

April 26, 1990

Docket Nos. 50-275
and 50-323

Mr. J. D. Shiffer, Vice President
Nuclear Power Generation
c/o Nuclear Power Generation, Licensing
Pacific Gas and Electric Company
77 Beale Street, Room 1451
San Francisco, California 94106

Dear Mr. Shiffer:

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SUBJECT: ISSUANCE OF AMENDMENTS (TAC NOS. 74102 AND 74103)

The Commission has issued the enclosed Amendment No. 53 to Facility Operating License No. DPR-80 and Amendment No. 52 to Facility Operating License No. DPR-82 for the Diablo Canyon Power Plant (DCPP), Units 1 and 2, respectively. The amendments change the Diablo Canyon combined Technical Specifications (TS) in response to your application for license amendments dated July 5, 1989, as supplemented by letters dated December 1, 1989 and April 10, 1990 (Reference LAR 89-08). The amendments revise the TS to allow the boric acid concentration in the Boric Acid Tank (BAT) to be reduced from twelve to four weight percent at the fourth refueling outage for each unit.

A copy of the related Safety Evaluation is enclosed. Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY H. ROOD

Harry Rood, Senior Project Manager
Project Directorate V
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 53 to DPR-80
2. Amendment No. 52 to DPR-82
3. Safety Evaluation

cc w/enclosures:

See next page

DRSP/PD5
PShea*
03/06/90

DRSP/PD
HRood*
03/01/90

OGC
MYoung*
03/27/90

DRSP/(A)D:PD5
JLarkins
04/26/90

*See previous concurrence

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PDR ADDCK 05000275
FDC

Handwritten initials and date: 4/27/90



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 26, 1990

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Nuclear Power Generation
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A copy of the related Safety Evaluation is enclosed. Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

A handwritten signature in black ink that reads "Harry Rood". The signature is written in a cursive style with a large, looped "H" and "R".

Harry Rood, Senior Project Manager
Project Directorate V
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 53 to DPR-80
2. Amendment No. 52 to DPR-82
3. Safety Evaluation

cc w/enclosures:
See next page

Mr. J. D. Shiffer
Pacific Gas and Electric Company

Diablo Canyon

cc:

Richard F. Locke, Esq.
Pacific Gas & Electric Company
Post Office Box 7442
San Francisco, California 94120

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON NUCLEAR POWER PLANT, UNIT 1
DOCKET NO. 50-275
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 53
License No. DPR-80

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Pacific Gas & Electric Company (the licensee), dated July 5, 1989, as supplemented by letters dated December 1, 1989 and April 10, 1990, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the 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.

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PDR ADDCK 05000275
P PDC

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-80 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 53, are hereby incorporated in the license. Pacific Gas & Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment becomes effective at the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



John T. Larkins, Acting Director
Project Directorate V
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 26, 1990



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON NUCLEAR POWER PLANT, UNIT 2
DOCKET NO. 50-323
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 52
License No. DPR-82

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Pacific Gas & Electric Company (the licensee), dated July 5, 1989, as supplemented by letters dated December 1, 1989 and April 10, 1990, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the 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 2.C.(2) of Facility Operating License No. DPR-82 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 52, are hereby incorporated in the license. Pacific Gas & Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment becomes effective at the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



John T. Larkins, Acting Director
Project Directorate V
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 26, 1990

ATTACHMENT TO LICENSE AMENDMENT NOS. 53 AND 52
FACILITY OPERATING LICENSE NOS. DPR-80 and DPR-82
DOCKET NOS. 50-275 AND 50-323

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change. Overleaf pages are also included, as appropriate.

Remove Page

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B 3/4 1-2

Insert Page

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3/4 10-1
B 3/4 1-2

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} GREATER THAN 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.6% $\Delta k/k$.

APPLICABILITY: MODES 1, 2*, 3, and 4.

