

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

July 23, 1987

W. L. STEWART  
VICE PRESIDENT  
NUCLEAR OPERATIONS

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D. C. 20555

Serial No. 87-341  
E&C/MWH:vlhrl  
Docket Nos. 50-280  
50-281  
License Nos. DPR-32  
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY  
SURRY POWER STATION UNITS 1 AND 2  
ASME SECTION XI RELIEF REQUEST  
HEAT EXCHANGER REPLACEMENTS

Surry Power Station is planning to replace the component cooling water heat exchangers and is studying the replacement of the recirculation spray heat exchangers. Pursuant to 10 CFR 50.55a paragraph g(5), relief is requested from certain requirements for component replacement as delineated in the ASME Code Section XI, 1980 Edition, Winter 1980 Addenda. The following basis is provided.

The original heat exchangers were manufactured to the requirements of the 1968 ASME Code Section III, Class C. In accordance with IWA-7210, Construction Codes, the replacement must meet the requirements of the original construction code, or alternatively, later editions of the same construction code. Because the original construction code, 1968 ASME Code Section III, Class C, referred to Section VIII of the ASME Code, we request permission to use the 1986 Edition of Section VIII of the ASME Code for the construction of these replacement heat exchangers.

To facilitate the NRC's review of this relief request, we have performed a evaluation of the requirements of the 1968 ASME Code Section III, Class C with respect to the requirements of the 1986 ASME Code Section VIII, Division 1. In addition, we have compared Subsection UG (General) and Subsection UW (Fabrication) requirements of the 1968 Edition to the 1986 Edition of the ASME Code Section VIII, Division 1. Summaries of the comparisons performed are provided in Attachments A thru C.

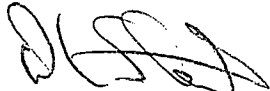
8707300025 870723  
PDR ADDCK 05000280  
P PDR

A001 w/check  
1/1 150

Our evaluation of these Code comparisons has concluded that a vessel built to the 1986 ASME Code Section VIII, Division 1 will meet or exceed the original requirements of the 1968 ASME Code Section III, Class C. Therefore, Virginia Electric and Power Company proposes to purchase these replacement heat exchangers to the requirements of the 1986 ASME Code Section VIII, Division 1 and from a vendor which has a quality assurance program in accordance with 10 CFR 50, Appendix B. We consider that adequate justification exists for relief to be granted from the 1980 ASME Code Section XI requirement. Your prompt attention is requested so that timely heat exchanger replacement can be accomplished. Should you require additional information, please contact us.

In accordance with 10 CFR 170, an application fee of \$150.00 is enclosed.

Very truly yours,



W. L. Stewart

Attachments

cc: U. S. Nuclear Regulatory Commission  
Region II  
101 Marietta Street, N. W.  
Suite 2900  
Atlanta, Georgia 30323

Mr. W. E. Holland  
NRC Senior Resident Inspector  
Surry Power Station

Mr. Chandu P. Patel  
NRC Project Manager - Surry  
Directorate II-2  
Division of Reactor Projects I/II

APPENDIX A  
EVALUATION OF REQUIREMENTS  
FOR VESSELS BUILT TO  
1968 ASME CODE SECTION III, CLASS C  
WITH RESPECT TO  
REPLACEMENT VESSELS BUILT TO  
1986 ASME CODE SECTION VIII, DIVISION 1

EVALUATION OF REQUIREMENTS  
1968 ASME CODE SECTION III, CLASS C

ASME SECTION III, 1968 EDITION  
SUBSECTION C, REQUIREMENTS FOR CLASS C VESSELS  
ARTICLE 21, GENERAL REQUIREMENTS

- N-2110 REQUIREMENTS  
Subsection C covers requirements for vessels classified as Class C.
- N-2111 The requirements of Section VIII of the Code shall apply to the materials, design, fabrication, inspection and testing and certification of Class C vessels except that the below listed additional requirements apply.
- N-2112 Paragraph U-1(g) of Section VIII shall not apply to Class C vessels.
- N-2113 The rules of paragraph UW-2(a) of Section VIII of the Code shall apply to any Class C vessels that may contain substances whose level of radioactivity is such that their production, storage, or use is subject to regulations of Federal or Local jurisdictions.

