

Statement
**of the Investor, State Enterprise Radioactive Waste (SERAW), for the
Investment Proposal Decommissioning Units 1-4 Kozloduy NPP,
concerning the written statement of the Romanian Ministry of
Environment and Climate Change, Annex to the letter No. 3037/RP/06-08-
2013**

A. Specific comments

Comment on Chapter 3, subchapter 3.1

- 1) Chapter 3 - 3.1 Atmosphere - the study of climatic and meteorological characteristics of the region is presented as an uneven time sequence both between meteorological parameters and between them and radiological parameters analyzed. Given the fact that there is a strong dependency between meteorological parameters and spatio-temporal evolution of natural and artificial radioactivity, we believe that the period of time in which meteorological parameters evolution is studied needs to be at least the same as the radionuclide (1992 - 2011).

Answer: As legally required, chapter 3 describes the present state of the environmental components and factors. For the climatic and meteorological characteristics it is usual and sufficient to describe a period of recent years (normally 5 years).

The period related to radioactive emissions and immissions from 1992-2011 was chosen independently from the above stated. It was chosen to show that activities with major influences on the decrease of emissions of radionuclides were performed in this period (reconstruction of Units 3 and 4, reconstruction and modernisation of Units 5 and 6, final shut down of Units 1+2 and final shut down of Units 3+4).

Comment on chapter 3, subchapter 3.2

- 2) Chapter 3/Page 10 of 263 - Table 3.2.2.1-1 "Data about the conducted aerosols monitoring" and Chapter 3/Page 12 of 263 - Table 3.2.2.2-1 "Data about the monitoring conducted of the atmosphere settlements": the correct terminology is "gamma spectrometry" not "gamma spectrophotometric" as presented.

Answer: Editorial mistake, the correct terminology is "gamma spectrometry". The mistake does not affect the analyses and conclusions made in the EIAR.

- 3) Chapter 3 /Page 11 of 263: the fact that ^7Be specific activity from atmospheric air is about 1000 times higher than ^{137}Cs does not represent a reason for comparison and examples of good practice developed over time at Kozloduy NPP, because ^7Be is a natural radionuclide, of cosmogenic origin, found in Group 3 of radiotoxicity and ^{137}Cs is an artificial radionuclide, found in Group 2 of radiotoxicity, which clearly indicates that a value for ^{137}Cs comparable with ^7Be would have major effect on public health from the area. We require this explanation to be replaced.

Answer: The figure 3.2.2.1-2 illustrates the differences of the natural and artificial level on measuring point 9. In the text on page 10 is explained that ^7Be is a cosmogenous nuclide and thus natural.

The EIAR analyses and conclusions regarding ^{137}Cs pollution are based on the measurement results provided in Table 3.2.2.1-1 (data about the conducted aerosols monitoring), the measured values results and the normative limits are compared, and the presented conclusion is as follows: "Recorded radioactivity of ^{137}Cs in the air is about 10^5 - 10^6 times lower than the norms in the country (AAPC for ^{137}Cs according to Basic Radiation Protection Norms -2012 is 3.2 Bq/m^3)."

- 4) Chapter 3/Page 17 of 263: NERSN presentation of the two environmental monitoring programs must be identical with the one presented on TI/Page 99 of 110. The information presented in page no.17 from Chapter 3 is poorly translated. We agree with this paragraph:

"In the area of influence of Kozloduy NPP on the Romanian territory the National Environmental Radioactivity Surveillance Network (NERSN) in Romania performs two programs of environmental radioactivity surveillance, which operate in parallel:

- Standard Surveillance Environmental Radioactivity Program — simultaneously performed by all SSRM. In the Standard Program all SSRM have the same sampling and analysis schedule.
- Special Surveillance Environmental Radioactivity Program — individually performed by every SSRM, under NEPA's coordination. The Special Program assumes that every laboratory has its own monitoring program within its competence area;

In Romania, the National Environmental Radioactivity Surveillance Network (NERSN) ensures the radiological monitoring in the influence area of Kozloduy NPP — Bulgaria at 4 laboratories, called Surveillance Stations for Radioactivity Monitoring (SSRM): SSRM Bechet, SSRM Craiova, SSRM Drobeta Turnu Severin and SSRM Zimnicea, and 17 automatic monitoring stations for determination of the gamma background in Dolj county, in Mehedinti county and in Teleorman county."

