

# Environmental Impact Assessment Report for Decommissioning of Units 1 to 4 at Kozloduy Nuclear Power Plant



# Environmental Impact Assessment Report for Decommissioning of Units 1 to 4 at Kozloduy Nuclear Power Plant



## VOLUME 1



# **Environmental Impact Assessment Report for Decommissioning of Units 1 to 4 at Kozloduy Nuclear Power Plant**



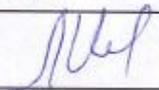
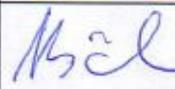
## **VOLUME 3**

# **Environmental Impact Assessment Report for Decommissioning of Units 1 to 4 at Kozloduy Nuclear Power Plant**



## **VOLUME 4**

## Environmental Impact Assessment Report for Decommissioning of Units 1 to 4 at Kozloduy Nuclear Power Plant

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## Document Handling

### Revisions

Revisions of the present document are made by exchange of the complete document including the cover page with signatures. No exchange of individual pages is allowed.

The revision number and the respective release date are indicated at the top of all pages.

Changes with respect to the relevant previous document are marked with a vertical line at the right hand side of the pages.

The reasons for the release of a new revision and/or main modifications in the actual revision and the pages concerned are recorded in the below list of revision.

Number of revision	Reason/ Main modifications/ Explanations
00	Initial Document
01	Based on Client's Comments on Revision 00
01cor	Revised version 01 based on EBRD and Client Comments on Rev 01
01.2	Revised version 01 based on KNPP Safety Council, EBRD and Client Comments on Rev 01cor and MoEW Letter from 09.07.2010
01.3	Revision based on Clients Comments on rev.01 at KNPP Safety Council
01.4	Revised version for integration of the Transboundary aspect assessment, based on the letter of the Romanian Side for participation in the EIA Procedure in Transboundary Context (Chapters A, 1, 3, 4, 7, 9,10. NTS and CAR)
01.5	Revised version 01.4 based on the Client Comments on the transboundary aspect integration in Revision 01.4 (integral edition of the EIA-R and NTS)
01.6	Revision based on new revision of the Terms of Reference to define the scope and content of Environmental Impact Assessment of the Investment Proposal – Revision 4A - SE RAW
02	The present edition of the EIAR is fully entirely revised and supplemented in accordance with MEW Letter ref No OBOC-289/09.01.2013 and based on the EBRD comments on the Non-technical summary. In chapter 7, Table 7.2.1.-2 is given a reference of the accepted and non-accepted remarks, statements, opinions and recommendations being made. The revision from 12 April 2013 – BG version (30 May 2013 – EN version) is subsequent to the MEW Letter ref .№OBOC-289/28.03.2013 – Revised EIAR with removed discrepancies

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## LIST OF ABBREVIATIONS

AB	Auxiliary Building
AAPC	Annual Average Permissible Concentration
AC	Alternating Current
a.d.w	Air-dry weight
AER	Atomenergoremont PLC
AISERC	Automated Information System for External Radiation Control
ALARA	As Low As Reasonably Achievable
ALS	Accident Localization System
AMS (AMC)	Automated Meteorological Station
AOX	Absorbable Organic Halogens
ASAP	Automated system for aerologic probing
BAB	Basic Auxiliary Building
BAS	Bulgarian Academy of Science
BCP	Boron Concentrate Pump
BDS	Bulgarian State Standard
BNRP	Basic Norms on Radiation Protection
BOD	Biological Oxygen Demand
BPS	River Bank Pump Station
BULRaMo	National Automated System for Permanent Control of the Gamma-radiation Background
CA	Controlled Area
CAS	Condenser Sump
CC	Cold Channel
CED	Collective Effective Dose
CM	Council of Ministers
COD	Chemical Oxygen Demand
CP	Cooling Pump
CPS	Circulation Pump Station
CR	Control Room
CS	Controlled Shaft
DC	Drainage Channel
DC Panel	Direct Current Panel
DCM	Decree of Council of Ministers
DCP	Drainage Condensate Pump

DeManS	Decommissioning management system
DF	Decontamination Factor
DG	Diesel Generator
DGS	Diesel Generator Station
DRTD	Disease Rate with Temporary Disability
DSAR	Decommissioning Safety Analysis Report
DSFS	Dry Spent Fuel Storage
DSS	Decay Storage Site for Transitional RAW
DT	Drainage Tank
DW	Demineralized Water
DWF	Demineralized Water Facility (also WDF – water demineralization facility)
EBIT	Emergency Boron Injection Tank
EBRD	European Bank for Reconstruction and Development
ECT	Evaporator Concentrate (Bottoms) Tank
EDF	Electricité de France
EEA	Environmental Executive Agency
EEIR	EWN Environmental Impact Register
EFWP	Emergency Feed Water Pump
EIA	Environmental Impact Assessment
EIAR	Environment Impact Assessment Report
EMC	Electromechanical Counter
EMF	Electromagnetic Fields
EP	Electricity Production
EP -1, EP - 2	Electricity production 1; Electricity production 2
EPA	Environment Protect Act
EPC	Environmental Protection Committee
ERC	Environmental Radiation Control (Department)
ERM	Environmental Radiological Monitoring (former RREC)
EU	European Union
EWN	EnergieWerke Nord
EWST	Emergency Water Storage Tank
FAIV	Fast acting Isolation Valve
FMR	Financial and Material Resources
FRMF	Free Release Measurement Facility
FW	Feed Water

