

International Atomic Energy Agency

**Survey of NPP design candidates and Vendors.
Request for Vendors Information Document**

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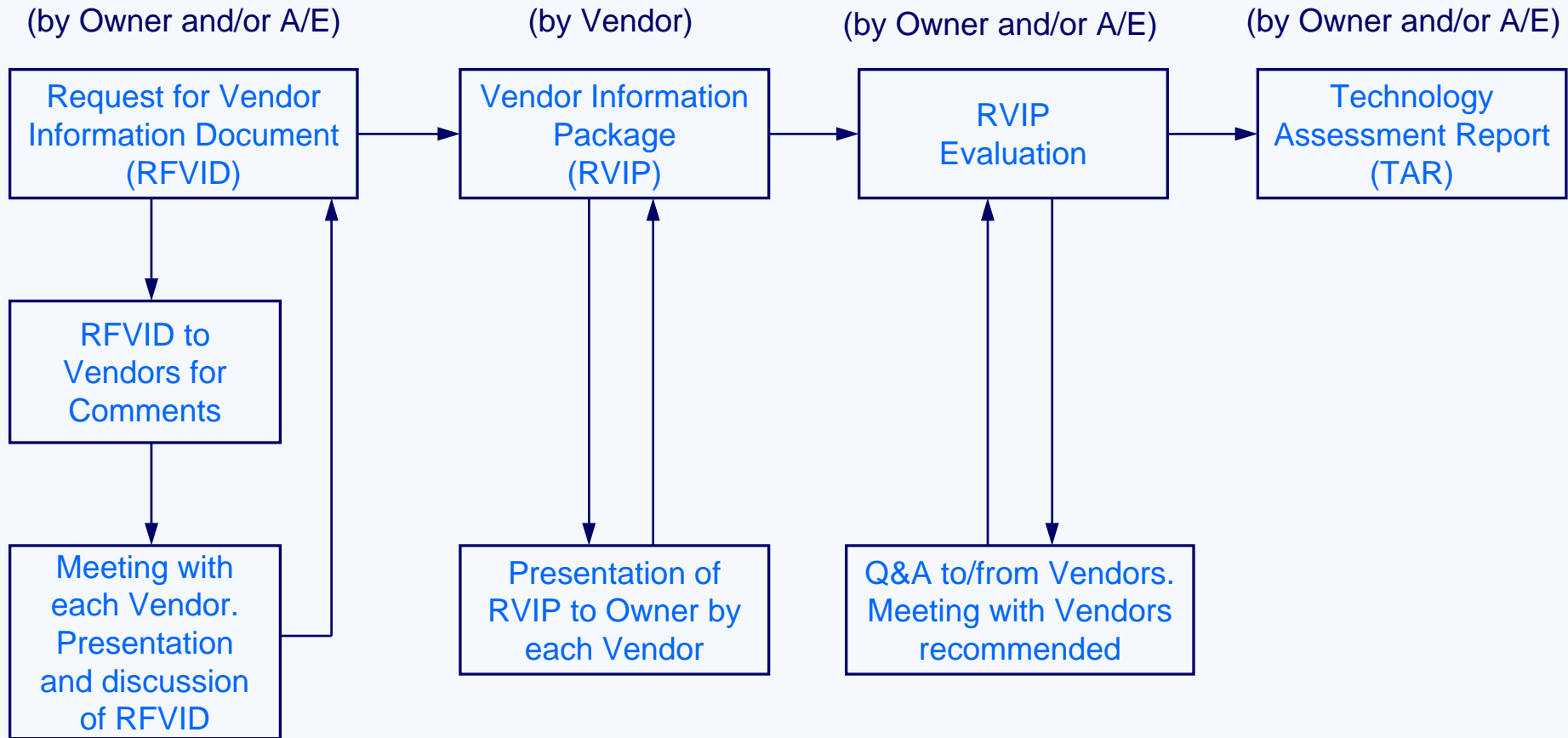


EMPRESARIOS AGRUPADOS

Engineers and Consultants

**Technical Cooperation Workshop on
Nuclear Power Plant Technology Assessment
Vienna, November 17-20, 2008**

Technology Assessment Process



Request for Vendor Information Document (RFVDI)

- **Purpose:** Obtain information from Reactor Vendors to:
 - Perform an Overall Evaluation of available NPP technologies
 - Get familiar and evaluate the plant design Features
 - Evaluate the licensability of the plant design in a specific country
 - Evaluate the feasibility of construction at a predetermined site(s)
 - Review the plant operation and maintenance features
 - Carry on a preliminary economic and financial analysis of the NPP construction project (budgetary estimate and business case)
 - Help to set the basis for the contracting model



RFVI Document Structure

Letter of Invitation

1. Introduction and Purpose
2. General Project Information
3. Country's Nuclear Infrastructure (i.e. legal, intl' agreements, safeguards, etc)
4. Guidelines to Vendors to submit the Information
5. Scope of Supply
6. Design Requirements
7. Licensing and Safety
8. Fuel Cycle and Waste Management
9. Construction
10. Plant Operation and Maintenance
11. Quality Assurance
12. Project Organization
13. Local Participation and Technology Transfer
14. Commercial aspects, budgetary estimate and financing



RFVID - General Project Information

- **Purpose:** To inform the Vendor about the Owner and the NPP Project that he is planning

