Staff Responses to Public Comments on Draft Regulatory Guide DG-1221, "Control of Stainless Steel Weld Cladding of Low-Alloy Steel Components" dated June 2009 (Proposed Revision 1 of Regulatory Guide 1.43 dated May 1973)

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Public Comments		NRC Response
NEI-1	The notices requested comments on all of these draft regulatory guides by August 31, 2009. NEI and EPRI are collecting and consolidating industry comments on these draft guides, but it has become apparent that it will not be possible to complete a comprehensive review of all of these documents in the time available, The information contained in these draft guides is important to the industry's work on primary system materials and it is important to carefully evaluate the changes proposed. NEI is therefore requesting a 30-day extension of the public comment period on these draft guides until October 1, 2009, to allow adequate time to complete and document our review.	Extension to October 1, 2009 granted per NRC 7590-01-P dated August 11, 2009 (ML092230530).
W-1	The draft RG retains the same reference to SA-508, Class 2 material as the original RG. Since SA-508 has been updated, and the classifications have changed, the DG should be updated to reflect that SA-508, Class 2 is now SA-508, Grade 2, Class 1.	"SA-508 Class 2" has been revised to "SA-508 Grade 2 Class 1 (formerly known as SA-508 Class 2)" in three places in Section B, Discussion, and in Position 1 of Section C, Regulatory Position, of the RG.

Public Comments		NRC Response
W-2	A typographic (extra period) occurs in the 6th paragraph of the Discussion section: "ASME Boiler and. Pressure Vessel Code."	The extra period has been removed from the RG.
W-3	Regulatory Position 3 states: "If production welding procedure does not conform to these limitations, an examination for cracking should be performed on the production part from which a section of cladding has been removed, or the cladding procedure should be requalified in accordance with Regulatory Position 2, above." If the production welding procedure does not comply with limitations on essential variables, it is already in violation of ASME Section IX. Therefore, more qualification should be required than is presently described in Position 2, or otherwise the cladding would have to be removed and re-applied within the essential variable limits. Alternatively, perhaps this position could be re-worded to clarify that the intent is not the limitations of essential variables from Section IX.	Position 3 of Section C, Regulatory Position, of the RG will be changed as follows: "Production welding should be monitored to verify compliance with the limitations on essential variables established by the procedure qualification. If the production welding procedure does not conform to these limitations, an examination for cracking should be performed on the production part from which a section of cladding has been removed, ~~or~~ and the cladding procedure should be requalified in accordance with Regulatory Position 2, above."
W-4	The Discussion portion of the DG talks about hydrogen related cracking as well as re-heat cracking. Is the testing in the Regulatory positions intended to detect both? It does not seem to have any limitations on testing directed towards hydrogen related cracking. If not addressed, should the DG clarify that the "regulatory position" only addresses re-heat cracking?	The regulatory positions in the RG address underclad cracking occurring in coarse grain steels when using high deposition welding processes such as strip and six wire cladding processes. Keeping the heat input rates below 150 KJ/in addresses or resolves this problem. No change is required to the RG regarding this comment.

Public Comments		NRC Response
DOM-1	Page 3, [5th] Paragraph: "Welding processes known to induce underclad cracking, such as the high-heat-input processes indicated above, should not be used for cladding material susceptible to underclad cracking, ..." It's not the cladding material that is susceptible. I think there is a phrase missing. It should read: "Welding processes known to induce underclad cracking, such as the high-heat input processes indicated above, should not be used for cladding any grade of material susceptible to underclad cracking, ..."	The fifth paragraph in Section B, Discussion, of the RG is changed as follows: "Welding processes known to induce underclad cracking, such as the high-heat input processes indicated above, should not be used for cladding any grade of material susceptible to underclad cracking, ..."
PG&E-1	In the discussion section, paragraph 9, a better description is needed for the alternative bend test. Should the maximum tensile stress be applied to the fusion line area and HAZ? The way it is currently written, the face of the bend specimen would be the weld-bead overlap area which can be consider to be weld metal. However, the expected cracking is in the base metal HAZ.	The ninth paragraph in Section B, Discussion, of the RG is changed as follows: "An alternative test method includes the use of standard guided bend tests in which the bend specimens are oriented approximately parallel (deviations not greater than 15 degrees) to the direction of welding. In this test, the tensile face must be located at the weld-bead-overlap area. The maximum tensile stress should be applied to the fusion line area and heat affected zone."

