

April 15, 1999

Mr. Roger O. Anderson, Director
Nuclear Energy Engineering
Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 -
ISSUANCE OF AMENDMENTS RE: INCORPORATION OF COMBUSTION
ENGINEERING STEAM GENERATOR WELDED TUBE SLEEVE TOPICAL
REPORT REVISION (TAC NOS. MA4716 AND MA4717)

Dear Mr. Anderson:

The Commission has issued the enclosed Amendment No. 144 to Facility Operating License No. DPR-42 and Amendment No. 135 to Facility Operating License No. DPR-60 for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated February 5, 1999, as supplemented March 1, 1999. The amendments change certain requirements for repair of defective steam generator tubes specified in TS 4.12, "Steam Generator Tube Surveillance," based on the latest revision to a previously approved methodology. This methodology, as described in ABB Combustion Engineering Topical Report (CEN-629-P, Revision 2, and Addendum 1 to Revision 1), "Repair of Westinghouse Series 44 and 51 Steam Generator Tubes Using Leak Tight Sleeves," had been approved by the staff in a safety evaluation dated November 4, 1997.

A copy of our related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

ORIGINAL SIGNED BY:

Tae Kim, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

- Enclosures: 1. Amendment No. 144 to DPR-42
- 2. Amendment No. 135 to DPR-60
- 3. Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 15, 1999

Mr. Roger O. Anderson, Director
Nuclear Energy Engineering
Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 -
ISSUANCE OF AMENDMENTS RE: INCORPORATION OF COMBUSTION
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A copy of our related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in cursive script, appearing to read "Tae Kim".

Tae Kim, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosures: 1. Amendment No. 144 to DPR-42
2. Amendment No. 135 to DPR-60
3. Safety Evaluation

cc w/encl: See next page

DATED: April 15, 1999

AMENDMENT NO. 144 TO FACILITY OPERATING LICENSE NO. DPR-42-PRAIRIE ISLAND UNIT 1
AMENDMENT NO. 135 TO FACILITY OPERATING LICENSE NO. DPR-60-PRAIRIE ISLAND UNIT 2

Docket File (50-282, 50-306)

PUBLIC

PD3/Sec III-1 Rdg

J. Zwolinski/S. Black

C.O. Thomas/G. Dick

T. Harris

T. J. Kim (2)

OGC

G. Hill (4)

W. Beckner

E. Murphy

J. Tsao

ACRS

R. Lanksbury

SEDB (RCN)

Mr. Roger O. Anderson, Director
Northern States Power Company

Prairie Island Nuclear Generating
Plant

cc:

J. E. Silberg, Esquire
Shaw, Pittman, Potts and Trowbridge
2300 N Street, N. W.
Washington DC 20037

Site Licensing
Prairie Island Nuclear Generating
Plant
Northern States Power Company
1717 Wakonade Drive East
Welch, Minnesota 55089

Plant Manager
Prairie Island Nuclear Generating
Plant
Northern States Power Company
1717 Wakonade Drive East
Welch, Minnesota 55089

Tribal Council
Prairie Island Indian Community
ATTN: Environmental Department
5636 Sturgeon Lake Road
Welch, Minnesota 55089

Adonis A. Neblett
Assistant Attorney General
Office of the Attorney General
455 Minnesota Street
Suite 900
St. Paul, Minnesota 55101-2127

Site General Manager
Prairie Island Nuclear Generating
Plant
Northern States Power Company
1717 Wakonade Drive East
Welch, Minnesota 55089

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
1719 Wakonade Drive East
Welch, Minnesota 55089-9642

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Mr. Stephen Bloom, Administrator
Goodhue County Courthouse
Box 408
Red Wing, Minnesota 55066-0408

Commissioner
Department of Public Service
121 Seventh Place East
Suite 200
St. Paul, Minnesota 55101-2145



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-282

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 144
License No. DPR-42

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Northern States Power Company (the licensee) dated February 5, 1999, as supplemented March 1, 1999, 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, 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 2.C.(2) of Facility Operating License No. DPR-42 is hereby amended to read as follows:

