

CNEN

REUNIÃO TÉCNICA CNEN – IBAMA UAS



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Rio de Janeiro – 12/12/2018



Ministério da
Ciência, Tecnologia
e Inovação



Histórico - Reuniões Técnicas

- Reunião CNEN – 25/06/2015
- Reunião DIANG - 25/01/2016
- Reunião CNEN – 28/01/2016
 - Definição das Bases Normativas
- Reunião CNEN – 30/08/2017
- Reunião CNEN - 02/10/2018

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PROBLEMA

- Data de esgotamento estimado da PCU de Angra 1: **05.12.2021**;
- Data de esgotamento estimado da PCU de Angra 2: **21.07.2021**;
- Data limite para o início do descarregamento das piscinas: **22.01.2021** (6 meses antes do esgotamento de Angra 2: parada 2P17);
- Data para implantação do armazenamento a seco: **22.01.2020** (12 meses para contingências).



SITUAÇÃO ATUAL

Angra	Capacidade de armazenamento das PCUs (Células)	Ocupação Atual (Células)	Elementos combustíveis no núcleo do reator (ECIs)	Esgotamento previsto das PCUs (ano)
Unidade 1	1.252	978	121	dez/21
Unidade 2	1.084	704	193	jul/21

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SOLUÇÃO PROPOSTA

- UFC
- UAS
 - Instalação de armazenamento complementar a seco a ser construída para abrigar até 5 ciclos de recarga das Usinas (mínimo de 460 ECIs);
 - Armazenamento de 37 CASCOS.

REFERENCIAS TÉCNICAS

- Norma CNEN 1.04
 - PPPI
 - PPPF
- 10CFR72 - Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste.
- 10CFR72.214 List of approved spent fuel storage casks.
- NUREG – 1536 – Standard Review Plan for Dry Storage Systems.
- NUREG – 1567 – Standard Review Plan for Spent Fuel Dry Storage Facilities.
- ASME Section III Subsection NB – Rules for Construction of Nuclear Facility Components – Division 1 – Subsection NB – Class 1 Components

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REFERENCIAS ADICIONAIS

NRC FORM 651 (10-2004) 10 CFR 72		U.S. NUCLEAR REGULATORY COMMISSION				
CERTIFICATE OF COMPLIANCE FOR SPENT FUEL STORAGE CASKS			Page 1 of 4			
<p>The U.S. Nuclear Regulatory Commission is issuing this Certificate of Compliance pursuant to Title 10 of the Code of Federal Regulations, Part 72, "Licensing Requirements for Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste" (10 CFR Part 72). This certificate is issued in accordance with 10 CFR 72.238, certifying that the storage design and contents described below meet the applicable safety standards set forth in 10 CFR Part 72, Subpart L, and on the basis of the Final Safety Analysis Report (FSAR) of the cask design. This certificate is conditional upon fulfilling the requirements of 10 CFR Part 72, as applicable, and the conditions specified below.</p>						
Certificate No.	Effective Date	Expiration Date	Docket No.	Amendment No.	Amendment Effective Date	Package Identification No.
1032	June 13, 2011	June 12, 2051	72-1032	0		USA/72-1032
<p>Issued To: (Name/Address)</p> <p>Holtec International Holtec Center 555 Lincoln Drive West Marlton, NJ 08053</p>						
<p>Safety Analysis Report Title</p> <p>Holtec International Final Safety Analysis Report for the HI-STORM FW MPC Storage System</p>						
<p>This certificate is conditioned upon fulfilling the requirements of 10 CFR Part 72, as applicable, the attached Appendix A (Technical Specifications) and Appendix B (Approved Contents and Design Features), and the conditions specified below:</p> <p>APPROVED SPENT FUEL STORAGE CASK</p> <p>Model No.: HI-STORM FW MPC Storage System</p> <p>DESCRIPTION:</p> <p>The HI-STORM FW MPC Storage System consists of the following components: (1) interchangeable multi-purpose canisters (MPCs), which contain the fuel; (2) a storage overpack (HI-STORM FW), which contains the MPC during storage; and (3) a transfer cask (HI-TRAC VW), which contains the MPC during loading, unloading and transfer operations. The MPC stores up to 37 pressurized water reactor fuel assemblies or up to 89 boiling water reactor fuel assemblies.</p> <p>The HI-STORM FW MPC Storage System is certified as described in the Final Safety Analysis Report (FSAR) and in the U. S. Nuclear Regulatory Commission's (NRC) Safety Evaluation Report (SER) accompanying the Certificate of Compliance (CoC).</p> <p>The MPC is the confinement system for the stored fuel. It is a welded, cylindrical canister with a honeycombed fuel basket, a baseplate, a lid, a closure ring, and the canister shell. All MPC components that may come into contact with spent fuel pool water or the ambient environment are made entirely of stainless steel or passivated aluminum/aluminum alloys. The canister shell, baseplate, lid, vent and drain port cover plates, and closure ring are the main confinement boundary components. All confinement boundary components are made entirely of stainless steel. The honeycombed basket provides criticality control.</p>						

