INEL
Idaho National Engineering Laboratory

June 8, 1995

Mr. W. C. Liu
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Office of Nuclear Regulatory Research
United States Nuclear Regulatory Commission
Washington, DC 20555

95 ADDENDA ANALYSIS TABLES - JFC-19-95

Reference: NRC Form 189, "ASME Code Section XI - Technical Assistance,"
Job Code W6185, February 1995

Dear Mr. Liu:

Enclosed are the subject tables which contain the analysis of sections III and XI BPV Code changes from BNCS ballots 547 and 556. Two additional BNCS ballots that followed or will follow the February and May 1995 Main Committee meetings will be required to complete the analysis of the 95 Addenda.

Comments on the format and content are requested. Note that Item No. 11 on the Section XI table has been identified as unacceptable.

This completes Node 95-16 on the NRC Milestone Information Report.

Sincerely,

J. F. Cook, Principal Investigator
Materials Physics Department

JFC

Enclosure

cc: S. F. Armour, DOE-ID, MS 1134
P. I. Campbell, NRC NRR
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ENCLOSURE 2

Table 1. Summary and Evaluation of Section III ASME BPV Code Changes, 1995 Addenda

"Subsections NB, NC, and ND"

08Jun95 Draft

Item No.	Paragraph, Figure, Table	Description	Im Pact	Explanation of Impact and Factors*	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
1	1132.2(e) 1132.2-2 Fig	Clarifies the jurisdictional boundaries relative to the first connecting weld of a non-structural attachment. BNCS 556, Item 94-396.	L	Provides for conservative clarification. No factors change.	N	N	N	N	N
2	4622.1-1 TBL 4622.7(b)-1 TBL	Changes P number listing from 5 to 5A, 5B, 5C. BNCS 547, Item 94-314.	E	ASME labeled this as an editorial action.					
3	6610	Clarifies the requirements with regard to the allowable internal pressure for components. Changes "not more than 1.25" to "not less than 1.25." BNCS 547, Item 94-403.	L	Corrects a technical error. Some increase in safety from providing better pressure tests.	I	N	N	N	N
4	7736,7748	Updates requirements for proretion of valve capacity to a greater overpressure. BNCS 547, Item 94-305.	L	Some reduction in cost due to new allowances. No other factors change.	N	N	N	N	D
		"Subsections NB and NC"							
5	3338.2,3339.1(NB) 3239.1(NC)	Revises dimensional ratios for design of nozzles to be consistent with Section VIII, Division 2. A related change (Item No. 8) is made to Appendix XII. BNCS 556, Item 94-397.	L	Provides for clarification and consistency in design rules. No factors change.	N	N	N	N	N
		"Subsections NC and ND"							
6	3600	Incorporates the provisions of Case N-313 into Code. Allows fillet welds for certain branch connections. BNCS 547, Item 94-303.	L	Case N-313 is in Guide 1.84. Thus, it has been available for use. Therefore, no change in factors. A strong minority in Section III objected to this change and believed that all nuclear branch connections should be made with full penetration welds.	N	N	N	N	N

*The impact of each item has been evaluated to be high (H), medium (M), low (L), editorial (E), or errata (ER). Each of the factors - safety, occupational exposure, exposure to the public, records, and cost - has been determined to increase (I), decrease (D), or not change (N) for each high, medium, or low item.

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1995 Addenda

Subsection IWA

08Jun95 Draft

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors*	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
1	2110(g)(h)	2110 covers inspector duties. Adds term "replacement" to go with the term "repair." BNCS 547, Item 94-331.	E							
2	4000	Extensive editorial change which replaces the classifications of repair, replacements, and modification with the generic term "repair/replacement activity." BNCS 556, Item 94-413.	E							
3	4170,9000	Revises the the reconciliation requirements. Current requirements are very general, resulting in some licensees performing unnecessary evaluations and others may not be performing enough. BNCS 556, Item 94-329.	M	Adds specific requirements for reconciling and documenting the reconciliation. Safety increases through better and more uniform reconciliation. Additional records are estimated at 12 person hours per 10-year interval based on an estimated average of 3 reconciliation reports each 10 years for each plant.	I	N	N	N	I	I
4	4630	Incorporates Case N-496 covering helical-coil threaded inserts. BNCS 547, Item 94-324.	L	These provisions are already available through the endorsement of the case in Guide 1.147. Thus, no factors change.	N	N	N	N	N	N
5	5244	Incorporates intent inquiry 93-005 which eliminates requirement for VT-2 certification for conducting tests of buried components. BNCS 556, Item 94-412.	L	VT-2 certification is not applicable thus costs decreases. No other factors change. Note that certification in leak testing would be appropriate for these tests, but Code committee consensus could not be obtained on these additional requirements.	N	N	N	N	N	D
6	9000	Revises the current definition of "owner" to agree with the BNCS approved definition. BNCS 547, Item 94-322.	E							
7	9000	Moves definition of "dissimilar metal weld" from tables. Related changes are made to Tables IWB-2500-1 (Item No. 9) and IWE-2500-1. BNCS 556, Item 94-415.	E							
			Subsection IWB							
8	1220	Incorporates intent inquiry 92-46 to state that emergency core cooling systems are to be excluded from the calculation of makeup capacity. BNCS 556, Item 94-414.	L	This intent should already be used by most licensees. Thus, no factors change.	N	N	N	N	N	N
9	2500-1 Table	Part of the Item No. 7 IWA-9000 action. Definition of "dissimilar metal weld" is deleted from this table (exam categories B-F and B-J) and moved to IWA-9000. BNCS 556, Item 415.	E							

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EGG-MS-10537
Revision 5

Input to Draft Regulatory Analysis for Proposed Amendment to 10 CFR 50.55a

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Table 1. Summary and Evaluation of Section III ASME BPV Code Changes, 1989 - 1994 Addenda

Subsection NCA

06Jun95 Draft

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors*	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
001	1130,1220,2143,32 003852,3867,3900, 41105123,5210, 9000	94	Clarifies by avoiding confusion of similar terms, providing consistency, removing redundancy, and improving terminology and definitions. Reference BNCS LB No. 508, Item 93-271.	E						
002	1221.1, 3852, 9000	94	Editorial corrections addressing a BNCS negative vote.	E						
003	1232,1250,3220(f) 3251,3256,3511.2 3555(a) 4134.17-1 TBL 5230(b),9000	91	Adds piping supports to the scope of general requirements.	L	This addition of piping supports to the list of items covered by the Design Specifications (NCA-3250) and Design Report (NCA-3350, 3550) results in no change for any of first 3 factors, since the information required would have been developed in any case. Additional costs for the Code required documentation would be minimal (< 1 person-hr).	N	N	N	I	I
004	3125	91	Clarifies N Certificate Holder responsibility for subcontracted stress analysis or design by including material from NCA-3551.	E						
005	3200	93	Adds a new paragraph NCA-3270, renumbers old paragraphs NCA-3270 and NCA-3280 and revises references to these paragraphs. Requires Owner to provide, certify, and file the Overpressure Protection Report per NX-7200.	L	Corrects an omission in the Owner's Responsibilities list. No factors change since the requirements for this report are already in NX-7200.	N	N	N	N	N
006	3255,3360,3551.2 3555(a)	89	Updates year of reference for ANSI/ASME N623.3, "Qualification and Duties of Specialized Professional Engineers," from 1985 to 1988.	L	There are no significant changes in the updated reference, thus all factors are no change.	N	N	N	N	N
007	3260(b)	91	Adds (b) prefix to second paragraph of NCA-3260.	E						

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Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors*	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
008	3260(c),3520,3550	91	Clarifies responsibility of N-Certificate Holder with respect to filing the Design Report or Certified Design Report Summary. Changes 3260(c), 3520(d)(6), 3520(d)d(7), 3551.3, and 3557.	L	This requires that when a Certified Design Report Summary (CDRS) for standard supports is furnished in lieu of a Design Report, documentation shall be provided to indicate that the CDRS has been properly reviewed. This is estimated to add 1 person-hour per CDRS.	N	N	N	I	I
009	3550	91	Revises title.	E						
010	3551	91	Clarifies.	E						
011	3551.1	91	Adds a reference to NCA-3551.3.	E						
012	3552	91	Revises the term "Design Documents" to "Design Output Documents".	E						
013	3553	91	Revises the term "Design Documents" to "Design Output Documents".	E						
014	3581	92	Clarifies the intent of the Code to allow N & NV Certificate Holders to supply replacement items as material without "supply of material" in the scope of their certificate.	L	Cost saving to Certificate Holder. Resurvey by ASME would have been required if "supply of materials" had to be included in the scope.	N	N	N	N	D
015	3800,9000	94	Eliminates restrictive definitions introduced with 1990 addenda, incorporates recent interpretations, clarifies organization requirements and provides Quality System Program requirements and responsibilities based on the activities performed by an organization. New terms (Material Organization, Accredited or Qualified Material Organization, source material and performance assessment) are introduced and included in the NC-9000 glossary.	L	This change is much easier to read and understand due to the reorganization of material and the introduction and definition of the new terminology. Because of this, there is a positive impact on safety. There are two areas of expanded requirements that will increase cost and the number of records, but also have a positive impact on safety. This revision requires an annual audit (performance assessment) of the Qualified Material Organization by the Accredited Material Organization or the Certificate Holder. See NCA-3842.2(h). Also, the new paragraph addressing Indoctrination, Training and Qualification of Personnel has been significantly expanded with more specific requirements. See NCA-3852.1. It is estimated that Material Organizations that need to implement these new requirements will expend 80 man hours per employee per year on training.	I	N	N	I	I

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Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
016	3811(b)	90	Changes general paragraph reference NX-2610 to NB-NG-2610 in order to be more specific.	E						
017	3820	92	Clarification of the Code intent to include catalog standard supports as "material."	E						
018	3851,3852(c),3852(d)9000	90	Clarifies the definitions of Material Manufacturer and Material Supplier, and clarified when an organization may issue a Certificate of Compliance.	L	This change, to clarify definitions and procedures for issuing a Certification of Compliance, should make it easier for an organization to meet Code requirements. Cost reductions, if any, however, would be minimal.	N	N	N	N	D
019	3853	92	Adds rules for validation period (3 yr) and renewal notification time (>6 months prior to expiration) of Material Manufacturer Quality System and Identification and Verification Programs.	E	Editorial, since this reiterates rules that already exist in NCA-8180.					
020	4110(b)	91	Updates reference of ANSI/ASME NQA-1 to the 1989 edition.	L	There are no significant changes in the updated reference, thus all factors are no change.	N	N	N	N	N
021	4110(b)	92	Updates reference of ANSI/ASME NQA-1 to include Addenda 1b-1991.	L	The changes to NQA-1 by the addenda includes an addition of a new nonmandatory appendix, a corrective action flow chart, and editorial word changes in the storage facilities paragraphs. None of the factors change.	N	N	N	N	N
022	4110(b)	94	Updates reference of ANSI/ASME NQA-1 to include Addenda 1c-1992.	L	There are no significant changes in the updated reference, thus all factors are no change.	N	N	N	N	N
023	4120	92	Relocates definitions of NCA-4120 to NCA-9000.	E						
024	4134.9	92	Clarifies the date requirement for the activity performed.	E						

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Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NCA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
025	5121(a),5122,5123	89	Updates year of reference for ANSI/ASME N626, "Qualification and Duties for Authorized Nuclear Inspection Agencies and Personnel" from 1985 to 1988, and added reference to Addenda N626a-1987 and N626b-1988 covering responsibilities to supervise inspectors.	L	There are no significant changes in the updated reference, thus all factors are no change.	N	N	N	N	N
026	5121(a),5122,5123 5222(l)	90	Corrects reference to ANSI/ASME N626 to 1985 edition.	ER						
027	5121(a),5123,5220(i)	91	References the 1990 Edition and 1991Addenda (N626a-1991) of ASME N626 which requires that Authorized Inspection (AI) Agencies be accredited by ASME.	M	Safety may increase due to more uniform and higher-quality authorized inspection services. Costs will increase, however, because of the accreditation requirement. Assuming that 8 agencies will be accredited each 3 years with 2 ASME consultants spending 4 days including travel for each accreditation activity will average about $2300 per plant per year for 100 plants. It is assumed that 50% or $1150 per plant per year will be record costs.	I	N	N	I	I
028	5121(a), 5122, 5123, 5220(i), 5300 (k)	94	Updates the addenda of ASME N626-1990 from N626a-1991 to N626b-1992 for the first four paragraphs. For NCA-5300(k), the edition is changed from N626-1985 to N626-1990 with addenda through N626b-1992.	L	The changes in the N626b-1992 addenda result in minor increases in documentation of inspection training and experience. It is estimated that this will cost AI agencies approximately $5000/inspector/year. Note: it is believed that the change for NCA-5300(k) was inadvertently missed in the 1991 addenda by the ASME Boiler and Pressure Vessel Code Committee. However, Item No.'s 25-27 address the impact of previous updates of N626 since 1985, including the current change to NCA-5300(k).	I	N	N	I	I
029	5121(a)	92	Clarifies the Code intent with respect to invoking ASME N626.	E						
030	5123	93	Changes "a Certificate Holder" to "an N-type Certificate Holder."	E						
031	5220(j)	89	Changes "safety and safety relief valves" to "pressure and vacuum relief valves".	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NCA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
032	5242(a)	90	Corrects the term "Quality Assurance Program" to "Quality Assurance Manual".	EP						
033	8100-1 T3L	90	Revises Note 7 and added Note 9 to Table NCA-8100-1 to clarify how miscellaneous items and items supplied as material are to be handled.	E						
034	9000	89	Adds definitions to Glossary for "Design Input Documents," and "Design Output Documents".	E						
035	9000	91	Deletes the term "Design Life" from the Glossary because the term is not a Code requirement.	E						
036	9000	93	Revises the definition of "Owner" to be more specific regarding the legal responsibility of the organization.	E						
037	9000	94	Removes 20 definitions from NCA-1000 and 3000 and relocates them in NCA-9000, Glossary. Also, several definitions are simplified or clarified.	E						
			Subsections NB, NC, and ND							
038	1132.2-1,2,&3 FIG	90	Revises sketches to show cover welds as distinguished from attachment welds. Also, the note 5's in the NB -2 and ND -2 figures are corrected for reference of Paragraph 2190.	E						
039	2121(c)	90	Clarifies the use of materials for control valve disks and cages.	L	None of the factors change.	N	N	N	N	N
040	2180	94	Permits the use of pyrometric instruments to monitor metal temperatures during heat treatment.	L	Pyrometric instruments represent a saving in time and occupational exposure when used in lieu of thermocouples which must be attached directly or indirectly to the metal, and then removed.	N	D	N	N	D

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NCA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
041	2342	93	Clarifies that alternate, separate impact test for forgings must be subjected to the same reduction and working as the forgings they represent. Further, it clarifies that two Charpy V tests per part are required for weights > 10,000 lb.	L	There may be some increase in cost for reduction, working, and additional Charpy test. It depends on how the material supplier interpreted the Code prior to this revision.	N	N	N	N	I
042	2342(f)	91	Adds subparagraph to clarify the test specimen requirements for static castings. This permits the use of separated cast test coupons in conducting the Code required impact tests.	L	This should decrease the cost in those cases where it is impracticable to obtain test coupons from the parent casting. None of the other factors are affected.	N	N	N	N	D
043	2360(b)	91	Updates the reference from the "National Bureau of Standards" to the "National Institute of Standards and Technology".	E						
044	2420	91	Changes the acronym for "Fuel Gas Welding (FGW)" to "Oxy-Fuel Gas Welding (OGW)".	E						
045	2433.1	94	Updates the edition year of AWS-A4.2 from 1974 to 1991.	L	The 1991 Edition to AWS A4.2, "Standard Procedures for Calibrating Magnetic Instruments to Measure the Delta Ferrite Content of Austenitic Stainless Steel Weld Metal" is the second revision since 1974. It expands the range of calibrations and measurement to include, for the first time, duplex austenitic-ferritic stainless steel weld metals. The changes have no significant impact. Thus, none of the factors are affected.	N	N	N	N	N
046	2433.1-1 FIG	94	Upgrade of the Delta Ferrite Diagram.	L	The diagram to determine the delta ferrite level in welding materials from chemical analysis has been revised based on WRC Bulletin 342. The old diagram does not handle manganese correctly, predicts delta ferrite values that are too high for highly alloyed stainless steels and does not account for the presence of copper. The new diagram is more accurate, thereby decreasing the possibility of solidification cracking. Slight increases in safety and a slight decrease in cost (no weld repairs) may be realized.	I	N	N	N	D

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NCA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
047	2559	93	Permits repair by welding of Cu-Ni and Ni alloy materials except heat exchanger tubes.	L	This could save on cost if repair of parts other than heat exchangers can be made	N	N	N	N	D
048	3132-1 TBL	90	Includes latest applicable standards as references.	L	Each of the listed standards was examined by the ASME Section III Working Group on Piping and the changes were determined to be minor technical or editorial. None of the factors are affected.	N	N	N	N	N
049	NB&NC-3661.2, 3661.2 Ft-Nt ND-3661.3, 3361.3 Ft-Nt	91	Replaces subparagraph in each subsection with new footnote.	E						
050	NB-3683,NC-3673.2 ND-3673.2(b) FIG	91	Deletes δ, which is the average permissable mismatch at girth butt welds, as a parameter of the primary plus secondary stress indices for certain piping and components to simplify the Code.	L	The resulting small increase in the stress index will have little impact on design. Thus, none of the factors change.	N	N	N	N	N
051	4122	94	Adds a subparagraph that specifies that material from which the traceability marking is lost shall be treated as non conforming material until testing or other positive identification has been documented that assures material conformance.	L	Safety is increased by preventing the use (intentional or not) of unmarked material.	I	N	N	N	N
052	4212	94	Changes "critical temperature" to "transformation temperature".	E	"Critical temperature" is no longer considered accurate terminology.					
053	4212, 4213, 4223.1	94	Adds a reference in 4212 to 4213 for qualifying the forming and bending processes for impact property requirements and in 4214, 4220 and 4223.1 for required dimensions. The change also revises the title of 4213 and changes the method in 4223.1 of confirming the minimum wall thickness for formed or bent piping and tubing.	L	The added references in 4212 clarify intended requirements. The revision to 4223.1 adds actual wall thickness measurement to the acceptable methods of confirming minimum wall thickness after forming or bending.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections NB, NC, and ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
054	4311.4,4424	94	Removes requirements from these paragraphs that were included in the 1990 addenda to Section IX.	E	This was in response to an EPRI editorial review, and represents no change in requirements for inertia and continuous drive friction welding.					
055	4335	92	Clarifies by incorporating intent inquiry III-1-90-16 to include hard facing as well as weld deposit cladding in the exemption from heat affected zone impact testing.	E						
056	4424(d)	94	Clarifies the requirements for fillet welds. Changes the weld thickness requirement from "not less than the minimum wall thickness required by "..-3000" to "meets the requirements of ..-3000".	L	There was some confusion as to what the term "minimum wall thickness" really is, so the Committee made this clarification. Thus there is no significant impact.	N	N	N	N	N
057	4427	93	Clarifies the requirements for fillet welds.	L	This change will prevent the inappropriate rejection of fillet welds by inspectors and thereby reduce repair or evaluation costs (approx. $1500 per rejected weld).	N	N	N	N	D
058	4622.7(b)-1 TBL	92	Corrects the reference to Type 410S welds: S was missing.	ER						
059	4630	94	Removes a possible conflict with 5130 and clarifies the requirements of 4630.	E	This was in response to an EPRI editorial review.					
060	5112	92	Permits the use of digitization of radiography and radioscopic images per Art. 2, App III of Section V.	L	Some decrease in cost and records with the use of new technology.	N	N	N	D	D
061	NB-7111(b),7738, 7745 NC-7111(b) ND-7111(b),7738 7745,7755	91	Updates reference to ASME PTC 25.3 to the 1988 edition. This gives more explicit instructions on determination of the "coefficient of design" from test data.	L	No factors change.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections NB, NC, and ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
082	7310, 7320 Ft-Nts	93	Indicates that expected transients include normal and upset conditions while unexpected transients include emergency and faulted conditions.	L	This improves safety since it assures that the Overpressure Protection Report will include all transients. It should be noted that normal, upset, emergency, and faulted conditions have been replaced elsewhere in the Code by Level A, B, C, and D, respectively.	I	N	N	N	N
083	NB-7512.1,7513, 7731.3.7734.2(a) 7741.3.7743.2(a) NC-7512.1,7513, 7525,7731.3, 7734.2(a),7741.3, 7744.2(a) ND-7512.1,7513 7731.3,7734.2(a) 7741.3,7742.4(a)	91	Changes the antichatter pressure tolerance for safety valves from 3% to the greater of 3% or 2 psi. Changes the rated lift pressure tolerance for safety valves from 3% to the greater of 3% or 2 psi. Changes the maximum capacity certification test pressure for relief valves (and safety relief valves) to the greater of 3% (10%) of set pressure or 3 psi.	L	The effect of this revision is to slightly increase the allowable tolerance for valves with rated capacity less than 65 psi. It thus makes it easier for those valves to meet Code requirements and could result in fewer rejects, thereby lowering the overall costs. There are no changes in the other factors.	N	N	N	N	D
084	7515	94	This: (1) clarifies that adjustment requirements are only those that can be made without disassembly of the relief valve, and, (2) it requires that a seal be added to a pilot operated relief valve that seals the pilot and main valves together.	L	The combined seal change represents an increase in safety since inadequate valve performance has been noted when pilot valves were used with main valves different from those that had been tested by the Certificate Holder.	I	N	N	N	N
085	NB-7611 & Ft-Nt 12 NC-7612 & Ft-Nt 13 ND-7612 & Ft Nt 13	90	Redesignates paragraphs with new titles and revises burst pressure tolerance for rupture burst pressure tolerance for rupture disk devices with stamped burst pressures up to and including 40 psi. Changes the permitted burst pressure tolerance of a rupture disk from +/- 5% of the stamped value to +/- 2 psi. Changes "rupture" to "burst" in footnotes.	L	This makes it easier to qualify rupture disks whose stamped value is less than 40 psi. Some cost reduction might be expected. However, any reduction would be minimal. The other factors are unaffected.	N	N	N	N	D
086	NB-7734.3 NC&ND- 7734.3 7744.3,7754.3	91	Adds a requirement for the coefficient of discharge determined by 7734.2 to be used only for valves whose throat-to-inside-diameter ratio is in the range 0.15 to 0.75 unless verified by test.	L	Valves where additional tests are required will require additional records (about one person-hr per set of tests).	N	N	N	I	I

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections NB, NC, and ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
067	7811	92	Clarifies by providing for standardization of information marked on valve stamps.	E	Editorial, since valves have always been required to be stamped.					
068	NB-7830 NC-7840 ND-7840	90	Corrects a reference to NCA-8233 made for Nameplate Stamping and Reports.	E						

Subsections NB and NC

069	2321.1 NC-2311(a)-1 TBL	89	Updates reference of ASTM E-208 to the 1985 Edition.	L	The 1985 Edition revises the Drop Weight test method from 2 pass to 1 pass because this is technically correct. Safety increases because of greater assurance of obtaining reliable test results. No other factors change.	I	N	N	N	N
070	2321.1 NC-2311(a)-1 TBL	92	Updates reference of ASTM E-208 to the 1991 Edition.	L	There are no significant changes in the updated reference, thus all factors are no change.	N	N	N	N	N
071	2572.1(c)(3)	89	Corrects an incorrect references to radiographic requirements for castings for pumps and valves.	E						
072	3641.1,3658 NC-3611.2	91	Clarifies the definition of P_o and the requirements for evaluation of flanged joints.	E						
073	4241 NB-4243	94	Removes implication in these paragraphs that "open root" or "tight butt" welds with out gas backing cannot meet the requirements of 4424.	E	This was in response to an EPRI editorial review which points out that it does not matter whether or not gas backing was employed if the weld surface meets the requirements of 4424. This revision makes requirements match practice and therefore has no impact.					