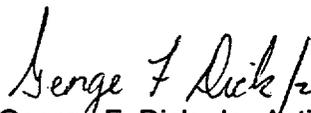
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Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 144 , 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 issuance, with full implementation within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



George F. Dick, Jr., Acting Chief, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: April 15, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 144

FACILITY OPERATING LICENSE NO. DPR-42

DOCKET NO. 50-282

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

REMOVE

TS.4.12-4
TS.4.12.5

INSERT

TS.4.12-4
TS.4.12.5

D. Acceptance Criteria

1. As used in this Specification:

- (a) Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.
- (b) Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.
- (c) Degraded Tube means a tube containing imperfections $\geq 20\%$ of the nominal wall thickness caused by degradation.
- (d) % Degradation means the percentage of the tube wall thickness affected or removed by degradation.
- (e) Defect means an imperfection of such severity that it exceeds the repair limit. A tube containing a defect is defective.
- (f) Repair Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging or repaired by sleeving because it may become unserviceable prior to the next inspection and is equal to 50% of the nominal tube wall thickness. If significant general tube thinning occurs, this criteria will be reduced to 40% wall penetration. This definition does not apply to the portion of the tube in the tubesheet below the F* or EF* distance provided the tube is not degraded (i.e., no indications of cracks) within the F* or EF* distance for F* or EF* tubes. The repair limit for the pressure boundary region of any sleeve is 25% of the nominal sleeve wall thickness. This definition does not apply to tube support plate intersections for which the voltage-based repair criteria are being applied. Refer to Specification 4.12.D.4 for the repair limit applicable to these intersections.
- (g) Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break.
- (h) Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg.
- (i) Sleeving is the repair of degraded tube regions using a new Alloy 690 tubing sleeve inserted inside the parent tube and sealed at each end by welding or by replacing the lower weld in a full depth tubesheet sleeve with a hard rolled joint. The new sleeve becomes the pressure boundary spanning the original degraded tube region.

- (j) F* Distance is the distance from the bottom of the hardroll transition toward the bottom of the tubesheet that has been conservatively determined to be 1.07 inches (not including eddy current uncertainty). The F* distance applies to roll expanded regions below the midplane of the tubesheet
 - (k) F* Tube is a tube with degradation, below the F* distance, equal to or greater than 40%, and not degraded (i.e., no indications of cracking) within the F* distance.
 - (l) EF* Distance is the distance from the bottom of the upper hardroll transition toward the bottom of the tubesheet that has been conservatively determined to be 1.62 inches (not including eddy current uncertainty). EF* distance applies to roll expanded regions when the top of the additional roll expansion is 2.0 inches or greater down from the top of the tubesheet
 - (m) EF* Tube is a tube with degradation, below the EF* distance, equal to or greater than 40%, and not degraded (i.e., no indications of cracking) within the EF* distance.
2. The steam generator shall be determined OPERABLE after completing the corresponding actions (plug or repair by sleeving all tubes exceeding the repair limit and all tubes containing through-wall cracks or classify as F* or EF* tubes) required by Tables TS.4.12-1 and TS.4.12-2.
3. Tube repair, after April 1, 1999, using Combustion Engineering welded sleeves shall be in accordance with the methods described in the following:
- CEN-629-P, Revision 03-P, "Repair of Westinghouse Series 44 and 51 Steam Generator Tubes Using Leak Tight Sleeves";
4. Tube Support Plate Repair Limit is used for the disposition of a steam generator tube for continued service that is experiencing predominantly axially oriented outside diameter stress corrosion cracking confined within the thickness of the tube support plates. At tube support plate intersections, the repair limit is based on maintaining steam generator serviceability as described below:
- a. Steam generator tubes, whose degradation is attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with bobbin voltages less than or equal to 2.0 volts will be allowed to remain in service.
 - b. Steam generator tubes, whose degradation is attributed to outside diameter stress corrosion cracking within the bounds of the tube support plate with a bobbin voltage greater than 2.0 volts, will be repaired or plugged, except as noted in Specification 4.12.D.4.c below.



