April 6, 2009

Mr. Jerald G. Head
Senior Vice President, Regulatory Affairs
GE Hitachi Nuclear Energy
3901 Castle Hayne Road MC A-50
Wilmington, NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 323 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Head:

By letter dated August 24, 2005, GE Hitachi Nuclear Energy submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The U.S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

If you have any questions or comments concerning this matter, you may contact me at 301-415-3808 or zahira.cruz@nrc.gov, or you may contact Amy Cubbage at 301-415-2875 or amy.cubbage@nrc.gov.

Sincerely,

/RA/

Zahira Cruz Perez, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-010

Enclosure:
Request for Additional Information

cc: See next page

April 6, 2009

Mr. Jerald G. Head
Senior Vice President, Regulatory Affairs
GE Hitachi Nuclear Energy
3901 Castle Hayne Road MC A-50
Wilmington, NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 323 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Head:

By letter dated August 24, 2005, GE Hitachi Nuclear Energy submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The U.S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

If you have any questions or comments concerning this matter, you may contact me at 301-415-3808 or zahira.cruz@nrc.gov, or you may contact Amy Cubbage at 301-415-2875 or amy.cubbage@nrc.gov.

Sincerely,

/RA/

Zahira Cruz Perez, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-010

Enclosure:
Request for Additional Information
cc: See next page
Distribution: See next page

ADAMS ACCESSION NO. ML090930545 NRO-002

OFFICE	PM:NGE1:NRO	PM:NGE1:NRO
NAME	ZCruz Perez	ACubbage
DATE	04/06/09	04/06/09

OFFICIAL RECORD COPY

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO.323 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION DATED APRIL 6, 2009

Distribution:
PUBLIC

Hard Copy
NGE1/2 R/F
ZCruz Perez, NRO
CPatel, NRO

E-Mail:
RidsNroDnrlNge1
RidsNroDnrlNge2
RidsAcrsAcnwMailCenter
RidsOgcMailCenter
KWinsberg, OGC
JJolicoeur, RES
SMarshall, RES
SChakrabarti, NRO
SSamaddar, NRO
DJeng, NRO

Requests for Additional Information (RAIs)
ESBWR Design Control Document (DCD), Revision 5

RAI Number	Reviewer	RAI Summary	RAI Text
3.7-69	Jeng D	Analysis method used for all new SASSI analyses.	Confirm that all new SASSI analyses conducted in support of the RAI 3.8-94 response, including the three (3) uniform site cases with embedment, used the "NRC Method" (as defined by GEH) to derive the surface spectra. If this is not the case, provide technical justification for the method employed.
3.7-70	Jeng D	Justification for determining that a shear wave velocity ratio of 2.5 or less between the top and middle layers.	Describe in detail how it was determined that a shear wave velocity ratio of 2.5 or less between the top and middle layers is acceptable, while a shear wave velocity ratio greater than 2.5 between the top and middle layers is not acceptable. Include numerical results from any parametric studies conducted.
3.7-71	Jeng D	Exclusion of layered cases 2 and 4.	With the exclusion of Layered Cases 2 and 4, the staff is concerned that GEH has not included a sufficient diversity of layered site cases to draw generic conclusions about the response of the ESBWR Category I structures for a realistic range of possible site conditions. Layered Cases 1 and 3 only examine the sensitivity of the structural response for two (2) different thicknesses (20m and 40m) of a 300 m/s shear wave velocity layer above bedrock (1700 m/s shear wave velocity). This is hardly representative of the realistic range of possible site conditions. Provide the technical basis, including numerical results as applicable, for concluding that the only restriction for layered sites is the 2.5 ratio discussed in RAI 3.7-70.
3.7-72	Jeng D	Embedment effect not considered in earlier analyses based on the results obtained by the new analyses.	GEH states in the DCD, through Rev. 5, and in prior RAI responses, that ignoring embedment effects is conservative. Conceptually, the staff concurred with this. Therefore, the finding that in-structure response spectra generated at the top of the CB using the new SASSI analysis results for uniform sites <u>with</u> embedment significantly exceed the DAC-3N analysis results for uniform sites <u>without</u> embedment requires further evaluation. The staff reviewed the new response spectra comparisons included in the response to RAI 3.8-94, and noted that the significant exceedances are in the 2 horizontal directions, at about 15 Hz, for the hard uniform site.