Answer: Editorial mistake not affecting the analyses and conclusions made in the EIAR..

- 5) Chapter 3/Page 17 of 263: Data presented in Table 3.2.4-1 "Results of radiological monitoring in Romania within 30km range of Kozloduy NPP", were not reported by NERSN.

Answer: The basis of all information about Romania is the document "Necessary data to assess the transboundary effects in Romania", submitted by Romanian Government. In this document only NERSN is named as responsible organisation for the radiological monitoring. In other countries it is usual that only one organisation is responsible for the radiological monitoring. Therefore the consultant has interpreted NERSN as the only source.

Regardless of which institution is the source of these values, the presented data remains unchanged as the data was normally submitted by the Romanian authorities

The origin of the information does not affect the analyses and conclusions made in the EIA Report

- 6) Chapter 3/Page 18 of 263: Table 3.2.4-2 "Total beta activity of the atmosphere aerosols, ^{222}Rn and ^{220}Rn in the atmospheric aerosols and total beta activity of atmospheric settlements", section „Atmospheric precipitations" must be renamed "Total atmospheric depositions", with measurement unit Bq/m^2 .

Answer: Bq/m^3 is a typing mistake. The measurement unit is Bq/m^2 . The term precipitation should be renamed total atmospheric deposition. The term precipitation is not usual but has the same meaning as deposition. These findings do not affect the analyses and conclusions made in the EIAR.

- 7) Chapter 3/Page 18 of 263: Table 3.2.4-3 "Measurement of gamma background from 13 automatic monitoring stations", presents data from 15 automatic stations.

Answer: Typing mistake without influence on the analyses and conclusions provided in the EIAR..

- 8) Chapter 3/Page 18 of 263: Table 3.2.4-4 "Gamma spectrum analysis of atmospheric aerosols and atmospheric precipitates" must be renamed "Gamma spectrum analysis of atmospheric aerosols and total atmospheric deposition". As well, section „Atmospheric precipitations" must be renamed "Total atmospherically depositions", with measurement unit Bq/m^2 per day. The significance of LD must be put under the table.

Answer: The measurement unit is Bq/m^2 . The term "precipitation" should be "total atmospheric deposition". The term precipitation is not usual but has the same meaning as deposition. . These findings do not affect the analyses and conclusions made in the EIAR.

LD abbreviation means "Limit of Detection"

Comment on Chapter 3, subchapter 3.3

- 9) Chapter 3/Page 78 of 263, there are 17 automatic air gamma dose rate monitoring stations, from which 15 are in Dolj County.

Answer: The information given on page 78 is identical to that presented in the document "Necessary data to assess the transboundary effects in Romania", provided by Romanian Authorities. However, this finding does not affect the analyses and conclusions made in the EIAR.

- 10) Chapter 3/Page 79 of 263: from Table 3.3.3.2.2-1 "Total Beta activity in the wells in the 30 km area" analysis results for this location were not reported by NERSN

Answer: See answer to 5). The origin of the information does not affect the analyses and conclusions made in the EIA Report

Comment on Chapter 3, subchapter 3.4

- 11) Chapter 3/Page 101 of 263 — The names of the localities from Table 3.4-19 are Bechet, Craiova, Drobeta-Turnu Severin and Zimnicea. They must be corrected accordingly.

Answer: Editorial mistake not affecting the analyses and conclusions made in the EIAR.

- 12) Chapter 3/Page 102 of 263 — Table 3.4-20 and Table 3.4.-21 — There is no Bechet County, there is only Dolj County. Bechet is a locality within Dolj County. The soil samples were taken by SSRM Bechet.

Answer: Editorial mistake not affecting the analyses and conclusions made in the EIAR.

Comment on Chapter 3, subchapter 3.8

- 13) Chapter 3/Page 164 of 263 - subchapter 3.8.1.3 "Impact of Kozloduy NPP on the flora and vegetation on the territory of Romania", there are 17 automatic air gamma dose rate monitoring stations, from which 15 are in Dolj County, one automatic station is in Mehedinti County and one automatic station in Teleorman County.

