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**Comments on:**

**Comprehensive Package Proposal for**

**Building ACP-100 in Iran**

**Date:** October 2015

**General Comments:**

1. The CNNC/CZEC should be officially authorized by Chinese Government for building ACP-100 in Iran.
2. The description of plant presented in chapters 2, 4, 5, 7, 8, 9 and 10 is incomplete. It does not describe all the plant systems and component and just provide very mediocre and selective description of few systems. It is worth mentioned that the general format of “Technical description” would be used as a contract technical attachment. However this document itself needs some revision.
3. A set of conceptual drawings shall be provided.
4. Any proposed SMR shall be licensable in the country of origin, while as per proposal, this issue is underway and has not been accomplished yet.
5. The codes and standards which will be followed in the design of equipment, components and structures shall be specified. In case of Chinese standard the equivalent international standard for them shall be specified.
6. There should be no difference between the international and Chinese standards. The international standards shall be prevailed in case of differences.
7. Supply of fuel first core, full scope simulator and spare parts should be included in the scope of the contract
8. The information on the severe accident countermeasures and the description of the mitigation systems has not been provided in this proposal.
9. The following topics should be explained in this proposal:
   * Adoption of ACP-100 to natural and environmental site conditions in IRAN.
   * Observing rules, regulations, and requirements of the INRA (Iran Nuclear Regulatory Authority) which are accepted to be fulfilled completely by the contractor for siting, design, manufacturing, construction and commissioning of the plant.
10. There is no requirement for the technology transfer of ACP-100 to be approved by the UN security council
11. The quality of all figures in the document is low and shall be enhanced.
12. Since several abbreviations are used in the text, please add an abbreviation section.
13. Table of Contents for each volume is helpful.

**Specific Comments:**

**Volume 1: General**

1. The organizational structure of the project should be aligned with the main responsibilities stated inVol.1 section 6.
2. The engagement of subcontractors in the project and their relationships with the main contractor should be explained in details.
3. The main responsibilities described inVol.1 section 6 should be merged with those mentioned in Vol.2 section 3.3.
4. What is the basis for considering the Safe shutdown earthquake (SSE) ground acceleration as “0.3 g” for the proposed project? This value should be calculated for any specific site and may differ from one site to another.
5. The description of different plant operating modes and the specification of each mode (including reactivity condition, rated thermal power and average reactor coolant temperature) should be provided.

