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Exelon Nuclear

10 CFR 50.90

RS-01-114

June 6, 2001

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Dresden Nuclear Power Station, Unit 2
Facility Operating License No. DPR–19
NRC Docket No. 50–237

Subject: Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit

References:
1) Letter from R. M. Krich (Commonwealth Edison Company) to U.S. NRC, "Request for Technical Specifications Change, Transition to General Electric Fuel," dated September 29, 2000
2) Letter from R. M. Krich (Exelon Generation Company) to U.S. NRC, "Supplement to GE–14 Fuel License Amendment Request," dated March 1, 2001
3) Letter from G. A. Watford (Global Nuclear Fuel) to U. S. NRC, "Transmittal of GNF-A Proprietary Report, NEDC-32981P, 'GEXL96 Correlation for ATRIUM-9B Fuel,'" dated September 26, 2000
4) Letter from R.M. Krich (Commonwealth Edison Company) to U.S. NRC, "Request for License Amendment for Power Uprate Operation," dated December 27, 2000

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company (EGC), LLC, formerly Commonwealth Edison (ComEd) Company, requests a change to the Technical Specifications (TS) of Facility Operating License Number DPR–19 for the Dresden Nuclear Power Station (DNPS) Unit 2. The proposed change revises the values of the Safety Limit for the Minimum Critical Power Ratio (SLMCPR) in TS Section 2.1.1, "Reactor Core SLs," for Unit 2 Cycle 18 for both two loop operation and single loop operation to 1.08 and 1.09, respectively. EGC requests approval of this proposed change prior to October 20, 2001, to support operation of DNPS Unit 2 following the refueling outage scheduled to begin on October 20, 2001.

In Reference 1, ComEd submitted proposed changes to the DNPS TS to support a change in fuel vendors from Siemens Power Corporation (SPC) to Global Nuclear Fuel (GNF) and to allow operation with GE14 fuel. A supplement to this request was provided in Reference 2. In Reference 3, GNF submitted a topical report regarding an analysis methodology to be used for SPC ATRIUM-9B fuel. This methodology applies to

A001

the SPC ATRIUM-9B fuel that would remain in the DNPS Unit 2 core following the fuel transition. The proposed change to the SLMCPR is a result of the analyses completed in support of this fuel transition.

In Reference 4, ComEd submitted proposed changes to the operating license and TS for DNPS Units 2 and 3 to support operation at uprated power. The analyses completed in support of this proposed change to the SLMCPR were performed assuming uprated power conditions, but the analyses are also applicable to operation at the current licensed power level.

Some of the information contained in Attachment F of this submittal is classified as proprietary to our fuel supplier, GNF, and is identified as text contained between opening double brackets ([[ ) and closing double brackets ( ]]). The proprietary information is of the type that GNF maintains in confidence and withholds from public disclosure. It has been handled and classified as proprietary as supported by the affidavit attached. We hereby request that this information be withheld from public disclosure in accordance with the provisions of 10 CFR 2.790. Attachment G provides a redacted, non-proprietary version of the information in Attachment F.

This request is subdivided as follows.

1. Attachment A gives a description and safety analysis of the proposed change.
2. Attachment B includes the marked–up technical specification pages with the proposed change indicated.
3. Attachment C describes our evaluation performed using the criteria in 10 CFR 50.91(a)(1) that provides information supporting a finding of no significant hazards consideration using the standards in 10 CFR 50.92(c).
4. Attachment D provides information supporting an Environmental Assessment.
5. Attachment E contains the affidavit supporting the request for withholding the identified proprietary information from public disclosure, as required by 10 CFR 2.790(b)(1).
6. Attachment F provides additional information prepared by GNF supporting the proposed change.
7. Attachment G provides a redacted, non-proprietary version of the information in Attachment F.

This proposed change has been reviewed by the Plant Operations Review Committee and the Nuclear Safety Review Board in accordance with the Quality Assurance program.

EGC is notifying the State of Illinois of this application request for a change to the TS by transmitting a copy of this letter and its attachments to the designated State Official.

Should you have any questions concerning his letter, please contact Mr. Allan R. Haeger at (630) 657–3807.

Respectfully,

R. M. Krich
Director – Licensing
Mid-West Regional Operating Group

Attachments:

Affidavit
Attachment A: Description and Safety Analysis for Proposed Changes
Attachment B: Marked Up Pages for Proposed Changes
Attachment C: Information Supporting a Finding of No Significant Hazards Consideration
Attachment D: Information Supporting an Environmental Assessment
Attachment E Global Nuclear Fuel Affidavit for Withholding Information
Attachment F: Global Nuclear Fuel Additional Information Regarding the Cycle Specific SLMCPR for Dresden Unit 2 Cycle 18
Attachment G: Non-Proprietary Version of Global Nuclear Fuel Additional Information Regarding the Cycle Specific SLMCPR for Dresden Unit 2 Cycle 18

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station
Office of Nuclear Facility Safety – Illinois Department of Nuclear Safety

STATE OF ILLINOIS	)
COUNTY OF DUPAGE	)
IN THE MATTER OF	)
EXELON GENERATION COMPANY	) **Docket Number**
DRESDEN NUCLEAR POWER STATION, UNIT 2	) **50–237**

SUBJECT: Request for Technical Specifications Change Minimum Critical Power Ratio Safety Limit

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

R. M. Krich
Director – Licensing
Mid-West Regional Operating Group

Subscribed and sworn to before me, a Notary Public in and for the State above named, this 5th day of June, 2001.