EVALUATION OF REQUIREMENTS

The original design specifications required the recirculation spray and the component cooling water heat exchangers to be built to ASME Section III, Class C.

The new recirculation spray heat exchangers and the new component cooling water heat exchangers are considered replacements per ASME Section XI, Article IWA-7000. Article IWA-7000 allows replacement vessels to be built to a later edition of the construction code. The construction code used to manufacture the original heat exchangers was 1968 ASME Section III, Class C which referred to Section VIII. The requirements of ASME Section XI, IWA-7000 are met since the replacement vessels are to be built to 1986 ASME Section VIII requirements. In addition, a Quality Assurance Program in accordance with 10 CFR 50 Appendix B shall be required of the vessel manufacturer.

Paragraph U-1(g) is a permissive statement in the 1968 Section VIII requirements referring to stamping of the vessel. The 1986 Edition of Section VIII contains essentially the same statement only the paragraph is (k) rather than (g). We intend to have these replacement heat exchangers built in accordance with the requirements of the 1986 ASME Code Section VIII and they will be stamped with the Code "U" symbol.

Paragraph UW-2(a) of the 1986 ASME Section VIII describes welding and radiography requirements. These requirements are the same as the 1968 ASME Section VIII but are explained in more detail. The rules of UW-2(a) will be applied to the replacement recirculation spray heat exchangers. The rules of UW-2(a) were not applied to the original component cooling water heat exchangers because this article was specifically exempted in the original procurement specification. The rules of UW-2(a) will not apply to the replacement component cooling water heat exchangers, but the vessels will be required to be fully radiographed.

**EVALUATION OF REQUIREMENTS**  
**1968 ASME CODE SECTION III, CLASS C - Cont'd**

ASME SECTION III, 1968 EDITION  
SUBSECTION C, REQUIREMENTS FOR CLASS C VESSELS  
ARTICLE 21, GENERAL REQUIREMENTS

N-2114 Paragraph UG-125 through UG-134 of Section VIII shall not apply and the requirements of Article 9 shall be substituted. Article 9 - Protection Against Overpressure.

N-2115 Class C vessels shall be stamped with the letter "N" below the Code U - symbol in the stamping shown in Fig. UG-118 of Section VIII of the Code.

Original Materials of Construction

Recirculation Spray Heat Exchangers:

Shell - 90/10 CuNi  
Tube Sheets - 90/10 CuNi  
Tubes - 90/10 CuNi

Component Cooling Water Heat Exchangers:

Shell - Carbon Steel  
Tube Sheets - Carbon Steel - 1/8" Monel Overlay  
Tubes - 90/10 CuNi

EVALUATION OF REQUIREMENTS

This requirement pertaining to pressure relief devices was exempted in the original design specification for the component cooling water heat exchangers. Over-pressure protection is not required in either the case of the component cooling water or the recirculation spray heat exchangers, therefore, this requirement does not apply to the replacement heat exchangers.

Since the replacement heat exchangers are being fabricated to ASME Section VIII in lieu of ASME Section III, no "N" stamp is required.

Replacement Materials of Construction

Recirculation Spray Heat Exchangers:

Shell - Stainless Steel  
Tube Sheets - Stainless Steel Clad w/Titanium  
Tubes - Titanium  
Section XI allows material changes to improve operability and reliability.  
The replacement materials of construction were selected because of their superior resistance to corrosion and pitting.

Component Cooling Water Heat Exchangers:

Shell - Carbon Steel  
Tube Sheets - Carbon Steel Clad w/Titanium  
Tubes - Titanium  
Section XI allows material changes to improve operability and reliability.  
Titanium was selected to replace Cu-Ni because of it's superior ability to resist the corrosive effects of the Surry Power Station river water.

