RESAR-3S
AMENDMENT 15
INSTRUCTION SHEET

The following instructional information and check list is being furnished to insert Amendment 15 into the RESAR-3S Reference Safety Analysis Report.

Since in most cases the original RESAR-3S contains information printed on both sides of a sheet of paper, a new sheet is furnished to replace sheets containing superseded material. As a result, the front or back of a sheet may contain information that is merely reprinted rather than changed.

Discard the old sheets and insert the new sheets, as listed below. Keep these instruction sheets in the front of Volume I to serve as a record of changes.

Remove (Front/Back)	Insert (Front/Back)
3B-1/3B-2	3B-1/3B-2
3B-3/3B-4	3B-3/3B-4
3B-5/3B-6	3B-5/3B-6
3B-13/3B-14	3B-13/3B-13a
---/---	3B-14/---
---/---	3B-20a/---
3B-35/3B-36	3B-35/3B-35a
---/---	3B-36/3B-36a
3B-43/3B-44	3B-43/3B-43a
---/---	3B-44/---
3B-77/---	3B-77/3B-77a
3B-78/---	3B-78/3B-78a

1634 033

APPENDIX 3B

EXTENSION REVIEW MATTERS FOR PRELIMINARY DESIGN APPROVALS

The Commission's August 22, 1978, policy statement on standardization includes a provision which allows any Preliminary Design Approval (PDA) that had been previously issued for a three-year term to be extended for two additional years. This provision applies to PDA-7 issued for the RESAR-3S application on December 30, 1976, and when approved, will extend the PDA to December 31, 1981.

As set forth in the policy statement, each application for a PDA extension will be subject to an assessment of the design with respect to the Category I, II, and III matters approved since the regulatory requirement's cutoff date for the PDA in question and the Category IV matters scheduled for review by the RRRC. A tabulation of each Category I, II, III, and IV matter approved or scheduled for R^3C review since the regulatory requirement's cutoff date of October 30, 1975 for RESAR-3S, is provided in the index tables which follow.

Appendix 3B addresses each matter identified by the index as being within Westinghouse scope of supply. Matters not within Westinghouse scope will be addressed in the applicant's Safety Analysis Report.

As noted in Appendix 3A, throughout the text of RESAR-3S, commitments are made to comply with regulatory criteria, positions and guides. Compliance is based upon the Westinghouse interpretation of the statement of the requirement. Where the Westinghouse position differs from Westinghouse's understanding of the regulatory requirement, alternate positions are presented and defended as acceptable.

The regulatory requirement's cutoff date for RESAR-3S is October 30, 1975, which precedes the effective dates and implementation dates of all of the Westinghouse NSSS scope PDA extension review matters in Category I, with the exception of Regulatory Guide 1.92 Revision 1. Therefore, according to present NRC policy on standardization, RESAR-3S compliance is not required for any of the Category I matters except for Regulatory Guide 1.92 Revision 1. However, as indicated in the individual responses which follow, compliance or an acceptable alternative position can be demonstrated for all of the Westinghouse NSSS scope PDA extension review matters in Categories I, II, III and IV, without the necessity for implementing RESAR-3S design changes.

INDEX

CATEGORY I MATTERS APPROVED BY REGULATORY REQUIREMENTS REVIEW COMMITTEE (R^3C)

