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Naval nuclear propulsion: Brazil

Report by the Director General

A. Introduction

1. This report of the Director General is on Agency safeguards in relation to Brazil's naval nuclear propulsion programme. It provides an update since the Director General's previous report of November 2024.¹

B. Background

B.1. Interactions between the Agency, Brazil and ABACC

2. In December 2021, Brazil informed the Agency of its decision to initiate discussions with the Agency on an arrangement for Special Procedures for the use of nuclear material under safeguards in nuclear propulsion and in the operation of submarines and prototypes, in accordance with Article 13 of the Agreement between the Republic of Argentina, the Federative Republic of Brazil, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) and the Agency (the Quadripartite Safeguards Agreement).²

¹ GOV/INF/2024/13, 15 November 2024.

² Reproduced in document INFCIRC/435.

3. Article 13 of the Quadripartite Safeguards Agreement (QSA) provides that if a State Party intends to exercise its discretion to use nuclear material³ which is required to be safeguarded under the QSA for nuclear propulsion or operation of any vehicle, including submarines and prototypes, or in such other non-proscribed nuclear activity as agreed between the State Party and the Agency, the procedures provided in paras (a) – (c) of Article 13 shall apply. Also, under Article 13 of the QSA, the Agency shall be kept informed of the total quantity and composition of the nuclear material subject to the Special Procedures and of any export of such material.

4. Brazil stated that, in compliance with the requirements set out in Article 13 of the QSA, “the use of the nuclear material for nuclear propulsion of submarines and prototypes will not be in conflict with any undertaking of Brazil under agreements concluded previously with the Agency referring to safeguards” and “during the period of application of the special procedures the nuclear material will not be used for the production of nuclear weapons or other nuclear explosive devices”. It also stated that the Brazilian Navy had developed indigenous technologies for the nuclear fuel cycle and was designing a nuclear-powered conventionally-armed submarine; its nuclear propulsion plant was also being developed indigenously, and the nuclear fuel for the reactor will be produced in Brazilian nuclear facilities, all of which are under Agency and ABACC safeguards.

5. Pursuant to Article 40 of the QSA and Code 3.1.2 of the Subsidiary Arrangements (General Part) to the QSA, Brazil notified the Agency that, in line with the schedule of the nuclear-powered submarine programme, a partial license for its construction had been issued by the Naval Authority for Nuclear Safety and Quality.

6. The Agency aims to ensure that it will be able to continue to fulfil its obligations under the QSA and provide a credible and soundly-based conclusion that the nuclear material that will be subject to the arrangement under Special Procedures pursuant to Article 13 of the QSA will not be diverted to nuclear weapons or other nuclear explosive devices.^{4,5}

7. On 25 May 2022, Brazil provided the Agency with a “proposal of safeguards special procedures for the nuclear material for use in naval propulsion prototypes and in the conventionally armed, nuclear-powered submarine” in relation to the provisions of Article 13 of the QSA. On 26 May 2022, preliminary discussions between Brazil, ABACC and the Agency were initiated. During these discussions, Brazil provided the Agency and ABACC with general information on the nuclear submarine operation, facilities that would be involved in the programme, and what Brazil considered “classified and sensitive technology and information”. In light of these considerations, Brazil indicated the facilities that would be involved in the development of naval nuclear propulsion including a land-based prototype reactor and submarine, and provided its understanding of how safeguards under the QSA could be applied under the arrangement for Special Procedures. The Agency, inter alia, reiterated its commitment to protect related classified knowledge, as required by the QSA and the Agency’s regime for the protection of classified safeguards information.

8. In October and November 2022, the Agency held two meetings with Brazil and ABACC. During the first meeting, upon Brazil’s invitation, the Agency visited relevant facilities. During the second meeting, the Agency presented a conceptual proposal of safeguards measures to be considered as part of the discussions on the arrangement under Special Procedures in relation to Article 13 of the QSA. The Agency’s proposal was customized to protect sensitive information while providing assurance that

³ “Nuclear material” means any source or any special fissionable material as defined in Article XX of the Statute (...). See Article 98.2.O. of INFCIRC/435.

⁴ INFCIRC/435 (QSA) Article 2(a).

⁵ INFCIRC/435 (QSA) Article 13(a)(ii).

the nuclear material being used for nuclear propulsion or in the operation of the prototype reactor would not be diverted.

9. In May 2023, the Agency received from Brazil through ABACC preliminary information related to the planned facilities of the naval nuclear propulsion programme, as required under Article 40 of the QSA and the Subsidiary Arrangements (General Part) to the QSA.

