit and Bases

PARAMETER: Containment Temperature

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER
Name
Independent Reviewer

Signature

4/28/93
Date

APPROVED BY: J.R. Congdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) 4/28/93
Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 02

Parameter: Containment Temperature

Step Value(s):	**Use(s):**
< 215 °F	To verify containment temperature and pressure criteria are satisfied for CIAS termination.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

No applicable basis/reference was found (See Ref. 1).

Assumptions:

None

References:

1. EMail Message, "Boiler Plate for References," Paul Curry (SCE) to Bill Watson (ABB C-E), 3/1/93.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009- OPS92 -075 Rev.01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

009-OP592-075 Rev 01

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks:

MARTIN GREER / Martin Greer 4/28/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 03 Engineering Limit and Bases

PARAMETER: Containment Temperature

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/28/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER — Name, Independent Reviewer
Signature — Date 4/28/93

APPROVED BY: J. R. Condon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) Date 4/28/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 Group: 03

Parameter: Containment Temperature

Step Value(s):	**Use(s):**
< 215 °F	To determine if CSAS should have actuated or should be actuated.
< 215 °F	To evaluate the need to initiate containment spray operation.
STABLE OR LOWERING	To evaluate the need to initiate containment spray operation.
< 215 °F	To verify that CCAS is the appropriate success path (via containment temp < 215 F and stable) or direct the operator to a different success path.
STABLE OR LOWERING	To verify that CCAS is the appropriate success path (via containment temp < 215 F and stable) or direct the operator to a different success path.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

No applicable basis/reference was found (See Ref. 1)

Assumptions:

None

References:

1. EMail Message, "Boiler Plate for References," Paul Curry (SCE) to Bill Watson (ABB C-E), 3/1/93.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-0PS92-173

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/28/93
Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

File No: 009-OPS92-078
Revision: 00
Page: 1 of 2

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 04 Engineering Limit and Bases

PARAMETER: Containment Temperature

PREPARED BY: Will B. Dawes
Cognizant Engineer (Print Name)

Will B Dawes
Cognizant Engineer (Signature) Date: 11-1-92

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists 9 of QAM-101.

Patrick J Fennell Patrick J Fennell 18-4-92
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Compton
Cognizant Engineering Manager (Print Name)

Joseph R Compton 11/5/92
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 04

Parameter: Containment Temperature

Step Value(s):	**Use(s):**
NOT RISING	To verify conditions inside containment to be normal.

Engineering Limit(s):

None.

Bases for Engineering Limit(s):

There are no associated engineering limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually, when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limits are evaluated for their engineering limits.

Assumptions:

None.

References:

None.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: Module 05 Group 04/009-OPS 92-075/Rev 00

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?		✓
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?	✓	
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

EXHIBIT 3.10-1

17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?		✓
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?		✓
25. Are requirements for record preparation review, approval, retention. etc., adequately specified?		✓

Comments/Remarks: _____

_____

_____

_____

_____

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 05 Engineering Limit and Bases

PARAMETER: Containment Temperature

PREPARED BY: John M. Flaherty
Cognizant Engineer (Print Name)

Cognizant Engineer (Signature) Date: 4/27/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREEN — Name
Independent Reviewer
Signature
4/28/93 — Date

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Cognizant Engineering Manager (Signature) Date 4/28/93

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 05

Parameter: Containment Temperature

Step Value(s):	**Use(s):**
< 145 °F	To determine if event re-diagnosis is required.
< 145 °F	To determine if the success path in use (containment temperature < 145 F) is acceptable, or direct the operator to a different success path.

Engineering Limit(s):

None

Bases for Engineering Limit(s):

No applicable Basis/Reference was found (See Ref. 1).

