Nuclear Decommissioning Assistance Programme

Kozloduy Programme

Work Programme 2021-2022

Annex 3

Decommissioning programme

1. CURRENT STATE

The beginning of 2020 was marked to a great extent by the global spread of COVID-19 pandemic.

Bulgaria, like most countries, has introduced measures to mitigate the spread of the COVID-19. A state of emergency, declared by the Bulgarian Parliament, continued for two months until mid-May 2020, and some restrictions remained in force until the end of June. By order of the Minister of Energy, SERAW's Executive Director has introduced adequate COVID-19 mitigation measures to ensure continuation of the decommissioning and radioactive waste management activities in a safe manner, thereby significantly reducing the short-term impact on Decommissioning project milestones. As a result, there were no irrecoverable impacts on the activities included in Work Programme 2020 and no cost implications on KIDSF GA 048D for SERAW's salaries due to COVID-19. These measures have ensured that so far there are no financial and/or schedule impacts on the overall decommissioning programme.

SERAW continues focusing on the dismantling of equipment in the Controlled area in accordance with design approved by BNRA and progressing with the identified specific objective performance indicators as per Commission Implementing Decision C(2019) 3073.

The Plasma Melting Facility (Project 5b) second operational campaign was successfully completed on 10 May 2020, and the third, on 10 November. The second operational campaign achieved an average Volume Reduction Factor (VRF) of 22.25 and Treatment Rate of 51.69 kg/h, showing a significant improvement over the results of the first operational campaign - 15.25 and 31 respectively. This was improved in the third one, achieving the treatment of approximately 110 tons of radioactive waste equal to 709 m3 of non-compacted radwaste, demonstrating an improved VRF of 49.2 The annual plan for 2020 (equal to the PMF annual throughput) of 250 tons was fulfilled, with 251 tons of RAW treated in 2020. The contractor has continued supporting SERAW with the supply of necessary spare parts and consumables. The two-year Defect Notification Period expired in November 2020 together with the contractor's support during the commissioning stage of the PMF operation. The contractor's assistance, in particular the expertise of Belgoprocess, remains crucial to enable SERAW to continue operating and maintaining the facility in a safe, reliable and efficient manner. Therefore, SERAW and Belgoprocess have considered the extension of the current term for a further year. This cost will be covered by the not-to-exceed amount of €730,000 already allocated in the contract for the contractor's support and supplies.

The Plasma Melting Facility's (Project 5b) fourth operational campaign commenced on 8 April 2021 following routine repair and maintenance at the beginning of the year. On 18 May, the PMF was shut down due to a cooling water leak in the waste feed tube. SERAW's operational staff removed the feed tube for repair and further defects were revealed in the Primary Treatment Chamber refectory material. Prior to this unplanned outage, 17,812 kg (33.39 m^3) of drummed waste and 35,645 kg (334.31 m^3) of bagged waste, resulting in 22,284 kg (6.29 m^3) of final waste product, demonstrating a volume reduction factor of approximately 58 and a processing rate of 50 kg/hour. The campaign is planned to restart in September and finish in December 2021 subject to facility's continued fault-free operation. The Contractor has continued to support SERAW with the supply of necessary spare parts, consumables and technical advice.

On 15 July 2020, SERAW received the Bulgarian Nuclear Regulator's (BNRA) permit for installation of the equipment for the retrieval and conditioning of wet solid waste(Project 9b-2). In March 2021, SERAW approved the Detailed Design, Quality Assurance Programme and Quality Plan for the installation phase of Wet Solid Waste Treatment (Project 9b-2). On 27 May 2021, SERAW applied to the Ministry of Regional Development and Public Works (MRDPW) for a construction permit for the installation of radioactive waste treatment equipment, which was subsequently issued on 28 July 2021 subject to 14-day appeal period from the date of promulgation in State Gazette. The COVID-19 situation has caused disruption to the supply chain in the USA delaying the procurement of key equipment. Revised delivery dates have now been fixed with the suppliers and the relevant factory acceptance tests will be undertaken prior to shipment from the USA. Considering the above, the onsite installation works have been rescheduled to commence with Bulgarian-sourced equipment prior to the arrival of imported equipment. Thanks to these measures a potential delay has

so far been avoided. D-R PMU is closely monitoring the situation. Equipment installation is expected to start in September 2021.

Meanwhile, SERAW is progressing with the dismantlement of equipment in the emergency boron units to establish buffer storage area(s) with sufficient capacity for the drums produced by Project 9b-2.

On 21 October 2020, the Council of Ministers authorised the Minister of Energy to start negotiating and signing (on behalf of the Government) the nuclear indemnity agreement with the contractor, as provided for in the KIDSF Framework Agreement between the Republic of Bulgaria and EBRD ratified by law and adopted by the 39th National Assembly of Bulgaria. The agreement was fully signed on 14 December 2020.

Regarding Power supply to Facilities and Buildings of Kozloduy NPP Plc. and SERAW (Project 35-1), a Contract Agreement with the selected Contractor was signed on 12 October 2020. The project Kick off Meeting was held on 27 October 2020. The Quality assurance programme was approved in December 2020.

The design packages (Project 44) for the dismantling of equipment in AB-1, and RB Unit 1, excluding Primary Circuit, (Deliverables 3&4) were approved by the Regulator as a modification of systems, structures and components (SSC) in July and April 2020 respectively. The design package for dismantling of the Primary Circuit and components within Unit 1 Reactor Building (Deliverable 5) was approved by SERAW in January 2020 and submitted to BNRA for review. Based on the Technical Specification for all items of plant, equipment and tools for dismantling activities in RBs and ABs (Deliverable 6), the PIS for Project 13b and 13c was updated and approved at the AoC in December 2020.

In continuation of the on-going beneficial synergy between Bohunice and Kozloduy programmes, SERAW finalised the tender process for Transfer of Equipment and Know-How for Decontamination of the Primary Circuits in KNPP Units 1-4 (Project 55-2) and Decontamination of the Primary Circuits of the Kozloduy Nuclear Power Plant, Units 1 to 4 (Project 55-3). JAVYS has provided a valuable information about the DfD (Decontamination for Decommissioning) process based on the decontamination of the Primary Circuit at Bohunice V1 NPP, this successful experience will be applied at Kozloduy. The equipment from Bohunice V1 NPP, necessary for decontamination of the primary circuits of Units 1-4 (Project 55), arrived in two shipments in March - April 2021 and was unloaded at the Kozloduy site. The project to perform the decontamination itself (Project 55-3), however, is behind schedule. Through an agreed action plan, the delay was minimised to three months for the Critical path activity of the Decommissioning Programme, namely "Decontamination of the primary circuit of Unit 3" (the first unit to be decontaminated), scheduled to be completed in December 2021. This delay, though, does not affect the end date of the overall Decommissioning Programme.

Works on Construction of NDF Phase 1 (Project R-10) resumed on 10 June 2020 after suspension of work due to the last year's fatal accident was lifted. Several Senior Management Meetings with the Contractor were held at the beginning of the year to agree upon measures that must be put in place in order to ensure that the highest safety standards and culture are implemented and maintained at site during the whole project duration. Subsequently, the Contractor submitted a Plan for Implementation of Remedial Actions to correct, maintain and monitor the areas of concern related to Contractor's underperformance in the areas of Health and Safety, quality controls, quality of concrete works, project management, site management and maintenance, which was finally approved on 11 May 2020 and incorporated into the Contract as contractual commitment. An enhanced project management organisational structure and Permit-to-Work System were put in place, as a result, Health & Safety improved significantly. Construction works continued. A KPMC site visit was held on 1 October 2020, which witnessed the progress on the spot and appreciated the successfully introduced and implemented measures.