Item	Reg. Guide	Rev.	Effective Date	W NSSS Scope	Applicant Scope
1	1.7	2	1/31/78	X	
2	1.9	1	9/1/78		X
3	1.20	2	1/9/76	X	
4	1.28	1	11/29/77	X	
5	1.29	3	6/20/78	X	
6	1.31	2	7/20/76	X	
7	1.32	2	11/14/77		X
8	1.33	1	10/21/76		X
9	1.35	2	8/15/75*		X
10	1.38	2	5/77	X	
11	1.39	2	7/12/77		X
12	1.52	2	11/29/77		X
13	1.63	1	3/22/77		X
14	1.64	2	1/9/76	X	
15	1.68	2	6/20/78	X	X
16	1.68.1	0	9/26/75*	Not Applicable to PWRs	
17	1.72	1	11/15/77		X
18	1.84	12	3/78	X	
19	1.85	12	3/78	X	
20	1.90	1	5/26/77		X
21	1.92	1	8/22/75*	X	
22	1.94	1	2/6/76		X
23	1.95	1	10/21/76		X
24	1.99	1	1/14/77	X	See Cat. III Response
25	1.100	1	6/14/77	X	
26	1.103	1	10/76		X
27	1.106	1	1/28/77		X
28	1.107	1	10/21/76		X
29	1.116	0-R	5/77		X
30	1.118	1	9/27/77	X	

*Date precedes regulatory requirement's cutoff date for RESAR-3S of October 30,1975.

Item	Reg. Guide	Rev.	Effective Date	W NSSS Scope	Applicant Scope
31	1.120	1	5/11/77		X
32	1.122	1	11/15/77		X
33	1.123	1	7/77	X	
34	1.126	0	1/14/77	X	
35	1.128	1	6/20/78		X
36	1.129	0	2/18/77		X
37	1.131	0	5/26/77		X
38	1.132	1	10/19/78		X
39	1.134	1	10/19/78		X
40	1.135	0	7/12/77		X
41	1.136	0	8/31/77		X
42	1.137	0	9/27/77		X
43	NUREG-0102 (SRP 1.8)	0	9/27/77	X	
44	1.138	0	11/15/77		X
45	1.XXX	0	11/15/77		X
46	1.140	0	11/29/77		X
47	1.142	0	1/31/78		X
48	8.19	0	3/14/78	X	
49	RSB 5-2	0	3/14/78	X	See Cat. III Response
	1.XX (RS 035-2)		10/19/78		X
	SRP 13.1	1	10/19/78		X
	SRP 13.4	1	10/19/78		X
	ETSB 11-4		10/19/78		X

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CATEGORY II MATTERS APPROVED BY REGULATORY REQUIREMENTS REVIEW COMMITTEE (R^3C)

Item	Reg. Guide	Rev.	Effective Date	W NSSS Scope	Applicant Scope
1	1.27	2	11/12/75		X
2	1.52	1	1/9/76		X
3	1.59	2	8/77		X
4	1.63	1	3/22/77		X
5	1.68.2	1	5/16/78		X
6	1.91	1	11/15/77		X
7	1.97	1	1/28/77	X	
8	1.102	1	11/12/75		X
9	1.105	1	9/15/76	X	
10	1.108	1	6/14/77		X
11	1.115	1	3/22/77		X
12	1.117	1	12/20/77		X
13	1.124	1	8/31/77	X	
14	1.130	0	7/77	X	
15	1.137	0	9/29/77		X
16	8.8	2	8/18/76	X	
17	BTPASB 9.5-1		8/18/76		X
18	BTP MTEB 5-7		4/13/77		X
19	SRP 5.4.7	1	1/31/78	X	See Cat. III Response
20	1.141	0	1/31/78	X	See Cat. III Response
	BTP-ASB 9.5-1		8/18/76		X

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CATEGORY III MATTERS APPROVED BY REGULATORY REQUIREMENTS REVIEW COMMITTEE (R^3C)

Item	Reg. Guide	Rev.	Effective Date	W NSSS Scope	Applicant Scope
1	1.56	1	5/[illegible]/7[illegible]	Not Applicable to PWRs	
2	1.68.2	1	5/1 [illegible]		X
3	1.99	1	1/14/77	X	
4	1.101	1	3/77		X
5	1.114	1	11/76		X
6	1.121	0	5/11/76	X	
7	1.127	1	11/29/77		X
8	1.137	0	9/27/77		X
9	SRP 5.4.7	1	1/31/78	X	
10	1.141	0	1/31/78	X	
11	RSB 5-2	0	3/14/78	X	
	NUREG-0460 Volume 3		1/2/79	X	

