ANNEX II

ANSWER TO QUESTIONS OR COMMENTS

NATIONAL NUCLEAR SAFETY REPORT – 2013-

Nº 1
CNS-REF.-ART.: General
PAGE OF REPORT: 8
CHAPTER OF NAT. REPORT: 1.4.1.4

How were the stress test principles (utilized for existing units at the site) applied into ongoing design work for the CAREM design?

The CAREM 25 design was reviewed considering Fukushima experience. The main topics that have been considered related to extreme external events were:

1) Seismic Design.
- The DBE was reviewed.
- A risk based criteria was used according to regulatory standards AR 3.10.1, Protection against earthquakes in NPPs, and, AR 3.1.3, Radiological criteria relating to accidents in NPPs.

2) Loss of heat sink and SBO
- CAREM-25 is an Integrated PWR.
- Safety systems relying on passive features.
- The reactor´s safety functions can be performed during 36 hours without power supply (long grace period).
- CAREM-25 considers in its design base the loss of heat sink and SBO during the grace period.
- After grace period, it is foreseen that:
  - The decay heat removal from the core will be carried out by using the fire extinguishers system or an autonomous cooling system.
  - The containment cooling will be carried out by using the fire extinguishers system or an autonomous cooling system.
  - The power supply to safety related systems will be carried out by using autonomous generation systems.

3) Mitigation: It is foreseen:
- The control of the H2 generated in the containment during severe accidents.
- The cooling of the RPV´s lower plenum using an alternative cooling system.

4) Spent Fuel Pool
- It is foreseen the cooling of the spent fuel pool using an alternative cooling system.

Nº 2
CNS-REF.-ART.: General
PAGE OF REPORT: 3
CHAPTER OF NAT. REPORT: I.7 / Annex I

Argentina comments on the continued strong use of international reviews, IAEA missions and OSART. Does Argentina have a plan to conduct a self-assessment and request an IRRS mission in the future?

The Argentine Nuclear Regulatory Authority (ARN) routinely performs as part of its management system, self-assessments of the performance of its regulatory activities. The ARN also, in its regulator competence, has an active participation in all the IAEA Standards Committees and has its regulation harmonized with such standards, among which are those dealing with the recommended regulatory management modes. Moreover it also uses for self-assessment, the international regulatory experience acquired through its participation in various regulatory forums (Ibero-American Forum of Radiological and Nuclear Regulatory Agencies, CANDU Senior Regulators, meetings with other regulatory authorities, etc.).

It is noteworthy that Argentina has requested IAEA missions to address specific issues, such as an independent evaluation of the alleged contamination of the groundwater-table near the Ezeiza Atomic Centre.

Regarding that Argentina has not yet requested any IRRS mission; this is due to the priorities assigned to the use of its specialized available human resources. It should be mentioned that the Argentine Nuclear Plan had no significant progress for over twenty years, until in 2006 the Government decided to re-launch the nuclear and fuel cycle activities that were suspended, and simultaneously begin the development of new projects.
Such activities include the completion of the construction and the operation of CNA-II, the life extension of CNE, the feasibility analysis for the life extension of CNA-I; the finalization of the design and the beginning of the construction of the CAREM reactor, the commencement of the feasibility studies for a fourth NPP and the design and construction of the multipurpose research reactor RA-10.
The re-launch of the nuclear plan involved a significant increase in regulatory activities due to the corresponding control and licensing actions and consequently the ARN´s staffs was augmented from about 250 to more than 420 people, of which about 20% are involved in regulatory activities related to the control and licensing of nuclear reactors.
Much of that staff are mostly junior professionals who are still in the training stage. Therefore, the ARN´s senior staffs is facing the challenge of conducting the control of the operating nuclear reactors; carry out the licensing of the facilities in the stages of design and construction, and coaching the young professionals.
From the above, it clearly emerges that there are objective constraints for the ARN to assume in the short term, in addition to the regulatory tasks above mentioned, the commitment to adequately address an IRRS mission, which according to the experience in other countries, entails a significant additional effort for an extended period.
The previously expressed considerations were explicitly exposed in a meeting held by the ARN´s President with IAEA's senior staff.
The consideration for requesting Peer Review Missions, whose importance and necessity is out of discussion in our country, shall take place as soon as an equilibrium be achieved which allows due attention for such missions, without prejudice to the execution of the other regulatory activities and the installations safety.

Nº 3
CNS-REF.-ART.: General
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: All

Report describes in many areas how international peer reviews are applied in Argentina. According to the text, these are applied in the utility side and not on the regulatory side. Can you explain why Argentina has not yet conducted an IRRS mission in the country?

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Nº 4
CNS-REF.-ART.: General
PAGE OF REPORT: 8
CHAPTER OF NAT. REPORT: Annex VI, item 2.9

With regard to the incident, would Argentina provide additional information as follows:
1) What was the root cause of the hydrogen accumulation in the steam generator?
2) Does rate of draining through pump has any effect on the release of hydrogen?
3) Is it a practice to measure presence of hydrogen, whenever a major equipment like steam generator is opened for maintenance? What is the experience with detection of hydrogen in such instances?
1) The root cause of the hydrogen accumulation in the steam generator was the radiolysis of heavy water to drain the system at collectors' level.
2) It was not yet studied the effect of the rate of draining through pumps on the release of hydrogen.
3) Yes, the hydrogen measurement when the steam generator is opened is carried out. In some cases D2 was detected and removed by sweeping.

Nº 5
CNS-REF.-ART.: General
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: -

Ireland thanks Argentina for its comprehensive report.
Argentina appreciates the comment from Ireland.

Nº 6
CNS-REF.-ART.: General
PAGE OF REPORT: 4
CHAPTER OF NAT. REPORT: 1.4.1

The participation of Argentina in the FORO review of national reports on the post-Fukushima assessments of safety of nuclear power plants was noted. Please provide additional information on how the review was conducted and any outcomes of relevance to the Argentinean regulator and operators.
As indicated in section 1.4.1 of the National Report, a Peer Review (PR) was conducted to review the results of the stress tests (STs) included in the National Reports (NR) presented to the FORO, whose main objective was to ensure that the analyses and studies related with the STs, were carried out under homogeneous criteria and allowing to achieve NPPs' adequate protection levels against the considered phenomena and the postulated conditions.
The PR consisted in verifying that STs are consistent with the scope and the specifications established in the document which defining them. Besides, the PR included a technical assessment of those STs in order to check that such STs were carried out with consistency and robustness. As agreed in advance between the all the FORO´s members (Argentina; Brazil; Cuba, Chile, Mexico; Spain; Peru, and Uruguay), for the Argentinean NR, the PR was carried out by the Brazilian Regulatory Agency (CNEN). In the corresponding PR´s report, that was presented by the CNEN to the FORO´s members remaining, in order to be undergone to its review and analysis, the most relevant

aspects / observations were highlighted, good practices were identified and suggestions / recommendations were proposed.
During the PR was verified compliance with the guidelines established for the STs both in the STs´ reports of the Argentinean NPPs' as in the performance of the Argentinean Regulatory Body (ARN). The representatives of Cuba, Chile, Peru, and Uruguay officiated as rapporteurs in the review sessions and the technical secretariat was in charge of an IAEA´s Technical Officer. Each PR´s reports content was discussed and it were agreed together by all the FORO´s members (including the IAEA´s Technical Officer). Consequently, regardless of the PR, all the representatives of FORO´s countries, had the opportunity to ask questions and comments on the INs of countries possessing NPPs (Argentina; Brazil, Mexico and Spain), in order to consolidate the joint review process. In this context, it was verified the existence of strengthens in terms of the routinely use of standards and instructions that support the assessments made by Argentina, as well as that the Argentine NPPs are robust to face the challenges imposed by the considered accidents. Besides, it was considered that the Argentine NPPs will be strengthened to the extent that the complementary analyses and the improvements arising from the STs are completed.
Finally, it was recommended to ARN the following of those aspects open or which are in a development stage, which are mentioned in the NR and that could mean that some future actions such as new regulatory requirements were taken. The following more relevant findings of the PR were highlighted:

1) The NR submitted by ARN to the FORO is consistent with the proposed scope in the STs´ specifications which were established by the FORO.
2) Use of probabilistic safety assessments (PSA): The following good practices and suggestions were identified:
   - o Good practices:
     - The development of a preliminary version of the PSAs Levels 1, 2 and 3 for CNAII.
     - The use of APS in the seismic margin program.
     - The use of the PSAs for evaluating design changes of structures, systems and components.
     - The use of APS in the CNE´s Life Extension (PLEX) program.
   - o Suggestions:
     - Expand the existing studies including external events combined or consequential, mainly at sites with features that could infer the occurrence of such events.
3) Earthquakes: The following good practices and suggestions were identified:
   - o Good practices:
     - The adequacy of the criteria in relation to the state of the art and the study´s sequences that were performed to determine the seismic threat curves and the update of the sites´ seismological characteristics.
     - Independent assessment of Atucha´s site which was carried out by ARN.
     - The new seismic assessment of the Embalse´s site which was carried out by ARN, including the development of the curves of the Probabilistic Safety Hazard Analysis (PSHA) and the Uniform Hazard Spectra (UHS), as well as the floor response spectra (FRS) for the reactor building and auxiliary enclosures belonging to the other buildings affected to PLEX project.
   - o Suggestions:
     - Conclude the on-going seismic re-evaluations.
4) Floods/low level water/other external events: The following good practices were identified:
   - o Good practices:
     - The existence of procedures for monitoring the river water level by means of measurements and daily records, whose values are included in the on-line parameters´ control system of the plant.
     - Installing an additional pump in the river water assured cooling system of the CNA I, located at the CNAII´s pumps house, which is designed to cope with extreme floods and extreme low water levels.
     - Updating the hydrological and hydraulic studies for the Atucha and Embalse sites.
     - Updating the assessment of tornadoes risk's for the Atucha and Embalse sites.
     - Re-assessment of scenarios for wind loads, lightning and heavy rain.
5) Loss of off-site power: The following good practices were identified:
   - o Good practices:
     - Review and improvement of emergency procedures.
     - Electrical Interconnection among normal bars of CNA I and CNA II.
     - New emergency power supply system for CNA I.

- Review of some procedures for extending the use of diesel generators (DGs) by means of additional fuel tanks.
- Implementation of mobile diesel generators (MDGs).
- Connecting of MDGs and alternative pumps to remove residual heat (CNA I).
- Connection between one of the three CNA I´s new DGs and CNA II.

6) Loss of off-site power and on-site power (station black out, SBO); loss of heat sinks coincident with SBO: The following good practices and suggestions were identified:
   - o Good practices:
     - Operating instructions for disturbances and accidents were modified to include critical control parameters of the spent fuel storage pools (SFSP) -the temperature and level were included.
     - The strategy of including the MDGs and additional alternative water supply facilities as a mean to water replacement in the long term (including the SFSPs), in case the occurrence of events beyond the design basis.
     - Implementing a separate independent pump to take out water from the water table to feed the SFSPs by connecting manually the pump to a MDG.
   - o Suggestions:
     - Finalize the assessment of the fuels integrity which are in handling process inside the fuelling machine (FM) under a SBO scenario, evaluating the FM´s power supply possibility through a MDG.
     - Implement the proposed strategy developed in the framework of the severe accident management program (SAMP) for SBO (CNAI).
     - Set an explicit goal of 24 hours for the batteries' performance elongation for a prolonged SBO.
7) Severe accident management and recovery -on site-: The following good practices and suggestions were identified:
   - o Good practices:
     - The use of simplified models which allowed carrying out plant sensitivity studies in front of variations of critical parameters values.
     - The development of specific guidelines for severe accidents (SA) has been based on national requirements and the requirements of the countries of origin of technologies (Germany and Canada).
   - o Suggestions:
     - Clarify about the use that was given to the simplifications in the simulations carried out with the MELCOR code.
     - Carry out a follow up to verify compliance with the proposals requested appropriately and within the expected time.
8) Emergency preparedness and response and post-accident management -off site-: The following good practices and suggestions were identified:
   - o Good practices:
     - Planning of extended emergency drills over time.
     - Implementation of an environmental monitoring network around NPPs, consisting of radiological and meteorological stations, both portable and fixed, for the purpose of having real-time information to facilitate an effective response in accidental situations.
     - To require the NPPs a review of the source term, in order to update the implementation of pre-calculated scenarios with radiological consequences for different severe accident types.
     - Implementation of an environmental monitoring network around NPPs, consisting of radiological and meteorological stations, both portable and fixed, for the purpose of having real-time information to facilitate an effective response in accidental situations.
   - o Suggestions:
     - Carry out a follow up to verify compliance with the proposals requested appropriately and within the expected time.
     - Have suitable emergency lighting equipment to facilitate during a long term carry out the necessary actions inside and outside the different plant buildings.