D-R PMU is constantly monitoring compliance with the approved Plan and holds weekly, H&S and monthly progress meetings.

The Contractor has made good progress with the auxiliary buildings and is progressing towards making them weather tight before the winter period. All utility connections for the NDF site have been completed. The test

chamber has also progressed well to demonstrate the contractor's approach for construction of the storage cells.

D-R PMU reviewed the performance of the NDF Phase I construction contractor at a Senior Management meeting on 23 October 2020. The main areas that require further improvement include increase of the on-site workforce and planning of work. D-R PMU continues strictly monitoring these areas. Once these improvements are in place, D-R PMU will finalise the evaluation of the contractor's performance against the agreed Plan for Implementation of Remedial Actions. Meanwhile, D-R PMU extended the evaluation period by three months under the provisions of the signed Contract Amendment 4. This extension in no way affects the progress and quality of the construction works in line with the highest safety standards and culture during the whole duration of the project.

Several Senior Management Meetings with the Contractor were held already in 2021, at which D-R PMU emphasized the main areas requiring further improvement by noting that the workforce almost doubled in May 2021 against the workforce since the resumption of work in June 2020, but still not yet sufficient to achieve the required levels of progress. A resourced Contract Programme which ensures that the highest levels of Health & Safety Standards are maintained for the whole duration of the contract, was agreed following the subsequent iterative review process. 'In principle' agreement for EoT until October 2023 was reached, ensuring that the highest levels of Health & Safety Standards will be maintained for the whole duration of the contract subject to the Contractor's satisfactory performance (including the provision of the increased workforce resources) and monitoring. This extension of time is not subject to any contract price increase under R-Project 10. In this context, the geodetic, hydrogeological and radiological predisposal monitoring of the Radiana site (R-Projects 3A-A, 3E-A and 3F-A) as well as Designer's and Independent construction supervision services (R-Projects 8 and 9) will be extended to align with the updated NDF Phase 1 construction schedule within the funds already allocated for these tasks in Decommissioning Cost Estimate under KIDSF Grant Agreements 035E and 046B.

2. DESCRIPTION OF THE ACTION

List of activities included in the detailed decommissioning plan (WBS) for the period 2021-2022:

WBS Number	Activity Group	Activities - 2021	Activities - 2022
01	**Pre-decommissioning actions**		
01.0500	Authorisation	- Preparation of documentation for the application of Plasma Melting Facility licensing (Project 5b) - Preparation of documents for applying for RAW Processing Facility license (after modernization) - Development of licensing documentation for commissioning of Phase 1 of the National Disposal Facility - Preparation of documentation for the application for Facility for Retrieval and Processing of Historical Wet Solid Wastes licensing (Project 9b-2) - Preparation of documentation for the application for Power Supply to Facilities and Buildings of KNPP and SERAW (Project 35-1) - Preparation of documentation for the application for the decontamination of Primary Circuits of Unit 1-4 (Project 55-3) Preparation of documentation for the coordination and approval of dismantling activities in Reactor Building of Units 1-4	- Preparation of documentation for the application of Plasma Melting Facility licensing (Project 5b) - Preparation of documents for applying for RAW Processing Facility license (after modernization) - Development of licensing documentation for commissioning of Phase 1 of the National Disposal Facility - Preparation of documentation for the application for Facility for Retrieval and Processing of Historical Wet Solid Wastes licensing (Project 9b-2) - Preparation of documentation for the application for Power Supply to Facilities and Buildings of KNPP and SERAW (Project 35-1) - Preparation of documentation for the application for Deliverable 7 -Design for the modification and upgrade the Reactor Building of Units 3 and 4 to facilitate the Storage of Activated Components arising from the Decommissioning of Units 1 to 4 (Project 44) - Preparation of documentation for the coordination and approval of dismantling activities in Reactor Building of Units 1-4
02	**Facility shutdown activities**		
02.0200	Mode of operation of Units 1&2 as a RAW Management Facility	- Removal of historical waste from Units 1&2 as per the annual schedule for treatment and conditioning of RAW	- Removal of historical waste from Units 1&2 as per the annual schedule for treatment and conditioning of RAW
02.0400	Mode of operation of Units 3&4 as a RAW Management Facility	- Removal of historical waste from Units 3&4 as per the annual schedule for treatment and conditioning of RAW.	- Removal of historical waste from Units 3&4 as per the annual schedule for treatment and conditioning of RAW
03	**Dismantling activities outside Controlled Area**		
03.0700	Activities in DGS-1	- ***Project 39-2***: Reconstruction of the DGS-1 Building for Decommissioning Purposes	
03.0800	Activities in CPS-1	- Preparatory activities for dismantling at CPS-1 (ЦПС-1) - Planning the Dismantling Activities in CPS-1 - Dismantling Activities in CPS-1	- Planning the Dismantling Activities in CPS-1 - Dismantling Activities in CPS-1

WBS Number	Activity Group	Activities - 2021	Activities - 2022
04	**Dismantling activities within the Controlled Area**		
04.0100	Preparation of Reactor Building of Units 1&2 for dismantling	- Removal of fluids from the systems - Switching off / disconnecting of all electrical systems which are not needed - Removal of the insulation from the systems in accordance with the decontamination plan - Supervision and setting up of systems and equipment deemed to be used during decommissioning (handling and lifting equipment) - Adapting of the ventilation systems in the RB - Setting up and maintaining the systems which remain in operation - Installation of new systems - Primary circuit decontamination and of the auxiliary systems (after cost benefit assessment) - Preparatory works for decontamination of primary circuit (SERAW) - Decontamination, draining, rinsing, drying and isolation of the technological systems which are not needed for the decommissioning	- Removal of fluids from the systems - Switching off / disconnecting of all electrical systems which are not needed - Removal of the insulation from the systems in accordance with the decontamination plan - Supervision and setting up of systems and equipment deemed to be used during decommissioning (handling and lifting equipment) - Adapting of the ventilation systems in the RB - Setting up and maintaining the systems which remain in operation - Installation of new systems - Primary circuit decontamination and of the auxiliary systems (after cost benefit assessment) - Preparatory works for decontamination of primary circuit (SERAW) - Decontamination, draining, rinsing, drying and isolation of the technological systems which are not needed for the decommissioning
04.0200	Preparation of Reactor Building of Units 3&4 for dismantling	- Isolation of all systems which are not needed for dismantling - Isolation of the operating part and not operating part of the systems above - Removal of fluids from the systems - Switching off / disconnecting of all electrical systems, which are not needed - Removal of the insulation from the systems in accordance with the decontamination plan - Supervision and setting up of the systems and the equipment deemed to be used during decommissioning (systems for handling, lifting equipment) - Setting up and maintaining the systems, which remain in operation - Installation of new systems - Primary circuit decontamination and of the auxiliary systems (after cost benefit assessment) - Preparatory works for decontamination of primary circuit (SERAW) - Decontamination, draining, rinsing, drying and isolation of the technological systems which are not needed for the decommissioning	- Isolation of all systems which are not needed for dismantling - Isolation of the operating part and not operating part of the systems above - Removal of fluids from the systems - Switching off / disconnecting of all electrical systems, which are not needed - Removal of the insulation from the systems in accordance with the decontamination plan - Supervision and setting up of the systems and the equipment deemed to be used during decommissioning (systems for handling, lifting equipment) - Setting up and maintaining the systems, which remain in operation - Installation of new systems - Primary circuit decontamination and of the auxiliary systems (after cost benefit assessment) - Decontamination, draining, rinsing, drying and isolation of the technological systems which are not needed for the decommissioning

