Quality Assurance Program for Angra 1 License renewal and Long-Term Operation

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Eletrobras
Eletronuclear

Our business

Angra 1 and Angra 2 are resposible to produce **3,2% of the brazilian electricity**.

For RJ, it is 30% of the energy.

Fonte : http://www.eletrobras.com/

1) Show the QA requirents for LRA and LTO.

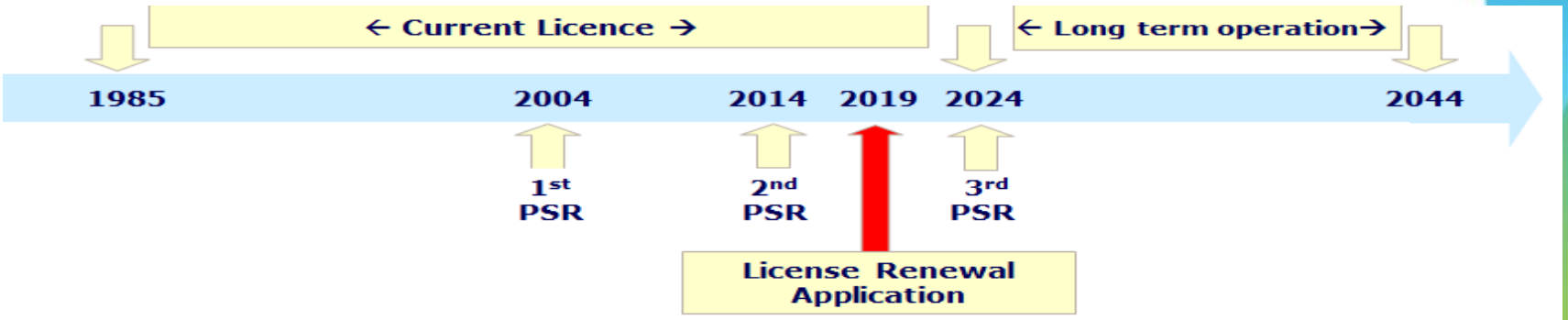
1) Show the 18 QA BR (10FR50 App B)

2) Show the CNEN NN 1.16

3) Show the implementation of the QA program for Angra 1LRA and LTO.

The licensing process is based on the Permission for Permanent Operation (AOP), as CNEN NE 1.04.

According to CNEN NE-1.04 the the current Permit for Permanent Operation may be extended if based on technical assessments to demonstrate that the effects of aging will be satisfactorily managed during the long-term operation period.
The Angra 1 timeline is shown in figure 1.



1985 - Start of commercial operation
2004 - 1st Periodic Safety Review
2014 - 2nd Periodic Safety Review
2019 - License Renewal application
2024 - 3rd Peridic Safety Review
2024 - Expiration of current license and beginning of extended life for 20 years
2044 - Expiration of renewed license

According to the CNEN NT07/2018 application for Long—Term Operation (LTO) shall consider the following topics, but not limited to:

- Plant Programs;
- Environmental Equipment Qualification for Electric and I&C Component (US-NRC 10 CFR50.49);
- Maintenance Effectiveness Monitoring Program Assessment (US-NRC 10CFR50.65)
- Ageing Management Review;
- TLAA Revalidation;
- Technological obsolescence Program;
- Specific Periodic Safety Review related the LTO;
- Final Safety Analysis Report, including the Technical Specification Review;
- Regulations, Codes and Standards Updating;
- A technical assessment of the physical condition of the plant;
- An evaluation of past operating experience at the plant relating to ageing,
- Obsolescence and other safety issues;
- Storage of spent nuclear fuel for long-term operation;
- Radioactive waste management for long-term operation;
- An assessment of the environmental impact of long-term.
- Human Resources, competences and knowledges.

The QAP for LRA and LTO of Angra 1:

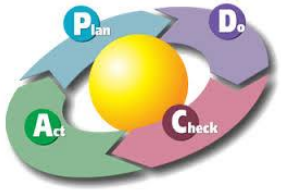
For all these activities is necessary to implement a QAP. For license renewal and long-term operation, the QAP must be according to the:

10 CFR50.34,
10 CFR 50 App. B,
Appendix A.2 do NUREG-1800,
Appenndix A-1 NUREG-1801
Safety Guide NS-G-2.12 da IAEA.

Historically the Nuclear Quality Assurance standard began in the US in the late 1960s with the publication of the 10CFR50 App B.