			(1) To better characterize these results and understand this behavior, the staff requests GEH to provide separate one-to-one comparisons between DAC-3N results and SASSI results for (1) each of the 3 uniform site cases (soft, medium, hard), (2) for each direction (X,Y,Z), and (3) for the CB Top and the CB Basemat, a total of 18 comparisons. (2) The staff also requests GEH to evaluate whether each "with embedment" exceedance can be explained on physical grounds, or if it is potentially an indication of a modeling or numerical error.
3.7-73	Jeng D	Technical explanation for CB eigenvalue analysis results.	The staff discovered an unexpected result while reviewing DCD Tables 3A.7-8 through -14, which lists the CB eigenvalue analysis results (frequencies and participation factors) for the first 10 modes, for 7 different site conditions. In six (6) of the seven (7) tables, there is an identical frequency of 14.83 Hz, with only "Z rot" participation. The seventh ($7^{th)}$ table (fixed base) lists a frequency of 15.19 Hz, with only "Z rot" participation. This appears to indicate the presence of a natural vibration mode that is not sensitive to the site condition, and only involves rotation about the vertical axis. The staff requests the applicant to provide a technical explanation for this modal behavior. Also, the staff requests the applicant to evaluate whether this mode may be driving the CB spectral spikes at about 15 Hz.
3.8-94 S04	Chakrabarti S	Additional clarification on High Dynamic Bearing Pressure	Based on the review of GEH RAI 3.8-94 S03 response, presented in GEH letter dated February 20, 2009, GEH is requested to address the items described below. A) As described on page 10 of 34 in the RAI response, the evaluation of peak toe pressure is made considering the bearing pressures due to the three perpendicular earthquake directions at only three time steps and not at every time step throughout the time history. The three time steps correspond to the time when Mx is maximum, when My is maximum, and when V is maximum. At each of these three time steps, the other two corresponding forces are utilized. GEH is requested to provide the technical basis why this approach is considered to be acceptable since at other time steps, where Mx, My, and V may not be maximum values, the resulting bearing pressures may actually be higher. Typically, a bearing pressure time history analysis should be

			performed at every time steps using algebraic summation or alternatively, the bearing pressures due to the three maximum forces may be combined by the SRSS method. B) As described on page 11 of 34 in the RAI response, the calculation of bearing pressure is performed for one horizontal and vertical directions (i.e., two dimensional evaluation) using the "Energy Balance Method." Then another calculation is performed for the maximum bearing pressure contribution from the other horizontal earthquake direction. The total bearing pressure is then determined by the addition of these two values. GEH is requested to describe and identify the source of the specific "Energy Balance Method" being used to calculate the bearing pressure for this evaluation. Also, explain how the contact lengths CL and CW shown on page 10 of 33 are determined. C) The forces used to calculate the maximum soil bearing pressures were obtained from the SASSI analyses. These analyses consider that the soil and foundation are integrally connected. However, the bearing pressure calculations on page 11 of 34 show that uplift occurs. Describe the extent of the maximum uplift that occurs in SASSI (denoted by tension in the soil springs), recognizing that this region could expand further if the tension springs would be released using a different computer code. Provide the technical basis for using these seismic loads in the bearing and sliding calculations from the SASSI analyses without consideration of the effects of uplift on the seismic demand loadings. Alternatively, an analysis that considers the nonlinear effect of liftoff due to the three input directions applied simultaneously can be considered. D) In Item 3 on page 12 of 34 (Evaluation of Results), GEH indicates that the resulting toe pressures from the two layered soil cases (L2 and L4) are large as compared to those of the other generic soil cases. GEH deduces that this result may be due to the fact that large velocity contrasts exist in the layers of these cases (greater than 2.5). In the last paragraph on this page, the statement is made that "the best estimate low strain profile can be used because only the velocity ratio is of interest". However, it is not clear if this difference is in fact the only cause or even the primary cause of the computed large peak responses. Other issues (such as the reduction in site radiation