" OFFICIAL SEAL "
Timothy A. Byam
Notary Public, State of Illinois
My Commission Expires 11/24/2001

Notary Public

Attachment A
Request for Technical Specifications Change
for Minimum Critical Power Ratio Safety Limit

DESCRIPTION AND SAFETY ANALYSIS FOR PROPOSED CHANGES

A. SUMMARY OF PROPOSED CHANGES

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company (EGC), LLC, formerly Commonwealth Edison (ComEd) Company, requests a change to the Technical Specifications (TS) for Dresden Nuclear Power Station (DNPS), Unit 2. The proposed change revises the Safety Limit Minimum Critical Power Ratio (SLMCPR) in accordance with the General Electric (GE) Company's standard safety analysis methodology, GESTAR II (Reference 1), which requires that a cycle specific SLMCPR be calculated for each cycle. The proposed change revises the SLMCPR for Unit 2 Cycle 18 for two loop operation and single loop operation to 1.08 and 1.09, respectively.

In Reference 2, ComEd submitted proposed changes to the DNPS TS to support a change in fuel vendors from Siemens Power Corporation (SPC) to Global Nuclear Fuel (GNF) and to allow operation with GE14 fuel. A supplement to this request was provided in Reference 3. In Reference 4, GNF submitted a topical report regarding an analysis methodology to be used for SPC ATRIUM-9B fuel. This analysis methodology applies to the SPC ATRIUM-9B fuel that would remain in the DNPS Unit 2 core following the fuel transition. The proposed change to the SLMCPR is a result of the analyses completed in support of this fuel transition.

In Reference 5, ComEd submitted proposed changes to the operating license and TS for DNPS Units 2 and 3 to support operation at uprated power. The analyses completed in support of this proposed change to the SLMCPR were performed assuming uprated power conditions, but the analyses are also applicable to operation at the current licensed power levels.

The proposed change is described in detail in Section E of this Attachment. The marked up TS pages are provided in Attachment B.

B. DESCRIPTION OF THE CURRENT REQUIREMENTS

TS Section 2.1.1, "Reactor Core SLs" contains the SLMCPR for two loop operation and for single loop operation and reads, in part, as follows. "For Unit 2 two recirculation loop operation, MCPR shall be $\geq$ 1.09 for cycle exposures $\leq$ 13,800 MWd/MTU, and $\geq$ 1.12 for cycle exposures > 13,800 MWd/MTU, or for Unit 2 single recirculation loop operation, MCPR shall be $\geq$ 1.10 for cycle exposures $\leq$ 13,800 MWd/MTU, and $\geq$ 1.13 for cycle exposures > 13,800 MWd/MTU."

C. BASES FOR THE CURRENT REQUIREMENTS

The fuel cladding integrity SLMCPR is established to assure that at least 99.9% of the fuel rods in the core do not experience boiling transition during an anticipated operational occurrence (AOO). To determine the specific value for the cycle specific safety limit, a full core statistical analysis is performed. The core model incorporates the uncertainty effects

of manufacturing tolerances, uncertainty in the measurement of core operating parameters, critical power ratio (CPR) calculational uncertainties, and the statistical uncertainty associated with the fuel vendor's correlation. The probability of boiling transition occurring, and the number of rods that might possibly experience boiling transition as a function of the nominal MCPR, is then calculated. The SLMCPR for the current DNPS cycle (i.e., cycle 17) is based on SPC reload fuel and calculation methodologies as described in the current TS.

D. NEED FOR REVISION OF THE REQUIREMENT

To support the fuel transition, GE methodology was used to calculate the required SLMCPR for the next fuel cycle (i.e., cycle 18). The results of this analysis indicate that the SLMCPR can be reduced from the current TS values and that the exposure dependency can be eliminated. Thus the proposed change will simplify the TS and provide increased operational flexibility.

E. DESCRIPTION OF THE PROPOSED CHANGE

The value of the SLMCPR for Unit 2 in TS Section 2.1.1.2, is revised to read, "For Unit 2 two recirculation loop operation, MCPR shall be ≥ 1.08, or for single recirculation loop operation, MCPR shall be ≥ 1.09."

F. SAFETY ANALYSIS OF THE PROPOSED CHANGE

Attachment F contains a safety analysis of the proposed change in a format that GNF has established with the NRC for submitting changes to the SLMCPR. The results of that analysis are summarized in the following paragraphs.

Table 1 of Attachment F summarizes the relevant input parameters and results of the SLMCPR determination for the DNPS, Unit 2, Cycle 18 and 17 cores. The quantities that have been shown to have some impact on the determination of the SLMCPR are provided. The DNPS, Unit 2, Cycle 18 core will contain a mixture of SPC and GNF fuel. The DNPS, Unit 2, Cycle 17 core was loaded with SPC fuel. The SLMCPR evaluations for Cycle 18 were performed using GNF methods and generic uncertainties, supplemented with DNPS Unit 2 specific uncertainties. These calculations use the GEXL14 correlation for GE14 fuel, which is described in Reference 1, and the GEXL96 correlation for SPC ATRIUM-9B fuel, which was submitted for NRC approval in Reference 4.

There exists a small population of high exposure SPC ANF-9X9-2 fuel that will be loaded into DNPS, Unit 2, Cycle 18. There are 28 of these bundles and they will all reside on the core periphery and operate at very low power. The GE critical power correlation GEXL05 was applied to this fuel in the determination of the SLMCPR along with very conservative R-factors that result in conservative critical power predictions relative to the SPC ANFB critical power correlation. It was confirmed that this fuel is not susceptible to boiling transition and does not contribute to the SLMCPR.

Based on all of the facts, observations and arguments presented in Attachment F, it is concluded that the calculated SLMCPR value of 1.07 for the DNPS Unit 2 Cycle 18 core is appropriate for two loop operation. DNPS has chosen to adopt a more conservative SLMCPR value of 1.08 for two loop operation in order to potentially avoid the need for future license amendment requests.

