B-2 - Infrastructure Scope of Work

TABLE OF CONTENTS

1 Basis of Proposal for Infrastructure Scope of Work

The Contractor herein intends to provide this proposal to elaborate on details for implementation of the Engineering Procurement and Construction scope for the retube and retube-related infrastructure for Cernavoda Unit 1 retube and refurbishment. This proposal also provides details related to compliances expected for Infrastructure scope, as outlined in Technical Specification and Descriptive Document included in the RFP.

1.1 Laws, Regulations, Codes and Standards

The Romanian national laws and regulations, codes and standards, and applicable international and Canadian codes and standards, as stated in Annex B Technical Specification, shall be applied to infrastructure designs and works, where applicable.

• Law 111/1996 republished - on the safe conduct, regulation, licensing and control of nuclear activities, with subsequent amendments and completions;

• Law 10/1995 – Regarding quality in civil works, with subsequent amendments and completions;

• Law 50/1991 – regarding authorization of the execution of construction works, with subsequent amendments and completions;

• Law 307/2006 – Regarding firefighting;

• Law 319/2006 – Occupational safety and health;

• Law 16/1996 – Law of national archives

• Law 372/2005 – Energy performance of buildings;

• Normative CR 0-2012 - The basics of the building design;

• SR EN ISO 9001:2001, "Quality management systems. Requirements"

• CR 1-1-3/2012 - Design Code. Assessment of snow action on buildings.

• CR 1-1-4/2012 - Design code. Assessment of wind action on buildings.

• SR EN 1990:2004 – Eurocode: Foundations of structure design;

• SR EN 1990:2004 - Eurocode: Foundations of structure design;

• SR EN 1991-1 - Eurocode 1: Actions on structures;

• SR EN 1992-1 - Eurocode 2: Design of concrete structures;

• SR EN 1997-1 - Eurocode 7: Geotechnical design;

• SR EN 1998-1 - Eurocode 8: Design of structures for earthquake resistance;

• SREN 1991-1-1- Eurocode 1- Actions on Buildings

• HG 1091/2006 – Minimum occupational safety and health requirements;

• GD 300 / 2006 - GD on minimum safety and health requirements for temporary or mobile construction sites;

• C 300-1994. Normative for fire prevention and extinguishing during the execution of construction works and related installations;

• I5-2010 – normative for the design, execution and operation of ventilation and air conditioning installations;

• I7-2011 – normative for the design, execution and operation of electrical installations related to buildings;

• I9-2015 – normative for the design, execution and operation of sanitary installations related to buildings;

• I13-2015 – the norm for the design, execution and operation of central heating installations;

I 18- Standard for the design and execution of low-current indoor electrical installations for civil and production buildings

• P100-1/2013 – seismic design code – Part I – design provisions for buildings;

• P118-1999 – fire safety regulations for buildings;

• P118/3-2015 – fire safety regulations for constructions, Part II – fire detection, signaling and warning installations;

• P118/2-2013 – fire safety regulations for constructions, Part II – extinguishing installations;

• NP 24-97 - Standard for the design and execution of car parks

• NP 068-2002 – normative on the design of civil buildings in terms of the requirement of safety in operation;

• NP 069-2014 – normative on the design, execution and exploitation of roof coverings on the slope of buildings;

• NP 061-2002 – normative for the design and execution of artificial lighting systems in buildings;

• GP 121-2013 – design guide, execution on corrosion protection;

• NP 051-2012 – normative on the adaptation of civil buildings and urban space to the individual needs of people with disabilities;

• HG 907/2016 – stages of development and framework content of technical and economic documentation related to investment objectives/projects financed from public funds, with subsequent amendments and completions;

• DG 343/2017 – Regulations on the reception of civil works;

• HG 925/1995 Regulation regarding the technical verification and expertise of projects, technical expertise of the construction works and, as well as the verification of the works quality;

• HG 766/1997 for the approval of certain regulations on quality in construction; Annex 3 Regulation establishing the category of importance of construction works;

• Order No 3454/2019 amending and supplementing the Methodological Rules for the application of Law No 50/1991 on the authorization of construction works, approved by Order of the Minister for Regional Development and Housing No 839/2009;

• Decision No 62 of 7 February 1996 approving the list of investment and development objectives and the criteria for their implementation, for which the permit of the General Staff is mandatory;

• Order No 180 of 29 November 2022 approving the methodological rules on the approval and authorization of fire safety and civil protection;

• GD 1425/2006 for the approval of the Methodological Norms for the application of the provisions of the Law on Safety and Health at Work no. 319 / 2006;

• NP 112-2014 normative on the design of surface foundations;

• ISO 11799:2015 – Document storage requirements for archive and library materials;

• ISO 14721:2012 –Space data and information transfer systems;

• EC 1/1995 – Regulation on the design of civil buildings

• STAS 6131/79 – Safety heights and the composition of parapets

• Labor protection law, no. 90/1996 and methodological rules of application;

• Regulation on occupational health and safety with order 9/N/15.03.93.

• NCN 01 - Regulation on authorization of the execution of nuclear specific civil works

• NMC-01 - Norms regarding the authorization of quality management systems applied to the construction, operation and decommissioning of nuclear installations, approved by Order of the President of CNCAN no. 65/2003, published in the Official Gazette of Romania, Part I, no. 681 bis of September 26, 2003;

• NMC-02 - Norms regarding the general requirements for quality management systems applied to the construction, operation and decommissioning of nuclear installation, approved by Order of the CNCAN president no. 66/2003, published in the Official Gazette of Romania, Part I, no. 681 bis of September 26, 2003, amended by Order no. 286/2004 of 27.08.2004 published in the Official Gazette of Romania, Part I, no. 874 of 24/09/2004

• NMC-05 - Norms on the specific requirements on the quality management systems applicable for the design of nuclear installations, approved by the CNCAN President's Order no. 69/2003