			damping due to layering effects, ratios of the velocity to the bedrock velocities below, impact of layer thickness on the computed site amplification, etc.) may in fact contribute to such large responses. Provide detailed information to indicate that (a) the velocity ratio is the primary parameter controlling such high amplifications in toe pressure, and (b) the value of the site parameters that will lead to acceptable levels of peak toe pressure. Also see requested information in the new RAIs 3.7-70 and 71, which relate to this issue. E) In the same discussion (Item 3 on page 12 of 34 - Evaluation of Results), a new site interface parameter, for the maximum ratio of soil shear wave velocity in adjacent layers, will be added to the DCD. The RAI response states that "The ratio is the average velocity of the bottom layer divided by the average velocity of the top layer." Provide a description of how the average shear wave velocity is calculated and include it in the appropriate locations in the DCD (i.e., DCD Tier 2, Section 2 as well as Table 2.0-1, and DCD Tier 1, Table 5.1-1). Also, provide the technical basis for this definition of the average shear wave velocity and explain how it would compare to the results obtained by properly treating multiple layers of varying shear wave velocities. F) In the same discussion (Item 3 on page 12 of 34 - Evaluation of Results), the statement is made that "this velocity ratio condition does not apply to the FWSC nor to the RB/FB and CB if founded on rock-like material having a shear wave velocity of 1067 m/sec (3500 ft/sec) or higher." The definition of "rock" material, following the guidance of the SRP Section 3.7.2, associated with SSI evaluations is not 3,500 fps but 8,000 fps after which SSI effects are considered small. Provide the numerical results available to indicate that the computation of maximum toe pressure is not impacted by the velocity ratios for cases where the layer beneath the basemat has velocities greater than 3,500 fps. G) In DCD Tier 1, Table 5.1-1 and DCD Tier 2, Table 2.0-1, the descriptions provided for minimum static and minimum dynamic bearing capacity are not clear. These requirements should be specified as "maximum bearing demand" not "minimum bearing capacity" since these values were obtained from the envelope of the elastic SASSI results applied to the liftoff calculations. The COL applicant then needs to determine the allowable

			bearing pressure based on the site-specific soil "bearing capacity" divided by the factor of safety appropriate for the design load combination. Therefore, the DCD should be revised to capture the following items: (1) present the values as maximum static bearing demand and maximum dynamic bearing demand, and (2) expand the footnote applicable to these values to state that the allowable bearing pressure shall be developed from the site-specific bearing capacity divided by a factor of safety appropriate for the design load combination. H) In Section 3A.8.8, there is no indication that the torsional seismic effects are included in developing the soil pressures for the design of the foundation walls, along with the wall pressures from the translational seismic loadings. Explain how the torsional seismic effects have been included in the design of the foundation walls. I) In several of the enveloping floor response spectra (e.g., Figures 3.8-94(19), (20), and (22), the staff noted that "valleys" exist between successive peaks in the low frequency region, up to approximately 5 Hz. If the spectral peaks are influenced by site conditions, it is the staff's position that these "valleys" should be filled-in to accommodate the expected variability in site shear wave profiles that may be encountered for this generic design. GEH is requested to provide an explanation why these valleys have not been filled-in. J) In item (3) on page 14 of 34, Table 3.8-94(5) – Maximum Dynamic Soil Bearing Stress Involving SSE + Static, the bearing pressures under soft, medium and hard soils for each of the three structures (RB/FB, CB, and FWSC) are presented. For the CB, the tabulated bearing pressures are 0.44 MPa for soft, 2.2 MPa for medium, and 0.42 MPa for hard soils. These values show a very large variation between the medium soil values and the other two values, unlike the RB/FB and FWSC, where a more gradual variation exists. Therefore, GEH is requested to explain why the bearing pressure for the CB medium soil case varies by a factor of five times from the soft and hard soil cases.