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CATEGORY IV MATTERS

A. REGULATORY GUIDES NOT CATEGORIZED

Item	Reg. Guide	Rev.	Issue Date	W NSSS Scope	Applicant Scope
1	1.13	1	12/75		X
2	1.14	1	8/75*	X	
3	1.75	1	1/75*	X	
4	1.79	1	9/75*	X	
5	1.83	1	7/75*	X	
6	1.89	0	11/74*	X	
7	1.93	0	12/74*		X
8	1.104	0	2/76		X

B. SRP CRITERIA

Item	Branch	SRP Criteria	Implementation Date	W NSSS Scope	Applicant Scope
1	MTEB	5.4.2.1	11/24/75	X	
2	CSB	6.2.1	11/24/75	X	
		6.2.1A			
		6.2.1B			
		6.2.1.2			
		6.2.1.3			
		6.2.1.4			
		6.2.1.5			
3	CSB	6.2.5	11/24/75	X	
4	CSB	6.2.3	11/24/75		X
5	CSB	6.2.4	11/24/75	X	
6	ASB	9.1.4	11/24/75	X	
7	ASB	10.4.9	11/24/75		X
8	SEB	3.5.3	11/24/75		X

*Date precedes regulatory requirement's cutoff date for RESAR-3S of October 30, 1975.

Category I

Item

RG 1.31 Rev. 2 Control of Ferrite Content in Stainless Steel Weld Metal

RESPONSE

Regulatory Guide 1.31, Revision 2, Control of Ferrite Content in Stainless Steel Weld Metal, describes a method for implementing General Design Criteria 1 of Appendix A 10CFR Part 50 and Appendix B 10CFR Part 50 with regard to control of welding austenitic stainless steel components and systems. The following paragraphs discuss the method to be used by Westinghouse to control delta ferrite in austenitic stainless steel welding; this method is in compliance with Revision 2 of the guide.

The welding of austenitic stainless steel is controlled to mitigate the occurrence of microfissuring or hot cracking in the weld. Although published data and experience have not confirmed that fissuring is detrimental to the quality of the weld, it is recognized that such fissuring is undesirable in a general sense. Also, it has been well documented in the technical literature that the presence of delta ferrite is one of the mechanisms for reducing the susceptibility of stainless steel welds to hot cracking. Available data indicates that a minimum delta ferrite level (expressed in Ferrite Number (FN)), above which the weld metals commonly used by Westinghouse will not be prone to hot cracking, lies somewhere between 0 FN and 3 FN.

The scope of these controls discussed herein encompasses welding processes used to join stainless steel parts in components designed, fabricated or stamped in accordance with ASME B&PV Code, Section III Class 1, 2, and CS components. Delta ferrite control is appropriate for the above welding reqirements except where no filler metal is used or for other reasons such control is not applicable. These exceptions include electron beam welding, autogenous gas shielded tungsten arc welding, explosive welding, and welding using fully austenitic welding materials.

Westinghouse components are fabricated utilizing welding procedures qualified in accordance with ASME Code Section III; also delta ferrite content verification is required for welding materials used for welding qualification testing and for each welding process used in the production of austenitic stainless steel components. Specifically, undiluted weld deposits of the "starting" welding materials are required to contain a minimum delta ferrite level of 5 FN. The ASME Code permits the use of either a chemical analysis method or a magnetic measurement method to determine the delta ferrite content; however, in the fabrication of Westinghouse components, Ferrite Number is measured on an as-deposited weld pad using a calibrated magnetic measuring device, as recommended by Revision 2 of Regulatory Guide 1.31.

1634 040

Category I

Item	RG 1.32 Rev. 2 1/14/77	Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants

RESPONSE

Electric Power Systems are not within Westinghouse NSSS scope; however, as noted in the response to RG 1.32 in RESAR-3S, Section 3A, interface information on Class 1E electric systems is provided in Section 8.3. Interface information concerning the applicability of IEEE-308-71 requirements is given in Section 7A.