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PG&E-2	What about the option of making multiple cross-sections (minimum of 3) in the through-thickness direction either transverse to the weld or parallel to the weld. This way the weld, HAZ and base metal can be viewed.	The eighth paragraph in Section B, Discussion, of the RG is changed as follows: "... This is followed by progressive grinding and examination through the HAZ until the cracks are completely revealed. Another test method is to make a minimum of three cross section specimens in the through thickness direction either transverse or parallel to the weld and examine the weld, HAZ and base metal for cracks."
PG&E-3	Why is the acceptance criteria being applied to both test methods (polishing method and bend test). Cracks identified in the bend test method may be generated due to the tensile loading.	The acceptance criteria stated in Regulatory Position 2.e applies only to examination of polished samples. Position 2.e of the RG will be changed as follows: "e. The following indications on any 1 in. length of evaluation test specimen or over the area of review of the polished surface should be the basis for rejection of the welding procedure: (1) any fissures greater than 0.030 inch (0.76 mm) in length or 0.010 inch (0.25 mm) in depth, or (2) more than three fissures 0.005 inch (0.13 mm) to 0.010 inch (0.25 mm) in depth."
PG&E-4	In Section C.2.e, the acceptance criteria is applied for any 1-inch length. In the case of the polished surface test, should the acceptance criteria be over an area?	No, the acceptance criteria is applied to any one inch length of the cladding/base metal interface.

Public Comments		NRC Response
HUNT-A	There is no doubt that the current revision (Regulatory Guide 1.43) of Control of Stainless Steel Weld Cladding of Low-Alloy Steel Components issued in May 1973 needed revised. Since that time there have been dramatic improvements in base materials, welding processes used for overlay cladding, and NDE examination techniques. But I must say that as a professional engineer engaged in both the commercial nuclear and naval nuclear programs that I was disappointed in DG-1221. For a Regulatory Guide to achieve its intent it is imperative that it be clear, concise and recognize the current state of the nuclear fabrication industry. DG-1221 does not meet these objectives and is just a minor tweak of Regulatory Guide 1.43. DG-1221 is too vague and as such can easily lead to misinterpretation by the end user and therefore result in unintended outcomes from its use.	Please see NRC Response to specific comments below.
HUNT-1	SA-508 Class 2 and 3 are sited various times, yet in the current revision of the ASTM A-508-05b these alloys no longer exist. SA-508 Class 2 and 3 are no longer included as permitted base materials in the ASME B&PV Code and thus cannot be used for new construction therefore their reference in DG-1221 is outdated and meaningless. In addition, the lead-in paragraph in Section C leaves it up to the end user to determine "any grade of material that has a know susceptibility to underclad cracking". The vast majority of the industry is currently using fine grain SA-508 Type II Class I which is much less prone to underclad cracking and this needs recognized in DG-1221.	Please refer to the NRC Response to Comments B&W-B and B&W-2 below.
HUNT-2	DG-1221 sites references from 1971, 1972 and 2000. While these references supported and further validated the May 1973 revision, they are outdated today and newer references should be sited that address today's base materials and welding techniques and what has been learned in the last 10 years.	The cited references provide the latest available material for the topics relevant to the RG.

