Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL 60515-5701

June 30, 1997

ComEd

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Application for Amendment to Appendix A, Technical Specifications, for Facility Operating Licenses:

Byron Nuclear Power Station, Units 1 and 2
Facility Operating Licenses NPF-37 and NPF-66
NRC Docket Nos. 50-454 and 50-455

Braidwood Nuclear Power Station, Units 1 and 2
Facility Operating Licenses NPF-72 and NPF-77
NRC Docket Nos. 50-456 and 50-457

Boron Credit in the Spent Fuel Storage Pool

Reference:

1. J. Hosmer (ComEd) to USNRC Letter, Generic Letter 96-04, "BORAFLEX DEGRADATION IN SPENT FUEL POOL STORAGE RACKS," dated November 6, 1996
2. G. Dick (NRC) to I. Johnson (ComEd) Letter, dated April 2, 1997

Pursuant to Title 10, Code of Federal Regulations, Part 50, Section 90 (10 CFR 50.90), Commonwealth Edison Company (ComEd) proposes to amend Appendix A, Technical Specifications, for Facility Operating Licenses NPF-37, NPF-66, NPF-72, and NPF-77 for Byron Nuclear Power Station, Units 1 and 2 (Byron), and Braidwood Nuclear Power Station, Units 1 and 2 (Braidwood), respectively. ComEd proposes to revise Technical Specification Section (TS) 3.9.11, 5.6.1.1, and 6.9.10 to allow ComEd to permanently take credit for soluble boron in the spent fuel storage pool water to maintain an acceptable margin of subcriticality. The proposed revisions also provide appropriate controls to ensure the soluble boron concentration in the spent fuel storage pool water is adequately maintained. These changes are required to compensate for the degradation of the Boraflex panels in the spent fuel storage cells.

The proposed changes in this license amendment request have been reviewed and approved by both On-site and Off-site Review in accordance with ComEd procedures. A detailed description and a safety analysis of the proposed changes are presented in Attachment A. The proposed changes to Appendix A, Technical Specifications, are presented in Attachment B. ComEd has reviewed this proposed license amendment request in accordance with 10 CFR 50.92(c) and has determined that no significant hazards consideration exists. This evaluation is documented in Attachment C. An environmental Assessment has been completed and is contained in Attachment D. A copy of the Westinghouse criticality analysis forming the basis for this amendment is included in Attachment E. A copy of the Byron and Braidwood Spent Fuel Pool Dilution Analysis has been performed and is included in Attachment F.

A068 1/1

ComEd's response to Generic 96-04 (Reference 1) included a compensatory action to restrict the use of reverse osmosis units until a long-term solution/corrective action was in place. This restriction was due to the potential to increase the degradation of the Boraflex. Since this license amendment request takes no credit for Boraflex, the compensatory action will not be required upon issuance of this amendment.

ComEd is notifying the State of Illinois of our application for this license amendment request by transmitting a copy of this letter and its attachments to the designated State Official.

ComEd respectfully requests that the NRC review and approve this license amendment by December 1, 1997, because the interim Boron Credit amendment (Reference 2) is in effect until December 31, 1997.

To the best of my knowledge the statements contained in this document are true and correct.

Please address any comments or questions regarding this matter to Marcia Lesniak, Nuclear Licensing Administrator at 630/663-6484.

Sincerely,

John B Hosmer

John B. Hosmer
Vice President
Engineering

Attachment A: Description and Safety Analysis of the Proposed Changes
Attachment B: Proposed Changes to Appendix A, Technical Specifications
Attachment C: Evaluation of Significant Hazards Considerations
Attachment D: Environmental Assessment
Attachment E: Byron and Braidwood Spent Fuel Rack Criticality Analysis Using Soluble Boron Credit, May, 1997
Attachment F: Byron and Braidwood Spent Fuel Pool Dilution Analysis, Revision 2, May 29, 1997

cc: G. Dick, Byron/Braidwood Project Manager-NRR
C. Phillips, Senior Resident Inspector-Braidwood
S. Burgess, Senior Resident Inspector-Byron
A. B. Beach, Regional Administrator-RIII
Office of Nuclear Safety-IDNS