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-306

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 135
License No. DPR-60

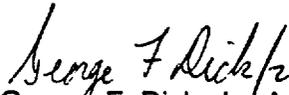
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Northern States Power Company (the licensee) dated February 5, 1999, as supplemented March 1, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the 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, 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 2.C.(2) of Facility Operating License No. DPR-60 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 135 , 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 issuance, with full implementation within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



George F. Dick, Jr., Acting Chief, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: April 15, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 135

FACILITY OPERATING LICENSE NO. DPR-60

DOCKET NO. 50-306

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

REMOVE

TS.4.12-4
TS.4.12.5

INSERT

TS.4.12-4
TS.4.12.5

D. Acceptance Criteria**1. As used in this Specification:**

- (a) Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.
- (b) Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.
- (c) Degraded Tube means a tube containing imperfections $\geq 20\%$ of the nominal wall thickness caused by degradation.
- (d) % Degradation means the percentage of the tube wall thickness affected or removed by degradation.
- (e) Defect means an imperfection of such severity that it exceeds the repair limit. A tube containing a defect is defective.
- (f) Repair Limit means the imperfection depth at or beyond which the tube shall be removed from service by plugging or repaired by sleeving because it may become unserviceable prior to the next inspection and is equal to 50% of the nominal tube wall thickness. If significant general tube thinning occurs, this criteria will be reduced to 40% wall penetration. This definition does not apply to the portion of the tube in the tubesheet below the F* or EF* distance provided the tube is not degraded (i.e., no indications of cracks) within the F* or EF* distance for F* or EF* tubes. The repair limit for the pressure boundary region of any sleeve is 25% of the nominal sleeve wall thickness. This definition does not apply to tube support plate intersections for which the voltage-based repair criteria are being applied. Refer to Specification 4.12.D.4 for the repair limit applicable to these intersections.
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- (h) Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg.
- (i) Sleeving is the repair of degraded tube regions using a new Alloy 690 tubing sleeve inserted inside the parent tube and sealed at each end by welding or by replacing the lower weld in a full depth tubesheet sleeve with a hard rolled joint. The new sleeve becomes the pressure boundary spanning the original degraded tube region.

- (j) F* Distance is the distance from the bottom of the hardroll transition toward the bottom of the tubesheet that has been conservatively determined to be 1.07 inches (not including eddy current uncertainty). The F* distance applies to roll expanded regions below the midplane of the tubesheet
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 144

TO FACILITY OPERATING LICENSE NO. DPR-42

AND AMENDMENT NO. 135 TO FACILITY OPERATION LICENSE NO. DPR-60

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2

DOCKET NOS. 50-282 AND 50-306

1.0 INTRODUCTION

By letter dated February 5, 1999, supplemented March 1, 1999, Northern States Power Company (NSP, the licensee) requested an amendment to the Prairie Island Units 1 and 2 Operating Licenses that would authorize changes to the Technical Specifications (TS). The amendments change requirements for repair of defective steam generator tubes specified in TS.4.12, "Steam Generator Tube Surveillance," based on the latest revision (Revision 3) to a previously approved methodology. This methodology, as described in ABB Combustion Engineering Topical Report (CEN-629-P), "Repair of Westinghouse Series 44 and 51 Steam Generator Tubes Using Leak Tight Sleeves," Addendum 1 to Revision 1, and Revision 2, (proprietary and nonproprietary reports) had been approved by the staff in a safety evaluation dated November 4, 1997, and referenced in TS.4.12.

Revision 3 to CEN-629-P, published in September 1998, include, among other minor changes, an improved sleeve installation technology and structural analyses. Accordingly, the licensee has requested the subject amendments to incorporate Revision 3 to CEN-629-P to TS.4.12 by reference.

The March 1, 1999, supplement provided corrected TS pages. This information was within the scope of the original *Federal Register* notice and did not change the staff's initial proposed no significant hazards considerations determination.

2.0 EVALUATION

The licensee proposed the following changes to the TS:

a. TS 4.12.D.1.(f)

The repair limit for the sleeve is changed to the following: "The repair limit for the pressure boundary region of any sleeve is 25% of the nominal sleeve wall thickness."