In Brazil, there is the standard CNEN NN 1.16 - Quality Assurance for the Safety of Nuclear Power Plants and Other Facilities.

IAEA Quality Assurance standards have been reformulated and updated to extend the concept of Quality Assurance in the nuclear sector to an Integrated Management System.



The constant revision of the standards has as its main objective the Continuous Improvement of Quality Assurance Systems.

Wich is the npp product?

Who is our client?

The QA standard

10CFR50 Apêndice B

It applies: activities affecting quality of **items important to safety,** developed in each of its various stages: site selection, design, construction, commissioning, operation and decommissioning.

CNEN NN 1.16

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THE QA program to the LRA and LTO

- NUREG 1801 and 1800, CNEN NT 07/18 and 08/18

Activities affecting quality of **items important to safety** and **items not important to safety but subject of an AMR (Aging Management Review)**.

THE 18 QA BR

10 CFR 50 App B/ NQA-1	Requirements CNEN NN 1.16
I – Organization	4.3
II - Quality assurance program	4.2
III – Design control	4.5
IV – Procurement Document control	4.6
V – Instructions, procedures and drawings	4.1.4
VI – Document control	4.4
VII – Control of purchase material, equipment, and services	4.6.3
VIII – Identification and control of materials, parts and components	4.7
IX – Control of special processes	4.8
X – Inspection	4.9 /4.9.1
XI – Test Control	4.9/4.9.2
XII – Control of measuring and test equipment	4.9.3
XIII – Handling, storage and shipping	4.7.2
XIV – Inspection, test and operationg status	4.9/4.9.4
XV – Nonconforming materials, parts, or components	4.10
XVI – Corretive action	4.11
XVII – Quality assurance records	4.12
XVIII – Audits	4.13

CNENN NN 1.16
Requirement 4.1 - QA system

CNENN NN 1.16
Requirement 4.2 - QA program

FSAR chapter 17.2 and PA-GE 30 procedure

LRA and LTO
FSAR chapter 17.2 and PA-LG procedure

CNENN NN 1.16
Requirement 4.3 - Organization

CNENN NN 1.16
Requirement 4.4 - Document control
Requirement 4.12 – Record control

FSAR Cap 17, PA-GE30, PA-LG 01

ETN policy and LTO program policy

CNENN NN 1.16
Requirement 4.5 - Project control

CNENN NN 1.16
Requirement 4.6 - PO control

The supplier must be qualified
SR and QR

CNENN NN 1.16
Requirement 4.7 - Material Control

Handling, storage,
transportation,
delivery to the user ...

Other Important QA Standards for Purchasing Items / Services

Operational Quality Item / Service (Angra 1) - ISO 9001 - Quality Management.

National safety item / service (Angra 1) - CNEN NN 1.16.

Imported Nuclear Safety Item / Service (Angra 1) - 10 CFR 50 App.B, NQA-1, ANSI N45.2 Series Standards.

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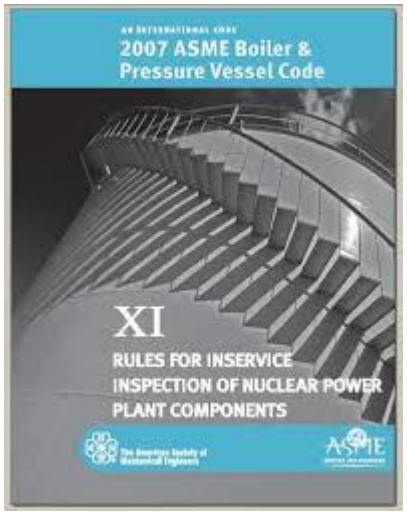
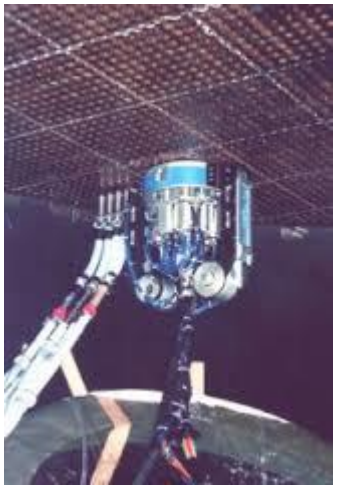
CNENN NN 1.16
Requirement 4.8 - Special process

