

Joint Convention  
 Questions Posted To Brazil in 2015

Country	Article	Ref. in National Report
France	General	Section K

**Question/ Comment** The report provides a lot of information on the management of waste produced further to the remediation of the Goiânia site. However, regarding the issue of the large quantity of waste (liquid and solid) produced by a nuclear accident like Fukushima, could Brazil indicate whether it is planned in future Waste Management Policy taking into account in terms of:

- Objectives and strategy for recovery and waste management (waste characterization and segregation ; volume reduction)?
- Dedicated waste management facilities during the post-accidental phase?

**Answer** Although it is important the planning for the initial response following an event, the characteristics of each nuclear accident are greatly distinct and depend on the installation location, urgency, and other aspects which are not always possible to predict in advance.

In Goiânia accident, the actions involved several Brazilian organisms and the strategy was very effective in terms of control and environmental remediation. As result it was constructed a temporary storage facility with the subsequent construction of the final disposal facility of Abadia de Goiás. The experiences arising from nuclear accidents are lessons that should be followed. Abundant publications due to Chernobyl and Fukushima accidents are available. Meetings and discussions about the experiences of countries on remediation in several conditions are quite frequent. As important as to have strict rules is to have a trained staff to seek the most appropriate response in each different emergency situation.

Regarding dedicated waste management facilities during the post-accidental phase; in the Brazilian legislation there is a provision for construction of a temporary storage facility to receive the radioactive waste arising from a nuclear or radiological accident. In case of large scale events the situation will be treated case by case depending on the consequences of the event and making use of the appropriate technological solutions.

Country	Article	Ref. in National Report
France	General	Section K

**Question/ Comment** The report only provides information on the “Fukushima response plan” for the Admiral Álvaro Alberto's Nuclear Power Station in the city of Angra dos Reis. Could Brazil indicate whether any actions are envisaged to take into account the lessons from Fukushima on other cycle facilities?

**Answer** At INB, the production sites of URA (Uranium Concentrate Unit) and FCN (Nuclear Fuel Factory) performed reevaluation of their Final Safety Analysis Report (FSAR) taking into account strict seismic impacts on their physical installations, and revised the most critical postulated accidents. In addition, FCN at Resende has established improvements to the emergency power system.

Regarding the others nuclear installations, due to natural conditions existing in Brazil and since they are small facilities, CNEN saw no reason to ask

improvements in the existing safety conditions or demand a reassessment of safety in these units due to Fukushima's accident lessons. Despite of it, it should be mentioned that all nuclear licensee must periodically submit to CNEN a revision of its FSAR.

	Country France	Article General	Ref. in National Report Document
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Question/ Comment Brazil's National Report should include an executive summary and a matrix.

Answer Brazil traditionally presents a summary of their nuclear policies and program in Section A (Introduction) of his National Report, as well as usually presents his matrix only for the contracting parties at the country group session in the review meeting of the JC. However, the option to include the matrix in the next Brazil Report will be considered.

	Country Euratom	Article Article 4	Ref. in National Report B1
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Question/ Comment The report mentions that spent fuel is not considered as waste. Are there some actions on-going to investigate the possibility of reprocessing of the fuel?

Answer Eletronuclear recently established preliminary conversations with potential international suppliers in order to evaluate conditions and costs to start a small scale pilot reprocessing program similar to the program already started by Taiwan Power Co.

	Country Italy	Article Article 5	Ref. in National Report G, 82
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Question/ Comment Section G : Safety of Spent Fuel Management - The current situation is the storage of spent fuel in the plant pools.....

If the decision is taken to store fuel in "dry storage" on-site, new detailed requirements will have to be established by CNEN.

Does Brazil foresee the construction of a centralize spent fuel storage facility out of NPP sites?

Answer No. Brazilian nuclear utility – Eletronuclear – has already decided to build an extra wet storage facility on the site of the NPP Angra site. The facility licensing application has already been submitted to the Brazilian environmental agency and its first phase – storage capacity 2,400 PWR fuel elements – is expected to be operative by 2018.

	Country Germany	Article Article 10	Ref. in National Report p. 88 (Section G)
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Question/ Comment Spent fuel storage demonstration plant

The technical viability of spent fuel conditioning using welded canisters is supposed to be tested in a demonstration plant to be erected still in this decade. Having this ambitious target in mind what is the status of work preparing the licensing documents, performing the licensing procedure and constructing the plant, respectively?