For single loop operations (SLO) the calculated safety limit MCPR for the limiting case is 1.09.

G. IMPACT ON PREVIOUS SUBMITTALS

EGC has reviewed the proposed change regarding its impact on any previous submittals. The proposed change is related to proposed changes submitted in References 2, 3, and 5, but does not impact any changes proposed in these or any other previous submittals.

In Reference 4, GNF submitted a topical report for NRC approval that describes the GEXL96 correlation and its use for analyzing SPC ATRIUM-9B fuel. This report is being reviewed by the NRC.

In Reference 5, ComEd submitted proposed changes to the operating license and TS for DNPS Units 2 and 3 to support operation at uprated power. The analyses completed in support of this proposed change to the SLMCPR were performed assuming uprated power conditions, but the analyses are also applicable to operation at the current licensed power level.

H. SCHEDULE REQUIREMENTS

EGC requests approval of the proposed change prior to October 20, 2001, to support operation of DNPS Unit 2 following the refueling outage scheduled to begin on October 20, 2001.

I. REFERENCES

1. General Electric Standard Application for Reactor Fuel (GESTAR II), NEDE–24011–P–A–14, June 2000

2. Letter from R. M. Krich (Commonwealth Edison Company) to U.S. NRC, "Request for Technical Specifications Change, Transition to General Electric Fuel," dated September 29, 2000

3. Letter from R. M. Krich (Exelon Generation Company) to U.S. NRC, "Supplement to GE–14 Fuel License Amendment Request," dated March 1, 2001

4. Letter from G. A. Watford (Global Nuclear Fuel) to U. S. NRC, "Transmittal of GNF-A Proprietary Report, NEDC-32981P, 'GEXL96 Correlation for ATRIUM-9B Fuel,'" dated September 26, 2000

5. Letter from R.M. Krich (Commonwealth Edison Company) to U.S. NRC, "Request for License Amendment for Power Uprate Operation," dated December 27, 2000

Attachment B
Request for Technical Specifications Change
for Minimum Critical Power Ratio Safety Limit

REVISED TECHNICAL SPECIFICATIONS PAGE

2.0-1

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:

THERMAL POWER shall be ≤ 25% RTP.

2.1.1.2 With the reactor steam dome pressure ≥ 785 psig and core flow ≥ 10% rated core flow:

1.08

For Unit 2 two recirculation loop operation, MCPR shall be > ~~1.09~~ for cycle exposures ≤ 13,800 MWd/MTU, and ≥ 1.12 for cycle exposures > 13,800 MWd/MTU, or for Unit 2 single recirculation loop operation, MCPR shall be ≥ ~~1.10~~ for cycle exposures ≤ 13,800 MWd/MTU and ≥ 1.13 for cycle exposures > 13,800 MWd/MTU.

1.09

For Unit 3 two recirculation loop operation, MCPR shall be ≥ 1.10, or for single recirculation loop operation, MCPR shall be ≥ 1.11.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be ≤ 1345 psig.

2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

Attachment C
Request for Technical Specifications Change
for Minimum Critical Power Ratio Safety Limit

INFORMATION SUPPORTING A FINDING OF NO SIGNIFICANT HAZARDS CONSIDERATION

According to 10 CFR 50.92(c), "Issuance of amendment," a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

Involve a significant increase in the probability or consequences of an accident previously evaluated; or

Create the possibility of a new or different kind of accident from any accident previously evaluated; or

Involve a significant reduction in a margin of safety.

Exelon Generation Company (EGC), LLC is proposing to amend the Dresden Nuclear Power Station (DNPS) Technical Specifications (TS) to revise the Safety Limit Minimum Critical Power Ratio (SLMCPR) to support a change in fuel vendors from Siemens Power Corporation to Global Nuclear Fuel (GNF) and to allow operation with GE14 fuel. The proposed change revises the SLMCPR for Unit 2 Cycle 18 for two loop operation and single loop operation to 1.08 and 1.09, respectively.

Information supporting the determination that the criteria set forth in 10 CFR 50.92 is met for this amendment request is indicated below.

Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

The probability of an evaluated accident is derived from the probabilities of the individual precursors to that accident. The consequences of an evaluated accident are determined by the operability of plant systems designed to mitigate those consequences. Limits have been established consistent with NRC approved methods to ensure that fuel performance during normal, transient, and accident conditions is acceptable. The proposed change conservatively establishes the safety limit for the minimum critical power ratio (SLMCPR) for Dresden Nuclear Power Station (DNPS), Unit 2, Cycle 18 such that the fuel is protected during normal operation and during any plant transients or anticipated operational occurrences.

Changing the SLMCPR does not increase the probability of an evaluated accident. The change does not require any physical plant modifications, physically affect any plant components, or entail changes in plant operation. Therefore, no individual precursors of an accident are affected.

The proposed change revises the SLMCPR to protect the fuel during normal operation as well as during any transients or anticipated operational occurrences. Operational limits will be established based on the proposed SLMCPR to ensure that the SLMCPR is not violated during all modes of operation. This will ensure that the fuel design safety

criteria (i.e., that at least 99.9% of the fuel rods do not experience transition boiling during normal operation and anticipated operational occurrences) is met. Since the operability of plant systems designed to mitigate any consequences of accidents has not changed, the consequences of an accident previously evaluated are not expected to increase.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Creation of the possibility of a new or different kind of accident would require the creation of one or more new precursors of that accident. New accident precursors may be created by modifications of the plant configuration, including changes in allowable modes of operation. The proposed change does not involve any modifications of the plant configuration or allowable modes of operation. The proposed change to the SLMCPR assures that safety criteria are maintained for DNPS, Unit 2, Cycle 18.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

Does the proposed change involve a significant reduction in a margin of safety?