Category I

Item		
	RG 1.38 Rev. 2 5/77	Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants

RESPONSE

The Westinghouse position on compliance with Regulatory Guide 1.38, Rev. 2 is presented in WCAP-8370 Rev. 8A[1] and WCAP-7800 Rev. 5[2].

1634 042

Category I

Item	RG 1.32 Rev. 2 1/14/77	Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants

RESPONSE

Electric Power Systems are not within Westinghouse NSSS scope; however, as noted in the response to RG 1.32 in RESAR-3S, Section 3A, interface information on Class 1E electric systems is provided in Section 8.3. Interface information concerning the applicability of IEEE-308-71 requirements is given in Section 7A.

Category I

Item	RG 1.106 Rev. 1 1/28/77	Thermal Overload Protection for Electric Motors on Motor Operated Valves

RESPONSE

As noted in RESAR-3S, Section 7A, thermal overload protection for safety-related system MOV's is not provided by Westinghouse. Any thermal overload protection provided for safety related MOV's must be discussed by the applicant.

Category II

Item		
	RG 8.8 Rev. 2 8/18/76	Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be as Low as Is Reasonably Achievable (Nuclear Power Reactors)

RESPONSE

RESAR 3S does not address Regulatory Guide 8.8 Rev. 2. However, the required information to address this regulatory guide is contained in a topical Westinghouse report, WCAP 8872 [6], "Design, Inspection, Operation and Maintenance Aspects of the Westinghouse NSSS to Maintain Occupational Exposures As Low As Reasonably Achievable", April 1977. The information in this report will be included in safety analysis reports referencing the RESAR-3S design.

Category II

Item	BTP ASB 9.5-1 8/18/76	Guidelines for Fire Protection for Nuclear Power Plants Under Review and Construction

RESPONSE

Design of fire protection systems is not within Westinghouse scope. However, equipment supplied by Westinghouse will not preclude the applicant from designing a fire protection system to meet the requirements of BTP-ASB 9.5-1.

1634 046

Category III

Item	RG 1.99 Rev. 1 9/15/76	Effects of Residual Elements on Predicted Radiation Damage to Reactor Vessel Materials

RESPONSE

Justification of the Westinghouse position on Rev. 0 and Rev. 1 of the Guide is detailed in references [7] and [8] respectively.

In summary, Rev. 1 of the Guide is substantially identical with Rev. 0, with minor clarifications and inclusion of a new position C.2, which had previously been included in the Discussion section of Rev. 0.

The Westinghouse letter of comment on Rev. 1 reiterates the comments of Rev. 0 and includes further clarification of hardship imposed by the Guide with respect to vessel material.

The Westinghouse position with respect to each of the Guide positions is as follows:

1. The basis as well as the scope of the Guide for predicting adjustment of reference temperature as given in Regulatory Position C.1 are inappropriate since the data base used was incomplete and included some data which were not applicable.

2. Westinghouse is in agreement with the Guide Position C.2a. However, with respect to Guide Position C.2b, Westinghouse believes that Figure 2 of the Guide is incorrect since the upper shelf energy for six-inch thick ASTM A302B reference correlation monitor material reported by Hawthorne indicates essentially a constant upper shelf at fluences above $\sim 1 \times 10^{19}$ n/cm^2. [8]

3. The Westinghouse position with reference to the Guide Position C.3, controlling residual elements to levels that result in a predicted adjusted reference temperature of less than 200°F at end-of-life, is that the stresses in the vessel can be limited during operation in order to comply with the requirements of Appendix G to 10CFR Part 50 even though the end-of-life adjusted reference temperature may exceed 200°F. By applying the procedures of Appendix G to ASME Section III, the stress limits including appropriate Code safety margin can be met.