3.8-96 S04	Chakrabarti S	Additional clarification on Sliding analysis	Based on the review of GEH RAI 3.8-96 S03 response, presented in GEH letter dated February 20, 2009, GEH is requested to address the items described below. A) In response to Item 3 on Page 21 of 27, the following statement is made. "The weak link at the sliding interface of concrete to soil is the soil, since the concrete surface in contact with soil is rough. As a result, the 0.7 coefficient of friction is controlled by the soil shear strength as a function of internal friction angle, tan (ϕ), where ϕ is equal to 35 degrees. Since this friction angle results in a friction coefficient larger than 0.6, which is the value for concrete placed against hardened concrete not intentionally roughened in accordance with ACI 349 Section 11.7.4.3, roughening the mudmat top surface is required to ensure that the interface between the basemat and mudmat is not the controlling sliding surface. The following statement, "The top surface of the mudmat is intentionally roughened in accordance with ACI 349-01 Section 11.7.9 requirement." will be added to DCD Tier 2 Subsection 3.8.6.5." This response however, appears to neglect potential sliding between the bottom of the mud mat and the soil surface, and implies that sliding will take place in the soil below the mud mat. GEH is requested to provide the technical basis for the statement that "the concrete surface in contact with the soil is rough", and as a result, the failure surface can only occur within the soil below the mud mat (e.g., providing appropriate references and/or test data). Alternatively, testing by the COL applicant may be required to demonstrate this assumption. B) In Item (8) (page 21 of 27), GEH indicates that the design forces on the walls of the NI are based on the envelope of SASSI runs for non-embedded cases using uniform half-space representations of a site as well the results of two layered soil cases using the embedded condition of the NI. Provide the following information for the embedded soil cases: (1) explain whether the input motions were defined at the basemat elevation, (2) if so, explain how the motions were converted to the appropriate input motions in SASSI problem, and (3) explain why the results of two layered cases can be considered as bounding for generic design. Also see requested information in new RAIs 3.7-69 and 71, that relate to this issue.

			In the same section, GEH also provides the following recommendation: "To ensure the wall design seismic lateral pressures induced from backfill are not exceeded, a COL item will be added in DCD Tier 2 Table 2.0-1 to limit the product of peak ground acceleration (α) of the site-specific Foundation Input Response Spectra (FIRS) in g's, Poisson's ratio (v) and density (γ) as follows: α (0.95v + 0.65) γ: 1220 kg/m3 (76 lbf/ft3) maximum." Provide an explanation and the basis for this recommendation. C) In Item (9) (pages 22 through 26 of 27), a description of the revised sliding evaluation is presented. This new calculation considers the static coefficient of friction beneath the basemat and on the side walls, passive soil pressures, and at rest soil pressures. As indicated in the prior revision to this RAI, the use of these terms should be based on a consistent set of expected deformations. For example, to develop the full passive pressure capability of the soil implies that sufficient foundation deformation occurs. This may not be consistent with the use of the full static coefficient of friction. Therefore, provide detailed information which demonstrates that the individual forces used in the stability calculations are calculated in a consistent manner for the assumed foundation displacements. D) In Item (9), (page 24 of 27), the lateral resistance pressure (Fr) provided by the foundation/walls perpendicular to the direction of motion is defined to be the difference of the passive and active pressures. The paragraph also states that "The net resistance is determined to achieve the required 1.1 FS, while not exceeding the at-rest soil pressure considered in the wall design." For the FWSC, another term Fr' is defined as: "Lateral resistance pressure along the FWSC shear-key normal to the direction of motion. The net resistance is determined to achieve the required 1.1 FS." In Section 3 – Summary of Calculated FS, presented on page 25 of 27 of the RAI response, the minimum FS for the RB/FB is equal to 1.53, and for the CB and FWSC the FS is 1.1. GEH is requested to address the related items listed below. (a) For the RB/FB, if Fr is calculated such that the FS is equal to 1.1, explain why the Summary of Calculated FS in the RAI response states that FS is equal to 1.53 and not 1.1.