FWP	Feed Water Pump
GCF	Gas Cooling Filter
GHG	Green House Gases
GOCP	Gas Oil Cooling Pump
GOCS	Gas Oil Cooling System
GPS	Gas Purification System from Radioisotopes
GSSS	Generator Shaft Sealing System
HAST	High Activity Sorbents Tank
HC	Hot Channel
HELCOM	Helsinki Convention for the Protection of the Baltic Sea
HPC	High pressure Cylinder
I&C	Instrumentation & Control
IAEA	International Atomic Energy Agency
IAEA	International Atomic Energy Agency
ICPDR	International Convention for the Protection of the Danube River
IDCC	Individual Dosimetric Control Centre
IHNRM	In-house Non Radiation Monitoring
IP	Investment Proposal
JVC	Jet Vortex Condenser
KGR	Greifswald NPP
KNPP	Kozloduy Nuclear Power Plant
LAST	Low Activity Sorbents Tank
LCH	Law on the Cultural Heritage
LHC	Low Head Channel
LLA	Long Lived Aerosols
LMS	Local Monitoring Station
LOCA	Loss of Coolant Accident
LPC	Low Pressure Cylinder
LPH	Low Pressure Pre-heater
LRAW	Liquid RAW
LSMN	Local Seismological Monitoring Network
LST	Lubricant Surge Tank
LSU	Litostratigraphic Units
MA (SZ)	Monitored Area (Surveillance Zone)
MAFI	Ministry of Agriculture and Food Industry
MB	Main Building (Reactor Building)
MCP	Main Coolant Pump
MCR	Main Control Room
MCsP	Main Coolant Pipeline
MDA (LLD)	Minimum Detectable Activity (Lower level detectable) (also MPA)

MDC (MDH)	Main Drainage Channel
MEE	Ministry of Economy and Energy
MEUR	Million EUR
MH	Ministry of Health
MIV	Main Isolation Valve
MEW	Ministry of Environment and Water
MPC	Maximum Permissible Concentration (also MAC/Maximum allowable concentration)
MPL M. e	Monthly Single Maximum Permissible Limit
MRDPW	Ministry of Regional Development and Public Works
MS	Monitoring Shaft
MSH	Main Steam Header
MSK	Medvedev Sponheuer Karnik Seismic Scale
MSV	Main Steam Valve
NAEMS	National Automatic Environmental Monitoring System
NCRBRP	National Centre for Radiobiology and Radiation Protection
NDF	National Disposal Facility for Low and Intermediate Level Short Lived Radioactive Waste
NICM	National Institute for Cultural Monuments
NIMH-BAS	National Institute on Meteorology and Hydrology to BAS
NIPNCV	National Institute for Protection of Immovable Cultural Values
NPP	Nuclear Power Plant
NRA	National Regulatory Authority
NRRPC	National Centre for Radiobiology and Radiation Protection
NSSS	Nuclear Steam Supply System
OC	Oil Cooler
OCBP	Oil Cooling Buster Pump
OS	Oil System
OSC	Oil Seal Cooler
PA	Protected Area
PAZ	Precautionary Action Zone
PCL	Permissible Concentration Limit
PDS	Pre-decommissioning Stage
PMF	Plasma Melting Facility
PT	Protected Territory
RAM	Radioactive Materials
RAW	Radioactive Waste
RB	Reactor Building
RCC	Reinforced Concrete Containers
RCI	Reducing Cooling Device
RCMIW	Repository for Conventional Municipal and Industrial Waste

RES	Facility for Retrieval and Stabilization of Spent Ion Exchange Resins
RFS	Reactor Final Shutdown
RH	Reactor hall
RHS	Residential and Hygiene Sewage Drainage System (also Sanitary Sewage System)
RIEW	Regional Inspection for Environment and Waters
RIoEW	Regional Inspectorate of Environment and Water
RISA	Research Institute of Soil Science and Agro ecology
RM	Radiation Monitoring
RNG	Radioactive Noble Gas
RPA	Radiation Protection Area
RPV	Reactor Pressure Vessel
RWT	Facility for Treatment and Conditioning of Solid RAW with High Volume Reduction Factor
SAR	Safety Analysis Report
SB	Sanitary Building
SCC	Secondary Condense Cooler
SCH	Stator Cooling Heat Exchanger
SCP	Stator Cooling Pump
SCS	Structures, Components and Systems
SE	Safe enclosure
SE "RAW" (SERAW)	State Owned Enterprise "Radioactive Waste"
SFP	Spent Fuel Pool
SFS	Spent Fuel Storage
SG	Steam Generator
SGC	Steam Generator Compartments
SLA	Short Lived Aerosols
SNF	Spent Nuclear Fuel
SNFSF	Spent Nuclear Fuel Storage Facility
SO	Solved Oxygen
SPA	Sanitary Protection Area (also HPA – Hygiene Protection Area)
SRDW	Size Reduction and Decontamination Workshop
SS	Shift Supervisor
SSE	Sealing Steam Ejector
ST	Start-up Transformer
SW	Shaft Well (also IIIIC)
SWD	Site for Conventional Waste from Decommissioning
SWP	Service Water Pump
SWT	Special Water Treatment (also SVO)
TC	Transport Corridor

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TCC	Technical Condensate Cooler
TCC	Trapezoid Cross-section Channel
TG	Turbo-generator
TH	Turbine Hall
TLD	Thermo-Luminescent Dosimeter
TLV	Threshold Limit Value
ToR	Terms of Reference
TPP	Thermal Power Plant
U	Uranium
UWB	Groundwater Body
VC	Ventilation Centre
VOC	Volatile Organic Compound
VS	Ventilation Stack
WPP	Water Power Plant
WTS	Waste Treatment System
WWER	Water-cooled Water-moderated Energetic Reactor