The value of the proposed SLMCPR provides a margin of safety by ensuring that no more than 0.1% of the rods are expected to be in boiling transition if the MCPR limit is not violated. The proposed change will ensure the appropriate level of fuel protection. Additionally, operational limits will be established based on the proposed SLMCPR to ensure that the SLMCPR is not violated during all modes of operation. This will ensure that the fuel design safety criteria (i.e., that at least 99.9% of the fuel rods do not experience transition boiling during normal operation as well as anticipated operational occurrences) are met.

Therefore, the proposed change does not involve a significant reduction in the margin of safety.

Attachment D
Request for Technical Specifications Change
for Minimum Critical Power Ratio Safety Limit

INFORMATION SUPPORTING AN ENVIRONMENTAL ASSESSMENT

Exelon Generation Company (EGC), LLC has evaluated this proposed change against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessment." EGC has determined that this proposed change meets the criteria for a categorical exclusion set forth in 10 CFR 51.22(c)(9), "Criteria for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," and as such, has determined that no irreversible consequences exist in accordance with 10 CFR 50.92(b), "Issuance of amendment." This determination is based on the fact that this change is being proposed as an amendment to a license issued pursuant to 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or that changes an inspection or a surveillance requirement, and the amendment meets the following specific criteria.

(i) The amendment involves no significant hazards consideration.

As demonstrated in Attachment C, this proposed change does not involve any significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed change is limited to revising the Safety Limit Minimum Critical Power Ratio. This change does not by itself allow for an increase in the unit power level, does not increase the production, nor alter the flow path or method of disposal of radioactive waste or byproducts. Therefore, the proposed change does not affect actual unit effluents.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed change will not result in changes in the operation or configuration of the facility. There will be no change in the level of controls or methodology used for processing of radioactive effluents or handling of solid radioactive waste, nor will the proposal result in any change in the normal radiation levels within the plant. Therefore, there will be no increase in individual or cumulative occupational radiation exposure resulting from this change.

Attachment E
Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit

Global Nuclear Fuel

Affidavit for Withholding Information

Affidavit

I, Glen A. Watford, being duly sworn, depose and state as follows:

(1) I am Manager, Nuclear Fuel Engineering, Global Nuclear Fuel – Americas, L.L.C. ("GNF-A") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the attachment, *Additional Information Regarding the Cycle Specific SLMCPR for Dresden Unit 2 Cycle 18*, May 4, 2001.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GNF-A relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4) and 2.790(a)(4) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information," and some portions also qualify under the narrower definition of "trade secret," within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GNF-A's competitors without license from GNF-A constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of GNF-A, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future GNF-A customer–funded development plans and programs, of potential commercial value to GNF-A;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b., above.

(5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GNF-A, and is in fact so held. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in (6) and (7) following. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GNF-A, no public disclosure has been

made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GNF-A. Access to such documents within GNF-A is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GNF-A are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains details of GNF-A's fuel design and licensing methodology.

The development of the methods used in these analyses, along with the testing, development and approval of the supporting methodology was achieved at a significant cost, on the order of several million dollars, to GNF-A or its licensor.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GNF-A's competitive position and foreclose or reduce the availability of profit–making opportunities. The fuel design and licensing methodology is part of GNF-A's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC–approved methods.

The research, development, engineering, analytical, and NRC review costs comprise a substantial investment of time and money by GNF-A or its licensor.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GNF-A's competitive advantage will be lost if its competitors are able to use the results of the GNF-A experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GNF-A would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GNF-A of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

Affidavit

State of North Carolina)
County of New Hanover) SS:

Glen A. Watford, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 4th day of May, 2001

Glen A. Watford
Global Nuclear Fuel – Americas, LLC

Subscribed and sworn before me this 4 day of MAY, 2001

Notary Public, State of North Carolina

JAMES E. McGINNESS
Notary Public, State of North Carolina
New Hanover County

My Commission Expires 1/23/06

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Attachment F
Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit

Global Nuclear Fuel

Additional Information Regarding the

Cycle Specific SLMCPR for Dresden Unit 2 Cycle 18

Attachment G
Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit

Global Nuclear Fuel

Non-Proprietary Version of Additional Information Regarding the

Cycle Specific SLMCPR for Dresden Unit 2 Cycle 18

References

[1] Letter, Frank Akstulewicz (NRC) to Glen A. Watford (GE), "Acceptance for Referencing of Licensing Topical Reports NEDC-32601P, *Methodology and Uncertainties for Safety Limit MCPR Evaluations*; NEDC-32694P, *Power Distribution Uncertainties for Safety Limit MCPR Evaluation*; and Amendment 25 to NEDE-24011-P-A on Cycle Specific Safety Limit MCPR," (TAC Nos. M97490, M99069 and M97491), March 11, 1999.

[2] Letter, Thomas H. Essig (NRC) to Glen A. Watford (GE), "Acceptance for Referencing of Licensing Topical Report NEDC-32505P, Revision 1, *R-Factor Calculation Method for GE11, GE12 and GE13 Fuel*," (TAC No. M99070 and M95081), January 11, 1999.

[3] *General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation and Design Application*, NEDO-10958-A, January 1977.

[4] Responses to NRC "Request for Additional Information for Topical Report NEDC-32981-P, GEXL96 Correlation for ATRIUM-9B Fuel", (TAC No. MB0183, March 7, 2001), April 27, 2001.

[5] *GEXL96 Correlation for ATRIUM-9B Fuel, NEDC-32981P,* Revision 0, September 2000.