More details in www.foroiberam.org

Nº 7
CNS-REF.-ART.: General
PAGE OF REPORT: 15
CHAPTER OF NAT. REPORT: 2.8

The NPP operators have clearly been subjected to a number of international peer reviews through WANO. Have there been, or are there plans for, the national regulatory body to host such an international peer review of its activities and functions?

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Nº 8
CNS-REF.-ART.: General
PAGE OF REPORT: 21
CHAPTER OF NAT. REPORT: 2

In Chapter 2, page 21, an interesting reference is made in the last bullet point to Plant tours where in 2012 more than 10,000 visitors were received. Given the obvious public interest demonstrated can you elaborate on what these tours show and also how the Digital Communication work described in the third bullet point is being received by the public and stakeholders?

Each group of visitors is received daily in the NPPs by the Public Relation Division. An introduction regarding the operation and general information of the industry, highlighting the importance of the

safety culture at the organization is given. The visitors received brochures that explain the plants´ activities. Afterwards the group performs a walk down around the plant, complying with the valid regulation to enter the facility. It is conducted by two guides visiting the main control room, the turbine building and some external areas.
The visits are open to the public and are composed by persons belonging among others, to teachers, students, companies, governmental organisms and community in general. In Addition, the communication actions that are performed outside the plants, such as expositions, congresses and communication campaigns, generate an important quantity of visits.
The relation with the public has been optimized, throughout the digital communication channels of the company. During 2013 the website (http://www.na-sa.com.ar/) with a daily update, received more than 120,000 visits and NASA continue with the production and delivery of the newsletter which counts with 50 editions and more than 21,000 subscribers.
The nuclear communication is also reinforced throughout the social networks, mainly with the presence of Facebook, achieving at the time around 6400 followers. In the other hand, a large quantity of visits is received by Flickr (http://www.flickr.com/photos/nucleoelectrica/) and YouTube (http://www.youtube.com/user/nucleoelectricaarg) with video and photographic material.
The Facebook fan page (https://www.facebook.com/nucleoelectricaargentina) constitutes the most dynamic channel for the digital communication, since it allows a more friendly interaction, less formal and more direct with the public in regards to the communications activities and campaigns performed by NASA.

Nº 9
CNS-REF.-ART.: General
PAGE OF REPORT: 5
CHAPTER OF NAT. REPORT: -

The report describes the process of the Argentinian Stress Test including a joined review by the regulatory authorities members of the Iberoamericano de Reguladores Radiológicos y Nucleares (FORO). The report also states that the FORO plenary approved the results of this peer review process. Please clarify the individual responsibilities of the FORO members in approving these results?
Each FORO member with NPPs (Argentina, Brazil, México and Spain) performs a Stress Test for each NPP. The FORO members without NPP are Cuba, Chile, Peru and Uruguay.
A peer review (PR) was conducted under a cross check methodology. Each report was discussed and it was agreed by all the FORO´s members (including the IAEA´s Technical Officer). Consequently, regardless of the PR, all the representatives of FORO´s countries had the opportunity to ask questions and comments on the reports, in order to consolidate the joint review process.
A final document with the results of the joint review including the PR´s results and the opinion of the all FORO´s member was issued.
This final document was first sent to the FORO´s Executive Technical Committee and, after that, this Committee sent the document to the FORO´s Plenary, where was approved.
The responsibility of the Executive Technical Committee was to inform to the FORO's Plenary about the stress tests development.
The FORO´s Plenary is composed by the Presidents of each Regulatory Body of all country members (Argentina; Brazil; Cuba, Chile, Mexico; Spain; Peru and Uruguay) whom were responsible for approving and release the final document.

Nº 10
CNS-REF.-ART.: General
PAGE OF REPORT:
CHAPTER OF NAT. REPORT: 1.4.1

Apart from the FORO peer review mechanism, is there also an action by the regulator and/or operator to review the results of the European stresstest (Ensreg report, national action plans)?
The stress tests required to the FORO´s member countries which have NPPs, aimed to achieving the objectives of the IAEA Action Plan and the Nuclear Safety Convention (NSC), are similar to the implemented by the Western European Nuclear Regulators Association (WENRA) and the European Nuclear Safety Regulatory Group (ENSREG). In such sense, the European experience was

incorporated in order to improve and adapt the FORO's requirements to the technology of the NPPs existing in the region. Furthermore, the Argentine NPPs follows the Significant Operating Experience Report (SOERs) of WANO about lessons learned post Fukushima.
Therefore, there is not a specific action by the regulator and/or operator to review the results of the European stress tests.

Nº 11
CNS-REF.-ART.: General
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 2.2

About training & qualification:
1) Can Argentina provide more detailed information about the training programme contents and training hours for new coming NPP inspectors and other staff of the regulatory body?
2) Which part of the training of regulatory body staff is provided by the NPP organisation(s)?
3) What is the training and retraining budget per person at the regulatory body?
4) Is there a qualification system for inspectors?

1) The Junior Inspectors, before starts their activities on facilities, take a one year course of radiation protection and nuclear safety. Then they start a training on the job in the NPPs provided by senior inspectors through conducting joint activities which are complemented by the participation in national and international training activities related to specific regulatory issues such as non-destructive testing, I&C features, maintenance aspects, ageing, etc.
2) The inspectors belonging to regulatory body participates in training courses provided to plant´s staff by the utilities, according to regulatory interest.
3) The allocated budget for training and re-training of personnel is variable depending on the needs. It is not set in advance an assigned budgetary limit to training. When the need for training arises, the viability is evaluated, and decided depending on the particular situation.
4) Currently ARN is developing a formal qualification process for inspectors. Meanwhile the qualification is based on the training and activities results.

Nº 12
CNS-REF.-ART.: General
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 2.5

Since CNA-I will extend its life, why is it not required to have its own full scope simulator (like CNA-II)?
Even though ARN began analysing the preliminary report for the CNA-I life extension, the licensee informed to ARN that currently is reassessing the viability and the scope of the CNA-I life extension (EOL in 2017).
Therefore, ARN has not yet defined the scope of the requirements to be submitted to the mentioned licensee. Nevertheless if the life extension is required by NASA and approved by ARN, the full scope simulator will be required.

Nº 13
CNS-REF.-ART.: General
PAGE OF REPORT: 12-13 / 29
CHAPTER OF NAT. REPORT: 2.6 / 3.6.5.1

External hazards assessments: As a follow-up a site re-evaluation was done on seismic hazards. The report doesn't elaborate on a re-evaluation of flooding hazards. Are these re-evaluations on flooding done and if not, what is the reason for that?
As mentioned in the National Report, the most significant external hazards affecting the Argentine NPPs´ (earthquakes; flooding, low level water; and others external events) were required by ARN. The evaluation for Atucha site is detailed in the National Report Section 3.17.2.3.3.1.2 Flooding/Low water level (page 150).
The evaluation for Embalse site is detailed in the National Report Section 3.17.2.3.3.2.2 Flooding/Low water level (page 154).

Nº 14
CNS-REF.-ART.: General
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 2.7

In this section a very comprehensive description of activities on the subject of severe accident management is given. But after 2010 these activities seem to have stopped. Can you elaborate on the activities on the subject of severe accident management after 2010?

As mentioned in the National Report, a reschedule as to continue with the development of the Severe Accident Management Program (SAMP) of CNA-I was approved by ARN. The CNE´s SAMP development has been considered by integrating the tasks related to the life extension project.
Regarding CNA-II, due to it is under licensing process, the SAMP is under development.
Nevertheless during this stage some activities related to SAMP have been developed:

1) CNA-I:
   Due to the CNA-I is a unique design, no external experience can be applied. For that reason the time involved in the SAMP development is much longer than in other NPPs.
   It can be noted that the evolution time for accidental sequences is very long compared with typical PWR/BWR designs, but the precise times are necessary to define timely corrective actions
   The main activities were focused on preventive strategies, and a significant effort was dedicated in refine the developed of the accident´s progression model.
   Anyway, as a result of the post-Fukushima stress test the following improvements were decided:
   a) Preventive strategies to avoid core damage:
      - Coolant inventory reposition by the pressure and inventory control system (TA) in small LOCA. conditions.
      - Water supply to the SGs through the Second Heat Sink system (SHS) in different accidental. scenarios.
      - Strategy to be applied to face a 220 VDC power supply failure was already implemented.
      - Strategy to be applied in case of voltage drop in the 24 VDC lines was already implemented.
   b) Alternative power sources: A mobile diesel generator (MDG) to supply essential consumption required to face with severe accident situations caused by a SBO occurrence will be implemented as to provide alternatives to the existing sources for secured electricity supply.
   c) New Emergency Power Supply System (EPS).
   d) Passive Auto-catalytic Recombiners (PARs): PARs as a measure for severe accident management aimed at ensuring the containment function are in the process to be fully installed.
   e) The Severe Accident Management Guidelines (SAMG) is being re-evaluated.
   f) Venting filtered containment system installation. This improvement is foreseen to be implemented within the life extension project.
   g) The development of the model for severe accident progression with MELCOR package is being updated.
2) CNE:
   SAMP is under development as part of the life extension activities, and taking advantage of the experience acquired from the CANDU community. Besides, and as in CNA-I, improvements were decided in light of stress test results.

For more details, see National Report Section 1.4.1.3 “severe accident management and recovery –on site-“.

Nº 15
CNS-REF.-ART.: General
PAGE OF REPORT: 15-16
CHAPTER OF NAT. REPORT: 2.8

1) About the three listed IAEA missions: were these carried out on request of the regulator? And who in Argentina took the initiative to invite these missions; the operator(s) or the regulatory body?
2) Can Argentina give more details about the recommendations of the IFMAP mission for interaction with the regulator?

3) There is no mentioning of OSART and SALTO missions. Does Argentina have future plans to invite these IAEA missions? If yes: when? If no: why not?
4) Does Argentina have future plans to invite an IAEA IRRS mission for peer review of the regulator? If yes: when? If no: why not?
1) The IAEA missions were decided in consensus between the Regulator and the Licensee.
2) The main recommendation is that the Licensee inform the regulator as early as possible about the design characteristics and safety issues of the projects, in order to consider the regulatory aspects that can strongly impact on it.
3/4) The Argentine Nuclear Regulatory Authority (ARN) routinely performs as part of its management system, self-assessments of the performance of its regulatory activities. The ARN also, in its regulator competence, has an active participation in all the IAEA Standards Committees and has its regulation harmonized with such standards, among which are those dealing with the recommended regulatory management modes. Moreover it also uses for self-assessment, the international regulatory experience acquired through its participation in various regulatory forums (Ibero-American Forum of Radiological and Nuclear Regulatory Agencies, CANDU Senior Regulators, bilateral meetings with other regulatory authorities, etc.).
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From the above, it clearly emerges that there are objective constraints to assume in the short term, in addition to the tasks above mentioned, the commitment to adequately address Peer Review mission, which according to the experience in other countries, entails a significant additional effort for an extended period.
The previously expressed considerations were explicitly exposed in a meeting held by the ARN´s President with IAEA's senior staff.
The consideration for requesting Peer Review Missions, whose importance and necessity is out of discussion in our country, shall take place as soon as an equilibrium be achieved which allows due attention for such missions, without prejudice to the execution of the other activities and the installations safety.

Nº 16
CNS-REF.-ART.: General
PAGE OF REPORT: 18 and 118
CHAPTER OF NAT. REPORT: 2.9 and 3.14.3.2.2

Use of TSOs: a) The German company GRS is contracted by the licensee as a TSO. Does Argentina have a national TSO? b) From 3.14.3.2.2 it seems that GRS is contracted as a TSO by ARN. Earlier it was written that GRS was acting as a TSO for the licensee. Is this an acceptable situation in terms of preventing conflicts of interest and can you elaborate on that?
a) Yes, Argentina has national TSO. For example, in 3.8.3.1.1. General Aspects, it is written that the Argentinean enterprise INVAP (regulatory branch) and the Litoral University are regular ARN's TSO on safety assessment issues.
b) Given the particular characteristic of the unique Atucha type design, there are few recognized specialist on it in the world. Because the German origin of the Atucha design, Argentina decide to

employ GRS as a TSO for PSA evaluation. Anyway, in order to avoid conflicts, GRS is only assessing the licensee in CNA-II - PSA level 2, and is also assessing to ARN in PSA level 1 and deterministic accident analysis. The subjects and experts are totally independent.

Nº 17
CNS-REF.-ART.: General
PAGE OF REPORT: 21
CHAPTER OF NAT. REPORT: 2.10

Does ARN have actual safety relevant plant data available during an emergency? If not, is ARN planning to install an on-line data communication system with the NPPs?
Yes, ARN is working to install an on-line data communication system with the NPPs.