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections NB, NC, and ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
074	4362	94	Includes machine welds in the requalification requirements for automatic and semi-automatic weld procedures.	L	There is no impact because a machine made weld has always been considered either an automatic weld or a semi-automatic weld by manufacturers. Inclusion of the word "machine" is just a clarification.	N	N	N	N	N
075	4435	92	Expands the rules for non-structural attachments to include temporary attachments and provides specific rules for removal of non-structural attachments. A similar change for ND is Item No. 196.	L	Improves safety since there were no previous requirements for removal. NDE will result in additional records and costs: less than one person-hr for records and $300 for NDE per removal.	I	N	N	I	I
076	5111,5511-1 TBL	93	Indicates that real time radioscopy is included in the term "radiographic examination" and expands Table to include hole sizes and wire diameters.	L	This is a partial inclusion of Code Case N-484 in the Code allowing the use of new technology to reduce cost.	N	N	N	N	D
077	NB-7733,7734.2(b), 7742,7743.2(b) NC-7733,7734.2(b), 7743,7742.2(b),7753 , 7754.2(b)	91	Revises to clarify and standardize the procedures for replacing unacceptable valves and the types of test failures that are to be used as a basis for the ASME designee to refuse certification of a particular valve design.	L	Safety increases because of the increased assurance of eliminating unacceptable valves from service. No other factors change.	I	N	N	N	N
			Subsections NC and ND							
078	3432.1, 3432.2	94	Incorporates two new subparagraphs providing pump flange requirements for pressure and external load design.	L	Prior to this change, there were no specific design requirements for pump inlet and outlet flanges. The two new paragraphs require that existing rules in other parts of the Code be used for pump flange design. NB-3432.2 also requires that external loads plus pressure shall not affect pump operability with excessive distortion or misalignment. Thus, these new rules will increase safety and incur some increased analysis cost. However, the analysis costs would be offset by reduced repair or replacement costs.	I	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections NB, NC, and ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
079	3441.1	91	Provides enabling rules for the design of pumps with scroll dimensions greater than 20 in. or nozzles greater than NPS 4. This permits the design by either experimental stress analysis according to Appendix II or by analytical methods certified in accordance with NCA 3551.1 which is essentially the only formalized previous practice under the old Code rules.	L	The one new feature of this change is to require the certification of any design qualification analyses according to the requirements of NCA 3551.1. This will assure that the analyses have been properly reviewed and retained in the Design Report. The safety factor is increased because of such assurance. The additional record burden is estimated to consist only of one page per design for certification signatures. It is estimated that costs may increase up to $5000 per design to cover any additional verification analyses required for certification. The other factors are unchanged.	I	N	N	I	I
080	3516,3132-1 TBL	92	Incorporates Code Case N-31-1 (elastomer diaphragm valves) and references 1988 edition of MSS-SP-100.	L	These rules were available in the Code Case since 1985 so there is no impact. MSS-SP-100 replaces the requirements for elastomer diaphragms formerly given in the Code Case.	N	N	N	N	N
081	3673.2(b)-1 FIG	89	Rearranges i-factor equation for circumferential fillet or socket welded joints and revises footnote 11 that gives C_x definition for circumferential fillet or socket welded joint i-factor. Change to footnote 11 conflicts with the referenced Figures NC & D - 4427-1. Also, error was made in published change of equation; varies from the ballot. Corrected by errata in 91 Addenda (next record).	L	Change to equation as corrected in the 91 Addenda is editorial, but the conflict in the notes 11 and 4427-1 Figures needs to be corrected. The regulatory guide should not accept the change to the notes 11. With this limitation, none of the factors change.	N	N	N	N	N
082	3673.2(b)-1 FIG	91	Corrects i-factor equation for circumferential fillet or socket welded joints.	ER						
083	NC-5283 ND-5282,5283	94	Clarifies examination requirements for flat bottoms of atmospheric and 0-15 psig storage tanks which are supported on grade.	L	It is clarified that the vacuum box method of examination shall be used for bottom joints when a tank rests on grade. This requirement will have no effect on the factors.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections NB and NC (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
084	6221	94	This incorporates Code Case N-368 into Subsections NC and ND, providing an alternate hydrostatic test pressure for piping between centrifugal pump discharge and the first block valve. In lieu of a 1.25 x Design Pressure hydro test, this allows the hydro test to be conducted at the pump shut off head. The upper pressure limit would be controlled by the stress limits of NC-6222.	L	Since Case N-368 has been endorsed by Regulatory Guide 1.84, none of the factors change. Code action to define "shut off head" is recommended.	N	N	N	N	N
085	7622,7623	94	This permits the installation of rupture disks constructed from non-fragmenting material.	E	Although 7620 does not prevent the use of non-fragmenting material as a rupture disk, the wording of 7622 and 7623(c) imply the use of fragmenting material. The rewording makes it clear that non-fragmenting material is not prohibited.					
086	7734.2(a),7744.2(a) 7754.2(a) ND-7754.2(b)	91	Adds a requirement to limit the "coefficient of design" to 0.875 or less.	L	This gives more explicit instructions on determination of the "coefficient of design" from test data. It does not change any of the factors.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections NC and ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3581	91	Clarifies.	E						
087	1132.1	90	Clarifies Attachments and Jurisdictional Boundaries between Subsections NB and NF.	E						
088	1132.2-4 FIG	90	Adds figure to illustrate attachments to core support structures within the reactor pressure vessel which do not perform a pressure retaining function.	E						
089	1132.2-4,3135 FIG	91	Clarifies Attachments and Jurisdictional Boundaries between Subsections NB and NG.	E						
090	1140,4730	94	Moves the first of two sentences in NB-4730 and places it in a new one sentence Subsubarticle, NB-1140.	E						
091	2121(a)	90	Removes redundant requirements.	E						
092	2190(b)	90	Changes "nor" to "or".	E						
093	2332(a)(1)	89	Revises the Cv test temperature to be at or below the lowest service temperature established in the Design Specification, to be consistent with other parts of the Code. Item No.'s 105 and 107 are related.	E	ASME classified this as editorial.					
094	2332(a)(1) Ft-Nt 4	89	Deletes footnote 4 to NB-2332(a)(1) definition of lowest service temperature to use the one established in the Design Specification [NB-3211(d)].	E	ASME classified this as editorial.					
095	2431.1(b)	91	Corrects an incorrect paragraph reference from Sec. IX, QW-201.1 to Sec. IX, QW-2a.	ER						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

"Subsections NC and ND (continued)"

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
096	2545.3,2546.3	93	Clarifies acceptance criteria and makes these paragraphs consistent with NB-2576(c).	E						
097	2551	94	Corrects a paragraph reference.	ER						
098	2573.8	89	Corrects an error in depth of repair from 3/4 in. published in 1986 Addenda to 3/8 in.	ER						
099	3211(d)	89	Consolidates alternate methods of demonstrating protection against nonductile fracture given in other parts of the Code.	E						
100	3211(d) Ft-Nt 24	89	Relocates definition for "lowest service temperature" from footnote 4 NB-2332(a)(1) to footnote 24 NB-3211(d).	E						
101	3227.6(b)	92	Corrects paragraph reference for description of local thermal stress.	ER						
102	3228.4(b),3228.4(c)	91	Incorporates the provisions of Case N-196-1 "Exemption from Shakedown".	L	This revision, to incorporate Code Case NB-196-1 into the Code makes no change in any of the factors, since the Case has been available for use since 1982.	N	N	N	N	N
103	3339.1(b)-1 FIG	90	Corrects nomenclature.	ER						
104	3339.3-1 TBL	90	Corrects last entry under third column.	ER						
105	3412.1(c),3611.5	89	Adds requirements for prevention of nonductile fracture for large pumps and piping by reference to NB-3211(d).	E	Part of the Item No. 093 editorial action.					
106	3417	93	Makes NB-3417 the same as NC-3417 with regard to seismic loading and analysis of pumps and their driver.	E	Editorial, since no change in requirements result from this.					

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NB

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Record	Cost
010	3551	91	Clarifies.	E						
107	3511	89	Adds footnote reference to warn that valve design life may be less than plant design life, and deleted some requirements for preventing nonductile fracture that are now included in NB-3211(d).	E	Part of the Item No. 093 editorial action.					
108	3534, 3545.2(c)(1) 3545.2(c) FIG	92	Changes stress index, C_2 and replaces Figure with equation for ΔT	L	Arithmetic error in C_2 was nonconservative. Correction results in increased safety. Figure was not in error, but new equation is easier to use than log-log curves. Decrease in cost <1 person-hr.	I	N	N	N	D
109	3545.2(b)(3)	91	Corrects P_s to p_s in equation for F_b.	ER						
110	3653.6(c)	91	Corrects an incorrect paragraph reference from NB-3228.3(b)-1 to NB-3228.5(b)-1.	ER						
111	3683.4(c)	89	Revises stress index equations for B_1, B_2, C_1, and C_2 for girth fillet welds between piping system components to include weld leg dimensions.	L	This will reduce the calculated values for some applications, thereby making it easier to meet Code stress limits. The cost reduction, however, would be minimal.	N	N	N	N	D
112	3683.5(a)	93	Clarifies the equations to be used for indices C_1 and C_2 when $t>0.237$.	E						
113	3685.1-2 TBL	90	Corrects Note (3) for in-plane Mz.	ER						
114	4244 (a)-1, (b)-2, (c)-1, (d)-1, (e)-1 FIG	94	Clarifies the definitions shown on these figures by adding a reference to NB-3643 for piping, as well as NB-3352.4 for vessels. Note that the reference to NB-3643 is incorrect for (d)-1; it should be NB-3661.3	L	This change will clearly indicate where to get dimensional requirements for vessel nozzles and piping branch connections addressed by these figures. It will prevent someone from using vessels design rules for piping.	N	N	N	N	N
115	4335	94	Clarifies when impact tests are required by making a cross reference to NB-2300. Item No. 191 is related.	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

"Subsection NB (continued)"

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
116	4335.1(c)	89	Deletes redundant exemption of austenitic and nonferrous weld metal from impact testing covered in NB-2400.	E						
117	4622	89	Revises the requirement for removing thermocouples used to monitor welding process temperatures by reference to NB-4435(b). Note: This revision seems to be in error because NB-4435 as revised in 1987 Addenda no longer contains "removal of temporary attachments".	L	Clarifies that temporary welds for thermocouples are not required to be post weld heat treated. There are no changes in any of the factors.	N	N	N	N	N
118	4622.4244(a)-1(g) FIG	94	Removes sketch (g) from Figure 4244(a)-1 and invokes the entire paragraph, NB-4435 rather than just NB-4435(b), in two places of NB-4622.	E	Sketch (g) deals with design (reinforcement) considerations and does not detail fabrication requirements (Note, however, that this sketch, now, is not included in the design rules, although NB-3339.1(b) refers to NB4244(a)-1.) The changes to NB-4622.10(b)(5) and .11(c)(5) appear to be unnecessary since these sub- subsubparagraphs refer to removal, which NB-4435(b) addresses. It is believed that the change to the last sentence in each place of NB-4622 should be, "Their installation and removal shall be in accordance with NB-4435."					
119	4622.7(b)-1, TBL	94	The change to this table, "Exemption to Mandatory PWHT," puts socket welds into a separate category of weld type, adds them to additional P-Numbers, and puts size limits on exemptions. Related Item No.'s are 189 and 196.	L	The first revision to the table separates socket welds from the circumferential butt weld category and includes them singularly with weld P-No. 3 (except Gr 3), 4, 5, 9A and 9B. Previously, socket welds of all diameters in tubes and pipes were exempt from PWHT. Now only those with an O.D. equal to 2 3/8 or less are exempt. Since NB-3661.3 limits partial penetration welds to 2-in. nominal size, the added O.D. limit is editorial. Including socket welds with P-No. 4, 5, 9A & 9B will exempt more welds from PWHT, but this is no less safe since these P-Numbers are already exempt for circumferential butt welds. Personnel exposure, records and fabrication costs could be slightly reduced. The change of P-No.7 to P-No.6 or 7, Gr.1 is considered to be errata or editorial. Per Section IX, Type 405 base metal is P-no.7, Group 1 and Type 410 is P-No.6, Gr.1.	N	D	N	D	D

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Record	Cost
010	3551	91	Clarifies.	E						
120	4622.9	93	Makes Fig. NB-4622.9(c)(5) competible with the text by adding the term "weld buildup."	E						
121	4622.9(d)	89	Permits penetrant method of examination of temperbead weld repair in addition to magnetic particle method.	L	This will decrease the cost of examining temperbead weld repairs by giving the manufacturer the option of using either liquid penetrant or magnetic particle methods. The cost reduction, however, would be minimal.	N	N	N	N	D
122	4622.9(f)-1 FIG	93	Changes include errata and more explicit weld dimensional requirements.	L	The clarification of dimensional requirements of the test weld will result in more uniform welder qualification test plates between fabricators.	I	N	N	N	N
123	4622.11	94	Clarifies the examination requirements in 4622.11(d)(3) for the repair of partial penetration welds and changes the preheat temperature range when repairing welds in 4622.11(c)(7).	L	The addition of 4622.11(d)(3) allows progressive liquid penetrant examination of partial penetration weld repairs when volumetric examination is not meaningful. This is a practical change based on experience and has no impact on the factors. The change to 4622.1(c)(7) reducing the preheat temperature range from (450°F-660°F) to (450°F-550°F) is conservative and has negligible impact.	N	N	N	N	N
124	5320,5243,5246,5246	89	Provides for the use of ultrasonic examination of full penetration butt welded joints in lieu of radiographic examination.	L	For certain types of welded joints, modern methods of ultrasonic examination in lieu of radiographic examination provide equivalent or superior results. Cost reductions may result, but the primary advantage is in easier usage and improved results. Plant safety would increase and occupational exposure might decease.	I	D	N	N	D
125	5242	89	Designates the welded joints shown in referenced Figure NB-4244(a)-1 as full penetration butt "welded joints" rather than "welds".	E						
126	5245,5260,5261,5262 5270,5271,5274	89	Changes "weld" to "welded joint".	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
127	5273	89	Changes "Hard surfacing" to "Hard surfacing weld metal".	E						
128	7110	89	Adds Design Pressure as a protection requirement and indicates that design of reactor shutdown systems is beyond the scope of this article. Related changes are Item No.'s 131, 132, and 140.	E	ASME classified this as editorial.					
129	7110(b),7130,7131(a)7131(c)	94	Clarifies the intent by stating that the examinations and tests are only applicable to reclosing pressure relief valves.	E						
130	7111	89	Redefines "overpressure" as pressure which exceeds the Design Pressure. Other related changes are below. BNCS 424, ASME 91-226.	E	ASME classified this as editorial.					
131	7120	89	Part of the Item No. 128 editorial action. Permits the use of certain component designs without pressure relief devices.	E						
132	7130,7131,7132,7140 7141,7142,7172,7176	89	These are additional parts of the Item No. 128 editorial action to clarify pressure relief requirements.	E						
133	7141,7220	94	This resolves industry and regulatory safety related issues related to anticipated reductions in pressure relief valve performance in steam service when an inlet water loop seal is installed between the valve and the component or system being protected.	L	The additional paragraphs justify the use of a relief valve certified for steam service when a water loop seal is installed on the inlet to the valve. Since the water will delay the full opening of the valve, the revisions require that the overpressure protection report (OPPR) consider the purge time of the loop seal water. Since loop seals have been used for some years, the new requirements for the OPPR represent an increase in Safety. The increase in the OPPR cost is negligible.	I	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
134	7176,7177,7178	90	Separates the requirements for safety valves and pilot operated pressure valves. Permits use of certain valves for gas and liquid service in addition to steam service.	L	Cost could decrease through a possible reduction in inventory. No other factors change.	N	N	N	N	D
135	7210	89	Delete reference to a nonapplicable subarticle.	E						
136	7220	89	Reword for clarity.	E						
137	7230,7240	89	Makes editorial changes and updates reference to ANSI/ASME N626.3 to the 1984 Edition.	L	There are no significant changes in the updated reference, thus all factors are no change.	N	N	N	N	N
138	7250	89	Includes "regulatory authorities" with those having jurisdiction at the plant site.	E						
139	7300,7310,7320,7500	89	Revises title.	E						
140	7311,7312,7314,7321, 7410,7512.2,7513.1 7514,7515,7520-7527 7530,7533,7541 7543-7546	89	These all contain additional editorial changes which are related to the Item No. 128 action.	E						
141	7410,7420	91	Changes "set pressure" to "stamped set pressure".	E						
142	7512.2,7512.3,7513 .17513.2,7525	91	Clarifies by adding reference paragraph numbers for both the Overpressure Protection Report and the Design Specification.	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Record	Cost
010	3551	91	Clarifies.	E						
143	7512.3,7513.2,7524.2	89	Changes title and adds permission to adjust set pressure of safety valves either from test or from existing test data obtained in accordance with NB-7732.2. This clarifies that for Class 1 valves, adjustment of valve blow down can be made by the manufacturer based on already available blow down data. The Certificate Holder would not be required to perform a full flow blow down test on each production valve.	L	The required data would be available from the full flow Demonstration of Function Tests performed in accordance with NB-7732.2. None of the factors change.	N	N	N	N	N
144	7513	89	Changes overpressure allowance for attaining rated lift for safety relief and relief valves to be consistent with other book sections.	E						
145	7520	93	Adds a specific requirement to include in the Overpressure Protection Report an analysis of the effects of delay between the opening and closing of the pilot and main valves; adds a requirement to include the limits for the valve response time in the valve design specification; adds specific pressure limits for achieving full lift of the main valve; adds a pilot valve set pressure tolerance for liquid service, which is the same as specified in NB-7513.1 for safety relief and relief valves; clarifies that blowdown requirements are only applicable to the pilot valve and that the blowdown adjustment for other fluids should be specified in valve design specification; and the basis for the adjustments should be covered in the Overpressure Protection Report.	L	This will increase safety due to the more detailed evaluations. There will be some increase in cost (approx. 40 person-hrs) for the additional Overpressure Protection Report.	I	N	N	N	I
146	7525(b)	91	Adds reference paragraph numbers for both the Overpressure Protection Report and the Design Specification. A related change for ND is Item No. 197.	E						
147	7530	93	Brings the requirements for power actuated relief valves in line with those for spring loaded valves.	L	These changes require response time analyses to be included in the Overpressure Protection Report and additional valve tests of response time and valve actuation tolerances. Total cost increase should be 40-80 person-hrs for each report for analyses and tests.	I	N	N	N	I

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
148	7541(b)	90	Clarifies by editorial revision.	E						
149	7542	89	Adds a sentence to clarify which valves, in a group of two or more, are to be credited with opening at the set point of auxiliary actuating devices and which are to be credited with opening at the valve set pressure.	L	Clarification of existing requirements. No factors change.	N	N	N	N	N
150	7600, 7700 7821 Ft-Nt 16	90	Changes titles and updates many paragraphs with respect to the rest of Section III. BNCS 345, ASME 89-236.	E						
151	7732	90	Deletes "Pilot or Power Operated Valves" from the title. This allows the Flow Model Test Method for certification of all types of pressure relief valves.	L	Allowing this method for other valves could decrease cost. No other factors change.	N	N	N	N	D
152	7734.2(a)	91	Adds a requirement to limit the "coefficient of design" to 0.875 or less.	L	This gives more explicit instructions on determination of the "coefficient of design" from test data. It does not change any of the factors.	N	N	N	N	N
153	7800	93	Change stamping requirements in response to recommendations to standardize stamping requirements for all Sections of the Code.	L	These changes result in more explicit data requirements for the stamp or valve but should result in little or no impact.	N	N	N	N	N
154	7830	89	Corrects an incorrect reference to an applicable NCA requirement.	E						
			Subsection NC							
155	2331(b)	89	Relocates subparagraph to design section [NC-3124].	E						
156	2510	90	Corrected title and contents.	ER						
157	2545.3, 2546.3	93	Clarifies acceptance criteria and makes these paragraphs consistent with NC-2576(c).	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Record	Cost
010	3551	91	Clarifies.	E						
158	2571(b)	90	Removed reference to NC-2510.	ER						
159	2571-1 TBL	90	Corrected first entry under "Item" column.	ER						
160	2573.8	89	Corrects an error in dimensions published in 1986 Addenda.	ER						
161	3124	89	Relocates subparagraph NC-2331(b) from materials section.	E						
162	3224.6,3224.8	92	Clarifies thickness requirements for ellipsoidal and torispherical heads and makes Subsection NC formed head requirements equivalent to Section VIII, Div. 2.	L	Safety improves by wording changes and by the inclusion of the thickness formula when the upper limit of the head design curves is exceeded. The equation has been in Section VIII, Div. 2 since, at least, 1986.	I	N	N	N	N
163	3593	90	Corrects title.	ER						
164	3593.1	90	Corrects paragraph contents.	ER						
165	3611.2(e)(3)	91	Corrects nomenclature for NE.	ER						
166	3611.2(e)-1 TBL	90	Changes column heading from " t " to " f ".	ER						
167	4335.1(c),4335.1(d)	89	Relocates subparagraph (c) provision to design section [NC-2431]. Redesignates subparagraph (d) as NC-4335.1(c)	E						
168	4622.4(c)-1 TBL	93	Removes alternate holding times and temperatures for P-numbers 10C-Gr. 1, 1 and 5-Gr. 1. Also increases alternate holding time for 1000°F from 3 hr/in. thickness to 4 hr/in. for P-No. 1, 3, 9A-Gr. 1 and 9B-Gr. 1. NC is now identical to NB, which was similarly revised by addenda to the 1986 Edition.	L	The changes described were based on the recommendations contained in WRC Bulletin No. 315. Materials and temperatures are not commonly associated with nuclear NC & ND construction. No factors change.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NC (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
169	4622.7(b)-1 TBL	94	Similar to the Item No. 119 NB change - Revision to Table 4622.7(b)-1, "Exemption to Mandatory PWHT".	L	See Item No. 119. Note that NC-3661.2 limits socket welds to 2-inch nom. pipe size and less.	N	D	N	D	D
170	7000 (All)	93	This is a technical and major editorial change to this Article, Overpressure Protection. The changes are similar to those made to NB-7000 with previous addenda. The technical changes are: a listing of acceptable fluids for pilot operated valves with auxiliary actuating devices, the replacement of upset and emergency terminology with "expected" and "unexpected" transients (unexpected includes faulted conditions), and a correction to the equation for F. Also, the approved edition of N 626.3 was changed from 1979 to 1988, which requires each applicable Registered Professional Engineer (RPE) to maintain more records.	L	The editorial changes clearly describe the intent of this Article and will eliminate many misinterpretations. It is clear that pilot operated valves with aux. act. devices can be used for all fluids. The expected and unexpected transient terminology assures consideration of all transients in the Design Specification. All of this, plus the equation correction, enhances safety with no increase in cost. There will be some increase in cost and records (about 4 hr per RPE per year) due to additional, more specific record keeping by each applicable RPE due to the adoption of the 1988 edition of N626.3.	I	N	N	I	I
171	7142	90	Makes NC-7142 consistent with NB-7142.	E						
172	7142(a)	91	Deletes the last sentence of NC-7142(a) as redundant with NC-7142(e).	ER						
173	7527	92	Clarifies that this paragraph refers to pilot operated valves (7520) and that 7527.1 and 7527.2 must be considered when establishing credit for relief capacity.	E						
174	7753,7754	93	Improves the format of the equation for F.	L	It was possible for someone to make a nonconservative calculation with the old format. Therefore, this change assures a safe calculation.	I	N	N	N	N