Answer Eletronuclear is studying the feasibility of the dry storage solution and intends to construct a demonstration plant accordingly. To this end, Eletronuclear is involving several national and foreign research universities.

As a consequence of those studies the implementation and licensing process time may be reevaluated.

Country	Article	Ref. in National Report
Germany	Article 11	p. 88 (Section G)

Question/ Spent fuel complementary wet storage unit  
Comment

Could Brazil please provide information as to whether lessons learnt from the Fukushima Dai-ichi NPP accident have been or will be considered in the design of the envisaged spent fuel complementary wet storage unit?

Answer The Spent Fuel Complementary Storage Unit is being designed considering the lessons learned from Fukushima Dai-ichi NPP accident. The main improvement to be incorporated in the plant will be a passive heat removal system, to ensure the operation of the plant, even during a station blackout.

Country	Article	Ref. in National Report
Germany	Article 12	p. 91 (Section H)

Question/ Preparation of requirements for disposal  
Comment

Both the Angra-1 and Angra-2 nuclear power plants are equipped with Solid Waste Treatment Systems. Resulting waste forms must fulfil the requirements for disposal established by National Commission for Nuclear Energy (CNEN) regulations. On which scientific-technical basis have such requirements been developed? Have any considerations been made that such requirements may not comply with the waste acceptance requirements of the planned National Low and Intermediate Level Waste Repository?

Answer Both Angra 1 and 2 NPPs entered in operation before the establishment of the waste acceptance criteria – WAC – for the Brazilian LILW repository (in fact, these criteria are currently been re-discussed by a working group of experts from CNEN and the main waste generators). Therefore, the historical wastes generated so far by Angra (and other producers) those fail to meet the criteria existing at the moment of their disposal shall be pre-treated accordingly. The foreseen standard treatment is re-encapsulation inside a 2.2 m cubic concrete overpack.

It is worth mentioning that only generic WAC will be established in the regulations. Site-specific and repository-specific criteria will be decided upon later, during the detailed design phase or even during the repository construction.

Concerning the wastes generated after the repository commissioning and operation, it is expected that the main generators, including Eletronuclear, will take the needed measures to comply with the WAC. Once again, wastes failing to meet the requirements will be pre-treated at the generators expenses.

Country	Article	Ref. in National Report
United States of America	Article 15	H.5.2.3, pg. 113

Question/ Please provide an update on the results of the safety assessment for the  
Comment Abadia de Goias waste repositories. Please explain how the assessment resembled or differed from previous assessments, including the models used, assumptions, data, scenarios, and outcomes. Please explain why the assessment could not be completed in 2012. Will the requirement for a new

assessment every ten years be retained?

Answer The new safety assessment for the Abadia de Goiás Repository includes the following updates/modifications with regard to the previous ones:

- All data used in the previous assessments were reviewed;
- Updated information about food consumption (data from IBGE - Brazilian Institute of Geography and Statistics, 2010) was incorporated into the new document;
- The safety assessment was conducted in accordance with the new CNEN regulations NN-8.01 and NN-8.02 issued in 2014;
- An uncertainty analysis was performed using the Latin Hypercube Sampling (LHS) method.

The reassessment considers the same assumptions and scenarios adopted in the previous work (2002). The hybrid numerical-analytical one-dimensional solution used in 2002 was replaced by the exact solution of the ADE for semi-infinite medium, in order to perform an uncertainty analysis.

The results obtained are not significantly different from the old ones, showing that there is no need to change the requirement for a new assessment every ten years.

The new safety assessment has already been concluded and the Safety Report is being currently written.

Country	Article	Ref. in National Report
Euratom	Article 19	E.2.1, p.37

Question/ Comment Federal Law 9765 of 1998 established taxes and fees for each individual licensing step, as well as for the routine work of supervision of the installations by the regulatory body. Is there any safeguard in place to ensure that this system does not lead to the development of client-based approaches rather than safety driven ones?

Answer CNEN does not establish the values of taxes and fees but just has the prerogative to suggest these values to the government. Each tax or fee is associated to a different type of license (or activity) and its values are established by the Federal Government in the Federal Law 9765. All the money collected with taxes and fees goes to the Federal Government and CNEN, beyond its role of regulatory body, just controls the payment that is needed to issue or renew the license. Therefore, the system is decentralized and entirely transparent.