NRC FORM 651 (3-1999) 10 CFR 72		U.S. NUCLEAR REGULATORY COMMISSION	
CERTIFICATE OF COMPLIANCE FOR SPENT FUEL STORAGE CASKS		Certificate No. 1032	
Supplemental Sheet		Amendment No. 0	
		Page 4 of 4	
<p>h. Placement of the HI-STORM FW MPC Storage System at the ISFSI.</p> <p>i. HI-STORM FW MPC Storage System unloading, including flooding MPC cavity and removing MPC lid welds. (A mockup may be used for this dry-run exercise.)</p> <p>Any of the above steps can be omitted if they have already been successfully carried out at a site to load a HI-STORM 100 System (USNRC Docket 72-1014).</p>			
<p>10. AUTHORIZATION</p> <p>The HI-STORM FW MPC Storage System, which is authorized by this certificate, is hereby approved for general use by holders of 10 CFR Part 50 licenses for nuclear reactors at reactor sites under the general license issued pursuant to 10 CFR 72.210, subject to the conditions specified by 10 CFR 72.212, this certificate, and the attached Appendices A and B. The HI-STORM FW MPC Storage System may be fabricated and used in accordance with any approved amendment to CoC No. 1032 listed in 10 CFR 72.214. Each of the licensed HI-STORM FW MPC Storage System components (i.e., the MPC, overpack, and transfer cask), if fabricated in accordance with any of the approved CoC Amendments, may be used with one another provided an assessment is performed by the CoC holder that demonstrates design compatibility. The HI-STORM FW MPC Storage System may be installed on an ISFSI pad with the HI-STORM 100 Cask System (USNRC Docket 72-1014) provided an assessment is performed by the CoC holder that demonstrates design compatibility.</p>			
<p>FOR THE U. S. NUCLEAR REGULATORY COMMISSION</p> <p>/RA/</p> <p>Kimberly J. Hardin, Acting Chief Licensing Branch Division of Spent Fuel Storage and Transportation Office of Nuclear Material Safety and Safeguards Washington, DC 20555</p>			
<p>Dated July 14, 2011</p> <p>Attachments: 1. Appendix A 2. Appendix B</p>			

REFERENCIAS ADICIONAIS

FINAL SAFETY ANALYSIS REPORT

ON

THE HI-STORM FW MPC STORAGE SYSTEM

By

Holtec International
 Holtec Center
 One Holtec Drive
 Marlton, NJ 08053
 (holtecinternational.com)

Holtec Project 5018
Holtec Report No. HI-2114830
Safety Category: Safety Significant

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FSAR SECTION REVISION STATUS, LIST OF AFFECTED SECTIONS AND REVISION SUMMARY

FSAR Report No.: HI-2114830

FSAR Revision Number: 3

FSAR Title:

Final Safety Analysis Report on the HI-STORM FW System

This FSAR is submitted to the USNRC in support of Holtec International's application to secure a CoC under 10CFR Part 72.

FSAR review and verification are controlled at the chapter level and changes are annotated at the chapter level.

A section in a chapter is identified by two numerals separated by a decimal. Each section begins on a fresh page. Unless indicated as a "complete revision" in the summary description of change below, if any change in the content is made, then the change is indicated by a "bar" in the right page margin and the revision number of the entire chapter including applicable figures (annotated in the footer) is changed.

A summary description of change is provided below for each FSAR chapter. Minor editorial changes to this FSAR may not be summarized in the description of change.

Chapter 1 (including Glossary and Notation)

Affected Section or Table No.	Current Revision No.	Summary Description of Change
Sub-section 1.0.1	3	Updated the list of ECOs and 72.48 Evaluations for changes that are incorporated into this revision of the FSAR.
Table 1.0.3		Clarified the requirement for vertically lifting the HI-STORM FW system to include tilting of the HI-TRAC VW if needed to clear an obstruction as indicated in Subsection 4.5.1. Also, updated to include Helium leakage testing for the MPC base metals and welds for the shell and baseplate. Both changes were made via ECOs.
Subsection 1.2.1.4.1		Clarified that the fuel basket is always in the vertical orientation when in storage via an ECO.
Subsection 1.2.2.1		See the summary above for Table 1.0.3 on lifting of the HI-STORM FW system.
Subsection 1.2.3		Clarification added that sub-design heat loads are in Chapter 4.
Table 1.2.3		New heat load patterns added for MPC-37 for Amendment 1.
Table 1.2.4		New heat load pattern added for MPC-89 for Amendment 1.