Subsection ND

175	2121(a)	90	Deletes "special" from "special requirements".	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NC (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
C10	3551	91	Clarifies.	E						
176	2510	90	Corrects title and paragraph 2510.	ER						
177	2545.3,2546.3	93	Clarifies acceptance criteria and makes the paragraphs consistent with ND-2576(c).	E						
178	2552,2553	90	Deletes paragraph ND-2552.	ER						
179	2571(b)	89	Clarifies that castings used in valves supplied in accordance with ANSI B16.34 shall be examined in accordance with ANSI B16.34.	E						
180	2571-1 TBL	90	Deletes "pipe fittings" from first entry under Item column.	ER						
181	2573.8	89	Corrects an error in dimensions published in 1987 Addenda.	ER						
182	3111	90	Redesignates subparagraphs (a)-(g) as subparagraphs (b)-(h); adds new subparagraph (a) to cover internal and external pressure under loading conditions for General Design requirements.	L	This was published as errata but does change a technical requirement. This does not limit the conditions designed for. Pressure would always be considered; thus no factors change.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NC (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
183	3441.8,3434.1	89	Incorporates detailed additional design calculations for Type K Centrifugal Pumps including the effects of piping forces and moments, and forces and moments due to seismic vibrations. Adds requirements for bolting for these pumps.	M	This adds specific Code requirements for including the effects of seismic loadings on Type K centrifugal pumps for ASME Class 3 Service. Since these pumps are normally designed and manufactured independent of the ASME Service Level, and since the NRC has, since the mid 1970s, required seismic analysis for ASME Class 1 pumps, essentially the only difference has been in the required documentation. For plants using non-seismically qualified pumps for Class 3 Service, the additional design calculations are simple and easy to implement, but would increase the cost, estimated to be approximately 40 person-hrs per pump with about 25% (10 person-hrs) for documentation. Plant operations should be somewhat safer because of increased assurance of component integrity. There is no change in either occupational or public exposure because Class 3 pumps do not handle radioactive fluid.	I	N	N	I	I
184	3593	90	Corrects title.	ER						
185	3593.1	90	Corrects paragraph.	ER						
186	3600	90	Extensive editorial changes to numerous subparagraphs to make ND-3600 consistent with earlier changes to NC-3600. BNCS 314, ASME 88-361.	E						
187	3611.2(c)(2) 3611.2(c)(3) 3611.2(c)(4)	91	Changes "P" to "P_a" to agree with referenced Eq. (5), ND-3641.1.	E						
188	3641.1(c)	91	Clarifies the definition of P_a for the evaluation of flanged joints.	E						
189	3658	91	Clarifies the requirements for the evaluation of flanged joints in piping.	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection NC (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
190	3673.2(b)-1 FIG	90	Revises the reference to Figure 4427-1. Related to the Item No. 193 change to Figure 4427-1.	E						
191	4335	94	Same as the Item No. 115 NB change that clarifies when impact tests are required.	E						
192	4335.1(c)&(d)	89	Relocates (c) provision to design section (ND-2431). Old (d) now (c).	E						
193	4427-1 FIG	91	Adds sketch (C-3) to agree with Fig. NC-4427-1.	E						
194	4435	90	Corrects an incorrect reference to NC-2000.	E						
195	4435	92	Similar to the Item No. 075 NB and NC change. Expands the rules for nonstructural attachments to include temporary attachments and provides specific rules for removal of nonstructural attachments.	L	Improves safety since there were no previous rules for removal. No additional costs for NDE, since this is Code Class 3.	I	N	N	N	N
196	4622.7(b)-1,TBL	94	Same as the Item No. 119 NB change - Revision to Table 4622.7(b)-1, "Exemption to Mandatory PWHT".	L	See Item No. 119. Note, also, that ND does not limit socket weld size. This change to Table 4622.7(b)-1 exempts sockets welds of 4.0 inch OD and less from PWHT. Previously, all P-3,Gr 3 socket welds were exempt. Therefore, this represents an increase in safety for Subsection ND. P-No. 9A and 9B are not in Table ND-4622.7(b)-1.	I	D	N	D	D
197	7512.2(a),7512.3,7513 7524	91	Same as the Item No. 146 NB change. Adds reference paragraphs for both the Overpressure Protection Report and the Design Specification.	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
198	7512.3,7513.1(a) 7513.2,7424.2 7524.3(a)	91	Permits use of alternate tolerances on set pressure to agree with Subsection NB.	L	The alternate tolerances have no effect on any of the factors.	N	N	N	N	N
199	7733,7743,7734.2(b) 7742.2(b),7753	91	Clarifies and standardizes the procedure for replacing unacceptable valves.	E						

Appendix I

200	1.0,2.0,3.0,4.0,5.0,6.0 7.0,8.0,11.0,12.0,13.0 Tables	92E	This administrative change in the 1992 Edition moves all of these tables which contain material propery data to Section II, Part D.	E	Any changes below to any of these tables (1.0-8.0 & 11.0-13.0) in 1992 or later addenda were published in Section II, Subpart D.					

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
201	1.1 TBL	91	Deletes SA-213 from second bracketed grouping under Low Alloy Steels, 1 to 2 Chromium Alloys.	ER						
202	1.1 TBL	92	Removes Class 1 designation from SA-352-LCB.	ER						
203	1.1 TBL	92	Removes SA-213, T7 and SA-335, P7.	L	No change in factors; materials no longer being produced or used; other suitable materials are in the Code.	N	N	N	N	N
204	1.1 TBL	92	Removes two materials, SA-213, T3b and SA-369, FP-30.	L	No change in factors; materials no longer being produced or used; other suitable materials are in the Code.	N	N	N	N	N
205	1.2,1.3,7.2, 7.3,10.2,10.3 Tables	89	Increases slightly the S_m values for austenitic steels, high Nickel alloys, and copper-nickel alloys. BNCS 314, ASME 88-359.	L	These revised S_m and/or S values are in response to criteria changes adopted earlier by Section III. There are no changes in any of the factors because the new values are only slightly different from the old values.	N	N	N	N	N
206	1.2,7.2 Tables	89	Deletes reference to notes for SB-166 NO6690 Rod & Bar under High Nickel Alloys.	L	This is part of essentially editorial changes to correct and clarify tables and Appendices. No factors change.	N	N	N	N	N
207	1.2 TBL	89	Adds stress line for SB-163 NO6690 material.	L	The new values of S_m for Alloy 690 high nickel alloy as distinct from the earlier Alloy 600 classification are in response to criteria changes adopted earlier by Section III. There are no changes in any of the factors because the new values are not much different from the old values.	N	N	N	N	N
208	1.2,3.2,7.2, 10.2 Tables & Notes	90	Adds SA-376 Type 304 stainless steel seamless pipe to tables. This relates the stress values to a size restriction that has been added to the SA-376 specification for Grades TP304 and TP304H product forms. BNCS 314, ASME 88-302.	L	There are no changes in any of the allowable stress values, and consequently no changes in any of the factors.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
209	1.2,1.3,2.2, 3.2,7.2,7.3, 10.2,10.3,13.3, Tables	90	Revises slightly the allowable S_m values for Types 321, 347, and 348 stainless steels and added reference to Note 25 for SA-376 seamless pipe. This updates the stress table for Grade 321 stainless steels in response to changes in criteria adopted earlier by Section III, and provides a revision for SA-376 addressing material thickness. This also updates stress values for 18Cr-10Ni-Cb alloy. BNCS 374, ASME 90-160.	L	There are no changes in any of the factors because the new values are not much different from the earlier values.	N	N	N	N	N
210	1.2 TBL	91	Corrects Type or Grade for SA-182 from F304N & F304H to read F304 & F304H.	ER						
211	1.2 TBL	91	Corrects Nominal Composition for SA-479 309S to read 23Cr-12Ni.	ER						
212	1.2 TBL	91	Corrects notes and stress line for first bracketed grouping under High Alloy Steels, Type 316 stainless steels.	ER						
213	1.2 TBL	91	Corrects Nominal Composition for SA-336 to read 16Cr-12Ni-2Mo-N.	ER						
214	1.2 TBL	91	Deletes Notes 4 and 18 to Table I-1.2.	ER						
215	1.2 TBL	92	Removes N from SA-182, Type 304N; corrects listing of SA-376, TP304 and TP 304H.	ER						
216	1.2,2.2 7.2,10.2 14.1 Tables	92	Deletes material SA-412 from Tables.	L	No change in factors since the existing SA-240 (XM-19) is essentially identical to SA-412 (XM-19). They have the same UMS number.	N	N	N	N	N
217	1.3 TBL	92	Revises S_m value for SB-164 at 300°F.	L	No change in factors since the new value is not much different.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection ND (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
218	2.2 TBL	91	Corrects all four entries under Copper-Nickel Alloys, Type or Grade to read C71500.	ER						
219	3.2 TBL	90	Corrects S_y entries for 950°F and 1000°F for High Nickel Alloys, third bracketed group.	ER						
220	4.0,6.0 Tables	89	Adds new thermal conductivity, thermal diffusivity, thermal expansion, and modulus of elasticity properties for Alloy NO6690.	L	These new physical properties for Alloy 690 high nickel alloy as distinct from the earlier Alloy 600 classification are based on studies conducted at Westinghouse. Although the new values are more accurate, they are not much different from the earlier Alloy 600 values. Thus, there are no changes in any of the factors.	N	N	N	N	N
221	5.0 TBL	91	Corrects coefficient B for 600°F under High Nickel Alloys, for (825) Ni-Fe-Cr-Mo-Cu to read 8.20.	ER						
222	6.0 TBL	91	Corrects Modulus of Elasticity for -200°F under Nonferrous Materials, High Nickel Alloys, for N10276 (C-276) to read 31.3.	ER						
223	7.1,10.1 Tables	90	Adds allowable stress values for SA-738 carbon steel plate as a function of plate thickness.	L	These new stress allowables for SA-738, G-C are identical to the values previously assigned to SA-737 C1.2. There is no change in any of the factors.	N	N	N	N	N
224	7.1 TBL	90	Revises Note 4 to table to agree with Note 4 to Table 7.2.	E	No technical change.					
225	7.1,7.2,7.3, 10.0 Tables	91	Revises titles to include Class 2, 3, and MC Components and makes other changes in preparation for consolidating material properties in a new Part II of Section II of the ASME BPV Code. BNCS 424, ASME 91-205.	E						
226	7.1 TBL	91	Corrects Min. Yield Strength for SA-414C under Carbon Steels to read 33 ksi.	ER						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
227	7.1 TBL	91	Deletes SA-213 T3b under Low Alloy Steels, 1 to 2 Chromium Alloys, from second bracketed grouping.	ER						
228	7.1 TBL	91	Corrects Nominal Compositon for SA-240 XM27 and SA-479 XM27 to read 27 Cr-1 Mo.	ER						
229	7.1 TBL	92	Revises S-values for all temperatures for two carbon steel material groups.	L	No change in factors since the new values are not much different.	N	N	N	N	N
230	7.1 TBL	92	Removes material SA-213, T3b; editorially relocates SA-414, Gr c and revises its minimum specified yield strength.	L	Changes are insignificant.	N	N	N	N	N
231	7.2 TBL	89	Adds new allowable stress S values for SA-249 Type 309 stainless steels. BNCS 319, ASME 89-60.	L	These revised and new values are in response to criteria changes adopted earlier by Section III. There are no changes in any of the factors because the new values are only slightly different from the old values.	N	N	N	N	N
232	7.2 TBL	89	Removes reference to Note (1) for Type F316LN stainless steel.	ER						
233	7.2 TBL	89	Deletes reference to Note 6 for SB-166 NO6600 Bar under High Nickel Alloys.	E	No technical change.					
234	7.2 TBL	90	Revises slightly the allowable stress S values for the third and fourth bracketed groupings under unalloyed titanium.	L	There are no changes in any of the factors because the new values are only slightly different from the old values.	N	N	N	N	N
235	7.2 TBL	91	Corrects Notes for both SB-564 NO6625 entries under High Nickel Alloys.	ER						
236	7.2 TBL	92	Revises S value at 100°F for Type 321 stainless steels	L	No change in factors since the new value is not much different.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Record	Cost
010	3551	91	Clarifies.	E						
237	7.2 TBL	92	Reverses notes (31) and (32) for SB-564. Note (31) indicates allowable stress for 4-inch dia. and smaller and Note (32) indicates allowable stress for over 4-inch diameter.	ER						
238	7.3 TBL	89	Adds allowable S values for SA-574 low alloy steels and Notes 17-21 pertaining to use of this material. It appears that an error was made in publication since Note 17 is not referenced.	L	Cost could decrease where it would be advantageous to use this material. No other factors change.	N	N	N	N	D
239	7.3 TBL	90	Revises the allowable stress S values for SA-354 Gr BC and B carbon steel bolting materials. This relates the stress values to a size range/minimum tensile property combinations.	L	There are no changes in any of the factors because there are no changes in any of the stress values.	N	N	N	N	N
240	7.3 TBL	91	Corrects Min. Ult. Tensile Strength for < = 1/2 in. dia. SA-574, all grades or types, under Low Alloy Steels, to read 180 ksi.	ER						
241	7.3 TBL	92	Corrects minimum specified tensile strength for SA-574.	ER						
242	8.1 TBL	91	Corrects Min. Ult. Tensile Strength for SA-675 50 to read 50 ksi.	ER						
243	8.1 TBL	91	Corrects Min. Yield Strength for second SA-455 to read 37 ksi.	ER						
244	8.1 TBL	91	Corrects Min. Yield Strength for third SA-455 to read 38 ksi.	ER						
245	8.1 TBL	92	Revises yield strength of SA-455.	ER						
246	8.4,14.2 Tables	89	Redesignates SB-402 Cu-Ni copper alloy sheet and plate as SB-171. This parallels the deletion of SB-402 from Section II of the BPV Code.	E	No technical change.					
247	8.4 TBL	90	Deletes SB-11 copper plate from Table I-8.4.	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
248	8.4 TBL	90	A follow on action to Item No. 245. Replaces SB-402 Cu-Ni plate and sheet with SB-171 Cu-Ni plate and sheet in Table I-8.4.	E	No technical change.					
249	8.4 TBL	91	Corrects Size or thickness in 2 places for SB-209 5456, H321 under Aluminum and Aluminum Alloy Products, Sheets, and Plates.	ER						
250	8.4 TBL	91	Corrects Spec. No. for Cu-Ni 70/30 and Cu-Ni 90/10 to read SB-171.	ER						
251	8.4 TBL	92	Corrects size callout for SB-209, alloy 5456.	ER						
252	9.1 TBL	89	Deletes an erroneous entry in Table I-9.1.	ER						
253	9.6 FIG & TBL	94	Adds design fatigue curve and tabulated values for Grade 9 titanium.	L	This material is not normally used in nuclear plants but, if it were advantageuos, it could now be used and thus lower costs.	N	N	N	N	D
254	10.1 TBL	89	Increases minimum yield strength values for SA-541 carbon steel from 35 to 36 ksi.	L	The change is small. No factors change.	N	N	N	N	N
255	10.3 TBL	92	Removes bolt material, SA-193, Gr B6 (416).	L	No change in factors. SA-193, Gr B6 (410) with the same material properties and chemistry as B6 (416) is still available.	N	N	N	N	N
256	11.1 TBL	91	Corrects Min. Ult. Tensile Strength to read 70 ksi. and corrected Stress Intensity for 100°F to read 23.3 ksi for SA-352LC3 under Low Alloy Steels.	ER						
257	11.1 TBL	92	Revises tensile strength and S_m value for SA-352, Gr LC3.	L	The changes are small, < 8% increase; no change in factors.	N	N	N	N	N

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Geo Exp	Pub Exp	Rec ord	Cost
010	3561	91	Clarifies.	E						
258	12.1 TBL	91	Corrects Min. Ult. Tensile Strength for SA-352 LC3 to read 70 ksi under Low Alloy Steels.	ER						
259	12.1 TBL	92	Revises S values for SA-675m Gr 55 Carbon Steel at all temperatures.	L	No change in factors since new values are not much different.	N	N	N	N	N
260	13.1 TBL	91	Corrects Min. Ult. Tensile Strength for SA-352 LC3 to read 70 ksi under Low Alloy Steels.	ER						
261	13.3 TBL	91	Corrects Yield Strength Intensity for 300°F to read 24.8 and for 700°F to read 19.4 for fourth bracketed grouping under High Alloy Steels, Austenitic Stainless Steels.	ER						
262	13.3 TBL	91	Corrects Yield Strength Intensity for 700°F to read 19.4 ksi for SA-320 B8T under High Alloy Steels, Austenitic Stainless Steels.	ER						
263	14.2 TBL	92	Removes SB-11 copper plate from the table, which references appropriate external pressure design charts.	L	None of the factors change, since SB-11 is not included in any of the allowable stress tables.	N	N	N	N	N
264	14.2 TBL	93	Coverage for Ni Alloys N06022, N06030, and N10276 was added to Table 1B of Section II, Part D. This change to Table 14.2 in Section III Appendices indicates the appropriate external pressure design chart for these materials.	L	Cost could decrease where it would be advantageous to use this material. No other factors change.	N	N	N	N	D
			Appendix IV							
265	1000	93	This is a complete rewrite of the Appendix on the procedure to obtain approval for new materials.	L	The rewrite converts generic requirements to more specific requirements, clearly indicating the data the Committee has always required prior to acceptance of a new material. Cost should decrease because right information will be provided with the first request.	N	N	N	N	D

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
			Appendix VII							
266	1102-2 & -3 1103-3 Tables	89	Adds Tables VII-1102-2 & -3 and VII-1103-3 containing the values used for constructing the existing Fig. VII-1102-2, etc. BNCS 327, ASME 89-175.	E	Clarification of existing requirements.					
267	1102-4 TBL	89	Removes exponent from tabulated values used to construct Fig. VII-1102-4.	ER						
268	1102-6 TBL	89	Corrects last A entry for 900°F used to construct Fig. VII-1102-6.	ER						
269	1102-7 TBL	89	Corrects first A entry for 300°F used to construct Fig. VII-1102-7.	ER						
270	1103-7 FIG	91	Adds Fig. VII-1103-7 for determining shell thickness of cylindrical and spherical vessels under external pressure when constructed of Alloy NO8020.	L	Cost could decrease where it would be advantageous to use this material. No other factors change.	N	N	N	N	D
271	1104-4 TBL	89	Corrects third B entry from 0.810 to 0.610 used to construct Fig. VII-1104-4.	ER						
272	1105-2 TBL	89	Corrects third B entry for 300°F from 0.641 to 0.841 used to construct Fig. VII-1105-2.	ER						
273	1105-3 TBL	89	Removes incorrect exponent from third entry for 400°F used to construct Fig. VII-1105-3.	ER						
274	1106-3 TBL	89	Corrects fourth B entry for 100°F from 0.550 to 0.850 used to construct Fig. VII-1106-3.	ER						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
			Appendix XI							
275	3120(b)	89	Includes previously missed reference to Fig. XI-3120-1 sketch (6b), which shows typical integral type flanges.	E	Clarification of existing requirements.					
			Appendix XIII							
276	1141-1 FIG	88	Corrects notation in Note 4 of "hopper diagram".	ER						
277	2110	90	Adds "Analytical Method" as an acceptable method for determining peak stresses around openings in Class 2 vessels for fatigue evaluation. It permits the use of finite element or other analytical methods for determining peak stresses at nozzle openings subject to the same restrictions on analytical methods for determining stresses at other locations now contained in Appendix XIII.	M	The is judged to be medium because it extends the application of Code approved methods to a problem that had previously been specifically excluded. There is no change in the record burden because the designer is already required by other parts of the Code to certify the design analyses and to include them in the Design report. There are no changes in any of the factors except cost, which will decrease for those cases where the only other alternative would be to conduct an experimental stress analysis.	N	N	N	N	D
278	1110-1	89	Corrects first entry for 400°F from 0.0987 to 0.987.	ER						
279	1160	89	Corrects 2nd line of "Problem" from (G-0.82) to (G=0.82).	ER						
280	1160	89	Corrects first equation under Solution.	ER						
			Appendix XIX							
281	1110	89	Adds "Scope" as title.	E	No technical change.					
282	1120	89	Redesignates paragraph XIX-1111 as XIX-1120.	E						

Table 1. Summary and Evaluation of Section III BPV Code Changes, 1989 - 1994 Addenda (Continued)

Appendix VII (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im Pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Rec ord	Cost
010	3551	91	Clarifies.	E						
283	1200(g)(3)	88	Corrects equation for Z.	ER						
			Appendix XX							
284	1000 (All)	93	Provides clarification by separating the requirements for requesting Interpretations, Code Cases, and Code Changes.	L	All changes have no impact except for cost, which may decrease because of making it easier to get the right information in the first submittal to the Committee. This Appendix only covers administrative requirements related to Code changes and does not effect nuclear plants.	N	N	N	N	D
			Appendix XXII							
285	1200	88	Corrects nomenclature for Q_s and T_L.	ER						

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda

"Subsection IWA"

11May95 Draft

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors*	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
001	1400	90	Changes subparagraphs (c), (k), and (l) and adds subparagraph (p) to clarify the Owner's responsibilities regarding flaw evaluation.	E							
002	1400	93	Changes "nuclear power system" to "nuclear power plant."	E							
003	1400, 2420	90	Clarification of 1400(c) and 2420 regarding inspection plans and schedules.	E							
004	1400(c)	89	Changes "plans and schedules" to "inspection plans and schedules."	E							
005	1400(j)	89	Adds "in accordance with written programs and plans" to the Owner responsibility "performance of repairs and installation of replacements."	E							
006	1600-1 TBL	89	Updates the table to reference the latest edition of N626, ANSI/ASME N626b-1988, which covers qualification and duties for Authorized Nuclear Inspection Agencies and personnal.	L	There are no significant changes in the updated referenced N626, thus all factors are "no-change."	N	N	N	N	N	N
007	1600-1 TBL	90	NQA-1 is updated to the 1989 edition and ASTM E1065 is added for reference by Appendix VIII.	H	NQA 1 is not mandatory as Section XI allows 10 CFR 50 Appendix B as an alternate. This is rated "high" since ASTM E1065 is related to the Item No. 159 Appendix VIII change.	I	D	D	I	I	I
008	1600-1 TBL	92	Adds ASTM E1324 for characterization of ultrasonic instruments in accordance with Appendix VIII. A related change is Item No. 162.	E							
009	1600-1 TBL	92	Includes the correct edition and addenda of OM Part 4 which is referenced by IWF-5000 and also adds ASTM D974 which is referenced in Subsection IWL. Also ANSI/ASNT CP-189 is added, which is referenced in IWA-2300. Related changes are Item No.'s 020 & 145.	E							

*The impact of each item has been evaluated to be high (H), medium (M), low (L), editorial (E), or errata (ER). Each of the factors - safety, occupational exposure, exposure to the public, critical path, records, and cost - has been determined to increase (I), decrease (D), or not change (N) for each high, medium, or low item.

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors*	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
010	1600-1 TBL	93	Adds reference to ASTM E 185, 1992, for use with nonmandatory Appendix A. This also corrects the title of the standard in Appendix A.	E							

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
011	1600-1 TBL, 2120(c)	91	References the 1990 Edition and 1991Addenda (N626s-1991) of ASME N626 which requires that Authorized Inspection Agencies be accredited by ASME. Other changes to the Table are an errata correction to the OM-6 and OM-10 references and an editorial reorganization of the references.	M	Safety may increase due to more uniform and higher-quality authorized inspector services. Assuming 8 agencies will be accredited each 3 years with 2 ASME consultants spending 4 days including travel for each accreditation activity will average about $2,300 per plant per year for 100 plants. It is assumed that 50% or $1,150 per plant per year will be record costs. Since this change effects authorized inspector services, it is related to all parts of Section XI where authorized inspector services are used.	I	N	N	N	I	I
012	2110,2200,2430	91	Updates the effected IWA paragraphs to include reference to the published Subsection IWL, which include inservice inspection requirements for concrete containments.	E							
013	2110(d)	89	Deletes reference to the "Inspection Specialist" because the "Inspection Specialist" designation has been deleted from ANSI/ASME N626.	E							
014	2200(b)	89	Adds reference to nonmandatory Appendix D for surface preparation for nondestructive examination.	E							
015	2210	90	Technical and editorial change to clarify and improve visual examinations. Realistic minimum lighting levels and procedure demonstration criteria are specified.	M	Since this increases safety by providing uniform and consistent visual examinations, it will also decrease the potential for accidental radiation release that could affect both the public and plant employee radiological exposure. It will not increase the time for performing examinations and thus does not affect the critical path. Increased costs to purchase and maintain light meters is estimated at $300 per plant per year. Records are estimated to cost $115 per plant per year. This is related to all parts of Section XI where visual examinations are required.	I	D	D	N	I	I
016	2210-1 TBL	92	Change of height unit from "mils" to the standard Code inch unit. This also includes changing "nondestructive testing personnel" to "nondestructive examination personnel" in the References part of the Organization of Section XI on Page xxiv.	E							

*The impact of each item has been evaluated to be high (H), medium (M), low (L), editorial (E), or errata (ER). Each of the factors - safety, occupational exposure, exposure to the public, critical path, records, and cost - has been determined to increase (I), decrease (D), or not change (N) for each high, medium, or low item.