Answer: The information stated on page 164 is based on that provided by Romanian document "Necessary data to assess the transboundary effects in Romania"; this discrepancy does not affect the the analyses and conclusions made in the EIAR.

- 14) Chapter 3/Page 165 of 263: analysis results for milk, fruits and vegetables from Gigeră locality were not reported by NERSN.

Answer: See answer to 5). The origin of the information does not affect the analyses and conclusions made in the EIA Report

Comments to Chapter 3, subchapter 3.11

- 15) Chapter 3/Page 200 of 263 - in subchapter 3.11.1.1 "Radioecological monitoring", there are 17 automatic air gamma dose rate monitoring stations, from which 15 are in Dolj County, one automatic station in Mehedini County and one automatic station in Teleorman County.

Answer: See answer to 13); similar for page 200. This discrepancy does not affect the analyses and conclusions made in the EIAR.

Comment to Chapter 3, subchapter 3.1

- 16) According to the official information received from P 16De109Rev02_EIA_R-Chapter 3.3 in which were displayed the climatic and meteorological characteristics of the region, we believe that the period of time 2006-2010 during which the weather conditions were investigated, is for too short.

Answer: See answer to 1).

Comment to Chapter 8

- 17) According to the official information received from P 16De109Rev02_EIA_R-Chapter 8, Conclusions, in which is stated that due to the prevailing wind direction in the region, the probability of aerosols transmission in the direction of Romanian territory is very limited, we request that the associated probability to be specified separated for each wind direction.

Answer: See answer to 1); the requested information is available but not necessary for this EIA procedure.

Comment to the whole EIA-Documentation, related to the accidents analysis

- 18) The assessment of the experts who prepared the documentation which includes the Environmental Impact Assessment Report (EIA-R), referring to the situation when unwanted events happen during the decommissioning of Units 1-4 at KNPP is that significant transboundary effects are not expected in any of the scenarios analyzed (see reference documents P 1 6De109Rev02 EIAR - Transboundary Aspects of IP and P 16De109Rev02_EIA_R NTS - Non-Technical Summary). However, we consider that is advisable and necessary to analyze and evaluate major accident scenarios (worst case scenario), involving an event which would lead to the total destruction of the entire facility, subject of the decommissioning process (such as major earthquake, terrorist attack, plane crash, generalized fire etc.)

Answer: The accidents analyses during decommissioning are considered in a more comprehensive way in the Decommissioning Safety Analysis Report (DSAR) [58]. In chapter 1, section 1.14 are given in summary only the results of the limiting IE. In section 1.14 the limiting events are considered and also initial and boundary conditions and main conservative assumptions are given. Concerning external events such as earthquakes, flooding and external fire in the DSAR, reference is made to the SAR of Units 1-4. Results show that there are no consequences during normal operation of these Units.

The detailed analysis is given in the Decommissioning Safety Analysis Report which is the main document required and approved by the Bulgarian Nuclear Regulator prior issuance the licence allowing decommissioning activities.

In Chapter 7, Section 7.5 of the SAR of Units 3 and 4 operation ([29], [30]) are analyzed the following external initiating events:

- Operational Basic Earthquake;
- Flooding of Kozloduy NPP site;
- Aircraft crash.
- External fire.

Operational basic earthquake

In Kozloduy NPP I and II designs are specified input data for the seismic characteristics by using data from before 1977. Within the frame of Project PH BG-9512-02-01 of the 6-months WANO Program (1992) for upgrading of the seismic safety of Units 1-4 all building structures containing equipment or systems needed for the safe shut-down of Units 3 and 4 in case of seismic impact were investigated by using approved similar procedures. The building structures are reviewed by using new seismic characteristics, including the floor response spectra.