Comparison of Dresden Unit 2 Cycle 18 SLMCPR Value

Table 1 summarizes the relevant input parameters, if available, and results of the SLMCPR determination for the Dresden Unit 2 Cycle 18 and 17 cores. The Dresden Unit 2 Cycle 18 core will be loaded with GNF fuel. The Dresden Unit 2 Cycle 17 core was loaded with SPC fuel. The SLMCPR evaluations for Cycle 18 were performed using NRC approved GNF methods and generic uncertainties[1], supplemented with Dresden Unit 2 specific uncertainties. These calculations use the GEXL14 correlation for GE14 fuel and GEXL96[5] for the SPC fuel. The SLMCPR evaluations for Cycle 17 were performed by SPC. The quantities that have been shown to have some impact on the determination of the safety limit MCPR (SLMCPR) are provided.

[[ ]].

Pin-by-pin power distributions are characterized in terms of R-factors using the NRC approved methodology[2]. [[ ]]

Summary

[[ ]] have been used to compare quantities that impact the calculated SLMCPR value. The calculated 1.07 Monte Carlo SLMCPR for Dresden Unit 2 Cycle 18 is consistent with what one would expect [[ ]] the 1.07 SLMCPR value is appropriate.

Based on all of the facts, observations and arguments presented above, it is concluded that the calculated SLMCPR value of 1.07 for the Dresden Unit 2 Cycle 18 core is appropriate.

For single loop operations (SLO) the calculated safety limit MCPR for the limiting case is 1.09 [[ ]]

Supporting Information

Core loading information is provided as Figures 1 and 2. The impact of the fuel loading pattern differences on the calculated SLMCPR is correlated to the values of [[ ]] information for Cycle 17 is not available.

[[ ]]
[[ ]]

The following information is provided in response to NRC questions on previous submittals containing GE14 fuel designs:

1. Provide the details for R-Factor calculation for GE14 fuel and provide the data bases to justify that the approach is conservative with respect to the approved method stated in NEDC-32505P, Revision 1.

Response:

Calculation of GE14 R-factors follows the approved methodology of NEDC-32505P Rev. 1. The R-factor calculations consist of three essential components: the weight scheme for combining rod peaking factors, the additive constants for adjusting individual position performance and the behavior for partially controlled conditions. The weighting scheme of GE14 is identical to that of GE12 because the two bundles are identical in the lattice geometry. The GE14 bundle is similar to the GE12 bundle. It is a 10x10 design with 78 full length rods, 14 part length rods and 2 large central water rods. The location of the part length rods and the water rods are identical. The main difference is that the length of the part length rods and the spacer locations are slightly different. The additive constants are derived from the test data along with the GEXL coefficients. For partially controlled conditions, the bundle R-factors are calculated based on the prescribed axial power shapes that corresponds to the specific GEXL correlation. [[ ]] The process used for GE14 is the same as the approved methodology in NEDC-32505PA Rev. 1 and the recommendations in the SER.

2. Provide the details for GEXL14 correlation including its development and verification process, and data bases, and justify that the GEXL14 correlation is conservative.

Response:

Section 1.2.7 of NEDE-24011-P-A (GESTAR II) provides the conditions by which a GEXL correlation may be developed and documented. Explicit NRC approval of the "GEXL topical report" is not required under the NRC-approved provisions of Amendment 22 to GESTAR II.

An overview of the evaluations performed for GE14 fuel was provided previously in NEDC-32868P, Revision 0, December 1998 titled "GE14 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II)" and NEDC-32868P, Revision 1, September 2000. Revision 0 of this document was transmitted by G. A. Watford (GE) letter MFN-045-98 to the attention of M. J. Davis at the NRC Document Control Desk dated December 11, 1998. Section 2.8.3 of this document describes the GEXL14 correlation. The same information is contained in Revision 1.

Additional supporting details were provided previously by separate transmittal of "GEXL14 Correlation for GE14 Fuel", NEDC-32851P, Revision 1, September 1999. This document was transmitted by G.A. Watford (GE) letter FLN-2000-12 dated August 8, 2000 to the NRC Document Control Desk and to the attention of Tai L. Huang (NRC). Section 3 of NEDC-32851P, Rev. 1 describes the database used to develop the GEXL14 correlation for GE14 fuel.

GEXL14 correlation is developed based on the full scale ATLAS test data. The full scale test data were used to generate the GEXL coefficients as well as the additive constants for R-factor calculations to accurately predict the data points over the application range. The report "GE14 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II)" documents the GEXL14 data and verification base. The database used to develop the GEXL14 correlation consists of [[ ]] different test assemblies. This correlation development database consisted of a total of [[ ]] critical power data

points. The database used to verify the GEXL14 correlation consists of [[ ]] different test assemblies. The correlation verification database consisted of a total of [[ ]] data points. [[ ]]

The GEXL14 correlation is valid for GE14 fuel over the following range of state points:

	Database range	Correlation application range
Pressure:	[[	]]
Mass Flux:	[[	]]
Inlet Subcooling:	[[	]]
R-factor:	[[	]]
*exception		[[ ]]

[[ ]]

The GEXL14 correlation like previous GEXL correlations is derived as a best fit to the ATLAS critical power data. The GEXL correlation is not intended to be conservative. The GEXL correlation is derived following the process described in GESTAR II (NEDE-24011-P-A-14) Section 1.1.7.C.iv "Correlation fit to data shall be best fit". The bias and uncertainty in the correlation is determined as specified in GESTAR Section 1.1.7. The overall GEXL14 uncertainty is [[ ]]. This uncertainty is an explicit input to the approved SLMCPR methodology.