WBS Number	Activity Group	Activities - 2021	Activities - 2022
04.0300	Planning the dismantling activities within controlled area of Units 1-4	- ***Project 44:*** Elaboration of a Design for Dismantling of Equipment in the Controlled Areas of KNPP Units 1-4. Delivery 7 - Detailed concurrent planning during dismantling of ventilation systems within Controlled Area of Units 1-4 - Detailed concurrent planning during dismantling of ventilation systems in RB of Units 3&4 - Planning the dismantling of recirculation ventilation system cooling the reactor cavity and the hermetic rooms 1÷5P-1 - Detailed concurrent planning during dismantling of electrical systems within Controlled Area of Units 1-4 - Detailed concurrent planning during the dismantling of I&C systems within Controlled Area of Units 1-4 - Detailed concurrent planning during the dismantling of technological systems within Reactor Buildings of Units 1-4 - Detailed concurrent planning during the dismantling of technological systems within Reactor Buildings of Units 1&2 - Planning the dismantling of system for SFP filling and cooling - Detailed concurrent planning during the dismantling of technological systems within Reactor Buildings of Units 3&4 - Planning the dismantling of main steam lines in the SGC (БПГ) - Planning the dismantling of feed water in the Reactor Building - Planning the dismantling of Steam Generators - Detailed concurrent planning during the dismantling of technological and ventilation systems within AB-1 and AB-2	- ***Project 44:*** Elaboration of a Design for Dismantling of Equipment in the Controlled Areas of KNPP Units 1-4. Delivery 7 - Detailed concurrent planning during dismantling of ventilation systems within Controlled Area of Units 1-4 - Detailed concurrent planning during dismantling of ventilation systems in RB of Units 3&4 - Planning the dismantling of recirculation ventilation system cooling the reactor cavity and the hermetic rooms 1÷5P-1 - Detailed concurrent planning during dismantling of electrical systems within Controlled Area of Units 1-4 - Detailed concurrent planning during the dismantling of I&C systems within Controlled Area of Units 1-4 - Detailed concurrent planning during the dismantling of technological systems within Reactor Buildings of Units 1-4 - Detailed concurrent planning during the dismantling of technological systems within Reactor Buildings of Units 1&2 - Detailed concurrent planning during the dismantling of technological systems within Reactor Buildings of Units 3&4 - Planning the dismantling of main steam lines in the SGC (БПГ) - Planning the dismantling of feed water in the Reactor Building - Planning the dismantling of Steam Generators - Detailed concurrent planning during the dismantling of technological and ventilation systems within AB-1 and AB-2

WBS Number	Activity Group	Activities - 2021	Activities - 2022
04.0400	Dismantling activities in Reactor Building of Units 1&2 and AB-1	- Dismantling of electrical systems in RB of Units 1&2 - Dismantling of I&C systems in RB of Units 1&2 - Dismantling of technological systems in RB of Units 1&2 - Dismantling of AESGFW (ДСАПП) - Dismantling of AESGFW (ДСАПП) - Unit 1 - Dismantling of AESGFW (ДСАПП) - Unit 2 - Dismantling of system for SFP filling and cooling - Dismantling of technological equipment in AB-1	- Dismantling of electrical systems in RB of Units 1&2 - Dismantling of I&C systems in RB of Units 1&2 - Dismantling of technological systems in RB of Units 1&2 - Dismantling of technological equipment in AB-1
04.0500	Dismantling activities in Reactor Building of Units 3&4 and AB-2	- Dismantling of ventilation systems in RB of Units 3&4 - Dismantling of recirculation ventilation system cooling the reactor cavity and the hermetic rooms 1÷5 P-1 - Dismantling of electrical systems in RB of Units 3&4 - Dismantling of I&C systems in RB of Units 3&4 - Dismantling of technological systems in RB of Units 3&4 - Dismantling of interim circuit, RCPS (СУЗ) - Unit 3 - Dismantling of MC MCP (МК ГЦП) - Unit 3 - Dismantling of sprinkler system - Unit 3 - Dismantling of Primary Circuit Safety Injection System- Unit 3 - Dismantling of insulations - Dismantling of Insulation of a steam generators - after decontamination - Dismantling of Insulation of pipelines from AESGFW (ДСАПП) - Dismantling of Steam generators - Dismantling of technological equipment in AB-2 - Dismantling of SVO-5, filtration part - Dismantling of SVO-3, filtration part	- Dismantling of ventilation systems in RB of Units 3&4 - Dismantling of recirculation ventilation system cooling the reactor cavity and the hermetic rooms 1÷5 P-1 - Dismantling of electrical systems in RB of Units 3&4 - Dismantling of I&C systems in RB of Units 3&4 - Dismantling of technological systems in RB of Units 3&4 - Dismantling of insulations - Dismantling of Insulation of a steam generators - after decontamination - Dismantling of Steam generators - Dismantling of technological equipment in AB-2

WBS Number	Activity Group	Activities - 2021	Activities - 2022
04.0600	Decontamination activities in Reactor Buildings of Units 1-4	- Decontamination of equipment and rooms prior to dismantling - Project 55-2: Transfer of equipment, related requirements and associated services for the decontamination of the primary circuits in Kozloduy NPP Units 1 to 4 - Decontamination of equipment and rooms prior to dismantling - Project 55-3: Decontamination of the Primary Circuits of the Kozloduy Nuclear Power Plant, Units 1 to 4 - Decontamination of closed systems for dose reduction	- ***Project 55-2:*** Transfer of equipment, related requirements and associated services for the decontamination of the primary circuits in Kozloduy NPP Units 1 to 4 - Decontamination of equipment and rooms prior to dismantling - Project 55-3: Decontamination of the Primary Circuits of the Kozloduy Nuclear Power Plant, Units 1 to 4 - Decontamination of closed systems for dose reduction
04.0700	Procurement of equipment for dismantling within the controlled area	- ***Project 13b-c:*** Procurement of Tools and Equipment for dismantling and size reduction within the Controlled Area	- ***Project 13b-c:*** Procurement of Tools and Equipment for dismantling and size reduction within the Controlled Area
05	**Waste Processing, Storage and Disposal**		
05.0100	Construction of National Disposal Facility Radiana	- ***Project R-3a-a:*** Predisposal Monitoring of the Radiana site Continuation of geodesic monitoring - ***Project R-3e-a:*** Predisposal Monitoring of the Radiana site Continuation of the hydrogeological monitoring and geochemical analyses - ***Project R-3f-a***: Pre-disposal Monitoring of the Radiana Site. Continuation of the radiological monitoring - ***Project R3g:*** Predisposal Meteorological Monitoring of Radiana Site - ***Project R-4d-4:*** Preparation of Radiana site. Construction works for relocation of irrigation channel M1 - ***Project R-5:*** Technical design and ISAR preparation for NDF - ***Project R-5K-1:*** Design of multilayer test cover - ***Project R-8:*** Designer's supervision of NDF Phase 1 Construction - ***Project R-9:*** Independent supervision of NDF Phase 1 Construction - ***Project R-10:*** Construction of NDF Phase 1 - ***Project R-11:*** Development of licensing documentation for commissioning of NDF Phase 1 - Support services and security	- ***Project R-3a-a:*** Predisposal Monitoring of the Radiana site Continuation of geodesic monitoring - ***Project R-3e-a:*** Predisposal Monitoring of the Radiana site Continuation of the hydrogeological monitoring and geochemical analyses - ***Project R-3f-a***: Pre-disposal Monitoring of the Radiana Site. Continuation of the radiological monitoring - ***Project R-4d-4:*** Preparation of Radiana site. Construction works for relocation of irrigation channel M1 - ***Project R-5:*** Technical design and ISAR preparation for NDF - ***Project R-5K-1:*** Design of multilayer test cover - ***Project R-8:*** Designer's supervision of NDF Phase 1 Construction - ***Project R-9:*** Independent supervision of NDF Phase 1 Construction - ***Project R-10:*** Construction of NDF Phase 1 - ***Project R-11:*** Development of licensing documentation for commissioning of NDF Phase 1 - Support services and security