Nº 18
CNS-REF.-ART.: General
PAGE OF REPORT: 15
CHAPTER OF NAT. REPORT: 2.8

The last OSART missions to Argentina have taken place in 1997 and 1991 respectively. No IRRS Missions have ever taken place. When will Argentina host an IRRS mission? When will Argentina host up to date OSART Missions again?
The Argentine Nuclear Regulatory Authority (ARN) routinely performs as part of its management system, self-assessments of the performance of its regulatory activities. The ARN also, in its regulator competence, has an active participation in all the IAEA Standards Committees and has its regulation harmonized with such standards, among which are those dealing with the recommended regulatory management modes. Moreover it also uses for self-assessment, the international regulatory experience acquired through its participation in various regulatory forums (Ibero-American Forum of Radiological and Nuclear Regulatory Agencies, CANDU Senior Regulators, bilateral meetings with other regulatory authorities, etc.).
It is noteworthy that Argentina has requested IAEA missions to address specific issues, such as an independent evaluation of the alleged contamination of the groundwater-table near the Ezeiza Atomic Centre.
Regarding that Argentina has not yet requested any IRRS mission; this is due to the priorities assigned to the use of its specialized available human resources. It should be mentioned that the Argentine Nuclear Plan had no significant progress for over twenty years, until in 2006 the Government decided to re-launch the nuclear and fuel cycle activities that were suspended, and simultaneously begin the development of new projects.
Such activities include the completion of the construction and the operation of CNA-II, the life extension of CNE, the feasibility analysis for the life extension of CNA-I; the finalization of the design and the beginning of the construction of the CAREM reactor, the commencement of the feasibility studies for a fourth NPP and the design and construction of the multipurpose research reactor RA-10.
The re-launch of the nuclear plan involved a significant increase in regulatory activities due to the corresponding control and licensing actions and consequently the ARN´s staffs was augmented from about 250 to more than 420 people, of which about 20% are involved in regulatory activities related to the control and licensing of nuclear reactors.
Much of that staff are mostly junior professionals who are still in the training stage. Therefore, the ARN´s senior staffs is facing the challenge of conducting the control of the operating nuclear reactors; carry out the licensing of the facilities in the stages of design and construction, and coaching the young professionals.
From the above, it clearly emerges that there are objective constraints for the ARN to assume in the short term, in addition to the regulatory tasks above mentioned, the commitment to adequately address an IRRS mission, which according to the experience in other countries, entails a significant additional effort for an extended period.
The previously expressed considerations were explicitly exposed in a meeting held by the ARN´s President with IAEA's senior staff.
The consideration for requesting Peer Review Missions, whose importance and necessity is out of discussion in our country, shall take place as soon as an equilibrium be achieved which allows due attention for such missions.
Regarding to receive OSART Missions again, NASA has required in the last few years a great amount of preparatory work by experienced people in different areas, and it will continue requiring an extraordinary effort in the next few years. For that reason have been not requested OSART missions

in this period. However, WANO Peer Review Missions in different areas have been performed at the plants and, in 2014 a WANO Corporate Peer Review is planned.

Nº 19
CNS-REF.-ART.: General
PAGE OF REPORT:
CHAPTER OF NAT. REPORT: N.A

How is the IAEA Action Plan on Nuclear Safety being implemented in Argentina? What is its status of implementation?

According to what were informed in the National Report, the actions taken in the light of the Fukushima Daiichi accident, highlighting the Argentine´s continued efforts to strengthen the nuclear safety, in achieving the objectives of the IAEA Action Plan are detailed below, including the more relevant issues related to its implementation, as well as its corresponding status:

1) Safety assessments in the light of the accident at Fukushima Daiichi NPP:
   Safety assessments have been carried as part of the stress tests required to determine the NPPs safety margins assuming the occurrence of a sequential loss of the lines of defence in depth caused by extreme initiating events. For more information see sections 1.4.1; 1.4.1.1, 1.4.1.2, 1.4.1.3, 1.4.1.4 and Annex VIII of the National Report.
2) IAEA Peer Reviews:
   Argentina has requested IAEA missions to address specific issues, such as an independent evaluation of the alleged contamination of the groundwater-table near the Ezeiza Atomic Centre. Owing to the priorities assigned to the use of its specialized available human resources considering the Government decision of re-launch the nuclear and fuel cycle activities that were suspended, and simultaneously begin the development of new projects, there are objective constraints for Argentina to assume in the short term the commitment to adequately address IAEA Peer Reviews. For that reason IAEA Peer Reviews have been not requested in this period.
   The previously expressed considerations were explicitly exposed in a meeting held by the ARN´s President with IAEA's senior staff. The consideration for requesting IAEA Peer Review Missions, whose importance and necessity is out of discussion in our country, shall take place as soon as an equilibrium be achieved which allows due attention for such missions. For more information see the previous answer referred to section 2.8; page 15 of the National Report.
3) Emergency preparedness and response:
   Analysis and assessments, as part of the stress tests carried out in 2011 / 2012, required by the Regulatory Body related with emergencies management and control, fuel damage mitigation, radioactive emissions reduction, revision of procedures, personnel training and equipment availability were performed. Besides, Argentina applies to the IAEA Response and Assistance Network (RANET) by lending response teams, services and equipment, as well as the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in case of a Nuclear Accident or Radiological Emergencies. For more details see Sections 3.16.2.8 and 3.16.2.9 of the National Report.
4) Nuclear Regulatory Authority:
   - An assessment of the adequacy of human and financial resources and need for technical and scientific support for fulfil its functions is being periodically carried out to decide the required arrangements to dispose of these resources. For more details see Sections 3.8.3.1 and 3.8.6 of the National Report.
   - IRRs missions: this issue is developed in item 2 of this answer.
5) Operating Organizations:
   - NASA has developed and initiated a Program for the Strengthening of the Safety Culture (SC). This program is devoted to the NPPs, as well as to other groups and activities associated to them. The activities timetable covers three years. The program has the objective of linking SC and plant operation activities in a very practical by using the measures some indicators, self-assessments and surveys.
   - A program to incorporate new professionals aimed to increase the licensee´s personnel by a process of recruitment and training of junior professional is being implemented. The training and capacitation courses for these personnel, as well as the retraining of the remaining staff has incorporated the lessons learned from Fukushima and, for this purpose, includes topics like severe accident management,

safety culture, international safety normative, external events, emergency preparedness, etc.

- The participation of licensee´s specialists at national, regional and international levels in technical meetings, workshops and expert missions aimed to improve their scientific and technical capacity (including CANDU PSA Working Group, WANO, EPRI, etc.) was increased.
- A Corporate Peer Review from WANO is foreseen to be held at NASA Headquarters by the end 2014 to evaluate different aspects of management systems and performance.
- OSART missions: this issue is developed in item 2 of this answer.

6) IAEA safety standards:
A harmonization process of ARN regulatory standards (AR) against IAEA's standards was carried out. As a result of the harmonization process, the comparative analysis and taking into account the lessons learned from the Fukushima accident related with sites of NPPs, was developed a preliminary version of the new Regulatory Standard AR 10.10.1 "Siting of Class I Nuclear Installations".
The ARN also, has an active participation in all the IAEA Standards Committees (e.g. CSS, INSAG, NSGC, NUSSC, RASSC, TRASSC and WASSC).
For more details see Sections 3.7.2.1 and 3.7.2.2 of the National Report.

7) International Legal Framework:
Argentine is party to all of the four safety related conventions since their inception. Argentine representatives have actively participated in the regular and extraordinary meetings of them, and in particular in those aiming at exploring ways of enhancing the implementation of the Convention on Nuclear Safety and of the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management. In the case of the CNS, this was effected specially through its attendance to the four meeting of the Effectiveness and Transparency Working Group.
In addition to that, Argentina has resumed its participation in IAEA International Expert Group on Nuclear Liability (INLEX), thus collaborating in this forum to the consideration of mechanisms that contribute to a global nuclear liability regime.

8) Capacity Building:
The Regulatory Body and the Licensee have been continuing their efforts to strength and maintain the education and training of the human resources, covering all the nuclear safety related areas. In this sense, the personnel involved has been participating in courses, workshops, technical meetings and expert missions at national, regional and international levels. For more details see Sections 2.2; and 3.8.3.1.4 of the National Report.

9) Protection of people and the environment from ionizing radiation:
   - An assessment for monitoring, decontamination and remediation activities is still being carried out, which includes increasing the emergency team number and training, as well as the required equipment and the corresponding procedures.
   - ARN is assessing the use of radiation risks coefficients and the limitations of epidemiological studies at low doses exposure situations to be properly explained for demonstrating the reasons why is not correct to attribute health effects from small notional individual doses (below 100 mSv).

10) Communication and Information Dissemination:
Argentina had signed both the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in case of a Nuclear Accident or Radiological Emergencies. In that sense, it is foreseen that all the communication/information be disseminated through the ARN´s Crisis Committee. This Committee has a procedure aimed to assure suitable transparency and effectiveness of communication to provide timely, clear, factually correct, objective and easily understandable information related with a nuclear emergency.

Nº 20
CNS-REF.-ART.: General
PAGE OF REPORT: 5
CHAPTER OF NAT. REPORT: Summary

The section refers to an upgrade of the earthquake hazard to a one in 10 000 year event referred to as the Review Level Earthquake established at 0.1g horizontal. Is this to be

understood as an RLE for which the essential functions must survive to ensure safe shutdown?
Yes, the 0.1g Peak Ground Acceleration value was adopted as Review Level Earthquake (RLE) due to the fact that provides a sufficient margin over the original Design Basis Earthquake. So, for this RLE value the plant must ensure their ability to perform the safety functions.

Nº 21
CNS-REF.-ART.: General
PAGE OF REPORT: 4
CHAPTER OF NAT. REPORT: 1.4.1

The Fukushima accident has shown that design and siting, especially the back-fitting of plants according to the state of the art of science and technology, are crucial topics. Is Argentina in favor of extending the scope of OSART missions from mainly operational issues to design and siting issues?
Argentina is taking into consideration this issue but has not reached any conclusion yet. However, in principle, It is considered that the international peer review of issues like design and siting would be beneficial for the NPPs´ safety around the world but, it needs to be consider that there are not overlapping with the scope of other peer reviews.

Nº 22
CNS-REF.-ART.: 6
PAGE OF REPORT: 26
CHAPTER OF NAT. REPORT: 3.6.4.1.4

This section states that: "The Regulatory Body, through its on-site inspectors, checks the fulfillment of the routine tests program, by witnessing the safety relevant tests, in order to verify that the results meet the corresponding acceptance criteria". What percentage of the overall planned tests does ARN directly witness and what is the process used by ARN to select tests to be witnessed?
Embalse NPP is a CANDU type unit, with design features that allows for partial testing of its systems. The systems' functionality can be tested by isolating small parts of such systems and performing a periodic test on each of those parts. As a consequence of this design philosophy, the periodic testing program is large, and encompasses various systems, including not only the safety systems or the safety-related systems, but also operating systems. The objective of the regulatory program of routine tests monitoring is to supervise the execution of a selected sample of those periodic tests (which are of regulatory interest), verifying not only the technical compliance with its acceptance criteria, but also extract conclusions regarding such aspects as the human performance of the test executing staff; the suitability, validity, and identify possibilities of improvements; perturbations introduced in the testing program due to pending preventive maintenance or unsolved corrective maintenance; adequacy of the documentation generated related to eventual deficiencies or deviations arisen during the testing procedures; etc.
In order to accomplish such objectives; the Regulatory Body, selects a representative sample of tests to witness them in a monthly basis, pertaining to safety systems and safety-related systems. Besides, the selected tests are changed monthly, to extend the coverage of the regulatory oversight to all the safety/safety related systems each six months.
In the CNA-I NPP case, which is a PHWR designed by KWU, the testing procedures encompass the systems as a whole, and depending on the actions to be tested, they must be executed in a determined plant operating state. Because of that, the periodic testing program is much smaller than in the CNE NPP, and the Regulatory Body sets its objective to witness 100% of the executed tests. On the other hand, in both NPPs, the compliance with the execution and acceptance criteria of all the tests pertaining to safety systems and safety-related systems is verified in another complementary stage of regulatory oversight, by auditing all the plants´ periodic testing programs.