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Crit Path	Rec ord	Cost
017	2216	92	This deletes the Section XI paragraph on cleaning for visual examination since the subject is now covered in the referenced Section V of the Code.	E							
018	2216	93	Requires color discrimination for remote visual examination to enhance detection of relevant conditions.	L	Enhanced examination should increase safety and decrease risk of public exposure. Cost would increase for those licensees who would have to replace black and white equipment with color equipment earlier than originally planned. This is related to any parts of Section XI when remote visual examinations are used.	I	N	D	N	N	I
019	2233	93	This is related to the Appendix IV action described in Item No. 154.	E							
020	2300	92	Adopts the ASNT Standard CP-189 for qualification and certification of nondestructive examination personnel, but takes exception to the CP-189 requirement that all Level III's must have an ASNT certificate. This clarifies and improves past requirements by having the mandatory Code reference a mandatory standard rather than the SNT-TC-1A recommended practice. This is related to changes to Appendix VII described in Item No. 156. This is also related to any parts of Section XI where nondestructive examinations are required.	L	All are judged as "no change" because this will only result in more uniform NDE personnel certification practices and will not result in significant changes to present practices.	N	N	N	N	N	N
021	2321,2322	91	Revises the specification of minimum vision acuity for NDE personnel. The non-quantitative Jaeger J-1 is replaced with the quantitative Snellen 20/25 (6.25 minute included angle). This is related to any parts of Section XI where nondestructive examinations are required.	L	The small increase in measurement and documentation costs is more than compensated for by the quantitative acuity requirements resulting in more reliable nondestructive examinations which increase safety and decrease exposure. Documentation is estimated at 2 person-hours, one time, at each facility.	I	D	D	N	I	I
022	2322(c)	91	Adds "Alternatively," to the second sentence in the paragraph which provides an alternative for Level III NDE personnel recertification examinations.	E	The alternative was included but not previously labeled as such.						

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
023	2322,APVII	90	Deletes the requirement for Level III NDE personnel to repeat the Basic examination for recertification. This is compatible with current ASNT practice. This change also adds the Practical (hands-on) examination for certification of Level III's. It includes revisions to both IWA-2300 and Appendix VII. It also includes minor editorial cleanup of Appendix VII. This is related to any parts of Section XI where nondestructive examinations are required.	L	This will enhance the minimum skills of Level III NDE personnel and therefore increase safety through more effective NDE. There is no change in costs since the increase for Practical examinations is compensated for by the decrease for deleting the Basic examination for recertification.	I	N	N	N	N	N
024	2340	89	Change from "Level III candidates shall be a graduate of an accredited high school or shall have passed a standardized high school equivalency test" to "Level III candidates shall have high school or equivalent education."	E							
025	2350	92	Clarifies the definition of limited certification of NDE personnel and permits a reduction in the number of examination questions as well as the prior permitted reduction in training and experience. This is related to any parts of Section XI where nondestructive examinations are required.	L	The cost decreases slightly because of the reduced number of questions required for written examinations for limited certifications. None of the other factors change.	N	N	N	N	N	D
026	2410 thru 2413	91	Deletes IWA-2411, -2412, and -2413 that contained requirements for Code Editions/Addenda for PSI and ISI that conflicted with 10CFR50.55a. It revises IWA-2410 to reference 10CFR50.55a.	E							
027	2420	94	Deletes "substitute examinations and tests" since it was felt that this is not a Code matter. This was a term used to cover relief requests. These are covered in the Regulations. See the related change under IWA-6220.	L	All are "no change" since existing requirements in the Regulations continue.	N	N	N	N	N	N
028	2430	89	Provides clarification of "commercial service." Footnote 5 (paragraph IWA-2430) is deleted and the IWA-9000 definition of "commercial service" is revised.	E							
029	2430	90	Thisis related to the technical changes to Subsection IWF which provide a sampling plan for support examinations. The referencing words in IWA regarding IWF are changed. This change did not appear in the 1990 Addenda but was published as Errata in the 1991 Addenda.	E							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
030	2430	93	This clarifies the requirements for timing of inspection periods within the inspection interval and allows reduction or extension of a period up to 1 year to coincide with a plant outage.	L	All are "no change" since this clarifies existing requirements.	N	N	N	N	N	N
031	2431	89	This is an administrative change that provides for operation after 40 years. It starts with Paragraph IWA-2431, and includes IWA-2432, IWB-2411, IWC-2411, and IWD-2411 and Tables IWB-2412-1, IWB-2500-1, IWC-2412-1, IWD-2412-1, and IWE-2500-1.	L	This does not address technical or licensing issues. Cost would be reduced since operation after 40 years will be used only if cost-effective.	N	N	N	N	N	D
032	2440	90	Clarifies the requirements covering application of Section XI Code Cases.	E							
033	3641.2(c)	92	This corrects an error in a paragraph reference.	ER							
034	4000	91	This major editorial change combines the repair and replacement rules into one subarticle that were previously scattered through twelve subarticles. It clarifies the Code requirements.	E							
035	4000,9000	93	This revises the definition of Construction Code, adds a definition of Owner's Requirements, and revises IWA-4000 to change the requirements that apply to the new definitions. This is related to the other parts of Section XI wherever these terms are used.	L	A possible increase in safety and an accompanying decrease in exposure due to more clear requirements for repair/replacement items.	I	N	D	N	N	N
036	4100	92	This revises IWA-4110 and IWA-4120. IWA-4120 is renumbered and retitled to IWA-4111, Applicability. The current list of exemptions are expanded and clarified by including appropriate Construction Code exemptions.	L	A small decrease in cost since the clarification of exemptions has the potential of reducing processing of Code inquiries.	N	N	N	N	N	N
037	4110,7110	91	References nonmandatory Appendix J, Guide to Plant Maintenance Activities and Section XI Repairs/Replacements.	E							
038	4120,4710	92	Deletes the exemption for NPS 1 and smaller items and adds alternative requirements. IWA-4710 is revised to continue the present exemption from hydrostatic tests of small items. This is related to all Section XI repair/replacement activity.	L	The alternative requirements better ensure that small items will function as designed. Thus, a small increase in safety and a small decrease in the potential for public exposure to radiation.	I	D	N	N	N	N

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
039	4130	89	This requires the Licensee to provide more details in repair programs and plans (10 items versus the previous 4 items).	L	A small increase in cost because of the additional information which must be recorded in repair plans. This is estimated to add one person-hour time for each repair operation.	N	N	N	N	I	I
040	4130,4132	93	Provides rules for establishing a QA program for a Repair Organization other than the Owner. This is related to all Section XI repair/replacement activity.	L	This could reduce costs by providing consistent minimum rules for repair organization QA programs.	N	N	N	N	N	D
041	4140(b)(5)	93	Incorporates intent inquiry 91-019 and clarifies requirements for recording of reference points during and after repairs.	L	All are "no change" since this clarifies existing Code requirements.	N	N	N	N	N	N
042	4150	94	Changes title from "Verification of Acceptability" to Evaluation of Acceptability" and clarifies text.	E							
043	4170	94	Clarification of rules for use of later Editions and Addenda of Section XI in Repair/Replacement programs.	E							
044	4180	93	Deletes the paragraph since its provisions are redundant to other Code requirements.	E							
045	4310	91	Clarifies the rules for evaluation of defect removal areas and adds reference to "appropriate flaw evaluation rules of Section XI" in addition to the reference of the Construction Code.	L	This clarification of the Code may reduce costs slightly by eliminating inquiries to the Code.	N	N	N	N	N	D
046	4322	89	Clarifies the Code intent that material must be mechanically removed from a thermally processed repair area. This action also moves requirements from Subsection IWB to Subsection IWA.	E							
047	4340	91	Eliminates the requirement for surface examination of the removal cavity when the full thickness of the weld is removed and the backside of the joint is inaccessible. This makes IWA-4340 consistent with Section III, Division 1, NB-4453.1.	L	This will reduce cost by making it unnecessary to prepare a relief request for this surface examination which is not practical to be performed. This would reduce paperwork costs about 16 person-hours per plant per interval.	N	N	N	N	D	D

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
048	4412,4413	92	Combines IWA-2412 and -2413 which contained similar requirements and deletes the text made redundant by reference to Section IX. A technical change is that the final NDE is now VT-1 as previously required for GTAW and GMAW versus the visual or surface examination, as applicable, required in the deleted IWA-2413.	L	All are "no change" since this is for the most part editorial.	N	N	N	N	N	N
049	4500	90	This total rewrite updates the Section XI welding requirements. It deletes confusing terms and makes the Section XI repair welding requirements compatible with the Section III welding requirements.	L	This will reduce cost by clarifying the requirements.	N	N	N	N	N	D
050	4500	91	Incorporates the GTAW temper bead repair from Code Case N-432. Major revisions are the addition of GTAW temper bead repair techniques and the addition of limitations on the depth and area of some temper bead repairs.	L	The added limitations on depth and area of welded repairs are more conservative and therefore may increase safety. The provision for use of automated welding (GTAW) may reduce employee radiation exposure.	I	D	N	N	N	N
051	4512	92	Lowers the post weld bake heat treatment temperature for the gas tungsten arc weld repair process from 450-500°F to a 300°F minimum. This change was supported by technical data.	L	This could reduce the outage time by reducing the time required for welding should GTAW temperbead repairs be used.	N	D	N	D	N	D
052	4513.1-1 FIG.	91	Adds Figure IWA-4513.1-1 which should have been included with the IWA-4500 action above covering temper bead repair.	E							
053	4546-1,4546-2 FIGS.	93	Clarifies the figures.	E							
054	4700(b)(7)	89	Exempts seal welds from the hydrostatic test requirements following a repair by welding.	L	This has minimal impact since the subject welds are "minor" and they do receive normally scheduled Section XI pressure tests.	N	D	N	N	N	D
055	4700(c)	89	Deletes Subparagraph (c) and exempts minor repair welds (up to 10% of the design thickness) from the subsequent hydrostatic test.	L	This has minimal impact since the subject welds are "minor" and they do receive normally scheduled Section XI pressure tests.	N	D	N	N	N	D
056	4810,4820	94	Clarifies the examination and PSI requirements for repairs and replacements; also incorporates inquiry XI-1-89-42. Permits the PSI to be performed either before or after the required pressure test.	L	All are "no change" because this clarifies existing requirements.	N	N	N	N	N	N

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
057	5211	93	Clarifies requirements for permitting a pneumatic test for Class 2 and Class 3 systems as answered in Inquiries 91-009 and 92-003.	L	All are "no change" because this clarifies existing requirements.	N	N	N	N	N	N
058	5214(a)	90	Corrects designation of referenced paragraphs regarding pressure testing of repairs and replacements.	ER							
059	5250	90	Provides for first removing only one bolt (closest to leakage source) and then removal of all bolts in the connection if degradation is found on the one bolt. Previously all bolts from the connection had to be removed if leakage occurred at the connection.	L	Less disassembly and reassembly operations will lower time required in radiation areas for plant personnel. This will also decrease costs.	N	D	N	N	N	D
060	5250	93	Correction of reference from "IWA-4700" to "IWA-4000."	E							
061	5265	92	Incorporates an intent inquiry dealing with pressure changes with elevation.	L	Clarifies the intent of the existing Code. Thus, all are "no change."	N	N	N	N	N	N
062	6000,1400	90	This extensive editorial action clarifies the requirements for records and reports.	E							
063	6220	94	Deletes "substitute examinations and tests" since it was felt that this is not a Code matter. This was a term used to cover relief requests. These are covered in the Regulations. See the related change under IWA-2420.	L	All are "no change" since existing requirements in the Regulations continue.	N	N	N	N	N	N
064	6220(c)	89	Changes "shall be prepared" to "shall be required."	E							
065	6220(e)	89	Changes "Plans" to "Inspection plans."	E							
066	6240	90	Clarifies the ISI Summary Report submittal requirement.	E							
067	7210(c)(1)	90	Adds missing word. "Owner's" to "Owner's Specification."	ER							
068	7300	91	Deletes IWA-7310 and changes the title of IWA-7300. IWA-7310 duplicated the requirements contained in IWA-7200.	E							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
069	7320	89	Adds provisions for the pressure testing of mechanical joints of replacements attached to systems or components by mechanical methods. The title changes from "WELDING" to "INSTALLATION, " and the addition of a definition of "installation" to the IWA-9000 Glossary is part of this action.	L	All are "no change" since this clarifies requirements that should have been followed per prior Code rules.	N	N	N	N	N	N
070	7400(a)(4)	91	Clarifies the IWA-7400 NPS 1 and smaller exemption. It states, "The term piping includes tubing. However, the NPS 1 exemption does not apply to heat exchanger tubing, or sleeves or plugs used for heat exchanger tubing."	E							
071	9000	89	Definitions are added for "overpressure protection" and "safety function." Other actions revised the definition for "commercial service" and added a definition for "installation" in this 1989 Addenda.	E							
072	9000	90	Adds definitions of "text information," "unit of data storage," and "bobbin coil." These terms are used in Appendix IV which covers eddy current examination of steam generator tubing.	E							
073	9000	90	Revises and adds 28 definitions related to flaw evaluation to the Glossary. It also includes changes to nonmandatory Appendix A. Definitions from A-9000 that have been moved to IWA-9000 are deleted and "crack" is changed to "flaw."	E							
074	9000	91	Deletes "inservice life" from the Glossary and adds definitions for "design life" and "design lifetime."	E							
075	9000	92	Adds terms used by Subsection IWL to the glossary. Definitions are provided for "post tensioning", "prestressed concrete", "reinforced concrete, "tendon", and "unbonded tendons".	E							
076	9000	92	Adds the definition of "structural integrity test" to the Glossary. This term is used in Subsection IWL.	E							
077	9000	92	Removes definitions pertaining to testing of pumps and valves which are no longer used in Section XI because Subsections IWP and IWV now reference OM standards.	E							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
078	9000	93	These are additional terms being deleted for the same reason as Item No. 077 above.	E							
			Subsections IWA-D								
079	5000	91	This extensive change clarifies the system pressure test requirements for Class 1, 2, and 3 systems and components. It also includes changes to Examination Category Tables IWX-2500-1 covering pressure tests. Table footnotes are moved to the IWX-5000 text.	E	Discussion with the Section XI Working Group on Pressure Testing individual involved with this confirmed the editorial nature of this change.						
080	see description	93	Provides for a "system leakage test" in lieu of a system hydrostatic test during each 10-year interval. Changes to IWA-5221, Table IWB-2500-1, IWB-5200, Table IWC-2500-1, IWC-5200, and IWD-5240 are all part of this action. BNCS 497, ASME 93-191.	M	The higher hydrostatic test pressure provides minimal benefit and could degrade components. The simpler system leakage test reduces critical path tasks and costs. Record costs also decrease about 16 person hours per BWR plant per interval through the elimination of a relief request. See Item No. 123.	N	D	N	D	D	D
			Subsections IWA-F								
081	see description	91	Several different terms have been in Section XI for "power plants" (e.g., "power plant" and power unit"). This changes all these to simply "plant." Also changes "light-water cooled power plants" to light-water cooled plants" in titles and text of the subsections. Many locations within Section XI are changed by this action as shown by a Table included in BNCS letter ballot 424.	E							
082	see description	94	Deletes redundant cross references to repair and replacement requirements. These were consolidated into IWA-4000 in the 1991 Addenda. IWA-7000 and IWB-F 4000 and 7000 are deleted. BNCS 535.	E							
			Subsection IWB								
083	1220	92	Deletes the reference to 10CFR50 that defined the reactor coolant pressure boundary. It also changes the definition of "in piping" to be consistent with Subsections IWC and IWD.	E							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWA (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
084	2410	93	Deletes a requirement regarding timing of inspection intervals which is redundant to IWA-2430 requirements.	E							
085	2411,2412	91	Corrects "inspection period" to "inspection interval" in two places.	E							
086	2411,2412, 2500-1 TBL	91	Clarifies examination schedule requirements.	E							
087	2411,2412, 2500-1 TBL	94	Clarifies the existing requirements for partial deferral of examinations and incorporates intent inquiry XI-1-89-14.	E							
088	2500(b)	89	Clarifies that examination category B-F is "Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles." This also includes changes to Table IWB-2500-1 (Exam Categories B-F and B-J) Figure IWB-2500-8, Table IWB-3410-1, and Paragraph IWB-3514.	E	This clarifies Code requirements. Previously it was unclear as to which examination category, B-F or B-J, applied to dissimilar metal welds.						
089	2500-1 TBL	89	This change and the same change to Table IWC-2500-1 clarifies the inservice examination exemption of ultrasonic examination for reflectors transverse to the weld length direction for ferritic piping.	E							
090	2500-1 TBL	89	Changes the required examination from surface to visual (VT-1) for reactor vessel closure head nuts (Examination Category B-G-1, Item No. B6.10). This change was approved only after a study of past examination records. No problems had been found and the visual examination was determined suitable for finding future inservice degradation.	L	Cost decreases because visual examination costs less than surface examination.	N	N	N	N	N	D
091	2500-1 TBL	92	Removes the definition of "beltline region" from this Table and adds the definition of this term from 10 CFR 50, Appendix G to the IWA-9000 Glossary.	E							
092	2500-1 TBL	93	Provides clarification that welds are to be examined in the same sequence during each inspection interval "to the extent practical."	L	This clarifies the Code intent; thus all factors are N.	N	N	N	N	N	N

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
095	2500-1 TBL & FIGS. 3516.1	93	Provides clarification of the lettering in the figures and changes Examination Categories B-H and B-K-1 note 4 and IWB-3516.1 to agree with the new lettering.	E							
094	2500-1 TBL	94	Cleanup of title, notes, and contents of this Table. BNCS 508 contains a 1/2 page summary of the changes.	E							
093	2500-1 TBL	94	Continues the present practice of permitting partial examinations of pump and valve internal surfaces, but adds the requirement to do a full or more complete examination if subsequent disassembly provides more access. BNCS 535, Item 94-232.	L	A small increase in safety, cost, and records due to more extensive and consistent pump and valve examinations among Licensees. This corrects a deficiency in requirements that originated with the 1988 Addenda. Additional records for additional examinations would be kept along with all the other examination records. Two person-hours per plant per 10-year inspection interval is estimated.	I	N	N	N	I	I
096	2500-20 FIG.	92	Changes "2nd, 3rd, and 4th inspection intervals" to "successive inspection intervals." This change was missed in the 89 Addenda change that provides for operation after 40 years.	E							
097	3132.4	93	Change "acceptable for service" to "acceptable for continued service." The same change is made to IWC-3122.4 and IWE-3122.4.	E							
098	3512	89	Provides clarification. "Full Penetration Welds of Nozzles" is changed to "Full Penetration Welded Nozzles." It also includes changes to Paragraph IWB-2500 and Tables IWB-2500-1 (Exam Category B-D) and IWB-3410-1.	E							
099	3610-1 FIG	90	Removes an erroneous "S" dimension in this figure which covers flaws for analytical evaluation of clad components. Note that this was not identified as errata on the ASME Code Summary of Changes.	ER							
100	3641.3	89	Corrects an error in the 1989 Code. In four places, "greater than" signs (>) are changed to "less than" signs (<).	ER							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
101	3650	89	Provides flaw evaluation rules for ferritic piping.	M	This is judged as no effect on safety and public exposure since these rules provide conservative criteria for continued operation. They reduce cost and employee exposure since they can in certain instances eliminate the need for repair of ferritic piping in radiation areas. Minor piping repair operations are not expected to extend the critical path time, thus no effect.	N	D	N	N	N	D
102	3710	94	3710 covers the scope of 3700, "Analytical Evaluation of Plant Operating Events." This changes "in course of preparation" to "This Subarticle provides rules for evaluation of events and conditions for pressure boundary and associated structures in operating plants." This does not change any technical requirements.	E							
103	3730	93	Provides fracture toughness criteria for reactor vessels with material upper shelf Charpy impact energy levels less than 50 ft-lbs and reference to a new non-mandatory appendix. It includes provisions of Case N-512.	M	Reporting and costs would increase when this is used due to the analysis and reporting to the NRC (estimated at 40 p-hrs per analysis).	N	N	N	N	I	I
104	4241,4242	90	Corrects errors in referenced paragraph identification.	ER							
105	4300	89	Provides requirements for repair of heat exchanger tubes by sleeving.	L	Having minimum Code requirements for tube sleeving will result in less effort than developing sleeving programs and having them approved on a case-by-case basis. Therefore, cost is expected to decrease. Records are estimated at four person-hours time for each series of sleeving operations during a refueling outage.	N	N	N	N	I	D
106	4332.1(a)1	90	Clarifies the essential variable "ligament thickness" for tube repair using tube sleeving by fusion welding.	E							
107	7000	89	This is a major editorial change which moves common replacement requirements from individual Subsections to the IWA General Requirements Subsection. It includes editorial changes to IWB-7100, -7300, -7320, -7400, -7600; IWC-7200, -7300, -7400; IWD-7200, -7300, 7400; IWF-7100, -7300, -7310, -7400, and -7600.	E							

Subsections IWB-C

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
108	3112,3132	91	Corrects the reference from IWA-6220 to IWA 6230 since in the 1990 addenda the paragraph numbering was changed.	E							
			Subsections IWB-D								
109	1220	94	Adds welds located inside penetrations to the lists of inaccessible welds that are exempt from examinations. Incorporates Cases N-198-1, N-334 & N-322, none of which is in Regulatory Guide 1.147. Exception or modification in Reg. Guide may be required. BNCS 535.	L	Relief with the condition to examine the accessible welds adjacent to the inaccessible welds. Existing practices are not judged to change significantly, thus no factors change.	N	N	N	N	N	N
110	1220 & IWD-2500-1 TBL	91	Adds to the exemptions for Classes 1, 2 and 3, "Integral attachments of supports and restraints that are inaccessible due to being encased in concrete, buried underground, or encapsulated by guard pipe." The changes are located in IWB-1220(b), IWC-1223, and IWD-1220. This action also clarifies the Table IWD-2500-1 examination category D-A integral attachment examination requirements.	L	This reduces costs by eliminating the need to process a Request for Relief for these inaccessible integral attachments. This is estimated to save 16 person-hours time in record expenses for each plant per each inspection interval.	N	N	N	N	D	D
111	2200	94	In IWA-2200, redundant PSI requirements to those in IWA-4820 are deleted; and, in IWB and IWC-2420, a reference IWA-4820 for PSI of repair and replacements is addded. Refer to BNCS 535, Item 94-95.	E	This does not change existing requirements. However, when PSI is to be performed, before or after the system pressure test, is not clarified by this change.						
112	2412	94	Adds rules for scheduling examinations when items or welds are added to a plant.	L	Some decrease in cost due to having consistent rules for all Licensees. No other factors change.	N	N	N	N	N	D
113	2420	91	These changes provide consistent terminology regarding successive inspections. IWD-2420 is added to provide Class 3 requirements similar to Class 2 requirements.	L	This is rated "low" since the Class 3 examinations are limited in scope and limited to the visual method. About 8 person-hours per inspection period is estimated for additional records.	I	N	N	N	I	I
			Subsection IWC								
114	1221,1222	89	Provides clarification of the Section XI exemptions applicable to Class 2 examinations.	E	This clarifies previous requirements.						
115	1221,1222	91	Clarifies the exemptions from volumetric and surface examinations for components within specific systems.	E							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections IWB-D (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
116	2412	91	Clarifies examination schedule requirements. The same change was made to IWB-2412.	E							
117	2500-1 TBL	89	This change and the same change to Table IWB-2500-1 clarifies inservice examination exemption for ultrasonic testing for reflectors transverse to the weld length direction for ferritic piping.	E							
118	2500-1 TBL	90	Changes the note references of the sixth and seventh column heads of Examination Category C-F-2 to match the notes at the bottom of the table.	ER							
119	2500-8 FIG	93	Clarifies the lettering on the figure to be consistent with the same change to IWB figures.	E							
120	3500	90	Corrects errors in column heading of tables IWC-3510-1 and IWC-3511-1 which cover allowable planar flaws, surface and subsurface.	ER							
121	3513.1(c)	90	Provides instructions for confirmation of surface flaws for Class 2 bolting that are the same as the instructions for Class 1 bolting and makes them compatible with the Appendix VIII UT procedure qualification for bolting.	L	This is low impact because flaw confirmation instructions for Class 1 bolting can now also be used for Class 2 bolting.	N	N	N	N	N	N
122	5210	93	See Item No. 057 IWA-5211 change above.	L	All are "no change" since this clarifies existing Code requirements.	N	N	N	N	N	N
123	5222	91	Incorporates Code Case N-479 and provides for the Class 2 BWR main steam system to be hydro tested at Class 1 conditions provided the Class 2 portion is not capable of being isolated from the Class 1 portion by the boundary valve.	L	No change in Safety or Public Exposure since the test conditions for Class 1 and 2 are not significantly different. Also no change in other factors since the subsequent change (Item No. 080) which eliminates Class 1 and Class 2 hyrostatic tests, makes this change have no impact.	N	N	N	N	N	N
124	5222(e)	91	Adds IWC-5222(e) to exempt open-ended vent and drain lines and open-ended safety and relief valve discharge lines from hydrostatic testing.	L	Cost decreases about 16 person-hours per plant per interval due to eliminating a relief request.	N	N	N	N	D	D