ATTACHMENT A

DESCRIPTION AND SAFETY ANALYSIS OF
PROPOSED CHANGES TO APPENDIX A
TECHNICAL SPECIFICATIONS OF
FACILITY OPERATING LICENSES
NPF-37, NPF-66, NPF-72, AND NPF-77

A. DESCRIPTION OF THE PROPOSED CHANGE

Commonwealth Edison (ComEd) proposes to revise Byron and Braidwood Technical Specifications (TS) Limiting Condition for Operation (LCO) 3.9.11, "WATER LEVEL/BORON CONCENTRATION-STORAGE POOL," and associated Bases, Specification 5.6.1.1, "CRITICALITY," and Specification 6.9.1.10, "CRITICALITY ANALYSIS OF BYRON AND BRAIDWOOD STATION FUEL STORAGE RACKS." The proposed revisions allow ComEd to permanently take credit for soluble boron in the spent fuel storage pool water to maintain an acceptable margin of subcriticality. The proposed revisions also provide appropriate controls to ensure the soluble boron concentration in the spent fuel storage pool water is adequately maintained. These changes are required to compensate for the degradation of the Boraflex panels in the spent fuel storage cells.

The proposed changes are discussed in detail in Section E of this attachment. The affected TS pages showing the proposed revisions are included in Attachments B-1 and B-2 of this request.

B. DESCRIPTION OF THE CURRENT REQUIREMENT

The affected portion of LCO 3.9.11 requires the soluble boron concentration of the water in the storage pool to be maintained at greater than or equal to 2000 ppm whenever irradiated fuel assemblies are in the storage pool. This requirement is temporary and remains in effect until December 31, 1997. Surveillance requirement 4.9.11.a requires pool boron concentration to be determined at least once per 24 hours.

If this requirement is not satisfied, action "b" of LCO 3.9.11 requires that all movements of fuel and crane operations with loads in the fuel storage area be suspended and action taken to restore the soluble boron concentration to within its limit as soon as possible. This required action is also temporary and remains in effect until December 31, 1997.

Specification 5.6.1.1 requires, in part, that the spent fuel storage racks be maintained with an effective neutron multiplication factor, k_{eff}, less than or equal to 0.95 when flooded with unborated water by controlling fuel assembly placement in each region of the spent fuel pool (SFP). This requirement is modified by a footnote stating that until December 31, 1997, Specification 5.6.1.1 requires the spent fuel storage racks to be maintained with a k_{eff} of less than

or equal to 0.95 when flooded with water containing a minimum of 2000 ppm soluble boron.

In addition, Specification 5.6.1.1 includes requirements for fuel assembly spacing within the Region 1 and 2 racks and enrichment/Integral Fuel Burnable Absorber (IFBA)/burnup requirements for storage of assemblies in Regions 1 and 2. Enrichments of up to 5.0 weight percent U-235 are permitted in the SFP provided the limitations associated with the particular Region are also met.

Specification 6.9.1.10 describes the content of the CRITICALITY ANALYSIS OF BYRON AND BRAIDWOOD STATION FUEL STORAGE RACKS and how changes to the document are transmitted to NRC.

C. BASIS FOR THE CURRENT REQUIREMENT

The minimum boron concentration requirement of LCO 3.9.11 ensures adequate safety margin to criticality in the spent fuel storage racks is maintained. The value of k_{eff} is maintained at less than or equal to 0.95 when including the presence of 2000 ppm boron in the SFP water.

The sampling frequency for the spent fuel pool boron concentration was chosen conservatively based on the sampling frequency for reactor shutdown margin in Mode 5, Cold Shutdown.

The requirements of Specification 5.6.1.1 ensure that k_{eff} is maintained less than or equal to 0.95 when there is 2000 ppm soluble boron present in the SFP water. The fuel assembly spacing and enrichment/IFBA/burnup requirements ensure that the k_{eff} requirements described above are met for borated and unborated water in the SFP.

As discussed in a submittal dated November 5, 1996, ComEd committed to implement the following compensatory measures in addition to and in support of the requirements of LCO 3.9.11 and Specification 5.6.1.1 to maintain soluble boron in the SFP:

1. Appropriate procedures were changed to reflect the requirement to maintain a minimum of 2000 ppm soluble boron in the SFP;
2. Use of the Reverse Osmosis Unit for silica removal was restricted to slow the rate of Boraflex dissolution;
3. The SFP level loss procedure was revised to clearly state that non-borated emergency makeup sources must be used only as a last resort;
4. Checkerboarding of spent fuel assemblies was completed in accordance with a Byron- and Braidwood-specific criticality analysis to ensure k_{eff} is maintained less than 1.0 without credit for soluble boron; and
5. SFP level and temperature are checked at least daily.