After the execution of some reconstructions at the main bearing structures of the main buildings of Units 1-4, it was proven that **in case of 0.2g seismic acceleration**, the latter have slipping margins towards the ground base (at the boundary blanket –foundation slab), which coefficient is bigger than 1.0 (1.4). The remaining buildings and facilities that provide safety such as the (SDGS, fountain ponds /FP (ББ)/, DPS (ОПЦ), the circulation pump station /CPS (ЦПЦ)/, which are sources of additional water to the FP, the technological trestles and ducts had been checked for 0.2 g acceleration. The same is valid for the ventilation stacks.

The envelope initiating event in case of Operating Base Earthquake can be defined as a ***Rupture of the discharge line for resins from the SVO-3 filters in close vicinity to the filter.***

During an earthquake on the KNPP site this event is covered by an event of rupture of a pipeline from a system for retrieval of resins from HLRT due to a higher specific activity in the HLRT.

In case of flooding the results show that:

- KNPP site is not endangered by flooding from the Danube River. The water levels in the River when high waters are passing are lower than the crown level of the service water supply facilities at the site.
- In case of destruction of the hydro units, constructed upstream the Timok River and passing of a high wave along Kozloduy section, the water level of the Danube River is lower than the crown level of the facilities for service water supply and the KNPP site.

Aircraft crash

Concerning aircraft crash, the total probability of an aircraft crash against NPP (includes civil, military and agricultural air fleets) is evaluated to be $2.15E-8$ 1/a. This value is below $1E-7$ 1/a recommended by IAEA and it is below the frequency of events from Category 4 of the design conditions (Article 12, para (1 of [3])).

External fire

The following main sources of fire hazard on NPP site have been considered in the analysis, given in Section 3.3.3.3 of DSAR: Forests, Storehouses for explosives (solid, liquid and gaseous), Main oil and gas pipelines, Railroad, Highway, River transports, Airports and air communications, Communal buildings, Industrial sites.

Based on the analyses carried out and on the assessment of impacts due to events causing fire, external to the plant site, the basic fire sources are identified to be: Fire on Trucks travelling on the roads around the nuclear power plant and Fires on boats on the Danube River. The results from the analyses are summarized as follows:

- 1) The probability for a fire event from the above sources has a very low value – less than 1×10^{-6} 1/year.
- 2) The results from an impact of main fire sources outside the NPP site are negligible for the NPP site and the equipment placed on it, and do not affect the safety of the NPP Units.

Therefore scenarios resulting from such events do not need to be analysed.

Initiating events caused by man-made hazards

In Chapter 2 of the SAR of Units 3 and 4 ([29], [30]), a detailed review is done of the possible impacts on NPP, resulting from human activities. A summary of this review is presented in Chapter 3 of the Decommissioning Plan (document KPMU/DCP/003). All possible sources of explosions, fires, discharges of toxic substances etc., have been reviewed. All kinds of transport (railway, river, road and air) have been analyzed as well as plants and petrol stations. The following main conclusions are drawn as a result of this:

- The remoteness of KNPP site from the international river way at about 3.5 km, the presence of Kozloduy island and the closure of Danube River sleeve that is inherent for the site for external boats, reduces the risk of terrorist attacks on KNPP;
- No chemical contamination sources have been found, which could result in hazardous concentrations of harmful substances in the air;
- All possible car accidents, which could occur on the regional road network in the region around Kozloduy NPP, have a featuring of local impact and can not cause an initiation of an emergency process in the plant;
- The impact of eventual railway incidents on Kozloduy NPP is practically zero, because they can not cause an emergency initiating event at the plant;
- Sites that contain explosive materials (petrol stations, military air ports etc.) can not initiate an emergency process in the plant.

Conclusion

A specific issue for the Units being in decommissioning is the hazard from radiation emergency at some of the nuclear facilities, located at KNPP site - Units 5 and 6 and the spent nuclear fuel storage facilities.

The analysis of the radiological consequences caused by beyond design accidents, including severe accidents at these facilities, is a part of their Safety Analysis Reports. The response actions in case of radiation emergencies are defined in Kozloduy NPP Emergency Plan, which is applied also for Units 1-4.

The Safety Analysis of the specified nuclear facilities includes an analysis of the consequences from external initiating events – detonation, explosion, flooding fire, etc. In the Safety Analysis Reports it is proven that such events have very low probability and they do not result into degradation of the fundamental safety functions of the facility. Therefore it is not necessary that these events are taken into account as external impacts on the Units in the decommissioning process.