• NMC-08 - Norms regarding the specific requirements for the quality management systems applied to the construction-assembly activities for nuclear installations, approved by the Order of the CNCAN president no. 72/2003, published in the Official Gazette of Romania, Part I, no. 681 bis of September 26, 2003;

• NMC-07 - Rules on specific requirements for Quality Management Systems applied to the activities of manufacturing products and providing services for nuclear facilities

• NMC-09 - Rules on specific requirements for quality management systems applied to commissioning activities of nuclear installations

• NSN 02 - Nuclear safety rules for the design and construction of nuclear power plants, published in the Official Journal, Part I No 855 bis of 21/21/2010;

• NDR-07 - Norm regarding safety requirements for the decommissioning of nuclear and radiological facilities, approved by Order of the President of CNCAN no. 102/2022 and published in the Official Gazette of Romania, no. 587 of 16.06.2022;

• NSN 07 - Nuclear safety regulations on the preparation of the response to transients, accidents and emergency situations

• NSN 06 - Nuclear safety regulations on the protection of nuclear installations against external events of natural origin

• NSN 09 - Rules on the protection of nuclear power plants against fire and internal explosions

• GSN 07 - Nuclear safety guide on the preparation of the nuclear installation refurbishment, approved by the CNCAN President's Order no. 341 / 09.01.2019,

• GSN 01 - Nuclear safety guide on the industrial codes and standards for nuclear power plants, approved by the CNCAN President's Order no. 51/23.03.2015,

• GSN-09 Guide regarding the development and evaluation of nuclear safety culture

• NGN-01 Nuclear Safety Norm regarding Nuclear Safeguards

• NGN-02 Nuclear Safety Norm Regarding the detailed list of materials, devices, equipment, and information pertinent for proliferation of nuclear weapons and other nuclear explosive devices

• NPF-01 Norms regarding Physical Protection for Nuclear Activities

• NSN-05 Nuclear Safety Norm regarding operating limits and conditions for nuclear facilities

• NSN-14 on the licensing of operating personnel, management personnel and specific training staff of the nuclear power plants, research reactors and other nuclear installations

• NSN – 18 Nuclear Safety Norm regarding event registration, reporting, analysis of events and use of Operating Experience from Nuclear Facilities

• NSN-20 Nuclear Safety Norm regarding nuclear safety policy and independent evaluation of nuclear safety

• NSN-23 Nuclear Safety Norm regarding personnel training, qualification and authorization for nuclear facilities

• NSN-26 Nuclear Safety Norm regarding the interfaces between nuclear safety, radiological safety, physical protection, protection against cyber threats and nuclear safeguards

• NSN-27 Nuclear Safety Norm regarding the use of standards for the evaluation and continuous improvement of nuclear safety for nuclear power plants

• Order No 153/2023 approving the Methodology for the determination of radon concentration in indoor air and workplace air

• Order No 2223/2023 approving the technical regulation "Guide on methods of prevention and control of radon ingress in new buildings, indicative RTC 7-2022".

• Law no. 333/2003 on the protection of objectives, goods, values and personnel

• Decision No 301/2012 approving the methodological rules for the implementation of Law No 333/2003 on the protection of objectives, goods, values and personnel

• GD no. 526/2018 for the approval of the National Radon Action Plan, published in the Official Gazette of Romania, Part I, No. 645/25.VII.2018;

• Ordinance No 600/1997 - On fire protection

• G.D. no. 51/1996 - adopting the Regulation on the approval of the acceptance of assembly works of machinery, equipment, technological installations and the commissioning of production capacities

• Order No 91/1991 - approving the forms, the authorization procedure and the content of the documents provided for by Law 50/1991.

• C29 - Regulation on the improvement of weak foundations by mechanical means

• C56 - Standard on quality control and acceptance of construction works and related installations

• C90 - Regulation on the conditions for the discharge of waste water into the sewerage networks of populated plants

• C140 - Standard for the execution of concrete and reinforced concrete works

• CE 1 - Standard for the design of civil buildings in terms of the operational safety requirement

• CPH1 - Standard for the adaptation of buildings and public places to the requirements of disabled people

• NP 35 - Provisional technical regulations for the protection of concrete floors against the action of vegetable oils and vegetable oil emulsions

• P7 - Standard for the design and execution of constructions founded on ground sensitive to dampness

• P130 - Methodological rules for the monitoring of the performance of constructions over time, including condition monitoring of their technical condition

• NP 058 - 02 - Standard for the design and execution of centralized thermal energy supply systems - networks and thermal points.

• NP 059 - 02 - Rules for the operation of centralized heat supply systems - networks and thermal points

• ME 005-2000 - Manual for drawing up operating instructions for building installations.

• STAS 1242/1 - Foundation soil. General principles of investigation.

• STAS 1243 - Foundation soil. Classification and identification of soils.

• STAS 1846 - External sewers. Flow rates. Design requirements.

• STAS 2448 - Sewers. Manholes. Design requirements

• STAS 2912 - Protection against electrocution. The limits

• STAS 3051 - Sewerage systems. Sewers of outdoor networks. Design requirements.

• STAS 3300/1 - Foundation soil. General principles of calculation.

• STAS 3300/2 - Foundation soil. Calculation of the foundation ground in case of direct foundation.

• STAS 6646/2,3 - Artificial lighting.

• STAS 6701 - Sewers. Siphon drains and storage.