ACTION:

For Unit 1 and 2, Cycle 4:

With the SHUTDOWN MARGIN less than 1.6% $\Delta k/k$, immediately initiate and continue boration at greater than or equal to 10 gpm of a solution containing greater than or equal to 20,000 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

For Unit 1 and 2, Cycle 5 and after:

With the SHUTDOWN MARGIN less than 1.6% $\Delta k/k$, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7,000 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.6% $\Delta k/k$:

- a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s);
- b. When in MODES 1 or 2 with K_{eff} greater than or equal to 1, at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6;
- c. When in MODE 2 with K_{eff} less than 1, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6;
- d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of Specification 4.1.1.1.e., below, with the control banks at the maximum insertion limit of Specification 3.1.3.6; and

*See Special Test Exceptions Specification 3.10.1.
DIABLO CANYON - UNITS 1 & 2 3/4 1-1

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- e. When in MODES 3 or 4, at least once per 24 hours by consideration of the following factors:
- 1) Reactor Coolant System boron concentration,
 - 2) Control rod position,
 - 3) Reactor Coolant System average temperature,
 - 4) Fuel burnup based on gross thermal energy generation,
 - 5) Xenon concentration, and
 - 6) Samarium concentration.

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within $\pm 1\% \Delta k/k$ at least once per 31 Effective Full Power Days (EFPD). This comparison shall consider at least those factors stated in Specification 4.1.1.1.1e., above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPD after each fuel loading.

REACTIVITY CONTROL SYSTEMS

SHUTDOWN MARGIN - T_{avg} LESS THAN OR EQUAL TO 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be greater than or equal to 1% $\Delta k/k$.

APPLICABILITY: MODE 5.

ACTION:

For Unit 1 and 2, Cycle 4:

With the SHUTDOWN MARGIN less than 1% $\Delta k/k$, immediately initiate and continue boration at greater than or equal to 10 gpm of a solution containing greater than or equal to 20,000 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

For Unit 1 and 2, Cycle 5 and after:

With the SHUTDOWN MARGIN less than 1% $\Delta k/k$, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7,000 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1% $\Delta k/k$:

- a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s); and
- b. At least once per 24 hours by consideration of the following factors:
 - 1) Reactor Coolant System boron concentration,
 - 2) Control rod position,
 - 3) Reactor Coolant System average temperature,
 - 4) Fuel burnup based on gross thermal energy generation,
 - 5) Xenon concentration, and
 - 6) Samarium concentration.

REACTIVITY CONTROL SYSTEMS

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

3.1.1.3 The moderator temperature coefficient (MTC) shall be:

- a. Less positive than $+5 \times 10^{-5} \Delta k/k/^{\circ}F$ for 0% to 70% RATED THERMAL POWER, and for > 70% to 100% RATED THERMAL POWER the MTC decreases linearly to 0 $\Delta k/k/^{\circ}F$ for the all rods withdrawn condition, beginning of cycle life (BOL); or
- b. Less negative than $-3.9 \times 10^{-4} \Delta k/k/^{\circ}F$ for all rods withdrawn, end of cycle life (EOL), RATED THERMAL POWER condition.

APPLICABILITY: Specification 3.1.1.3a. - MODES 1 and 2* only#.
Specification 3.1.1.3b. - MODES 1, 2, and 3 only#.

ACTION:

- a. With the MTC more positive than the limit of Specification 3.1.1.3a. above, operation in MODES 1 and 2 may proceed provided:
 1. Control rod withdrawal limits are established and maintained sufficient to restore the MTC to less positive than the limit of Specification 3.1.1.3a within 24 hours or be in HOT STANDBY within the next 6 hours. These withdrawal limits shall be in addition to the insertion limits of Specification 3.1.3.6;
 2. The control rods are maintained within the withdrawal limits established above until a subsequent calculation verifies that the MTC has been restored to within its limit for the all rods withdrawn condition; and
 3. A Special Report is prepared and submitted to the Commission pursuant to Specification 6.9.2 within 10 days describing the value of the measured MTC, the interim control rod withdrawal limits and the predicted average core burnup necessary for restoring the positive MTC to within its limit for the all rods withdrawn condition.
- b. With the MTC more negative than the limit of Specification 3.1.1.3b. above, be in HOT SHUTDOWN within 12 hours.
- c. The provisions of Specification 3.0.4 are not applicable.

*With K_{eff} greater than or equal to 1.

#See Special Test Exceptions Specification 3.10.3.