2. General Project Information

- The Owner
- Plant Type and Size. Number of Units
- Project Description
- Project Schedule
- Site(s) Information and Data
- Electrical Grid System

Guidelines to Vendors to submit the information

- **Purpose:** Provides guidelines to the Vendors on (a) how to prepare and submit their information (b) the structure and contents of the information the Owner expects to receive and (c) the process that will be followed to assess the technology

3. Guidelines to Vendors

- Notification of intent to submit the Information
- Confidentiality
- Language of the Information
- Request for Clarifications
- No payment to Vendor
- Vendor Information Package Structure and Contents
- Delivery of the Information: Address and submission date
- Description of the technology assessment process to be followed



Vendor Information Package Structure and Contents (1 of 7)

- The Vendor Information Package can be structured as follows:
 - **Part I:** Vendor Information and References
 - **Part II:** Technical Information
 - **Part III:** Commercial Information

Vendor Information Package Structure and Contents (2 of 7)

- **Part I: Vendor Information and References**
 - Vendor Identification
 - Vendor qualification and experience in similar projects
 - List of References
 - Vendor Organization
 - Vendor business status and financial information

Vendor Information Package Structure and Contents (3 of 7)

- **Part II: Technical Information**

1. **Plant Description**

Including:

- Vendor Standard Plant Description, if available,
- Plot Plan
- Building General Arrangement Drawings

2. **Plant Performance**

Including Heat Balance at 100% Rated Output



Vendor Information Package Structure and Contents (4 of 7)

3. Design

- Overall Design Features
- Proven Design
- Design Life
- Reactor Coolant System and Reactor Non-Safety Aux. Systems
- Reactor Systems
- Engineered Safety Systems and Containment
- Fuel Handling and Storage. Refueling
- Radioactive Waste Treatment
- Plant Cooling Water Systems. UHS
- Plant Auxiliary Systems
- Turbine-Generator and Steam-Water Cycle Systems
- Electrical Systems
- I&C
- Civil and Structural design

Vendor Information Package Structure and Contents (5 of 7)

4. Licensing, Safety and Physical Security

- Codes and Standards
- Availability of a Standard Plant Design
- Licensing Status of Vendor's Standard Plant Design (e.g. Design Certification)
- Licensing basis and compliance with regulatory requirements
- Licensing documentation
- Classification Criteria (Structures, systems and components)
- Safety Philosophy
- Design Basis Accident
- Severe Accidents
- Physical Segregation and redundancy criteria
- N+1 or N+2 criteria for safety systems
- Aircraft crash
- Physical security



Vendor Information Package Structure and Contents (6 of 7)

5. Construction and Erection

- Construction Methods and Sequence
- Shop prefabricated Modules
- Construction Modules
- Proposed Project Schedule
- Plant Testing and Commissioning

6. Plant Testing and Commissioning

- Shop functional tests of major components
- Preoperational testing of systems and components
- Plant Commissioning (Hot Testing)

7. Operation and Maintenance

- Plant Operation Modes
- Load following capability. Load variation. Load rejection
- Maintenance Provisions
- Plant Staffing and Organization Chart

8. Quality Assurance

- Vendor's Quality Management System

9. Project Organization Proposed by Vendor



Vendor Information Package Structure and Contents (7 of 7)

- **Part III: Commercial Aspects, budgetary estimate and financing**
 - Vendor's position on Contract Model
 - Vendor alone or in Consortium when Bids will be requested
 - Budgetary price and price breakdown
 - Vendor's position to a possible financing request
 - Main commercial conditions by Vendor
 - Personnel Training Program
 - Local participation
 - Technology Transfer

Summary of Main Subjects to be Evaluated (1 of 5)

1. General

- Plant Type and Size
- Plant Layout and Building General Arrangements
- Plant siting envelope parameters (soil conditions, SSE, environmental conditions, etc.)
- Standardization: Availability of a Standard Plant Design
- Design philosophy
- Proven design
- Safety systems concept

Summary of Main Subjects to be Evaluated (2 of 5)

2. Safety Features and Investment Protection

- Licensability
- Accident resistance
- Core damage prevention
- LOCA protection
- Severe accident provisions and frequency
- Station Black-out protection
- Operator action
- N+1 or N+2 criteria for safety systems design
- Containment design and Containment margin
- Source term
- H₂ generation
- Physical Protection provisions
- Emergency Planning



Summary of Main Subjects to be Evaluated (3 of 5)

3. Plant Performance

- Rated net power output
- Rated net heat rate
- Refueling period
- Availability (design)
- Unplanned automatic scrams
- Plant maneuverability
- Load rejection capability
- LLW produced per year
- Operability and maintainability provisions in design
- Equipment accessibility
- Provisions for equipment replacement
- Instrumentation and Control system technology
- Operation simplicity



Summary of Main Subjects to be Evaluated (4 of 5)

4. Design Process and Construction

- Design Simplicity
- Detail Design Status (Degree of completion at construction start)
- Design process. Use of modern design tools (3D Model)
- Configuration Management System
- Project Information Management System. DBs
- Construction Schedule
- Modularization
- Construction Methods
- Constructability

Summary of Main Subjects to be Evaluated (5 of 5)

5. Commercial Aspects

- Contracting Model (Vendor's view)
- Budgetary Estimate
- Any special commercial condition by Vendor
- Readiness to provide a financing scheme
- Expected kW cost
- Expected kWh cost (capital, O&M and fuel)