4. Recent surveillance capsule data from the Point Beach and Connecticut Yankee reactor vessels [9] indicate a steady state condition of irradiation damage due to the annealing effect at operating temperature. As an alternative to R.G. 1.99, operating limits for Westinghouse plants will be determined by using the current radiation damage curves developed by Westinghouse[10]. It is expected that, as more surveillance capsule data is accumulated, both the R.G. 1.99 and Westinghouse damage curves will prove to be overly conservative.

1634 047

Category III

Item	RG 1.114 Rev. 1 11/76	Guidance on Being Operator at the Controls of a Nuclear Power Plant

RESPONSE

Regulatory Guide 1.114 is not in Westinghouse scope. However, the design of the control panels for equipment supplied by Westinghouse will not preclude a control room design and layout in which all controls, instrumentation displays, and alarms required for the safe operation, shutdown, and cooldown of the unit are readily available to the operator in the control room.

1634 048

Category III

Item

RSB 5-2 Rev. 0
3/14/78

Reactor Coolant System Overpressurization Protection

RESPONSE

The pressurizer power-operated relief valves will be supplied with additional actuation logic to ensure that a completely automatic and independent RCS pressure control backup feature is provided for the operator during low-temperature operations. This system provides the capability for additional RCS inventory letdown, to minimize the number of occurrences of pressure transients and to reduce the severity of such transients, should they occur.

The basic function of the system logic is to continuously monitor RCS temperature conditions, with the logic armed whenever plant operation is at low temperatures. An auctioneered system temperature will be continuously converted to an allowable pressure and then compared to the actual RCS pressure. This comparison, when required, will provide an actuation signal to the power-operated relief valves.

1634 049

Category III

Item NUREG-0460 Volume 3 1/02/79 — Anticipated Transients Without Scram

RESPONSE

The most recent NRC position with regards to ATWS is defined in NUREG 0460 Volume 3 dated December, 1978. The required analyses needed to satisfy this position are presented in references 16, 17 and 18. These analyses demonstrate that a Westinghouse PWR design is inherently self limiting and peak pressures are below emergency stress limits for alternative 3 plants.

1634 050

Category IV-A

Item

RG 1.14 Rev. 1 8/75 — Reactor Coolant Pump Flywheel Integrity

RESPONSE

Since the issuance of Regulatory Guide 1.14, Revision 1, the NRC Staff has provided to Westinghouse a copy of Draft 2, Revision 2 of Regulatory Guide 1.14 (via on April 12, 1976 letter from Robert B. Minoyne to C. Eicheldinger). This draft was formulated from industry and concerned parties' comments. It is significant that the Draft 2 version incorporates several of the Westinghouse comments on Revision 1. Since Draft 2 has not been formally published as Revision 2 of Regulatory Guide 1.14, the exceptions and clarifications (from the original Westinghouse comments) are provided below:

1. Post-Spin Inspection

Westinghouse has shown in WCAP-8163, "Topical Report Reactor Coolant Pump Integrity in LOCA,"[11]"that the flywheel would not fail at 290% of normal speed for a flywheel flaw of 1.15 inches or less in length. Results for a double ended guillotine break at the pump discharge with full separation of pipe ends assumed, show the maximum overspeed to be less than 110% of normal speed. The maximum overspeed was calculated in WCAP-8163 to be about 280% of normal speed for the same postulated break, and an assumed instantaneous loss of power to the reactor coolant pump. In comparison with the overspeed presented above, the flywheel could withstand a speed up to 2.3 times greater than the flywheel spin test speed of 125% provided that no flaws greater than 1.15 inches are present. If the maximum speed were 125% of normal speed or less, the critical flaw size for failure would exceed 6 inches in length. Non-destructive tests and critical dimension examinations are all performed before the spin tests. The inspection methods employed (described in WCAP-8163) provide assurance that flaws significantly smaller than the critical flaw size of 1.15 inches for 290% of normal speed would be detected. Flaws in the flywheel will be recorded in the pre-spin inspection program (see WCAP-8163). Flaw growth attributable to the SPIN test (i.e., from a single reversal of stress, up to speed and back), under the most adverse conditions, is about three orders of magnitude smaller than what non-destructive inspection techniques are capable of detecting. For these reasons, Westinghouse performs no post-spin inspection and believes that pre-spin test inspections are adequate.