REACTIVITY CONTROL SYSTEMS

3/4.1.2 BORATION SYSTEMS

FLOW PATH - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.1 As a minimum, one of the following boron injection flow paths shall be OPERABLE with motor-operated valves required to change position and pumps required to operate for boron injection capable of being powered from an OPERABLE emergency power source:

- a. A flow path from the boric acid tanks via a boric acid transfer pump and charging pump to the Reactor Coolant System if the boric acid storage tank in Specification 3.1.2.5a. is OPERABLE, or
- b. The flow path from the refueling water storage tank via a charging pump to the Reactor Coolant System if the refueling water storage tank in Specification 3.1.2.5b. is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With none of the above flow paths OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.1 At least one of the above required flow paths shall be demonstrated OPERABLE:

For Unit 1 and 2, Cycle 4:

- a. At least once per 7 days by verifying that the temperature of the heat traced portion of the flow path is greater than or equal to 145°F when a flow path from the boric acid tanks is used, and
- b. At least once per 31 days by verifying that each valve (manual, power-operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position, or

For Unit 1 and 2, Cycle 5 and after:

- a. At least once per 7 days by verifying that the temperature of the flow path is greater than or equal to 65°F when a flow path from the boric acid tanks is used, and
- b. At least once per 31 days by verifying that each valve (manual, power-operated or automatic) in the flow path that is not locked, sealed or otherwise secured in position, is in its correct position.

REACTIVITY CONTROL SYSTEMS

FLOW PATHS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.2 Each of the following boron injection flow paths shall be OPERABLE:

- a. The flow path from the boric acid tanks via a boric acid transfer pump and a charging pump to the Reactor Coolant System (RCS), and
- b. The flow path from the refueling water storage tank via a charging pump to the RCS.

APPLICABILITY: MODES 1, 2, 3 and 4#.

ACTION:

- a. With the flow path from the boric acid tanks inoperable, restore the inoperable flow path to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F within the next 6 hours; restore the flow path to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.
- b. With the flow path from the refueling water storage tank inoperable, restore the flow path to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.2 Each of the above required flow paths shall be demonstrated OPERABLE:

For Unit 1 and 2, Cycle 4:

- a. At least once per 7 days by verifying that the temperature of the heat traced portion of the flow path from the boric acid tanks is greater than or equal to 145°F,
- b. At least once per 31 days by verifying that each valve (manual, power-operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position,
- c. At least once per 18 months by verifying that each automatic valve in the flow path actuates to its correct position on a safety injection test signal, and

#Only one boron injection flow path is required to be OPERABLE whenever the temperature of one or more of the RCS cold legs is less than or equal to 323°F.

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- d. At least once per 18 months by verifying that the flow path required by Specification 3.1.2.2a. delivers at least 10 gpm to the RCS.

For Unit 1 and 2, Cycle 5 and after:

- a. At least once per 7 days by verifying that the temperature of the flow path from the boric acid tanks is greater than or equal to 65°F.
- b. At least once per 31 days by verifying that each valve (manual, power-operated or automatic) in the flow path that is not locked, sealed or otherwise secured in position, is in its correct position.
- c. At least once per 18 months by verifying that each automatic valve in the flow path actuates to its correct position on a safety injection test signal, and
- d. At least once per 18 months by verifying that the flow path required by Specification 3.1.2.2a delivers at least 30 gpm to the RCS.

REACTIVITY CONTROL SYSTEMS

CHARGING PUMP - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.3 At least one charging pump in the boron injection flow path required by Specification 3.1.2.1 shall be OPERABLE and capable of being powered from an OPERABLE emergency power source.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no charging pump OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.3.1 At least the above required charging pump shall be demonstrated OPERABLE when tested pursuant to Specification 4.0.5. In addition, when the above required charging pump is a centrifugal charging pump, verify that, on recirculation flow, the centrifugal charging pump develops a differential pressure of greater than or equal to 2400 psid.

4.1.2.3.2 All centrifugal charging pumps, excluding the above required OPERABLE pump, shall be demonstrated inoperable* at least once per 12 hours, except when the reactor vessel head is removed, by verifying that the motor breaker D.C. control power is de-energized.

*An inoperable pump may be made OPERABLE for testing per Specification 4.0.5 provided the discharge of the pump has been isolated from the Reactor Coolant System by an isolation valve with power removed from the valve operator, or by a sealed closed manual isolation valve.

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.4 At least two charging pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4#.

ACTION:

With only one charging pump OPERABLE, restore at least two charging pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F within the next 6 hours; restore at least two charging pumps to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.4.1 At least two charging pumps shall be demonstrated OPERABLE when tested pursuant to Specification 4.0.5. In addition, when the above required charging pumps include a centrifugal charging pump(s), verify that, on recirculation flow, each required centrifugal charging pump(s) develops a differential pressure of greater than or equal to 2400 psid.

