

January 29, 2008

Mr. Thomas D. Walt, Vice President
H. B. Robinson Steam Electric Plant,
Unit No. 2
Carolina Power & Light Company
3581 West Entrance Road
Hartsville, South Carolina 29550-0790

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 - ISSUANCE OF
AMENDMENT TO MAKE A ONE-TIME CHANGE TO TECHNICAL
SPECIFICATION (TS) 3.1.7 "ROD POSITION INDICATION" (TAC NO. MD7335)

Dear Mr. Walt:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 217 to Facility Operating License No. DPR-23 for the H.B. Robinson Steam Electric Plant, Unit No. 2 (HBR). This amendment consists of changes to the HBR TSs in response to your application dated November 15, 2007, as supplemented by letter dated December 21, 2007.

The amendment revises the TS requirements for Section 3.1.7, "Rod Position Indication." The requirements related to one inoperable bank demand position indicator are modified by a footnote to allow two demand position indicators to be inoperable per bank for one or more banks on a temporary basis during the current operating cycle (Cycle 25). The footnote expires at the end of operating cycle 25.

A copy of the related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

Marlayna Vaaler, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosures: 1. Amendment No. 217 to DPR-23
2. Safety Evaluation

cc w/encls: See next page

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Unit No. 2**

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CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-261

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No.217
Renewed License No. DPR-23

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Carolina Power & Light Company (the licensee), dated November 15, 2007, as supplemented by letter dated December 21, 2007, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 3.B. of Renewed Facility Operating License No. DPR-23 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 217 are hereby incorporated in the license.

The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to Renewed Facility
Operating License No. DPR-23
and the Technical Specifications

Date of Issuance: January 29, 2008

ATTACHMENT TO LICENSE AMENDMENT NO. 217
RENEWED FACILITY OPERATING LICENSE NO. DPR-23
DOCKET NO. 50-261

Replace page 3 of Renewed Operating License No. DPR-23 with the attached page 3.

Replace the following page of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Page

3.1-16

Insert Page

3.1-16

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 217 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-23

CAROLINA POWER & LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

1.0 INTRODUCTION

By application dated November 15, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073300458), as supplemented by letter dated December 21, 2007 (ADAMS Accession No. ML073601014), the Carolina Power & Light Company (the licensee), now doing business as Progress Energy Carolinas, Inc. (PEC), submitted a request for changes to the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR), Technical Specifications (TSs).

The requested amendment is a one-time change that would affect TS Section 3.1.7, "Rod Position Indication." The requirements related to one inoperable bank demand position indicator (DPI) would be modified by a footnote to allow two DPIs to be inoperable per bank for one or more banks on a temporary basis during the current operating cycle (Cycle 25). This provision would allow for corrective maintenance on three inoperable DPIs in the rod position indication (RPI) system that necessitates removing both DPIs for the affected rod banks from service during the repair.

The December 21, 2007, letter supplemented the proposed TS change by modifying the request such that the condition of two DPIs inoperable in one or more banks would be allowed as a temporary change to the TSs, rather than a permanent change as originally proposed. The letter also supplemented, but did not change the intent of the initial proposed no significant hazards consideration determination.

Notice of consideration of this amendment and an opportunity to request a hearing was published in the *Federal Register* on November 28, 2007 (72 FR 67321).

2.0 REGULATORY EVALUATION

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The TSs ensure the operational capability of structures, systems, and components that are required to protect the health and safety of the public. The U.S. Nuclear Regulatory Commission's (NRC's) regulatory requirements related to

Enclosure

the content of the TSs are contained in Section 50.36 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.36), which requires that the TSs include items in the following categories:

- (1) safety limits, limiting safety systems settings, and limiting control settings;
- (2) limiting conditions for operation (LCOs);
- (3) surveillance requirements (SRs);
- (4) design features; and
- (5) administrative controls.

General Design Criterion (GDC) 13 in 10 CFR Part 50, Appendix A, specifies that instrumentation shall be provided to monitor variables and systems over their operating ranges during normal operation, anticipated operational occurrences, and accident conditions. In accordance with GDC 13, the objectives of the rod control system and RPI system are to ensure that control rod alignment and insertion limits are maintained. Operators utilize the analog rod position indication (ARPI) system to monitor the positions of the rods to establish that the plant is operating within the bounds of the accident analysis assumptions.