**SITUAÇÃO
AVALIAÇÃO
DO RPAS**

RPAS	PTs
CHAPTER 1: GENERAL DESCRIPTION	PT-CODRE-064/18 *PT-CODRE-108/18
CHAPTER 2: SITE CHARACTERISTICS	
CHAPTER 3: OPERATION SYSTEMS	
CHAPTER 4: SSC AND DESIGN CRITERIA EVALUATION	*PT-CODRE-109/18
CHAPTER 5: INSTALLATION AND STRUCTURAL EVALUATION	
CHAPTER 6: THERMAL EVALUATION	
CHAPTER 7: SHIELDING EVALUATION	PT-CODRE-105/18
CHAPTER 8: CRITICALITY EVALUATION	PT-CODRE-067/18
CHAPTER 9: CONFINEMENT EVALUATION	*PT-CODRE-110/18
CHAPTER 10: CONDUCT OF OPERATIONS EVALUATION	
CHAPTER 11: RADIATION PROTECTION EVALUATION	*PT-CODRE-105/18
CHAPTER 12: QUALITY ASSURANCE EVALUATION	PT-CODRE-004/17
CHAPTER 13: DECOMMISSIONING EVALUATION	*PT-CODRE-111/18
CHAPTER 14: WASTE CONFINEMENT AND MANAGEMENT EVALUATION	
CHAPTER 15: ACCIDENT ANALYSIS	PT-CODRE-063/18
CHAPTER 16: TECHNICAL SPECIFICATIONS	PT-CODRE-106/18
CHAPTER 17: MATERIAL EVALUATION	
CHAPTER 18: AGING MANAGEMENT PROGRAM	*PT-CODRE-112/18
Proteção Contra Incêndio	PT-CODRE-049/18
Proteção Física	PT-DISSEN-001/18 PT-DISSEN-018/18
Questionário Técnico COSAP	PT-COSAP-006/18

SITUAÇÃO COM A UAS

Quantidade de Elementos Combustíveis a serem transferidos até 2040							CASCOS
Ano	2020	2025	2030	2035	2040	Total	Total
Angra 1	220	220	220	220	220	1100	30
Angra 2	260	260	260	260	260	1300	41
Total	480	480	480	480	480	2400	72