4.1.2.4.2 All centrifugal charging pumps, except the above required OPERABLE pump, shall be demonstrated inoperable* at least once per 12 hours whenever the temperature of one or more of the Reactor Coolant System (RCS) cold legs is less than or equal to 323°F by verifying that the motor breaker D.C. control power is de-energized.

#A maximum of one centrifugal charging pump shall be OPERABLE whenever the temperature of one or more of the RCS cold legs is less than or equal to 323°F.

*An inoperable pump may be made OPERABLE for testing per Specification 4.0.5 provided the discharge of the pump has been isolated from the Reactor Coolant System by an isolation valve with power removed from the valve operator, or by a sealed closed manual isolation valve.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCE - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.5 As a minimum, one of the following borated water sources shall be OPERABLE:

For Unit 1 and 2, Cycle 4:

- a. A Boric Acid Storage System and at least one associated heat tracing channel with:
 - 1) A minimum contained borated water volume of 835 gallons,
 - 2) A boron concentration between 20,000 and 22,500 ppm, and
 - 3) A minimum solution temperature of 145°F.
- b. The Refueling Water Storage Tank (RWST) with:
 - 1) A minimum contained borated water volume of 50,000 gallons,
 - 2) A minimum boron concentration of 2300 ppm, and
 - 3) A minimum solution temperature of 35°F, or

For Unit 1 and 2, Cycle 5 and after:

- a. A Boric Acid Storage System with:
 - 1) A minimum contained borated water volume of 2,499 gallons,
 - 2) A boron concentration between 7,000 and 7,700 ppm, and
 - 3) A minimum solution temperature of 65°F.
- b. The Refueling Water Storage Tank (RWST) with:
 - 1) A minimum contained borated water volume of 50,000 gallons,
 - 2) A minimum boron concentration of 2300 ppm, and
 - 3) A minimum solution temperature of 35°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.5 The above required borated water source shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 - 1) Verifying the boron concentration of the water,
 - 2) Verifying the contained borated water volume, and
 - 3) Verifying the boric acid storage tank solution temperature when it is the source of borated water.
- b. At least once per 24 hours by verifying the RWST temperature when it is the source of borated water and the outside ambient air temperature is less than 35°F.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.6 Each of the following borated water source(s) shall be OPERABLE:

For Unit 1 and 2, Cycle 4:

- a. A Boric Acid Storage System and at least one associated heat tracing channel with:
 - 1) A minimum contained borated water volume of 5106 gallons,
 - 2) A boron concentration between 20,000 and 22,500 ppm, and
 - 3) A minimum solution temperature of 145°F.
- b. The Refueling Water Storage Tank (RWST) with:
 - 1) A contained borated water volume of greater than or equal to 400,000 gallons,
 - 2) A boron concentration between 2300 and 2500 ppm, and
 - 3) A minimum solution temperature of 35°F, or

For Unit 1 and 2, Cycle 5 and after:

- a. A Boric Acid Storage System with:
 - 1) A minimum contained borated water volume of 14,042 gallons,
 - 2) A boron concentration between 7,000 and 7,700 ppm, and
 - 3) A minimum solution temperature of 65°F.
- b. The Refueling Water Storage Tank (RWST) with:
 - 1) A minimum contained borated water volume of 50,000 gallons,
 - 2) A boron concentration between 2300 and 2500 ppm, and
 - 3) A minimum solution temperature of 35°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With the Boric Acid Storage System inoperable, restore the system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F; restore the Boric Acid Storage System to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.
- b. With the RWST inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS

4.1.2.6 Each borated water source shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 - 1) Verifying the boron concentration in the water,
 - 2) Verifying the contained borated water volume of the water source, and
 - 3) Verifying the Boric Acid Storage System solution temperature.
- b. At least once per 24 hours by verifying the RWST temperature when the outside air temperature is less than 35°F.

EMERGENCY CORE COOLING SYSTEMS

3/4.5.5 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The Refueling Water Storage Tank (RWST) shall be OPERABLE with:

- a. A minimum contained borated water volume of 400,000 gallons,
- b. A boron concentration of between 2300 and 2500 ppm, and
- c. A minimum solution temperature of 35°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the RWST inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 - 1) Verifying the contained borated water volume in the tank, and
 - 2) Verifying the boron concentration of the water.
- b. At least once per 24 hours by verifying the RWST temperature when the outside ambient air temperature is less than 35°F.