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HUNT-3	DG-1221 discussed "wide strip" SAW cladding and 6 wire SAW cladding but does not even mention other welding processes such as ESW (Electro Slag Welding) strip, ESO (Extended Stick Out ESW and SAW Strip Welding) and multi wire GMAW, just to name a few. The industry today considers strip wider than 60 mm to be wide so most welding engineers reading DG-1221 would consider DG-1221 to not apply when using strip of 60 mm width or less regardless of the welding process in use.	Please refer to the NRC Response to Comment B&W-3 below. Underclad cracking has been reported only in forgings and plate material of SA-508 Grade 2 Class 1 (formerly known as SA-508 Class 2) composition made to coarse-grain practice when clad using high-deposition-rate welding processes identified as "high-heat-input" (> 150 Kj/in) processes, such as the submerged-arc wide-strip and the submerged-arc 6-wire processes. Cracking was not observed in SA-508 Class 2 materials clad by "low-heat-input" processes controlled to minimize heating of the base metal. Therefore, this regulatory guide does not apply to other welding processes and material combinations that specify fine grain practice.
HUNT-4	DG-1221 implies that ultrasonic inspection cannot locate underclad cracking. While this was true in May 1973, it is not today. Enhanced ultrasonic inspection techniques are used in the nuclear industry today that can easily locate underclad cracking. The use of these enhanced "near zone" ultrasonic techniques needs to be recognized and encouraged in DG-1221.	Please refer to the NRC Response to Comment B&W-8 below.
HUNT-5	Section C, 1. can easily be interpreted to say that Section C and therefore DG-1221, ONLY apply when welding on SA-508 Grade 2 coarse grain forgings regardless of welding process or heat input in use. I doubt that is the intent but that is what the words say.	Please refer to the NRC Response to Comment B&W-2 below.

Public Comments		NRC Response
HUNT-6	In the second paragraph of Discussion, a discussion is included where cold cracking was observed when subsequent weld layers of stainless steel cladding were deposited without preheat. These occurrences have nothing to do with underclad clacking and should be removed from DG-1221. A good technical discussion of cold cracking and its prevention is already presented in Regulatory Guide 1.50.	The staff agrees with the commenter. The second paragraph in B, Discussion, of the RG will be changed as follows (also refer to the response to Comment B&W-2 below): "~~Reheat~~ Underclad cracking (or "hot" underclad cracking) has been reported only in forgings and plate material of SA-508 ~~Class 2~~ Grade 2 Class 1 (formerly known as SA-508 Class 2) composition[5] made to coarse-grain practice. High-deposition-rate welding processes such as the submerged-arc wide-strip (i.e., > 60 mm) and the submerged-arc 6-wire result in coarse grains in the weld metal. Reheat underclad cracking occurs when the ~~second~~ adjacent layer of high-heat-input cladding is added, which reheats the heat-affected zone (HAZ) in the carbon steel causing a liquid phase along the grain boundaries and grain boundary separation upon cooling. Reheat underclad cracking was not observed in SA-508 ~~Class 2~~ Grade 2 Class 1 (formerly known as SA-508 Class 2) materials clad by "low-heat-input" processes controlled to minimize heating of the base metal. ~~Cold underclad cracking (or "hydrogen-induced" underclad cracking) has occurred in American Society of Mechanical Engineers (ASME) SA-508 Class 3 Grade 3 Class 1 (formerly known as SA-508 Class 3) forgings after deposition of the second and third layers of cladding, where neither preheating nor postweld heat treatment was applied during the cladding process.~~ Further, cracking was not observed in clad SA-533 Grade B Class 1