APPENDIX B  
EVALUATION OF  
SUBSECTION UG (GENERAL)  
1968 VS 1986 ASME CODE SECTION VIII, DIVISION 1

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UG (GENERAL)  
SURRY POWER STATION

Page 1 of 8

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
General (Matl's) UG-4	Materials subject to stress due to pressure shall conform to ASME Section II specs. (This subsection is UG-5 in 1986 Code.)	Same as UG-6(b) in 1968 Code. UG-4(b) added to address nonpressure parts exemption from conforming to material specifications for material they are attached to.	1986 Code Section UG-4(b) allows material for nonpressure part to not conform to the material specification to which they are attached or to a material specification permitted in Division 1.
Plate	Plate shall conform to ASME Section II specs. (This subsection is UG-5 in 1986 Code.)	Same as 1968 Code except does not include nonpressure parts which were moved to UG-4(b).	Equivalent requirements
Forgings UG-6	Use of forged and rolled material allowed provided coarse ingot structure removed. (This subsection is UG-7 in 1968 Code.)	Same as 1968 Code.	Equivalent requirements
Castings UG-7	Use of cast material allowed. (This subsection is UG-8 in 1968 Code.)	Same as 1968 Code.	Equivalent requirements
Pipe & Tubes UG-8	Use of seamless and welded pipe and tubes allowed. (This subsection is UG-9 in 1968 Code.)	Same as 1968 Code except testing of tubes after finning has been expanded.	Equivalent requirements. 1968 Code allows internal pneumatic or individual tube hydraulic testing of each tube after finning.
Weld Materials UG-9	Does not exist in 1968 Code.	Weld materials must comply with ASME Section II	1986 Code more restrictive since 1968 Code did not specify any requirements.
Nonspec. Material UG-10	Provides conditions for accepting materials not fully identified with a Code-approved spec.	Expanded to include material with manufacturer certification and material identified in a production lot but not certified because documentation is not available.	1986 Code provides conditions for identified material with complete certification from the material manufacturer and material identified to a particular production lot but which cannot be qualified under UG-10(a).
Misc. Press. Parts UG-11	Provides exceptions for accepting prefabricated and preformed pressure parts.	Same as 1968 Code and allows parts to be furnished by a manufacturer who is not a Certificate of Authorization holder.	1986 and 1968 Codes equivalent. 1986 Code allows parts be furnished by a manufacturer who is not a Certificate of Authorization holder.
Bolts & Studs UG-12	Allows use of bolts and studs.	Expanded to include studs greater than 80 in. in length with unthreaded portion specs.	NA - Do not anticipate using stud >80 in. in length.

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UG (GENERAL)  
SURRY POWER STATION

Page 2 of 8

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Nuts & Washers UG-13	Allows use of nuts and washers.	Same as 1968 Code.	Equivalent requirements
Rods & Bars UG-14	Allows use of rod and bar stock for pressure parts.	Same as 1968 Code.	Equivalent requirements
Product Spec. UG-15	Does not exist in 1968 Code.	Allows use of wrought iron products for which no spec. exists for a particular grade under certain conditions.	NA - Since wrought iron products are not being used.
General (Design) UG-16	Specifies minimum thickness for plate	Expanded to be more specific and excludes corrosion allowance in allowable thickness.	1986 Code more restrictive since 1968 Code allowed corrosion allowance as part of min. wall.
Methods of Fab. UG-17	Allows construction by combination of methods.	Same as 1968 Code.	Equivalent requirements
Matl's in Comb. UG-18	Allows combination of materials.	Same as 1968 Code.	Equivalent requirements
Design Temp. UG-20	Guidelines for determining design temperature.	Expanded to include external pressure construction.	1986 Codes more restrictive. Includes section for design temperature limits for exterior pressure construction and maximum design temperature of materials.
Design Press. UG-21	Guidelines for determining design pressure.	Same as 1968 Code.	Equivalent requirements
Loadings UG-22	Loads to be considered during design.	Expanded to include attachment of internals and differential thermal expansion.	1986 Code more restrictive. 1986 Code includes the attachment of internals and differential thermal expansion in loadings to be considered in the design of a vessel.
Max. Allow. Stress UG-23	Guidelines for calculating maximum allowable stress values.	Expanded to include earthquake and wind loading.	1986 Code more restrictive. 1986 Code Section UG-23(d) provides criteria for the combination of earthquake loading or wind loading with other loadings in UG-22.



COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UG (GENERAL)  
SURRY POWER STATION

Page 3 of 8

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Corrosion UG-25	Guidelines for corrosion allowance.	Same as 1968 Code plus requires user to specify corrosion allowance other than those required by UG-25.	1986 Code more restrictive. Requires user to specify corrosion allowance other than those required by UG-25.
Linings UG-26	Linings not considered in wall strength.	Same as 1968 Code.	Equivalent requirements
Shell Thickness Internal Press. UG-27	Guidelines for calculating minimum shell thickness required.	Same as 1968 Code plus refers to UW-9 for reduction in thickness within a shell course or spherical shell.	1986 Code more restrictive. Requires any reduction in thickness within a shell course or spherical shell to be in accordance with UW-9.
Shell Thickness Under External Press. UG-28	Guidelines for calculating minimum shell thickness required.	Revised to use different equations; same basic content.	1986 Code is more restrictive. Both shells and tubes under external pressure are included. Different equations are used in the 1986 Code for the determination of required minimum thickness for cylindrical and spherical shells.
Stiffening Rings UG-29	Guidelines for moment of inertia for stiffening rings.	Revised to use new equations and figures for determining arc of shell left unsupported; same basic content.	1986 Code more restrictive. Equations are provided to determine required moment of inertia in cases where only stiffening ring is considered or combined ring shell is considered.
Attach. Stiff Rings UG-30	Guidelines for attaching stiffening rings to shell. NA	Revised to delete riveting and bolting as means of attaching stiffening rings; only welding and brazing now allowed.	1986 Code more restrictive. 1986 Code only allows welding and brazing to be used for attaching stiffening rings to shell.
Tubes UG-31	Guidelines for determining minimum tube wall thickness.	Revised to use Section UG-28 for pipe under external pressure instead of Figure UG-31 in 1968 Code.	Equivalent requirements. 1986 Code requires Section UG-28 be used for pipe under external pressure instead of Figure UG-31.
Flat Heads UG-34	Guidelines for determining minimum thickness of flat heads.	Same as 1968 Code; minor changes in equations.	Equivalent requirements. 1986 Code has minor changes in equations.

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UG (GENERAL)  
SURRY POWER STATION

Page 4 of 8

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Openings UG-36	Guidelines for size and shape of openings in vessels.	Revised to add reducers under external pressure and oblique, conical shell sections.	1986 Code more restrictive. Includes reducer sections under internal pressure and oblique conical shell sections under internal pressure.
Opening Reinf. UG-37	Guidelines for determining required opening reinforcement.	Revised to provide more detail. Added Figure UG-37-1; basically same content.	1986 Code has additional Figure UG-37-1, "Nomenclature and formulas for reinforced openings." This figure illustrates a common nozzle showing symbols and formulas for determining reinforcement requirements.
Reinf. Limits UG-40	Limits of reinforcement area.	Revised to use calculations from UG-37. Added Figure UG-40 for clarification of reinforcement dimensions.	1986 Code has additional Figure UG-40 which provides representative configurations describing the thickness or height of reinforcing element. UG-37 calculations are used to determine the maximum area in nozzle wall for reinforcement.
Reinf. Strength UG-41	Required strength of reinforcements for openings.	Revised to add Figure UG-41.1 for clarification of weld strength paths.	1986 Code has added Figure UG-41.1. Nozzle attachment weld loads and weld strength paths to be considered.
Attach. Nozzles UG-43	Methods of attaching pipe and nozzle necks to vessels.	Revised to delete riveted connections and added guidelines for stud thread engagement which are addressed in UG-44 in 1968 Code.	1986 Code does not allow riveted connections. It includes formula to determine minimum stud thread engagement.
Flanges & Pipe Fitting UG-44	Dimensional requirements of bolted flange connections.	Revised to refer to ANSI Standards.	1986 Code more restrictive. Instituted ANSI standards.
Nozzle Neck Thickness UG-54	Guidelines for wall thickness of nozzle necks.	Revised to account for external pressure situations.	1986 Code more restrictive. Has added requirements for vessels under external pressure. Nozzle neck thickness must now be required for internal and/or external pressure.
Supports UG-54	Refers to Appendix G for support design.	Same as 1968 Code.	Equivalent requirements

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UG (GENERAL)  
SURRY POWER STATION