3. Provide justification that the impacts of low R-factor and low subcooling are reflected in developing the overall bias and uncertainty, inaccuracies associated with the GEXL correlation are accounted for in the SLMPCR calculation. Also, identify the analysis and the data bases available in the approved topical report.

Response:

The "GEXL14 Correlation for GE14 Fuel", NEDC-32851P, Revision 1, September 1999 was transmitted by G.A. Watford (GE) letter FLN-2000-12 dated August 8, 2000 to the NRC Document Control Desk and to the attention of Tai L. Huang (NRC). Section 3 of NEDC-32851P, Rev. 1 describes the database used to develop the GEXL14 correlation for GE14 fuel.

[[ ]]

It is difficult to predict and therefore detect the rod location of the boiling transition in a bundle with low R-factor because many rods show the same vulnerability to boiling transition; nevertheless, the critical power value itself is well-predicted. This fact is supported by the lack of any trend in the correlation error as the lower R-factor values are approached. The second point is that the GEXL14 correlation exhibits the typical almost-linear behavior in the critical quality for low R-factor values that one would expect [[ ]]

4. The staff approved those methodologies cited in Question 2 with one condition that the 3D-MONICORE bundle power calculational uncertainty should be verified when applied to fuel and core designs not included in the benchmark comparisons in Tables 3.1 and 3.2 of NEDC-32694P, and three actions should be taken for application of NEDC-32601P for a new fuel. GE14 is considered a new fuel at the time the staff approved those licensing topical reports, therefore, provide the details of the actions taken and verification for Cycle n operation.

Response:

The referenced requirement for 3D-MONICORE and the three actions pertaining to NEDC-32601P correspond to the four items listed as the NRC's Technical Position in Enclosure 2 accompanying their SER dated March 11, 1999 approving NEDC-32601P and NEDC-32694P. The NRC positions are quoted here together with the actions taken to satisfy each item. Item (a) is the specific requirement from NEDC-32694P that pertains to 3D-MONICORE. Items (b), (c) and (d) are the three actions pertaining to NEDC-32601P referred to in the question.

Item (a): Since changes in the fuel and core design can have a significant effect on the calculation accuracy, the 3D-MONICORE bundle power calculational uncertainty should be verified when applied to fuel and core designs not included in the benchmark comparisons of Tables-3.1 and 3.2 of NEDC-32694P.

POWERPLEX is to be used to monitor Dresden Unit 2 Cycle 18 operation. Accordingly, the POWERPLEX bundle power distribution uncertainty is used in the SLMCPR calculations. Item (a) is therefore not applicable for this application.

Item (b): Since changes in fuel design can have a significant effect on the calculation accuracy, the TGBLA fuel rod power calculational uncertainty should be verified when applied to fuel designs not included in the benchmark comparisons of Table 3.1 of NEDC-32601P.

The fidelity of the TGBLA lattice physics calculations for fuel rod powers depend on the lattice designs. The key considerations are the lattice geometry, the location of the water rods, the location of the gadded rods and for vanished-rod lattices the location of the part-length rods. All these characteristics are identical for GE12 and GE14. See the response to question (3) above. Although the length of the part-length rods is different between GE12 and GE14, this has no impact on the lattice calculations which are performed either for a fully-rodded or partially-rodded lattice. Table 3.1 of NEDC-32601P includes several 10x10 lattices. The values given in Table 3.1 for GE12 are representative of the values being calculated for GE14, thus there is no impact.

Item (c): The effect of the correlation of rod power calculation uncertainties should be reevaluated to insure the accuracy of R-Factor uncertainty when the methodology is applied to a new fuel lattice.

The R-factor uncertainty is dominated by the same factors that influence the rod powers as described above for item (b). The uncertainty is the same for GE12 and GE14. The derivation of the uncertainty value is presented for GE 10x10 lattices (i.e., GE12 and GE14) in Appendix C of NEDC-32601P-A.

Item (d): In view of the importance of MIP criterion and its potential sensitivity to changes in fuel bundle designs, core loading and operating strategies, the MIP criterion should be reviewed periodically as part of the procedural review process to insure that the specific value recommended in NEDC-32601 P is applicable to future designs and operating strategies.

The calculated value of MIP depends only on two things: [[ ]] The GEXL correlation for GE14 was provided in the Amendment 22 submittal for GE14 together with the uncertainty [[ ]] that is needed for the SLMCPR analyses and the calculation of MIP. The GEXL correlation for ATRIUM 9B and 9X9 SPC fuel was provided in the GEXL96 submittal[4] together with the uncertainty [[ ]] that is needed for the SLMCPR analyses and the calculation of MIP. See also the response to question (2) above. GE (GNF) continues to monitor MIP and periodically assess it as part of their procedural

review process. Specific scoping analyses preformed for cores partially and fully-loaded with GE14 fuel have given no indications that suggests that the MIP values from these calculations are statistically distinct from historical data. [[ ]] Thus there is no indication that the MIP criteria should be changed.