2. Interference Fit Stresses and Excessive Deformation

Much of Revision 1 deals with stresses in the flywheel resulting from the interference fit between the flywheel and the shaft. Because Westinghouse's design specifies a light interference fit

Category IV-C

Item	Branch	Applicable SRP Section	Title
18 8/1/76	ASB	10.4.7	Design Guidelines for Water Hammer in Steam Generators with Top Feedrign Design (BTP ASB-10.2)

RESPONSE

The steam generators employed in the RESAR-3S design are of the preheater type and do not employ top feedring design. Therefore, BTP-ASB-10.2 is not applicable. For a discussion of water hammer in RESAR-3S steam generators, refer to the response to item IV.B.20, above, "Water Hammer for Steam Generators with Preheaters (SRP 10.4.7 par. I.2.b)"

1634 052

Category IV-C

Item
19 Environmental Control Systems for Safety Related Equipment

RESPONSE

Environmental control systems for safety related equipment are not in Westinghouse scope. However, the environmental design of mechanical and electrical equipment supplied by Westinghouse is discussed in RESAR-3S Section 3.11. Environmental design requirements described in Section 3.11 cover equipment located inside containment, outside containment and in the control room.

1634 053

REFERENCES

1. "Westinghouse Water Reactor Divisions Quality Assurance Plan," WCAP-8370, Revision 8A, September 1977.

2. "Nuclear Fuel Division Reliability and Quality Assurance Plan," WCAP-7800, Rev. 5, December 6, 1977.

3. "Methodology for Qualifying Westinghouse PWR-SD Supplied NSSS Safety Related Electrical Equipment, WCAP-8587-R1, September 1977, Supplement 1, Rev. 1, November 1978.

4. "General Method of Developing Multifrequency Biaxial Test Inputs for Bistables," WCAP-8695, September 1975.

5. "Fuel Densification Experimental Results and Model for Reactor Application," WCAP-8218-P-A (Proprietary Class 2), WCAP-8219-A (Non-Proprietary, Class 3), March 1975.

6. "Design, Inspection, Operation, and Maintenance Aspects of the Westinghouse Nuclear Steam Supply System to Maintain Occupational Radiation Exposures as Low as Reasonably Achievable," WCAP-8872, April 1977.

7. Letter of Comment on Rev. 0 of Reg. Guide 1.99 to the Secretary of the Commission by C. E. Eicheldinger, NS-CE-784, September 22, 1975.

8. Hawthorne, J. R., "Radiation Effects Information Generated on the ASTM Reference Correlation - Monitor Steels," to be published.

9. Westinghouse RESAR-3S, Chapter 16, Figure B3/4 4.2, Page B3/4.

10. Letter NS-TMA-1843 to the Secretary of the Commission by T. M. Anderson, June 23, 1978.

11. "Reactor Coolant Pump Integrity in LOCA," WCAP-8163, September 1973.

12. "High Pressure Water Hammer Test of the Split Flow Preheat Steam Generator," WCAP-9232, January 1978.

13. "Damping Valves of Nuclear Power Plant Components," WCAP-7921-AR, May 1974.

14. Marasco, F. W. and Siroky, R. M., "Westinghouse 7300 Series Process Control System Noise Tests," WCAP-8892-A, June, 1977.

15. Letter dated April 20, 1977 from R. L. Tedesco (NRC) to C. Eicheldinger (Westinghouse).

REFERENCES (Continued)

16. Letter NS-TMA-2096, T. M. Anderson (Westinghouse) to R. J. Mattson (NRC), dated June 8, 1979.

17. Letter NS-TMA-2159. T. M. Anderson (Westinghouse) to S. H. Hanauer, dated November 15, 1979.

18. Letter to be written, December, 1979.

1634 055