Subsection IWD

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWC (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
125	1210,1220,2200 2500,2500-1 TBL	91	Clarifies the examination requirements for Class 3 systems. It simplifies Table IWD-2500-1 by combining 3 examination categories into 2 new examination categories.	E							
126	1220.1, 1220.2	89	Provides clarification of the Section XI exemptions applicable to Class 3 examinations. Same as the Item No. 114 change above.	E	This clarifies previous requirements.						
127	2500-1 TBL	90	Corrects the reference to IWF-2510 in note 3 of Examination Categories D-A, D-B, and D-C to accommodate recent changes to IWF-2510.	E							
128	5210	93	Deletes the IWD-5223(f) pneumatic test of safety or relief valve piping which discharges into the containment suppression pool and adds this piping to the IWD-5223(a) exemptions. This change is justified by the pneumatic test pressures not providing a meaningful test of the piping due to the negligible static pressure stresses developed by the test.	L	The factors occupational exposure and cost will decrease due to eliminating the performance of a test that is not meaningful.	N	D	N	N	N	D
129	5223(a), 5223(f)	92	See Item No. 057 IWA-5211 change above.	L	All are "no change" since this clarifies existing Code requirements.	N	N	N	N	N	N
			Subsection IWF								
130	1210	90	Changes the description of supports for which examination requirements apply.	E	The scope of supports requiring examination has not changed.						
131	1210-1 FIG	90	Deletes the figure which only provided information and was not relevant to any Code requirement.	E							
132	1230	90	Adds the definition of supports that are exempt from examination that were previously covered by an Inquiry. Supports not accessible due to concrete, burial, or guard pipe are also exempt.	L	Cost decreases about 16 person-hours per plant per interval because there is no longer a need to request relief for the now exempt inaccessible supports.	N	N	N	N	D	D
133	2200(a)	90	Clarifies which supports receive preservice examination. All supports not exempted by IWF-1230 are required to receive preservice examination.	E							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsection IWD (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Im pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Crit Path	Rec ord	Cost
134	2220(b)	91	Revises the rule to do all PSI after initiation of hot functional or power ascension tests to apply only to systems operating over 200°F "unless determined unnecessary by evaluation". Examinations are allowed to be performed during operation or during the next refueling outage. What kind of "evaluation" and who approves it are not specified in this change.	L	This reduces cost since many supports can now have a one time PSI performed at installation. Increased PSI records are estimated at $1,000 for each new plant.	N	N	N	N	I	D
135	2410	90	Provides clarification of the inspection schedule requirements. Examination requirements after 40 years are added as has been done for the other Section XI Subsections.	E							
136	2410	94	Adds rules for scheduling examinations when items or welds are added to a plant. Same as the change to IWB-D 2412 above. BNCS 535.	L	Some decrease in cost due to having consistent rules for all Licensees. No other factors change.	N	N	N	N	N	D
137	2420	90	Change title "SUCCESSIVE INSPECTION INTERVALS" to "SUCCESSIVE INSPECTIONS."	E							
138	2420, 2430	93	Clarifies when successive or additional examinations are required by providing more specific cross references and the description of conditions that require these examinations.	E							
139	2430	90	Revises additional examination requirements to include exempt supports if corrective measures are required as a result of the first additional examinations on non-exempt supports.	M	Occupational exposure could increase due to more additional examinations. Offsite exposure may decrease due to improved plant safety from finding and then correcting defective supports. The additional examinations would add to the cost of support examinations. However, these may be compensated for by the reduced initial sample for piping supports allowed by the accompanying revision to Table IWF-2500-1. Records are estimated at 16 person-hours per plant per year.	I	I	D	N	I	I
140	2500	90	Accompanies the technical change to Table IWF-2500-1 and clarifies what is to be looked at during examinations of supports.	E							
141	2500-1 TBL	90	Provides for sampling of piping supports, 25% of Class 1, 15% of Class 2, and 10% of Class 3. However, if corrective action is required, the revision to IWF-2430 expands the samples.	M	This provides an incentive for better initial checking and care of supports, since if ISI does not result in corrective action triggering expanded sampling, inspections will be reduced. Reduced records are estimated to save 12 person-hours per refueling outage.	I	D	N	N	D	D

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections IWF (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
142	2510	90	Editorial change that goes along with the technical change to Table IWF-2500-1.	E							
143	3000	90	Change, in three places, "p >eitions" to "settings".	E							
144	3122.1	93	Correction of reference from IWA-6220 to IWA-6230.	E							
145	5200,5300	92	Goes along with the Item No. 009 change to Table IWA-1600-1 for reference of OM, Part 4.	E							
146	5400	89	Deletes reference to O&M-1987, Part 4 (Rev.1) for repair and replacement of snubbers because the O&M repair/replacement requirements differ from the Section XI requirements. Reference is now made to IWA-4000 and IWF-4000 (repairs) and IWA-7000 and IWF-7000 (replacements).	L	This has no impact since it makes the snubber repair/replacement requirements the same as what is applied to other type supports.	N	N	N	N	N	N

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Subsections IWF (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
147	entire Appendix	89	Covers the implementing requirements for Appendix VIII. It requires that reactor vessel, piping, and bolting ultrasonic examinations be performed per the Appendix VIII qualification requirements. This revision was not published in the 89 Addenda, but appeared as a "Special Errata" which was distributed with Volume 26 of Section XI Interpretations. The revised Section XI pages were included as errata with the 90 Addenda.	H	See Item No. 159	I	D	D	I	I	I
148	2500	92	Provides reference to Section V for ultrasonic thickness measurements.	L	This could increase safety by providing uniform consensus requirements to increase the accuracy and repeatability of ultrasonic thickness measurements.	I	N	N	N	N	N
149	Supplement 12	91	Removes the "in course of preparation" status of Supplement 12 - Flaw Sizing. It references the Appendix VIII performance demonstration requirements for piping and vessels and provides for application of sizing techniques qualified to Appendix VIII to other components provided they are within the scope of the qualified procedure.	L	This reduces cost by providing for wider use of flaw sizing techniques qualified to Appendix VIII.	N	N	N	N	N	D
150	Supplement 13	94	This corrects an omission made in the 1986 Addenda. This adds back the omission by specifying that Appendix A of Article 5 of Section V applies when flat search units are used.	L	Clarifies the scope of an existing requirement. No factors change.	N	N	N	N	N	N
			Appendix II								
151	NIS-1 and NIS-2 Forms	93	Provides guidance for completing the forms as is provided in other Sections.	L	All factors are no change since this clarifies existing requirements.	N	N	N	N	N	N
			Appendix IV								
152	entire Appendix	90	Updates the Code to be consistent with state-of-art eddy current steam generator tubing examination practices that are being applied by all PWR licensees. Multiple frequency examination is specified and rules for digital systems are included.	L	This has no impact because practically all PWR licensees have long been examining steam generator tubing using the practices required by this revision.	N	N	N	N	N	N
153	entire Appendix	93	Section V has incorporated the Section XI Appendix IV with the exception of personnel requirements. This action deletes all of Appendix IV except for the personnel requirements and adds a reference to Section V in IWA-2233.	E							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

Appendix I

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
154	entire Appendix	93	Clarification by separating the requirements for requesting Interpretations, Code Cases, and Code changes.	L	All are "no change" except cost which could decrease because of making it easier to get the right information in the first submittal to the Code. This Appendix only covers administrative requirements related to Code changes and does not affect nuclear plants.	N	N	N	N	N	D
			Appendix VI								
155	entire Appendix	92	Deletes Appendix VI which covers ultrasonic examination of bolts and studs. The provisions of Appendix VI were included in Appendix VIII which was published in the 1989 Addenda.	E							
			Appendix VII								
156	2300,4300	92	These changes go along with the change to IWA-2300 (see Item No. 020) for referencing ASNT CP-189. CP-189 contains several of the Appendix VII provisions which this action now deletes.	L	See Item No. 020.	N	N	N	N	N	N
157	3300,4240	93	Clarifies the intent of "outside agency" and the annual training requirements.	L	A potential decrease in costs because the clarification of intent eliminates the cost of outside consultant hiring.	N	N	N	N	N	D
158	4220	93	Provides rules for training of UT personnel who were previously qualified prior to the rules of Appendix VII.	L	A decrease in cost by clarifying when prior training can be accepted for implementation of Appendix VII.	N	N	N	N	N	D
			Appendix VIII								
159	entire Appendix	89	This is a new mandatory appendix that covers qualification of ultrasonic examination systems (equipment, procedures, personnel) for both detection and measurement of flaws.	H	Since this is rated high, these factors are discussed in more detail in the "Analysis of a Significant Revision" in the front part of this Appendix.	I	D	D	I	I	I
160	3100	91	Revises the title of VIII-3100 from "Personnel Requirements" to "Qualification Test Requirements" to correctly describe its contents.	E							

Table 2. Summary and Evaluation of Section XI ASME BPV Code Changes, 1989 - 1994 Addenda (Continued)

"Appendix V"

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
161	4000, Supplement 1	92	References the recently issued ASTM E1324 for measuring ultrasonic instrument electronic characteristics. It shortens and revises Supplement 1 which contained details now included in the referenced ASTM standard. It also changes acceptable tolerances based on modeling and experimental data and provides for control of narrow band width systems. The referenced standard is included in the Item No. 008 revision to Table IWA 1600-1.	L	All are judged as "no change" because most of the action is editorial. There is only a minor change in technical requirements.	N	N	N	N	N	N
162	Supplements 4-7	91	Provides a 10% tolerance on qualification specimen thickness. It also provides editorial clarification of cladding requirements for qualification specimens for Supplements 5 and 8 and clarification of Table VIII-S8-1.	L	This reduces costs by providing more flexibility in the design and use of ultrasonic performance demonstration specimens.	N	N	N	N	N	D
163	Supplements 2-4,6,7,10-12	93	Adds performance demonstration requirements for dissimilar metal welds and overlay repair welds. Also changes flaw sizing acceptance to a Root Mean Square based criterion.	M	Since this is related to the Item No. 159 high rated change, these factors are discussed in more detail in the "Analysis of a Significant Revision" in the front part of this Appendix.	I	N	D	N	I	I
164	Supplement 8, 1.1(c)	94	This permits the location of qualification flaws for UT of bolting to be placed one bolt diameter from the end. It incorporates Case N-457, which is included in Regulatory Guide 1.147.	L	Cost decreases due to *not* having to run trials on multiple specimens to define the minimum metal path.	N	N	N	N	N	D
165	Supplement 13	94	Supplements 3, 5, 6, and 7 define separate demonstrations for RPV qualification. In some cases, the specific skills and techniques may apply to more than one application. This leads to duplication when a candidate performs demonstration for several supplements instead of just one. This new supplement reduces the number of flaws necessary for demonstration when a candidate performs demonstrations for multiple supplements.	L	Cost decreases through more efficient use of specimens. No other factors change.	N	N	N	N	N	D

Table 3. Summary and Evaluation of ASME OM Code Changes[1], 1990 Edition

"Subsection ISTA[2]"

11May95 Draft

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors[3]	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
001	1.1	The OM Code does not identify provisions for accessibility and inspectability, examination procedures, and reports in the scope.	E	The Section XI scope includes these requirements [IWA-1100(a)], however, since the scope does not provide requirements, this difference is insignificant.						
002	1.2	The OM Code jurisdiction does not cover complete power plants.	L	Section XI covers complete power plants as well as individual components that have met all the requirements of the construction code (Section XI, IWA-1200). However, since the OM Code addresses components, not systems, this difference is insignificant.	N	N	N	N	N	N
003	1.3.1	The OM Code refers to testing and examination.	E	Section XI refers to inspection and testing (IWA-1310).						
004	1.3.2	The OM Code does not discuss components classified to a higher class than required by the group classification criteria, piping that penetrates a containment vessel, nor non-nuclear safety class systems.	L	Section XI includes these requirements in IWA-1320. There is no significant impact, however, because it is the responsibility of the Owner to determine the appropriate Code class (OM Code, ISTA 1.4).	N	N	N	N	N	N
005	1.4	The OM Code does not include preparation of diagrams and system drawings identifying the extent of the areas of components subject to examination; maintenance of inspection records, such as diagrams, drawings, and evidence of personnel qualifications; and retention of inspection records; as responsibilities of the Owner.	L	Although Section XI, IWA-1400, includes these requirements, there is no significant impact. Specific diagrams or drawings identifying the areas subject to examination are not necessary. Snubber examinations are performed using design drawings (OM Code, ISTD 4.1). The OM Code requires retention of inspection records in ISTA 3. The OM Code requires personnel to be qualified in accordance with the Owner's QA program (ISTD 1.9).	N	N	N	N	N	N
006	1.5	The OM Code provisions for accessibility do not specifically include the following considerations: sufficient space for removal and storage of structural members, shielding and insulation; installation and support of handling machinery; and performance of alternate examinations in the event structural defects or indications are revealed which may require such examinations.	E	The OM Code does, however, require access for the inspector and examination personnel and equipment necessary to conduct the test or examination, which would cover these specifics identified in Section XI, IWA-1500.						

[1]i.e., changes in requirements in the ASME OM Code 1990 Edition from existing requirements in Section XI 1989 Edition and Standard Technical Specifications.

[2]Compared with Section XI, Subsection IWA.

[3]The impact of each item has been evaluated to be high (H), medium (M), low (L), editorial (E), or errata (ER). Each of the factors - safety, occupational exposure, exposure to the public, critical path, records, and cost - has been determined to increase (I), decrease (D), or not change (N) for each high, medium, or low item.

Item No.	Paragraph, Figure, Table	Description	Im pact	Explanation of Impact and Factors[3]	Saf ety	OccE xp	Pub Exp	Crit Path	Rec ord	Cost
007	1.6	The OM Code references the 1988 Addenda of ANSI/ASME N626.	L	Section XI references the 1987 Addenda. The only difference between the 1987 and 1988 Addenda is that the 1988 Addenda requires the ANII supervisor to be qualified as an "ANII supervisor".	P	N	N	N	N	N
Item No.	Paragraph, Figure, Table	Description	Im pact	Explanation of Impact and Factors	Saf ety	OccE xp	Pub Exp	Crit Path	Rec ord	Cost
008	2.1.1	The OM Code does not address the inspector duties to perform the following: -review the examination plan and any revisions to the plan during the preservice interval; -verify visual examinations, VT-3, have been performed and the results recorded; -verify that the examinations are performed by personnel employed by the Owner or the Owner's agent and are qualified; -require requalification of procedures or operators if the requirements are not being met; and -certify examination records after verifying the requirements have been met and records are correct.	L	Section XI, IWA-2110 includes these requirements. Safety may decrease due to decreased ANII involvement.	D	N	N	N	N	N
009	2.1.3	The OM Code requires the Owner to notify the inspector when specific tests or examinations will be performed.	E	Section XI, IWA-2130 requires the Owner to keep the inspector informed of the progress of the preparatory work necessary to permit inspections.						
010	N/A	The OM Code does not include the surface replication methods and surface cleaning requirements.	L	Surface replication methods are generally not used for snubber visual examinations. Cleaning is performed under the Owner QA program.	N	N	N	N	N	N
011	N/A	The OM Code does not provide for alternative examination methods.	L	Alternate examination methods are generally not used for snubber visual examinations.	N	N	N	N	N	N

[1]i.e., changes in requirements in the ASME OM Code 1990 Edition from existing requirements in Section XI 1989 Edition and Standard Technical Specifications.

[2]Compared with Section XI, Subsection IWA.

[3]The impact of each item has been evaluated to be high (H), medium (M), low (L), editorial (E), or errata (ER). Each of the factors - safety, occupational exposure, exposure to the public, critical path, records, and cost - has been determined to increase (I), decrease (D), or not change (N) for each high, medium, or low item.

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

"Subsection ISTA (continued)"

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
012	N/A	The OM Code deletes the VT-3 visual examination requirements for snubber testing and VT-3 personnel qualification. The licensee is required by the Code to qualify test personnel in accordance with his procedures or in accordance with an approved QA program.	M	Licensees are currently required by the regulations to perform snubber examinations in accordance with ASME Section XI. Section XI requires a VT-3 examination method. There may be a slight increase in plant risk as a result of potential inadequacies in training and qualifying personnel in accordance with licensee specific requirements in lieu of a industry standard. Additionally, there may be a decrease in the cost to the licensees due to the decrease in training, documentation, and required education levels. The qualification and training of personnel performing snubber inspections is, however, still required. Licensee qualification programs may meet, or even exceed, the VT-3 requirements. Additionally, the licensee would still be required to train and certify personnel that perform examinations required by Section XI (e.g., examinations of pump casings and valve bodies, reactor vessel interiors, and supports) in accordance with VT-3 requirements. There would be a limited increase in the NRC inspection burden due to the implementation of licensee specific qualification requirements versus the use of an industry standard.	D	N	N	N	D	D
013	2.2.1	The OM Code does not explain "related requirements".	E	Section XI, IWA-2411, Footnote 3 addresses related requirements.						
014	2.2.1	The OM Code requires the initial inservice test interval to comply with the edition and addenda of this section adopted by the regulatory authority 12 months prior to the issuance of the operating license.	L	The OM Code complies with the requirements in 10CFR50.55a(f)(4)(i).	N	N	N	N	N	N
015	2.2.2	The OM Code does not specify the requirements for the preservice test interval plan.	L	Preservice test interval plans are required and it is assumed that ISTA 2.2.2 will be used in their preparation.	N	N	N	N	N	N
016	2.2.3	The OM Code has deleted Inspection Program A.	L	Although, Section XI allows an Inspection Program A, the impact is low based on the OM Code test and examination frequencies which are independent of the length of the interval. Additionally, no US utilities are currently using Program A.	N	N	N	N	N	N
017	2.2.4	The OM Code does not address the use of Code Cases during the preservice examination or test intervals.	L	Code cases can be used as allowed by Regulatory Guide 1.147.	N	N	N	N	N	N
018	3.2.1	The OM Code has deleted the Section XI Owner responsibility to prepare summary reports for Class 1 and 2 snubbers, pumps and valves, Form NIS-1 for Class 1 and 2 snubber examinations, and preservice plans, schedules and records.	L	The OM Code requires documentation of examinations and tests. This documentation is available to the enforcement and regulatory authorities.	N	N	N	N	D	D

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

"Subsection ISTA (continued)"

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
019	3.2.2	The OM Code does not address the cover sheet requirements for schedules.	E	Schedules are part of Plans in accordance with 2.2.2 and cover sheet requirements are specified.						
020	3.3.1	The OM Code states that records shall be maintained for the service lifetime of the component.	E	ISTA 1.4(k), Owner's Responsibility, however, states that the records shall be maintained for the service lifetime of the system, as required by Section XI, IWA-6310.						
021	3.3.3	The OM Code does not address the requirement for maintaining test reports and schedules, pump and valve reports, and NDE procedures.	E							
022		The OM Code does not reference Section XI, IWA-4000 or 7000 for repairs and replacements of snubbers, pumps and valves.	L	Licensees are currently using Section XI rules and it is anticipated that this practice would continue in the absence of other rules. Therefore, all factors are no change.	N	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTA (continued)

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
023	1.1	The OM Code scope is not limited to Class 1, 2, or 3 pumps. The OM Code scope includes additional safety-related pumps.	L	Although the OM scope includes safety-related components, the regulations require the application of the ASME Codes to Class 1, 2, and 3 components. The proposed amendment does not include a change to the scope of the regulations for pumps and valves.	N	N	N	N	N	N
024	4.6.2(b)	The OM Code requires that when measuring differential pump pressure, a differential pressure gage or transmitter that provides direct measurement of pressure difference or by taking the difference between the pressure at a point in the inlet pipe and the pressure at a point in the discharge pipe shall be used.	E	Although Section XI states that the different methods of determining differential pressure may be used, there is no significance to this change.						
025	Remaining ISTB paragraphs	There are no differences, besides format, between the OM Code and Section XI.	E							
Subsection ISTC[2]										
026	1.1	The OM Code scope is not limited to Class 1, 2, or 3 valves. The OM Code scope includes additional safety-related valves.	L	Although the OM scope includes safety-related components, the regulations require the application of the ASME Codes to Class 1, 2, and 3 components. The proposed amendment does not include a change to the scope of the regulations for pumps and valves.	N	N	N	N	N	N
027	Remaining ISTC paragraphs	There are no differences, besides format, between the OM Code and Section XI.	E							
Subsection ISTD[3]										
028	1.1	The OM Code requirements apply only to Class 1, 2, and 3 and MC component snubbers.	L	The current regulations, § 50.55a, address only Class 1, 2, and 3 components. The Technical Specifications, however, apply to all safety-related snubbers. The Standard Technical Specifications and many Technical Specifications for newer plants apply to all snubbers, except those that are installed in non safety-related systems, and then only if their failure or the failure of the system on which they are installed has no adverse effect on any safety-related system. A change to the scope of the regulations is proposed to address all safety-related snubbers. This will result in no impact.	D	D	N	D	D	D
029	1.2	The OM Code specifically addresses Owner responsibilities.	L	The TS do not specifically address Owner responsibilities. However, there is no significant change in Owner responsibilities, as they are currently covered under the Owner Appendix B QA program.	N	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTB[1]

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
030	1.3.1	The OM Code ensures "operational readiness" of snubbers.	E	The STS and individual TS ensure "operability."						
031	1.3.2	The OM Code allows exemptions of certain snubbers if technical justification is provided in the inspection plan filed with the enforcement and regulatory authority.	M	The STS do not address snubber exemptions. Exemptions from the TS may, however, be authorized by the NRC. The Regulations [10CFR50.55a(a)(3)(i), (a)(3)(ii), (f)(6)(i), and (g)(6)(i)] require NRC authorization if relief from the Code requirements is sought. Some plant TS specifically state that snubber exemptions may be granted by the Commission. One older plant TS exempts snubbers greater than 50,000 lb. capacity and snubbers that are identified as "especially difficult to remove" or in "high radiation zones" from functional testing, provided they have been demonstrated operable during the previous tests. This plant has only four snubbers greater than 50,000 lb. capacity (used on reactor coolant pumps) and the licensee currently tests these snubbers. Additionally, the licensee has not exempted any safety-related snubbers based on removal difficulties or radiation. Although the licensee could exempt certain snubbers from testing and examination without prior Commission approval, the licensee has to provide technical justification for the exemptions and it is assumed that the exemptions would be approved by the Commission. A modification has been included to not allow exemptions under this paragraph, which will result in no impact.	D	D	N	N	D	D
032	1.4	The OM Code definition of repair and replacement is not consistent with Section XI.	L	There is no impact because the two codes are used independently.	N	N	N	N	N	N
033	1.5	The OM Code requires applicable design and operating information be available for use during the program.	E	This information is available in accordance with the Owner QA program.						
034	1.6, 1.7, 2.2, 3.3	The OM Code has specific documentation requirements for examination, test, maintenance and repair procedures and instructions and examination and test results.	L	There would be no significant change. Procedures, instructions, and results are covered under the QA program, although the specific requirements are not specified in the TS, they are included in most Owner programs.	N	N	N	N	N	N

[1]Compared with Section XI, Subsection IWP.

[2]Compared with Section XI, Subsection IWV.

[3]Compared with existing requirements [i.e., Section XI 1989 Edition, NUREG-0452, "Standard Technical Specifications for Westinghouse Pressurized Water Reactor," Revision 4, November 1981 or Revision 4a, 1987 (STS), and selected individual plant Technical Specifications (TS)].