Nº 23
CNS-REF.-ART.: 6

PAGE OF REPORT: 38/176
CHAPTER OF NAT. REPORT: -

In 2010, the Regulatory Body faced the need to license an innovative reactor design (CAREM reactor). For this purpose ARN defined an "ad hoc" licensing scheme based on the authorization of "non-routine practices". This licensing scheme envisages the following permits: Authorization for Use of Site and Construction, Authorization for Fueling, Authorization for Core Subcritical Testing, Authorization for initial criticality, Authorization for Zero Power Tests, Authorization for Power Increase and Authorization for Full Power Tests. The conditions and requirements for granting such authorizations were defined in a document approved by the ARN Board of Directors. The main difference with a conventional licensing process is given by the possibility to complete the plant design detailed information as it moves forward with its development. Please inform whether there are more differences between the "ad hoc" licensing scheme and the conventional licensing process.
The most important difference between the "ad hoc" licensing scheme and the conventional licensing process is the possibility to complete the plant design during construction.
The purpose of the "ad hoc" licensing process is to allow more flexibility in the development of the project even if there are information non relevant on safety implications that may be completed later, which also implies a much close regulatory oversight and assessment.
Resuming, in the standard licensing process the design must be fully consolidated and the engineering aspects must be included in the Preliminary Safety Analysis Report, whose approval by the RB is the condition to Issue the Construction License. If the construction is implemented according to the PSAR, and the commissioning process is satisfactory, the RB is in conditions to issue the Operating License.
In the CAREM Prototype licensing process, the PSAR is replaced by various documents, where the most relevant is the Design Report, which must be updated during construction including engineering consolidation and test results.
The Construction and the Commissioning Licenses are replaced by a set of partial permissions issued by the RB considering the results of the close regulatory oversight and assessment.

Nº 24
CNS-REF.-ART.: 6
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 1.4.1.3 / 3.6.5

The National Nuclear Safety Report list the action foreseen/taken to implement venting filtered containment system at CNA-I, CNA-II and CNE. Do requirements exist from the Regulatory Body in this respect? Can you give details e.g. on the strategy for operation, usability and retention factors.
Yes, the Regulatory Body has submitted to NPPs´ licensee the regulatory requirements asking for the implementation of venting filtered containment systems in CNA-I, CNA-II and CNE (by issuing the Regulatory Requirements RQ-CNAI-102/3.2 c; RQ-CNAII-045/3.3 and; RQ-CNE-097/3.3).
The filters specifications are in the design stage for CNA I and CNA-II NPPs (unique design).
In CNE the filters will be supplied by AREVA and the related details are:

- Operation Mode: Cyclic mode, with pressure values 300/200 kPa (absolute) for on/off the venting.
- Retention factors: > 99.999% for aerosols 1-2um.

Nº 25
CNS-REF.-ART.: 6
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.6.4.1.1 / 3.6.5.1 / 3.6.5.3

Will a NPP life time extension be granted for the 10 years Periodic Safety Review License renewal time interval or another period of time?
The NPPs Life extension is foreseen for a second complete operational period similar to the original life time.

One of the conditions established by the Operation License is to perform a Periodical Safety Review each ten years that must be approved by the RB to the license renewal for another ten years.

Nº 26
CNS-REF.-ART.: 6
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.6.4.1.3

The reduction of the time span between outages from 18 to 12 months for a NPP approaching the end of design life is a safety directed measure.
Yes, it is a regulatory requirement in order to evaluate the fitness for service of the critical components near the end of life, and to be replaced during refurbishment.

Nº 27
CNS-REF.-ART.: 6
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.6.4.1.4

The report states that the Regulatory Body checks the fulfilment of the periodic test program. Did the Regulatory Body already check the program as a whole at the accruement and is periodic checking of the composition and the content in place in addition to the checks of the fulfilment of this periodic test program?
Yes, the Regulatory Body also checks the periodic test program as a whole.

Nº 28
CNS-REF.-ART.: 6
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.6.4.2.1.2

The new Emergency Power Supply System (EPS) is modelled in the PSA. Can you provide results on the amount of improvements to CNA-I and CNA-II (e.g. core damage frequency) due to implementation of the new EPS? What will be the overall benefit after implementation of all safety improvements (e.g. large release frequency)?
The safety impact of the new EPS in CNA-I was performed in 2010 at an early stage of the project in order to inform ARN on this plant modification. The information available at that time was not enough to incorporate the system in the PSA model. However, among the conclusions of the analysis it was pointed out that the improvement in system´s reliability at demand and operation is estimated in almost an order of magnitude for the case of loss of off-site power (LOOP). This improvement takes into account redundancies (1 out of 3 instead of 2 out of three which is the present EPS system); the fact that emergency bars will be independent (now they are interconnected and failure in synchronization has an important weight) and physical separation which diminishes common cause failures in comparison with the existing EPS.
Considering the complete contribution of LOOP to core damage frequency (CDF), there is a reduction of around 60% for the LOOP´s contribution to CDF.
With respect to PSA event trees, an improvement for the initiating events loss of secured river water system, loss of both emergency electric bars and loss of one normal electric bar was identified. Currently the loss of both emergency electric bars contributes in 9.3% to the global CDF and this contribution will be eliminated with the new EPS.
An interconnection between CNA-I/CNA-II normal electric bars will be maintained manually activated. Among the improvements that are being analysed after Fukushima, it is considered that CNA-I´s EPS can be a backup for CNA-II through this interconnection. These measures are still under study, and up to now no calculations on their impact on global core damage frequency have been done.

Nº 29
CNS-REF.-ART.: 7.1
PAGE OF REPORT: 35
CHAPTER OF NAT. REPORT: 3.7.2.1

Would ARN comment on how much and to what extent existing regulatory (and technical) requirements have had to adapt in order to remain technology neutral in the face of CAREM and a currently technology neutral Fourth NPP?
Most of the Argentinean Regulatory Standards are based on performance and were already harmonized with the IAEA Standards. Until now, it was not necessary to adapt these standards in order to remain technology neutral.

Nº 30
CNS-REF.-ART.: 7.1
PAGE OF REPORT: 38
CHAPTER OF NAT. REPORT: 3.7.3.2.1

According to the report an ad hoc Commissioning Committee constituted by senior specialists that continuously evaluate the execution of the commissioning program and recommends its continuation, is appointed by the licensee. Please state the criteria pursuant to which the Commissioning Committee is chosen, especially with respect to independence.
The members of Ad hoc Commissioning Committee are selected by the Licensee taking into account their experience and knowledge. The Committee consists mainly in specialists belonging to CNA-II project as well as specialists belonging to utility. These specialists have more than 30 years of experience in different areas of CNA-I and CNE such as engineering, construction, commissioning, operation, quality assurance, nuclear safety and core design.
Although these highly specialized personnel are very experienced, sometimes it is required assistance from specialists of different areas. These specialists assist to the Committee meetings to explain details about different subjects.
The Committee evaluates all the steps performed during the commissioning for authorize to continue to the next step.
Proposed members to integrate the Committee as well as its functioning procedures have been informed to the Regulatory Body, which could ask for to add additional specialist in areas that considers as not covered.

Nº 31
CNS-REF.-ART.: 7.2.1
PAGE OF REPORT: 38/163
CHAPTER OF NAT. REPORT: -

In particular, the NPP's design must comply with the radiological criteria related to accidents (Regulatory Standard AR 3.1.3.). CNA-II is the first NPP where the licensing process is made applying the Regulatory Standard AR 3.1.3 that considers in a probabilistic balanced manner the plant safety profile as well as the deterministic criteria normally taken into account.
Are there any other additional radiological criteria like release and contamination of land area which ARN would apply for further projects?
At present the only probabilistic criterion in force is the established in the Regulatory Standard AR 3.1.3. The convenience of additional safety goals for further projects is being analysed at ARN.

Nº 32
CNS-REF.-ART.: 7.2.2
PAGE OF REPORT: 39-40
CHAPTER OF NAT. REPORT: 3.7.3.2.3

It is mentioned that ARN issues individual license and special authorization for the personnel to perform certain functions of NPP as per the organization chart.

1) **Kindly elaborate the various functions for which individual licenses are issued? Also, what are the minimum requirements necessary for the same.**
2) **Also provide the areas/work for which special authorizations are issued?**
3) **Special authorizations are issued for a period of two years. What is the procedure followed for the renewal of these authorizations?**

ARN issues two conceptually different kinds of complementary certificates for the personnel that carry out the needed duties to operate a NPP, which include decisions that can influence on the plant safety: the Individual License (IL) and the Specific Authorization (SA).
The IL is a certificate recognizing the technical and scientific capacity of an individual to perform a given function in a nuclear reactor. The IL is personally requested; it has no expiration date and by itself does not enable to exercise a specified function in a nuclear reactor.
The SA is a certificate recognizing the specific knowledge of a person, for perform a specific function in a given nuclear reactor. The SA must be requested by the Licensee for a person holding the corresponding IL, has a maximum validity term of two years and authorizes to exercise the function specified in the nuclear reactor requested.

1) The licensable functions for which ILs are issued includes plant manager; operational staff (shift chief and operators); radiological protection staff, engineering managers; maintenance managers; technical support managers; and nuclear safety managers. The necessary requirements for each one of the mentioned ILs are detailed in the plant's document "Missions and Functions Manual".
2) For the reasons mentioned before, the SAs are issued for the same positions indicated in 1 for the IL.
3) For the SA´s renewal it is required that the Licensee presents to ARN:
   a) A formal application for SA´s renewal.
   b) Certificate of psychological aptitudes.
   c) Certification of the NPP´s Licensee attesting the effective and proper performance of the specified function as well as the compliance and approval of the retraining program by the SA´s holder, which fulfilment is periodically controlled by ARN. In case that the SA´s holder would have not played effectively the specified function during the SA´s period of validity, the regulatory authority may require a review and/or a performance test to consider the corresponding renewal.

Nº 33
CNS-REF.-ART.: 7.2.2
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3

The Report states that Argentina employs a permit-granting system for the personnel where special permits are granted to the licensed personnel to do certain types of works at NPP along with granting individual licenses for performance of certain functions. Don't you think that duplication and excessive over-regulation appear to exist in this approach?
As were explained in section 3.7.3.2.3. (nuclear power plant personnel licensing), the Individual License (IL) and the Specific Authorization (SA), are two kinds of conceptually different and complementary authorizations which are required for holding a licensable position in a given NPP. In the Argentinean personnel licensing system, IL and SA are complementary authorizations which are required for holding a licensable position in a given NPP because the IL covers the level and quality of the personnel´s technical-scientific knowledge and the SA covers the corresponding specific qualification, the on-the-job-training and/or periodical re-training and the psychophysical aptitudes. This is mainly because to what, essentially, the IL is of theoretical character while the SA is of practical character.
The IL is a necessary but not a sufficient condition for holding a licensable position in a given NPP and is of permanent character (it means that do not need to be renewed). The SA is obtained after taking courses according to programs accepted by the ARN, on-the-job-training finalization and passing examinations overseen by its personnel. It has a maximum validity of two years and may be renewed after some conditions are met.
Therefore, there are not duplication and excessive over-regulation in granting both IL and SA for holding a licensable position in a given NPP.

Nº 34
CNS-REF.-ART.: 8.1
PAGE OF REPORT: 45
CHAPTER OF NAT. REPORT: -

The increase in personnel during the 2010 / 2013 period, mainly young professionals, is due mainly to the need to cover positions which have to be filled as specialised professionals

reach retirement age and also to cover the new tasks to be undertaken for the licensing of new nuclear projects in Argentina. Could you describe ARN's implementation of its knowledge-management program?
The KM program that has been developed until 2011 fulfilled the established goal of dealing with gap generation and risks of knowledge loss caused by the departure of experienced personnel and the need to transfer such expertise to younger generations through training activities, as well as the preservation of information and the historical regulatory knowledge. It means that, the KM program has permitted rescuing and retaining specific regulatory knowledge in the informed critical areas.
Therefore, ARN has decided to modify the strategy applied by including the KM program in the education and training activities, as a way to prioritize mainly the on the job training of the young professionals that have already been incorporated to ARN.

Nº 35
CNS-REF.-ART.: 9
PAGE OF REPORT: 59
CHAPTER OF NAT. REPORT: -

The report states that the responsibility for radiological and nuclear safety of small installations (low risk installations) is assigned to one person (generally the installation manager), and that the Regulatory Body requires that such a person should be duly qualified. The technical competence of the installation manager is without any doubt a very important pre-condition to assuming the responsibility of a nuclear installation. However, the report does not mention whether there is any (Energy) Act in Argentina that clearly stipulates to whom the prime responsibility for safety is assigned. Would you please provide information on this issue?
As was informed in the National Report, Act Nº 24,804 sets that the ARN is in charge of the regulation and surveillance of nuclear activities concerning radiological and nuclear safety, physical protection and safeguards. Article 16 of the mentioned Act authorized the ARN to issue Regulatory Standards concerning radiological and nuclear safety, physical protection and safeguards.
The Regulatory Standard, AR 10.1.1."Basis Standard on Radiological safety" divided the installations under regulatory control in three categories:

- Class I: Require more than one step for the licensing process (NPPs, Research Reactors, Critical Assemblies, etc.)
- Class II: Require only one licensing step (Operation License) and correspond to medical and industrial installations.
- Class III: Require only a Register, and correspond to diagnosis and research activities.