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b. TS 4.12.D.3

The effective date for using the updated topical report is changed to the following: "Tube repair, after April 1, 1999, using Combustion Engineering welded sleeves shall be in accordance with the methods described in the following:"

Reference to CEN-629-P, Revision 2, is revised to CEN-629-P, Revision 03-P.
Reference to CEN-629-P, Addendum 1, Revision 1, is deleted.

Since the staff has previously approved the methodology described in CEN-629-P, up to and including Addendum 1 to Revision 1 and Revision 2, this staff evaluation focuses on the changes between Revision 3, and previously approved versions of CEN-629-P.

In Revision 3, analysis input assumptions were changed for the operating pressures and temperatures, and design conditions for the primary and secondary sides of the steam generator to bound the maximum temperature and pressure differentials across the primary to secondary side of the steam generator. The stresses on the steam generator tube sleeve were recalculated to reflect the changes in temperature and pressure. The calculated stresses remained within the American Society of Mechanical Engineers (ASME) Code Section III allowable values and satisfy safety margins recommended in NRC Regulatory Guide (RG) 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes."

Revision 3 included an alternative method to remove brushing fines and loose material prior to sleeve installation. Previously, a lint-free cotton swab was used to dry wipe the brushed areas of the steam generator tube. Alternatively, a high-pressure air system can now be used for cleaning the steam generator tubes after brushing the inside surface of the tubes. The high-pressure air system was tested for its effectiveness in cleaning the tube. Revision 3 to CEN-629-P requires visual inspection of all conditioned tubes before a sleeve can be installed. A tube will undergo repeated cleaning until adequate cleaning is confirmed by visual inspection. The staff finds the use of the high-pressure air system as an alternative method acceptable because the requirements for in-place inspection and acceptance criteria for tube conditioning remain in place.

The assumed minimum tensile strength of alloy 690 was changed from 90 ksi [kips per square inch], as indicated in Revision 2, to 80 ksi in Revision 3 of CEN-629-P. Alloy 690 is the material of construction for the leak-tight sleeve. Based on the minimum tensile strength of 80 ksi, ABB-CE has recalculated the allowable sleeve degradation limit of 45.5% of the sleeve wall thickness. This is the controlling flaw for both the main steam line break and normal operating conditions. Considering allowances for potential flaw growth and inspection uncertainty, the licensee proposed a stricter limit on allowable sleeve degradation to 25% of the sleeve wall thickness. The current allowable sleeve degradation is 31% of the sleeve wall thickness. The staff finds that the new 25% limit is acceptable because it fully accounts for the reduction in minimum tensile strength.

The contents in Addendum 1, Revision 1, to CEN-629-P, have been incorporated into Revision 3. The information in Addendum 1, Revision 1, documents structural analysis in

accordance with ASME Code section III NB-3324.1 and RG 1.121. The staff finds the portion of Revision 3 that incorporates information from Addendum 1, Revision 1, is acceptable.

The staff concludes that the above changes to TS 4.12.D.1.(f) and TS 4.12.D.3 are acceptable based on the following. The staff has determined that the changes incorporated in CEN-629-P, Revision 3, did not affect sleeve design, installation, and qualification significantly. The changes did affect results of structural analyses; however, the stresses on the sleeve are still within the ASME Code Section III allowable and safety margins recommended in RG 1.121. The allowable sleeve repair limit was reduced, in the conservative direction, from the current 31% to the proposed 25% of the sleeve wall thickness.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has 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 (64 FR 11964). Accordingly, the 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 the amendments.

5.0 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: J. Tsao

Date: April 15, 1999

April 15, 1999

Mr. Roger O. Anderson, Director
Nuclear Energy Engineering
Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 -
ISSUANCE OF AMENDMENTS RE: INCORPORATION OF COMBUSTION
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REPORT REVISION (TAC NOS. MA4716 AND MA4717)

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A copy of our related Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

ORIGINAL SIGNED BY:

Tae Kim, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
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Docket Nos. 50-282 and 50-306

Enclosures: 1. Amendment No. 144 to DPR-42
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