10. From May 2023 to November 2024, the Agency held four meetings with Brazil and ABACC to continue with technical discussions on possible safeguards measures for the land-based prototype reactor and on how classified and sensitive technology and information can be protected while applying such measures. The Agency and ABACC also proposed possible technical measures to protect classified information related to the fuel to be used in the land-based prototype reactor and submarines. In addition, in February 2024, the Agency organized a workshop on 'safeguards-by-design' in Brazil for Brazilian regulators, facility designers and operators.

B.2. Other relevant information

11. On 27 March 2024, open sources, released in the context of the French President's visit to Brazil, reported that France would continue to assist Brazil in the development of its nuclear-powered submarines, without announcing any specific assistance to Brazil. The Agency, in a letter dated 2 May 2024, requested France to provide to the Agency any relevant information, as necessary, in the context of France's reporting obligations under its Additional Protocol (AP).

12. In its reply, dated 15 October 2024, France clarified that its cooperation with Brazil on the conventional components of Brazil's nuclear-powered submarines began in 2008. France also indicated that any aspects of this cooperation relevant to France's legal obligations would continue to be reported to the Agency under France's AP declarations.

C. Developments since previous report

13. Since the Director General's previous report in November 2024, the Agency, ABACC and Brazil have held three negotiation meetings, in Brazil and in Vienna, to continue the technical discussions on the land-based prototype reactor and the fuel to be used in the land-based prototype reactor and submarines. The discussions also addressed the content of the design information for the land-based prototype reactor – which is essential for the Agency and ABACC to develop the safeguards approach for the facility – and a procedure for the design information verification (DIV) during its construction phase, while paying due consideration to the protection of sensitive information.

14. Brazil has provided updated design information for the land-based prototype reactor, and has been requested to provide a further update in response to requests for clarification from the Agency and ABACC.

15. The DIV procedure for the land-based prototype reactor during its construction phase was agreed by all parties. DIVs are being conducted regularly at the facility by the Agency and ABACC, the latest being in October 2025, in accordance with the agreed procedure. In addition to the DIVs, during one of the meetings in Brazil, the Agency visited the land-based prototype reactor and the fuel fabrication plant which is planned to produce fuel for the prototype and the submarines, in order to monitor the progress of their construction.

16. In the first of the three negotiation meetings mentioned above, the parties agreed to establish a Technical Working Group (TWG), with representation from the Brazilian Navy, the Brazilian Ministry

of Foreign Affairs, the newly established Brazilian State nuclear regulatory authority,⁶ ABACC and the Agency. The TWG discussed technical topics with specific objectives in relation to the measures to be applied under Special Procedures, and reported the outcome to the negotiation meetings.

17. The TWG held 10 virtual meetings between May and October 2025 and focused its discussions on verification techniques and equipment that could be applied to the nuclear fuel to be used for the land-based prototype reactor and submarines, and reported the outcome to the negotiation meetings. As a result of those discussions, a common understanding was developed on a technical concept for verifying nuclear material in nuclear fuel. The concept also considered equipment that could be used for such a purpose. TWG has been discussing issues related to the nuclear material to be declared by Brazil and the mechanism to be used by the Agency and ABACC to protect sensitive data, to ensure that sufficient data would be available for the Agency and ABACC to draw safeguards conclusions.

18. In this context, during the meeting in Vienna, Brazilian counterparts visited the Agency's Safeguards Technical and Scientific Services laboratories to view non-destructive assay, and containment and surveillance equipment. The visit provided an opportunity to discuss the equipment that might be used in the application of verification measures in the context of Brazil's naval nuclear propulsion programme.

19. The creation of the TWG has brought together diverse technical expertise and ensured a collaborative approach in addressing complex technical challenges and facilitating progress.

D. Summary

20. Since May 2022, the Agency has engaged Brazil and ABACC on technical discussions in relation to an arrangement under Special Procedures pursuant to Article 13 of the QSA.

21. Brazil has provided to the Agency updated design information for the land-based prototype reactor and the Agency has continued to conduct DIVs at this facility. The Agency will conduct further verification activities at this facility as and when necessary.

22. The Agency, ABACC and Brazil have continued discussions on technical aspects of the arrangement under Special Procedures pursuant to Article 13 of the QSA, and on ways to facilitate possible verification activities in relation to Brazil's naval nuclear propulsion programme. Detailed technical discussions will continue in order to develop the required arrangement. Once the arrangement is finalized, the Director General will transmit it to the Board of Governors for appropriate action.

23. The Director General will continue to report as appropriate.

⁶ The National Nuclear Safety Authority (ANSN).