Engineering Responsibilities and Design Authority Concept for Construction and Operation of Cernavoda NPP Romania

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Romania
CITON Director
1. Introduction

2. Definition and function of the design authority (DA)

3. Relations and interfaces among responsible designers and the design authority

4. Engineering roles and responsibilities in the design and operation of NPP

5. Engineering and research infrastructure to support the design and operation of NPPs

6. Lessons learned to be applicable to new builds
1. Introduction

- Nuclearelectrica operates 2 CANDUs 700 MWc Reactors at Cernavoda Site. Units 3 & 4 under construction;

- Unit 1 Commissioned in 1997 – type of external contracts (3 license agreements): Engineering Support Agreement (ESA); Main Equipment Manufacture; Canadian supply procurement services.

- Unit 2 Commissioned in 2007 – type of external contract - Management contract;


Actual status: Negotiations with an interested investor to acquire the majority share package. To be completed this month;

- Local infrastructure to support NPP Operation: Heavy Water Plant, nuclear fuel factory, components manufacturing capabilities, engineering and research available.
2. Definition and function of the design authority (DA)

- Design Authority concept is not regulated in the current Romanian regulatory frame. However, the regulator requires the applicant to present, in the application package, the project organization model with detailed information on each participant, including but not limited to “plant designer” (PD), “design authority” (DA) “responsible engineering organization” (GA General Architect);

- In C1 the DA was the vendor (AECL – Canada). It’s role was “to review and decide upon all Design Change Notices (DCN) raised by PD or GA (both certified as CANDU license holders by AECL n.a.) that would affect the design intent”. The design intent was defined in a specific set of documents called “basic design documentation” later used for PSR;

- In C2 the DA was the owner who delegated the responsibility to AECL – Canada, CITON Romania. The function was the same. The entire process was controlled by Management Team (MT).
Design authority during operation is more or less in line with Canadian practice - at C1: the vendor (DA) and the owner had in place, during the turn-over from commissioning to operation phase, a program to transfer, among other things, their DA responsibilities to the owner’s engineering department. The process was mainly formal (organizational) as long as CITON was organized at that time as the design and engineering division of the owner organization;

- at C2, CITON was externalized from owner organization. The DA for operation stays with the operator (not owner) from the moment CITON was externalized.
3. Relations and interfaces among responsible designers and the design authority

- C1 (first of a kind) - According to ESA, CITON was certified by AECL (the DA) to use the conceptual documentation (as build Wolsung 1) to play the role of PD for replicated NSSS on Romanian territory. The process took about two years. This arrangement was in place for construction period when CITON was the GA. The documentation produced by CITON as PD (i.e., conceptual design package – system technical specifications) were accepted by DA;

- for the commissioning phase AECL assumed the role of plant designer and general architect. The work was performed by operating staff with the engineering support provided by CITON;

- C2 Plant designer - CITON
  General architect - MT (a team of Canadians, Italians and Romanians) DA - SNN
  Relations, responsibilities and interfaces clearly defined in procedures (DCN Procedure - the most relevant) Commissioning performed by SNN with the support of GA.

### DESIGN CHANGE NOTICE REVIEW/APPROVAL SHEET

**DCN #**

**Date:**

**PART I**

**PROPOSAL**

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<th>BSI:</th>
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<td>AREA:</td>
<td>NSP ☐</td>
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**DCN TITLE:**

**INITIATING DOCUMENT:**

**DCN DESCRIPTION AND JUSTIFICATION:**

**ESTIMATED COST:**

| TOTAL: | ENGINEERING: | MATERIAL/MAT: | LABOUR: |

**ORIGINATOR:**

**DEPARTMENT MANAGER:**

**DIVISION GENERAL MANAGER:**

### PART II

**DRAC REVIEW/APPROVAL**

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**DIVISION/DEPT.**

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**PBC:** GEN. MGR.

**CONSTRUCTION:** GEN. MGR.

**ENGINEERING/QS:** GEN. MGR.

**SAFETY & LICENSING:** MANAGER

**COMMISSIONING:** GEN. MGR.

**OPERATION:** STATION MGR.

**PROJECT DIRECTOR**

**DEPUTY PROJECT DIRECTOR (Ansaldi)**

**DEPUTY PROJECT DIRECTOR (SNN)**

**ADDITIONAL COMMENTS:**

**DCN**

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**JURISDICTIONAL AUTHORITY (CNCAE):**

| YES | NO | INFO | INFO ONLY | YES | NO |

**JURISDICTIONAL AUTHORITY (ISCIR):**

| YES | NO |

### PART III

**DESIGN AUTHORITY APPROVAL**

**SITE REPRESENTATIVE**

**HOME OFFICE**

| AECI | ANSALDO | CITON |

| NAME: | SIGNATURE: | DATE: |
4. Engineering roles and responsibilities in the design and operation of NPP

- to prepare all required documentation starting with sitting studies up to level 3 commissioning procedure and level 1 operating instructions;

- to prepare all safety documentation required by the regulatory documents;

- to support the client in relation with all regulatory bodies;

- to provide site and manufacturing shops technical assistance to make sure the design is properly implemented;

- during operation to provide technical support to the operator.
5. Engineering and research infrastructure to support the design and operation of NPPs

A. Local infrastructure: - plant designer function and engineering capabilities provided by CITON together with its subcontractors;
   - R & D provided by ICN, ICSI and others.

B. External infrastructure: - CANDU Energy (technology vendor) – engineering;
   - CANDU Owners Group – engineering and R & D.
6. Lessons learned to be applicable to new builds

- Design and engineering organizations should be involved in the early stages and be the facilitator between the buyer, the seller of the technology and the regulator;

- One of the important function of the engineering organizations is to be aware and to use operation feed-back experience to improve the design (provision of the Romanian regulations). This function cannot be properly achieved if the work is done by various organizations;

- Design history Dockets (files) should be considered as a deliverable to the operators as part of turn over process together with the DCA (Design Completion Assurance).
Thank you for your attention!

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