• PE 101/85 Standard for the construction of electrical switchgear and transformers with voltages above 1 kV

• PE 102/86 Standard for the design and execution of connection and distribution installations with voltages up to 1000 V a.c. in energy units

Canadian, American and international standards and codes

• CSA N291-08 (R2013) - Requirements for Safety-Related Structures for CANDU Nuclear Power Plants;

• CSA N293-12 - Fire protection for nuclear power plants;

• CSA N289.1-08 (R2013) - General requirements for seismic design and qualification of CANDU nuclear power plants;

• CSA N289.2-10 - Ground motion determination for seismic qualification of nuclear power plants;

• CSA N289.3-10 - Design procedures for seismic qualification of nuclear power plants;

• CSA N289.4-12 - Testing procedures for seismic qualification of nuclear power plant structures, systems and components;

• CSA N289.5-12 - Seismic instrumentation requirements for nuclear power plants and nuclear facilities;

• CSA N286-12 - Management system requirements for nuclear facilities;

• CSA N286.0.1-14 - Commentary on N286-12, Management system requirements for nuclear facilities;

• CSA N286.7-99 (R2012) - Quality Assurance of Analytical, Scientific and Design Computer Programs for Nuclear Power Plants;

• CSA N286.7.1-09 - Guideline for the application of N286.7-99, Quality assurance of analytical, scientific, and design computer programs for nuclear power plants;

• CSA A23.1 Concrete Materials and Methods of Concrete Construction

• CSA A23.2 Test Methods and Standard Practices for Concrete

• CSA A23.3 Design of Concrete Structures

• CSA N286 Overall Quality Assurance Program Requirements for Nuclear Power Plant

• CSA N286.7 Quality assurance of analytical, scientific, and design computer programs

• CSA N287.1 General Requirements for Concrete Containment Structures for Nuclear Power Plants

• CSA N287.2 Material Requirements for Concrete Containment Structures for Nuclear Power Plants

• CSA N287.3 Design Requirements for Concrete Containment Structures for Nuclear Power Plants

• CSA N287.7 In-Service Examination and Testing Requirements for Concrete Containment Structures for Nuclear Power Plants

• CSA N288.1-14 - Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities;

• CAN/CSA-N288.2-M91 (R2013) - Guidelines for Calculating Radiation Doses to the Public from a Release of Airborne Radioactive Material Under Hypothetical Accident Conditions in Nuclear Reactors;

• CSA N288.3.4-13 - Performance testing of nuclear air- cleaning systems at nuclear facilities;

• CSA N289.1 General Requirements for Seismic Design and Qualification of Nuclear Power Plants

• CSA N289.2 Ground Motion Determination for Seismic Qualification of Nuclear Power Plants

• CSA N289.3 Design Procedures for Seismic Qualification of Nuclear Power Plants

• CSA N289.4 Testing Procedures for Seismic Qualification of Nuclear Power Plants Structures, Systems and Components

• CSA N289.5 Seismic Instrumentation Requirements for CANDU Nuclear Power Plants

• CSA N290.0 General Requirements for Safety Systems of Nuclear Power Plants

• CSA N290.1 Requirements for the Shutdown Systems of CANDU Nuclear Power Plants

• CSA N290.3 Requirements for the Containment System of Nuclear Power Plants

• CSA N290.4 Requirements for the Reactor Regulating Systems of CANDU Nuclear Power Plants

• CSA N290.6 Requirements for Monitoring and Display of CANDU Nuclear Power Plants

• CSA N290.7 Cyber Security for Nuclear Power Plants and Small Reactor Facilities

• CSA N290.12 Human Factors in Design for Nuclear Power Plants

• CSA N290.13 Environmental Qualification of Equipment for CANDU Nuclear Power Plants

• CSA N290.15 Requirements for the Safe Operating Envelope of Nuclear Power Plants

• CSA N290.16 Requirements for Beyond Design Basis Accidents

• CSA N291 Requirements for Nuclear Safety-Related Structures

• CSA N292.0-14 - General principles for the management of radioactive waste and irradiated fuel;

• CSA N292.2-13 - Interim dry storage of irradiated fuel;

• CSA N292.3-14 - Management of low- and intermediate-level radioactive waste.

• CSA N293 Fire Protection for Nuclear Power Plants

• CSA C22.1 Canadian Electrical Code, Part 1- Safety Standards for Electrical Installations

• CSA S16 Design of Steel Structures

• CSA G40.20 General Requirements for Rolled or Welded Structural Quality Steel

• CSA G40.21 Structural Quality Steel

• CSA W59 Welded Steel Construction

• ISO 9001 Quality Management System - requirements

• ASME-BPVC-Section III DIV 3-2013 - Section 3 - Rules for construction of nuclear facility components - Division 3 - Containments for transportation and storage of spent nuclear fuel and high-level radioactive material and waste;

• ASME-BPVC-Section III NCA-2013 - Section 3 - Rules for construction of nuclear facility components - Subsection NCA - General requirements for division 1 and division 2;

• ASME-BPVC-Section III DIV 2-2013 - Section 3 - Rules for construction of nuclear facility components - Division 2 - Code for concrete containments;

• ASME-BPVC-Section III APPENDICES-2013 - Section 3 - Rules for construction of nuclear facility components - Division 1 - Appendices;

• ASME-BPVC-Section III NG-2013 - Section 3 - Rules for construction of nuclear facility components - Division 1 - Subsection NG - Core support structures;

• CSA A 23.3-1970. Code for the design of plain and reinforced structure

• CSA S 16. Steel structures for buildings (1969)

• ACI 318-77 Code for reinforced and prestressed concrete.

Operating documentation to be provided to the Contractor by the Beneficiary (SNN)

• IR-03610-107 Cernavoda NPP Stress Test Report

• U1-20000-ST-CIBF Identification and Coding of Fire Protection Barriers. Vol. A Service Building and D2O

• IR-20000-07 Construction supervision program - structures and finishes, canals and hydrotechnical structures

• IDP-PST-088 Construction Behavior Monitoring at Cernavoda NPP

• 79/82-20000-TH-56, Procedure for routine monitoring of nuclear specific buildings.

• I-067.09.001-C7-002, Procedure for the routine monitoring of classical buildings. Framework procedure for routine monitoring of classical buildings.

• 79/82-20000-TH-57, Procedure for monitoring the behavior over time of buildings in the event of subsidence.

• 79/82-20000-TH-58, Procedure for monitoring the behavior over time of the triangulation system.

• 79/82-20000-TH-62, Procedure for monitoring the time behavior of structures under seismic action.