3/4.9 REFUELING OPERATIONS

3/4.9.1 BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 The boron concentration of all filled portions of the Reactor Coolant System and the refueling canal shall be maintained uniform and sufficient to ensure that the more restrictive of the following reactivity conditions is met either:

- a. A K_{eff} of 0.95 or less, which includes a 1% $\Delta k/k$ conservative allowance for uncertainties, or
- b. A boron concentration of greater than or equal to 2000 ppm, which includes a 50 ppm conservative allowance for uncertainties.

APPLICABILITY: MODE 6*.

ACTION:

For Unit 1 and 2, Cycle 4:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and initiate and continue boration at greater than or equal to 10 gpm of a solution containing greater than or equal to 20,000 ppm boron or its equivalent until K_{eff} is reduced to less than or equal to 0.95 or the boron concentration is restored to greater than or equal to 2000 ppm, whichever is the more restrictive, or

For Unit 1 and 2, Cycle 5 and after:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7,000 ppm boron or its equivalent until K_{eff} is reduced to less than or equal to 0.95 or the boron concentration is restored to greater than or equal to 2,000 ppm, whichever is the more restrictive.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The more restrictive of the above two reactivity conditions shall be determined prior to:

- a. Removing or unbolting the reactor vessel head, and
- b. Withdrawal of any full-length control rod in excess of 3 feet from its fully inserted position within the reactor vessel.

4.9.1.2 The boron concentration of the Reactor Coolant System and the refueling canal shall be determined by chemical analysis at least once each 72 hours.

*The reactor shall be maintained in MODE 6 whenever fuel is in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed.

REFUELING OPERATIONS

3/4.9.2 INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 As a minimum, two Source Range Neutron Flux Monitors shall be OPERABLE each with continuous visual indication in the control room and one with audible indication in containment and the control room.

APPLICABILITY: MODE 6.

ACTION:

- a. With one of the above required monitors inoperable or not operating, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes except for latching the control rod drive mechanism shaft to the rod cluster control assemblies and friction testing of individual control rods.
- b. With both of the above required monitors inoperable or not operating, determine the boron concentration of the Reactor Coolant System at least once per 12 hours.

SURVEILLANCE REQUIREMENTS

4.9.2 Each Source Range Neutron Flux Monitor shall be demonstrated OPERABLE by performance of:

- a. A CHANNEL CHECK at least once per 12 hours,
- b. An ANALOG CHANNEL OPERATIONAL TEST within 8 hours prior to the initial start of CORE ALTERATIONS, and
- c. An ANALOG CHANNEL OPERATIONAL TEST at least once per 7 days.

3/4.10 SPECIAL TEST EXCEPTIONS

3/4.10.1 SHUTDOWN MARGIN

LIMITING CONDITION FOR OPERATION

3.10.1 The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 may be suspended for measurement of control rod worth and shutdown margin provided reactivity equivalent to at least the highest estimated control rod worth is available for trip insertion from OPERABLE control rod(s).

APPLICABILITY: MODE 2.

ACTION:

For Unit 1 and 2, Cycle 4:

- a. With any full-length control rod not fully inserted and with less than the above reactivity equivalent available for trip insertion immediately initiate and continue boration at greater than or equal to 10 gpm of a solution containing greater than or equal to 20,000 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.
- b. With all full-length control rods fully inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at greater than or equal to 10 gpm of a solution containing greater than or equal to 20,000 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

For Unit 1 and 2, Cycle 5 and after:

- a. With any full-length control rod not fully inserted and with less than the above reactivity equivalent available for the trip insertion immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7,000 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.
- b. With all full-length control rods fully inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7,000 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

SURVEILLANCE REQUIREMENTS

4.10.1.1 The position of each full-length control rod either partially or fully withdrawn shall be determined at least once per 2 hours.

4.10.1.2 Each full-length control rod not fully inserted shall be demonstrated capable of full insertion when tripped from at least the 50% withdrawn position within 24 hours prior to reducing the SHUTDOWN MARGIN to less than the limits of Specification 3.1.1.1.

SPECIAL TEST EXCEPTIONS

3/4.10.2 GROUP HEIGHT, INSERTION AND POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION

3.10.2 The group height, insertion and power distribution limits of Specifications 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.1, and 3.2.4 may be suspended during the performance of PHYSICS TESTS provided:

- a. The THERMAL POWER is maintained less than or equal to 85% of RATED THERMAL POWER, and
- b. The limits of Specifications 3.2.2.1 or 3.2.2.2 and 3.2.3 are maintained and determined at the frequencies specified in Specification 4.10.2.2 below.