WBS Number	Activity Group	Activities - 2021	Activities - 2022
05.0200	Reconstruction of existing facilities and procurement of additional equipment for management of historical waste	- ***Project 5b:*** Facility for Treatment and Conditioning of Solid Radioactive Waste with a High Volume Reduction Factor **(**technical support**)** - ***Project 32b-6:*** Design and implementation of Emergency Power Supply to the Consumers of Compressed Air Nitrogen Station to the PMF - ***Project 32b-7:*** Design, supply and installation of pipeline for ammonia water and sodium hydroxide from the existing AB-2 infrastructure to the PMF - ***Project 32b-8:*** Procurement of a tanker for collection, transport, compliant storage and feed supply of the ammonia water via the existing water purification plant in Auxiliary Building 2 (AB2)	
05.0300	Reconstruction of existing facilities and procurement of additional equipment for management of materials from the decommissioning activities	- ***Project 38-3:*** Supply of Loading and Transportation Equipment for Waste from Decommissioning of KNPP Units 1-4 - ***Project 44:*** Preparation of the Technical Design and SAR for the modification and upgrade the Reactor Building of Units 3 and 4 to facilitate the Storage of Activated Components arising from the Decommissioning of Units 1 to 4 (design part of Project 50) - ***Project 48***: Modernisation and Reconstruction of SD RAW-Kozloduy to Receive and Process Decommissioning RAW - ***Project 49:*** Supply of containers for storage of activated materials - ***Project 50:*** Reconstruction of the RB for temporary storage of containers with activated materials (design phase ongoing under Project 44)	- ***Project 44:*** Preparation of the Technical Design and SAR for the modification and upgrade the Reactor Building of Units 3 and 4 to facilitate the Storage of Activated Components arising from the Decommissioning of Units 1 to 4 (design part of Project 50) - ***Project 48***: Modernisation and Reconstruction of SD RAW-Kozloduy to Receive and Process Decommissioning RAW - ***Project 49:*** Supply of containers for storage of activated materials - ***Project 50:*** Reconstruction of the RB for temporary storage of containers with activated materials
05.0400	Management of historical RAW	- ***Project 9b-2***: Retrieval and Processing of the Historical Wet Solid Waste - Retrieval and Processing of the Historical Solid Waste - Reducing the volume of RAW using PMF - Procurement/ Manufacturing of RCC for conditioning historical waste - Final conditioning of historical waste in RCC - Temporary storage of RCC with historical waste	- ***Project 9b-2***: Retrieval and Processing of the Historical Wet Solid Waste - Retrieval and Processing of the Historical Solid Waste - Reducing the volume of RAW using PMF - Procurement/ Manufacturing of RCC for conditioning historical waste - Final conditioning of historical waste in RCC - Temporary storage of RCC with historical waste

WBS Number	Activity Group	Activities - 2021	Activities - 2022
05.0500	Management of decommissioning waste and materials	- Initial measurement, characterisation and sorting - Temporary storage of non-radioactive materials - Temporary storage of radioactive materials - Temporary storage in Turbine Hall - Temporary storage in Reactor Buildings - Decontamination of radioactive materials in the SRDW - Measurements for release from Regulation - Disposal of non-radioactive waste - Processing the decommissioning solid waste in RAW TF - Processing the secondary liquid waste from SRDW - Processing the decommissioning liquid waste from AB-2 (or from a temporary storage tank) in RAW TF - Manufacturing of RCC for conditioning decommissioning waste - Final conditioning of decommissioning waste in RCC - Temporary storage of RCC with decommissioning waste	- Initial measurement, characterisation and sorting - Temporary storage of non-radioactive materials - Temporary storage of radioactive materials - Temporary storage in Turbine Hall - Temporary storage in Reactor Buildings - Decontamination of radioactive materials in the SRDW - Measurements for release from Regulation - Disposal of non-radioactive waste - Processing the decommissioning solid waste in RAW TF - Processing the secondary liquid waste from SRDW - Processing the decommissioning liquid waste from AB-2 (or from a temporary storage tank) in RAW TF - Manufacturing of RCC for conditioning decommissioning waste - Final conditioning of decommissioning waste in RCC - Temporary storage of RCC with decommissioning waste
06	**Site Infrastructure and Operation**		
06.0100	Site security and surveillance	- Site security and personnel access	- Site security and personnel access
06.0200	Site operation and maintenance	- ***Project 35-1:*** The Power Supply to Facilities and Buildings of KNPP and SERAW - ***Project 35-2:*** Fluid supply to facilities and buildings of Kozloduy NPP plc and SERAW - Inspection and maintenance of buildings and systems - Site upkeep activities - Utilities	- ***Project 35-1:*** The Power Supply to Facilities and Buildings of KNPP and SERAW - ***Project 35-2:*** Fluid supply to facilities and buildings of Kozloduy NPP plc and SERAW - Inspection and maintenance of buildings and systems - Site upkeep activities - Utilities

WBS Number	Activity Group	Activities - 2021	Activities - 2022
06.0300	Operation of support systems	- Readjustment and operation of electrical and lighting systems according to the requirements of decommissioning - Readjustment and operation of ventilation systems according to the requirements of decommissioning - Readjustment and operation of heat and steam systems according to the requirements of decommissioning - Readjustment and operation of water supply and fire extinguishing systems according to the requirements of decommissioning - Readjustment and operation of sewage systems according to the requirements of decommissioning - Readjustment and operation of compressed air systems according to the requirements of decommissioning	- Readjustment and operation of electrical and lighting systems according to the requirements of decommissioning - Readjustment and operation of ventilation systems according to the requirements of decommissioning - Readjustment and operation of heat and steam systems according to the requirements of decommissioning - Readjustment and operation of water supply and fire extinguishing systems according to the requirements of decommissioning - Readjustment and operation of sewage systems according to the requirements of decommissioning - Readjustment and operation of compressed air systems according to the requirements of decommissioning
06.0400	Radiation and environmental safety monitoring	- Radiation protection and monitoring - Environmental protection and radiation environmental monitoring	- Radiation protection and monitoring - Environmental protection and radiation environmental monitoring
07	**Project Management, Engineering and Support**		
07.0100	Project Management by consultant	- DR-CON	- DR-CON
07.0200	Project Management	- Project Management for D-R PMU - Quality assurance and quality surveillance - General administration and accounting - Public relations	- Project Management for D-R PMU - Quality assurance and quality surveillance - General administration and accounting - Public relations
07.0300	Decommissioning management system	- Operation of System for Management of Decommissioning Materials	- Operation of System for Management of Decommissioning Materials
07.0400	Support services	- Engineering Support - Waste management support - Decommissioning support including chemistry, decontamination - Training and Development in Decommissioning - Training of personnel - Documentation and records control - Procurement, warehousing and materials handling - Housing, office equipment, support services	- Engineering Support - Waste management support - Decommissioning support including chemistry, decontamination - Training and Development in Decommissioning - Training of personnel - Documentation and records control - Procurement, warehousing and materials handling - Housing, office equipment, support services
07.0500	Health and safety	- Health physics - Industrial safety - Personnel safety equipment and work clothing	- Health physics - Industrial safety - Personnel safety equipment and work clothing
08	**Fuel and Activated Material**		
08.0300	Temporary Storage of activated material	- Temporary storage of boron absorbers and dummy assemblies in Reactor Building	- Temporary storage of boron absorbers and dummy assemblies in Reactor Building

2.1. Significant milestones

The table as follows provides an overview of milestones to achieve in the 2 years. It includes the drafting and submission of all grant agreements or equivalent, essential deliverables important for the continuation of the programme and procurement procedures of higher value.