• IR-20000-025 Annual report on the activity of monitoring the behavior of constructions at the Cernavoda NPP in 2011.

• 79-01040-220-03, rev.0, Assessment of floor response spectra for Service Building Cernavoda Unit 1;

• 79-24000-DE-001, rev.0, Service Building complex;

• 79-24000-DG-001, rev.0, Service Building design requirements;

• AECL, TD-79-01040-220-003, 82.09.21. Assessment of Floor Response Spectra for the Cernavoda U l, Service Building (graphics);

• AECL, TD-79-01040-220-013, 1992-08-12. Assessment of Floor Response Spectra for Cernavoda-U 1, Service Building, D2O Tower and EPS/SCR Building;

• AECL, TD-79-01040-220,1993-26-07. Assessment of Floor Response Spectra for Cernavoda-U 1, Service Building, Part. 1.

• Regulation (EC) No 1907/2006, commonly referred to as REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals)

Laws, standards, Eurocodes, applicable regulations in Romania, in effect.

2 Not used.

3 Procurement

Procurement for the remaining infrastructure buildings will be as per the listing in Annex 3 and will be subject to adjustments during the tender process.

The Contractor will implement equipment labelling in accordance with PSP-P012-005, Rev.0 ‘Color coding and labelling of plant equipment’ prior to shipment.

3.1 General Procurement

- The Contractor will procure all items in Annex 3 to Annex B of the Technical Specification with the exception of the technological components (retube components) required for Building 1.
- The Contractor will procure all materials, machinery and functional equipment requiring erection and transport (including custom clearing) equipment for completion and ensuring the functionality of the infrastructure (Buildings 5, 6, 10 and PCA16A), in accordance with the requirements set out in the Detailed Design - Technical Design and Execution Details.
- The Contractor will purchase all the infrastructure facilities, machinery and equipment set out in, but not limited to, the list of equipment in Annex 3 of Annex B to the Technical Specification.
- The Contractor will ensure that the manufacturing of equipment, components, devices, tools is in accordance with the applicable quality management requirements and technical requirements.
- The Contractor will provide the following documentation on the equipment installed in the retube infrastructure facilities.
    - Operation and Maintenance Manual,
    - Operating Procedure (OP).

4 Construction

The Contractor shall be authorized by CNCAN to NMC-08. The Contractor shall start construction after receiving the construction permits from the Beneficiary and that the site has been turned over to the Contractor. After obtaining the construction permit, the Contractor shall place its Site Organisation on the premises indicated by the Beneficiary. The Contractor shall manage the work, personnel assignment, work safety, construction site security, and work quality for the duration of the construction work.

The Contractor will provide all the necessary equipment, tools, labour, and materials required to perform the work. All specialized tools will be accompanied by necessary documentation for proper and safe usage.

The Contractor will comply with Section 6 provisions of Annex B to DD for Lifting equipment covered by ISCIR PT R 1-2010 1st Ed.

The Contractor confirms to comply with all items included in Section 7 of Technical Specification of Appendix B to DD

The Contractor will be responsible for the construction lifecycle from work preparation to work safety, to work effectiveness, to work quality, and finally to work completion that meets the Beneficiary's provisional and final acceptance criteria.

4.1 Access Control and Physical Protection

The Contractor confirms to comply with requirements stated in Section 10 of Annex B Technical Specification to DD. Access to the Cernavodă NPP site will be granted through the Access Control Points indicated in Sections 4.3.1.7 to 4.3.1.12 of this proposal with respective details provided. Entrance to and exit from the Site shall be through the access control points, which will be controlled by The Beneficiary's security guards. The Contractor shall ensure that access to the site and to all works carried out on the site shall comply with the agreed rules, procedures, instructions and site regulations.

The Beneficiary shall provide general security services for the Site. In the event that the Contractor uses the site provided by the Beneficiary, the Contractor shall take its own precautions against the loss of Equipment and Tools during working hours and shall be responsible for their safety up to the Provisional Acceptance of the respective Infrastructure areas. The Beneficiary shall be responsible for security against the loss of equipment and tools, as well as for safety, outside working hours. The Contractor's site security staffs shall be operationally integrated into a single security system implemented and managed by the Gendarmerie.

During the Project activities, the Contractor who will be assigned premises in use on the Cernavodă NPP site will follow all required laws and regulations enforced at site. The Contractor will provide criminal records and psychological test results for access to the Cernavodă NPP site and will comply with the applicable site access procedures and legislation.

On Cernavodă NPP site, the Contractor's security personnel will be approved, trained and controlled by the gendarmerie unit coordinating the single security system. Where accreditation is required for the Contractor's personnel, including its subcontractors, all information required by the Beneficiary shall be provided in a timely manner in accordance with the procedures of the Plant.

4.2 Not used

4.3 Retube-Related Infrastructure Including Building 5 and Building 6

4.3.1 Scope of Work

For existing structures and storage facilities under retube-related infrastructure, the Contractor will conduct on-site inspection of these facilities, including the access routes, prior to starting planning and design activities. Example of these facilities are the yarding services and the change room modification in the Service Building. The detailed design of Retube Related Infrastructure is currently in progress under Refurbishment Pre-project Contract (PPC2), Amendment #3. The design of Retube Related Infrastructures follows Annex 1 to Annex B to DD, with all the changes or deviations are being finalized in collaboration with SNN and in response to SNN's requests, technical issues, or contractor requests, with the approval of SNN under PPC2 contract.

4.3.1.1 Retube Operation Center (Building # 8)

The purpose of this construction is to install the foundation and concrete work for the Retube Operation Center (ROC). This work will be carried out according to detailed drawings and does not include the installation of operational facilities for the ROC.

- The building is considered container type, temporary and modular.
- The building will be placed on an existing concrete.
- The building services such as HVAC, firefighting and fire detection are built in containers.
- The building must be connected to an external electrical source by SNN.