The AR-10.1.1 Standard establishes that the responsibility for the safety in all the installations (Class I, II and III) fall on the holder of the License, Practice Authorization or Register as appropriate.
The Holder of the License might delegate in all or partially, the execution of its duties on the safety of a Class I or II installation but remains in full its corresponding responsibilities

Nº 36
CNS-REF.-ART.: 9
PAGE OF REPORT: 59
CHAPTER OF NAT. REPORT: -

The report does not mention the responsibilities of the licensee holder with reference to the decommissioning of low risk installations? Who is responsible for the decommissioning of low risk installations? Would you please outline this issue?
The scope of the National Report only includes to NPPs, not small installations or low risk installations. On the contrary, the reference to these low risk installations in section 3.9.1 of Article 9 was aimed to a historical introduction which refers to the beginning of nuclear activity in Argentina when our country did not have NPPs.
In Argentina, the responsible for the decommissioning of low risk installations is the holder of the License, Practice Authorization or Register of such installations.

Nº 37
CNS-REF.-ART.: 10

PAGE OF REPORT: 67
CHAPTER OF NAT. REPORT: 3.10.2.7

The IAEA nuclear safety Action Plan (adopted by the BoG and unanimously endorsed by the GC) strongly encourages Member States to voluntarily host IAEA peer reviews on a regular basis. It recommended each Member State with NPPs to voluntarily host at least one IAEA OSART mission by 2014, with the initial focus on older NPPs. The last OSART mission was invited by Argentina in 1997 (Embalse NPP). When does Argentina plan to invite OSART missions?

The Argentine Nuclear Plan had had no significant progress for over twenty years, until in 2006 the Government decided to re-launch the nuclear and fuel cycle activities that were suspended, and simultaneously begin the development of new projects.

Such activities include the completion of the construction and the operation of CNA-II, the life extension of CNE, the feasibility study for CNA-I life extension; and the feasibility study for a Fourth NPP.

These activities have required a great amount of preparatory work by specialists in different areas, and they will continue requiring an extraordinary effort in the next few years. For that reason OSART missions have been not requested in this period. However, WANO Peer Review Missions in different areas have been performed at the NPPs and, in 2014 a WANO Corporate Peer Review is planned.

The consideration for requesting Peer Review Missions, whose importance and necessity is out of discussion in our country, shall take place as soon as an equilibrium be achieved, which allows due attention for such missions without affecting the licensee activities.

Nº 38
CNS-REF.-ART.: 10
PAGE OF REPORT: 65
CHAPTER OF NAT. REPORT: 3.10.2.2

It is stated that evaluation of the safety culture by licensee is included in the program for renewal of personnel Specific Authorizations. Could Argentina elaborate on how person specific safety culture is assessed? Is there any process of assessing organization level safety culture as well? If yes how these two are connected.

In 2011 NASA developed a Program for the Strengthening of the Safety Culture. This program is devoted to the NPPs, as well as to other groups and activities associated to them. It not only covers nuclear safety but also radiological safety and the industrial safety, including fire, environmental protection and emergencies. The activities timetable covers three years.

The program has the objective of linking safety culture (SC) and plant operation activities in a very practical /applied manner by using the measures of Eight Indicators, Self-Assessments and Surveys. For that purpose it defines stages to be applied within each of the involved issues. The way to evaluate results is through self-assessment and polls based on IAEA and WANO principles for the strengthening of the program and the development of safety indicators. Since 2007, four WANO's Technical Support Missions were carried out addressed mainly to the NPP´s operating personnel and the corporate safety culture.

A program´s evaluation is in use in each NPP, to verify whether the facts and personnel activities coincide with high management's expectations, the WANO Principles (WANO GL 2006-02) and the characteristics and attributes of the IAEA GS-G-3.5. Along the development of the plan there are evaluation meetings with high management participation to verify the program evolution and define courses of action.

Furthermore, the training programs for personnel´s specific authorization (SA) includes the above mentioned topics and, ARN verify during the exams carried out to initially issue a SA as well as for SA's renewal of the plant involved personnel. In addition, ARN periodically carries out the following evaluations:

- Plant personnel SC attitudes during inspections / audits;
- Trends in event reports, corrective action effectiveness and measures implemented to prevent safety related troubles and; safety performance indicators

Nº 39
CNS-REF.-ART.: 10
PAGE OF REPORT: 65
CHAPTER OF NAT. REPORT:

How is Safety Culture defiend within ARN and NA-SA?
The definition of Safety Culture (SC) applied by ARN and NASA is aligned with the IAEA´s corresponding concept. Therefore, ARN and NASA adopt the definition by considering SC as “that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance”. As was informed in the National Report, ARN continuously is carrying out an assessment and oversight of the NASA's SC. In this sense, these activities are addressed to consider latent conditions that could lead to potential safety performance degradation at NPPs. In NASA, the way to evaluate results is through self-assessment and polls based on WANO Principles (WANO GL 2006-02) and IAEA GS-G-3.5.

Nº 40
CNS-REF.-ART.: 10
PAGE OF REPORT: 65
CHAPTER OF NAT. REPORT: -

In assessments: does the licensee evaluate the influence of organizational factors as the root cause of events or is this only evaluated by ARN-analysts?
The Licensee also evaluates relevant /minor events, considering the influence of organisational factors as one of the root causes of such events

Nº 41
CNS-REF.-ART.: 10
PAGE OF REPORT: 64
CHAPTER OF NAT. REPORT: 3.10.1

The reports states that the regulatory system complies with the concept of Safety Culture. Would you please outline the understanding of your concept of safety culture?
The definition of Safety Culture (SC) applied by ARN is aligned with the IAEA´s corresponding concept. Therefore, ARN adopts the definition by considering SC as “that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance”.

Nº 42
CNS-REF.-ART.: 11.1
PAGE OF REPORT: 71
CHAPTER OF NAT. REPORT: Table 3.11.1

Can Argentina provide the reasons for reduction in plant load factor of NPPs in years 2011 & 2012 as compared to 2010?
Since January 2011, a decision was taken to reduce power in Embalse NPP to about 83%FP, except in periods of very high demand. The reason for this decision was to allow the plant operation considering the pressure tubes service life, reaching the beginning of the plant refurbishment activities.

Nº 43
CNS-REF.-ART.: 11.2
PAGE OF REPORT: 71
CHAPTER OF NAT. REPORT: -

Is there any regulation regarding the accepted ratio between own personnel (employed by the licensee) and contractors during normal operations and during a "standard" outage?
There are not regulations regarding to a ratio between the licensee´s personnel and the contractors during normal operation and a "standard" outage.

Nº 44
CNS-REF.-ART.: 12
PAGE OF REPORT: 74
CHAPTER OF NAT. REPORT: 3.12

The report describes the use of human reliability analysis in conjunction with PSA, and also describes human performance program elements. Can Argentina elaborate on implementation of its human factors engineering program?
Details on the implementation of the Human Factors Engineering Program are shown in Article 12 "Human Factors" of the Argentine National Report.

Nº 45
CNS-REF.-ART.: 12
PAGE OF REPORT: 74
CHAPTER OF NAT. REPORT: -

Which competencies are used to carry out investigations of root causes on occurred events? And what methods are applied?
The analysts who carry out investigation of root causes are experts in the event analysis, by using among others issues, knowledge of systems / components; follow up of event sequences and groups brainstorming. The more applied methods are those related with HPES (Human Performance Evaluation / Enhancement System) and the WANO root cause methodology.

Nº 46
CNS-REF.-ART.: 12
PAGE OF REPORT: 80
CHAPTER OF NAT. REPORT: -

Does the HRA include evaluation of manual operations outside the control room?
The HRA of manual operations outside the main control room is included in the PSA. In general PSA studies implemented in Argentinian NPPs include HRA based on identification of the human actions specified in the document IAEA-Safety Series 50-P-10 "Human Reliability Analysis in Probabilistic Safety Assessment for Nuclear Power Plants". In this sense, the typical HA considered are:

- Category A (pre-initiators) including maintenance, test, calibration, realignment and restoration during normal operation.
- Category C (post-initiators). These human actions were mainly incorporated as "human headings" in the event trees. They could be operator diagnosis, operator actions and recovery actions in some specifics cases.

In this context, mostly of manual operations outside the control room considered are included in the Category A. On the contrary, most of the Category C is related to operator actions carried out inside control room. Only some of them may require some specific support task outside the control room.
Besides HRA is used to identify deficiencies in the operator actions, including manual operations outside the control room, and providing whatever is needed to analyse and perform possible corrective actions.

Nº 47
CNS-REF.-ART.: 12
PAGE OF REPORT: 80
CHAPTER OF NAT. REPORT: -

Has any HRA been carried out for CNA-II?
The HRA performed for CNA II has been based on the identification of the following types of human actions already included in the PSA L1, as recomended in the document IAEA-Safety Series 50-P-10 "Human Reliability Analysis in Probabilistic Safety Assessment for Nuclear Power Plants:

- Category A (pre-initiators) including maintenance, test, calibration, realignment and restoration during normal operation. The related human errors were identified and included in the fault trees of the systems that conforms the event trees headings.
- Category B (initiators): Explicit identification has not been done for those initiating events (IE) whose frequency was estimated from generic data or operational experience of a similar plant

(CNAI). It is assumed that the human contribution to these IE is included in the data. IE for which the frequency of occurrence has been estimated using simplified fault trees, included the human actions of Category A.

- Category C (post-initiators): The human actions evaluated were restricted to actions of type 1 included in procedural safety actions that were identified through the deterministic studies from event sequence evaluation and event tree construction. These human actions were mainly incorporated as “human headings” in the event trees.
- Category C, type 1: post-initiator actions were identified based on preliminary information available about abnormal/emergency procedures and specific deterministic studies made for event sequence evaluation and event tree construction. The human actions, generic HEPs corresponding to the response of the operating team to an abnormal event were estimated using methodology from NUREG/CR-4772. The maximum allowable time available for diagnosis and the “compelling annunciation time” were obtained from specific deterministic studies. The execution times were estimated following NUREG/CR-4772 guidelines. They were basically included as headings (basic events) in the event trees.
- Category C, type 2 (actions aggravating the accident sequences): are out of scope for current version of PSA-L1.
- Category C, type 3 (improvising recovery/repairs): are out of scope for current version of PSA-L1.

The methodology of analysis and data was selected from documents NUREG/CR-1728 “Handbook of Human Reliability Analysis with Emphasis on NPPs Applications” – THERP and NUREG/CR-4772 “Accident Sequence Evaluation Program – Human Reliability Analysis Procedure” ASEP –HRA, USNRC, 1987. For Category C, type 1 the dependencies were included in the corresponding human heading.

The task has not been separated into diagnosis and post-diagnosis actions. A single basic event is applied representing the whole task, which corresponds to the operator team diagnosis failure or/and post-diagnosis task failure.

Preventive accident management actions related to the recovery of offsite electrical power supply were identified as relevant to reduce the contribution of scenarios of station blackout to global core damage frequency. The corresponding emergency operating procedures were developed. The associated human reliability analysis for these actions was also performed according to NUREG/CR-4772.

Nº 48
CNS-REF.-ART.: 14.1
PAGE OF REPORT: 95-96
CHAPTER OF NAT. REPORT: 3.14.2.2.5

It is mentioned in the report that "Water-lancing of the hot leg side of TSP, in order to clean “broached holes” and normalize secondary side flow." Can you please clarify that this lancing operation was undertaken as a part of regular maintenance programme or it was a special operation undertaken to address the performance of SGs?

Water lancing of the SGs is a special task to improve the SG´s performance. This is not included in the regular maintenance program and is a special operation to address the SGs´ performance.

Nº 49
CNS-REF.-ART.: 14.1
PAGE OF REPORT: 94
CHAPTER OF NAT. REPORT: 3.14.2.2.3

What were the effect on reactor power, flux distribution and fuel power limitations during operating the reactor with empty fuel channels and flow restrictors?

The main effects of operating the reactor with empty fuel channels and the corresponding flow restrictors, results in a very slight deformation in the flow distribution.

The reduction in the number of channels with fuel produces an increase in the radial and in the total form factors, which may increase the channel´s powers or the bundle´s (axial) powers, keeping constant the reactor power. In order to get local power margins similar to a nominal full power condition, a small derating might be required. Due to a small fraction of channels was defueled, the derating was around 3 % and, hence the plant is self-imposed to limiting the maximum operating power to 97% FP, for getting a reasonable margin in the channel powers and the bundle powers. After the plant start-up, following the channels defueling, the spatial control action of the liquid zone

controllers tend to reduce their zone controllers levels, maintaining the global power distribution as close as possible to the nominal condition. In addition to the above mentioned, a fuel management strategy is adjusted to have an average fuel burn-up in the region slightly smaller than the corresponding to nominal condition. Due to this, the average levels of the liquid zone controllers returns to the set ranges

Nº 50
CNS-REF.-ART.: 14.1
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.14.3.1.1.2

Extension of the batteries availability: Is load reduction the only method to extend? What results (extension of availability) are expected from that measure?
Currently the extension of the batteries availability is carried out by reducing loads. Additionally, as it is mentioned in the National Report, this improvement will be supported by incorporating mobile diesel generators (MDG) at CNA-I, CNA-II and CNE, as well as the suitable electrical connections from outside these plants to connect these MDGs to the battery chargers, to extend the power from the batteries in SBO occurrence case. In qualitative terms it can provide increased availability, which will be dependent on demand.