CINEMA

LAYOUT

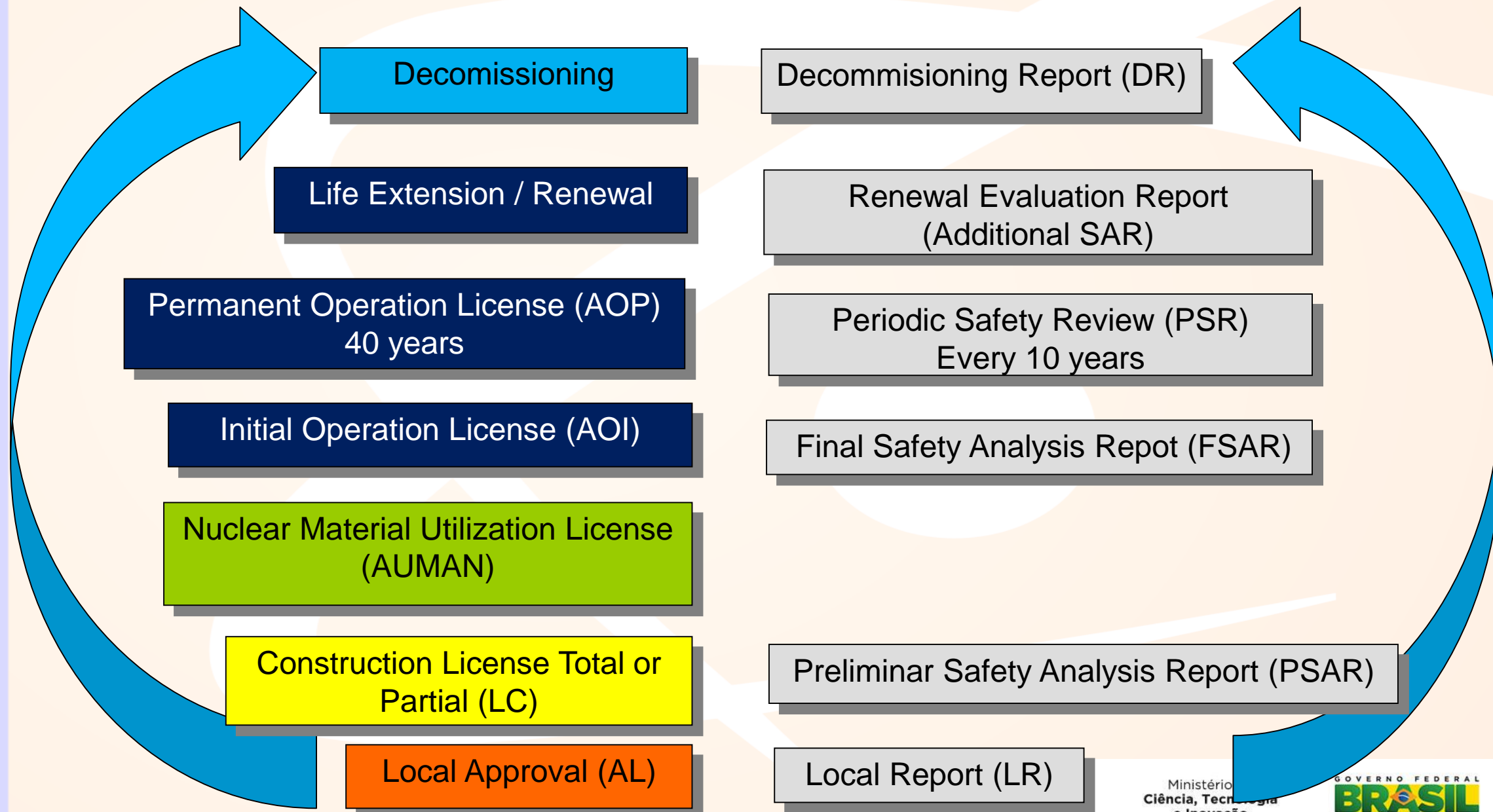


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Licensing Process: Administrative Acts

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Decomissioning

Decommissioning Report (DR)

Life Extension / Renewal

Renewal Evaluation Report (Additional SAR)

Permanent Operation License (AOP)
40 years

Periodic Safety Review (PSR)
Every 10 years

Initial Operation License (AOI)

Final Safety Analysis Report (FSAR)

Nuclear Material Utilization License (AUMAN)

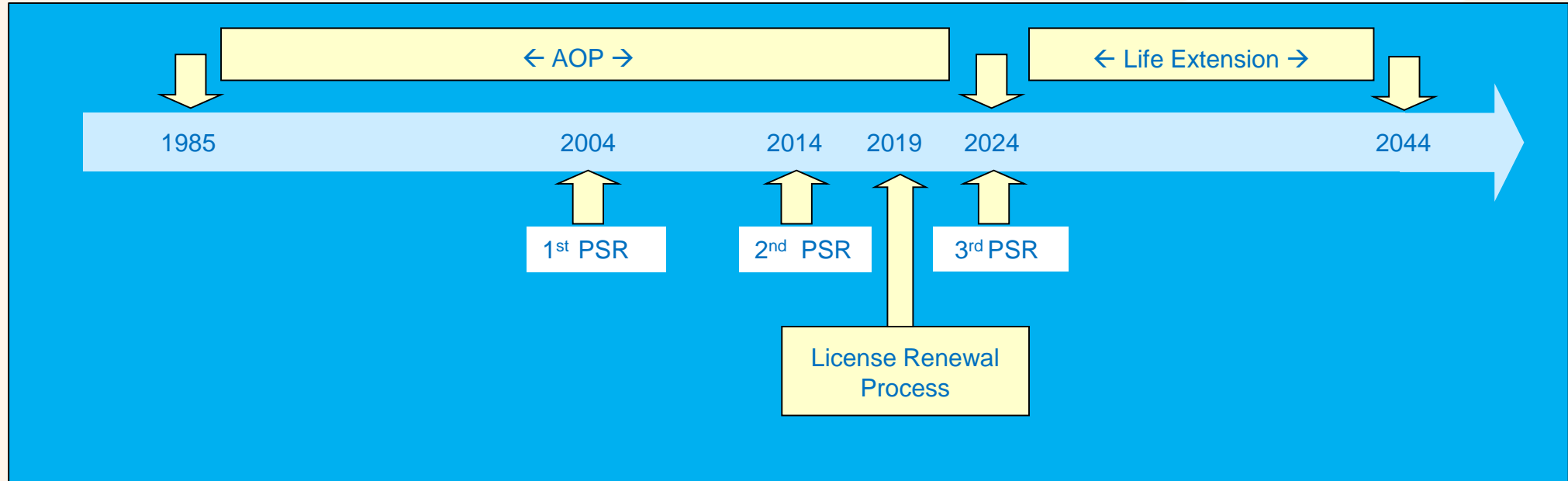
Construction License Total or Partial (LC)

Preliminar Safety Analysis Report (PSAR)

Local Approval (AL)

Local Report (LR)

Licensing Process: Chronological Progression Angra-1



- 1985: Commercial Operation
- 2004: 1st Periodic Safety Report (PSR)
- 2014: 2nd PSR
- 2019: Renewal Submittal (Final Limit)
- 2024: 3rd PSR
- 2024: End of Commercial Operation, start of the Long Term Operation (LTO)
- 2034: 4th PSR, potential continuation of LTO
- 2044: End of the LTO, start of the Decommissioning Process

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