Specification 6.9.1.10 ensures that NRC-approved methodologies are used to determine the fuel enrichment limits for storage.

D. NEED FOR REVISION OF THE REQUIREMENT

By a submittal dated November 5, 1996, ComEd requested an amendment to Byron and Braidwood LCO 3.9.11, "WATER LEVEL - STORAGE POOL," Specification 5.6.1.1, "CRITICALITY," and Specification 6.9.10, "CRITICALITY ANALYSIS OF BYRON AND BRAIDWOOD STATION FUEL STORAGE RACKS." This amendment request was to allow ComEd to temporarily take credit for soluble boron in the SFP water in maintaining an acceptable margin of subcriticality. The requested changes were required to compensate for the degradation of the Boraflex panels in the spent fuel storage cells. The request was supported by Westinghouse document CAC-96-248, "Byron and Braidwood Spent Fuel Rack Criticality Analysis with Credit for Soluble Boron," dated October 1996. ComEd stated that a new criticality analysis using an NRC-approved methodology would be submitted in June of 1997.

The current amendment request implements a long term solution to Boraflex degradation by taking credit for soluble boron in the SFP water and considering Region 1 rack boral inserts and rack interface requirements. The new criticality analysis is based upon the NRC-approved methodology described in WCAP-14416-NP-A, "Westinghouse Spent Fuel Rack Criticality Analysis Methodology," Revision 1, November 1996. The analysis performed as the basis for this amendment request is documented in CAC-97-162, "Byron and Braidwood Spent Fuel Rack Criticality Analysis Using Soluble Boron Credit," dated May 1997 (Attachment E).

In addition to the criticality analysis, a boron dilution analysis for the SFP has been performed for Byron and Braidwood Stations. This analysis is documented in the report "Byron/Braidwood Spent Fuel Pool Dilution Analysis," Revision 3, June 17, 1997 (Attachment F). A dilution analysis of the SFP is a new analysis required by the Safety Evaluation Report dated October 25, 1996, issued by the Office of Nuclear Reactor Regulation for Topical Report WCAP-14416-P, "Westinghouse Spent Fuel Rack Criticality Analysis Methodology."

E. DESCRIPTION OF THE REVISED REQUIREMENT

The proposed changes to the current Byron and Braidwood Technical Specifications are described below. The specific wording changes to Technical Specifications are shown in Attachments B-1 and B-2 for Byron and Braidwood Stations, respectively.

Proposed Changes to Technical Specification 3/4.9.11 and associated Bases

LCO 3.9.11 will be changed to implement a permanent requirement to maintain the soluble boron concentration of the water in the SFP at greater than or equal to 2000 ppm. The asterisk after LCO 3.9.11 and the associated footnote, concerning time limitations on the requirements, at the bottom of the page will be eliminated. Action b and Surveillance Requirement 4.9.11.a will be modified by removing the asterisks.

Surveillance requrement 4.9.11.a will be revised to require pool boron concentration to be

determined at least once per 48 hours.

Bases page 3/4 9-3 will be revised to provide a discussion of the basis for the boron requirements of TS 3/4.9.11. The Table of Contents pages XII and XVII will be revised to reflect the revised title of TS 3/4.9.11.

Proposed Changes to Technical Specification 5.6.1.1

Specification 5.6.1.1 will be revised to include the design feature elements associated with reactivity credit for the soluble boron in the SFP. The SFP racks and their features will not be physically changed by this revision.

The text and format of the revised TS is based on the October 25, 1996 NRC Safety Evaluation for the criticality analysis methodology and NUREG 1431, "Standard Technical Specifications," Specification 4.3.1. Byron- and Braidwood-specific terminology is incorporated as necessary. New Specification 5.6.1.1.h will be added to address interface requirements governing assembly storage within racks and between adjacent racks.