APPLICABILITY: MODE 1.

ACTION:

With any of the limits of Specifications 3.2.2.1 or 3.2.2.2 or 3.2.3 being exceeded while the requirements of Specifications 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.1 and 3.2.4 are suspended, either:

- a. Reduce THERMAL POWER sufficient to satisfy the ACTION requirements of Specifications 3.2.2.1 or 3.2.2.2 and 3.2.3, or
- b. Be in HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.10.2.1 The THERMAL POWER shall be determined to be less than or equal to 85% of RATED THERMAL POWER at least once per hour during PHYSICS TESTS.

4.10.2.2 The requirements of the below listed specifications shall be performed at least once per 12 hours during PHYSICS TESTS:

- a. Specifications 4.2.2.1.2 or 4.2.2.2.2 and 4.2.2.1.3 or 4.2.2.2.3, and
- b. Specification 4.2.3.2.

3/4.1 REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient SHUTDOWN MARGIN ensures that: (1) the reactor can be made subcritical from all operating conditions, (2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and (3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

SHUTDOWN MARGIN requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS T_{avg} . The most restrictive condition occurs at EOL, with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 1.6% $\Delta k/k$ is initially required to control the reactivity transient. Accordingly, the SHUTDOWN MARGIN requirement is based upon this limiting condition and is consistent with FSAR safety analysis assumptions. With T_{avg} less than 200°F, the reactivity transients resulting from a postulated steam line break cooldown are minimal and a 1% $\Delta k/k$ shutdown margin provides adequate protection.

3/4.1.1.3 MODERATOR TEMPERATURE COEFFICIENT

The limitations on moderator temperature coefficient (MTC) are provided to ensure that the value of this coefficient remains within the limiting conditions assumed in the FSAR accident and transient analysis.

The MTC values of this specification are applicable to a specific set of plant conditions; accordingly, verification of MTC values at conditions other than those explicitly stated will require extrapolation to those conditions in order to permit an accurate comparison.

The most negative MTC value equivalent to the most positive moderator density coefficient (MDC) was obtained by incrementally correcting the MDC used in the FSAR analyses to nominal operating conditions. These corrections involved subtracting the incremental change in the MDC associated with a core condition of all rods inserted (most positive MDC) to an all rods withdrawn condition, and a conversion for the rate of change of moderator density with temperature at RATED THERMAL POWER conditions. This value of the MDC was then transformed into the limiting MTC value $-3.9 \times 10^{-4} \Delta k/k/^{\circ}F$. The MTC value of $-3.0 \times 10^{-4} \Delta k/k/^{\circ}F$ represents a conservative value (with corrections for burnup and soluble boron) at a core condition of 300 ppm equilibrium boron concentration and is obtained by making these corrections to the limiting MTC value of $-3.9 \times 10^{-4} \Delta k/k/^{\circ}F$.

The Surveillance Requirements for measurement of the MTC at the beginning and near the end of each fuel cycle are adequate to confirm that the MTC remains within its limits since this coefficient changes slowly due principally to the reduction in RCS boron concentration associated with fuel burnup. In addition, verification during startup testing at beginning of life hot zero power for each cycle validates that the MTC parameters are within the limits specified for all other power levels.

REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1.4 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the Reactor Coolant System average temperature less than 541°F. This limitation is required to ensure: (1) the moderator temperature coefficient is within its analyzed temperature range, (2) the protective instrumentation is within its normal operating range, (3) the pressurizer is capable of being in an OPERABLE status with a steam bubble, and (4) the reactor vessel is above its minimum RT_{NDT} temperature.

3/4.1.2 BORATION SYSTEMS

The boron injection system ensures that negative reactivity control is available during each mode of facility operation. The components required to perform this function include: (1) borated water sources, (2) charging pumps, (3) separate flow paths, (4) boric acid transfer pumps, (5) associated heat tracing systems (only Unit 1 and 2, Cycle 4), and (6) an emergency power supply from OPERABLE diesel generators.

With the RCS average temperature above 200°F, a minimum of two boron injection flow paths are required to ensure single functional capability in the event an assumed failure renders one of the flow paths inoperable. The boration capability of either flow path is sufficient to provide a SHUTDOWN MARGIN from expected operating conditions of 1.6% $\Delta k/k$ after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at BOL when borating from hot zero power to COLD SHUTDOWN and requires 5106 gallons of 20,000 ppm (Unit 1 and 2, Cycle 4) or 14,042 gallons of 7,000 ppm (Unit 1 and 2, Cycle 5 and after) borated water from the boric acid storage tanks or 65,784 gallons of 2300 ppm borated water from the refueling water storage tank.