WBS Number	Activity Group	Milestone	Date
01.0500	Authorisation	Preparation of documentation for the application of Plasma Melting Facility licensing (Submission of license documentation to BNRA)	19-09-2021
01.0500	Authorisation	Preparation of documentation for the application of Plasma Melting Facility licensing (Issuance of operational license by BNRA)	01-06-2022
01.0500	Authorisation	Preparation of documents for applying for RAW Processing Facility license (Project 48-1 BNRA permit for modernisation)	31-07-2021
01.0500	Authorisation	Preparation of documentation for the application for Facility for Retrieval and Processing of Historical Wet Solid Wastes licensing (Project 9b-2 Construction Permit by the MRDPW)	31-07-2021
04.0215	Decontamination activities in Reactor Buildings of Units 1-4	Decontamination of primary circuit unit 3 (Project 55-3)	14-12-2021
04.0215	Decontamination activities in Reactor Buildings of Units 1-4	Decontamination of primary circuit unit 4 (Project 55-3)	10-02-2022
04.0215	Decontamination activities in Reactor Buildings of Units 1-4	Decontamination of primary circuit unit 1 (Project 55-3)	30-04-2022
04.0215	Decontamination activities in Reactor Buildings of Units 1-4	Decontamination of primary circuit unit 2 (Project 55-3)	27-06-2022
04.0400	Dismantling activities in Reactor Building of Units 1&2 and AB-1	Dismantling of technological equipment in AB-1/ Dismantling in BK 201 is finished and BK 201 is ready for Installation of the equipment under Project 9b-2	30-06-2021
04.0500	Dismantling activities in Reactor Building of Units 3&4 and AB-2	Dismantling of technological equipment in AB-2 Dismantling of SVO-5, filtration part Dismantling of SVO-3, filtration part	30-12-2021
04.0500	Dismantling activities in Reactor Building of Units 3&4 and AB-2	Dismantling of Steam generators – 3 (three) Steam Generators of Unit 3	15-12-2022
04.0700	Procurement of equipment for dismantling within the controlled area	Procurement of Tools and Equipment for dismantling and size reduction within the Controlled Area (Project 13b-c)	31-12-2021
05.0300	Reconstruction of existing facilities and procurement of additional equipment for management of materials from the decommissioning activities	Modernisation and Reconstruction of SD RAW-Kozloduy to Receive and Process Decommissioning RAW; Procurement of Supply and Implementation Phase (Project 48)	31-01-2022
05.0300	Reconstruction of existing facilities and procurement of additional equipment for management of materials from the decommissioning activities	Projects 46 & 49: Supply of containers for storage of activated materials (PIS preparation and submission for approval)	17-11-2022
05.0300	Reconstruction of existing facilities and procurement of additional equipment for management of materials from the decommissioning activities	Project 50: Reconstruction of the RB for temporary storage of containers with activated materials (PIS preparation and submission for approval)	17-11-2022
05.0400	Management of historical RAW	Project 9b-2: Completion of SAT	05-04-2022
05.0400	Management of historical RAW	Project 9b-2: Approval of the active tests report by BNRA (item 4 of the Permit) and start of Site Operation (AB-1)	20-05-2022

3. Dissemination of Knowledge

A summary of planned for 2021-2022 activities supporting the knowledge management objective are as follows:

1. Trilateral knowledge-exchange Seminar between Kozloduy, Bohunice and Ignalina Programmes – (to be held at Kozloduy).
2. RWS (regional work seminar) for sharing lessons learned for planning, building and upgrading waste processing facilities, safety assessment, case studies, and legislation requirements for obtaining of operation authorisation.
3. RTC for transferring experience on dismantling techniques for metal components, dismantling of large components and components with high level of contamination or activated, advanced techniques including remote dismantling.
4. RTC for transferring experience with high temperature treatment processing of radioactive waste including incineration, plasma treatment and re-melting.
5. RWS for sharing experience with conditioning, long storage and criteria for long stability of wasteforms for radioactive waste with high content of alpha or transuranium radionuclides.
6. RWS for comparison of methods and techniques for initial waste radiological characterisation, selection of adequate treatment technologies, final products WAC and comparison with best international practices - EVT1802889.
7. RTC for transferring of experience on decommissioning of civil structures of NPPs, method for concrete surfaces decontamination, safe demolition and/or clearance declaration.
8. RWS for improvement knowledge and dissemination experience on irradiate graphite management, characterisation, dismantling, treatment and packaging for storage and/or disposal.
9. RWS for sharing experience on clearance methodologies, methods, tools and equipment for release of materials from regulatory control including conditional release.
10. RWS for transferring knowledge and experience with methodologies for estimation of parameters for safety assessment of nuclides spreading for design of future disposal of conditioned RW in geological repository.

Finally, as of 2021 a specific knowledge product will be developed each year by the Kozloduy site in order to share knowledge matured in the past years. A Knowledge Product is a tangible output (document, service, event, etc.) of prepared knowledge that enables action of selected users.

For the purpose, a process aiming at identifying, managing, and sharing knowledge efficiently and routinely in the frame of the NDAP will be defined and shared with NDAP sites. It will describe the steps toward the development and sharing of relevant, actionable, impactful, and valuable knowledge products for EU stakeholders, focusing on decommissioning operators and other EU stakeholders as secondary targets. It will support the collection and sharing of a wide range of knowledge experiences on decommissioning and waste management governance issues, managerial best practices, and technological challenges, with a view to develop potential EU synergies. It will also provide tools and guidance for effective implementation in Ignalina (INPP), Kozloduy (KNPP) and Bohunice NPPs (BNPP). The process will be divided in 6 steps:

Step 1: ACQUIRE Identification and capture of Knowledge Inputs. The first step consists of the identification and capture of experiences, lessons learned and project feedback, using the existing channels and sources at the sites and new channel, such as the Knowledge Capture Sessions.

Step 2: CATEGORISE Categorisation of Knowledge Inputs. Inputs collected in Step 1 are categorised using the specific criteria, scoring methodology and tools. Existing methods in place to classify knowledge, like criticality analysis, may serve as a basis to assign scores based on the new criteria.

Step 3: STORE Record and Storage Knowledge Inputs. All inputs are stored on the current document system of each plant as usual. Selected, sharable inputs are documented and uploaded to the EC Knowledge Input Matrix.

Step 4: DEVELOP Development of Knowledge Products. This step focuses on the selection and development of knowledge products, using the inputs collected and categorised in the previous steps and the tools and guidance provided.

Step 5: SHARE Sharing and monitoring of Knowledge Products. Once developed, Knowledge Products are documented and monitored using the platform Knowledge Product Matrix.

Step 6: IMPROVE Continuous improvement & Sustainability of the process. Feedback from knowledge product users is gather using formats defined. Value is measured and recorded in the EC Knowledge Product Matrix, and feedback is used to update process guidance and training to improve future products.

In 2021, the knowledge product to develop at Kozloduy site will be the three-dimensional (3D) model and Uniform Information Model (UIM) created for the Controlled Areas of KNPP Units 1 to 4 to provide detailed information for planning, design and implementation of the dismantling activities and material management works. After finalising this knowledge product, the Kozloduy site will follow the process described above in order to identify and elaborate the most suitable knowledge product for the year 2022.

As the EC JRC is chef de file for the specific decommissioning knowledge management objective, the process will be developed in close cooperation with the JRC and in line with the content of their Work Programme.