The requirement that the spent fuel racks maintain a k_{eff} of less than or equal to 0.95 when fully flooded with unborated water is eliminated. The design feature will be changed to require a k_{eff} of less than 1.0 when fully flooded with unborated water and a k_{eff} of less than or equal to 0.95 when fully flooded with water borated to 2000 ppm.

A maximum enrichment of 5.0 weight percent U-235 for any fuel stored in the pool will be specified. Specifications 5.6.1.1.e and 5.6.1.1.g will refer to the CRITICALITY ANALYSIS OF BYRON AND BRAIDWOOD STATION FUEL STORAGE RACKS for specific limitations on fuel assembly storage in Regions 1 and 2. These limitations will include particular combinations of initial assembly enrichment, IFBAs in the fuel assembly, discharge burnup, and decay time.

Revised Specifications 5.6.1.1.a and 5.6.1.1.b will include a reference to the NRC-approved criticality methodology as the source for uncertainty allowances.

Current TS Figure 5.6-1 will be replaced with new TS Figures 5.6-1 through 5.6-3. The new spent fuel rack criticality analysis uses three figures to define the minimum burnup versus enrichment requirements for various Region 2 storage configurations: all cell storage, 3-out-of-4 checkerboard, and 2-out-of-4 checkerboard. The new figures also use fuel assembly radioactive decay time in addition to initial enrichment and discharge burnup to define SFP storage limits. Table of Contents page XVIII is revised to reflect the new figures.

Proposed Changes to Technical Specification 6.9.1.10

Specification 6.9.1.10 will be revised to include a reference to the NRC-approved criticality analysis methodology of WCAP-14416-NP-A and the decay time credit.

F. BASIS FOR THE REVISED REQUIREMENT

Criticality Analysis

The NRC-approved methodology that ensures the criticality safety of fuel assemblies in the fuel storage racks is described in WCAP-14416-NP-A. This report describes the computer codes, benchmarking, and methodology used to calculate criticality safety limits. This WCAP was used as the basis for CAC-97-162, "Byron and Braidwood Spent Fuel Rack Criticality Analysis Using Soluble Boron Credit," May 1997 (Attachment E).

This criticality analysis demonstrates that the acceptance criteria for criticality are met for storage of Westinghouse 17x17 optimized fuel assemblies (OFAs – bounding VANTAGE 5, VANTAGE+, and PERFORMANCE+ fuel types) under both normal and accident conditions with soluble boron credit, no credit for the spent fuel rack Boraflex neutron absorber panels and specified storage configurations and enrichment limits.

In addition to reactivity credit for soluble boron, credit is also taken in the criticality analysis for the fuel assembly burnup due to time in the reactor core, radioactive decay time of the spent fuel in the SFP, and the IFBA material which coats some of the fuel pellets and is an integral part of some fuel rods. In the Region 1 analysis, credit is also taken for boral inserts on interior cells and the interior walls of the peripheral cells.

Reactivity equivalencing is used to allow storage of fuel assemblies with higher initial enrichments (up to 5.0 weight percent U-235) than found acceptable with soluble boron credit alone. The concept is predicated on the reactivity decrease associated with fuel depletion for the fuel assembly burnup credit and the reactivity decrease associated with the addition of IFBAs to the fuel assembly for IFBA credit. The methodology for application of these credits is discussed in WCAP-14416-NP-A.

Decay time credit is an extension of the burnup credit process. This credit includes the time since an assembly was last discharged as a variable which gains additional margin in reactivity and reduces the minimum burnup requirements. Decay time credit is used only for the all cell and 3-out-of-4 storage configurations. Spent fuel decay time credit results from the radioactive decay of isotopes in the spent fuel to daughter isotopes, which results in reduced reactivity. As discussed in CAC-97-162, the following assumptions are used in the calculational models for decay time credit:

1. Fuel assemblies are modeled using the same criteria as for other calculations associated with Region 2.
2. Fuel is depleted using a conservatively high soluble boron letdown curve to enhance the buildup of plutonium making the fuel more reactive in the spent fuel storage racks. Sensitivity studies have shown that spectrum effects are also conservative for the decay time calculation.
3. No credit for fission product isotopic decay is used.
4. Only decay of Actinide isotopes is used.

5. Nominal spent fuel rack configuration/dimensions are used.

With the above assumptions, the calculation of the decay time burnup credit curves are found to be conservative for use in the spent fuel pool criticality analysis.