Page 5 of 8

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Lug Attach. UG-55	Methods for attaching platforms, etc.	Revised to delete riveting as a method of attachment.	1986 Code more restrictive. Riveting is deleted as method of attachment of lugs or clips to the outside or inside of the vessel.
General (Fabric) UG-75	Introductory paragraph	Same as 1968 Code.	Equivalent requirements
Cutting Plates UG-76	Allowable methods of cutting materials.	Same as 1968 Code.	Equivalent requirements
Mat'l Ident. UG-77	Methods of marking materials used for fabrication.	Same as 1968 Code.	Equivalent requirements
Repair of Defects in Mat'l's UG-78	Allows repair of minor defects in material.	Same as 1968 Code.	Equivalent requirements
Forming Shell Sect. UG-79	Describes rolling of plates to avoid flat parts.	Same as 1968 Code.	Equivalent requirements
Permissible Out- of-Roundness UG-80	Guidelines for determining permis- sible out-of-roundness of cylindrical shells.	Revised to add more detail to external pressure example; same basic content.	1986 Code external pressure section in- cludes a paragraph for maximum permissible deviation from nominal plate thickness.
Lug Attach. UG-82	Requirement for lugs and attachments to conform to shell curvature.	Revised to include situation where lugs and attachments cover pressure-retaining welds.	1986 Code provides details for the attach- ment of pressure and nonpressure parts over pressure-retaining welds.
Charpy Tests UG-84	Specifies impact testing on all material subject to pressure stress.	Completely revised to specify Charpy impact tests; general revision to latest testing techniques.	1986 Code more restrictive. Imposes Charpy V notch impact tests specifically.
Heat Treatment UG-85	Addresses heat treating and marking when heat treating is not performed by the mill.	Same as 1968 Code.	Equivalent requirements
General (Inspec. & Test) UG-90	General requirements for testing and inspection.	Revised to define more clearly responsi- bilities and documentation required of the manufacturer and inspector.	1986 Code more restrictive. It is more detailed in respect to required tests, inspections, and supporting documentation.

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UG (GENERAL)  
SURRY POWER STATION

Page 6 of 8

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Inspector UG-91	Defines qualifications of Inspectors.	Same as 1968 Code plus Inspector monitors manufacturer's Quality Control System.	Equivalent requirements. An additional responsibilitiy for the Inspector is specified.
Inspec. Access UG-92	Addresses inspector access to manu- facturer's shop.	Same as 1968 Code.	Equivalent requirements
Insp. of Matl's UG-93	Specifies documentation review and inspections to be performed by Inspectors.	Revised to accept piece marking with grade type and class from spec.; lists inspections required if no piece marking.	1986 Code more restrictive. Additional inspections of materials to be welded required.
Marking Matl's UG-94	Requires marking material spec. on materials, inspection of <1/4" plate (steel) and 1/4" nonferrous plate for deep dye stamping.	Same as 1968 Code except deletes inspection for deep dye stamping.	Equivalent requirements. 1986 Code does not require inspection of deep dye stamping.
Exam. during Fab. UG-95	Requires inspection of materials during fabrication to detect defects.	Same as 1968 Code.	Equivalent requirements
Dimen. Checks UG-96	Requires inspection of dimensions and fit of attachments.	Revised to include all pressure-retaining parts and inspection of attachments for proper curvature before attaching to vessel.	1986 Code more restrictive. Dimensional check of all pressure-retaining parts is required. 1968 Code only required head and ring sections.
Insp. during Fab. UG-97	Requires inspection at various stages of construction and prior to final closure and at hydro.	Revised to require inspection inside vessel prior to final closure when conditions permit, external inspection at hydro and inspection of welds prior to application of linings.	1986 Code more restrictive. External in- spection of vessel at time of hydro and pneumatic test required. All welds inside vessel to be inspected prior to lining.
Max. Allow. Press. UG-98	Defines maximum allowable working pressure.	Same as 1968 Code.	Equivalent requirements.
Hydro Test UG-99	Defines requirements for hydro tests; sets limits for hydro pressure.	Revised to allow waiver of post-hydro visual inspection of joints at 2/3 hydro pressure under certain conditions; recommends use of liquid relief valve under certain conditions.	Equivalent requirements. 1986 Code includes a waiver of post-hydro visual in- spection if certain criteria as outlined in UG-99(g) are met.