			(b) Explain why Fr "is determined to achieve the required 1.1 FS, while not exceeding the at-rest soil pressure considered in the wall design." According to the DCD, the foundation walls are designed for the worst soil pressures resulting from either SASSI 2000 analysis or ASCE 4-98 methodology, not the at-rest soil pressure. (c) For Fr' (used for the FWSC), there is no limitation on exceeding the at-rest soil pressure considered in the wall design, as there is for the other structures. Confirm that this was intended to be the case. If so, then were the shear keys designed for this potentially higher passive pressure load? (d) In view of the confusion, for each of the three structures (RB/FB, CB, and FWSC), provide a description of the approach used to calculate each of the resisting forces, their calculated magnitudes (for the governing FS), and compare the total calculated pressures for these resisting forces to what were used in the actual design. This comparison should clearly demonstrate that the foundation walls were designed to the higher of the SASSI 2000 analysis, ASCE 4-98 methodology, and sliding stability required passive pressures. E) In Item (9) (page 24 of 27), the lateral resistance provided by the foundation/walls <u>parallel to the direction of motion</u> (i.e., vertical edges of the side foundation/walls) is given as $F_{us} = P_o \tan(\phi)$, where ϕ is the soil internal friction angle. Since waterproofing membrane will be used on the vertical edges of the foundation and walls, explain how will it be demonstrated that the coefficient of friction between soil and the membrane is greater than 0.7 (based on $\tan(\phi)$, where ϕ = 35 degrees for the soil). F) In the description of the sliding evaluation method presented on page 24 of 27, the effective friction angle for wet sites is indicated to be determined from undrained shear strength data. If, as indicated in the RAI responses provided by GEH, effective pore pressures under seismic conditions are deemed to remain unchanged during short seismic response times, explain why the effective friction angle is not defined as potentially zero, particularly for silty foundation soils.

			G) In Item (10) (page 26 of 27), GEH indicates that "The basemat is designed to limit the concrete crack width during construction and normal conditions to no more than 0.4mm." Item (10) also states that "The mud mat is designed as structural plain concrete in accordance with ACI 318-05." Since the concrete is identified as plain concrete, it is not clear whether any reinforcement is utilized in the mud mat. Explain whether the design of the mud mat includes sufficient reinforcement: to limit cracks to no more than 0.4mm and to address temperature and shrinkage effects in accordance with ACI code requirements. Identify where the reinforcement requirements for the mud mat are defined in the DCD. H) In Item (10) (page 26 of 27), GEH indicates that a membrane waterproofing system is applied to the exterior walls and is relied upon to prevent infiltration of ground water through the exterior walls below grade. This does not address the RAI question which asked what waterproofing system is relied upon. GEH should provide information such as the type of waterproofing material, thickness, and whether the provisions of an industry standard such as ACI 515.1R-79 (revised 1985) will be used. I) GEH is requested to revise other applicable sections of the DCD (Section 3.8 and related appendices) that are affected by the revised calculation for sliding stability. As an example, DCD Tier 2, Section 3.8.5.5 – Structural Acceptance Criteria does not reflect the current approach being used.

cc:

Ms. Michele Boyd
Legislative Director
Energy Program
Public Citizens Critical Mass Energy
and Environmental Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