While this submittal credits soluble boron in the SFP criticality analysis, a storage configuration has been defined, with a 95-percent probability at a 95-percent confidence level, that ensures the spent fuel rack k_{eff} will be less than 1.0 with no credit for soluble boron or Boraflex panels in the racks, but including credit for fuel assembly burnup, the radioactive decay time of the spent fuel, and the presence of IFBAs. Soluble boron credit provides significant negative reactivity in the criticality analysis to provide subcritical margin such that the SFP k_{eff} is maintained less than or equal to 0.95. Soluble boron credit and storage configuration are also used to offset the reactivity increase when ignoring the presence of the spent fuel rack Boraflex neutron absorber panels.

The Byron and Braidwood spent fuel rack criticality analysis addresses postulated accidents in the SFP. The accidents that can occur and their consequences are not significantly affected by taking credit for boron in the SFP water as a major subcriticality control element.

The criticality analysis confirms that most SFP accident conditions will not result in an increase in k_{eff} of the spent fuel racks. An analysis of possible SFP accidents was performed. The accidents considered were: fuel assembly drop on top of the rack; fuel assembly drop between rack modules; fuel assembly drop between rack modules and the SFP wall; change in SFP water temperature due to a loss of normal SFP cooling; and misload of an assembly into a cell for which the restrictions on location, enrichment, and burnup are not satisfied. It was determined that the only two accidents which could cause an increase in k_{eff} were the change in SFP temperature and the misload of an assembly.

For the change in SFP temperature accident due to a loss of normal cooling, a temperature range of 32°F to 240°F is considered. The analysis assumes that the temperature change could occur at any time during operation of the SFP. Calculations were performed for the Byron and Braidwood SFP water temperature outside the normal range (50°F to 160°F). The results of these calculations show that this accident is bounded by the misloaded assembly accident. In all cases, reactivity margin is available to the 0.95 k_{eff} limit to allow for temperature accidents.

For the misloaded assembly accident, calculations were performed to determine the largest reactivity increase caused by a fuel assembly misplaced into a storage cell for which the restrictions on location, enrichment or burnup are not satisfied. The misloaded assembly event can occur only during fuel handling operations in the SFP.

The minimum boron concentration requirement determined from the various analyses is 550 ppm when no fuel handling accident is considered and 1650 ppm when considering the most limiting accident (a misloaded assembly). The most conservative of the minimum soluble boron concentrations from the analyses was chosen as the basis for the minimum boron concentration of the SFP. The minimum concentration of 1650 ppm from the misloaded assembly accident analysis

was increased to 2000 ppm for added conservatism. The margin for accident conditions included in the boron concentration limit does not account for both a loss of cooling event and a misload event occurring at the same time consistent with the guidance of ANSI/ANS 8.1-1983, "American National Standard for Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors."

The radiological consequences of a dropped assembly accident in the SFP do not change because of the presence of soluble boron in the SFP water. In that analysis, a high burnup fuel assembly is dropped onto the top of the racks and all fuel rods in the dropped assembly rupture releasing the gap radioactive gases. A large fraction of the halogen gases are entrained in the pool water, limiting the off-site exposure.

Dilution Analysis

Calculations were performed (Attachment F) to define the dilution time and volumes for the SFP. The dilution sources available at Byron and Braidwood were compiled and evaluated against the calculated dilution volume to determine the potential of a SFP dilution event. The dilution analysis concludes that an unplanned or inadvertent event that would result in the dilution of the SFP boron concentration from 2000 ppm to 550 ppm (minimum non-accident boron concentration) is not a credible event based on the following:

- In order to dilute the SFP to the design k_{eff} of 0.95, a substantial amount of water (612,000 gallons) is needed. To provide this volume, an operator would have to initiate the dilution flow, then abandon monitoring of SFP level and ignore tagged valves, administrative procedures, and a high level alarm. The most severe scenario that can be postulated based on existing plant equipment is 420 gpm flow through the demineralized water (WM) system. For this scenario, it would take a at least 24 hours before the required dilution volume would be reached. However, WM is not normally used for routine SFP makeup and abnormal operating procedures do not permit the use of WM for filling the SFP on a loss of level, except as a last resort. Additionally, the WM drop has a pipe cap and a normally closed valve. Small amounts of WM is used to decontaminate spent fuel handling tools, therefore, a warning tag to contact the Shift to evaluate the impact of the water addition is placed near WM and primary water (PW) connections. The most limiting scenario based on a lineup that may be used for routine SFP makeup is 220 gpm PW through the SFP cleanup (FC) system purification loop. For this scenario, it would take a minimum of 46 hours before the required dilution volume would be reached.