Country	Article	Ref. in National Report
United States of America	Article 19	E.2.3, pg. 44

Question/ Comment The report indicates that a Decree will be issued, consistent with Law 12731, to implement the revised SITRON. Please provide an update on this Decree. How has it changed the responsibilities of regulatory organizations or facility operators in the event of an emergency?

Answer No changes on roles and responsibilities of regulatory organizations will occur. The main purpose of the new Law and its Decree is to align the system according to the structure of the government. The main change was the inclusion of the Ministry of Health as the sixth organization in charge with sectorial organization. Previously the system was composed by a central body

and five organizations responsible for sectorial coordination.

Country	Article	Ref. in National Report
Italy	Article 20	E, 45

Question/ Comment The National Commission for Nuclear Energy (CNEN), through its Directorate for Radiation Protection and Nuclear Safety (DRS), is the national regulatory body, in accordance with the National Nuclear Energy Policy Act (Law 6189/74).

Effective separation between the functions of the regulatory organizations (CNEN and IBAMA) and the organization in charge of the promotion and utilization of nuclear energy for electric power generation is provided by the structure of the Brazilian Government in this area.

CNEN responsibilities include, receiving, treat, store and dispose of radioactive wastes; there are also 4 research reactors operating at CNEN institutes.

Could Brazil clarify how CNEN as competent regulatory authority is separated from an organisation concerned with the utilisation of nuclear energy as CNEN is operating nuclear facilities and also the function of the Directorate for Radiation Protection and Nuclear Safety (DRS) inside the organization of CNEN, in particular its relationship with DPD.

Could Brazil also clarify who issued the Authorization for Operation for the 4 research reactors operating at CNEN institutes?

Answer The Brazilian Government has assured the independency of regulatory activities in the nuclear area, in charge of CNEN, through the effective separation of assignments between its Directorate of Radiation Protection and Nuclear Safety (DRS) and the Directorate for Research and Development (DPD). As can be noted in figure E.2, page 47 of the National Report, within the framework of CNEN the Directorate for Radiation Protection and Nuclear Safety (DRS) is in charge of CNEN's regulatory body functions and does not operate any nuclear or radioactive installation. This allows for the effective separation from the production and promotion activities performed by the Directorate for Research and Development (DPD). Therefore, the DPD has the responsibilities of collecting, treating, storing and disposing of radioactive waste as well as operation of the 4 research reactors; however these activities are regulated and controlled by DRS as any activity carried out by any other licensee and are subjected to the same rules and regulations applied to all operators in Brazil. As consequence, the authorization for operation of the 4 research reactors currently operating at DPD was issued by DRS.

Although, CNEN has assured a functional independency between nuclear regulatory activities and the others as promoting and research & development activities, the Federal Government took the political decision to create an administratively and legally independent regulatory body. The new agency will be created by a federal law. The proposal is based on the existing structure of the DRS and the bill is being analyzed by the government before to be addressed to the Congress.

Country	Article	Ref. in National Report
United States of America	Article 20	E.3.1, pg. 46

Question/ The report indicates that the structure of CNEN may be revised to split off an

Comment independent regulatory body (Brazilian Regulatory Nuclear Agency), and that a proposal will be sent to the National Congress. Please provide an update on this process.

Answer The process is currently in progress at high federal government levels. It is already sure that at some point the administrative separation inside of the CNEN's structure will be achieved. The progress of the implementation process depends on a number of factors, including the priorities of the political moment.

Country	Article	Ref. in National Report
China	Article 21	A.2.2.1, Para 2 & 6, p4

Question/ Comment It is mentioned that IEA-R1 was commissioned in 1957 and the IPR-R1 TRIGA Mark I Reactor has been operating for 53 years.

Please describe the decommissioning plan of two research reactors and the specific considerations.

Answer For the IPR-R1 TRIGA Mark 1 reactor, the decommissioning plan content was already established by a group that participates of an IAEA Project about decommissioning of research reactors. A preliminary budget was estimated using the CERREX program. However the decommissioning plan was not detailed, firstly because the personal involved with the activities related to IPR-R1 is being renewed, and secondly because the high direction of CDTN was in process of change, and it was decided to postpone it. Nevertheless, this year the group restarted the work on the decommissioning plan in order to finalize its first draft.

There is no decommissioning plan regarding the research reactor IEA-R1.

Country	Article	Ref. in National Report
Italy	Article 25	F, 72

Question/ Comment Could Brazil provide information about the emergency preparedness (and eventual bilateral agreements) for responding to transboundary nuclear emergencies following both domestic events or emergency occurring in a nuclear installation within neighboring countries?