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	PubExp	CritPath	Record	Cost
035	1.8	The OM Code only requires personnel qualification in accordance with the Owner procedures or a QA program approved by the Owner.	L	Licensees are currently required by the regulations to perform snubber examinations in accordance with ASME Section XI. Section XI, paragraphs IWF-5200 (a) and 5300 (a) specifically require a VT-3 examination method. There may be a slight increase in plant risk as a result of potential inadequacies in training and qualifying personnel in accordance with licensee specific requirements in lieu of an industry standard. Additionally, there may be a decrease in the cost to the licensees due to the decrease in training, documentation, and required education levels. The qualification and training of personnel performing snubber inspections is, however, still required. Licensee qualification programs may meet, or even exceed, the VT-3 requirements. There would be a limited increase in the NRC inspection burden due to the implementation of licensee specific qualification requirements versus the use of an industry standard.	D	N	N	N	D	D
036	1.9	The OM Code requires instrumentation and test equipment to have the range and accuracy to demonstrate conformance to specific examination or test requirements and be calibrated and controlled in accordance with the Owner procedures or a QA program approved by the Owner.	L	These requirements are also contained in Section XI. They are not, however, addressed in the TS. They are addressed, however, in the Owner Appendix B QA program.	N	N	N	N	N	N
037	1.9	The OM Code does not address test equipment failure.	L	The STS and many individual TS address test equipment failure. Test equipment failure may invalidate testing and allow testing to resume at a later time provided all snubbers tested with the failed equipment are retested. The Owner QA program, however, addresses nonconforming test equipment.	N	N	N	N	N	N
038	1.10	The OM Code states that snubbers shall not be subjected to maintenance or repair specifically to meet the examination or testing requirements prior to examination or testing.	L	Section XI only requires testing to be performed in the as-found condition to the extent possible. The STS do not address this requirement. One plant TS does not allow prior maintenance specifically for the purpose of meeting functional test requirements. Owner's procedures typically require testing in the as-found condition. There would be a small increase in safety because all tests and examinations would reflect the as-found condition.	I	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

"Subsection ISTD (continued)"

Item No.	Paragraph, Figure, Table	Description	Im pact	Explanation of Impact and Factors	Saf ety	OccE xp	Pub Exp	Crit Path	Rec ord	Cost
039	1.10	The OM Code requires replaced or modified snubbers to be tested in accordance with the applicable preservice examination and inservice examination and test requirements.	L	Section XI requires the inservice examination and testing acceptance criteria to be satisfied (OM, Part 4, 1.5.7). Additionally, Section XI (IWA-7530) requires a preservice examination in accordance with IWF-2200. Many plant TS require functional tests for replacement snubbers prior to installation in the unit. Mechanical snubbers are required to meet the acceptance criteria subsequent to their most recent service and a freedom-of-motion test must have been performed within 12 months before being installed in the unit. The TS do not specifically address "modified" snubbers. There is no significant impact. The TS and Owner QA procedures require tests and inspections to verify that activities have been satisfactorily accomplished and components are operable.	N	N	N	N	N	N
040	1.10	The OM Code requires an evaluation of the effects of maintenance and repair activities on the snubbers intended function. If the activities could alter the snubber ability to perform its intended function, the snubbers shall be tested and examined to ensure the function is verified to be acceptable.	L	The STS and many individual TS require functional tests if repair activities might affect the functional test results before installation in the unit. There would be an increase in documentation requirements as a result of the required maintenance or repair evaluation. There would be no significant impact on safety because Owner tests and QA programs require verification that components are returned to operable status.	N	N	N	N	I	I
041	1.11	The OM Code requires replacement or modified snubbers have a proven suitability for the application and environment, and be examined and tested in accordance with the Codes.	L	There is no significant impact. Many plant TS and the STS require functional tests for replacement snubbers prior to installation in the unit. Additionally, the requirements of Section XI, IWA-7220, "Verification of Acceptability," would apply.	N	N	N	N	N	N
042	1.12	The OM Code addresses snubbers deleted based on analysis. If the deleted snubber is unacceptable, the remaining snubbers in the failure mode group (FMG) are subject to corrective action. Unacceptable deleted snubbers shall be used in determining the next examination interval or additional testing requirements.	L	There is no significant change. Although the TS does not address deleted snubbers, corrective action is based on the number of unacceptable snubbers. The wording of the OM Code has been changed but the intent of the requirements is the same as in Section XI [OM Part 4, paragraph 2.3.5.4 and 3.2.5.1(d)].	N	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

"Subsection ISTD (continued)"

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
043	1.13	The OM Code addresses transient dynamic events and requires the affected systems and snubbers be reviewed and corrective action taken if the event may affect snubber operability. Any actions taken are independent of the Code examination and testing requirements (e.g., additional tests, examination intervals). There are no implementation schedule requirements.	L	Section XI does not address transient dynamic events. The STS and many individual TS discuss transient event inspections. The TS specify that only snubbers attached to sections of systems that have experienced unexpected, potentially damaging transients be visually inspected within 6 months of the transient. One plant TS requires the inspection during the next scheduled visual inspection. One plant TS requires the inspection within 72 hours for accessible areas and 6 months for inaccessible areas. Many older plant TS do not address transient events. There would be a small increase in safety and record keeping because all plants snubber programs would address transient events. Most plant procedures, however, currently address transient event evaluations.	I	N	N	N	I	I
044	1.13	The OM Code does not address snubbers that appear inoperable during post-maintenance inspections and area walkdowns.	L	Some plant TS state that snubbers that appear inoperable during post-maintenance inspections, area walkdowns or transient event inspections shall not be considered inoperable when determining subsequent test intervals, provided the cause is established and remedied for any generally susceptible snubbers. There is no significant impact because most plants would consider this to be outside the scope of the Code.	N	N	N	N	N	N
045	1.14	The OM Code requires an evaluation of the system or component for possible damage when a snubber is unacceptable.	L	There is no significant impact. The STS's Limiting Conditions of Operation (LCO) require, within 72 hours, the inoperable snubber be restored to operable status and an engineering evaluation on the attached component be performed, or declare the attached system inoperable. Older individual TS require plant shutdown if the snubber cannot be restored with 72 hours. Some plant TS require an evaluation to justify continued operation with an unacceptable snubber. If continued operation cannot be justified the TS action requirements shall be met.	N	N	N	N	N	N
046	1.15	The OM Code specifies which records are to be maintained and controlled.	L	The OM Code includes test equipment identification which is not included in Section XI. There is no significant impact. Although the TS do not specifically address these records, they are addressed in the Owner QA program.	N	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
047	2.1	The OM Code limits the examination boundary from snubber pin to pin, inclusive.	L	Section XI, paragraph IWF-5200 (c) and 5300 (c), however, additionally requires examination of other snubber parts (i.e., integral and nonintegral attachments for snubbers, including lugs, bolting, pins, and clamps). The STS require an inspection to ensure the attachments to the foundation or supporting structure, and fasteners for attachment of the snubber to the component and snubber anchorage are functional. In addition to the requirements of the OM Code, a limited number of snubber mechanical attachments will be examined in accordance with Section XI, IWF-2000 (i.e., 25% of Class 1, 15% of Class 2, and 10% of Class 3). However, there would be a decrease in safety, because all snubber attachments to the supporting structure and component would no longer be required to be examined by Section XI or the Technical Specifications.	D	D	N	N	N	D
048	3.1	The OM Code requires testing at a load sufficient to verify the operating parameters. Testing at less than rated load must be correlated to operability parameters at rated load.	L	The TS do not specify test loads. There would be an increase in safety and record keeping due to testing at rated load and preparing an evaluation.	I	N	N	N	I	I
049	3.2	The OM Code allows correction factors to be used when the installed operating and test conditions differ. Test results must be correlated to operating conditions.	L	The TS do not address test conditions. Safety would increase based on evaluating test results which are correlated to operating conditions.	I	N	N	N	I	I
050	4 and 5	The OM Code specifies preservice examination and operability test requirements.	L	The TS do not address preservice tests and examinations. 10CFR50.34, App. A and App. B, as well as Regulatory Guide 1.68, address plant startup testing. However, these requirements do not include specifics. Safety would increase as a result of uniform preservice test and examination requirements.	I	N	N	N	N	N
	4.1	The OM Code specifies preservice examination requirements, including damage or impaired operability, snubber installation in accordance with design drawings and specifications, adequate swing clearance, fluid levels, structural connection installation.								
	4.2	The OM Code requires reexamination if the initial system preoperational test exceeds the preservice examination by more than 6 months.								
	4.3	The OM Code requires preservice thermal movement examinations. *(continued on next page)*								

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
050	5.2	The OM Code preservice test includes the same parameters as the inservice tests.								
	5.3	The OM Code differentiates between design and other deficiencies and specifies how they are to be corrected.								
051	6.1	The OM Code objective is to require a visual examination to identify physical damage, leakage, corrosion, or degradation from environmental exposure or operating conditions. The OM Code additionally requires an examination of external features that may indicate snubber operability.	E	The STS require verification that (1) there are no visible indications of damage or impaired operability, (2) attachments to the foundation or supporting structure are functional, and (3) fasteners for attachment of the snubber to the component and to the anchorage are functional.						
052	6.2	The OM Code allows the categorization of snubbers as accessible and inaccessible for examinations. The OM Code limits this categorization to inservice examinations.	E	Section XI allows this categorization to also apply to preservice examinations. The STS provides additional clarification that the snubber is inaccessible during reactor operation.						
053	6.3.1	The OM Code requires snubbers to be installed such that when activated, they are capable of restraining movement. Snubbers that are incapable shall be unacceptable. The OM Code requires an evaluation of conditions that might interfere with proper restraint of movement.	L	Section XI requires snubbers to be installed so that they can carry the load. Section XI, as well as the OM Code, require observation of loose fasteners, deformed members, and disconnected components. The STS require verification that (1) there are no visible indications of damage or impaired operability, (2) attachments to the foundation or supporting structure are functional, and (3) fasteners for attachment of the snubber to the component and to the anchorage are functional. Additionally, the 1990 vintage STS and many individual TS require manually induced snubber movement to verify freedom of movement (if the snubber does not have to be disconnected to exercise). For those plants whose TS require manually stroking snubbers as part of the inservice examination, there would be a small decrease in safety and radiation exposure for test personnel.	D	D	N	N	N	D
054	6.3.2	The OM Code requires snubbers to be installed such that thermal movement is not restricted which could cause overstressing of the pipe or equipment.	E	The TS require no visible indications of damage or impaired operability.						

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

"Subsection ISTD (continued)"

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
055	6.3.3	The OM Code requires snubbers to be free of defects that may be generic to particular designs as may be detected by visual examinations such as observation of fluid supply or content. If the fluid level is less than the minimum amount, a test may be performed to change the classification from unacceptable to acceptable. The test shall be performed with the piston in the as-found setting and in the extension (tension) direction. The OM Code also allows the test to be performed in a mode that closely resembles the operating and design requirements of the snubber in lieu of testing in the extension direction.	L	The TS require visual examinations. Some individual TS require, when the fluid port of a hydraulic snubber is found uncovered, the test is to be performed with the piston in the as-found setting, extending the rod in the tension mode direction. One TS allows the steam generator snubbers to be inspected independently if inoperability is due to excessive fluid leakage from external tubing. The STS and many individual TS require snubbers connected to an inoperable common fluid reservoir to be counted as inoperable snubbers. One plant TS allows inoperable snubbers connected to a common reservoir to represent one failure unless multiple individual failures are evident.	N	N	N	N	N	N
056	6.4	The OM Code allows snubbers that are unacceptable as a result of visual examinations to be tested and recategorized as acceptable, provided the testing can show that the unacceptable condition did not affect operability. The OM Code does not require the cause of the rejection to be remedied for generally susceptible snubbers.	L	The STS and most individual TS additionally require that the cause of the rejection be clearly remedied for that snubber and other snubbers, irrespective of type, that may be generically susceptible.	D	D	N	D	D	D
057	6.5.1	The OM Code requires the initial inservice examination to be started not less than 2 months after 5% power operation, and to be completed within 12 months after 5% power operation.	L	The STS and numerous individual TS require the first inservice visual inspection to be performed after 4 months, but within 10 months of commencing power operation (i.e., >5% rated thermal power). One TS required the initial visual inspections to be performed after 4 months but within 6 months of initial criticality.	N	N	N	N	N	N
058	6.5.2	The OM Code requires subsequent examinations at 18-month intervals unless unacceptable snubbers are found. Then the interval is decreased with increasing number of unacceptable snubbers in accordance with Table ISTD 6.5.2-1. The OM Code allows an alternate schedule if technical justification is accepted by the regulatory authority.	L	Generic Letter 90-09 provides an alternate interval schedule to the OM Code/Section XI which is based on the number of unacceptable snubbers in relation to the snubber population and a fuel cycle up to 24 months. Many individual TS have incorporated this alternate schedule. The STS and most plant TS follow the same interval schedule as the OM Code.	N	N	N	N	N	N
059	6.5.3	The OM Code requires the time to subsequent examination not be lengthened more than one increment at a time.	L	Section XI, the STS, and most individual TS also contain this requirement. If a generic problem has been identified and corrected, the STS and some individual TS allow the interval to be lengthened one step the first time and two steps thereafter, provided no inoperable snubbers of that type are found. One plant TS allows the interval to be lengthened up to two steps per inspection. The impact is low and no factors change because the OM Code allows snubbers to be assigned to failure mode groups (FMGs) and the examination intervals are determined for each FMG and not the total snubber population.	N	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	Qual Exp	Pub Exp	Crit Path	Record	Cost
060	6.6.1	The OM Code requires examination of all snubbers of all groups (accessible and inaccessible) for the initial examination.	E	Section XI, the STS, and most individual TS also contain this requirement.						
061	6.6.2	The OM Code requires subsequent examination of all snubbers of all groups. The OM Code allows the sample size to be reduced after two successful examination intervals at the maximum time interval (18 months), provided the Owner justifies the reduction and it is accepted by the regulatory authority. The OM Code also allows the sample size to be reduced after two successive intervals at 12 months for plants on annual refueling cycles.	L	The STS do not allow the sample size to be reduced. There is no impact because, although the OM Code allows sample size reduction, NRC acceptance is required.	N	N	N	N	N	N
062	6.7	The OM Code requires the cause of unacceptable snubbers to be determined, and for snubbers to be categorized into examination FMGs. The OM Code and Section XI specify the FMG to be used (e.g., design/manufacturing, application induced) and the FMG boundaries.	L	Although the TS do not address "FMGs", there is no significant impact because the STS and most individual TS require that the cause of the rejection be clearly established and remedied for that snubber and other snubbers, irrespective of type, that may be generically susceptible.	N	N	N	N	N	N
063	6.8	The OM Code provides FMG corrective actions including the impact on the subsequent examination schedule. It allows snubbers to be categorized as acceptable for the purpose of establishing the next examination interval by replacing or modifying all susceptible snubbers.	L	The TS allow snubbers that are unacceptable as a result of visual examinations to be tested and recategorized as acceptable, provided the testing can show that the unacceptable condition did not affect operability. The STS and most individual TS additionally require that the cause of the rejection be clearly established and remedied for that snubber and other snubbers, irrespective of type, that may be generically susceptible. Although the OM Code does not require testing, all susceptible snubbers will be replaced or modified.	N	N	N	N	D	D
064	7.1	The OM Code requires snubbers to be tested to verify the breakaway or drag force or both as required by the Owner procedures.	L	The STS and many individual TS require breakaway and drag tests for mechanical snubbers only. Some plant TS, however, do not specifically limit drag and breakaway tests to mechanical snubbers. Additionally, one plant TS and the 1980 vintage STS require the drag force not to increase more than 50% of previously measured values. One plant TS states that an increase of 50% is an indication of impending failure. There is no significant impact because, although the TS require breakaway and drag tests for mechanical snubbers only, the OM Code requires these tests only if required by the Owner procedures. The Code Committee is considering a change to limit these tests to mechanical snubbers. The test acceptance criteria is established by the Owner.	N	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Description	Im pact	Explanation of Impact and Factors	Saf ety	OccE xp	Pub Exp	Crit Path	Rec ord	Cost
065	7.1	The OM Code requires snubbers to be tested to verify the activation velocity or acceleration, bleed or release rate, and for units designed not to displace under continuous load; the ability to withstand load without displacement.	L	Some individual TS do not require demonstration of the ability to withstand load without displacement for those snubbers designed not to displace under continuous load. One individual TS only requires bleed/release tests for hydraulic snubbers. One plant TS does not specifically address what functional tests are to be performed. One plant TS also requires a verification of the snubber fasteners for snubbers selected for functional tests. There would be an increase in testing requirements and safety for some plants.	I	I	N	I	N	I
066	7.2.1	The OM Code requires the snubbers to be tested as found, to the fullest extent practicable.	L	Although, the TS do not specify this requirement, plants typically require this. There would be a small increase in safety because all tests would reflect as-found conditions.	I	N	N	N	N	N
067	7.2.2	The OM Code requires that the test methods shall not alter the snubber condition to the extent that the results are not representative of the parameters before the test.	L	The TS do not specify this requirement. There would be an increase in safety because the test results would reflect the snubber condition.	I	N	N	N	N	N
068	7.2.3, 7.2.4	The OM Code allows in-place or bench testing, provided the reinstalled snubbers undergo a limited preservice examination (ISTD 4.1(a)).	L	The TS allow either method of testing but do not address preservice examinations of "reinstalled" snubbers. There is no impact because the Owner QA program assures that reinstalled snubbers are installed correctly.	N	N	N	N	N	N
069	7.2.5	The OM Code allows the testing and examination of snubber subcomponents when limitations, due to size, test equipment or accessibility, prevent in-place or bench testing.	L	The TS do not address testing and examination of snubber subcomponents. This allowance will reduce the number of exemptions.	N	N	N	N	D	D
070	7.2.6	The OM Code allows the correlation of indirect measurements.	E	Section XI, the STS, and most individual TS also allow the correlation of indirect measurements.						
071	7.2.7	The OM Code requires each snubber of a parallel or multiple installation be identified and counted individually.	L	Although the TS do not specifically address this, the TS require each snubber to be demonstrated operable.	N	N	N	N	N	N
072	7.2.8	The OM Code requires fractional sample sizes to be rounded up.	E	The TS do not specifically address this.						

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

"Subsection ISTD (continued)"

Num No.	Paragraph, Figure, Table	Description	Im pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Crit Path	Rec ord	Cost
073	7.3	The OM Code allows qualitative testing in lieu of quantitative testing, provided the justification is acceptable to the regulatory authority. The OM Code requires the Owner to obtain data to demonstrate the ability of the parameter in question to be within the specification over the life of the snubber.	L	Section XI also allows qualitative testing. Section XI requires the Owner to justify the ability of the parameter to be within the specification. The TS do not address this option. However, there is no significant impact. Regulatory authority acceptance is required. 10CFR50.55a has allowed alternate testing that provides an acceptable level of quality and safety through the submittal of relief requests.	N	N	N	N	N	N
074	7.4	The OM Code requires testing a sample of snubbers at least every refueling outage.	E	The STS require testing a sample at least once per 18 months during shutdown. Some individual TS require testing once per cycle or each refueling outage.						
075	7.5	The OM Code requires unacceptable snubbers to be evaluated to determine the cause of the failure and categorized into test Failure Mode Groups (FMG).The OM Code FMG includes all unacceptable snubbers with a given failure mode and all other snubbers with similar potential for similar failure.	L	Section XI FMG includes all unacceptable snubbers with a given failure mode and all other snubbers subject to the same failure mode. The OM Code and Section XI specify the FMGs to be used (e.g., design, application induced) and the test boundaries. There would be no significant change. Although the STS and most individual TS do not address the use of test "FMGs", an engineering evaluation of each failure is required to be made to determine the cause of the failure. The results of the evaluation are used to determine the snubbers to be tested, irrespective of type, which may be subject to the same failure mode. One of the plant TS reviewed allowed snubbers to be categorized into test FMGs and separated for continued testing apart from the general population. The TS, however, does not specify the FMGs to be used.	N	N	N	N	N	N
076	7.6	The OM Code requires snubbers that do not meet the operability or qualitative test acceptance criteria (ISTD 7.1 or 7.3) to be subjected to corrective actions with their indicated impact on continued testing. The OM Code also requires the provisions of ISTD 1.10 and 1.11 to apply (Snubber Maintenance or Repair).	L	Section XI requires only those snubbers that have been found unacceptable by operability testing (OM Part 4, 3.2.1.1) to be subject to the 10%, 37 or 55 Sample Plans corrective actions with their indicated impacted on continued testing. The TS require snubbers which fail the functional test criteria to be repaired or replaced and additional snubbers tested. There is no significant change because the TS currently require snubbers which fail the functional test criteria to be repaired or replaced and additional snubbers tested.	N	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
077	7.7.1	The OM Code allows either the 10% or 37 testing sample plan.	L	Section XI and some individual TS also allow the 55 testing sample plan in addition to the 10% and 37 plans. Many individual TS specify only the 10% plan. There may be a decrease in the number of snubbers tested for those plants which can only utilize the 10% Plan, (they will now be able to use the 37 plan which requires fewer snubbers to be tested when the defined test group has more then 370 snubbers). Although there are individual TS that include the 55 plan. Those TS that include the 55 plan, however, also include a reject line in the 37 plan. Without the reject line, as in the OM Code version of the 37 plan, the 55 plan would require more testing and probably would not be chosen. There are two plants that utilize alternate sample plans. One utilizes an 88 sample plan and another utilizes a 105 sample plan. Alternate plans may be authorized by 50.55a(a)(3).	D	D	N	D	D	D
078	7.7.2, 7.7.4	The OM Code requires the plan used for each defined test plan group (snubber type for the TS) to be selected before testing for a given test interval begins, and that the selected plan be used through the test interval.	E	Individual TS that have multiple sample plans also contain this requirement. Section XI does not address this.						
079	7.7.2	The OM Code requires the Owner to file the plans and schedules with the enforcement and regulatory authority (ISTA 1.4(c)). The OM Code does not require the Owner to file the test plan selected with the NRC prior to the test period.	L	Individual TS require the Owner to notify the NRC Regional Administrators in writing of the plan selected for each snubber type prior to the test period, or the sample plan used in the prior test period shall be implemented.	N	N	N	N	N	N
080	7.7.3	The OM Code requires the defined test plan group to encompass all snubbers and shall be based on similarities of design or application. The snubbers may be grouped by size, type, design, application or other means determined by engineering evaluation.	L	Section XI and the TS do not specify "defined test plan groups." The TS, however, require a representative sample from each type of snubber (i.e., same design and manufacturer).	N	N	N	N	N	N
081	7.8.1	<u>10% Test Plan</u> The OM Code requires a representative, random sample of 10% of the snubbers in the defined test plan group (snubbers may be grouped by size, type, design, application, or other means).	L	Section XI requires a representative, random sample of 10% of the snubbers in the general population. The STS require a representative, random sample of 10% of each type (i.e., same design and manufacturer, irrespective of capacity). Some individual TS require a sample of 10% of hydraulic and 10% of mechanical snubbers. The OM Code, Section XI, STS and individual TS specify the sample to include various configurations, operating environments, sizes and capacity, as practical. Therefore, there is no significant change.	N	N	N	N	N	N
082	7.8.1	Additionally, the OM Code requires the first sample lot to be a composite based on the ratio of each particular category to the total number of snubbers in the defined test plan group.	E	Section XI requires the ratio to be based on the total number of snubbers installed in the plant. The STS and individual TS require the sample tested to be representative.						