- Since such a large water volume turnover is required (612,000 gallons), a SFP dilution event would be readily detected by plant personnel via alarms (high level in the SFP, fuel handling building sump alarm), flooding in the fuel handling building or by normal operator rounds through the SFP area (once every eight hours). The event could then be terminated prior to exceeding the design k_{eff} of 0.95. For the most limiting dilution scenario based on a routine lineup described above, the dilution occurs over 46 hours, allowing adequate time for operator intervention. The current administrative limit for the

spent fuel pool boron concentration is 2300 ppm, which increases the time a dilution would need to progress prior to exceeding the design k_{eff} value.

Therefore, it is highly unlikely that any dilution event in the SFP could result in the reduction of the SFP boron concentration to less than the 550 ppm non-accident limit.

As stated above, a SFP dilution event would be readily detected and terminated by plant personnel prior to exceeding the design k_{eff} of 0.95. A SFP boron concentration surveillance frequency of 48 hours will be used to verify the boron concentration is within the initial assumptions of the criticality analysis. The current frequency of 24 hours is based on the sampling frequency for reactor shutdown margin in Mode 5. Any dilution of the SFP, as explained above, would take a much longer time than an RCS dilution since the SFP volume is much larger than the RCS volume, and the turnover rate of water in the SFP is much less due to the lack of large dilution sources for the SFP. The 24 hour requirement was considered to be a conservative, bounding value until the review and approval of the generic methodology for the soluble boron credit was approved. The 48 hour sampling frequency is sufficient based on operating experience, and because significant changes in the boron concentration in the spent SFP are difficult to produce without detection, since the pool contains such a large inventory of water. Soluble boron concentration reduction requires the inflow and outflow of large volumes of water which are readily detected. Pool inventory changes provide a good indication of potential boron concentration changes. The pool water inventory is monitored by level indication and alarms and by periodic operator rounds of the SFP area, as discussed above.

Byron and Braidwood revised appropriate procedures to ensure that SFP boron concentration is verified greater than 2000 ppm at least once per 24 hours. Upon approval of this amendment request, the procedures will be revised to ensure SFP boron concentration is greater than 2000 ppm at least once per 48 hours. Checkerboarding of spent fuel assemblies in both the Byron and Braidwood SFPs will be undertaken in accordance with CAC-97-162 to ensure that SFP k_{eff} will remain less than 1.0 without credit for soluble boron. Fuel assembly placement is controlled in accordance with approved fuel handling procedures and the spent fuel rack storage configuration limitations. Periodic surveillances of the SFP inventory (physical inventory and piece counts) are performed in accordance with station procedures. These surveillances ensure physical SFP inventory verification is performed at least once per year and in a timely manner upon completion of fuel movement in the SFP. In addition, SFP level and temperature are checked at least daily at both Byron and Braidwood.

G. IMPACT OF THE PROPOSED CHANGE

The changes proposed in this request require maintaining SFP boron concentration at a minimum level. Boron has always been present in the SFP as a reactivity suppressor. This change places restrictions on the minimum concentration of soluble boron in the SFP and provides controls to ensure the minimum soluble boron concentration is maintained at all times. Thus, this change will not introduce any new operating modes for the SFP, nor any new equipment. No existing

equipment will be modified. Appropriate plant procedures will be revised to reflect the relaxation in SFP boron concentration surveillance frequency.

A criticality analysis has been performed to show that the spent fuel rack k_{eff} remains less than 1.0 with non-borated water in the SFP, with a 95-percent probability at a 95-percent confidence level. Thus, even if the SFP were diluted to 0 ppm, which would take significantly more water than evaluated above, the fuel would remain subcritical and the health and safety of the public would be assured.

H. SCHEDULE REQUIREMENTS

ComEd requests that these proposed changes be approved by December 1, 1997 to permit implementation prior to expiration of the interim TS amendment on December 31, 1997.