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		plate material, which is produced to fine-grain practice, regardless of the welding process used. Fine grain forgings are a method to reduce the susceptibility to underclad cracking."
HUNT-7	Section C, 3. should be removed or revised. This statement has little meaning because no means of establishing limitations on essential variables established by procedure qualification has been specified in Section C, 2. DG-1221 should require, as a minimum, that the rules of the ASME B&PV Code be applied to define the limitations of essential variables for cladding procedures qualified in accordance with Section C, 2.	The staff disagrees with the commenter. Limits on essential variables are established by the rules of ASME Code, Sections IX and III, and are based on the values recorded in the procedure qualification. This RG recommends that production welding be monitored to ensure that limits on essential variables, which are based on the procedure qualification, are met.
HUNT-8	In summary, DG-1221 needs to be further revised to make it clear and concise so there is no room for incorrect interpretation by the end used. In particular the following need clearly addressed: 1) exactly what base metals alloys it applies to, 2) a definition of "high heat input cladding process" which recognizes the currently used industry cladding processes (SAW and ESW strip, multiwire SAW and GMAW), 3) current NDE ultrasonic techniques that examine the "near zone" for very small indications, 4) clarify - does DG-1221 even apply if "fine grain" material is being cladded plus a clear, industry recognized, definition of "fine grain".	For 1), please refer to the NRC Response to Comment HUNT-1 above. For 2), please refer to the NRC Response to Comment HUNT-3 above. For 3), please refer to the NRC Response to Comment HUNT-4 above. For 4), please refer to the NRC Response to Comment HUNT-5 above.

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HUNT-9	A final suggestion is that Draft NRC Regulatory Guidelines be subjected to a peer review by organizations such as EPRI, EWI and CNF and possibility industry companies such as Westinghouse, AREVA and Babcock and Wilcox before the draft guideline is released for public comment. This would lead to draft guidelines being in alignment with the current industry knowledge base and fabrication practices.	The RG was published in draft form for public comment for all organizations to consider. Organizations such as NEI, EPRI, and Westinghouse, among others, reviewed and commented on the draft RG.
B&W-A	While it is understood that the intended purpose of issuing Regulatory Guides is to ensure the safe and continued operation of US commercial nuclear power plants, vague Regulatory Guides can impose unintended restrictions on fabrication techniques. More importantly, a liberal interpretation of a vague Regulatory Guide can result in the technical concern outlined in the Regulatory Guide being ignored with the possible ramifications of decreased reliability, restricted operational parameters, more frequent in service inspections or possible licensing delays.	Please see NRC Response to specific comments below.

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B&W-B	The current revision of Regulatory Guide 1.43 has been interpreted by some to apply only when stainless steel cladding is being deposited on a coarse grain SA-508 Class 2 forging. This specific base material, as well as SA-508 Class 3, are no longer included as permitted base materials in the ASME B&PV Code and thus cannot be used for new construction. Most knowledgeable manufacturers now require SA-508 forgings to be produced with a fine grain size thereby significantly increasing its resistance to fracture and reheat cracking.	SA-508 Class 2 is now designated as SA-508 Grade 2 Class 1, and SA-508 Class 3 is now designated as SA-508 Grade 3 Class 1 by ASTM and ASME. The RG has been revised to reflect this change. Please refer to the NRC Response to Comment W-1 above. In addition to those changes, "SA-508 Class 3" has been revised to "SA-508 Grade 3 Class 1 (formerly known as SA-508 Class 3)" in one place in Section B, Discussion, of the RG. SA-508 Grade 2 Class 1 and SA-508 Grade 3 Class 1 are both listed in the 2009 Addenda of the ASME Boiler & Pressure Vessel Code, Section II as allowed materials. For example, Section II, Part D, Subpart 1, Table 2A, "SECTION III, CLASSES 1, TC, AND SC DESIGN STRESS INTENSITY VALUES S_m FOR FERROUS MATERIALS" includes listings for both materials. Also, please refer to the NRC Response to Comment B&W-2 below regarding fine grain size.

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B&W-1	The base material nomenclature has been revised in SA-508-05b, a forging base material specification contained in Section II, Part A of the ASME B&PV Code. The SA-508 Class 2 and 3 classifications are no longer utilized. These have been replaced with a classification system which indicates a Grade denoting a chemical composition range and Class indicating a mechanical property range. Since these classifications are the only ones mentioned in the current revision of the Regulatory Guide, some have interpreted it to only apply when stainless steel is being deposited on a coarse grain SA-508 Class 2 forging. The Regulatory Guide should address the revision in the specification nomenclature and very clearly indicate which base materials, by specification, have known susceptibility to underclad cracking.	Please refer to the NRC Response to Comment B&W-B above.
B&W-2	The current revision of Regulatory Guide 1.43 states specifically that reheat underclad cracking has only been observed on a coarse grain SA-508 Class 2 forging. The Regulatory Guide should address the use of fine grain forgings as a method to significantly reduce the susceptibility to underclad cracking.	The last sentence in the second paragraph of Section B is changed as follows (also refer to the response to Comment HUNT-6 above): "…cracking was not observed in clad SA-533 Grade B Class 1 plate material, which is produced to fine-grain practice, regardless of the welding process used. Fine grain forgings are a method to reduce the susceptibility to underclad cracking."