With the RCS temperature below 200°F, one Boron Injection System is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity change in the event the single injection system becomes inoperable.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1% $\Delta k/k$ after xenon decay and cooldown from 200°F to 140°F. This condition requires either 835 gallons of 20,000 ppm (Unit 1 and 2, Cycle 4) or 2,499 gallons of 7,000 ppm (Unit 1 and 2, Cycle 5 and after) borated water from the boric acid storage tanks or 17,865 gallons of 2300 ppm borated water from the refueling water storage tank.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.0 and 9.5 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 53 TO FACILITY OPERATING LICENSE NO. DPR-80
AND AMENDMENT NO. 52 TO FACILITY OPERATING LICENSE NO. DPR-82
PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2
DOCKET NO. 50-275 AND 50-323

1.0 INTRODUCTION

By letter dated July 5, 1989, as supplemented by letters dated December 1, 1989 and April 10, 1990 (Reference LAR 89-08), Pacific Gas and Electric Company (PG&E or the licensee) requested amendments to the combined Technical Specifications (TS) appended to Facility Operating License Nos. DPR-80 and DPR-82 for the Diablo Canyon Power Plant (DCPP) Unit Nos. 1 and 2, respectively. The amendments change the TS to allow the boric acid concentration in the boric acid tank (BAT) to be reduced from twelve to four weight percent. Generic Letter 85-16, "High Boron Concentrations," issued on August 23, 1985, discussed incidents at operating nuclear plants in which boric acid has crystallized in the internals and rendered systems inoperable. The changes permitted herein will reduce the potential for such incidents at Diablo Canyon and reduce routine maintenance and operational problems associated with the boric acid storage and transfer systems.

The licensee plans to install two auxiliary tanks common to both Units 1 and 2 to provide additional tankage to support plant operations. The boric acid system modifications and boron concentration reduction will not be made until after these auxiliary tanks have been installed. Consistent with the schedule for installation of the auxiliary tanks, PG&E has requested that the revised Technical Specifications become effective for each unit following the refueling outage in which all the associated modifications are implemented. This will be the fourth refueling outage for each unit, currently planned for February 1991 for Unit 1 and October 1991 for Unit 2.

The staff evaluation of these changes is given below and is based on the licensee's letters of July 5, 1989, December 1, 1989 and April 10, 1990. The information contained in the licensee's letters of December 1, 1989 and April 10, 1990 did not change the action noticed, or alter the staff's proposed determination of no significant hazards consideration published in the Federal Register on August 9, 1989 at 54 FR 32713. The December 1, 1989 and April 10, 1990 submittals only modify the proposed TS changes to delay, for one cycle, the date of implementation for Unit 2.

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2.0 EVALUATION

The NRC staff has evaluated the proposed changes and finds them acceptable based on its review of the analyses and evaluations given by the licensee. A discussion of each of the specific technical specification changes made by these amendments is presented below.

The Diablo Canyon Power Plant uses two boric acid tanks for each unit each containing 12 weight percent boric acid. These tanks are the primary source of boron within the chemical and volume control system (CVCS) and are used to change the reactor coolant system (RCS) boron concentration and to provide RCS makeup water at the prevailing boron concentration.

Early Westinghouse plants such as Diablo Canyon were designed with the capacity of the two BATs to contain sufficient 12 weight percent boric acid solution to, without makeup to the BATs, borate the plant to a refueling configuration at the end of life, and following a return to full power, to borate to a cold shutdown condition. These criteria were based on operational considerations and were not associated with mitigation of any design basis accidents. Westinghouse plants since the Farley Nuclear Plant (licensed in 1977) use 4 weight percent boric acid concentration in the BATs.

Westinghouse conducted a plant specific analysis for Diablo Canyon Units 1 and 2 and determined that the following required constraints are necessary and sufficient to assure that the boric acid system can fulfill its safety functions:

- A. The BATs must maintain adequate boric acid solution volume and concentration to borate the RCS and CVCS to a cold shutdown at any time in core cycle with a shutdown margin consistent with that required by the technical specifications.
- B. Boric acid fluid temperatures must be maintained above the solubility limit throughout the acceptable concentration range.
- C. Sufficient volumetric margins must be provided to account for level instrument accuracy, avoid vortex formation within the tank outlet and provide adequate boric acid transfer pump net positive suction head.