Prepared by:

Ronaldo H. Szilard
Technical Project Manager
Dresden Unit 2 Project

Verified by:

G. N. Marrotte
Technical Program Manager

[[ ]]
[[ ]]

Table 1

Comparison of the Dresden Unit 2 Cycle 18 and Cycle 17 SLMCPR

QUANTITY, DESCRIPTION	Dresden Unit 2 Cycle 17	Dresden Unit 2 Cycle 18
Number of Bundles in Core	724	724
Limiting Cycle Exposure Point	N/A	MOC
Cycle Exposure at Limiting Point [MWd/MTU]	N/A	6,000
Reload Fuel Type	ATRIUM-9B	GE14
Latest Reload Batch Fraction [%]	34.3%	38.7%
Latest Reload Average Batch Weight % Enrichment	3.71%	4.09%
Batch Fraction for GE14	0%	38.7%
Batch Fraction for ATRIUM-9B	58.6%	57.5%
Batch Fraction for ANF 9x9-2B	41.4%	3.9%
Core Average Weight % Enrichment	3.41%	3.77%
Core MCPR (for limiting rod pattern)	N/A	1.43
[[ ]]	N/A	[[ ]]
[[ ]]	N/A	[[ ]]
Power distribution uncertainty	N/A	Specific
Non-power distribution uncertainty	N/A	See Table 2, Column 2
Calculated Safety Limit MCPR	**1.12**[1]	**1.07**[2]

Table 2

Inputs for modeling the plant system uncertainties for the GETAB and Dresden-2 Models

DESCRIPTION	COLUMN 1 Uncertainty Values (%) (NEDC-32601P-A)	COLUMN 2 Dresden-2 Specific Values (%)
Core flow rate (derived from pressure drop)	2.5 TLO 6.0 SLO	2.5 TLO 6.0 SLO
Individual channel flow area	2.0	2.0
Individual channel friction factor	5.0	5.0
Friction factor multiplier	6.0	6.0
Reactor pressure	0.7	2.3
Core inlet temperature	0.2	0.2
Feedwater temperature	0.8	4.47
Feedwater flow rate	1.8	2.7

[1] SPC Safety Limit MCPR of 1.12 includes the effects of channel bow per SPC approved method.

[2] GNF Safety Limit MCPR of 1.07 does not include the effects of channel bow per GNF approved method. Such effects are incorporated in the Operating Limit.

[[ ]]
[[ ]]

Figure 1 Reference Core Loading Pattern – Cycle 17

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1											B	H	H	J	J	J	J	H	H	B											60
2										J	B	A	B	A	B	B	A	B	A	B	J										58
3							J	H	H	A	E	E	E	G	D	D	G	E	E	E	A	H	H	J							56
4						J	B	E	G	G	G	A	G	F	A	A	F	G	A	G	G	G	E	B	J						54
5					J	A	A	G	E	G	B	G	E	G	E	E	G	E	G	B	G	E	G	A	A	J					52
6				J	A	B	G	F	G	B	G	F	G	B	F	F	B	G	F	G	B	G	F	G	B	A	J				50
7			J	B	A	G	B	D	E	F	D	C	D	F	A	A	F	D	C	D	F	E	D	B	G	A	B	J			48
8			H	E	G	F	D	A	F	D	B	A	F	E	A	A	E	F	A	B	D	F	A	D	F	G	E	H			46
9			H	G	E	G	E	F	B	F	E	F	E	F	E	E	F	E	F	E	F	B	F	E	G	E	G	H			44
10		J	A	G	G	B	F	D	F	B	F	E	F	B	F	F	B	F	E	F	B	F	D	F	B	G	G	A	J		42
11	B	B	E	G	B	G	D	B	E	F	A	A	E	F	A	A	F	E	A	A	F	E	B	D	G	B	G	E	B	B	40
12	H	A	E	A	G	F	C	A	F	E	A	B	F	E	A	A	E	F	B	A	E	F	A	C	F	G	A	E	A	H	38
13	H	B	E	G	E	G	D	F	E	F	E	F	A	F	E	E	F	A	F	E	F	E	F	D	G	E	G	E	B	H	36
14	J	A	G	F	G	B	F	E	F	B	F	E	F	A	F	F	A	F	E	F	B	F	E	F	B	G	F	G	A	J	34
15	J	B	D	A	E	F	A	A	E	F	A	A	E	F	B	B	F	E	A	A	F	E	A	A	F	E	A	D	B	J	32
16	J	B	D	A	E	F	A	A	E	F	A	A	E	F	B	B	F	E	A	A	F	E	A	A	F	E	A	D	B	J	30
17	J	A	G	F	G	B	F	E	F	B	F	E	F	A	F	F	A	F	E	F	B	F	E	F	B	G	F	G	A	J	28
18	H	B	E	G	E	G	D	F	E	F	E	F	A	F	E	E	F	A	F	E	F	E	F	D	G	E	G	E	B	H	26
19	H	A	E	A	G	F	C	A	F	E	A	B	F	E	A	A	E	F	B	A	E	F	A	C	F	G	A	E	A	H	24
20	B	B	E	G	B	G	D	B	E	F	A	A	E	F	A	A	F	E	A	A	F	E	B	D	G	B	G	E	B	B	22
21		J	A	G	G	B	F	D	F	B	F	E	F	B	F	F	B	F	E	F	B	F	D	F	B	G	G	A	J		20
22			H	G	E	G	E	F	B	F	E	F	E	F	E	E	F	E	F	E	F	B	F	E	G	E	G	H			18
23			H	E	G	F	D	A	F	D	B	A	F	E	A	A	E	F	A	B	D	F	A	D	F	G	E	H			16
24			J	B	A	G	B	D	E	F	D	C	D	F	A	A	F	D	C	D	F	E	D	B	G	A	B	J			14
25				J	A	B	G	F	G	B	G	F	G	B	F	F	B	G	F	G	B	G	F	G	B	A	J				12
26					J	A	A	G	E	G	B	G	E	G	E	E	G	E	G	B	G	E	G	A	A	J					10
27						J	B	E	G	G	G	A	G	F	A	A	F	G	A	G	G	G	E	B	J						08
28							J	H	H	A	E	E	E	G	D	D	G	E	E	E	A	H	H	J							06
29										J	B	A	B	A	B	B	A	B	A	B	J										04
30											B	H	H	J	J	J	J	H	H	B											02
	01	03	05	07	09	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	