Operability, including position indication, of the control rods and shutdown rods is an initial condition assumption in all safety analyses that assume rod insertion upon a reactor trip. Maximum rod misalignment is an initial condition assumption in the safety analysis that directly affects core power distributions and assumptions of available shutdown margin. Control rod inoperability or misalignment may cause increased power peaking due to the asymmetric reactivity distribution and a reduction in the total available rod worth for reactor shutdown.

As stated in 10 CFR 50.36(c)(2)(i), LCOs “are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a[n] [LCO] of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specification...” The remedial actions in the TSs are specified in terms of LCO conditions, required actions, and completion times (CTs) to complete the required actions. When an LCO is not being met, the CTs specified in the TSs are the time allowed for completing the specified required actions. The conditions and required actions specified in the TSs must be acceptable remedial actions for the LCO not being met, and the CTs must be of a reasonable duration for completing the required actions.

HBR TS LCO Section 3.1.7, provides the operability requirements, allowed conditions, required actions, CTs, and SRs associated with the RPI system, and thereby ensures compliance with the control rod alignment and insertion limits. LCO 3.1.7, Condition C, provides the required actions and CTs for one DPI per bank inoperable for one or more banks. The proposed change would modify the TS requirements to allow two DPIs per bank to be inoperable for one or more banks during Operating Cycle 25. The inoperability of two DPIs in a bank affects only the ability to determine the control system demand position for the bank. The actual rod position indications remain available through the use of the ARPIs, as required by Required Action C.1.1, which requires that all ARPIs for the affected banks are verified to be operable by administrative means once per 8 hours.

The NRC staff reviewed the licensee’s license amendment request to verify that the above regulatory requirements, as well as the licensing basis criteria stated in the Updated Final Safety Analysis Report (UFSAR), continue to be met with the proposed temporary change.

3.0 TECHNICAL EVALUATION

3.1 Description of Affected Systems

A description of the RPI system is provided in the Bases documents for TS LCO Section 3.1.7. A summary of the RPI system, as described in the Bases for TS LCO Section 3.1.7, was provided by the licensee as follows:

The axial position of shutdown rods and control rods are determined by two separate and independent systems: the Bank Demand Position Indication System (commonly called group step counters) and the Analog Rod Position Indication (ARPI) System.

The Bank Demand Position Indication System counts the pulses from the Rod Control System that move the rods. There is one step counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The Bank Demand Position Indication System is considered highly precise (± 1 step or $\pm 5/8$ inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod.

The ARPI System provides a highly accurate indication of actual control rod position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube with a center to center distance of 3.75 inches, which is 6 steps. Therefore, the normal indication accuracy of the ARPI System is ± 6 steps (± 3.75 inches), and the maximum uncertainty is ± 12 steps (± 7.5 inches). With an indicated deviation of 12 steps between the group step counter and ARPI, the maximum deviation between actual rod position and the demand position could be 24 steps, or 15 inches.

3.2 Background for Proposed TS Change

In its letters, the licensee stated that one DPI is currently inoperable in three rod banks and all ARPIs for the affected banks are being verified operable once per 8 hours, in accordance with the TS action requirements of LCO Section 3.1.7, Required Action C.1.1 for rods that are withdrawn to greater than or equal to 200 steps. The TS change is being proposed due to the inoperability of these three DPIs (Shutdown Bank A Group 2, Control Bank A Group 2, and Control Bank C Group 2) and the determination that both DPIs for the three control rod banks (Shutdown Bank A and Control Banks A and C) would be made inoperable for a brief period in order to correct the malfunction.

Although the current TSs allow continued operation with one DPI inoperable in one or more rod banks, operation in this configuration for an extended time exposes the plant to the possibility of APRI "drift," a condition in which the position indications given by the ARPI system are rendered less accurate during the temperature alterations created by changes in power necessitated by various surveillance and testing requirements (i.e. the rod exercise requirements contained in SR 3.1.7.3 as well as certain evolutions of turbine valve testing). Therefore, the corrective maintenance to restore the inoperable DPIs to operable status should be performed as soon as

practicable. Accordingly, the licensee requested approval of the proposed TS change as rapidly as possible to allow implementation of appropriate requirements for repair of the RPI system.