The first requirement is satisfied by increasing the borated water volume as specified in Technical Specifications 3.1.2.5 (Modes 5 and 6) and 3.1.2.6 (Modes 1, 2, 3, and 4). In TS 3.1.2.5 the minimum borated water volume in the boric acid storage system is increased from 835 gallons to 2499 gallons where the boron concentration is decreased from between 20,000 to 22,000 ppm to between 7,000 and 7,700 ppm. This boron capability is sufficient to provide shutdown margin of 1 percent $\Delta k/k$ after xenon decay and cooldown from 200°F to 140°F.

TS 3.1.2.6 deals with Modes 1, 2, 3, and 4 when the RCS average temperature is above 200°F. For this case a minimum of two boron injection flow paths are required in the event that one path fails. The boron capability of either flow path is sufficient to provide shutdown margin from expected operating condition of 1.6 percent delta-k/k after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at beginning of life (BOL) when borating from hot zero power to cold shutdown and requires 14,042 gallons of 7,000 ppm borated water from the boric acid storage tanks or 65,784 gallons of 2,300 ppm borated water from the refueling water storage tank. The borated water volume and boron concentration values for the boric acid storage system were changed in Specification 3.1.2.6 to agree with these values. The minimum borated water volume in the refueling water storage tank was 400,000 gallons. This value was not changed.

The second requirement is reflected in changes in the minimum tank and piping temperatures. The BATs have temperature indication on the main control board and are also alarmed. The minimum solution temperature will be changed from 145°F to 65°F, because 4.4 weight percent boric acid precipitates at 65°F. Since the solubility limit of 4 weight percent is close to room temperature the fluid temperature would approach its solubility limit slowly and allow time for operator intervention once the alarm was sounded. Thus, declaring the 4 percent weight percent boric acid system inoperable based on the loss of the heat tracing is not necessary. The proposed TS deletes the requirement for heat tracing as a condition for operability of the boric acid injection system and boric acid storage system.

Sufficient volumetric margins are available to account for level instrument accuracy, avoid vortex formation within the tank outlet and provide adequate boric acid transfer pump net positive suction head. This satisfies the third requirement.

The following systems modifications will be made in order to implement the reduced boron concentration changes.

- A. The internals of valves in the borated water flow path will be replaced with larger internals to allow an increase in borated water flow rate from 10 gpm to 30 gpm.
- B. The range on the boric acid flow transmitter and flow indicator will be increased to correspond to the new borated water flow rate.

- C. The low-level alarm settings on each BAT will be modified to satisfy the new requirement of 7,021 gallons for each BAT.
- D. The settings of the heat tracing controller will be modified to conform to the 4 weight percent boric acid concentration.
- E. The settings of each BAT heater temperature controller will be modified to conform to the 4 weight percent boric acid concentration.
- F. In order to have a ready supply of boric acid to refill the BATs, PG&E will install two additional auxiliary tanks with capacity of approximately 2,600 gallons each. Thus, at least one tank will be available to rapidly refill the BATs even while batching, recirculation, filling, or chemistry analyses are being performed in the other auxiliary tank. These tanks are not considered safety related but are provided for operational convenience. These tanks will be installed no later than the Unit 1 fourth refueling outage (February 1991). The boric acid system modification and boron concentration reduction will not be made until after these auxiliary tanks have been installed.

In summary, the staff has reviewed the safety analysis performed by PG&E in support of the proposed TS changes to reduce the boric acid concentration in the BAT from twelve to four percent. The changes proposed by PG&E will make the Diablo Canyon TS similar to the Technical Specifications for most Westinghouse plants and to the current Standard Technical Specifications. Since the analysis demonstrates that all the required constraints have been met, the proposed TS changes are acceptable.

PG&E plans to implement the required plant modifications and reduce boron concentration in the boric acid system after installation of the auxiliary tanks. The revised TS will be effective for each unit following the refueling outage in which the boric acid system modifications are implemented (the fourth refueling outage for each unit).

3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve changes to a requirement with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and a change in surveillance requirements. At Diablo Canyon, the restricted area coincides with the site boundary. We have determined that the amendments involve 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 previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet 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 these amendments.

4.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and (3) the issuance of these amendments will not be inimical to the common defense and security or the health and safety of the public.

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Dated: April 26, 1990