**Volume 2: General Technical Aspect**

1. Technical descriptions must include design of equipment and buildings. Mechanical design aspects of all systems shall be clarified. General layout of mechanical equipment and buildings shall be demonstrated.
2. The process diagrams of systems are not shown.
3. Detailed descriptions including system description, function, equipment and flow diagram for following systems should be provided:
   * Engineered Safety Features (Passive Core Cooling System, Passive Residual Heat Removal System, Automatic Depressurization System, etc.)
   * Nuclear Auxiliary Systems (Chemical and Volume Control System, Reactor Boron and Water Makeup System, Residual Heat Removal System, etc.)
   * Waste Treatment System
4. In subsection 1.2, Paragraph after Level 5, Text “The design of structures, system, and components of ACP-100 ... etc.” should be conformed to the international codes and standards.
5. In subsection 1.3; item (1), Parameter “Plant Operation mode: base ... etc.” Does it mean the unit load shall always be the rated load?
6. In subsection 1.4, Table 1.4-1, Parameter “DNB correlation”; please clarify AC-100 correlation.
7. Table 1.4-1, Parameter “Heat generated in fuel”; please clarify 125%.
8. In subsection 1.4, no data has been provided on “excess reactivity”, “worth of RCP rods”, “peaking factor” and “shutdown margin”.
9. Section 1.5. “Thermal and Hydraulic Design”, Design limits for thermal hydraulic analysis of normal operation and design basis accidents as well as hot channel factors which covers all manufacturing and operational uncertainties used in power distribution shall be defined in this section.
10. Subsection 1.9, item (2) - (a); please explain why is the temperature of core outlet smaller than reactor vessel outlet temperature (in Table 1.5-1)?
11. Subsection 1.9, item (2) - (a); please explain mechanical reactor coolant flow.
12. In subsection 1.9, item (3), engineered safety features are not described separately.
13. In subsection 3.3. “Project Structure and Organization”, “Design Coordination Dept.” has not been located in Iran side. The same Dept. seems to be useful for coordination of the design process.
14. In subsection 3.4, registration process of CNNC subcontractors by INRA has not been taken into account.
15. Subsection 5.1.1; please submit the detailed operation organization chart with the number of operation employees.
16. In subsection 5.4 “Waste Management”; necessary information about gaseous waste treatment system shall be provided.
17. Subsection 5.7; please describe both solid and fluid waste treatment.
18. Section 6; according to the Iran rules and regulations, each nuclear plant shall be licensed by INRA before construction and operation. This issue has not been presented in this section.
19. Section 6; any proposed SMR shall be licensable in the country of origin, while as per section 6”, this issue is underway and has not been accomplished yet.
20. It is requested to provide information on the engineered safeguards to be applied in the ACP100. This information should refer to the following points:
    * Safety related codes, standards, regulations and guidelines;
    * Protection against faults, accidents and external incidents, indicating emergency systems;
    * Radioactivity and radiation protection.
21. Section 6; CNNC should provide information on any ongoing modifications of the licensing requirements in their country during project execution.
22. A list of documents considered as the documents governing the plant licensing program, for the following steps should be well explained:
    * Limited Working Authorization Permit
    * Construction Permits
    * Fuel Loading Permit
    * Operating Permits
23. Section 7, Table 1; please define “Equilibrium Cycle” and describe the refueling scheme and optimization targets and limits to achieve the subsequent fuel cycles.
24. Section 8, The Contractor shall assume full responsibility for the completeness and timely provision of all documents to be prepared by the Contractor for the licensing and permit procedures, in accordance with the licensing program.
25. Section 8, a list of documents for approval by the owner should be stated.
26. Section 8, the contractor shall submit documents for approval by the principal. Should the principal disapprove the documents, the principal should inform the comments, and then the contractor shall prepare answer to the comments or modify the documents as necessary and resubmit them to the principal for approval.
27. Submission of manuals for operating, testing and maintenance of all safety related systems and equipment should be stated.
28. Section 9; a list of special tools should be submitted.
29. A list of spare and wear parts, consumables, and special tools (especially for inspection and maintenance and in-service inspection for the reactor) should be stated.
30. Characteristics of the full scope simulator of ACP-100 shall be explained in a section including software-hardware simulation for training of operation personnel of unit control room (UCR) with the use of the full-scale working model of real UCR, complex of all modes and mathematical model of the power unit, in real time-scale.
31. Since there is no long-term operation experience of the integral reactor technology and it is first-of-a-kind, the present design shall be confirmed by comprehensive experimental verification such as verifying in a test facility for passive core cooling system and LOCA accidents for any line connected to the system within the first isolation valve.
32. Maximum allowable number of tube plugging and conditions for replacement of the once through steam generators should be specified.
33. Preliminary list of anticipated operational occurrence conditions and design basis accidents which will be considered for the design of the reactor should be stated.
34. Please submit the technical questionnaires for nuclear systems and components and for turbine-generator plant according to appendix B of Bid Invitation Specifications for Nuclear Power Plants (Technical Reports Series No. 275 of IAEA).

**Volume 03: Scope of supply and services**

1. Supply of fuel first core and provision of fuel management program should be included in the scope of the contract
2. Designing, manufacturing, installation of a full scope simulator and all necessary computer softwares and hardwares shall be placed in the scope of the project.
3. Supply of spare parts should be included in the scope of the contract
4. Volume 3- Section 4:owner's scope and supply – at the end of the last bullet the following statement should be added:

"and the contractor shall also be responsible for timely provision of all necessary documents required for executing his obligations and related permits and licenses. Dates of submission by the Contractor of the licensing documents as required by the Iranian authorities will be notified by the principal."

**Volume 4: Technical Description of Nuclear Island**

1. In this volume, Buildings No. 6, 7 and 8 are not explained.
2. The selected site and site parameters should be discussed. (For instance, it is stated that the lowest level in the reactor building is -18m while in the coastal line the water table is close to the ground. Therefore, the deep excavation and construction in the level -18 m is so difficult and it seems sensible to modify the plant design based on this issue and the building’s architecture would be completely affected).
3. There is no data about the amount of effluent release from the plant into the environment, such as specifications of stack, amount of gaseous effluent and liquid effluent releases.
4. What is the prediction of the amount of nuclear waste after expiring of the plant lifetime?
5. Having implemented control processes, how much will nuclear articles be emitted?
6. In the present proposal, there is no data about the emergency HVAC system. Please declare if the Emergency HVAC system has been considered for this plant.