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UG (GENERAL)  
SURRY POWER STATION

Page 7 of 8

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Pneumatic Test UG-100	Defines conditions under which pneumatic test may be substituted for UG-99 hydro and specifies procedure.	Revised to allow waiver of visual inspection at 4/5 test pressure under certain conditions.	Equivalent requirements. 1986 Code includes a waiver of inspection of vessel at 4/5 of required test pressure if certain criteria in UG-100(c) are met.
Proof Tests for Max. Allow. Press. UG-101	Guidelines for testing materials for maximum allowable working pressure.	Same as 1968 Code.	Equivalent requirements
Test Gauges UG-102	Specifies acceptable test gauges.	Same as 1968 Code plus more specific on gauge range.	Equivalent requirements
NDT UG-103	Refers to Appendices for MP and LP tests.	Same as 1868 Code.	Equivalent requirements
General (Marking) UG-115	General marking requirements	Expanded to include specific units of measurement.	1986 Code more restrictive. Specific units of measurement are required to be used.
Required Marking UG-116	Specifies pressure vessel marking.	Basically the same as 1968 Code. Updated to delete references to riveted and seamless construction and to add pressure welded.	Equivalent requirements
Method of Marking UG-117	Specifies method of marking vessels.	Same as 1968 Code.	Equivalent requirements
Stamping UG-118	Specifies stamping method.	Same as 1968 Code.	Equivalent requirements
Nameplates UG-119	Specifies nameplates to be used.	Revised to be more specific about methods of attaching.	1986 Code is more restrictive. It is expanded and requires nameplate to be attached according to UG-119(e).
Data Reports UG-120	Addresses data sheets and partial data report.	Revised to include manufacturer's Quality Control System and expand instructions for Forms U-1, U-2, U-3.	1986 Code more restrictive. The data sheets require more exact information be provided.
Press. Relief Devices UG-125	General requirements to provide pressure relieving devices.	Revised to address "non-reclosing pressure relief devices" instead of rupture discs.	Equivalent requirement

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UG (GENERAL)  
SURRY POWER STATION

Page 8 of 8

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Press. Relief Valves UG-126	Specifies types of relief valves.	Revised to change setting tolerances.	1986 Code more restrictive. Specific set pressure tolerances for pressure relief valves are required.
Liquid Relief Valves UG-128	Specifies liquid relief valve minimum size.	Same as 1968 Code.	Equivalent requirements
Marking UG-129	Specifies marking for relief valves.	Revised to include non-reclosing pressure relief devices.	Equivalent requirements
Use of Code Stamp UG-130	Restrictions for use of Code symbol stamp.	Same as 1968 Code.	Equivalent requirements
Cert. of Press. Relief Vlv. Cap. UG-131	Guidelines for certification of relief valve capacity.	Revised to allow for tests with water.	Equivalent requirements. Capacity certification test for pressure relief valve for noncompression fluids shall be conducted with water.
Determ. of Press. Reliev. Requir. UG-133	Guidelines for set pressures of relief valves - partially moved to UG-126 in 1986 Code and UG-132 in 1968 Code.	Revised to address pressure-relieving capacity, partially addressed in UG-131 in 1968 Code.	Equivalent requirement. Information is now split up into different sections.
Press. Set of Press. Relief Devices UG-134	Guidelines for set pressures of relief valves.	Same as 1968 Code UG-133.	Equivalent requirements
Installation UG-135	Guidelines for installation of relief devices, listed under UG-134 in 1968 Code.	Same as 1968 Code UG-134.	Equivalent requirements
Min. Req. for Relief Valves UG-136	Does not exist in 1968 Code.	Guidelines for mechanical, materials, inspection, testing of relief valves.	1986 Code more restrictive. This is a new section which institutes a larger group of minimum requirements.