Assumptions:

None

References:

1. EMail Message, "Boiler Plate for References," Paul Curry (SCE) to Bill Watson (ABB C-E), 3/1/93.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-148

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREER / Martin Greer 4/28/93
Independent Reviewer: Name/Signature/Date

ABB COMBUSTION ENGINEERING
ENGINEERING LIMIT DOCUMENT COVER SHEET

CLIENT: Southern California Edison **PLANT:** San Onofre 2&3

PROJECT: ISOPS II Support **C-E JOB NUMBER:** 2001216

DOCUMENT: Module 05 Group 06 Engineering Limit and Bases

PARAMETER: Containment Temperature

PREPARED BY: Joseph R. Congdon
Cognizant Engineer (Print Name)

Joseph R. Congdon
Cognizant Engineer (Signature) Date: 4/28/93

VERIFICATION STATUS: COMPLETE
The Safety-Related design information contained in this document has been verified to be correct by means of Design Review using Checklists No 9 of QAM-101.

MARTIN GREER Martin Greer 4/28/93
Name Signature Date
Independent Reviewer

APPROVED BY: J. R. Congdon
Cognizant Engineering Manager (Print Name)

Joseph R. Congdon 4/28/93
Cognizant Engineering Manager (Signature) Date

SONGS 2&3 INSTRUMENT SUITABILITY STUDY
EMERGENCY OPERATING PROCEDURES

ENGINEERING LIMIT BASES DOCUMENT

Module: 05 **Group:** 06

Parameter: Containment Temperature

Step Value(s):	**Use(s):**
CONSTANT OR LOWERING	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
RISING	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
STABLE OR LOWERING	To evaluate the effectiveness of the present success path for control of containment temperature and pressure.
STABLE OR LOWERING	To determine if containment temperature is stable or lowering in order to allow continued use of the present success path, or direct the operator to a different success path.

Engineering Limit(s):

None.

Bases for Engineering Limit(s):

There are no associated engineering limits for the trending of parameters. Since no value is specified in the trend, no value will be assigned to the engineering limit. Usually, when an operator is instructed to trend an indication, the indication is used in conjunction with other parameters to corroborate the condition of a safety function. An operator is not required to perform a safety related action on the trending of a single parameter by itself in the EOIs. Where the trending of a parameter is combined with specified operating limits on that parameter, the values given for the operating limits are evaluated for their engineering limits.

Assumptions:

None.

References:

None.

CHECKLIST NO. 9

REVIEW OF OTHER DESIGN DOCUMENTS

Checklist 1 (Exhibit 3.3-1 of QAP 3.3) shall be considered whenever this Checklist is used, and if applicable, the Independent Reviewer shall include it in the reviewer's statement.

Document Title/Number/Revision: 009-OPS92-138 Rev.01

	OK	N/A
1. Were the inputs correctly selected and incorporated into the design?		✓
2. Is the material presented sufficiently detailed as to purpose, method, assumptions, references, and units?	✓	
3. Are the assumptions necessary to perform the design activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent reverifications when the detailed design activities are completed?		✓
4. Are the appropriate quality and quality assurance requirements specified?	✓	
5. Are the applicable codes, standards and regulatory requirements including issue and addenda properly identified, and are their requirements for design met?		✓
6. Have applicable construction and operating experience been considered?		✓
7. Have the design interface requirements been satisfied?		✓
8. Was an appropriate design method used?		✓
9. Have the adjustment factors, uncertainties, and empirical correlations been correctly applied?		✓
10. Is the output (results and conclusions) reasonable compared to inputs?		✓
11. Are the specified parts, equipment, and processes suitable for the required application?		✓
12. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		✓
13. Have adequate maintenance features and requirements been specified?		✓
14. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		✓
15. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		✓
16. Has the design properly considered radiation exposure to the public and plant personnel?		✓

	OK	N/A
17. Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?		✓
18. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		✓
19. Are adequate handling, storage, cleaning and shipping requirements specified?		✓
20. Are adequate identification requirements specified?	✓	
21. Has an appropriate title page been used?	✓	
22. Are all pages sequentially numbered and marked with a valid number?	✓	
23. Is the presentation legible and reproducible?	✓	
24. Have all cross-outs or overstrikes in the documentation been initialed and dated by the author of the change?	✓	
25. Are requirements for record preparation review, approval, retention, etc., adequately specified?	✓	

Comments/Remarks: _____

MARTIN GREEN / Martin Green 4/24/93

Independent Reviewer: Name/Signature/Date

EXHIBIT 3.10-1