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Datasheet for the decision of 2 February 2022

Case Number: T 2218/18 - 3.5.07

Application Number: 04255002.0

Publication Number: 1508902

IPC: G06F17/50, G21C5/00, G21C3/32, G21C17/00

Language of the proceedings: EN

Title of invention:
Method and arrangement to determine fuel bundle configuration for core of a nuclear reactor

Applicant:
Global Nuclear Fuel-Americas, LLC

Headword:
Fuel bundle configuration/GLOBAL NUCLEAR FUEL-AMERICAS

Relevant legal provisions:
EPC Art. 123(2)

Keyword:
Amendments - added subject-matter (yes)

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Case Number: T 2218/18 - 3.5.07

D E C I S I O N
of Technical Board of Appeal 3.5.07
of 2 February 2022

Appellant: (Applicant)	Global Nuclear Fuel-Americas, LLC 3901 Castle Hayne Road Wilmington, North Carolina 28402 (US)
Representative:	Richardt Patentanwälte PartG mbB Wilhelmstraße 7 65185 Wiesbaden (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 19 April 2018 refusing European patent application No. 04255002.0 pursuant to Article 97(2) EPC**

Composition of the Board:

Chair	J. Geschwind
Members:	R. de Man
	M. Jaedicke

Summary of Facts and Submissions

I. The applicant (appellant) appealed against the decision of the examining division refusing European patent application No. 04255002.0.

II. The examining division decided that the subject-matter of claim 1 of the sole request lacked inventive step over the following document:

D4: T. Kugo et al.: "Development of Intelligent Code System to Support Conceptual Design of Nuclear Reactor Core", Journal of Nuclear Science and Technology, Vol. 34, No. 8, 1997, pp. 760-770.

III. In its statement of grounds of appeal, the appellant maintained the main (and sole) request considered in the decision under appeal.

IV. In a communication accompanying a summons to oral proceedings, the board expressed the preliminary view that the subject-matter of claim 1 extended beyond the content of the application as filed (Article 123(2) EPC) and lacked inventive step both over document D4 and over a known general-purpose computer (Article 56 EPC).

V. By letter of 21 December 2021, the appellant withdrew its request for oral proceedings and requested a decision on the basis of the state of the file. It did not comment on the board's communication.

VI. The board cancelled the oral proceedings.

VII. The appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of the claims of its main request.

VIII. Claim 1 of the main request reads as follows:

"A computer-implemented method of determining a fuel bundle configuration for a core of a nuclear reactor, comprising:

defining (310) a plurality of inputs including at least core thermal limits, user-defined target conditions and bundle parameters consisting of at least one of local peaking, R-factor and bundle enrichment for at least one existing fuel bundle of a given core;

simulating (320), with use of the defined inputs, a virtual core loaded with said at least one existing fuel bundle to obtain simulation results, wherein the simulation results include simulation core thermal limits;

comparing (330) said simulation results against said core thermal limits; and

modifying (372) said at least one existing fuel bundle based on said comparing, including making fuel rod-by-fuel rod changes to determine a desired fuel bundle configuration for insertion into the virtual core that meets core thermal limits and user-defined target conditions, wherein

the fuel bundle configuration has the fewest number of different fuel rod types once the core thermal limits and bundle parameters have been met."

Reasons for the Decision

1. *The application*

2. The application relates to determining a fuel bundle configuration for a nuclear reactor core.

2.1 First, a number of inputs are defined via a GUI (see Figure 3, step 310). These inputs include core thermal limits, user-defined target conditions, and fuel bundle parameters corresponding to an existing fuel bundle (paragraph [0043] of the published application).

2.2 Next, a virtual core loaded with the existing fuel bundle is simulated by using a known simulator (Figure 3, step 320; paragraph [0045]). The results obtained by this simulation are compared against the core thermal limits and the user-defined target conditions (Figure 3, step 330; paragraphs [0045], [0048] and [0049]).

2.3 In dependence on the results of the comparison, changes are made to the fuel bundle configuration in an attempt to meet the core thermal limits and the user-defined target conditions, and the simulation is repeated (Figure 3, steps 350, 360, 370, 380, 385, 390; paragraph [0087]).

3. *Added subject-matter - Article 123(2) EPC*

3.1 The feature of claim 1 specifying that a virtual core is simulated "with use of the defined inputs" is not present in original claim 1. The appellant added this feature to claim 1 in its submission of 9 July 2014

filed with the examining division without indicating a basis for the amendment in the application as filed.

3.2 According to the "defining" step of claim 1, the defined inputs include "core thermal limits" and "user-defined target conditions".

The board is unable to identify in the application as filed a disclosure of the use of these specific inputs in the simulation of a virtual core. Instead, the application discloses that the simulation results are compared against the core thermal limits and user-defined target conditions to determine whether the current fuel bundle configuration is satisfactory or needs adjustment (see points 2.2 and 2.3 above).

3.3 In its communication, the board expressed the view that the feature "simulating, with use of the defined inputs, a virtual core" infringed Article 123(2) EPC. The appellant chose not to comment on the board's communication.

3.4 Hence, the board has no reason to deviate from its preliminary opinion and concludes that the application does not meet the requirements of Article 123(2) EPC.

4. *Conclusion*

Since the main (and sole) request is not allowable, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

S. Lichtenvort J. Geschwind

Decision electronically authenticated