Public Comments		NRC Response
B&W-3	A definition of wide submerged arc (SAW) "wide strip" cladding should be established to provide greater uniformity when evaluating the acceptability of conventional SAW welding procedures. Conventional SAW strip is commonly recognized as having a 60 mm width. Wide strip is usually considered to be greater than 60 mm. 90 mm and 120 mm are "wide strip" widths presently in use. Strip widths smaller than 60 mm are also utilized, with 30 mm being the most popular. It would be easy to conclude that 60 mm strip need not be evaluated for underclad cracking.	The second paragraph of Section B, Discussion, of the RG is changed as follows(also refer to the response to Comment HUNT-6 above): "…High deposition-rate welding processes such as the submerged-arc wide-strip (i.e., > 60 mm) and the submerged-arc 6-wire result…" Section C, Regulatory Position, Position 1.a of the RG is changed as follows: "High-heat-input welding processes that induce underclad cracking such as the submerged-arc wide-strip welding process (i.e., > 60 mm) and the submerged-arc 6-wire process should not be used."

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B&W-4	A more global definition of "high-deposition-rate" welding processes referred to in the second sentence of the second paragraph of B. DISCUSSION of the draft Regulatory Guide should be developed. The draft Regulatory Guide only mentions submerged arc wide strip and the submerged arc 6-wire welding processes used in the early 1970s. Reference 3 states that reheat cracking has been produced with the semiautomatic gas metal-arc welding process, yet this process is not discussed in the draft Regulatory Guide. Since the early 1970s numerous variations of all of these welding processes have been developed and employed for cladding applications. Electroslag strip cladding (ESW) has replaced submerged arc cladding (SAW) in a number of applications. Both of these cladding processes have further been modified to employ the use of an extended electrode extension (ESO) to reduce weld dilution, increase cladding rates or decrease heat input. As industry moves to utilize more automation, ESW and SAW are being replaced by the gas metal-arc welding process which can be more readily utilized by robotics. Additionally all welding processes can be further modified by adding supplemental filler metal by feeding additional filler wire either cold or electrically heated. This development of cladding procedures continues as lasers are being employed as a supplementary heating source to smooth out the weld deposit in "hybrid" welding process variations. These welding process variations are not well characterized with the conventional calculation for heat input (amperage X voltage X 60 / travel speed). Defining a limit of grain growth in the heat affected zone of the base material should be considered as a screening process for high heat input welding processes. This would limit the number of welding processes that would need to be subjected to the expensive testing procedure defined in C. REGULATORY POSITION and ensure that all high heat input cladding processes are properly evaluated.	The second sentence of the first paragraph in Section C, Regulatory Position, states the following: “Welding processes that induce underclad cracking by generating excessive heating and promoting grain coarsening in the base metal should not be used for cladding any grade of material that has a known susceptibility to underclad cracking.” The NRC will continue to assess the state of the art of welding nuclear components and update regulations and guidance as information becomes available.