4.3.1.2 Office Building (Building # 9)

The location of the facility will be inside the protected area of Cernavoda NPP (Cernavoda, Medgidiei street, no. 2, Constanta County), on a free land. Currently, the proposed building location is on existing concrete. The available surface for the construction of the building is 1,400 sqm, the site being constrained to a vertical development due to its physical limitations, the proposed height regime being P+3, four (4) levels respectively.

- The building foundation will be an elevated concrete slab on top of the existing concrete.
- The building structure will be concrete.
- The building will have a technical room at ground floor.
- The building systems will include HVAC, Firefighting, Fire Detection, Lighting, and Communication.
- Thermal point will be installed to facilitate heating using existing hot water system.
- External cladding to be installed on the building façade.

4.3.1.3 Concrete Platform (Building # 11)

The proposed location for this platform is within the protected area of Cernavoda NPP (Cernavoda city, Medgidiei street, no. 2, Constanta County), near the future access gate PCA16, situated in the southern part of DICA at the intersection of the access road to Units 3-5 and Medgidiei street. The land designated for this platform currently consists of an undeveloped broken stone platform at an elevation of 11.0~12.0 dMB, and it is free of burdens. The proposed area for the platform is approximately 27,300 sqm.

- Construction works will include landscaping and leveling to allow alignment with adjacent areas.

4.3.1.4 Access Control Building (Building # PCA12)

The new building will be located inside the Protected Area of Cernavoda NPP (Cernavoda town, Medgidiei street, no.2, Constanta County), on the site of the current PCA12. The land is relatively even, with no major unevenness or slopes. The current site consists of a concrete platform and the existing PCA12. The vertical layout will be designed to direct rainwater to the existing drainage system. Sidewalks will be constructed using anti-slip finished concrete. The new building must accommodate all functions required for an access control building and will be connected to the existing utilities of the Cernavoda NPP site. The specific connections will be detailed individually in the detailed design for the building.

- The building foundation will be an elevated concrete slab on top of the existing concrete.
- The building structure will be concrete.
- The building will have a technical room at ground floor.
- The building systems will include HVAC, Firefighting, Fire Detection, Lighting, and Communication.
- External cladding to be installed on the building façade.

4.3.1.5 Entrance Control Point – DIDR-U5 (Building # PCA13A)

The PCA13A Access Control Point for DIDR-U5, serving Radioactive Waste Storages Unit 5, will include an access control building, foundation for fence, and access gates. The building will be located in the Protected Area of Cernavoda NPP (Cernavoda town, Medgidiei street, no.2, Constanta County) on land adjacent to Unit 5, currently consisting of a stone backfill platform.

The elevation of the platform is 16.0 NMB. The building will be situated between the east side of the Reactor Building and the west edge of Unit 4. The proposed building dimensions are

6.0 m x 11.0 m, with a ground-floor level. A fence will be installed around the DIDR-U5 site.

- The building foundation will be a concrete slab type.
- The building structure will be concrete.

- The building will have a technical room.
- The building systems will include HVAC, Firefighting, Fire Detection, Lighting, and Communication.
- External cladding to be installed on the building façade.
- The building will have three (3) access gates: two (2) in the east area and one (1) in the west area. A motorized sliding gate will be installed.

4.3.1.6 Temporary Entrance Control Point (Building # PCA16)

The PCA16 Access Control Point and Emergency Diesel Building will be located inside the protected area of Cernavoda NPP (Cernavoda city, Medgidiei street, no.2, Constanta County), on vacant land near Unit 5, west of access road no.1 and south of DICA. The land currently consists of a damaged concrete platform, which will be removed. The proposed area for PCA16 is 300.0 sqm (15.0 m x 20.0 m), with a height of Ground Floor + 1 Floor (8.0 m). The Emergency Diesel will occupy 15.0 sqm. Traffic control will include barriers at intervals of approximately 3.0 m and 17.0 m, controlled electronically, with traffic lights operated by PCA16 and bollards installed after the final barrier.

- The building foundation will be an elevated concrete slab on top of the existing concrete.
- The building structure will be concrete.
- The building will have a technical room at ground floor.
- The building systems will include HVAC, Firefighting, Fire Detection, Lighting, and Communication.
- External cladding to be installed on the building façade.

4.3.1.7 Temporary Entrance Control Point (Building # PCA4)

PCA4 will be located in the Protected Area of Cernavoda NPP (Cernavoda town, Medgidiei street, no. 2, Constanta County), next to the current access gate on the north-west side of Unit 2, at the intersection of the access road between Units 2 and 3. The land currently consists of a crushed stone platform, free of charges, at an elevation of 16.0 NMB. The proposed area for PCA4 is approximately 60.0 sqm, with the building at ground floor level. The fence enclosing Unit 2 and Unit 3 will be approximately 500.0 m in length. The new PCA4 building must provide full access control functions for vehicles and personnel and will be connected to all utilities on the Cernavoda NPP platform.

- The building will be container type structure on elevated foundations.
- The building system will include ventilations, HVAC, Firefighting, Lighting, and Communication.

4.3.1.8 Access Control - DIDR U5 (Building # PCA13B)

The new PCA13B building will be located inside the Protected Area of Cernavoda NPP (Cernavoda town, Medgidiei street, no.2, Constanta County). The project involves installing a structure made of 4 modular containers, located adjacent to axis 1, between

rows E1 and F, with access through the existing door in the façade of Service Building of Unit 1. The construction will comply with the P118-1999 standard for Fire Safety of Buildings. Functionally, the building will include an access control room, an operator room, and a technical room.

- Building will be container type structure on elevated foundations.
- Building system will include ventilations, HVAC, Firefighting, Lighting, and Communication.

4.3.1.9 Unit 1 Service Building Changing Room (Building # 15)

This project involves reconfiguring the men's changing room and extending the women's changing room in the Service Building of Unit 1. The modifications will be executed identically to the specifications in document 82-24808-DCN-369. The men's changing room interior spaces will be reorganized, while the women's changing room will be modified based on the document used for the renovation of the changing room in Unit 2. Additional necessary furniture will be ordered and installed as part of this project.