The corrective maintenance needed to restore the inoperable DPIs will require the second DPI in each of the three rod banks to be made inoperable during the repair. Currently, the TSs have no required action for two inoperable DPIs in the same bank. Therefore, by making the second DPI inoperable in Shutdown Bank A and Control Banks A and C, LCO 3.0.3 would apply and the licensee would have to enter the associated required actions. LCO 3.0.3 would allow 1 hour for the licensee to return one of the two inoperable DPIs in each bank to operable status, or the licensee would be required to start shutting down the unit.

However, per the guidance contained in NRC Inspection Manual 9900, "Maintenance – Voluntary Entry into Limiting Conditions for Operation Action Statements to Perform Preventive Maintenance," LCO 3.0.3 is not to be voluntarily entered for the sake of operational convenience. In addition, the corrective maintenance for the DPIs currently inoperable will most likely take more than the 1 hour allowed by LCO 3.0.3.

Therefore, the licensee is proposing to amend the TSs to establish a condition for inoperability of both DPIs in one or more banks that will permit sufficient time to perform the corrective maintenance to restore the current inoperable DPIs to operable status without necessitating entry into LCO 3.0.3 or challenging any of the other TS requirements (SRs, testing, etc.).

3.3 Proposed TS Change

In its supplemental letter dated December 21, 2007, the licensee revised its proposed permanent change to TS LCO Section 3.1.7, and proposed instead to add the following temporary footnote, applicable only during Cycle 25, to TS LCO Section 3.1.7, Condition C:

During Cycle 25, the condition of two demand position indicators per bank inoperable for one or more banks is allowed with a required action to restore one demand position indicator per bank and a completion time of 4 hours.

The proposed change will allow both DPIs in one or more banks to be inoperable for up to 4 hours during the current operating Cycle 25. With this proposed change, when the licensee makes inoperable the second DPIs in the affected banks as necessary to perform the corrective maintenance on the current inoperable DPIs, the licensee would not be required to enter LCO 3.0.3. The licensee would instead enter the above note and declare inoperable all demand position indication for the affected banks.

The licensee would have 4 hours to return at least one of the inoperable DPIs in each affected bank to service before it has to start shutting down the unit. The licensee believes that 4 hours is enough time to perform the corrective maintenance needed to restore the current inoperable DPIs to operable status. In addition, as discussed below, this CT for the corrective maintenance does not challenge the completion of any other requirements related to rod position indication.

3.4 Technical Evaluation

As previously discussed, the current TS LCO Section 3.1.7 does not include a condition for the inoperability of two DPIs in the same rod bank. The inoperability of both DPIs in a bank affects

the ability to determine the control system demand position for the bank, which is used to verify rod position in order to ensure compliance with the licensing basis. However, the actual rod position indications remain available through use of the ARPIs, as required by Required Action C.1.1, which requires that all ARPIs for the affected banks are verified to be operable by administrative means once per 8 hours. In addition, the loss of both DPIs in one or more banks does not prevent or inhibit operation of the control rods, including the ability to fully insert all rods in the event of a reactor trip, as well as verify rod insertion using the rod bottom lights.

The reactor protection functions also remain operable and available to mitigate design basis events and transient conditions. Additionally, the applicable core power distribution limits (i.e., LCO 3.2.1, "Heat Flux Hot Channel Factor," LCO 3.2.2, "Nuclear Enthalpy Rise Hot Channel Factor," LCO 3.2.3, "Axial Flux Difference," and LCO 3.2.4, "Quadrant Power Tilt Ratio") remain in effect in accordance with the applicability requirements for those TSs.