4. FINANCIAL IMPLEMENTATION

This section establishes the available funding for the implementation of the decommissioning plan. All values are in EUR million.

Actual commitments or payment indicated by factual year of financial agreement signature and factual used sum for completed contracts and dedicated sum for ongoing contracts and **for current year**: financing contracts already signed and planned to be signed until the end of the year

The Union contribution from the new financial perspective (2021-2027) will only be included when adopted.

Kozloduy	Actual commitments or payments									
Source of Funding	Before 2014	2014	2015	2016	2017	2018	2019	2020	2021	2022
COM to KIDSF	867.7	39.416	40.205	41.009	41.729	42.666	43.519	44.388	9.000	8.870
Others to KIDSF	13.849					26.125				
KIDSF to SERAW	241.569	31.094	33.905	26.494	35.165	40.893	24.246	26.681	55.282	78.254
KIDSF out DP						11.826				
BNDF to SERAW	1.254	1.546	0.887	1.065	1.074	2.543	0.296	0.514	0.000	0.000
RWF to SERAW	24.447	8.969	9.462	4.094	1.961	1.532	1.615	2.487	4.440	4.372
DNF to SERAW	0.000	0.000	2.067	4.470	8.965	9.826	10.881	12.039	12.336	12.670
KNPP	182.404	1.790	4.146	4.261	3.034	1.834	2.298	1.613	1.412	1.223

In the table above are not included Management reserve funds for EUR 6.137 million and Risk provision funds for EUR 75.032 million.

COM to KIDSF: European Commission Delegation Agreements with KIDSF
Others to KIDSF: includes contributions from other donors to KIDSF and interests accrued on KIDSF (cumulative)
KIDSF to SERAW (and KNPP): Grant Agreements within the decommissioning window
KIDSF out DP: before 2014 Grant Agreements within the energy window, after 2014 administrative and other costs
BNDF to SERAW: Additional funding from the BNDF with Management Board authorisation payments for activities within the DDP
RWF to SERAW: Radioactive Waste Fund payments for activities within the DDP
DNF to SERAW: Decommissioning of Nuclear Facilities Fund payments for activities within the DDP
KNPP: KNPP own resources payments for activities within the DDP

5. TIMELINE FOR THE USE OF FUNDS

The hierarchical lists of planned activities (the work breakdown structure), associated schedules and indicative costs constitute the baseline decommissioning schedules for the implementation of ‘earned value management’.

Negative figures refer to decommitments.

ID	Denomination	Before 2019	2019	I half 2020	II half 2020	I half 2021	II half 2021	I half 2022	II half 2022	2023	2024	2025	2026	2027	2028	2029	2030	Budget at Completion
DSF	Project 1a: Dry Spent Fuel Storage Facility (combined with 1d)	72.831																72.831
DSF	Project 1b: Environmental Impact Assessment of the Dry Spent Fuel Storage Facility	0.142																0.142
IIR	Project 1c: Review of the Interim Safety Analysis Report of the Dry Spent Fuel Storage Facility by an Independent Assessor	0.017																0.017
LTF	Project 2: Liquid Radioactive Waste Treatment Facility	2.225																2.225
PHSa	Project 3a: Security Hardware and Software	0.596																0.596
PHSb	Project 3b: Physical Barriers and Access Points for KNPP	0.178																0.178
DTE	Project 4a: Decontamination and Water Treatment Equipment	0.772																0.772
D-RES	Project 5a: Facility for Retrieval and Stabilization of Spent Ion Exchange Resins (combined with 5f)	3.88																3.880
D-RES	Bulgarian Funding of project 5a via Bulgarian funding sources	-0.707																-0.707
D-ESA	Project 5d: Supply of equipment of sample analysis (5d-1, 5d-2, 5d-3, 5d-4, 5d-7, 5d-9, 5d-10, 5d-11, 5d-12)	1.073																1.073
D-RWT	Project 5b: Facility for Treatment and Conditioning of Solid Radioactive Wastes With a High Volume Reduction Factor	28.883	1.524	0	0.973	0	0.126											31.506
D-RWT	Bulgarian Funding of project 5b via Bulgarian funding sources (with negative sign because it is included in the Bulgarian funding below)	-8.236	-0.555	0	-0.225													-9.016
IEA	Project 5c: Environmental Impact Assessment for Facility for Treatment and Conditioning of Solid Radioactive Wastes With a High Volume Reduction Factor	0.177																0.177
PMF	Project 5g: Independent ISAR Review for the Plasma Melting Facility	0.03																0.030
FRM	Project 6a: Facility for Free Release Measurement (combined with 6j and 6k)	0.479																0.479
UFF	Project 6j: Assessment of Possible Upgrade of the Existing Free Release Measurement Facility	0.015																0.015
D-UFF	Project 6k: Facility for Free Release Measurement	0.292	0.008															0.300
ERI	Project 6b: Radiological Inventory Equipment	0.277																0.277
LEC	Project 6c: Laboratory equipment and consumables	0.05																0.050
AMWd	Project 6d: Supply of Vehicle Exit Monitors	0.187																0.187
AMWe	Project 6e: Weighbridge	0.019																0.019
AMWf	Project 6f: Supply of Additional Monitors	0.07																0.070
CRL	Project 6g: Supply of consumables for radiochemical laboratory	0.071																0.071
LEQ	Project 6h: Supply of laboratory equipment	0.128																0.128
PRD	Project 7: Moveable Facility for Personnel Redressing and Decontamination/ Contamination Monitoring	0.424																0.424
PBM	Project 7b: Supply of Personnel Beta Monitors	0.13																0.130

ID	Denomination	Before 2019	2019	I half 2020	II half 2020	I half 2021	II half 2021	I half 2022	II half 2022	2023	2024	2025	2026	2027	2028	2029	2030	Budget at Completion
LPR	Project 9a: Supply of Equipment for Retrieval of the Liquid Phase from Evaporator Concentrate Tanks	0.053																0.053
D-SPR	Project 9b: Facility for Retrieval and Processing of The Solidified Phase from Evaporator Concentrate Tanks - Phase 1	10.083																10.083
D-RES	Project 9b-2: Facility for Retrieval and Processing of Historical Wet Solid Waste				1.636		6.544		5.634	9	9	9.09						40.904
LMI	Project 9d: Supply of tank level measuring instrumentation	0.03																0.030
D-SQU	Project 9f: Design modifications and construction of the seismic qualification upgrade to AB2 building	0.125																0.125
HLG	Project 10: Control of Liquid and Gaseous Releases for the Units under Decommissioning at KNPP	1.085																1.085
MSC	Project 11a: Procurement of Equipment for on-site measurement, sampling and chemical analysis for complete radiological inventory of Units 1-4 of KNPP. (Combined with Project 6i)	1.673																1.673
D-WCP	Project 11b-1: Supply of different types of containers for transport and storage of materials resulting from dismantling works	0.727																0.727
D-WCP	Project 11b-1, phase-II: Supply of different types of containers for transport and storage of materials resulting from dismantling works		0.538															0.538
D-MBR	Project 11c: Evaluation of the material backlog and radiological inventory of KNPP Units 1-4	1.454																1.454
D-MBR	Project 11c-1 - Supply of Equipment and Consumables for the Performance of Evaluation of the Material Backlog and Radiological Inventory of KNPP Units 1-4	0.052																0.052
D-FRA	Project 12a: Size Reduction and Decontamination Active Workshop	18.668					0.479											19.147
D-SRA	Project 12b : Size Reduction Areas in Turbine Hall	0.997																0.997
D-HHE	Project 12c-1: Supply of cleaning and decontamination equipment for dismantling activities at KNPP Units 1-4	0.045																0.045
D-DIS	Project 13a: Dismantling and Decontamination Tools and Equipment for Turbine Hall	1.158																1.158
D-SPR	Project 13b and 13c: Supply of dismantling and fragmentation tools and equipment in reactor and auxiliary buildings and related services	0			0.4	5.4	2.76	2.24	9									19.800
D-FRF	Project 13d - Free Release Facilities to Monitor Waste	0							0.8									0.800
VMB	Project 13f: Supply of a Vehicle Mounted Boom Lift	0.358																0.358
TSF	Project 13g: Supply of racks for dismantled electric machines in the turbine hall of Kozloduy NPP Units 1-4	0.011																0.011
D-TLH	Project 13h: Supply of Telescopic Handler with Attachments and Fixed Platform	0.231																0.231
D-INFc	Project 14c: Design and Reconstruction of the System for Heating and House Load Steam	0.035																0.035
SPS	Project 14e: Security Perimeter Separation	0.675																0.675
RAP	Project 14f: Replacement of the artesian water pipelines	0.028																0.028
RSE	Project 14g: Supply of replacement security equipment for KNPP units 1-4	0.047																0.047