4.3.1.10 Transformer Platforms PT#1 to PT#5 (Building # 17)

The transformer substations will be located within the protected area of Cernavoda NPP, on a free land plot. The 110/6 kV transformer substation will be placed in an open area between pipelines and roads, as per Annex 1. Transformer substations T1 to T5 (6/0.4 kV) will be located on a concrete platform in the open air, as per Annex 2, and will serve various buildings, including Buildings 1, 2, and 7.

Project will be split into three (3) stages as follows:

(1) Development of HV network from existing 110 kV, SNN sub-station up to the new 110/6 kV sub-station; this process will include:

- Placing a new 110 kV cell within the existing SNN sub-stations.
- Executing a new electrical HV cable duct bank between two sub-stations – 300.0 m.
- Hardware integration with existing

communication. (2) Execution 110/6 kV sub-

station which will include:

- Concrete platform 29.0 m x 20.0 m.
- Outdoor lightning, oil separator, exterior fence and gate, inside access road.
- 16 MVA oil transformer including auxiliary equipment + LV terminators.
- Sub-station (command and protection) – 6.0 m x 10.0 m concrete foundations, steel structure and sandwich panels.
- Fire protection wall.

(3) MV network from 110/6 kV sub-station to field transformers:

- Five (5) dry type transformers are modular container type:
  - T1 – will serve Building 1 and Building 7

- T5 – will serve Building 2
- T3 - will serve Building 5 and Building 6
- T4 - will serve Building 9, Building 12 and PCA12
- T5 - will serve Building 10, Building 11, Building 18 and PCA 16

- MV cable network (duct banks) with distance between 300.0 m and 1,300 m.

4.3.1.11 Firewater Tanks and Pump Station (Building # 18)

This construction will be in the protected area of Cernavoda NPP, on a free land area of approximately 525.0 sqm (15.0 m x 35.0 m). The new station will provide all necessary

fire-extinguishing functions for the objectives of the infrastructure project. The station will not be connected to the existing fire network within the CNE Cernavoda, the fire station will be connected to other utilities such as electricity, thermal energy (as needed), fire detection systems, and a public address system.

- The firewater tanks and pump station will be composed from two (2) tanks approximately 1,300 cubic meters each and one fire pump station 14.0 m x 20.0 m.
- Fresh water for re-filling fire tanks will be provided from the Danube River using a floating barge which is placed 300.0 m away. The floating barge will be equipped with two (2) pumps of approximately 15.0 l/s flow.
- The fire pump station will include a filtering system for water, pumps (electrical, diesel + jokey) for firefighting and sprinkler systems.
- The fire pump station will be a steel structure building closed with sandwich panels on all sides. The roof will be inclined to ensure proper water drainage.

4.3.1.12 Relocate Existing Water/Heating Pipe Stacks and Cable Trays (Building # 20)

The relocation of the existing water and heating pipe stacks and cable trays will occur within the protected area of Cernavoda NPP. The current alignment overlaps with the necessary facilities and buildings for the RT-U1 project. This project includes the relocation and re-design of ducts and cable trays that currently provide heating, water supply, and power (6 kV cables), as well as data, telephone, and fiber optic cables. All systems will be re-designed and executed up to the connection points with the necessary infrastructure for the RT-U1 project.

- Relocations of water, heating pipes, and cable trays will one area next to PCA12.
- Relocation water and heating pipes will also be executed in a second location next to Parking Area and entrance next to PCA16. No cables will be relocated in this.
- The new structure will have concrete foundations and will be executed from steel structure.

4.3.1.13 Yarding Services (Building # 21)

This project aims to provide utilities and communication routes for the refurbishment objectives, complying with the P118-1999 fire safety regulations. The project will ensure access roads and utilities for various objectives, including the DIDR-U5 Reactor Building, office building, archive building, and others. Additionally, green spaces will be developed, and parking areas will include litter bins and water supply where necessary. The access roads will be connected to the existing roads according to the regulations for level intersections, with proper signage in place. Next to the access roads, pedestrian walkways will be facilitated for personnel access.

Yarding woks will include:

- Landscaping to ensure proper water drainage between existing and new platforms.
- Landscaping to ensure proper water drainage between existing and future access roads.
- Executing of tie-in points for utilities such as potable water, sewage water and rainwater.
- Executing several pumping stations for sewage, rainwater collection and discharge to designated tie-in points.
- The protection and relocation works must include also the underground utilities for sewage water, potable water, electrical U/G ducts, fire-fighting ring and exterior lighting for the perimeter defined by Building 4.
- Installation of the foundation with ground-levelling of Building 4.

4.3.1.14 Road Services (Building # 22)

Road services will be a continuous road, executed from concrete or asphalt, around

Buildings 1, 2, and 7. It will ensure a minimum width required for access of fire trucks and patrol cars. The road will be aligned on the South side with existing CFSU Fence limited at a maximum width of 3.7 m.

The road will be aligned on the North side with Buildings 1, 2, and 7 and must take into consideration land topography and natural slopes and therefore additional backfilling and soil improvement will be required for stability. The topography of road services may vary between

+13.0 dMB and +16.3 dMB. The road width on the North side will be limited by future extension of DICA. An access road will also be executed from East and West.

- Access roads will be constructed for fire truck and patrol car access around Buildings 1, 2, and 7, and concrete platform for temporary staging of new K-Boxes.

4.3.1.15 Piezometric Wells/Drillings (Building # 23)

The project involves the construction of four (4) observation wells (piezometers) for monitoring groundwater quality at the DIDR-U5 site. The depth of the boreholes will be based on factors such as the lithological profile, water level, and other relevant considerations. Drilling dimensions must be executed in a way that ensures the piezometers fulfill their required functions in accordance with applicable regulations.

4.3.1.16 Summary of Retube-Related Infrastructure SOW

Table 1 – Summary of retube-related infrastructure SOW.