Furthermore, the licensee stated that the inoperability of both DPIs in one or more banks does not directly affect any accident analysis or design basis limits or cause any limits not to be met. Although operability, including position indication, of the control rods and shutdown rods is an initial condition assumption in all safety analyses that assume rod insertion upon a reactor trip, the continued ability to determine actual rod position with the ARPIs ensures that the assumptions in the safety analyses will remain valid and that the assumed negative reactivity will be available to be inserted during a plant shutdown. Therefore, the NRC staff finds that the related design basis analyses remain acceptable

The inoperability of the DPIs does, however, prevent the comparison of the ARPIs to the demand position indication for verification of rod insertion and rod group alignment limits, which are required limits for maintaining the reactor within analyzed conditions. More specifically, the current TS requirements that rely on demand position indication include the following:

- LCO 3.1.4 states that for bank demand positions greater than or equal to 200 steps, each rod shall be within 15 inches of its bank demand position, and for bank demand positions less than 200 steps, each rod shall be within 7.5 inches of the average of the individual rod positions in the bank.
- SR 3.1.4.1 requires verification of individual rod positions within alignment limits at a frequency of 12 hours. The frequency of SR 3.1.4.1 changes to once every 4 hours if the rod position deviation monitor is inoperable.
- LCO 3.1.5 states that each shutdown bank shall be within insertion limits specified in the Core Operating Limits Report (COLR).
- SR 3.1.5.1 requires verification that each shutdown bank is within the limits specified in the COLR at a frequency of 12 hours.
- LCO 3.1.6 states that control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.
- SR 3.1.6.2 requires verification that each control bank insertion is within the limits specified in the COLR at a frequency of 12 hours. The frequency of SR 3.1.6.2 changes to once every 4 hours if the rod position deviation monitor is inoperable.

- LCO 3.1.7 states that the ARPI system and the demand position indicator system shall be operable. Required Action C.1.3 requires verification of the position of each rod in the affected bank(s) (i.e., bank(s) with one inoperable demand position indicator) to be within 15 inches of the bank demand position.
- SR 3.1.7.3 requires that each ARPI is within 15 inches of the associated bank demand position after moving each full length rod cluster control assembly (RCCA) bank greater than or equal to 19 steps and returning the banks to their original positions at a frequency of 31 days.

During the time that two DPis are inoperable in a bank, these TS requirements cannot be verified. Therefore, the proposed CT limit for restoring at least one DPI in the affected bank(s) to operable status has been chosen to be 4 hours. This time limit is consistent with the most limiting CT and SR associated with use of the DPis. In this way, the impact of having both DPis inoperable in a rod bank on verification of rod insertion and rod group alignment limits, which are required limits for maintaining the reactor within analyzed conditions, is minimized.

The use of a 4-hour CT provides a restriction that limits the time reactor operation can continue during the loss of all demand position indication. The staff finds that this time limit is consistent with the TS requirements for this type of loss of indication. If the required action to restore one DPI per affected bank is not completed within 4 hours, TS LCO 3.1.7 Condition D would be entered and Required Action D.1 to be in MODE 3 within 6 hours would become applicable.

A CT of 4 hours for the proposed condition provides a time limit that is more restrictive than those associated with the required actions for Condition C of TS LCO 3.1.7. Therefore, the CT limit for the proposed temporary allowed condition and associated required action to restore one DPI per bank will continue to allow timely completion of the Condition C required actions after restoration of one DPI per bank to operable status.

In addition, the requirements for the use of ARPis and applicable conditions for inoperable ARPis are unaffected by the proposed change. For example, TS LCO 3.1.7 Required Action B.1 requires that the position of rods with inoperable position indicators (ARPis or DPis) be verified using the movable incore detectors within 4 hours of moving the affected rods in excess of 24 steps in one direction. These requirements will continue to ensure that indication of the actual rod position of the affected banks is available using the ARPis or incore detectors.

3.5 Conclusion

Based on the evaluation described above, the NRC staff concludes that the proposed note, which provides the conditions and required actions for two inoperable DPis in the same rod bank for one or more banks, (1) addresses the exact situation that exists at HBR, (2) accounts for the impact of the proposed change on accident analyses, design basis limits, and other TS requirements, (3) incorporates a CT that minimizes the amount of time demand position indication is out of service for all affected banks, and (4) provides adequate controls to ensure that the rod position is known using alternate methods (i.e. ARPis or incore detectors), and is, therefore, acceptable. Based on this, the NRC staff also concludes that the proposed note meets the requirements 10 CFR 50.36 and the proposed amendment is, therefore, acceptable on a temporary basis to be implemented during operating Cycle 25.