**Volume 5: Technical Description of Nuclear Fuel and Fuel Cycle**

1. Technical description of the ACP100 fuel assembly components is incomplete, more explanation and some information of fuel components such as dimensions, compositions, materials, standards are requested.
2. N36 was defined as cladding tube material. It seems, this alloy is a new material, which developed in China, and we do not have any information about. It would be appreciated if you add some more information such as:
   * If this alloy has ever used in any other reactor?
   * When has this alloy been developed and qualified and who/which company or organization approved it to use in reactors? If there is any approved license it would be very useful.
   * If this alloy is used in any other countries.
   * How do you make sure that you can use this alloy in ACP100 safely? It seems there are differences between ACP100 conditions and other Chinese reactors, therefore, how can we be sure about the safety of using this alloy on ACP100 as a material of cladding tube?
3. There is some information in table 1.6.2 about material for the CF3S fuel assembly, but it is not completely clear. It is necessary to add the standard codes which are applied for designing and manufacturing of a.m. material. If there is any differences between the material specification such as composition, metallurgical and mechanical properties, etc., it must be mentioned in the proposal.
4. As we understood from the last meeting and the present proposal, CF3S which is used in CP300, will also be applied in ACP100 Reactor. It is obvious that due to different conditions of these two reactors, fuel parameters must be redesigned and customized. As the safety is very important, it is requested to submit more explanation about the quality, safety and the procedure of fuel selection. Information about your plan for fuel evaluation and qualification would be very helpful.
5. There is not enough information about RCCA. Some basic information such as summary of working procedure, materials, weight of materials is expected to add to the proposal. As same as fuel, please inform us if you have done qualification process for RCCA.
6. Please add the complete fuel design data. The applicability of the following fuel design criteria (not limited to these items) for ACP-100 fuels shall be explained:
   * DNB Safety Limit
   * Internal Gas Pressure
   * Mechanical Stress Of Clad
   * Fuel Enthalpy
   * Peak Cladding Temperature
   * Fatigue Of Cladding
   * Oxidation Of Cladding Thickness
   * Hydrogen Release
   * Hold-Down Force
   * Linear Heat Rate
   * Power Ramp
   * Cladding Diameter
   * Cladding Elongation
   * Radial Power Peaking Factor
   * Total Or Hot Spot Peaking Factor
   * Cladding Stability
7. Refueling duration (staring from the RPV unsealing to the RPV head sealing), medium repair with refueling, overhaul with fuel unloading should be explained.
8. The permissible number of the fuel elements damages of the "gas uptightness" type and the permissible number of the fuel elements damages with the direct fuel contact with the coolant for a core loading should be explained.
9. Please add the fuel design and operational criteria.
10. Please add the specification of different materials of fuel assembly including the composition and impurities. Which standards are used?
11. Please give the required data of RCCA absorber (AG %?-In %?-Cd %? And dimensions) in order to perform neutronic analysis and reactivity balance.
12. Please add the RCCA reactivity worth, reactivity control elements design requirements and criteria and reactor core reactivity balance.
13. Please describe the methodology used in steady state neutronic analysis.
14. Please add the core kinetic parameters and the methodology in dynamic calculations.
15. Please add the analysis results based on chapter 15 of FSAR.
16. Please provide a general document as an album of neutronics including the neutronic calculation analysis for steady state and transients.
17. Section 3 (Fuel Supply Plan), Text “it is not suggested to implement technology transfer for both nuclear power plant and nuclear fuel”; It shall be agreed upon between two countries at contracting time.

**Volume 6:**

**Technical Description of Turbine-Generation Plant Systems**

1. Heat and material balances and overall flow diagram of secondary cycle shall be described.
2. In this volume, the diagram for all subsystems is not shown.
3. The specifications of deaerator, condenser, and heaters are not presented.
4. Doesn’t the system have HP feed water heaters?
5. The temperature of cooling water supply to the main turbine condenser (and consequently condenser pressure) shall be checked again. The local temperature can be more than what is in the proposal.
6. Section 1, Paragraph 2; the power level is 125 MW.
7. Section 2, paragraph 3; please clarify if the main steam is saturated or dry.
8. Subsection 4.1.1, paragraph 4, Text “Extraction pipe is set ... etc.”; please confirm that the new design (only electricity production) has the same extraction.
9. Subsection 4.1.1, Table 6.4-1, parameter Rated Output (Maximum. Guaranteed); 125 MW is correct.
10. Subsection 4.1.4; please submit the heat balance diagram.
11. Subsection 4.2; please clarify the control oil supply and function.
12. Subsection 5.1; 125 MW is correct.
13. Subsection 6.1.2, paragraph 6, Text “The condenser tubes are expanded ... etc.”; the condenser tubes should be made from titanium alloy.
14. Subsection 8.4; please explain the function of testing the availability (TFS).
15. Section 11; this design is already changed please confirm the new design.( i.e. there is no more use of steam for water desalination purpose)