No	UNIT	CONTROLLED AREA	ARCHITECTURE	PILING	MECHANICAL	FOUNDATION	CONCRETE STRUCTURE	STEEL STRUCTURE	ROADS, LANDSCAPE,	EXCAVATION, BACKFILL	LIGHTNING	ELECTRICAL SYSTEM	I&C	RAIN WATER, SEWAGE	DOMESTIC WATER SUPPLY SANITARY, SEWAGE	FIRE FIGHTING	FIRE DETECTION	COMMUNICATION	HVAC	CIVIL REMOVAL	FURNITURE
8	Retube Operation Center	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
9	Office Building	NO	YES	TBD	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES
11	Concrete Platform	NO	NO	NO	NO	YES	NO	NO	YES	YES	NO	YES	NO	YES	NO	YES	NO	NO	NO	YES	NO
15	Changing Room	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
17	Electrical Transformers PT 110/6kV ; T1-T5 - 6/ 0.4kV + Distribution	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	NO
18	Fire water supply station + fire network	NO	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	NO
20	Relocation of existing water/heating pipe stakes and cable trays	NO	NO	NO	YES	YES	NO	YES	NO	YES	NO	YES	NO	NO	YES	NO	NO	YES	NO	YES	NO
21	Yarding services for Unit 1 Refurbishment Project	YES	NO	NO	YES	YES	NO	YES	YES	YES	NO	YES	NO	YES	YES	YES	YES	YES	NO	YES	NO
22	Road Services	YES	NO	No	NO	NO	NO	NO	YES	YES	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO
23	Piezometric Wells/Drillings	YES	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
PCA 4	Temporary access PCA4 & Unit 2 containment	YES	NO	NO	NO	YES	NO	NO	YES	YES	YES	YES	NO	NO	NO	YES	NO	YES	YES	YES	YES
PCA 12	Access Control Building PCA 12	NO	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES
PCA 13A	Entrance Control Point – DIDR-U5	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO	YES
PCA 13B	Temporary access PCA13B	YES	NO	NO	NO	YES	NO	NO	YES	YES	YES	YES	NO	NO	NO	YES	NO	YES	YES	NO	YES
PCA 16	Access Control Building – PCA16 and Emergency Diesel Building	NO	YES	NO	NO	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES

4.3.2 Inputs Required From SNN

- None

4.3.3 Deliverables

Key deliverables are presented in Table 2.

Table 2 – Deliverables items for retube-related Infrastructure.

Item #	Deliverables
1	General Documents: • Hand-over Document & Deliverable Index, • Project Specifications, • Project Quality Plan, • System List, • Health and Safety Plan.
2	Engineering & Procurement Record: • As-built drawings (for new installations only), • Shop drawings, • Request For Information (RFI), • FCR, FCN, DNR, • Calculations sheets, • Vendor's List, • FAT, • IFC Drawing Register, • Equipment labeling, • DTR, • Stock code number.
3	Construction Documents & Certificates: • Method Statement, • Inspection & Test Plan, • Request For Information (RFI), • Material Inspection Request, • Material Approval Request, • Test Reports, • Warranty Certificates, • History Files and History Dockets include documentation of operating instructions and declarations of conformity and technical approval for the materials used.

Item #	Deliverables
4	Commissioning / Turnover Documents: • Commissioning Documents, • SAT, • Turnover Inspection, • Turnover documentation has a permanent record of inspection criteria, plans, results and proposed actions related with engineering, procurement, constructions and commissioning.
5	Operation, Maintenance & Training Manual: • Operation, Maintenance & Safety Manual, • Training Manuals & Materials, • Key Turnover Log.

4.3.4 Building Specific Construction Items

4.3.4.1 Preparation of Construction Work Package (CWP)

The Contractor and/or Subcontractor (or Suppliers) shall be responsible for the following procedures and for providing the required documentation for the approval of CWPs related to the construction of infrastructures, as outlined in Annex B of the Technical Specification:

- Review the design change package or Request for Construction (RFC) package, if available.
- Perform a walkdown to become familiar with the worksite and preparatory work activities.
- Verify system isolation, drainage, and piping conditions, which will require the Beneficiary work records for confirmation.
- Prepare the Welding Procedure Specification (WPS) and ensure welder qualifications if welding is involved.
- Develop the Non-Destructive Examination (NDE) procedure.
- Prepare a Series Equipment List (this includes tools and construction materials, excluding the bill of materials).
- Prepare the transport plan for Major Equipment and Components.
- Prepare, review, and approve detailed work instructions or a comprehensive work plan.
- Prepare the construction Inspection and Test Plan (ITP).
- Collect and prepare necessary documentation, including the lifting plan, safe work plan, etc.
- Develop a plan to ensure compliance with relevant regulations and rules,

including a safety plan for pedestrian and vehicle traffic control during construction.

- Provide necessary training for workers.
- Update the CWP based on feedback from the training.
- Provide the necessary related chemicals used in the infrastructure with certificates of conformity, batch reports, and SDSs in Romanian, along with approval for any new chemicals.

4.3.4.2 General Transport Plan

The transport plan will be submitted once the Detailed Design Engineering (DDE) is completed, and the detailed transport plan will be included in the CWP. The plan will be prepared based on the format and criteria below and will be continuously revised and updated as needed during the contract.

(1) Transport Overview

- Project Name: [Enter project name]
- Date of Preparation: [Enter date]
- Transport Start Date: [Enter planned start date]
- Revision Date: [Enter revision date, if applicable]

(2) Transport Schedule and Notification

- Major Equipment and Heavy/Bulky Equipment:
  - Preliminary Notification: ninety (90) days before transport,
  - Final Notification: seven (7) days before transport.
- Other Equipment and Construction Materials:
  - Preliminary Notification: thirty (30) days before transport,
  - Final Notification: seven (7) days before transport.