FUEL TYPE

A	ANF9X9-2-P9DANB314-9GZ-SPC80M-145-T6-3909
B	ANF9X9-2-P9DANB314-8G5.0-SPC80M-145-T6-3910
C	ATRM9-P9DATB349-9GZ-SPC80M-9WR-145-T6-3911
D	ATRM9-P9DATB330-11GZ-SPC80M-9WR-144-T6-3915
E	ATRM9-P9DATB348-11GZ-SPC80M-9WR-144-T6-3913
F	ATRM9-P9HATB371-13GZ-SPC100T-9WR-144-T6-3914
G	ATRM9-P9HATB371-13GZ-SPC100T-9WR-144-T6-3912
H	ANF9X9-2-P9DANB313-7G3.5-SPC80M-145-T6-3907
J	ANF9X9-2-P9DANB313-8G4.0-SPC80M-145-T6-3908

[[ ]]
[[ ]]

Figure 2 Reference Core Loading Pattern – Cycle 18

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1											A	C	C	C	C	C	C	C	C	A											60
2										A	C	D	E	E	E	E	E	E	D	C	A										58
3							A	C	C	D	D	E	E	D	C	C	D	E	E	D	D	C	C	A							56
4						B	C	E	D	E	F	F	G	F	F	F	F	G	F	F	E	D	E	C	B						54
5					A	B	E	D	F	F	B	F	E	G	D	D	G	E	F	B	F	F	D	E	B	A					52
6				B	B	B	E	F	F	C	F	F	G	E	G	G	E	G	F	F	C	F	F	E	B	B	B				50
7			A	C	E	E	C	F	D	F	C	D	D	G	D	D	G	D	D	C	F	D	F	C	E	E	C	A			48
8			C	E	D	F	F	C	F	F	D	G	G	G	C	C	G	G	G	D	F	F	C	F	F	D	E	C			46
9			C	D	F	F	D	F	B	G	D	G	B	G	D	D	G	B	G	D	G	B	F	D	F	F	D	C			44
10		A	D	E	F	C	F	F	G	C	G	G	G	E	G	G	E	G	G	G	C	G	F	F	C	F	E	D	A		42
11	A	C	D	F	B	F	C	D	D	G	D	C	D	G	D	D	G	D	C	D	G	D	D	C	F	B	F	D	C	A	40
12	C	D	E	F	F	F	D	G	G	G	C	D	G	G	C	C	G	G	D	C	G	G	G	D	F	F	F	E	D	C	38
13	C	E	E	G	E	G	D	G	B	G	D	G	E	G	D	D	G	E	G	D	G	B	G	D	G	E	G	E	E	C	36
14	C	E	D	F	G	E	G	G	G	E	G	G	G	E	G	G	E	G	G	G	E	G	G	G	E	G	F	D	E	C	34
15	C	E	C	F	D	G	D	C	D	G	D	C	D	G	C	C	G	D	C	D	G	D	C	D	G	D	F	C	E	C	32
16	C	E	C	F	D	G	D	C	D	G	D	C	D	G	C	C	G	D	C	D	G	D	C	D	G	D	F	C	E	C	30
17	C	E	D	F	G	E	G	G	G	E	G	G	G	E	G	G	E	G	G	G	E	G	G	G	E	G	F	D	E	C	28
18	C	E	E	G	E	G	D	G	B	G	D	G	E	G	D	D	G	E	G	D	G	B	G	D	G	E	G	E	E	C	26
19	C	D	E	F	F	F	D	G	G	G	C	D	G	G	C	C	G	G	D	C	G	G	G	D	F	F	F	E	D	C	24
20	A	C	D	F	B	F	C	D	D	G	D	C	D	G	D	D	G	D	C	D	G	D	D	C	F	B	F	D	C	A	22
21		A	D	E	F	C	F	F	G	C	G	G	G	E	G	G	E	G	G	G	C	G	F	F	C	F	E	D	A		20
22			C	D	F	F	D	F	B	G	D	G	B	G	D	D	G	B	G	D	G	B	F	D	F	F	D	C			18
23			C	E	D	F	F	C	F	F	D	G	G	G	C	C	G	G	G	D	F	F	C	F	F	D	E	C			16
24			A	C	E	E	C	F	D	F	C	D	D	G	D	D	G	D	D	C	F	D	F	C	E	E	C	A			14
25				B	B	B	E	F	F	C	F	F	G	E	G	G	E	G	F	F	C	F	F	E	B	B	B				12
26					A	B	E	D	F	F	B	F	E	G	D	D	G	E	F	B	F	F	D	E	B	A					10
27						B	C	E	D	E	F	F	G	F	F	F	F	G	F	F	E	D	E	C	B						08
28							A	C	C	D	D	E	E	D	C	C	D	E	E	D	D	C	C	A							06
29										A	C	D	E	E	E	E	E	E	D	C	A										04
30											A	C	C	C	C	C	C	C	C	A											02
	01	03	05	07	09	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	

FUEL TYPE

A ANF9X9-2-P9DANB314-9GZ-SPC80M-145-T6-3909
B ATRM9-P9DATB330-11GZ-SPC80M-9WR-144-T6-3915
C ATRM9-P9DATB348-11GZ-SPC80M-9WR-144-T6-3913
D ATRM9-P9HATB371-13GZ-SPC100T-9WR-144-T6-3914
E ATRM9-P9HATB371-13GZ-SPC100T-9WR-144-T6-3912
F GE14-P10HNAB411-4G7.0/9G6.0-100T-145-T6-2484
G GE14-P10HNAB408-16GZ-100T-145-T6-2483

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