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B&W-5	The third sentence in the second paragraph of B. DISCUSSION of the draft Regulatory Guide incorrectly states "Reheat underclad cracking occurs when the second layer of high-heat-input cladding is added---". The six wire welding process previously utilized by B&W as reported in reference 4 was a single layer cladding process. This report clearly states that the observed underclad cracking occurred in the coarse grain region of the previous weld bead adjacent to the weld overlap of the current weld bead being deposited. This point is reinforced by the examination method described in Paragraph 2d of C. REGULATORY POSITION. This technical error should be corrected.	The third sentence in the second paragraph of Section B, Discussion, of the RG is changed as follows (also refer to the response to Comment HUNT-6 above): “Reheat underclad cracking occurs when the ~~second~~ adjacent layer of high-heat-input cladding is added, which reheats the heat-affected zone (HAZ) in the carbon steel causing a liquid phase along the grain boundaries and grain boundary separation upon cooling.”
B&W-6	Several manufacturers have successfully utilized a two weld layer cladding procedure to minimize the possibility of underclad cracking. These procedures were intentionally designed to develop a heat input sufficient to either temper the heat affected zone (reduce the base material hardness) or refine the coarse grain size developed by deposition of the first weld layer. This very successful technology is in conflict with the wording in comment 4 above which infers that the second weld layer initiates underbead cracking. The Regulatory Guide should address the use of two weld layer cladding processes to reduce susceptibility to underclad cracking.	Please refer to the NRC Response to Comment B&W-5 above.

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B&W-7	The third sentence in the second paragraph of B. DISCUSSION of the draft Regulatory Guide which incorrectly states "Reheat underclad cracking occurs when the second layer of high-heat-input cladding is added---"directly conflicts with the first sentence of the third paragraph of B. DISCUSSION which states "Characteristically, the underbead cracking occurs only in the grain-coarsened region of the base metal HAZ at the weld overlap." This also conflicts with the requirement specified in d. of C. REGULATORY POSITION to evaluate "A minimum of two weld clad overlap areas". The discussion in the Regulatory Guide should be revised to clearly indicate that underclad cracking occurs in the weld overlap of the first weld layer.	Please refer to the NRC Response to Comment B&W-5 above.
B&W-8	Reference 4 clearly demonstrated that minimal underclad cracking occurs prior to being subjected to a post weld heat treatment and the greater majority of underclad cracking occurs during a post weld heat treatment. Both conventional and enhanced UT examinations are currently used by a number of manufacturers to ensure that the size and distribution of any underclad cracking is below limits justified by engineering evaluations. The Regulatory Guide should state that NDE is only a valid examination if performed after a post weld heat treatment.	The third paragraph of Section B, Discussion, of the RG is changed as follows: "Characteristically, the underclad cracking occurs only in the grain-coarsened region of the base metal HAZ at the weld bead overlap. The subsurface location and size of these cracks [0.5 in. (1.3 cm) long x 0.165 in. (4.2 mm) deep, maximum] make them challenging to detect using nondestructive examination. NDE should be performed following post weld heat treatment as underclad cracking can grow during postweld stress relief heat treatment.[4] Detection often requires destructively removing the cladding to the weld fusion line and examining the exposed base metal either by metallographic techniques or with liquid penetrant or magnetic particle testing methods."

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B&W-9	Enhanced UT examination is currently used by a number of manufacturers to ensure that the size and distribution of any underclad cracking is below limits justified by engineering evaluations. These enhanced UT examinations were not included in early evaluations (mid 1970 thru early 1980) because techniques and equipment required to perform these examinations were not yet available. Techniques and equipment for performing these enhanced UT examinations have been much improved in the past decades. The Regulatory Guide should be strengthened to embrace this NDE examination and to clarify that it is only a valid examination if performed after a post weld heat treatment.	Please refer to the NRC Response to Comment B&W-8 above.
B&W-10	Initial construction of commercial nuclear reactor pressure vessels during late 1970 thru mid 1980 extensively utilized plate materials to fabricate heads and shell sections. Plate was rolled and long seam welded to form shells. Plate was hot formed in large presses to form complete heads or head component parts. Forgings were mostly procured for flanges, tubesheets and nozzle belts. During these early fabrication years, most of the large forgings being clad were component parts of the reactor vessel and closure head. So when the issue of underclad cracking surfaced, most cladding of pressure vessel forgings was on parts for the reactor vessel and closure head. It is realized that Regulatory Guide 1.43 applies to reactor vessel and closure head fabrication because of this history. The Regulatory Guide should more clearly state what components it is intended to be applied to.	The first paragraph of Section C, Regulatory Position, of the RG is changed as follows: "...Weld cladding ~~practices used in the fabrication of low-alloy steel safety-related components should be conducted in accordance with the following guidelines:~~ Class 1 and 2 vessels and components should comply with Section III and Section IX of the ASME Boiler and Pressure Vessel Code, supplemented by the following:"