Mr. Tom Sliva
7207 IBM Drive
Charlotte, NC 28262

DC GE - ESBWR Mailing List

Email

aec@nrc.gov (Amy Cubbage)
APH@NEI.org (Adrian Heymer)
art.alford@ge.com (Art Alford)
awc@nei.org (Anne W. Cottingham)
bevans@enercon.com (Bob Evans)
BrinkmCB@westinghouse.com (Charles Brinkman)
cberger@energetics.com (Carl Berger)
charles.bagnal@ge.com
charles@blackburncarter.com (Charles Irvine)
chris.maslak@ge.com (Chris Maslak)
CumminWE@Westinghouse.com (Edward W. Cummins)
cwaltman@roe.com (C. Waltman)
dan1.williamson@ge.com (Dan Williamson)
Daniel.Chalk@nuclear.energy.gov (Daniel Chalk
david.hinds@ge.com (David Hinds)
david.lewis@pillsburylaw.com (David Lewis)
David.piepmeyer@ge.com (David Piepmeyer)
donaldf.taylor@ge.com (Don Taylor)
erg-xl@cox.net (Eddie R. Grant)
Frostie.white@ge.com (Frostie White)
gcesare@enercon.com (Guy Cesare)
GEH-NRC@hse.gsi.gov.uk (Geoff Grint)
george.honma@ge.com (George Honma)
GovePA@BV.com (Patrick Gove)
greshaja@westinghouse.com (James Gresham)
gzinke@entergy.com (George Alan Zinke)
hickste@earthlink.net (Thomas Hicks)
hugh.upton@ge.com (Hugh Upton)
james.beard@gene.ge.com (James Beard)
james.gleason@ge.com (James Gleason)
jeff.waal@ge.com (Jeff Waal)
jerald.head@ge.com (Jerald G. Head)
Jerold.Marks@ge.com (Jerold Marks)
jgutierrez@morganlewis.com (Jay M. Gutierrez)
Jim.Kinsey@inl.gov (James Kinsey)
jim.riccio@wdc.greenpeace.org (James Riccio)
JJNesrsta@cpsenergy.com (James J. Nesrsta)
joel.Friday@ge.com (Joel Friday)
John.O'Neill@pillsburylaw.com (John O'Neill)
john.sorensen@ge.com (John Sorensen)
Joseph_Hegner@dom.com (Joseph Hegner)
junichi_uchiyama@mnes-us.com (Junichi Uchiyama)
kimberly.milchuck@ge.com (Kimberly Milchuck)
KSutton@morganlewis.com (Kathryn M. Sutton)

DC GE - ESBWR Mailing List

kwaugh@impact-net.org (Kenneth O. Waugh)
lchandler@morganlewis.com (Lawrence J. Chandler)
lee.dougherty@ge.com
lou.lanese@ge.com (Lou Lanese)
Marc.Brooks@dhs.gov (Marc Brooks)
maria.webb@pillsburylaw.com (Maria Webb)
mark.beaumont@wsms.com (Mark Beaumont)
Marvin.Smith@dom.com (Marvin L. Smith)
matias.travieso-diaz@pillsburylaw.com (Matias Travieso-Diaz)
media@nei.org (Scott Peterson)
mike_moran@fpl.com (Mike Moran)
MSF@nei.org (Marvin Fertel)
mwetterhahn@winston.com (M. Wetterhahn)
nirsnet@nirs.org (Michael Mariotte)
PAC2@nrc.gov (Peter Cochran)
pareez.golub@ge.com (Pareez Golub)
patriciaL.campbell@ge.com (Patricia L. Campbell)
paul.gaukler@pillsburylaw.com (Paul Gaukler)
Paul@beyondnuclear.org (Paul Gunter)
peter.yandow@ge.com (Peter Yandow)
pshastings@duke-energy.com (Peter Hastings)
rick.kingston@ge.com (Rick Kingston)
RJB@NEI.org (Russell Bell)
RKTemple@cpsenergy.com (R.K. Temple)
Russell.Wells@Areva.com (Russell Wells)
sabinski@suddenlink.net (Steve A. Bennett)
sandra.sloan@areva.com (Sandra Sloan)
sara.andersen@ge.com (Sara Anderson)
SauerB@BV.com (Robert C. Sauer)
sfrantz@morganlewis.com (Stephen P. Frantz)
stephan.moen@ge.com (Stephan Moen)
steven.hucik@ge.com (Steven Hucik)
tdurkin@energetics.com (Tim Durkin)
timothy1.enfinger@ge.com (Tim Enfinger)
tom.miller@hq.doe.gov (Tom Miller)
trsmith@winston.com (Tyson Smith)
Vanessa.quinn@dhs.gov (Vanessa Quinn)
VictorB@bv.com (Bill Victor)
Wanda.K.Marshall@dom.com (Wanda K. Marshall)
wayne.cutright@ge.com (Wayne Cutright)
wayne.marquino@ge.com (Wayne Marquino)
whorin@winston.com (W. Horin)