APPENDIX C  
EVALUATION OF  
SUBSECTION UW (FABRICATION)  
1968 VS 1986 ASME CODE SECTION VIII, DIVISION 1

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UW (FABRICATION)  
SURRY POWER STATION

Page 1 of 5

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Scope (Fabrication) UW-1	Applicability of Part UW	Same as 1968 Code.	Equivalent requirements
Serv. Restrict UW-2	Special restrictions for certain service.	Same as 1968 Code except lethal substance service expanded.	Equivalent requirements, section added to provide details for the radiographic examination of exchanger tubes and clarification of rules for shell-tube construction.
Weld Joint Cat. UW-3	Established welded joint categories.	Same as 1968 Code.	Equivalent requirements.
General (Mat'l's) UW-5	General material requirements for pressure vessels.	Revised to address pressure, nonpressure parts, and electroslag welding and friction welding processes.	1986 Code more restrictive. Pressure and nonpressure parts are now addressed separately. Restrictions on type of material to be used with different welding techniques apply.
General (Design) UW-8	General design applicability statement.	Same as 1968 Code.	Equivalent requirements
Design of Weld Joints UW-9	Specifies types of weld joints permitted and plate thickness.	Section UW-9(c) Tapered Transitions revised. Figure UW-9, Butt Welding of Plates of Unequal Thickness revised. Tapered transition of 3 times offset now allowed instead of minimum of 4 times offset in 1968 Code.	1986 Code more restrictive. A transition of 3 times offset is required. Restrictions now apply if transition is provided by welding or grinding.
Postweld Heat Treat UW-10	Refers to UW-40 for postweld heat treating procedure.	Same as 1968 Code.	Equivalent requirements
Radiographics & Ultrasonic Exam. UW-11	Specifies requirements for radiographic weld examination.	Revised to reference weld categories (A,B, C, etc) and allow ultrasonic examination under certain conditions.	Equivalent requirements. Ultrasonic examination is now allowed for final closure seam under condition UW-11.a(7).
Joint Efficiencies UW-12	Refers to Table UW-12 for joint efficiencies to be used.	Revised to provide exception for UW-11(a) when applicable; addresses seamless vessel sections or heads.	1986 Code more restrictive. Seamless vessel sections or heads are considered equivalent to welded parts.



COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UW (FABRICATION)  
SURRY POWER STATION

Page 2 of 5

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Attach. Details UW-13	Provides attachment details for vessel heads to shell.	Revised to provide greater detail.	1986 Code more restrictive. Restrictions apply to tapered transition joints. Longitudinal weld covered in more detail.
Openings In or Adjacent to Welds UW-14	Guidelines for openings in welded joints.	Same as 1968 Code.	Equivalent requirements
Weld Connections UW-15	Guidelines for weld strength calculations.	Revised to exempt certain nozzle attachment welds in Figure UW-16.1 from strength calculations.	1986 Code more restrictive. Figure UW-16.1 is more detailed in requirement to exempt nozzle attachments from stress calculations.
Min. Req. for Attach. at Weld Connections UW-16	Guidelines for location and minimum size of nozzle welds and other weld connections.	Revised to provide greater detail.	1986 Code more restrictive. Code addresses more attachment weld configurations with respect to joint type and weld size.
Plug Welds UW-17	Guidelines for use of plug welds.	Same as 1968 Code.	Equivalent requirements
Fillet Welds UW-18	Guidelines for use of fillet welds.	Same as 1968 Code.	Equivalent requirements
General (Fab.) UW-26	General guidelines for fabrication.	Revised to include welders not employed by manufacturer and requirement for manufacturers.	1986 Code more restrictive. Only welding qualified to Section IX allowed. Guidelines provided for welders not in the employ of the manufacturer.
Weld Processes UW-27	Lists allowable welding processes.	Revised to include inertia and continuous drive friction welding, reference to Section IX definitions, arc, and resistance stud welding.	Equivalent requirement. 1986 Code includes inertia and continuous drive friction welding. Section IX referenced.
Weld Procedure Quality UW-28	Requires qualification of weld procedures.	Revised to address welding nonpressure bearing attached to pressure parts, welding of test coupons.	1986 Code more restrictive. Code addresses qualification of nonpressure bearing attachments; 1968 Code does not address this.