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

"Subsection ISTD (continued)"

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
083	7.8.2	The OM Code requires for any snubber(s) determined to be unacceptable as a result of testing, an additional sample of at least one-half the size of the initial sample until the total number tested is equal to the initial sample size multiplied by (1 + C/2), where C is the total number of snubbers found to be unacceptable. The OM Code allows testing to cease when all the snubbers in the FMG have been tested.	M	The STS and many individual TS require, for each unacceptable snubber of a type (i.e., same design and manufacturer), an additional 10% of that type be tested until no more failures are found or all snubbers of that type have been tested. If the additional sampling is required due to failure of only one type of snubber, the test results shall be reviewed to determine if the additional samples should be limited to that type of snubber. Some individual TS require an additional 5% of that type be tested for each unacceptable snubber until there are no more failures found, or all snubbers of that type have been tested. For each unacceptable snubber, an additional 5% of the initial defined test plan group sample size would be required to be tested instead of 10% of the number of snubbers of the type that was unacceptable. The licensees are able to designate more defined test plan groups, containing smaller numbers of snubbers, than groups of snubber "types". Licensees would be required to test substantially less snubbers if unacceptable snubbers are found. Additionally, based on SNUG data from 1975-1988, there were numerous unacceptable mechanical snubbers due to failure to lockup. The Code change would have resulted in significantly less inspections/tests. There may be an increase in plant risk for those plants whose Technical Specifications require testing of an additional 10% for each unacceptable snubber, due to the decreased number of snubbers periodically tested and examined, and the potential for component failure due to a undetected snubber failure. There would be no increase in risk for the many plants whose Technical Specifications require an additional 5% for each unacceptable snubber. The occupational exposure would be reduced due to the reduction in testing and examinations. There would be a substantial decrease in cost. The average plant has 730 snubbers and has 5 snubbers that fail the functional test each outage*. Assuming a test cost of $2,000/snubber** and an average of 1.5 years between refueling outages, the average decrease in cost per plant would be $240,000 per year (5/1.5 x 10%/2 x 730 snubbers x $2,000). *NUREG/CR-5386, "Basis for Snubber Aging Research: Nuclear Plant Aging Research Program," D. Brown, G. Palmer, E. Werry, January, 1990.	D	D	N	N	D	D

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition: (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Description	Im pact	Explanation of Impact and Factors	Saf ety	OccE xp	Pub Exp	Crit Path	Rec ord	Cost
084	7.8.3	The OM Code specifies the composition of the additional test lots required as a result of unacceptable snubbers.	L	Many plant TS and the STS require the engineering evaluation of each failure be used in selecting snubbers to be tested. There is no significant change. The OM Code simply identifies the elements of an engineering evaluation.	N	N	N	N	N	N
085	7.8.4	The OM Code requires subsequent test interval snubbers to be selected in accordance with paragraph ISTD 7.8.1, 2, and 3.	M	The STS and most individual TS require snubbers placed in the same locations as snubbers which failed the previous test to be retested (but they cannot be included (counted) in the sample plan). The OM Code has deleted the Technical Specification requirement of most plants to test snubbers placed in the same location as snubbers which failed the previous functional test, without counting them in the sample plan. Licensees would be required to modify their snubber selection procedures and would test less snubbers. There may be an increase in plant risk due to potential snubber and ultimately component failure which may be caused by the snubbers operating environment or by a failure mode for which the corrective action was ineffective. The occupational exposure would be reduced due to the reduction in testing and examinations. There would be a small decrease in cost. The average plant has 730 snubbers and has 5 snubbers that fail the functional test each outage. Assuming a test cost of $2,000 per snubber and an average of 1.5 years between refueling outages, the average decrease in cost per plant would be $6,700 per year (5/1.5 x $2,000). A modification to the OM Code to require testing snubbers in the same location as snubbers that failed the previous functional test has been included to address this safety concern.	D	D	N	D	D	D

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
086	7.9	The OM Code provides corrective action requirements or FMGs and the impact on determining additional testing lots. One option for Design, Manufacturing, Maintenance, Repair, Installation, and Application Induced FMGs includes replacing or modifying all snubbers in the test FMG and declaring them operable in lieu of replacing or modifying only the unacceptable snubbers and determining additional test lots based on the number of unacceptable snubbers. The OM Code requires snubbers to be replaced or modified in accordance with paragraph ISTD 1.11.	L	Section XI, paragraph IWF-5400 references paragraph IWA-7000 which provides rules for replacements. Section XI explicitly states for application induced or isolated FMGs, the unacceptable snubbers that are reclassified as acceptable are not counted for the purpose of determining the number of additional sample lots. This could be implied in the OM Code. The TS require only inoperable snubbers to be replaced or restored and there is no provisions for recategorizing them as operable. One plant TS that addresses FMGs requires the number of unacceptable snubbers be used in determining additional test lots. It does not address recategorizing snubbers as acceptable (ISTD 7.9.1 (a) and (c)). The OM Code allows replacing or modifying all susceptible snubbers in lieu of performing additional tests which would result in less testing, however, more replacements and modifications. Therefore, the result would be no impact.	N	N	N	N	N	N
087	7.10	<u>37 Test Plan</u> The OM Code requires an initial random sample of 37 snubbers from the defined test plan group. Additional samples shall be randomly selected from the remaining population of the defined test plan group.	L	Section XI and one individual TS require samples from the general snubber population. The STS and many individual TS require samples from each type (i.e., same design and manufacturer) of snubber. Section XI also addresses subsequent test intervals sample selection (OM Part 4, 3.2.3.2(d)). This change would result in testing more snubbers initially, if the Owner chose to identify more defined test plan groups than snubber "types". 37 snubbers per type or defined test plan group are required to be tested. However, the 37 test plan would probably not be chosen by the Owner because more snubbers would be required to be tested. Therefore, there is no significant change.	N	N	N	N	N	N

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

"Subsection ISTD (continued)"

Item No.	Paragraph, Figure, Table	Description	Impact	Explanation of Impact and Factors	Safety	OccExp	Pub Exp	Crit Path	Record	Cost
088	7.11	The OM Code requires a supplemental test lot for each independent FMG from the defined test plan group (general population). The OM Code states that failures in the supplemental test lot require additional testing in the defined test plan unless an engineering evaluation indicates that another grouping is appropriate.	L	Section XI requires continued testing in any separate FMG be performed in accordance with paragraph 3.2.2 of OM, Part 4 (Inservice Operability Test Frequency). The STS do not address FMGs. Additional test lots are required for each unacceptable snubber. The Plant TS that does address FMGs requires that each FMG be counted as one unacceptable snubber for additional testing in the general population, and any additional unacceptable snubbers be counted for continued testing only for that FMG. This change may result in less additional snubbers required to be tested as a result of unacceptable snubbers in FMGs that contain a limited number of snubbers.	D	D	N	D	D	D
089	7.12	The OM Code requires testing to satisfy the inequality [N≥36.49+18.18C]. The OM Code redefines the variables N and C for independent FMGs.	L	Section XI and the individual TS that have a 37 plan also include a reject inequality, which requires all snubbers to be tested if the criteria is exceeded. Section XI and one plant TS require FMGs, but do not provide an explanation on applying the inequality (i.e., the Figure) to FMGs. The TS do not address FMGs. Although there is no "reject line" in the OM Code, the OM Code requires 100% testing if the "accept line" is not crossed. The reject line is crossed when ≥6.5% of snubbers fail. This failure rate will most likely result in extended testing.	D	D	N	D	D	D
090	7.12	The OM Code requires each snubber to be evaluated in its assigned order in the random sample.	L	Section XI requires the evaluation at the end of each lots testing. The STS require an evaluation at the end of each day testing. This change allows in process evaluation, allowing testing to stop once the inequality is satisfied. There is no change because most Owners discontinue testing for the day once the equality is satisfied.	N	N	N	N	N	N
091	7.13	The OM Code provides corrective action requirements for each FMG and the impact on determining additional testing requirements. Either all snubbers in the FMG must be replaced or modified or only the unacceptable snubbers must be repaired.	L	The STS do not address FMGs. The STS and the individual TS, however, require the inoperable snubbers to be replaced or restored, or declare the supported system inoperable. Therefore, there would be no significant change.	N	N	N	N	N	N
092	N/A	The OM Code does not address service life monitoring.	H	The STS and most individual TS require a snubber service life monitoring program to ensure that the service life is not exceeded between surveillance intervals. Since this change is rated high, these factors are discussed in more detail in the "Analysis of a Significant Revision" in the front part of this Appendix. The proposed amendment includes a modification to require a service life monitoring program.	D	D	I	D	D	D

Table 3. Summary and Evaluation of ASME OM Code Changes, 1990 Edition (Continued)

Subsection ISTD (continued)

Table 4. Summary and Evaluation of ASME OM Code Changes*, 1992 & 1994 Addenda & 1995 Edition

Subsection ISTB*

11Apr95 Draft

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors**	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
001	1.3	94	Adds definitions of Group A and B pumps, preservice test, reference point, and trending. Revises definitions of instrument accuracy, operational readiness, preservice test period, and reference values.	E	Definitions do not provide requirements.						
002	3.1	94	Requires Owner to categorize and identify pumps as Group A or B.	L	Group A pumps are those that are routinely operated. Group B pumps are those that are not routinely operated (i.e., standby pumps). Owners would be required to categorize pumps and include this information in their IST plans.	N	N	N	N	N	N
003	3.2	94	Revises to address Group A and B tests. Bypass loop may be used for Group B tests provided bypass loop can accommodate flow rate and time limitations for minimum flow. For Group A or comprehensive tests, it requires +/- 20% of design flow.	L	Bypass/test loops would have to be modified to accommodate the higher flowrates for a limited number of pumps or relief requests would have to be submitted (e.g., containment spray pumps in most PWRs).	I	I	N	I	I	I
004	4	94	Adds introduction to paragraph. Allows substitution of tests with more stringent requirements.	L	This allows flexibility in testing.	N	N	N	N	N	N
005	4.1	94	Revises preservice testing to require establishment of reference curves for centrifugal and vertical line shaft pumps.	L	Additional testing to develop pump curves would be required.	I	I	N	I	I	I
006	4.1-1 Table	95	"Differential" corrected to "differential pressure" in Note 1.	ER							
007	4.2	94	Adds reference to Groups A, B, and comprehensive tests for inservice test requirements.	E							
008	4.3	94	Requires reference values be established within ±20% of pump design flow for comprehensive test and when practical for Group A and B tests.	L	Bypass/test loops would have to be modified to accommodate the higher flowrates for a limited number of pumps or relief requests would have to be submitted (e.g., containment spray pumps in most PWRs).	I	I	N	I	I	I
009	4.4	94	Requires comprehensive or Group A test after replacement, repair, or maintenance.	E	No change to existing test requirements.						
010	4.5	94	Allows the establishment of an additional set of reference values based on previously developed pump curves.	L	Allows extrapolation between data points.	N	D	N	N	D	D

*The changes from requirements in the 1990 Edition of the ASME OM Code are summarized.

**The impact of each item has been evaluated to be high (H), medium (M), low (L), editorial (E), or errata (ER). Each of the factors - safety, occupational exposure, exposure to the public, critical path, records, and cost - has been determined to increase (I), decrease (D), or not change (N) for each high, medium, or low item.

Item No.	Paragraph, Figure, Table	Year	Description	Im pact	Explanation of Impact and Factors	Saf ety	Occ Exp	Pub Exp	Crit Path	Rec ord	Cost
011	4.6	94	Adds new paragraph to allow analysis to be used for justifying a new set of reference values even though pump may be in alert or action range.	L	The prior Addenda implicitly allowed analysis to be used for new reference values.	N	N	N	N	N	N
012	4.5	95	Reference to ISTB 6.1, Trending, corrected to ISTB 6.2, Acceptance Criteria.	ER						-	
013	4.7	94	Prior Paragraph 4.6, "Instrumentation," renumbered and renamed to 4.7, "Data Collection."	E							
014	4.7.1(a)	94	Allows parameters to be determined by analytical method.	L	ISTB 4.6.5 currently allows flow rate to be determined analytically.	N	N	N	N	N	N
015	4.7.1-1 Table	94	Requires more accurate pressure instruments for comprehensive and preservice tests.	L	Some pressure instruments may have to be replaced.	N	I	N	I	I	I
016	4.7.1(b)(2)	94	Replaces "shall not" with "does not".	E							
017	4.7.2,4.6.3, 4.7.4,4.6.5	94	"Measurement" deleted from titles and other minor rewording.	E							
018	5.1	94	Requires biennial tests as well as quarterly.	L	The biennial comprehensive test may be performed in lieu of the more limited quarterly test per ISTB4.	N	N	N	N	N	N
019	5.2	94	Subdivides paragraph to address Group A, B and comprehensive tests separately.	E	The impact of each subparagraph is given below through Item No. 19.						
020	5.2.1(a),5.2.2(a) 5.2.3(a)	94	Allows ±1% variance in pump speed.	L	Most utilities factor in some variance.	N	N	N	N	N	N
021	5.2.1(b),5.2.3(b)	94	Requires determination of flow after discharge pressure is equal to reference point for positive displacement pumps.	L	No change in most plants test procedures.	N	N	N	N	N	N
022	5.2.1(c),5.2.3(c)	94	New paragraph explains that vibration measurements are to be compared to both relative and absolute acceptance criteria.	E	Requirements currently contained in Table 5.2-2.						
023	5.2.1(e),5.2.2(d) 5.2.3(e)	95	Reference to ISTB 6.1, Trending, corrected to ISTB 6.2, Acceptance Criteria.	ER							

*The changes from requirements in the 1990 Edition of the ASME OM Code are summarized.

**The impact of each item has been evaluated to be high (H), medium (M), low (L), editorial (E), or errata (ER). Each of the factors - safety, occupational exposure, exposure to the public, critical path, records, and cost - has been determined to increase (I), decrease (D), or not change (N) for each high, medium, or low item.

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
024	5.2.2(b)	94	Requires measurement of either pressure or flowrate for Group B tests. Only flowrate is required for positive displacement pumps.	L	Test requires less data to be taken.	D	D	N	N	D	D
025	5.2.3-1 Table	95	Second test parameter, Δ, corrected to ΔP.	ER							
026	5.3	94	Revision limits paragraph on pumps in regular use to Group A pumps.	E	Group B pumps are not normally operating.						
027	5.4	94	Within 3 months "of placing the system" is replaced with "before the system is placed" in an operable status.	E							
028	5.5	94	Limits this paragraph on pumps lacking required fluid inventory to Group B pumps.	E	Pumps that lack the required fluid inventory are never Group A pumps.						
029	5.6	94	Eliminates requirement for the pumps to be run at least 2 minutes for the Group B test.	L	Stable conditions must be established before taking measurements.	N	N	N	N	N	N
030	6.1	94	New Paragraph: Requires trending of parameters in Table 4.1-1.	L	Most licensees currently use trending programs. The change does not specify what to do with the results of trending.	N	N	N	N	N	N
031	6.2	94	Old Paragraph 6.1 renumbered and broken down into three subheadings	E							
032	6.2.1	94	New paragraph on Alert Range.	E	Same requirement as before with additional Table identified.						
033	6.2.2	94	New paragraph on Action Range which allows analysis to be used to determine new reference values.	L	Prior addenda implicitly allowed analysis to be used for new reference values.	N	N	N	N	N	N
034	6.2.3	94	New paragraph on Systematic Error which allows retest for systematic error during testing.	L	Only instrument recalibration was addressed previously.	N	N	N	N	N	N
035	7.2	94	Adds to IST Plan records: identification of pumps subject to testing and pump category.	L	Additional information would be included in the IST Plan.	N	N	N	N	N	N
036	4.1-1 Table	94	Revises existing Table 5.2-1 to address preservice, Group A, Group B and comprehensive tests.	M	Affects Group B test only. Measurement of vibration has been deleted, and either ΔP or flowrate is required for this test.	D	D	N	N	D	D
037	5.2.1-1 Table	94	Replaces existing Table 5.2.-2a and adds clarification for non-reciprocating, positive displacement pumps.	L	Currently there are no vibration acceptance criteria for positive displacement pumps other than reciprocating.	N	N	N	N	N	N
038	5.2.1-2 Table	94	Replaces existing table 5.2.-2b.	E							

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impa	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
039	5.2.2a Table	92	Corrects inequality.	ER							
040	5.2.2-1 Table	94	Modifies existing hydraulic acceptance criteria for Group B positive displacement and vertical line shaft pump test.	L	Alert range has been deleted and the required action criteria is less stringent, resulting in less pumps requiring increased testing or corrective action.	D	D	N	D	D	D
041	5.2.3-1 Table	94	Modifies existing hydraulic acceptance criteria for comprehensive test.	L	The high required action criteria is more stringent for all pumps. The alert range is more stringent for centrifugal pumps. Therefore, this results in more pumps entering the alert and required action range.	I	I	N	I	I	I
Subsection ISTC											
042	1.3	94	Adds definition of non-intrusive testing.	E	Definitions do not provide requirements.						
043	2	94	Adds requirement for Owners to qualify non-intrusive techniques and include in plant design provisions necessary to comply with subsection.	L	10CFR50, Appendix B requires owners to qualify "special processes". The regulations provide design and access provision requirements.	N	N	N	N	N	N
044	4.5.4(a)	94	Adds non-intrusive testing as another example of positive means used for observing obturator movement.	L	Generic Letter 89-04, Position 1 allows non-intrusive means.	N	N	N	N	N	N
045	4.5.4(c)	94	Allows sample disassembly and inspection in lieu of disassembling every valve every refueling outage.	L	Generic Letter 89-04, Position 2 allows a sampling technique. The code change reflects the criteria of the Generic Letter, except that the code allows an inspection interval of 8 years (as opposed to 6 yrs.). This change reflects the industry shift from 18 mo. refueling cycles to 24 mo. cycles. One valve will still be tested every refueling outage.	N	N	N	N	N	N
046	4.5.6	94	Revises corrective action to address sample disassembly and inspection program.	L	Change reflects Generic Letter 89-04, Position 2 criteria.	N	N	N	N	N	N
047	6.2(e)	94	Adds sample disassembly and inspection program documentation requirements.	L	No additional documentation is required over that specified in Generic Letter 89-04.	N	N	N	N	N	N
Subsection ISTD											
048	1.1	94	Expands scope of ISTD to include all safety-related snubbers.	L	Plant Technical Specifications are not limited to ASME Code Class 1, 2, or 3 and require testing and examination of all safety-related snubbers. Therefore, there is no impact.	N	N	N	N	N	N
049	1.3	94	Deletes reference to Class 1, 2, 3, and MC.	L	See ISTD 1.1	N	N	N	N	N	N

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTB (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Ooe Exp	Pub Exp	Crit Path	Record	Cost
050	1.4	92	Definition of "Examination Group" has been deleted.	E	Examination Groups are only referred to in the existing requirements in Table ISTD 6.5.2-1 (note 1), which has been replaced.						
051	1.4	94	Definitions for activation, defined test plan group, drag force, isolated failure, and unexplained failure have been revised and the definition for transient dynamic event failure has been added.	E	Definitions do not provide requirements.						
052	1.10.1	94	Clarifies with no change in requirements.	E							
053	1.10.2	94	Requires repaired or maintained snubbers to undergo preservice examination and testing instead of inservice examination and testing.	L	There is no significant change between the preservice and inservice requirements.	N	N	N	N	N	N
054	1.12	92	As a result of analysis of the effected piping system, the unacceptable deleted snubbers are now required to be included in the examination population and examination category, in addition to the failure mode group (FMG), for determining the corrective actions. The example has been deleted.	L	This revision clarifies the intent of the Code and industry practice.	N	N	N	N	N	N
055	5.2	94	Item (a) on breakaway force and drag force has been revised and renumbered as (c) and (d). The new version separately discusses these parameters for mechanical (c) and hydraulic snubbers (d). Breakaway is no longer required for hydraulic snubbers. Hydraulic snubbers are required to have a drag test only if required to verify proper reassembly.	L	The STS and many plant TS do not require breakaway or drag verification for hydraulic snubbers. Therefore, there will be no impact for most plants.	N	N	N	N	N	N
056	6	92	Clarifies with no change in requirements.	E							
057	6.1	92	Replaces "operability" with "operational readiness" and other minor editorial changes.	E							
058	6.2	92	Clarifies that all snubbers may be considered as one population or categorized as accessible and inaccessible separately for examination. The revision adds the requirement that the classification must be chosen prior to an examination schedule and cannot be changed. Later, if decided to recombine into one population, the shorter interval of the categories shall be used.	L	These additional constraints on the decision of selecting the snubber population or categories will not significantly impact the current industry practices.	N	N	N	N	N	N
059	6.3	92	Clarifies with no change in requirements.	E							

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
060	6.4	92	Clarifies with no change in requirements.	E							
061	6.5.1	92	Clarifies with no change in requirements.	E							
062	6.5.2	92	Combines existing paragraphs 6.5.2 and 6.5.3. There is a change in the subsequent examination intervals after the initial examination at the time of first reactor power operation. The second examination is required to be conducted at the first refueling outage, rather than the existing requirement of 18 months. The third examination shall be conducted at the second refueling outage, irrespective of the outcome of the second examination. The subsequent examination interval will follow Table ISTD 6.5.2-1.	L	Changes in the inservice inspection intervals have relaxed the existing requirements. This will reduce the radiation exposure to workers, the cost, and recording efforts.	N	D	N	N	D	D
063	6.5.2-1 Table	92	This Table is completely revised. In addition to the number of unacceptable snubbers, the visual examination intervals also are dependent on the population or sizes of each category. The new requirements allow the next visual inspection interval to be twice, the same, or reduced by as much as two-thirds of the previous interval, depending on the number of unacceptable snubbers for various population sizes.	M	The existing code requirement reduces the examination interval from 18 months to 6 months when 2 unacceptable snubbers are found, irrespective of the size of the population. The new requirement, in addition to a maximum reduction of two-thirds of the previous interval, also allows doubling the previous interval for the next examination (not to exceed 48 months). Based on industry experience, an average plant will have a typical 24-48 month visual examination interval for all its snubbers. This less frequent examination schedule will reduce the operating cost, radiation exposure to workers and critical path. The revised code duplicates the alternate requirements provided in Generic Letter 90-09. Numerous licensees have incorporated this Generic Letter. For these licensees, there would be no impact.	N	D	N	D	D	D
064	6.6	92	Requires all snubbers, based either on the whole population or on the accessible categories, to be subject to inservice examination.	L	The existing code allows the sample to be reduced if justified and approved by the NRC. Therefore, the impact is minimal.	N	N	N	N	N	N
065	6.7	92	The concept of categorizing unacceptable snubbers into examination FMGs is eliminated. This eliminates paragraphs 6.7.1 to 6.7.4. However, the root cause evaluation of all unacceptable snubbers is still required.	L	Since the examination intervals based on the new Table are not as stringent when compared to the existing requirements, the concept of categorizing unacceptable snubbers into various FMGs has very little impact on the failure evaluation.	N	N	N	N	N	N
066	6.8	92	Since the use of FMGs for the unacceptable snubbers has been eliminated from the visual examination requirements, this section is revised entirely. Subsections 6.8.1 to 6.8.3 are removed. The Code requires that all unacceptable snubbers shall be adjusted, repaired, modified, or replaced.	L	Since the concept of FMGs has been eliminated as discussed above, corrective actions on each FMG are no longer required. The impact due to this is change marginal.	N	N	N	N	N	N

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
067	7	94	Replaces "operability" with "operational readiness" and makes other minor changes for clarification.	E							
068	7.1	94	Replaces "operability" with "operational readiness". Breakaway and drag force verification is no longer required for hydraulic snubbers.	L	The STS and many plant TS do not require breakaway or drag verification for hydraulic snubbers. Therefore, there will be no impact for most plants.	N	N	N	N	N	N
069	7.2	94	Paragraphs 7.2.4 and 7.2.5 are revised to include additional inspections as given in paragraph 4.1 during reinstallation and reassembly after testing. Additionally, there are a number of editorial changes.	L	Additional inspection activities are typically performed by the utilities as a good engineering practice.	N	N	N	N	N	N
070	7.3	94	Clarifies with no change in requirements.	E							
071	7.4	94	Clarifies with no change in requirements.	E							
072	7.5	94	Existing paragraph 7.7.3 is revised and relocated to ISTD 7.5. It has three subparagraphs 7.5.1 to 7.5.3. The selection of snubbers or snubber groups for testing is described in detail. Those snubbers subject to corrective action as a result of an examination are exempt from testing. Revision adds the requirement that snubbers for steam generators and reactor coolant pumps for PWR plants shall be at least one separate group.	L	This group selection criteria may have some minor impact on plant procedures, if the plant has a different strategy in choosing the test groups.	N	N	N	N	N	N
073	7.6	94	Relocates existing paragraphs 7.7.1, 7.7.2, and 7.7.4 and clarifies with no change in requirements. The new non-mandatory Appendix E is referred to for selecting the snubber testing plans.	E							
074	7.7	94	Relocates and revises existing paragraph 7.5. Clarifies snubbers failure inclusion in DTPG and the use of mathematical expressions for completing the test schedule. Isolated or unexplained failures have been removed from and transient dynamic events have been added to the list of FMGs.	L	There is no change in the requirements (including the number of additional tests as a result of unacceptable snubbers) for these FMGs.	N	N	N	N	N	N
075	7.8	94	Relocates the existing paragraph 7.6 and clarifies with no change in requirements.	E							
076	7.9	94	Relocates existing paragraph 7.8.	E							