- Staff Qualification
- Level III approved procedure Staff
- certificate Level III must be from a certifying body
- US Personnel in Angra 1 for Nuclear Class Component Welds - ASME XI Ap VIII Qualification (PDI-EPRI)

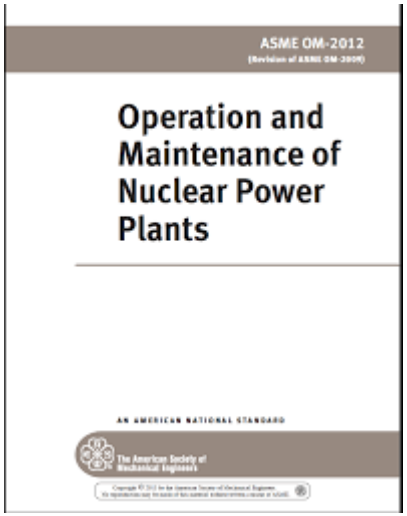
CNENN NN 1.16
Requirement 4.9 - Inspection and test program
4.9.1 ISI





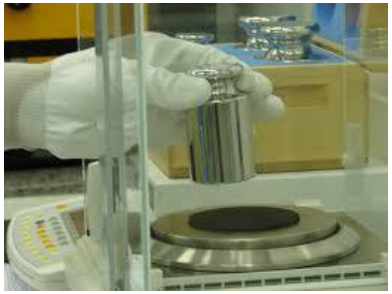
4º ISI interval – ASME Seção XI ed 2007 ad 2008

CNENN NN 1.16
Requirement 4.9 - Inspection and test program
4.9.1 IST

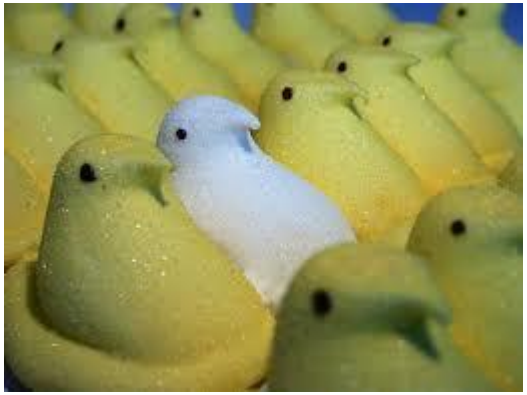


Valves, pumps ans snubbers - **OM Code edição 2004**

CNENN NN 1.16
Requirement 4.9 - Inspection and test program
4.9.3 calibration



CNENN NN 1.16
4.10 Non conformance
4.11 Corrective action



Non conformance	Corrective action
Identify the Problem To evaluate Differentiate: Discard, Repair, or Use as is Take Action Check / Follow Up Close	Identify the Problem To evaluate Identify the root cause Check for corrective action or preventive action Check / Follow Up Close

CNENN NN 1.16
Requirement 4.13 - Audit

Academic Formation

Professional Experience

Auditor training

Audit Experience

THE QAP implementation for Angra 1 LRA and LTO

Angra 1 PGQ was revised to include the Angra 1 LTO project.

It was included in Operation Manual the sequential administrative procedures to comply with the License Renewal and Long Term Operation:

PA-LG - General Administrative Procedures
PA-LE - Specific administrative procedures

THE QAP implementation for Angra 1 LRA and LTO

Elaboration of the QAP - PA-LG 01 and FSAR chapter 17.3

Elaboration of procedures:
PA-LE 02 – Comunication
PA-LG 03 – Documents and records control
PA-LG 04 – Documentation verification
PA-LG 05 – AMP ELABORATION

Other important change in the QAP are:
The identification of the SSC of the LTO scope in the drawing, procedures, maintenance program, purchase order.
The implementation of a metodology to identify when a design change affects a SSC of the LTO scope, because, maybe, it will be necessary to review the AMR and AMP.
Inclusion of audits about the LTO project in the audits program of Eletronuclear.
Perform the audits about the LTO project.

Conclusion

Angra 1 started the License Renewal and LTO project according the international st andards and technical notes of CNEN.

The QAP program for Angra 1 was reviewed to include the LTO program, in addition it was developed a QAP for the LTO project.

Angra 1 QAP and LTO QAP follow the requirements of CNEN NN 1.16 that are the same as 10CFR50 Appendix B.

Obrigada !