COOPER NUCLEAR STATION

CORE OPERATING LIMITS REPORT

CYCLE 29, REVISION 0

SECTION 6

MAXIMUM LINEAR HEAT GENERATION RATE

NON-PROPRIETARY

(REPLACEMENT FOR NLS2015016, ATTACHMENT 5)

6. MAXIMUM LINEAR HEAT GENERATION RATE

6.1 Technical Requirements Manual Reference

Technical Requirements Manual Specification T3.2.1.

6.2 Two Recirculation Loop Operation

During steady-state power operation, the maximum Linear Heat Generation Rate (LHGR) in any fuel rod in any fuel bundle at any axial location shall not exceed the applicable limiting value.

The maximum allowable Linear Heat Generation Rate with two recirculation loops in operation is defined as follows:

$$\text{LHGR Limit} = \text{minimum [LHGR(P), LHGR(F)]}$$

where,

$LHGR(P) = LHGR_{STD} * LHGRFACp$,

$LHGR(F) = LHGR_{STD} * LHGRFACf$,

$LHGR_{STD}$ = Fuel bundle type, fuel rod type, and peak pellet exposure dependent maximum LHGR values for rated core power and flow conditions represented by the values shown in Table 6-1,

LHGRFACp = Core power dependent multiplier shown in Table 2-2,

LHGRFACf = Core flow rate dependent multiplier shown in Table 2-3.

The $LHGR_{STD}$ values presented in Table 6-1 represent the maximum allowable peak pellet power (LHGR) as a function of pellet exposure for each pin type in each fuel bundle design. The maximum allowable LHGR limit values have the following pin type dependencies; UO_2 only pins which can either be full and partial length fuel rods, Gadolinia rods based on the local and maximum gadolinia concentration in the rod. The values in Table 6-1 were obtained from Reference 13. The core monitoring computer will be used to verify the pellet specific LHGR limits for each fuel bundle type are not violated.

No thermal limits monitoring is required below 25% of rated power. Therefore, the LHGR limit defined above is only applicable for core conditions at or above 25% of rated power.

6.3 Single Recirculation Loop Operation

The maximum allowable Linear Heat Generation Rate with one recirculation loop in operation (SLO) is defined as follows:

LHGR Limit = minimum [LHGR(P), LHGR(F), LHGR(SLO)]

where,

LHGR(SLO) = $LHGR_{STD}$ * LHGRFAC(SLO),

LHGRFAC(SLO) = Single loop operation PLHGR multiplier,

and LHGR(P) and LHGR(F) are as defined in Section 6.2 above.

As shown above, it is not necessary to apply both the off-rated (LHGRFACp and LHGRFACf) and SLO multiplier corrections at the same time.

The single loop operation peak LHGR (PLHGR) multipliers for each fuel bundle type are defined in Section 16 of Reference 6 as shown in the table below.

Fuel Bundle Type	SLO PLHGR Multiplier
All bundles	0.87

Table 6-1: Bounding $LHGR_{STD}$ Values By Fuel Bundle Type

EDB-2801, EDB-3033, and EDB-3187		
Peak Pellet Exposure (GWd/MT)	**$LHGR_{STD}$ (kW/ft) UO_2 Only**	**$LHGR_{STD}$ (kW/ft) bounding gad for all gad conc to 6% max**
GNF Proprietary data deleted		

Bundle Types

GNF Bundle #	GNF Fuel Bundle Identification
EDB-2801	GE14-P10DNAB393-17GZ-100T-150-T6-2801 (GE14C)
EDB-3033	GE14-P10DNAB383-2G6.0/12G5.0-100T-150-T6-3033 (GE14C)
EDB-3187	GE14-P10DNAB381-15GZ-100T-150-T6-3187 (GE14C)

EDB-4115, EDB-4116, EDB-4276, and EDB-4277		
Peak Pellet Exposure (GWd/MT)	**$LHGR_{STD}$ (kW/ft) UO_2 Only**	**$LHGR_{STD}$ (kW/ft) bounding gad for all gad conc to 7% max**
GNF Proprietary data deleted		

Bundle Types

GNF Bundle #	GNF Fuel Bundle Identification
EDB-4115	GNF2-P10DG2B390-14GZ-100T2-150-T6-4115 (GNF2)
EDB-4116	GNF2-P10DG2B389-12GZ-100T2-150-T6-4116 (GNF2)
EDB-4276	GNF2-P10DG2B391-14GZ-100T2-150-T6-4276 (GNF2)
EDB-4277	GNF2-P10DG2B390-2G7.0/10G6.0-100T2-150-T6-4277 (GNF2)

GLOBAL NUCLEAR FUEL

AFFIDAVIT

Global Nuclear Fuel – Americas

AFFIDAVIT

I, Lukas Trosman, state as follows:

(1) I am Engineering Manager, Reload Design and Analysis, Global Nuclear Fuel – Americas, LLC ("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 Enclosures 1 and 3 of GNF's letter, VSP-NPP-HP1-15-058, Vickie S. Perry to Khalil Dia (Nebraska Public Power District), entitled "Cooper Nuclear Station Cycle 28 and Cycle 29 Core Operating Limits Reports (COLRs)," June 18, 2015. GNF proprietary information in Enclosure 1, which is entitled "Cooper Nuclear Station Cycle 28 Core Operating Limits Report," and Enclosure 3, which is entitled "Cooper Nuclear Station Cycle 29 Core Operating Limits Report," is identified by a dotted underline inside double square brackets. [[This sentence is an example.{3}]] A "[[" marking at the beginning of a table, figure, or paragraph closed with a "]]" marking at the end of the table, figure or paragraph is used to indicate that the entire content between the double brackets is proprietary. In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(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 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought 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 aspects of past, present, or future GNF-A customer-funded development plans and programs, resulting in potential products to GNF-A;

d. 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) To address 10 CFR 2.390 (b) (4), 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. 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. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(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.

(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 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 information 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.

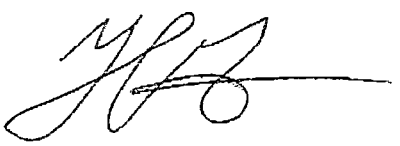
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

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.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 18th day of June 2015.



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