4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION

In its application and supplemental letter, the licensee addressed the no significant hazards consideration (NSHC) criteria in 10 CFR 50.92, "Issuance of amendment," and provided the following NSHC for the proposed amendment:

1. The Proposed Change Does Not Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated.

The proposed change provides new requirements for two demand position indicators inoperable in one or more banks. The inoperability of two demand position indicators in one or more banks does not directly affect any accident analysis or design basis limits or cause any limits not to be met, because the demand position indicators only provide an operational indication of the bank position as determined by the rod control system. The actual position of the control rods is determined by use of the ARPI for each control rod, or the movable incore detector system when ARPIS are inoperable.

The inoperability of the demand position indicators does prevent comparison of the analog rod position indicators to the demand position indication for verification of rod insertion and rod group alignment limits, which is conducted as a periodic surveillance to maintain the reactor within analyzed conditions. The use of a 4[-]hour completion time limit provides a restriction to the time that reactor operation can continue during the loss of demand position indication. Loss of the demand position indication does not cause the rods to change position, hence the actual control rod positions are expected to remain within required limits.

The proposed change to allow two demand position indicators to be inoperable in one or more banks does not affect the automatic or manual shutdown capability of the reactor protection system, and no accident analyses are impacted by the proposed change. The operability of the control rods is not affected by the inoperability of the demand position indicators.

Therefore, operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated, because this change does not result in the increased likelihood of any accident initiator or precursor, and the existing accident analyses are unaffected by the proposed change.

2. The Proposed Change Does Not Create the Possibility of a New or Different Kind of Accident From Any Previously Evaluated.

The proposed change provides new requirements for two demand position indicators inoperable in one or more banks. No new accident initiators are introduced by the proposed requirements because the allowed condition for inoperability of the demand position indicators does not cause any new failure modes to be created that could cause an accident. The proposed change does not affect the reactor protection system or the reactor control system. The control rods are expected to remain within the required control rod alignment and insertion limits because the failure of the demand position indicators does not cause the rods to change position and the ARPIS remain available in

the affected banks to verify the position of the control rods. Hence, no new failure modes or accident sequences are created that would cause a new or different kind of accident from any accident previously evaluated.

Therefore, operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any previously evaluated.

3. The Proposed Change Does Not Involve a Significant Reduction in the Margin of Safety. The operability of the rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. The proposed change does not alter the requirement to determine rod position, but provides a new allowed condition for two demand position indicators inoperable in one or more banks. The inoperability of two demand position indicators for one or more banks results in loss of the ability to periodically verify that ARPIs are operable and within expected limits. If this condition continued indefinitely, without compensating for the loss of demand position indicators, this condition could result in a reduced ability to accurately verify the position of the control rods. Hence, the proposed change provides an appropriately limiting time for this condition of 4 hours, which is substantially less than the surveillance frequency of 12 hours associated with the channel check performed for verification of operability of the ARPIs. This ensures the condition is corrected in a timely fashion or the reactor is shut down in accordance with the applicable TS action statements. This maintains operation of the reactor within the applicable margins of safety because the inoperability will be corrected or the unit will be shut down prior to any significant reduction in the ability to verify control rod position using the ARPIs.

Therefore, operation of the facility in accordance with the proposed amendment would not involve a significant reduction in the margin of safety.

The licensee concluded in its letters that the proposed amendment does not involve a NSHC. The NRC staff has reviewed the proposed changes to the TSs in the amendment and the NSHC given in the letters. Based on its review, the NRC staff agrees with the licensee and concludes that the NSHC given above is its final determination of NSHC for the amendment.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of South Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final finding that the amendment involves no significant hazards consideration, in Section 4.0, "Final No Significant Hazards Consideration," of this safety evaluation. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact

statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Marlayna Vaaler

Date: January 29, 2007