- 19) We consider necessary that definite procedures should be set out in detail regarding the flow of information to be implemented in case of events with possible transboundary impact. They should determine how to inform the Romanian side in case of an event produced to the facilities under decommissioning, as well as how to timely submit at least the following information: event type, date of event, the expected duration, radioactive materials released into the environment, area likely to be affected, recommended population protection measures. Procedures to be followed in emergency situations should be agreed between the responsible institutions of the two countries.

Answer: The Investor and the Consultant welcome a better cooperation, collaboration and flow of information. The basis must be a political agreement on the level of Ministries of Romania and Bulgaria.

B General Comments

Comments on the data presentation

We believe that it is necessary to submit data and information on environmental radioactivity in a uniform manner, allowing the understanding and comparison of the analyzed results. Thus:

1. Data presented by Bulgaria appear at best as graphs, and the rest are the minimum, maximum and average time interval analyzed, while the data reported by Romania are given explicitly, without graphics, trends etc.
2. Within the EIA Report must be presented a comparative analysis of the values reported by the two countries, at least for the time intervals for which data coincide.

Answer: The basis for the Romanian data is the document “Necessary data to assess the transboundary effects in Romania”, submitted by Romania. This information was used in the EIA Report without changes. The input data were used as provided, without modification in the presentation; as a result, the data presented for Bulgaria are mainly in graphs, the data presented for Romania are mainly in tables. It is unusual between experts and scientists to make more detailed analysis or another form (e.g. graphs) with data from other authors without contact, discussion and permission from them.

A comparative analysis of the reported values is not necessary, as Romania and Bulgaria has the same legal basis with the EU law and use the same international standards.

3. Due to the fact that the Bulgarian party is monitoring only from their country the possible impact zone from the vicinity of the objective (according Environmental Impact Assessment Report for the Decommissioning of Units 1 to 4 at Kozloduy NPP), and the Romanian population from that area can not easily access this information , we consider that it is necessary to develop a periodic report containing the results of the monitoring and the results to be communicated to the inhabitants of the Romanian bank of the Danube.

Answer: See answer to 19).

Comments on the protected areas

4. Within the project area, on the Romanian Danube bank, there are some natural protected areas, namely:
 - NATURA 2000 Sites ROSPA0010 Bistret and ROSPA0023 Confluență JiuDunăre, protected under the Birds Directive
 - NATURA 2000 Sites ROSCI0045 Coridorul Jiului and ROSPA0135 Nisipurile de la Dăbuleni, protected under the Habitats Directive
 - The protected natural area of national interest Casa Pădurii din Pădurea Potelu
code 2.667.

Answer: The NATURA 2000 protected areas are assessed in the EIA Report on the basis of the given information from Romania (“Necessary data to assess the transboundary

effects in Romania”) and information about Natura 2000 from the respective websites of the EU Commission.

The protected area of national interest “Casa Pădurii din Pădurea Potelu” is not assessed in the EIA documentation as it was not required by Romania and information was not given.

5. Given that these natural protected areas host many species and habitats whose maintenance and conservation are priority over any other interest, please note that we have no objection to the project *Decommissioning of Units 1-4 of the Kozloduy Nuclear Power Plant, Bulgaria* implementation, on condition that the project complies with international law, in particular the two EU Directives (Habitats and Birds). The adequate measures that will be proposed to be included by the Bulgarian party in the EIA final decision will be provided by the appropriate assessment developed for this project as required by the above mentioned EU legislation both for the Romanian and the Bulgarian NATURA 2000 sites. The EIA final decision must reflect the appropriate assessment measures for both sides of the Danube River (Bulgarian and Romanian).

Answer: The assessment of the Romanian NATURA 2000 areas took place on the basis of the above mentioned information. The influence of the decommissioning project on the NATURA 2000 areas of both sides of the Danube River is negligible.

Other measures for improvement of the conditions of the protected areas must be defined by the national authorities and relevant experts according to the above mentioned EU Directives.