ID	Denomination	Before 2019	2019	I half 2020	II half 2020	I half 2021	II half 2021	I half 2022	II half 2022	2023	2024	2025	2026	2027	2028	2029	2030	Budget at Completion
D-EID	Project 16: Environmental Impact Assessment for Decommissioning of Units 1-4 at KNPP	0.449																0.449
D-EID	Project 16a: Comunication support for Environmental Impact Assessment for Decommissioning of Units 1-4 at KNPP	0.049																0.049
LAR	Project 18a: Laboratory Analysis for Rest Life Time	0.003																0.003
NDE	Project 18b: Non - destructive Examination for Rest Life Time	0.013																0.013
D-DSS	Project 19-2: Lot 1 and Lot 2: Suplly of Lifting and Transportation Equipment	1.55																1.550
D-DSS	Project 19-4: Design and Construction of Sites for Management of Materials from the Decommissioning Activities at KNPP Units 1-4	3.03	0.05															3.080
D-ICD	Project 20: Information Centre for Decommissioning		0.236	0	0.368				0.016									0.620
D-DMSa	Project 22a-1: Supply of Software for Decommissioning Management System	0								1.105								1.105
DMSb	Project 22a: Upgrade of the Decommissioning Management System	0.165																0.165
DMSc	Project 22c: Supply of Multifunctional Input Device for Decommissioning Management System	0.01																0.010
D-ITC	Project 23-1: Inventory, Treatment and Conditioning of Contaminated Soil. Phase 1: Surveillance and Analysis									0.2		1.6						1.800
D-ITC	Project 23-2: Inventory, Treatment and Conditioning of Contaminated Soil. Phase 2: Implementation of remediation	0											0.5	1.5	1.5	1.5		5.000
D-CSA	Project 24: Concrete Core Sampling Analysis									2.38	0.42							2.800
EDS	Project 26: Equipment for Demolishing structure inside the Turbine Hall, Auxiliary Building and Reactor Building	0											1.575	1.575				3.150
TDD	Project 27: KNPP Training and Development in Decommissioning	0.059																0.059
TDD	Project 27: SERAW Training and Development in Decommissioning	0					0.04											0.040
D-WBT	Project 28: Supply of Equipment for Treatment of Accumulated Quantities of Radioactive Sludge at KNPP Units 1-4 (combined with 9b-2)	0																0.000
D-SNU	Project 32b-1: Supply of new utilities for infrastructure projects Units 1-4	0.084																0.084
D-DES	Project 32b-2: Providing of 6kV/0.4kV Electrical Power Supply for Plasma Melting Facility	0.249																0.249
D-IPD	Project 32b-3: Implementation of Project 32d	0.157	0.004															0.161
D-IPE	Project 32b-4: Implementation of Project 32e	0.34																0.340
D-IPP	Project 32b-5: Implementation of Project 32f	0.21																0.210
D-EPS	Project 32b-6 Design and implementation of Emergency Power Supply to the Consumers of Compressed Air Nitrogen Station to the PMF					0.01	0.087					0.003						0.100
D-PAS	Project 32b-7 Installation of pipelines carrying aqueous solutions of ammonia and sodium hydroxide to PMF					0.02	0.075		0.1					0.005				0.200
D-TSA	Project 32b-8 - Procurement of a tank semi-trailer for collection, transport, compliant storage and feed supply of the ammonia water and sodium hydroxide (reagents) needed for the operation of PMF and Related Services					0.035	0.31											0.345

ID	Denomination	Before 2019	2019	I half 2020	II half 2020	I half 2021	II half 2021	I half 2022	II half 2022	2023	2024	2025	2026	2027	2028	2029	2030	Budget at Completion
D-IIS	Project 35-1: Independent infrastructure separation between KNPP and SERAW (Power supply)				0.694	0.18		0.36	1.698	2.083					0.129			5.144
D-IIS	Project 35-2: Independent infrastructure separation between KNPP and SERAW (Fluids part)						0.274	0.071		0.142	0.668	0.821				0.051		2.027
D-TLE	Project 38-1 Supply of Lifting and Transportation Equipment	0.141																0.141
D-TLE	Project 38-2: Supply of Engine Powered Lift Truck Having 25t to 30t Loading Capacity	0.223																0.223
D-TLE	Project 38-3: Supply of Loading and Transportation Equipment for Waste from Decommissioning of KNPP Units 1-4	0				0.025	0.225											0.250
D-RDB	Project 39: Design and Assembling of Emergency Power Supply of Consumers from Kozloduy NPP Units 1&2 - Phase 1	0.727					0.019											0.746
D-RDBd	Project 39-2: Reconstruction of the DGS-1 Building for the Purposes on Kozloduy NPP Decommissioning	0.177	0.177	0.353	0.177	0.929				0.047								1.860
D-CRT	Project 40: Characterisation, retrieval, treatment of RAW from "Mogilnik" storages in Units 1-4 of KNPP and procurement of equipment for their temporary storing	0										0.8	0.8	0.8	0.8	0.8		4.000
D-IOS	Project 42: Implementation of an overall information strategy concerning the nuclear capacity decommissioning process	0								1								1.000
D-RHI	Project 43: Restoration of hydro-insulation of Turbine Hall and Reactor Building of KNPP Units 1-4	0.773							0.017									0.790
D-DCE	Project 44: Preparation of Detail Design for Dismantling of Equipment in the Controlled Areas of KNPP Units 1-4	3.598	2.158	0.719	1.115	0.891	0.693											9.174
D-RIS	Project 46: Procurement of technology and equipment for retrieval and interim storing of RAW from reactor ponds of Units 1-4 of KNPP								3	4	1							8.000
D-IRC	Project 47: Procurement of equipment providing individual radiation control for the process of decommissioning	0		0.111														0.111
D-MRP	Project 48-1: TD and update of SAR for Modernization of SD "RAW-Kozloduy" to receive and process decommissioning RAW				0.943	0.628												1.571
	Project 48-2: Modernization of SD "RAW-Kozloduy" to receive and process decommissioning RAW					2.051		3.153	3	6.153	6.153							20.510
D-SAM	Project 49: Supply of containers for storage of activated materials								2	2.666	2.666	2.668						10.000
D-TSC	Project 50: Reconstruction of the RB for temporary storage of containers with activated materials						0.5		1.5	1.5	1.5							5.000
	Project 51: Development of Integrated Information System for Radioactive Waste Management (IISRWM)									0.128		1.152						1.280
D-DCP	Project 55-1: Consultancy services in the preparation of the Reactor Building for the Decontamination of the Primary Circuit of KNPP Units 1-4		0.052															0.052
D-DCP	Project 55-2: Transfer of DfD equipment from Bohunice to Kozloduy				0.299	0.897												1.196
D-DCP	Project 55-3: Implementation of decontamination				0.114		4.434	6.821										11.369
R-DGM	Project R-1: Preparation of a detailed geodetic map of Radiana site	0.049																0.049
R-EAS	Project R-2: Environmental Impact Assessment Support	0.049																0.049
R-MGM	Project R-3a: Pre-disposal Monitoring of the Radiana Site. Geodesic Monitoring.	0.151																0.151