Answer The closest Brazilian borders with Argentina, Paraguay and Uruguay exceed 1,000km. Therefore, according to the GSR- Part 7, there is no need of special preplanned arrangements for this purpose. However, Brazil has a bilateral agreement with Argentina to provide early notification and mutual assistance in case of a nuclear accident.

Country	Article	Ref. in National Report
Montenegro	Article 25	Section F.5, page 72

Question/ Comment As Brazil stated in chapter E.2.3 of the Report (Section E Legislative and Regulatory System) SIPRON was established by Law 12731 of 21 November 2012. The SIPRON's structure includes organizations at the federal, state and municipal levels involved with licensing and control activities as well as those involved with public safety and civil defence. Operators of nuclear installations and facilities and supporting organizations are also part of SIPRON. SIPRON, as the umbrella organization for the coordination in emergency preparedness, organizes annually exercises that test the preparedness of all stakeholders involved in the response to the accident. In F.5 of the Report it is stated that there is established training periodically

activities which are conducted by trained radiological emergency team IPEN, which is very impressive. (Section E.1.3 doesn't exist it is technical error and according to Report it is E.2.3.)

1. Do SIPRON organize local exercises at the municipal level or only at the state level, or maybe both levels and who in the state system approves this training program? Could Brazil provide more information about this training program? Is this program part of law and regulations?
2. Could Brazil provide more information about early warning system?

Answer (Montenegro is right; there is a mistake with regard to the mentioned reference "E.1.3". Actually, the correct reference section in page 72, first paragraph, should have been "E.2.3")

Regarding the first question, under the umbrella of the SIPRON, in the year 2000 was created an Advisory Group called COPREN-AR. COPREN-AR stands for Committee for Preparedness and Response to a Nuclear Emergency at the Municipality of Angra dos Reis (the city where the NPP is). Representatives from the three levels of government compose COPREN. Among its responsibilities is the preparation, conduction and evaluation of full-scale exercises on a regular basis (every 2 years). As it is established by the Decree, each organization is responsible for its internal training program. Regularly the SIPRON promotes workshops to provide cross training.

Regarding the Early Warning System (EAS), this is currently implemented at the Protection Action Zone (PAZ), defined as the circular area with radius of 5km around the NPP. This system is composed by 6 sirens to the east and 2 sirens to the west regions, respectively. The system can provide sound and voice messages to the population. It is activated monthly, every 10th day of each month, at 10 am.

Country	Article	Ref. in National Report
France	Article 26	Sec. F6 pp.77 and 78 / Sec. K2 - p. 131

Question/ Comment The report indicates that CNEN issued a regulation for Decommissioning of Nuclear Power Plants and no decommissioning strategy has been planned for other nuclear facilities in Brazil. Could Brazil indicate when the strategy for decommissioning of other nuclear facilities will be established as well as their main orientations?

Answer Some of the INB sites have submitted to the regulators (nuclear and environmental) a specific document proposing their Decommissioning Plan. It should be mentioned that all nuclear facilities have their decommissioning strategy established as part of the Final Safety Analysis Report (FSAR). But the decision to start or not the decommissioning belongs to the licensee (operator) as well as the choice of the strategy used in the process that must combine the most appropriate technical solution with the most convenient financial cost to the operator.

Country	Article	Ref. in National Report
France	Article 26	Sec. F6 p.77 / Sec. K2 - p. 131

Question/ Comment The report indicates that the new safety regulation for Decommissioning of Nuclear Power Plants establishes technical and administrative activities to be performed for partial or total removal of NPPs regulatory control. Could

Brazil explain the criteria associated to the decision of implementing a partial or a total removal of NPPs regulatory control?

Answer A decommissioning plan should be submitted by the licensee for the evaluation and approval of CNEN. As already mentioned, the decision to start or not the decommissioning belongs to the licensee (operator) as well as the choice of the strategy used in the process that must combine the most appropriate technical solution with the most convenient financial cost to the operator.

Country	Article	Ref. in National Report
Italy	Article 26	F, 80

Question/ Section F : Other General Safety Provisions - In June 2010, the work of  
 Comment decontaminating the soil of USIN was initiated, at the INB unit in São Paulo..... Since 2012, INB has been working on the decontamination process of the site.

Could Brazil clarify how soil decontamination has been performed (such as on-site or off-site process)? In case of off-site process, where has the soil been moved and treated?