Nº 51
CNS-REF.-ART.: 14.1
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.14.3.1.1.3

Are there plans for installing alternative cooling systems, independent from the SG? If not please explain why not.
The alternative water sources for the Argentinean NPPS in case of severe accidents are detailed in the Section 3.14.3.1.1.3 “Loss of heat sinks”, then, our interpretation of the question is that it refers to the total loss of heat sinks. In that case it is foreseen to implement the following alternative cooling systems independent from the SGs:

- CNA I: RPV cooling from the external side.
- CNA II: RPV cooling from the external side.
- CNE: Provide a water supply line to the calandria/calandria vault from outside the reactor building.

Nº 52
CNS-REF.-ART.: 14.1
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.14.3.1.2.1

Venting filtered containment system. In other countries the filtered venting system is installed as a defence in depth measure. What is the reasoning behind not having this in Argentina?
The original design of the Argentinean PHWRs' Atucha-I and Atucha-II (German design) and Embalse (Canadian design) has not included a venting filtered containment system. However, the implementation of a venting filtered containment system in each NPP is one of the improvements under development as is detailed in different Sections of the National Report.

Nº 53
CNS-REF.-ART.: 14.1
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.14.3.2.1

Is it correct that CNA-I only has PSA Level 1? What are the further steps to develop PSA Level 2?
At present, CNA-I is working on deterministic studies for severe accident progression which are necessaries to develop PSA L2, that will be established as a regulatory condition in case of life extension.

Nº 54
CNS-REF.-ART.: 14.1
PAGE OF REPORT: 106
CHAPTER OF NAT. REPORT: -

As a consequence of the Fukushima accident and with the purpose of apply the corresponding lessons learned, ARN requested perform a stress test to each Argentinean NPP (See Annex VIII) consisting in a reassessment of the NPPs safety margins assuming the occurrence of a sequential loss of the lines of defence in depth caused by severe accidents. Does this reassessment contain the single failure criteria and conservative assumptions?
The stress tests were focused on the measures to be taken after the loss of safety functions due to accidents within and beyond the design basis. Besides, the assumptions relating to the operation of the systems involved in such loss of safety functions were re-assessed considering the single failure criteria and conservative assumptions.

Nº 55
CNS-REF.-ART.: 14.1
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 14.3.3

The safety factors reviewed as part of the periodic safety review for Atucha-I and Embalse differ. Although there are design differences between the two units, it is not clear why both units wouldn't evaluate similar elements of the design (e.g., hazard analysis, severe accident management) as part of the periodic safety review. Please clarify the reasons for why certain aspects of the design/operation aren't evaluated for both units as part of the periodic safety review.
As was explained in the National Report, the situation related the PSRs of CNA-I and CNE are clearly different.
The scope of CNE´s PSR was defined in order to detect the improvements that are necessary for its life extension, most of which will be implemented during the refurbishment outage.
CNA-I´s PSR is a condition required to renew the Operating License for next four years, until the end of service life be reached. If NASA decides to extend the plant life, a more exhaustive PSR must be performed. In particular, the studies of the existing conditions of the SSCs must be extended, according to a specific methodology that is being implemented.

Nº 56
CNS-REF.-ART.: 7 AND 14.3.3
PAGE OF REPORT: 34 AND 120
CHAPTER OF NAT. REPORT:

Please clarify the expiration date for the license for Atucha-I. From Articles 7 and 14, it appears that the current license for Atucha-I was issued in December 2003 and should have a validity period of 10 years; however, there did not appear to be any significant discussion about the review of a renewed license for Atucha-I.
The CNA-I License was issued in December 2003 and should have a validity period of 10 years. After a Periodic Safety Review performed by the Licensee and approved by the Regulatory Body, a new operation period was authorized.

Nº 57
CNS-REF.-ART.: 14.2
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.14.3.2.1

The Netherlands has good experience with IAEA IPSART missions to stimulate further development of PSA. Does Argentina also use this service? If yes, when? If not, why not? Can you elaborate on that?
At the beginning of the PSA capabilities development in Argentina, different specialists were received to train ARN and the Licensee personnel. Such advise was on fault and event trees developments, human factors, data treatment, codes uses, etc.
Besides, an Argentinean specialist participated in the development of the PSAPACK Code in the IAEA headquarters.
Currently, specialists from Argentina actively participate in PSA forums like the one in the frame of the CANDU Senior Regulators, devoted to PSA applications for this specific technology, and the results presented of the Argentinean NPPs PSA results, fit with the international standards.
Specialists from various recognized institutions like GRS-Germany, SANDIA NL-USA, CANDU Energy-Canada, and CNEA-Argentina, are acting as experts in the development and review of the PSA´s Levels 1, 2 and 3.
This environment of collaboration among Argentinean and foreign experts was fruitful and enough for PSA methodologies application.

Nº 58
CNS-REF.-ART.: 14.2
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.14.3.3

What criteria or calculation are used by ARN to determine or accept that a certain weakness does not have to be improved, because it is not compatible with the remaining plants' life period?
Each weakness is analysed in terms of its safety relevance and the possible solutions or improvements taking into account the feasibility, cost, radiological consequence, and time remaining up to EOL. Before take a regulatory decision, all these aspects are discussed with the licensee.

Nº 59
CNS-REF.-ART.: 14.2
PAGE OF REPORT: 117
CHAPTER OF NAT. REPORT: -

According to the national report it seems as if only PSA Level 1 is required? Is there any requirements (in place or planned) for Level 2 and 3?
CNA-I and CNE were commissioned before the AR 3.1.3. Regulatory Standard was issued. Then, only a full PSA Level I was required. Nevertheless, for life extension, one of the regulatory conditions is to perform a full PSA Level 2, and a conceptual PSA Level 3. Concerning new NPPs, like CNA-II and CAREM-25, the compliance of the AR. 3.1.3. Is required, that means the perform of a full PSA Levels 1 and 2, and a partial Level 3 (only public doses calculations, without economic and social consequences).

Nº 60
CNS-REF.-ART.: 15
PAGE OF REPORT: 123
CHAPTER OF NAT. REPORT: 3.15

In consideration of the numerous radiation protection lessons learned from the Fukushima accident for the nuclear industry, can Argentina elaborate on the initiatives taken to incorporate these lessons?
The details on the consideration of the radiation protection lessons learned from the Fukushima Accident are detailed in the Section 3.16.2.9 "Improvements Concerning Emergency Preparedness in the NPPs" of the Argentine National Report.

Nº 61
CNS-REF.-ART.: 15
PAGE OF REPORT: 125
CHAPTER OF NAT. REPORT: 3.15.3.1 / Table 3.15.4

The release of aerosols from CNE to the environment as gaseous discharges was in 2011 about two magnitudes larger compared to the release in 2010. Please comment on the reason for this.
The difference between reported values was due to a record error in January 2011 weekly discharge of Ag-110m. The correction was made in Operator´s records and the right value is 1.48 x 10-3 TBq.

Nº 62
CNS-REF.-ART.: 15
PAGE OF REPORT: 126
CHAPTER OF NAT. REPORT: 3.15.4.1

The Regulatory Standard AR 10.1.1 establishes that the dose limits have not been exceeded when given equations are fulfilled.
In these equations:

- **Hp (d) is the personnel equivalent dose at a depth of 0.07 mm and 3 mm (for skin and crystalline respectively), integrated in a year.**
- **LDT is the limit of equivalent dose in skin or the lens of the eye.**
- **Hp (10) is the personnel equivalent dose at a depth of 10 mm from the skin surface integrated in one year.**
- **Ij is the incorporation value of nuclide j during a year**
- **IL,j is the annual intake limit for nuclide j, resulting from the division of 20 mSv by the dosimetric factor of effective dose commitment for workers, per unit incorporation of the mentioned radionuclide.**

What is the value for the limit of equivalent dose to the skin and the lens, which is described with LDT?
The Regulatory Standard AR 10.1.1 establishes that the limit of equivalent dose to the skin is 500 mSv per year; meanwhile the limit dose for the lens is 150 mSv per year.

Nº 63
CNS-REF.-ART.: 15
PAGE OF REPORT: 124
CHAPTER OF NAT. REPORT: -

In assessing the radiation doses to the public living close to the nuclear power plants, how were the critical groups identified?
In Argentina, the characterization of the representative person (RP) (former critical group) adopted by ARN considers three aspects:
1) Geographical location: Site specific information is used for the geographical location of the RP. This information includes the population distribution around the NPP and the dispersion conditions in the site (discharge point characteristics, meteorological data and conditions of the surface water receptor body) for identifying the place with maximum radioactivity concentration. For retrospective assessments, the location is selected in the inhabited place, also with maximum radioactivity concentration.
2) Composition: For retrospective assessments, and in a simplified deterministic approach, a single age group is considered as adults. This way, the selection of a stable “reference group” allows the evaluation of trends in population doses due to annual releases.
3) Data on habits and exposure pathways: The data of habits and consumption rates for the critical pathways considered, are selected with a deterministic approach based on site specific information and international publications. Local food production is assumed to occur where the radioactivity concentration in those foods is expected to be the greatest.

Nº 64
CNS-REF.-ART.: 15
PAGE OF REPORT: 123
CHAPTER OF NAT. REPORT: 3.15.1

Monitoring issues:
1) Are the licensees in Argentina required to monitor the external dose rate off-site?

2) Do the authorities in Argentina have a system to independently monitor the external radiation dose rate near the NPP-sites?
3) The licensees have their own surveillance plan for monitoring discharges to the environment. Is ARN assessing this system by testing and inspecting the monitoring program of the licensees?
1) The licensees are required to perform an environmental monitoring in the surroundings of its facilities. This monitoring includes external dose rate off-site.
2) The Regulatory Authority has an independent system to verify the external radiation dose rate near the NPP sites.
3) The Regulatory Body performs independent audits of declared discharges made by the operator and an environmental monitoring in the surroundings of the facilities, which include measurements of activity in samples of water, sediment, vegetable, fish and milk, as well as other samples of the surrounding biosphere.

Nº 65
CNS-REF.-ART.: 15
PAGE OF REPORT: 124 / 125
CHAPTER OF NAT. REPORT: 3.15.2 / 3.15.3

1) Detailed information on the environmental releases is given. How can they be compared with the licensed amounts?
2) What are the doses by external radiation?
1) The releases are well below (under 10%) the authorized values for each radionuclide of gaseous and liquid discharges. The important parameter to be considered in the NPPs is that the dose estimated from the average discharges is in the 1 to 11 micro Sv/year range.
2) In our NPPs, the main contributor (more than 60%) to the dose from gaseous discharges is H-3 and mostly is by ingestion pathway. At CNE, the external dose contribution is about 30% of the total dose, meanwhile at CNA-I this contribution is about 20%.
In the case of liquid discharges, in CNE, around 40% of the total dose is due to sediments and at CNAI the contribution of external dose (by sediments) is about 65%.

Nº 66
CNS-REF.-ART.: 15
PAGE OF REPORT: 127
CHAPTER OF NAT. REPORT: 3.15.4

Do the Argentinean NPPs use dose constraints for occupational exposure to optimize the occupational dose to individuals?
Occupational dose constraints are used as boundary conditions to optimization at the stage of operations planning.
While ARN´s regulatory standards stipulate dose constraint values in the case of effluent discharges of NPPs, only Article 103 of the Standard AR 10.1.1 provides that the Regulatory Authority may impose dose constraints for occupational exposure in authorization of routine practices or the Operating License, in cases it deems appropriate.
Moreover, the operator uses occupational dose constraint values defined in case by case basis for operational planning of relevant activities, for instance during the scheduled annual maintenance shutdown. During the development of these tasks, ALARA meetings are carried out for verification of compliance with the dose schedule.

Nº 67
CNS-REF.-ART.: 15
PAGE OF REPORT: 127-130
CHAPTER OF NAT. REPORT: 3.15.5 / ALARA ACTIVITIES

Is cleaning of the primary system a reasonable option at the CNA-I NPP?
During the years 1995/1996, the possibility of a chemical cleaning to the primary and moderator systems of CNA-I (in order to lower the radiation fields) was analysed, but the large number of spent resins generated during cleaning made this project unviable. Beginning in 2006, the possibility to study the zinc´s dosage to the Primary/moderator system to lower the radiation fields was considered. This project was completed, being considered a reasonable option and it was put last year into effect.