**Volume 7: Technical Description of Balance of Plant**

1. In this volume heat and material balance diagram should be attached.
2. In this volume; all figures such as F-2.15.3.2-1 (reactor building ventilation system flow diagram) are illegible.
3. Subsection 2.1, Text “These systems include Containment Atmosphere...etc.”; Please specify safety and non-safety systems. Also, special considerations for safety systems such as multiple divisions and/or trains, diversity, physical separation, equipment qualification, etc. shall be specified.
4. Subsection 2.7.1, Text “The nuclear auxiliary building ventilation is not a safety related system”; if there are safety systems in Reactor Auxiliary Building which are required for accident mitigation, corresponding HVAC systems shall also be safety related.
5. Subsection 2.9.2, item 2 (Low flow exhaust subsystem with), Text” exhaust fans”; Equipment qualifications has to be mentioned. e.g. ASME qualification or similar to be considered for equipment working in the accident conditions.
6. Subsection 2.10.1, item 2 (Technical Room of chillers), Text” These subsystems are not safety related systems”; Electrical Rooms which serve safety equipment shall have safety HVAC systems.
7. Subsection 2.11.2, item 1 (Smoke extraction system equipped with), Text” exhaust fans”; Smoke exhaust fans to be of suitable classification such as F300 to withstand high temperature of smoke for a specific time duration.
8. Subsection 2.12.2, Paragraph 2, Text” an HEPA filter, iodine absorbers”; since in case of accident, filters may be failed or be in maintenance, redundancy shall be considered for filtration units in addition to fans.
9. Subsection 2.15.1, item 3 (Switchgear room ventilation and air conditioning system), Paragraph 2, Text” Switchgear room ventilation......after firefighting”; Positive pressure shall be considered also to avoid dust entrance.
10. Subsection 2.15.2, Paragraph 3, Text” air conditioners”; Air Handling Units or Roof Top Package is necessary for pressurization.
11. Subsection 3.1.5.2; According to NFPA Standards and reference plants main control room, electrical cabinet, storage battery, I&C electrical equipment room shall be protected by firefighting gas suppression systems while in this subsection, electrical equipment is protected with water spray and sprinkler systems.
12. Subsection 3.1.7.2, According to NFPA Standards and reference plants four or three fire pump shall be designed for fire water supply one electrical pump (1x100%), one diesel pump (1x100%) and two or one jockey pumps while in this subsection, two make-up water pumps (2x100%) and two make-up air pumps are considered for fire water supply.
13. Section 3, According to comments of subsections 3.1.5.2, 3.1.7.2 (above comments) and review of fire protection systems, it seems Chinese code is different from international codes and standards therefore, it is highly recommend to use international codes and standards such as NFPA, RG, AWWA, etc. for design of fire protection systems.
14. Section 4; which standards and guides are followed for communication systems?
15. Section 4; please present a block diagram of communication systems and its interface with other areas/systems.
16. Section 4; the definition of Safety Telephone System is not clear.
17. Section 4; is Generic Cabling System a communication system?
18. Section 5; which standards and guides are followed for nuclear island Automatic Fire Alarm System, and conventional island Automatic Fire Alarm System?
19. Section 5; It is expected that fire alarm system includes signal receiver from different switches of suppression system or the actuation of SOVs or door closer etc.
20. Section 5; please present a block diagram of fire alarm system and its interface with other systems.
21. Section 5; isn’t there any automatic/manual action after detecting of hydrogen?
22. Section 5; what is the safety category of fire alarm system (safety, safety related or non-safety)? Which criteria are considered in the design?
23. Section 5; please explain more detail about the whole structure of this system and its relationships with the other systems.
24. Section 5; is there any approach to solving the uncertainties of nuclear power plant fire detection?
25. Section 5; please present more information about fire hazard analysis and the basis for selection of fire detectors.
26. Section 5; please explain more detail for annunciation of fire alarm system (alarms, beacon, etc.)
27. The information including function, description and general layout for following buildings should be provided:
    * Standby Diesel Generator Building
    * Emergency Compressor House
    * Conventional Island Buildings
28. The description for communication subsystems has not been provided in this proposal.