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UW (FABRICATION)  
SURRY POWER STATION

Page 3 of 5

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Test of Welders & Welding Operators UW-29	Guidelines for qualification of welders.	Revised to be more specific with regard to welder testing, test coupons, reference QW-300 of Section IX.	1986 Code more restrictive. More testing is required by the 1986 Code. They include test for stud welding and non-pressure-bearing attachments.
Lowest Weld Temperature UW-30	Establishes low temperature limits for welding.	Same as 1968 Code.	Equivalent requirements
Cut, Fit, Alignment UW-31	Guidelines for fitting and aligning parts prior to welding.	Revised to provide more detail on tack welds, inertia, and friction welding techniques.	1986 Code more restrictive. Tack welds procedure must be qualified with Section IX. Detailed instruction for inertia and continuous drive friction welding provided.
Surface Cleaning for Welding UW-32	Guidelines for cleaning surfaces prior to welding.	Same as 1968 Code.	Equivalent requirements
Align. Tolerance UW-33	Specifies alignment tolerances.	Revised to reflect joint categories.	Equivalent requirements
Finish Long. & Circ. Joints UW-35	Finish details for butt weld joints and reinforcements.	Revised to provide greater detail with regard to material thickness and joint types.	1986 Code more restrictive. Code covers a wider range of material thickness with respect to allowable reinforcement of the welds.
Fillet Welds UW-36	Guidelines for fillet weld penetration.	Revised address edge thickness reduction.	1986 Code more restrictive. The shrink of the base metal due to welding at the edge of fillet weld must meet the requirements of Section UW-35(a).
Misc. Weld Req. UW-37	Listing of miscellaneous weld requirements.	Expanded to include manufacturer's quality control system, inertia, and friction welding.	Equivalent requirements expanded to include welder identification required for permanent nonpressure parts.
Repair Weld Defects UW-38	Guidelines for repair of weld defects.	Same as 1968 Code except references "thermal gouging" instead of "oxygen grooving" to remove defects.	Equivalent requirements

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UW (FABRICATION)  
SURRY POWER STATION

Page 4 of 5

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Peening UW-39	Allows peening weld metal.	Same as 1968 Code.	Equivalent requirements.
Proc. for PWHT UW-40	Guidelines for postweld heat treating welds.	Revised to address pressure parts of two different postweld number groups and provide number groups and provide more specific description of "nominal thickness."	1986 Code more restrictive for welding materials of two different P-numbers. PWHT shall be as specified in either UCS-56 or UHA-32. Nominal thickness is defined in detail.
Sect. Weld Joints UW-41	Addresses weld joint inspection by sectioning.	Same as 1968 Code.	Equivalent requirements
Surf. Weld Metal Buildup UW-42	This section does not exist in the 1986 Code.	Guidelines for weld metal buildup construction.	1986 Code more restrictive. Deposits of weld metal deposited to base metal must be performed under a qualified procedure and NDE performed.
General (Insp. & Test) UW-46	General statement of applicability.	Same as 1968 Code.	Equivalent requirements
Check Weld Proc. UW-47	Requires use of qualified welding procedures.	Same as 1968 Code.	Equivalent requirements
Check Welder Qualifications UW-48	Requires use of qualified welders.	Same as 1968 Code.	Equivalent requirements
Check PWHT Practice UW-49	Requires verification of postweld heat treatment.	Same as 1968 Code.	Equivalent requirements
Radiograph Exam. Welded Joints UW-51	Guidelines for radiographic examination of welds.	Revised to reference ASME V, Article 2, for radiographic examination of welds.	1986 Code more restrictive. 1986 Code references ASME V, for radiographic requirements. This section is more detailed for methods and requirements for radiographic examination.

COMPARISON OF 1968 TO 1986 ASME CODE SECTION VIII DIVISION 1  
SUBSECTION UW (FABRICATION)  
SURRY POWER STATION

Page 5 of 5

SUBSECTION (1986 TITLES)	1968 ASME VIII	1986 ASME VIII	COMMENTS
Spot Exam. of Welded Joints UW-52	Guidelines for spot examination of welded joints.	Same as 1968 Code plus includes external pressure vessels which were excluded from the 1968 Code.	1986 Code more restrictive. Includes external pressure vessel examination when required or permitted.
Technique for Ultrasonic Exam. UW-53	This section does not exist in the 1968 Code.	Provides for ultrasonic examination of welds according to Appendix 12.	1986 Code more restrictive. This section was not in the 68 Code. Gives requirement for UT examination when required or per- mitted.
General (Mark & Reports) UW-60	Refers to UG-115 through UG-120 for stamping and reports.	Same as 1968 Code.	Equivalent requirments
General (Press. Relief) UW-65	Refers to UG-125 through 134 for pressure relief devices.	Same as 1968 Code.	Equivalent requirements