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B&W-11	In the fifth sentence of the second paragraph of B. DISCUSSION, a discussion is included where cold cracking was observed when subsequent weld layers of stainless steel cladding were deposited without preheat. These occurrences, although associated with stainless steel cladding, are not germane to the balance of the rest of this discussion. A review of reference 3 indicates that these occurrences deal more with the lack of proper preheating practices which were compounded by high levels of diffusible hydrogen than with high heat input practices initiating reheat cracking. Controls to be enacted to preclude cold cracking and the technical evaluations or qualifications to ensure the adequacy of these controls are much different than controls to be enacted to preclude reheat cracking. Intertwining these two technical issues serves no purpose as C. REGULATORY POSITION provides no discussion of the controls or evaluations to be implemented to preclude cold cracking. A good technical discussion of cold cracking and its prevention is presented in Regulatory Guide 1.50. This documented problem should be discussed in Regulatory Guide 1.50 or a new Regulatory Guide and all reference to cold cracking removed from the draft Regulatory Guide 1.43.	Please refer to the response to Comment HUNT-6. Reference to cold cracking has been deleted.
B&W-12	Footnote 5 suggests that plate made to a coarse grain practice and a composition similar to SA-508 Class 2 is reported to have exhibited underclad cracking. A topical report outlining the details of this occurrence should be cited. The relevancy of this occurrence can only be ascertained if the technical details are available for examination.	Footnotes 1 through 4 cite reports detailing underclad cracking.

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B&W-13	Paragraph 2.a of C. REGULATORY POSITION, states "Base material for the test should be of the same grade as that to be used in production." As discussed in Comment 1 above, the current SA-508 material specification identifies base materials with a Grade denoting a chemical composition range and Class indicating a mechanical property range. Most of the materials listed in SA-508 can be procured to either a coarse or a fine grain melting practice. The Regulatory Guide should clarify what changes in base material should be permitted without requalification.	Section C, Regulatory Position, Position 2.a of the RG is changed as follows: "Base material for the test should be of the same grade and class as that to be used in production. A minimum of three representative heats of material should be tested. Where less than three heats of material are used in production, these heats may be tested in lieu of the three representative heats."
B&W-14	Paragraph 3. of C. REGULATORY POSITION, states "Production welding should be monitored to verify compliance with the limitations on essential variables established by procedure qualification." This statement has little meaning because no means of establishing limitations on essential variables established by procedure qualification has been specified. Regulatory Guide 1.43 should require, as a minimum, that the rules of the ASME B&PV Code be applied to define the limitations of essential variables for cladding procedures qualified in accordance with Paragraph 2. of C. REGULATORY POSITION.	Please refer to the responses to Comments HUNT-3 and W-3 above.

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B&W-C	In summary, Regulatory Guide 1.43 dated May 1973 does require revision as it is vague and has not been updated to utilize current base material terminology. Since the Regulatory Guide has been issued, numerous vessels have been manufactured by numerous fabricators for the US nuclear industry. Since compliance with this Regulatory Guide was applicable for the licensing of these new components, the position statements for each of these components should be reviewed prior to the finalization of this draft Regulatory Guide. One would expect that new conclusions could be reached concerning procurement of less susceptible base materials, a better definition of "High Heat Input Cladding Processes" and current NDE examinations. The current draft can be improved significantly to remove the vagueness of the current Regulatory Guide.	Please see NRC Response to specific comments above.