Answer While on-site, the soil is analyzed by performing scintillometric measurements, in order to be separated into distinct groups, according to their level of exposure rate. After segregation, both mineralogical and radiometric analyses are performed on each batch to determine the content of heavy minerals and the specific activity of selected radionuclides (U-nat, Th-nat, Ra-226, Pb-210, Ra-228).

According to the analytical results, the soil will be redirected as follows:

- below 0.5 Bq/g of Ra-226 and 0.5 Bq/g of Ra-228, it will be used for land restoration,
- for total activity concentration below or equal to 30 Bq/g, it will be disposed of in a sanitary landfill, and
- for total activity concentration above 30 Bq/g, it will be packed for future destination. If the mineralogical characterization of this material confirms the presence of heavy minerals, such as monazite, it will be transferred to the INB facility at Buena, in Rio de Janeiro State, where it will be treated in the same way as the local raw material containing monazite is. Any other material will be stored as radioactive waste.

Country	Article	Ref. in National Report
United States of America	Article 26	F.6.3.3, pg. 80

Question/ The report states that soil containing up to 30 Bq/g of Ra-226 and Ra-228  
 Comment resulting from the remediation of the Interlagos Processing Plant may be disposed of in a sanitary landfill. Please describe the analysis conducted to derive that limit. Will any sanitary landfill be suitable for this waste, or would it need some additional features (e.g., liners)?

Answer We may clarify that the activity of 30 Bq/g stated in the Report refers to the Total Activity of the material, assuming that the daughters of the radioactive decay in thorium and uranium series are all in “secular equilibrium”.

Only if the total activity concentration of the material is below 30 Bq/g, it will be sent for disposal in a sanitary landfill, which need not to have additional features other than the conventional requirements of the

## Environmental Laws.

Country	Article	Ref. in National Report
China	Article 28	J1.2, Para 3, p120

**Question/ Comment** It is mentioned that two big campaigns were conducted to collect disused radioactive sources and an especial truck and Type A containers were purchased.

Please describe the function of the especial truck; it is only for transport or for conditioning.

Please explain why only Type A containers were purchased and how to make Type A containers to fit different disused sources (different types and sizes).

**Answer** The truck was used solely as a transport vehicle, not for storage purposes. The logistics of the source collecting operation consisted of travelling to the sources users' premises (industry, hospitals, research centers), fetching the sources and transferring them to CNEN's centralized spent sources storage facilities. As for the specially designed Type A containers, they were used to receive only small sources, such as low-dose brachytherapy sources (previously conditioned in small lead shields) and lightning rods. Larger radioactive devices, such as industrial gauges or teletherapy heads, were appropriately stowed to the truck cargo compartment beside - not inside - the container.

Country	Article	Ref. in National Report
China	Article 28	J1.2, Para 2-6, p120

**Question/ Comment** It is mentioned that CNEN contacted all users of radioactive material in the country to participate in the effort to solve the problem of the storage of disused radioactive sources after the large radiological accident in Goiânia with a disused <sup>137</sup>Cs source in 1987 and thousands of spent sources were received and stored at Institutes in the last three years.

Please briefly describe the national strategy and practice for regaining control over orphan sources in Brazil.

**Answer** The Radiation Facilities, including the ones which use radioactive sources, are classified in 8 groups covering 6 areas: medicine, industry, research and education, distribution, services and production of radiopharmaceuticals (cyclotrons). The National Commission for Nuclear Energy (CNEN) has implemented a huge regulatory policy which covers the authorization of radioactive facilities, control (transfer, import and export) of radioactive sources, the maintenance of the national inventory of the radioactive sources, inspection program, radioprotection officer certification and registration of legal persons (specialists). CNEN also provides facilities and services necessary to manage and store radioactive disused sources.

Published regulations are the main instrument of CNEN's regulatory action. The CNEN has issued 44 Regulations covering nuclear and radioactive areas and 10 among them are currently used for the licensing, control of radioactive sources and facilities.

In order to ensure an integrated regulation concerning the access and use of radioactive sources, CNEN also acts in a coordinated way with other

governmental organizations, such as the control on import and export of radioactive sources, carried out by the CNEN and Customs, in accordance with the import and export legislation, and the CNEN-Ministry for Health inter-ministerial regulatory cooperation, established in order to harmonize and improve the regulatory action implemented by both organizations.