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Cost Exp	Pub Exp	Crit Path	Record	Cost
077	7.9.1	94	Relocates and revises the existing paragraph 7.8.1. The initial sampling may include snubbers concurrently scheduled for seal replacement or similar activity related to service life monitoring.	L	This may result in less snubbers being tested. Previously the entire sample had to be random.	N	D	N	N	D	D
078	7.9.2	94	Relocates existing paragraph 7.8.2 and clarifies with no change in requirements.	E	ISTD 7.11 now contains the test completion mathematical expression.						
079	7.9.3	94	Relocates and revises existing paragraph 7.8.3. The additional sample is now required to be selected from the DTPG.	L	This should have minimal impact on the current industry practices.	N	N	N	N	N	N
080	7.9.4	94	This new paragraph requires random additional sample selection from a FMG. The existing paragraph 7.8.4 is eliminated.	L	This should have minimal impact on the current industry practices.	N	N	N	N	N	N
081	7.10	94	Relocates existing paragraph 7.9 with no change in requirements.	E							
082	7.10.1	94	Relocates existing paragraph 7.9.3 on unexplained failure group and clarifies with no change in requirements.	E							
083	7.10.2	94	Relocates existing paragraph 7.9.2 on isoleted failure group and clarifies with no change in requirements.	E							
084	7.10.3	94	Relocates and revises the existing paragraph 7.9.1(a) and (c) and addresses design or manufacturing and application-induced FMGs only.	L	Snubbers in maintenance, repair and installation FMGs are no longer allowed to be recategorized as acceptable for the purpose of determining additional testing provided all snubbers in the FMG are replaced or modified. Additional snubbers would be required to be tested as a result of failures in these FMGs. However, there is no change in impact based on the requirement to perform additional tests versus replacing or modifying all snubbers in the FMG.	N	N	N	N	N	N
085	7.10.4	94	Relocates and revises existing para. 7.9.1(b).	E	The impact is discussed below for ISTD 7.11.						
086	7.10.5	94	This new paragraph addresses transient dynamic event FMG. No additional tests are required, however, the operational readiness of all snubbers in this FMG must be evaluated by stroking or testing.	L	ISTD 1.13 currently requires the affected snubbers to be reviewed and any appropriate corrective action taken.	N	N	N	N	N	N

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
087	7.11	94	Revises the 10% testing sample plan additional testing requirements. It contains mathematical expressions to determine additional samples when unacceptable snubbers are found for each DTPG, as well as FMG.	L	This mathematical expression is consistent with the existing requirement in para. 7.8.2, for the DTPG. This revision also addresses additional testing in FMGs. If a FMG has a limited number of snubbers, this revision could result in less additional snubbers being tested. The 10% plan is now consistent with the 37 plan.	N	D	N	D	D	D
088	7.12	94	Relocates existing paragraph 7.10 and clarifies with no change in requirements.	E							
089	7.12.1	94	Relocates existing paragraph 7.10.1 and clarifies with no change in requirements.	E							
090	7.12.2	94	This new paragraph addresses the additional sample size.	E	The requirements already exist in ISTD 7.12.1						
091	7.12.3	94	Relocates existing paragraph 7.10.2 and clarifies with no change in requirements.	E							
092	7.13	94	Recognizes the various FMGs and duplicates the additional testing requirements of the 10% Plan for the 37 Plan.	L	This should not impact the current industry practices.	N	N	N	N	N	N
093	7.13.1	94	Provides requirements for additional testing for unexplained failures.	L	This does not change the number of snubbers that would be tested.	N	N	N	N	N	N
094	7.13.2	94	This applies to those snubbers under the isolated failure groups. The revision does not require additional testing for this FMG.	L	This would result in less snubbers being tested as a result of failures.	N	D	N	N	D	D
095	7.13.3	94	This applies to those snubber failures attributed to design or manufacturing and application-induced FMGs. The revision does not require additional testing for these FMGs.	L	This would result in less snubbers being tested as a result of failures. However, all affected snubbers are corrected such that additional failures will not occur.	N	D	N	N	D	D
096	7.13.4	94	Clarifies the additional testing requirements.	E							
097	7.13.5	94	The new paragraph applies to those snubber failures which are categorized in the transient dynamic event FMG.	E	These requirements already exist in ISTD 1.13.						
098	7.14	94	Relocates existing paragraph 7.12 and clarifies with no change in requirements. The existing subparagraph 7.12.2, concerning snubber evaluation sequence, has been eliminated.	L	This should not impact the current industry practices.	N	N	N	N	N	N

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
099	7.15	94	This is a new paragraph on the retest requirements for previously unacceptable snubbers.	L	This should not impact the current industry practices. Most Technical Specifications currently contain this requirement.	N	N	N	N	N	N
100	7.14.1-1 Figure	94	Relocation of existing Fig. ISTD 7.12.1-1.	E							
Appendix I											
101	1.1	94	Scope is revised to make consistent with ISTC scope.	E							
102	Throughout Appendix	94	Changes "set pressure" to "set-pressure."	E							
103	1.1.2	94	Clarifies with no change in requirements.	E							
104	1.2	94	Reference for other definitions is changed to ANSI/ASME PTC 25.3. Definitions for gag and overpressure protection are revised. The definition for reactor criticality is deleted and definitions on owner, power-actuated relief valve and valve group are added.	E	Definitions do not provide requirements.						
105	1.3.1(b)	94	Clarifies with no change in requirements.	E							
106	1.3.1(c)	94	Clarifies with no change in requirements.	E							
107	1.3.1(e)	94	Adds new paragraph on the establishment and documentation of acceptance criteria.	L	Owner already required to prepare written acceptance criteria (I 1.3.2(a)(3)).	N	N	N	N	N	N
108	1.3.2	94	Deletes paragraph on Owner responsibility to prepare and maintain records and on Test Supervisor responsibilities.	L	Owner is required to prepare and maintain records in ISTA 3.2. Test Supervisor responsibilities for test personnel qualification, instrument calibration and compliance with procedures are now assigned to Owner. ISTC 6.3 covers the signing and dating of results.	N	N	N	N	N	N
109	1.3.3(a)	94	The initial 5-year test interval is revised and combined with the subsequent test schedule.	L	The initial 5 year period test schedule (Table I 1.3.3-1) has been deleted, however, all valves must still be tested within 5 years, with a minimum of 20% within 24 months.	N	N	N	N	N	N

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Subsection ISTD (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
110	1.3.3(b)	94	Relocates existing 1.3.3(c) and clarifies with no change in requirements.	E							
111	1.3.3(c)	94	Relocates and revises existing 1.3.3(d) and (e). The acceptance criteria includes the Owner's established set-pressure criteria, as well as ±3% of nameplate set-pressure. Other changes are editorial.	L	This gives the Owner the option of establishing acceptance criteria. This may result in fewer valves being declared inoperable. However, based on the requirements in 1.3.1(e), there should be no effect on safety as the acceptance criteria is based on the system/valve design basis or Technical Specification. Additionally, the -3% acceptance criteria will result in more valves being declared inoperable.	N	N	N	N	N	N
112	1.3.5(a)	94	The initial 10 year test interval is revised and combined with the subsequent test schedule.	L	The initial 10 year period test schedule (Table I 1.3.5-1) has been deleted, however, all valves must still be tested within 10 years, with a minimum of 20% within 48 months.	N	N	N	N	N	N
113	1.3.5(b)	94	Relocates existing 1.3.5(c) and clarifies with no change in requirements.	E							
114	1.3.5(c)	94	Relocates and revises existing 1.3.5(d) and (e). The acceptance criteria is revised to include the Owner established set-pressure criteria and -3% of name plate set pressure, as well as +3% of nameplate set-pressure. Other changes are editorial.	L	This gives the Owner the option of establishing acceptance criteria. This may result in fewer valves being declared inoperable. However, based on the requirements in 1.3.1(e), there should be no effect on safety as the acceptance criteria is based on the system/valve design basis or Technical Specification.	N	D	N	N	D	D
115	1.3.6	94	Clarifies with no change in requirements.	E							
116	1.3.7(a)	94	Changes containment vacuum relief valve test frequency from 6 months to 2 years or at refueling, whichever is sooner.	L	Less testing is required by the Code unless historical data indicates a requirement for more frequent testing. Based on this requirement for trending, safety should not be impacted. Containment vacuum breakers are explicitly covered by the BWR Technical Specifications. Therefore, this change will only affect PWRs.	N	D	N	D	D	D
117	1.3.7(b)	94	Clarifies with no change in requirements.	E							
118	1.4.1(a)	94	Clarifies with no change in requirements.	E							
119	1.4.1(b)	94	Requires the overall set-pressure instrument combined accuracy not to exceed ±1% of indicated pressure.	L	The current requirement is +1% and -2%. Instruments currently used by most Owners comply with this requirement.	N	N	N	N	N	N

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
120	2, 6	94	Replaces valves of the same manufacturer and type with valve group, and inspection with examination.	E							
121	3.1.1	94	The sequence of testing MSRVs before installation is revised. Accessories are required to be tested before the seat tightness test.	L	This will result in less radiation exposure to test personnel and cost. The normal practice is to perform the seat leakage test as the final test, after reinstallation. The current requirements may cause the Owners to perform the seat leakage test twice.	N	D	N	N	N	D
122	3.1.5, 3.1.6, 3.1.7, 3.2	94	Clarifies with no change in requirements.	E							
123	3.2.1	94	Requires testing before initial power generation to be performed at reduced or normal system pressure.	L	The Code previously required testing at both reduced and normal system pressure. However, industry practice is to perform the test at one pressure.	N	N	N	N	N	N
124	3.2.2	94	Requires MSRVs without auxiliary actuating devices to have their set-pressure verified within 6 months before criticality.	L	The Code previously did not require functional testing. This will result in additional testing.	I	N	N	N	I	I
125	3.2.4, 3.2.6	94	Requires nonreclosing pressure relief valves to pass a visual examination after installation, but before initial power generation.	L	This will require an additional examination.	I	N	N	N	I	I
126	3.2.5	94	Clarifies with no change in requirements.	E							
127	3.2.7(a)	94	Clarifies with no change in requirements.	E							
128	3.3	94	References control ring adjustment requirements in other paragraph of the Code.	E							
129	3.3.1	94	Clarifies that maintenance or set-pressure adjustments may be performed following the visual exam, seat tightness determination, and set-pressure determination; and before the accessory and seat tightness test. Additionally, the seat tightness test is moved to after the accessory tests. Footnote 1 is added to clarify the intent of the seat tightness determination (Code Interpretation 92-3).	L	The Code previously required all the testing to be performed prior to adjustment or maintenance. This will reduce the time it takes to test because the valve may be adjusted to meet the set-pressure criteria prior to removing it from the test stand. The accessory tests should not affect the set-pressure. Additionally, this will result in less radiation exposure to test personnel and cost. The normal practice is to perform the seat leakage test as the final test, after reinstallation. The current requirements may cause the Owners to perform the seat leakage test twice.	N	D	N	N	N	D

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
130	3.3.2	94	Changes the test sequence. The determination of operation and electrical characteristics of position indicators is required to be performed prior to the seat tightness test.	L	The normal practice is to perform the seat leakage test as the final test, after reinstallation. The current requirements may cause the Owners to perform the seat leakage test twice.	N	D	N	N	N	D
131	3.3.3	94	Clarifies that maintenance or adjustments may be performed following the visual exam, seat tightness determination, and set-pressure determination; and before the remaining tests. Additionally, the seat tightness test is now the last test performed.	L	The Code previously required all the testing to be performed prior to adjustment or maintenance. This will reduce the time it takes to test because the valve may be adjusted to meet the set-pressure criteria prior to removing it from the test stand. The accessory tests should not affect the set-pressure. Additionally, the normal practice is to perform the seat leakage test as the final test, after reinstallation. The current requirements may cause the Owners to perform the seat leakage test twice.	N	D	N	N	N	D
132	3.3.4	94	References requirements from paragraph I i.3.4 and requires a visual examination in accordance with the Owner examination, and not the receipt inspection procedure.	L	Both the receipt inspection and examination procedures are developed by the Owner, and may be identical.	N	N	N	N	N	N
133	3.3.5	94	Clarifies that maintenance or adjustments may be performed following the visual exam, seat tightness determination, and set-pressure determination; and before the remaining tests. Additionally, the seat tightness test is now the last test performed.	L	The Code previously required all the testing to be performed prior to adjustment or maintenance. This will reduce the time it takes to test because the valve may be adjusted to meet the set-pressure criteria prior to removing it from the test stand. The accessory tests should not affect the set-pressure. Additionally, the normal practice is to perform the seat leakage test as the final test, after reinstallation. The current requirements may cause the Owners to perform the seat leakage test twice.	N	D	N	N	N	D
134	3.3.6	94	References requirements from paragraph I 1.3.6 and requires a visual examination in accordance with the Owner examination, and not the receipt inspection procedure.	L	Both the receipt inspection and examination procedures are developed by the Owner, and may be identical.	N	N	N	N	N	N
135	3.3.7, 3.4	94	Clarifies with no change in requirements.	E							
136	3.4.1(a), (b), (c)	94	Clarifies with no change in requirements.	E							
137	3.4.1(d)	94	Clarifies that actuation may be performed at reduced or normal system pressure before resumption of power generation following maintenance.	L	The Code previously required the test to be conducted at reduced pressure. This clarifies the intent of the Code.	N	N	N	N	N	N

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
138	3.4.1(e), 3.4.2(d), 3.4.3(d), 3.4.5(d), 3.4.7(d)	94	This new paragraph allows the component not to be immediately maintained to comply with its acceptance criteria, provided that the ability of the valve to perform its function until the next test or maintenance opportunity is evaluated.	L	This will allow valves with minor set-pressure deviations to be accepted until the next test. This will reduce the number of corrective actions for minor deviations. However, based on the evaluation, the number of records is not affected. The OM Code already allows the Owner to analyze the stroke times of valves in lieu of repair or replacement (ISTC 4.2.9).	N	D	N	N	N	D
139	3.4.2(a), (b), (c), 3.4.3(a), (b), (c), 3.4.5(a), (b), (c), 3.4.7(a), (b), (c),	94	Clarifies with no change in requirements.	E							
140	3.4.4, 3.4.6	94	References requirements from paragraphs I 1.3.4, 1.3.6 and requires a visual examination in accordance with the Owner examination, and not the receipt inspection procedure.	L	Both the receipt inspection and examination procedures are developed by the Owner, and may be identical.	N	N	N	N	N	N
141	4.1.1(a), (c), 4.1.2(c)	94	Clarifies with no change in requirements.	E							
142	4.1.1(b), 4.1.2(b)	94	The specific minimum accumulator volume requirements are replaced with the volume "shall be sufficient to determine the valve set-pressure."	L	The Owner now must determine the minimum volume.	N	N	N	N	N	N
143	4.1.1(d), 4.1.2(d), 4.1.3(d)	94	Allows direct or indirect temperature measurements when establishing thermal equilibrium. It also does not require verification of thermal equilibrium when valves are tested at ambient temperature using a test medium at ambient temperature.	L	This will not change how licensees perform tests.	N	N	N	N	N	N
144	4.1.1(f), 4.1.2(f), 4.1.3(f)	94	Clarifies with no change in requirements.	E							
145	4.1.1(g), 4.1.2(g)	94	Adds requirement to return adjusted control ring to their proper position prior to return to service.	L	Most licensees programs already include this requirement, as IE Notice 92-64 alerted them to this concern.	N	N	N	N	N	N
146	4.1.2(a)	94	Allows air or nitrogen to be substituted at the same temperature without the additional testing requirements of I 4.3.	L	This will result in less testing.	N	N	N	N	D	D
147	4.1.3(b)	94	Clarifies with no change in requirements.	E							

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

"Appendix I (continued)"

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Ooo Exp	Pub Exp	Crit Path	Record	Cost
148	4.1.3(c)	94	Prohibits the use of assist devices for liquid service pressure relief valves.	L	Previously, the Code did not recommend the use of these devices. Generally assist devices are not used for these valves.	N	N	N	N	N	N
149	4.1.3(h)	94	Deletes the requirement that any subsequent openings at the same set point adjustment be within acceptance criteria, and that valve opening be determined when the valve is flowing at the rate of 40 cc/min.	L	This deletes the quantitative criteria for determining valve opening and allows a qualitative assessment. There should be no impact on the testing.	N	N	N	N	N	N
150	4.2	94	Clarifies with no change in requirements.	E							
151	4.2.2, 4.2.3	94	Replaces "may" with "shall."	L	This will not affect the methods or acceptance criteria used by licensees.	N	N	N	N	N	N
152	4.3.2	94	Clarification and correcting the reference to other paragraphs.	E							
153	5.1	94	Additional records that the Owner must maintain are added.	L	These records are currently required by ISTC 6.1 and 6.3.	N	N	N	N	N	N
154	5.2	94	Adds the requirement for the Owner to implement a schedule of testing to be performed.	L	I 1.1.1(b) currently requires the Owner to establish a program that defines and implements the requirements of this Appendix	N	N	N	N	N	N
155	5.3	94	Deletes the requirement for procedures to include special test requirements and acceptance criteria, and minor editorial rewording.	L	I 1.3.2(b) and (c) requires preparation of test procedures and written acceptance criteria.	N	N	N	N	N	N
156	5.5.1	94	Clarifies with no change in requirements.	E							
157	6	95	Reference to I 1.7 corrected to I 7.1.	ER							
158	7.1.1, 7.1.2	94	Revises the sequence of testing safety valves and power actuated relief valves before installation. Accessories are required to be tested before the seat tightness test.	L	The normal practice is to perform the seat leakage test as the final test, after reinstallation. The current requirements may cause the Owners to perform the seat leakage test twice.	N	D	N	N	N	D
159	7.1.4, 7.1.5, 7.1.6, 7.1.7	94	Clarifies with no change in requirements.	E							
160	7.2.1	94	Requires set-pressure verification 6 months before initial reactor criticality.	L	The Code previously required set-pressure verification within 6 months of initial fuel load. This change will affect the test schedule for plants that have not begun electric power generation.	N	N	N	N	N	N
161	7.2.2	94	Clarifies with no change in requirements.	E							

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
162	7.2.4, 7.2.6	94	Requires nonreclosing pressure relief valves to pass a visual examination.	L	This will require an additional examination.	I	N	N	N	I	I
163	7.2.5	94	Allows the Main Steam safety valves to be set-pressure and seat leak tested either before or after installation, but within 6 months before initial reactor criticality.	L	The Code previously required the tests after installation and system heatup , but before initial reactor criticality. This will affect the test schedule for plants that have not begun electric power generation.	N	N	N	N	N	N
164	7.2.7(a)	94	Clarifies with no change in requirements.	E							
165	7.3	94	References control ring adjustment requirements in another paragraph of the Code.	E							
166	7.3.1, 7.3.2, 7.3.3, 7.3.5, 7.3.6,	94	Clarifies that maintenance or adjustments may be performed following the visual exam, seat tightness determination, and set-pressure determination; and before the remaining tests. Additionally, the seat tightness test is now the last test performed.	L	The Code previously required all the testing to be performed prior to adjustment or maintenance. This will reduce the time it takes to test because the valve may be adjusted to meet the set-pressure criteria prior to removing it from the test stand. The accessory tests should not affect the set-pressure. Additionally, the normal practice is to perform the seat leakage test as the final test, after reinstallation. The current requirements may cause the Owners to perform the seat leakage test twice.	N	D	N	N	N	D
167	7.3.4, 7.3.7, 7.4.4, 7.4.7	94	References requirements from paragraphs I 1.3.4, 1.3.6 and requires a visual examination in accordance with the Owner examination, and not the receipt inspection procedure.	L	Both the receipt inspection and examination procedures are developed by the Owner, and may be identical.	N	N	N	N	N	N
168	7.3.8, 7.4	94	Clarifies with no change in requirements.	E							
169	7.4.1(a), (b), (c),	94	Clarifies with no change in requirements	E							
170	7.4.1(d), 7.4.2(d), 7.4.3(d), 7.4.5(d), 7.4.6(d)	94	This new paragraph allows the component not to be immediately maintained to comply with its acceptance criteria, provided that the ability of the valve to perform its function until the next test or maintenance opportunity is evaluated.	L	This will allow valves with minor set-pressure deviations to be accepted until the next test. This will reduce the number of corrective actions for minor deviations. The OM Code already allows the Owner to analyze the stroke times of valves in lieu of repair or replacement (ISTC 4.2.9).	N	D	N	N	N	D

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
171	7.4.2(a), (b), (c), 7.4.3(a), (b), (c), 7.4.5(a), (b), (c), 7.4.6(a), (b), (c), 7.4.8(a), (b)	94	Clarifies with no change in requirements.	E							
172	8.1.1(a)	94	Minor rewording with clarification that safety valves designed for saturated steam service that are installed on a water filled loop seal are to be tested with saturated steam.	E	This incorporates intent interpretation91-1.						
173	8.1.1(b), 8.1.2(b)	94	The specific minimum accumulator volume requirements have been replaced with the volume "shall be sufficient to determine the valve set-pressure."	L	The Owner now must determine the minimum volume.	N	N	N	N	N	N
174	8.1.1 (c), 8.1.2(c)	94	Clarifies with no change in requirements.	E							
175	8.1.1(d), 8.1.2(d), 8.1.3(d)	94	Allows direct or indirect temperature measurements when establishing thermal equilibrium. It also does not require verification of thermal equilibrium when valves are tested at ambient temperature using a test medium at ambient temperature.	L	This will not change how licensees perform tests.	N	N	N	N	N	N
176	8.1.1(f), 8.1.2(f), 8.1.3(f)	94	Clarifies with no change in requirements.	E							
177	8.1.1(g), 8.1.2(g)	94	Adds requirement to return adjusted control rings to their proper position prior to return to service.	L	Most licensee programs already include this requirement, as IE Notice 92-64 alerted them to this concern.	N	N	N	N	N	N
178	8.1.2(a)	94	Allows air or nitrogen to be substituted at the same temperature without the additional testing raquirements of I 8.3.	L	This will result in less testing.	N	N	N	N	D	D
179	8.1.3(b)	94	Clarifies with no change in requirements.	E							
180	8.1.3(h)	94	Deletes the requirement that any subsequent openings at the same set point adjustment be within acceptance criteria, and that valve opening be determined when the valve is flowing at the rate of 40 cc/min.	L	This deletes the quantitative criteria for determining valve opening and allows a qualitative assessment. There should be no impact on the testing.	N	N	N	N	N	N
181	8.2	94	Clarifies with no change in requirements.	E							

Table 4. Summary and Evaluation of ASME OM Code Changes, 1992 & 1994 Addenda & 1995 Edition (Continued)

Appendix I (continued)

Item No.	Paragraph, Figure, Table	Year	Description	Impact	Explanation of Impact and Factors	Safety	Occ Exp	Pub Exp	Crit Path	Record	Cost
182	8.2.3	94	Replaces "may" with "shall."	L	This will not affect the methods or acceptance criteria used by licensees.	N	N	N	N	N	N
183	8.3.1	94	Clarifies with no change in requirements.	E							
184	8.3.2	94	Clarifies and corrects the reference to other paragraphs.	E							
185	9.1	94	Adds additional records that the Owner must maintain.	L	These records are currently required by ISTC 6.1 and 6.3.	N	N	N	N	N	N
186	9.2	94	Adds the requirement for the Owner to implement a schedule of testing to be performed.	L	I 1.1.1(b) currently requires the Owner to a establish a program that defines and implements the requirementr of this Appendix.	N	N	N	N	N	N
187	9.3	94	Deletes the requirement for procedures to include special test requirements and acceptance criteria, and minor clarification rewording.	L	I 1.3.2(b) and (c) requires preparation of test procedures and written acceptance criteria.	N	N	N	N	N	N
188	9.5.1	94	Clarifies with no change in requirements.	E							