Nº 68
CNS-REF.-ART.: 15
PAGE OF REPORT: 123
CHAPTER OF NAT. REPORT: -

Do the regulatory body have any requirements for the licencees to demonstrate the function and efficiency on release measurements equipment and release limiting systems?
ARN regularly performs on-site campaigns for independent verification of discharges at NPPs in order to validate the values reported by the licensee, and also performs periodic audits and benchmarks to verify the equipment and calculations quality and accuracy.

Nº 69
CNS-REF.-ART.: 15
PAGE OF REPORT: 123
CHAPTER OF NAT. REPORT: -

According to Table 3.15.1 I-131 is a factor of 10 higher 2012 vs 2010, what is the reason for this?
The increase in the releases of I-131 in 2012 vs. 2010 is related to the occurrence of small failures in the fuel cladding. In 2010, there were four failed fuel elements, while no failed fuel elements were found in the years 2011 and 2012.

Nº 70
CNS-REF.-ART.: 15
PAGE OF REPORT: 123
CHAPTER OF NAT. REPORT: -

How often are the licensees required to report data from their surveillance plan?
ARN requires to the licensees to report data every three months.

Nº 71
CNS-REF.-ART.: 15
PAGE OF REPORT: 123
CHAPTER OF NAT. REPORT: -

Is the licensee required to demonstrate the application of BAT (Best Available Technology) on the efficiency and function of release limiting-systems?
The BAT (Best Available Technology) is not explicitly referred to in the ARN normative and its application is not mandatory by the licensee. However, it is considered an important tool to be used along with other complementary techniques (e.g. cost-benefit analysis) for the demonstration of compliance with ALARA, primarily in the design stage of the facility.

Nº 72
CNS-REF.-ART.: 15
PAGE OF REPORT: 127
CHAPTER OF NAT. REPORT: -

Are monitored personel who does not receive a detectable dose included in the calculations of average effective dose?
Yes, for the assessment of average effective dose all workers authorized for entry into the controlled area (radiological controlled area) are included, as well as to workers who have received less than the detection limit dose.

Nº 73
CNS-REF.-ART.: 15

PAGE OF REPORT: 127
CHAPTER OF NAT. REPORT: -

How is the ALARA-principle considered during the design phase?
During the design phase, the licensee must demonstrate, since the Preliminary Safety Report, that the radiation protection is optimized. For instance, in the case of public exposure, it must be demonstrate that the doses due to discharges of radioactive effluents proposals are as low as reasonably achievable according to the Regulatory Standard AR 10.1.1.
In demonstrating compliance with ALARA the licensee can use all available tools, quantitative and qualitative analyses and complementary techniques such as BAT (Best Available Technology), etc., to demonstrate that the NPPs' design satisfy the safety principles, assuring that doses within the installation or exposure due planned radioactive release are kept below the dose limits and kept as low as reasonably achievable.
The experience of previous projects allow apply the ALARA principle during the design stage based on the compilation of generic information, in particular occupational doses and environmental monitoring as reference values.
Relevant issues have been identified for design, such as the selection of materials, avoiding as much as possible the presence of cobalt and antimony in the primary circuit and in the reactor internals, to reduce the crud build up.
It have also been identified operational, inspection and maintenance tasks in areas of potential high doses, so reducing as much as possible occupational exposure by using shields, suitable room's dimensions, designing interventions with shorter exposure time, use of special tools for remote operations or remote inspection and maintenance (e.g. SG´s inspection), control and containment of sectors and robotic solutions.

Nº 74
CNS-REF.-ART.: 15
PAGE OF REPORT:
CHAPTER OF NAT. REPORT: N.A

The liquid radioactive releases without tritium to the environment by CNA-I and CNE are relatively high (e.g. 2,7 E-1 TBq for other radionuclides by CNA-I in 2012). Also the 10 micro-Sv-criterion is broken in 2012 by CNE for the critical group due to the liquid discharges. Does the supervisory authority plan to order measures, that the operators reduce the liquid radioactive releases?
When a relatively high discharge occurs, ARN requests the corresponding explanation about its causes and foreseen corrective actions, as in this case occurred. Specifically in 2012, in CNE, a relatively high tritium discharge in the liquid effluent occurred due to a heavy water loss caused by an extraordinary washed of resin tanks.
At CNA-I, more than 80% of the "other radionuclides" present in liquid discharges in 2012 corresponded to Co-60, Cs-137 and Sb´s isotopes which have represented a dose of only 0.6 µSv.

Nº 75
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 143
CHAPTER OF NAT. REPORT: 3.16.3.2

Argentina has signed agreements with Chile, Bolivia, Uruguay and Brazil on trans-boundary release in emergencies. Does Argentina conduct nuclear emergency preparedness exercises with these neighbouring states?
Argentina has participated as observer in emergency drills performed in Brazil´s NPPs and has received, in the same way, specialists from Brazil and Uruguay in emergency drills made in Argentina.

Nº 76
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 133/141
CHAPTER OF NAT. REPORT: 3.16.2.2

The report mentions that "Iodine Prophylaxis: distribution of stable iodine pills to the involved people must be implemented"; however, it is not clear if this is a requirement for pre-

distribution prior to an emergency or only a requirement to provide it after an emergency has occurred. Can Argentina elaborate on this issue?
Stable Iodine pills are previously located at the NPP and the surrounding municipalities within a 10 km radius. Once the emergency has been declared (green alert), National Gendarmerie, under the order of the emergency Authority, distributes them through its personnel set at the NPP´s site, in the Precautory Action Zone and the Urgent Protective Zone.

Nº 77
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 133
CHAPTER OF NAT. REPORT: 3.16.2.2

Iodine prophylaxis by distribution of stable iodine pills to the involved people must be implemented in the Precautionary Action Zone (PAZ). What is the strategy for distribution of the iodine tablets in the Precautionary Action Zone (PAZ) and Urgent Protective Zone (UPZ)? Are they already pre-distributed in advance?
Stable Iodine pills are previously located at the NPP and the surrounding municipalities within a 10 km radius. Once the emergency has been declared (green alert), National Gendarmerie, under the order of the emergency Authority, distributes them through its personnel set at the NPP´s site, in the Precautory Action Zone and the Urgent Protective Zone.

Nº 78
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 133
CHAPTER OF NAT. REPORT: 3.16.2.2

It is stated that the environmental monitoring starts once the radioactive material release has ended. The environmental monitoring results are used to define an Urgent Protective Zone (UPZ). To define the UPZ after the end of the release seems to be contradicting to iodine prophylaxis which is foreseen in this zone, since this measure is most effective shortly before the release. Is there a time limit to define the zone?
Due to the urgent need for distribution of iodine pills at NPP´s surroundings, there is a previously demarcated UPZ that covers up to 10 km. After the passage of the plume, radiological monitoring will allow to enlarge this zone and to apply, if needed, other protection actions as evacuation, food restriction, etc.

Nº 79
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 133
CHAPTER OF NAT. REPORT: 3.16.2.2
It is stated that values for the resettlement evacuation zones were calculated in the 80's and are currently being reviewed. Are there new findings concerning this topic?
At present, IAEA recommendations (G-S-G-2 and EPR-NPP Public Protective Action, 2013) are being analysed to be applied on our planning to face nuclear and radiological situations.

Nº 80
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 138
CHAPTER OF NAT. REPORT: 3.16.2.9.1

Concerning SAMGs. How far is the implementation of revision of SAMGs in the light of the Fukushima Daiichi accident?
In relation with CNA-I, the development of a procedural framework with the general information about the way that SAMGs guidelines must be improved using the Fukushima experience, is under revision process by ARN.
In relation with CNE, the existing SAMGs are being re-evaluated and adapted to the plant improvements due to refurbishment (see section 3.14.3.1.2.3.). Furthermore, the licensee will participate in a Joint Project from COG (CANDU Owners Group) about updating severe accident guidelines that include lessons learned from the Fukushima accident.

Nº 81
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 142
CHAPTER OF NAT. REPORT: 3.16.2.10
From the report it is not clear if the on-site response organisations are conducting exercises dealing with a nuclear emergency (classification, source-term estimation, advising on emergency measures etc)? Can you elaborate on this topic?
An internal Emergency Plan application exercise is made every year by a requirement of the Operating License. During this exercise, different scenarios are practiced, such as: emergency classification, source term estimate, measures to adopt according to emergency situation development, evacuation of non-essential staff, etc. Also emergency management items are included in the annual operators training program.

Nº 82
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 132
CHAPTER OF NAT. REPORT: 3.16.2.1

"The Nuclear Emergency Response System SIEN coordinates the national, provincial and local response organizations within a 10 km radius around each NPP to effectively manage nuclear emergencies in preparedness, intervention and recovery stages. Since a severe accident may have consequences for an area beyond the range of the PAZ, it is not clear who is responsible for the emergency preparedness and the emergency management in the UPZ." How is the emergency preparedness organized beyond the radius of 10 km around the NPP?
ARN is an organization with federal jurisdiction, therefore, any emergency out of the 10 Km area continues being under ARN's responsibility, by coordinating the response with other organizations as Civil Defence, Security Forces, Firefighters, etc. This is described in the national, governmental and municipal emergency plans.

Nº 83
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 133
CHAPTER OF NAT. REPORT: 3.16.2.2

The report states that for the iodine prophylaxis a distribution of tablets is intended in case of a nuclear accident. What is the assumed time needed for the distribution of iodine tablets to the people within the PAZ and the UPZ?
The time devoted to pills distribution at PAZ and UPZ is of approximately 2 to 3 hours, as was verified during the application of the NPPs´ Emergency Plan Exercises.

Nº 84
CNS-REF.-ART.: 16.1
PAGE OF REPORT: 138
CHAPTER OF NAT. REPORT: 3.16.2.8

For the foreseen point-to-point satellite connection with the NPPs, what kind of system will be installed (mobile or stationary solution), and what is the designed bandwidth?
The point-to-point satellite connection between the NPPs and ARN is through a mobile satellite communication system with a bandwidth of 250 Kbytes. The NPPs and ARN already have these devices and they are tested at the drill of each Emergency Plan.

Nº 85
CNS-REF.-ART.: 16.2
PAGE OF REPORT: 132
CHAPTER OF NAT. REPORT: -

“During the accident occurred on 11th March 2011 at Fukushima, Japan, the ARN´s SIEN made a daily tracing of the actions taken by the manager responsible of the emergency response. This circumstance allows making tests and desktop exercises to compare the actions taken in

Fukushima with the eventual actions that would be carried out in Argentina on a similar situation." This approach used by the emergency response organisation seems to be potentially a very useful way of considering its own response to a very challenging scenario.
Have the results of this 'tracing' been used as yet in any training or exercises? And if so, what changes has it brought about in the national emergency plans? Have other organisations in Argentina, such as the Regulatory Body or licensees, used the outputs from the tracing also?
The ARN´s Emergency Control Centre group used the results of the releases during Fukushima accident to validate the source term appraisal methodology on hypothetical accidents at the Argentinean NPPs. Moreover, this methodology was applied as an exercise to train radiological protection specialists of Argentina and other countries. The results are being used to refine the prompt response and the evaluation and prediction capabilities.
As was said throughout in the National Report, many actions were taken or are ongoing in Argentinean´s NPPs. With respect to emergency planning after the individual revision in each NPP, it was decided to perform a bench mark gathering the experts from both sites Atucha (CNA-I; CNA-II and CAREM) and Embalse (CNE) in order to:

- Identify common actions that need to be taken;
- Find the gaps between present practices, the corresponding ARN requirements, as well as the WANO recommendations;
- Elaborate an action plan for improving this area to be presented to NASA high management.

The analysed topics were: types of emergencies, equipment, human resources and organization, tools for dose calculation and measurement instruments, documentation update and, severe accident management, among others. In accordance with international standards the need of integrating a support group in the main activities was identified. A specific scheme for its functioning is under analysis.