Besides the control and licensing activities, CNEN gives support to safety and security complementary activities implemented by the other relevant actors. In this sense, CNEN has accompanied the installation of monitoring systems to detect radioactive scrap metal items as well as collecting the disused sources throughout the country to reduce the risk of radioactive scrap metal production. These control activities have been implemented by steel industries and include the operation of special monitoring systems such as gate and portal monitors, to identify potential contaminated scrap metal items.

Country	Article	Ref. in National Report
United States of America	Article 28	J.1, pg. 119

**Question/ Comment** The report states that licensees cannot store disused sources. They must be stored at a CNEN storage facility. What is the process by which a source is determined to be disused and how long does the licensee have to render the source for CNEN storage? Who bears the financial responsibility for this process? What plans does Brazil have for more permanent disposition/disposal of these sources?

**Answer** The two main categories of sources to be controlled are Cobalt-60 sources for radiotherapy and sources for industrial gammagraphy. In the first case, there is a regulatory agency under the Ministry for Health so called ANVISA (Brazilian Health Surveillance Agency) that prohibits its use below an established activity and obliges the licensee to substitute it. In this case, it is necessary to return the old source to the manufacturer or to send it to a CNEN storage facility. This is a condition to the approval of the importation of the new source. Regarding sources for industrial gammagraphy, all the companies have an authorization that limits the number of sources they can work. If they have sources that are not convenient to use for their work and they want to order a new one, they must return to the manufacturer the source with low activity to be able to substitute it. The licensees are responsible for the expenses to return the source to the manufacturer or to storage the source in the deposits of CNEN.

Industrial irradiators with huge amount of Cobalt-60 sources are few and well controlled and with a strict following-up process.

Currently the policy is to return the disused sources to the manufacturer. As for the sources not considered for repatriation, two potential final disposal pathways are considered: co-disposal in the LILW repository, subject to the establishment and approval of the waste acceptance criteria - the current option, or dispose of it in a borehole-type repository - which is only an option for the future. But, it is worth to mention that the CNEN storage facilities presently in operation in Brazil are capable of storing the present disused sources already stored and the estimated disused sources for the next decades

to come.

Country	Article	Ref. in National Report
China	Article 32	D.1.2.2, Para 2, p19

**Question/ Comment** It is mentioned that the concentrate resulting from the liquid waste treatment is further processed in order to reduce water content before being immobilized in bitumen and conditioned in 200-liter drums. Spent resins and filter elements are also immobilized in bitumen and conditioned in 200-liter drums.

Please briefly describe the bitumen immobilizing process, the safety factors needing considered, and relevant experiences.

**Answer** The bituminization process consists of a batchwise process where the bitumen and the wastes are mixed into a screw extruder machine. For evaporator concentrates, the remaining water is evaporated by the screw extruder with a foreseen temperature profile in order to result in a product with less than 1% of incorporated liquid besides others characteristics. For spent resin process the extruder evaporator is set to a temperature profile below the limit in order to avoid a formation undesired gases. In this sense, the spent resins are pre-dried before the process takes place. The safety of the process is achieved with the analysis of the bitumen (for example: flash point), the evaporator concentrates (nitrates), and spent resins prior their process. A simulated mixture bitumen/evaporator concentrates is performed to evaluate the safety of the process prior the operation (for example: thermal differential analysis). Also the waste mixture is analyzed to comply with the requirements of the waste deposit, according to a Process Control Program (PCP), tested in a National Research Center and submitted for approval to the Regulator. Besides these actions, the installation is provided with its own fire protection system and filtered ventilation system.

Country	Article	Ref. in National Report
United States of America	Article 32	A.1, pg. 1

**Question/ Comment** The report states that the current Pluriannual Plan extends through 2015. What steps are being taken to develop the next iteration of the plan? How does the Pluriannual Plan relate to the National Energy Plan, and how are any differences reconciled? How do these two government plans relate to the Energy Expansion Plan, which the report indicates is issued by Brazil's Energy Research Company (with approval of the government)?

**Answer** The Pluriannual Plan (PPA) is an instrument provided for in the Federal Constitution of Brazil in order to organize and facilitate public actions. The PPA declares all public policies of the government for a period of 4 years. On the other hand, the National Energy Plan (PNE) is a study that provides assistance for the formulation of a strategy of expanding energy supply. Similarly, the Energy Expansion Plan (PEE) is a tool that guides the actions and decisions related to solving the balance between the projections of economic growth in Brazil and the necessary expansion of energy supply. In this context, the PNE and the PEE are just tools of subsidies and only the public energy policies adopted within the government plan are inserted in the PPA.