**Volume 8: Technical Description of Electrical Systems**

1. In this volume, the description of electrical power system is very brief and without much detail. Each operating mode of the plant shall be discussed separately and for each mode, the list of loads energized and / or shed shall be given. There shall be at least a preliminary list of loads in the document.
2. The design’s conformity to different regulatory guides including those of NRC and IAEA and the relevant standards like IEEE shall be explained and guaranteed.
3. A layout drawing of electrical panels and their connections in the buildings of the plant shall be presented.
4. Please change all instances of 380V to 400V AC and 220 V to 230 V AC.
5. The grounding scheme in the document is not justified. For example, why should the neutral point of the generator and MV system is left unground?
6. There is no class 1E LV AC bus. So does it mean that there is no class 1E AC load? As mentioned in the general comments, a list of loads for all buses shall be included (at least a preliminary load list).
7. Connection of Class 1E buses to normal power sources during LOOP is not acceptable, though the class 1E system is mainly comprised of batteries.
8. Subsection 3.3 (6kV Standby Diesel Generator Set); How much is the diesel generator capacity?
9. Subsection 3.4 (Ancillary Diesel Generator System); How much is the capacity of the diesels?
10. Subsection 3.7.2 (Tele-control), Text “The ACP100 unit is designed generally to perform base load operation in the national grid and are not considered to perform automatic load frequency control (ALFC); ALFC should be coordinated with dispatching center.
11. Subsection 3.7.3; doesn't the PLC system need a Line Tuner?
12. Unit power consumption for house loads at 100% of gross electrical power should be explained.

**Volume 9: Technical Description of Instrumentation and Control**

1. It seems I&C System architecture is fully digital (except Non-Digital Logic which is not elaborated). What measures are taken for Common Mode Digital Failures especially in safety systems?
2. It is not clear which standards are considered in the design of ACP100 NPP I&C. in section 2, it is just mentioned "Chinese national standards". Please clarify which international/US codes and standards are fulfilled.
3. Please clarify the safety classification of I&C systems.
4. Which of IEEE (1E/N1E) or international IEC or IAEA are followed in the design? Please clarify the safety classification of ACP100 I&C systems and also criteria considered in the design of each system (single failure, common cause failure, power supply redundancy ...). It is recommended to present them in a table according to IEC61226.
5. Is there any seismic classification in the design of I&C equipment?
6. Please clarify if all the equipment inside containment is LOCA-Resistant or just the safety system equipment.
7. Usually the NPPs are base loads power plants; could you clarify if the ACP100 NPP has frequency control capability?
8. Nothing about the reactor control system especially boron reactivity control system is addressed. Could you please clarify if this system would be used in automatic mode or it is manual?
9. Which plant control strategies i.e. Turbine lead (steam pressure), Reactor Lead (Tavg of reactor) or Flux/Power of reactor will be used in automatic mode of the control system?
10. Please elaborate which in-containment parameters are monitored for PAMS or SAS? Are they measured by using sensing lines (impulse lines) to locate the transmitters outside of containment?
11. Figure F-1-1 (Main I&C system architecture block diagram):
    * Please show the safety category of systems in overall block diagram (with using different colors or other measures).
    * The systems shown in the Block Diagram does not match with the description presented in the text.
    * NC and NC\* are not described in the text.
    * Reactor Control System is not shown in the diagram.
    * Some boxes are not clear, such as the box above "Reactor Protection System".
    * What are the level 1 and level 2 networks for? Please elaborate these networks in the text.
    * Non-Digital Logic is not mentioned in the text. Is it a separated system from Diverse Actuation System? What is its function?
    * Monitoring systems (SAS, PAMS, IIC, etc.) are not illustrated in the block diagram. Moreover other systems such as CI-Turbine control system, Process (plant) control system, RMS, etc. cannot be found in block diagram.
12. Section 1, “General Description”; I&C systems are generally divided to NI, NC and BOP. Please clarify which systems are classified in each division? Nothing is explained about BOP in the text ,moreover this classification does not comply with Figure F-1-1.
13. Subsection 3.2.3; “In-core Instrumentation System”; Please clarify if the in-core instruments are safety classified. How many flux detectors are used in axial direction? Are they self-powered?
14. Subsection 3.2.6, "Seismic Instrumentation System"; Please clarify if this system performs any calculation to evaluate the integrity of important structures after earthquake or not.
15. Subsection 3.3.3. "NI Control System", It is stated in the second paragraph that "Three parameters are used to determine speed ...” in the second dash the feed water flow rate is used to identify secondary load, while the steam pressure is usually used for detection of turbine load. Please clarify.
16. Subsection 3.3.3, does the feed-water pump have variable speed or it has constant speed and the flow is controlled by a control valve?
17. Subsection 3.4; please clarify if the RPS is designed on the basis of 4 independent channels. So the safety actions will be triggered based on 2 out of 4 voting, is that right?
18. Subsection 3.4.1.Which system performs the emergency load sequencing of Diesel Generator?
19. Subsection 3.4.2., please clarify if manual initiation of protective actions is also in component level or just system level is covered.
20. Subsection 3.4.3; please clarify why the steam line pressure and temperature are considered for trip action, on the other hand the SG water level is not considered (in spite of other PWRs types). Moreover some signals are missed such as reactor period.
21. Subsection 3.4.4; please add a reference for mentioned conditions.
22. Subsection 3.4.5."ATWS mitigation system"; please clarify if this system is a part of RPS or it serves as a stand-alone system. It should be illustrated in system architecture in Fig. F-1-1.
23. Subsection 3.5, Diverse Actuation System (RDA):
    * Does the Diverse Actuation System have dedicated sensors/actuators (according to Fig.F-1-1)?
    * Why is it classified as Non-1E?
    * Does RDA contain a hardwire logic? Or, it has a digital platform.
    * How the CCF is considered in the design of RDA? How is different technology from RPS used in RDA?
24. Subsection 3.6, "SAS", why is SAS considered as Non-1E?
25. Subsection 3.7.2.8.; please clarify if the correct abbreviation is "SPDF" or "SPDS". Is this system a part of IIC? Does it have dedicated monitors or it is integrated as HMI pages of IIC?
26. There are plenty of monitoring systems including: IIC, SAS, SPDS, PAMS, etc. Please clarify their function and relation. Are PAMS and SAS different systems?
27. Isn’t there any fixture alarm system, mimic panel or hardwired interface for safety system actuation and monitoring? Are the safety system interface graphical HMI pages?
28. Subsection 3.8, "Remote Shutdown Station"; is the equipment of RSS portable?
29. Subsection 3.8.3.1, it is stated that "The RSS is not designed to consider MCR unavailability coincident with another accident, especially one requiring operation of safety systems." It means that if the MCR is not available and at the same time LOCA happens, the plant cannot be shut down safely. If so, isn’t this a major safety problem in the design?
30. Subsection 3.8.3.1, the main function of RSS should be emergency shutdown of reactor which is not mentioned.
31. Has any reliability assessment been done on the I&C system of ACP100 (especially safety systems)?