ID	Denomination	Before 2019	2019	I half 2020	II half 2020	I half 2021	II half 2021	I half 2022	II half 2022	2023	2024	2025	2026	2027	2028	2029	2030	Budget at Completion
	Project R-3a-a: Pre-disposal Monitoring of the Radiana Site. Geodesic Monitoring.	0.055	0.041	0.014	0.028	0.014	0.028	0.014	0.060	0.033								0.286
R-GMA	Project R-3b-1: Delivery of Technical Equipment for the NDF loess-cement cushion design and concrete control and monitoring of their construction	0.135																0.135
R-LFA	Project R-3b-2: Laboratory and field analyses for justification of the design parameters of loess-cement cushion	0.07																0.070
R-HMG	Project R-3e: Pre-disposal Monitoring of the Radiana Site. Hydrogeological monitoring and geochemical analyses	0.561																0.561
	Project R-3e-a: Pre-disposal Monitoring of the Radiana Site. Hydrogeological monitoring and geochemical analyses		0.143	0.028	0.028	0.028	0.021	0.021	0.042	0.042								0.352
R-MRM	Project R-3f: Pre-disposal Monitoring of the Radiana Site. Radiological Monitoring	0.158																0.158
	Project R-3f-a: Pre-disposal Monitoring of the Radiana Site. Radiological Monitoring	0.069	0.092	0.046	0.046	0.046	0.046	0.046	0.086	0.059								0.535
R-SMM	Project R-3g: Pre-disposal Monitoring of the Radiana Site. Meteorological Monitoring					0.1												0.100
R-PRS	R-4a-2: Preparation of Radiana site. Construction of industrial fence around Radiana site	0.928																0.928
R-WSS	R-4c-1: Preparation of Radiana site. Design of water supply for Radiana site	0.033																0.033
R-IWS	R-4c-2: Preparation of Radiana site. Drinking Water Pipeline for water supply of Radiana site and displacement of a portion for drinking water supply, relocation of telecommunication cables and power line 20 kV Elba	0.6																0.600
R-RIC	R-4d-3: Preparation of Radiana site. Detail Design for relocation of irrigation channel M1	0.129																0.129
R-CWR	R-4d-4: Preparation of Radiana site. Construction works for relocation of irrigation channel M1						1	2										3.000
R-SMA	R-4f: Preparation of Radiana site. Rehabilitation of access road for Radiana site	3.091				0.079												3.170
	R-4f-1: Independent Construction Supervision for the rehabilitation of access road for Radiana site	0.12																0.120
R-IND	R-5: Technical Design and ISAR Preparation for NDF	8.633	0.366			0.448												9.447
R-IIA	R-5a: Independent ISAR assessment	0.067																0.067
R-CTD	R-5b: Independent Assessment of design documents and supervision of the infrastructural preparation of Radiana site	0.24																0.240
R-LBL	R-5c: Lithostratigraphic boreholes along the longitudinal axis of the NDF disposal modules at Radiana site for justification of the pliocene sediments upper surface elevation	0.03																0.030
R-CSE	R-5g: EIA Public Disclosure Support	0.039																0.039
R-MLT	R-5k-1: Design of multi-layer test cover of NDF site						0.15		0.35									0.500
	R-5k-2: Construction of multi-layer test cover of NDF site									1.95	2.275	2.275						6.500
R-CMS	R-6: Comparative Migration Study	0.037																0.037
R-EGH	R-7: Engineering geological and hydrogeological field and laboratory investigations in the plain part of Radiana site	0.055																0.055
R-DSP	R-8: Designer's supervision of NDF Phase 1 construction	0.319	0.26	0.13	0.13	0.142	0.223	0.13	0.13	0.152								1.616
R-SOW	R-9: Independent supervision of construction of the NDF, Phase 1	1.069	0.506	0.000	0.458	0.916	0.916	0.358	0.358	0.419								5.000
R-CPN	R-10: Construction of NDF Phase 1	25.439	5.027	-1.257	5.399	0.840	7.620	7.799	11.940	12.10398					1.869			76.781

ID	Denomination	Before 2019	2019	I half 2020	II half 2020	I half 2021	II half 2021	I half 2022	II half 2022	2023	2024	2025	2026	2027	2028	2029	2030	Budget at Completion
R-DLD	R-11: Development of licensing documentation for commissioning of NDF Phase 1						1.110		1.110									2.219
	Construction of NDF Phase 2											4.2	9.45	9.45	9.45	9.45		42.000
	KPMU	45.491																45.491
	EAVTEN	3.671																3.671
	D-R CON	27.46	4.036	1.641	2.026	2.150	2.250	2.200	2.200	4.400	4.400	0.200						52.963
	KNPP and SERAW salaries	136.827	9.583	4.476	5.812	4.572	4.953	4.800	5.201	9.525	9.525	9.501	9.251	9.451	8.926	8.545	7.580	248.528
	Radioactive Waste Fund	50.465	1.615	0.679	1.808	2.22	2.22	2.186	2.186	4.292	4.376	4.420	4.462	4.554	4.602	4.691	4.734	99.510
	Decommissioning Fund	25.328	10.881	5.829	6.210	5.921	6.415	6.082	6.588	12.670	8.068	7.172	8.102	7.612	7.585	7.457	7.315	139.235
	Additional funding from the BNDF with Management Board authorisation	8.369	0.296	0	0.514	0	0	0	0									9.179
	Own KNPP resources	197.469	2.298	1.084	0.529	0.706	0.706	0.611	0.612	0.869	0.873	0.877	0.880	0.884	0.888	0.893	0.897	211.076
	Risk	0	0	0	3.264	2.984	6.001	4.612	11.034	12.922	8.629	7.429	4.185	4.371	4.342	3.896	1.364	75.032
	Management reserve	91.582	42.530	6.152	16.442	-1.603	-9.292	-20.343	-40.096	-40.645	-19.425	-12.347	0.857	-1.943	-4.273	-1.996	0.539	6.137
	Total	**782.333**	**81.866**	**20.005**	**49.187**	**30.628**	**40.931**	**23.161**	**28.564**	**49.197**	**40.128**	**39.861**	**40.062**	**38.259**	**35.818**	**35.286**	**22.429**	**1 357.715**

6. STAFFING PLAN

		Actual							Planned (year average)	
	Category	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
01	Pre-decommissioning actions	10	10	7	7	4	2	2	3	3
02	Facility shutdown activities	173	120	98	44	22	12	2	2	2
03	Dismantling activities outside controlled area	125	129	129	89	83	15	2	2	2
04	Dismantling activities within the controlled area	72	116	140	159	215	308	278	260	254
05	Waste Processing, Storage and Disposal	157	159	160	237	204	191	180	198	208
06	Site Infrastructure and Operation	124	124	124	124	77	77	63	27	23
07	Project Management, Engineering and Support	76	76	76	76	56	56	54	44	44
08	Fuel and Activated Material	0	5	5	5	5	5	5	5	5
09	Miscellaneous Expenditures	0	0	0	0	0	0	0	0	0
	TOTAL	737	739	739	741	666	666	586	541	541