Nº 86
CNS-REF.-ART.: 16.2
PAGE OF REPORT: 141
CHAPTER OF NAT. REPORT: -

The very active public participation and education programme around the nuclear power plants is to be commended. What has been the experience to date in initiating and maintaining this programme? Has it been easy to maintain the local population's interest in these outreach programmes?
Although it has not been easy to maintain this training and dissemination programme, the experience has been good. This programme has required trained staff, time and resources.
Since the beginning of its activity, the communities located in the NPP´s influenced areas were identified as one of its key publics of interest. In this sense, actions were performed that cover the transfer of tangible and intangible active resources, as well as the proactive support to ventures and institutions in areas near the plants, with the goal of generating conditions of development and wellbeing of its inhabitants.
The objective of this program is to reinforce the dialogue mechanism with the community, in order to generate mutual knowledge spaces and share thematic agendas of common interest.
In this program the following actions stand out:

- Live radio programs (encompassing the areas near to NPP): This is mainly oriented to provide information regarding the NPPs, management of the company and the nuclear industry in general. In 2013, 31 radio programs have been performed in the Atucha site zone and 30 in Embalse.
- Emergency Plan speeches in the NPPs influence zones: This action is performed as part of the annual training to teachers, students and community in general regarding the emergency plan application. It has the objective of providing information throughout a didactic manner, reinforcing the individual and collective knowledge.
- Actions in the schools: educational actions aimed to the schools that are located near the Atucha and Embalse sites are carried out, to reinforce the information regarding the nuclear energy in a ludic and didactic manner, through interactive speeches explaining how the nuclear electric energy is produced, the safety importance and the environmental care.

The constant presence of the licensee and ARN in the locality, feeding the link among all the interested public and the developed systematic actions generates the interest among the population, and its outcome is interest, trust, credibility and acceptance.

Nº 87
CNS-REF.-ART.: 16.3
PAGE OF REPORT: 131
CHAPTER OF NAT. REPORT: 3.16

Would ARN comment on how much direct influence both the regulator and the licensee have over long term land-use policies and plans in the regions surrounding a nuclear facility? (for the purposes of being able to address emerging potential external hazards over the life of the facility) What mechanisms exist for ARN and the licensee to influence development outside the site to mitigate potential external hazards?
The regulator and the licensee have not power to decide over long term land-use policies and plans in the regions surrounding a nuclear facility. Nevertheless there are indirect tools to influence on the matter. In this sense, as a condition to construct any installation, which could involves potential risks to the public and the environment, the site´s approval takes into account the stakeholders through public hearings in the frame of the environmental impact study. The regulator and the licensee participate in the hearings, if the new installation could affect the plant site.

Nº 88
CNS-REF.-ART.: 17.1
PAGE OF REPORT: 146
CHAPTER OF NAT. REPORT: -

Is the size of the deflagrating gas cloud for explosion design based on some potential source in the vicinity of a site, or is it generic?
The size of the deflagrating gas cloud considered for the Atucha site is based in potential sources of the vicinity (fuel ship transportation). In Embalse site, due to in the vicinity there are not industries with potential generation of explosive clouds, this cloud´s size is defined assuming a mobile source during route transportation.

Nº 89
CNS-REF.-ART.: 17.1
PAGE OF REPORT: 150
CHAPTER OF NAT. REPORT: -

Is the probable maximum high water level PMH related to an exceedance frequency?
The PMH is not related to an exceedance frequency. It is calculated in a deterministic way, assuming the total rupture of the Yaciretá dam, maximizing all adverse factors associated with flood hydrodynamic model used, considering that they occurs simultaneously.

Nº 90
CNS-REF.-ART.: 17.1
PAGE OF REPORT: 154
CHAPTER OF NAT. REPORT: -

Has the availability of the water relief from the dam of the Embalse Lake been analysed with respect to heavy debris carried by the water flow? Could this increase the flooding hazard at the NPP site?
The level differences between the spillway and the plant´s ground is 7.5 meters, and it was concluded that there is no flooding´s chance of the Embalse site due to spillway and dam features.

Nº 91
CNS-REF.-ART.: 18.1
PAGE OF REPORT: 160
CHAPTER OF NAT. REPORT: 3.18.3

According to section 3.18.3 of the national report, Argentina plans to review the Regulatory Standards (AR) in order to incorporate the lessons learned from the Fukushima accident. Could you please outline in which areas an adjustment of the AR could be necessary?

The main areas where was necessary a regulatory standards adjustment, are NPPs´ siting and design.

Nº 92
CNS-REF.-ART.: 18.1
PAGE OF REPORT: 162
CHAPTER OF NAT. REPORT: 3.18.3.1.1

One of the design changes foreseen to be implemented as design improvement after the Argentinian stress test is the enhancement of the spent fuel pools (SFP) at CNA-I. One of the measures foreseen is to install "passive components control for spent fuel pool system". Could you please elaborate on this specific measure?
The Report doesn't mention the installation of "passive components control for spent fuel pool system", but mentions the control of its functionality.
The proper functioning of the program for the verification of the vacuum breakdown/siphons associated with cooling was checked, finding them in adequate condition. Besides, it was added to the periodic inspections program, the control of the functionality of the vacuum breakdown/siphon system associated with the pipes of the cooling systems or the inventory control of the spent fuel storage pools. Including the above mentioned issues, a procedure related with passive components control increasing the frequency of tests and inspections was implemented.

Nº 93
CNS-REF.-ART.: 18.1
PAGE OF REPORT: 172
CHAPTER OF NAT. REPORT: 3.18.3.2.5

Another measure mentioned in the list of the design improvements aiming at improving the reliability of the diesel generators (DG) is an "alternative cooling mode of the DGs", which is foreseen for CNA-I and II. As DGs are usually cooled by cooling water, what kind of alternative cooling do you intend to install?
The alternative cooling mode of the DGs foreseen for the new EPS of CNA-I will be air cooled and for CNA-II, the current DGs' cooling system will be adapted using cooling towers with air circulating.

Nº 94
CNS-REF.-ART.: 19.1
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.19.4

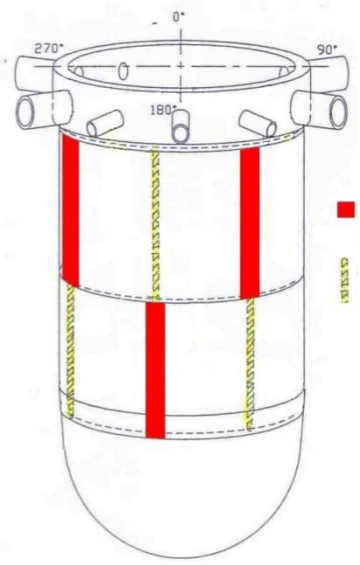
Approximately how many inspections have been performed by the Regulatory Body in each NPP in respect to the national investigations and actions taken in the light of the Fukushima Daiichi Accident?
As were informed in previous National Reports, from the Fukushima Daiichi accident occurrence, ARN performed inspections and evaluations to assess the readiness of mitigating systems including emergency preparedness, backup power sources; hydrogen mitigation systems and spent fuel storage systems. Besides, in 2011, ARN required a stress test to each Argentinean NPP consisting in a reassessment of the NPPs safety margin assuming the occurrence of a sequential loss of the lines of defense in depth caused by extreme external events (see details in National Report, Annex VIII).
According the regulatory practices in force, mainly through assessments and inspections, the ARN verify, controls and performs the following of the diverse activities that are being carried out to fulfil this requirement. However, due to the numerous inspections carried out during more than two years in relation with the action taken in the light of the Fukushima accident, it is extremely difficult accurately specify the number of such inspections and evaluations.

Nº 95
CNS-REF.-ART.: 19.1
PAGE OF REPORT: -
CHAPTER OF NAT. REPORT: 3.19.4

Is there a Regulatory Body requirement/regulation for assistance to an accidently affected NPP site/area from outside the affected area? Would such assistance from other parts of the country cover hardware and personal? Is air-borne assistance arranged?
According to the established by the Argentinean legislation, ARN has the responsibility for the external response in case accidental situations in the installations under its control. In such sense all the agreements needed to face such emergencies are signed, in force, and periodically tested by full emergency drills, including the airborne assistance.

Nº 96
CNS-REF.-ART.: 19.7
PAGE OF REPORT: 179-180
CHAPTER OF NAT. REPORT: 3.19.4
After the findings of flaws in the RPVs at the Doel and Tihange NPPs, did ARN require extensive inspection of RPVs? If yes, what were the results? If not, why not?
Following the experience at Doel NPP and Tihange NPP, ARN required to CNA-I to inspect the base material in order to reveal the presence (or non) of laminar defects similar to those found at the above mentioned plants.
During the planned outage 2013 at CNA-I, an inspection to the RPV base material was carried out jointly by the support company Doosan Power Systems (DPS) and the utility, NA-SA. The inspection was performed by automated ultrasonic and both, the volume of examination and the defect acceptance standard were defined by NA-SA after previous agreement with ARN. In relation to the inspection volume which can be seen below, 100% examination of the full wall thickness (225mm) and six of vertical segments of the RPV were required:

- 3 off 2852mm length,
- 3 off 2819mm length,
- Each segment, 700mm wide



The target flaw size for the inspection was 10mm x 10mm quasi lamination defects, oriented parallel to the inner and outer surfaces of the RPV. The inspection results showed that no unacceptable defects have been detected within the inspection volumes of any of the six segments of base material. Besides, only three reportable indications have been detected in the lower shell:

Indication	Type	Throughwall (mm)	Length (mm)	Ligament (mm)	X (mm)	Y (mm)	Z (mm)	Amp (dB)	Amp (%DAC)
1	Point	*NMD	*NMD	75.9 ID	-483	1256.0	149.1	32	**100%+6dB
2	Point	*NMD	*NMD	73.5 ID	-461	1268.9	151.5	34	**100%+8dB
3	Point	*NMD	*NMD	70.5 ID	-483	1273.9	154.5	29	**100%+3dB

*NMD = No Measureable Dimensions;
**Amplitude response wrt %DAC assumes the 3dB coupling correction is not required;

Table 1 Summary of Reportable Indications

Nº 97
CNS-REF.-ART.: 19.7
PAGE OF REPORT: 182
CHAPTER OF NAT. REPORT: 3.19.8

To what extend are operating experience and event reports from other plants used in the commissioning stage of CNA-II?
A group of specialists of CNA-II, based mainly on the lessons learned from domestic and international operative experience (OPEX), regularly classifies and analyses such OPEX, to identify and implement the applicable improvements or corrective actions according to specific procedures. Presently, CNA-II receives information from the following data bases:

- Internal events (domestic NPPs) which includes significant events, unforeseen outages and minor events or low level events.
- World Association Nuclear Operators (WANO).
- IAEA's International Reporting System.

Besides, in order to gain experience from the CNA-II commissioning stage, OPEX Procedures have been implemented for events report and analysis. This procedure was elaborated using the OPEX procedure of CNA-I as a reference. At present, the relevant failures or incidents that occur during the execution of preliminary tests (no nuclear) are analysed and the corresponding reports are submitted to the ARN and to the Commissioning Committee.
Apart from that, there are more than 20 external experts integrated to the commissioning staff. Most of them have participated in the start-up phase of the Konvoi Plants (Germany) and after that in Angra 2 NPP (Brazil). These experts have collaborated with the argentine staff to elaborate the commissioning procedures of CNA-II, and currently are involved in the implementation and evaluation of the commissioning tests.

Nº 98
CNS-REF.-ART.: 19.7
PAGE OF REPORT: 184
CHAPTER OF NAT. REPORT: 3.19.8.2

CNA-I used operating experience from German NPPs. How is this organised nowadays, especially with respect to LTO? Is CNA-I using operating experience from the manufacturer and Information Notices from GRS?
According to was informed in the National Report, the CNA-I has used since the operation´s beginning, the operational experience from designer Siemens-Kraftwerk Union AG, who played an important role in the transmission of operational experience from German plants. Currently the exchange of operational experience takes place through international bodies like WANO and IAEA/IRS, covering a larger group of plants and designs. Experience from the manufacturer, in particular with reference to LTO, is received through AREVA assistance.

Nº 99
CNS-REF.-ART.: 19.7
PAGE OF REPORT: 191
CHAPTER OF NAT. REPORT: 3.19.9.3.3

Which lessons from the accident at Fukushima Daiichi will be incorporated in the design of the Atucha-II spent fuel pools?

The spent fuel storage pools of CNA-II are located in a pool building which is located outside the containment and at ground level, it means to 23 m. height above the Paraná River level, which is the reason that it is not possible to be affected by flooding. However, it is possible that the spent fuel storage pool cooling water be lost. The results of the analysis at different stages of a loss of the pool cooling spent fuel function or the loss of secured service cooling system (PEB), indicates an initial heating phase of the pool water until saturation, increasing the pools level, followed by evaporation which decreases the water level.

Therefore, to cover this scenario was established a filling strategy through a pump specially installed, which suctions water from the groundwater and is fed from alternative and independent electric power from a mobile diesel generator (MDG).

A MDG to supply essential consumption required to face with severe accident situations caused by a SBO occurrence will be implemented as to provide alternatives to the existing sources for secured electricity supply in order to ensure the cooling of the spent fuel storage pools in the long term.

Alternatives water sources to the existing ones for reserve secured water supply (such as reservoirs, groundwater, etc.) to face severe accident situations caused by SBO and the loss of heat sinks will be provided. It also must have the appropriate accessories/devices to connect these water sources with the corresponding pumps and supply lines in order to ensure the spent fuel storage pools cooling in the long term.