**Volume 10: Technical Description of Civil Work**

1. Subsection 3.4 (Main Equipment Placement); Text “Heavy-cargo crane is used to overturn the equipment...etc.”; these cranes are generally used when more than one unit is planned for construction.

**Volume 14 National Participation and Technology Transfer**

1. Information on the ways and means for national participation and technology transfer should be provided.
2. information on the applicable laws and regulations as well as the governmental procedures in China which may affect the conditions of the contract or the export of components and equipment, documents, fuel supply and fuel cycle activities and services and, in particular, technology transfer should be provided.
3. CNNC should describe the assistance he is willing to give, in order to achieve the goal of using suppliers from the owner's country as well as the conditions for the proposed assistance.
4. There is no requirement for the technology transfer of ACP-100 to be approved by the UN security council

**Volume 15 Guarantee and Warranty**

1. For each of the guarantees and warranties the following points should be specified:
   * Subject of the guarantee or warranty, including the numerical value , the range of acceptance and the duration;
   * Procedures for determining compliance;
   * Consequences of non-compliance (repair, replacement or monetary penalties);
   * Criteria for the application, amounts and limits of monetary penalties;
   * Overall limits for monetary penalties;
   * Bonus arrangements,
2. guarantees and warranties shall cover the following items:
   * Design, materials and workmanship;
   * Performance and physical parameters(rated output, net output, heat rate, steam conditions, operating characteristics, fuel integrity and burn up);
3. Chinese side should provide details for each guarantee and warranty, including in particular provisions for remedial measures or monetary penalties in case of noncompliance without which a guarantee or warranty would be meaningless.

**Volume 16 Commercial Conditions**

1. The maintenance and decommissioning costs of the units are stated in the proposal as a percentage of the fixed assets. In order to facilitate the calculations, these parameters should be expressed in value Yuan/MWh
2. Although overnight costs for construction of two and four units in one site are presented in the proposal, the corresponding project durations for detailed calculations for those options are needed.