(3) Transport Details

- Category of Transported Items: [e.g., tools, materials, equipment]
- Mode of Transport: [e.g., air, rail, sea, road; specify the modes of transport]
- Estimated Transport Volume: [e.g., in units such as trucks, containers, ships, pallets]
- Place of Delivery: [Enter delivery location]
- Estimated Transport Time: [Enter estimated duration of transport]

(4) Additional Information and Updates

- The transport plan will be updated as necessary to reflect any changes during the contract.

4.3.4.3 Mobilization at Sites

- Ensure that the approved CWP and drawings are available on-site.
- Ensure the readiness of all materials, tools, procedures, CWPs, ITPs, etc., before proceeding with execution.
- Transport tools and equipment to the designated work area complying with all applicable legislations and approvals.
- Prepare toolboxes and secure them within the work area.
- Deliver materials and perform a visual inspection to confirm their condition.
- Bring in any new equipment required for the work.
- Issue a FCR if necessary.
- The Contractor shall perform site clearance throughout the entire SOW area, either before or after construction activities. All Contractor's and its subcontractors' personnel will be required to undergo training in accordance with the Beneficiary's procedures and the requirements

4.3.4.4 Site Survey Methodology of Existing Facilities

- Site Assessment:
  - Conduct a thorough survey of the construction site,
  - Identify the presence of underground utilities such as water, gas, electricity, and telecommunications lines.
- Physical Inspection:
  - Perform on-site inspections to locate underground facilities using ground-penetrating radar (GPR) or similar technologies,
  - Examine nearby buildings to assess any potential impact from construction activities.
- Prepare recommendations for excavation practices to avoid damage to underground facilities and surrounding buildings.

4.3.4.5 Review of Implementation Plan for Execution

- Perform a constructability review in collaboration with the Contractor’s designer.
- Report to the Beneficiary on any deviations from the bidding process and construction progress.
- The Contractor shall maintain all materials and equipment on site, ensuring they are solely used for project purposes, and shall keep an up-to-date list of key equipment, tools, and vehicles, which may only be removed from the site with prior notification and consent of the Beneficiary.

4.3.4.6 Piling Works

- The execution of piling works will follow the approved proposal for related buildings.
- Site preparation: clear the area and implement necessary safety measures.
- Equipment mobilization: bring in and set up piling machinery and tools.
- Piling execution: start piling in accordance with design specifications and safety protocols.
- Quality control: monitor and test the piles to ensure structural integrity and load capacity throughout the process.
- After completion, all piling equipment will be removed from the construction areas.

4.3.4.7 Removal Works

- Planning:
  - Develop a detailed removal plan, including safety measures and timelines.
- Site Preparation:
  - Clear the site of any obstructions and establish safety barriers,
  - Disconnect utilities (water, electricity, gas) to ensure a safe removal environment.
- Structural Removal:
  - Execute the main removal using proposed methods,
  - Monitor the process to ensure structural integrity and worker safety.
- Debris Disposal:
  - Sort and dispose of debris, recycling materials where possible,
  - Clean the site to prepare for the next phase of construction or development.

4.3.4.8 Building Works

- Clean the work area.
- Remove existing concrete columns and slabs, then conduct concrete work, shuttering, scaffolding, and rebar fabrication and removal.
- Pour and cure the concrete; conduct painting, masonry, steel structure work (including sandwich panel installation), and roofing work.
- Install doors and windows.
- Install and test fire detection systems, public address systems, QR registration systems, heating systems, hot water systems, IT networks, phone networks, fire extinguishing networks, and fire alarm systems.
- Install ventilation and air conditioning systems and complete piping work.
- Install interior lighting, emergency lighting, elevators, and cranes.

4.3.4.9 Access Road and Utilities Work

- Pave roads and pedestrian walkways; construct sanitary facilities, sewer systems, and electrical installations.
- Install fire extinguishing systems, traffic signals, road markings, and safety signs.
- Provide water supply and filtration systems for storage tanks.
- Install transformers, distribution panels, cell components, circuit breakers, voltage reducers, busbar separators, line separators, etc.

4.3.4.10 Connection or Disconnection Works for Existing Facilities

- Clean the work area.
- Connect or disconnect electricity, cold water supply, and sewerage systems.

4.3.5 Mechanical Completion and Commissioning

The Contractor will comply with the provisions set out in Government Decision **51/1996** part of Mechanical Completion and Commissioning activities. The Contractor also confirms to comply with requirements stated in Section 9 of Annex B Technical Specification to DD and Section 4 of DD Bullet point 8 relate to the commissioning for the infrastructure objectives.

The following tasks will be performed:

- Clean the work area.
- Perform isolation and continuity checks for all electrical, instrumentation, and control cables and connections as required.
- Conduct the final visual inspection and functional tests.
- Inspection of production capacities, which is carried out after completion of functional tests, and verification of the existence of conditions for normal operation at full capacity of machinery/or component.
- Complete a walkdown with QC for final acceptance of work completion.
- Perform a final documentation review with QC.
- Verify that all construction and quality steps are completed, signed off, and comply with all technical and quality requirements.
- Ensure any risk releases have been closed, if applicable.
- Verify all inspection reports are complete.
- Confirm that all photos are complete and organized with a photo index.
- Ensure all Non-Conformance Reports (NCRs) are closed.
- Verify that all identification markings in the field are correct.
- Prepare mark-ups for the installation drawings.
- Verify that all as-installed drawing mark-ups are complete.
- Move dismantled facilities and materials to designated locations outside, as required.
- Remove tools and equipment from the site.
- Collect all construction records and prepare the construction history file/docket.
- Submit the construction history file/docket.
- Notify the Beneficiary of the date of completion of all the works of installation of machinery and technological installations for approval.

4.3.6 Provisional Taking Over (PTO)

After the construction and mechanical completion of the buildings, the Contractor shall commence commissioning and then notify the Beneficiary of the PTO. The PTO process will be performed individually for each building.

The Contractor confirms to comply with requirements of Section 8 of Annex B to DD.