Response to the comment of Federal Republic of Germany in the framework of consultations on the results of environmental impact assessment for ZNPP and SUNPP

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	GRÜNE-FICHTELGEBIRGE		
DE1	The emergency preparedness and response plans are not sufficient2. The lack of preparedness in Ukraine and neighbour states is documented in the Report of the Nuclear Transparency Watch Working Group on Emergency Preparedness & Response. Therefore an upgrade of any old nuclear power plant is irresponsible. http://www.bmub.bund.de/P4714/ http://www.nuclear-transparency-watch.eu/category/activities/nuclear-emergency-preparedness-and-response	The comment does not have an appropriate justification. For each NPP emergency preparedness and response plans have been developed, which have passed state expertise on nuclear and radiation safety. In addition, NPP have been implementing measures to improve the its nuclear safety over the past 10 years, which have also been reviewed and approved from the IAEA. In assessing their appropriateness, sufficiency and completeness, experts from the German nuclear organization (GRS, TUV) are also taking part. It should be noted that the second link does not work.	
DE2	The therein discovered deficiencies and the other here mentioned ones are the reasons for me to ask for: 1. A correct documentation, 2. A translation into German, 3. An extension of the submission period to give the whole German public a reasonable chance to participate, 4. A hearing in Germany under the relevant treaties and the below mentioned Ukrainian EIA Law. 5. Otherwise I demand to close the both nuclear power plants for legal and safety reasons.	In accordance with article 4 of Espoo Convention, Ministry of Ecology and Natural Resources of Ukraine decided to submit for consultations the Non-technical summary of the EIA report and the EIA section "Transboundary impact", for more information please visit web-site: http://www.npp.zp.ua/Extoper/Documents and : https://www.sunpp.mk.ua/en/ltoe_en These materials were posted on the website of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) (http://www.bmub.bund.de/themen/atomenergie-strahlenschutz/nukleare-sicherheit/internationales/uvpsup/uvp-ukraine-akw-saporishshja-und-suedukraine/) 21.09.2017. We consider this sufficient time for consideration and familiarization.	
DE3	If I understand the new Ukrainian EIA Law[5] correctly, the public participation opportunities include public meetings and/or public hearings and the review of the final EIA. "Public consultations in the process of the environmental impact assessment shall be carried out with a view to identify, collect and take into account comments and suggestions from the public to the proposed activity." EIA Law, Art. 7(1). "Public consultations on the proposed activity after the submission of the environmental impact assessment report shall be carried out in the form of public hearings and in the form of submission of written comments and suggestions (including in an electronic	Indeed, the new Law provides the public participation in the environmental impact assessment process. However, However, the effect of this Act begins from December 18, 2017. But the Ministry of Ecology and Natural Resources of Ukraine needs to develop additional by-laws to implement such requirements. At the moment, the results of the environmental impact assessment of ZNPP and SUNPP are posted on the official websites of NPP since the end of 2015 and there are no comments or proposals on the text or structure of this reports from the Ukrainian public. As part of the implementation of the Espoo Convention provisions it is planned to hold consultations with the affected parties (the Republic of Belarus, Poland, Slovakia, Hungary, Romania, Republic of Moldova, Germany), scheduled for 23-24.10.2017 in Kyiv.	

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	form)." EIA Law, Art. 7(5). Public Input at Meeting Detail: The public may comment on the proposed activity in writing during the public consultation period or orally during consultations. EIA Law, Art. 7(2). A public meeting and/or hearing is automatically required by the Law. If I'm wrong, and the mentioned law that I found in internet isn't the right one, please correct me.		
DE4	It's an agreed consensus of the Espoo Convention and Aarhus Convention that nuclear energy is an ultra-hazardous technology with transboundary effects. There are many open questions that need to be discussed with the Ukrainian authorities in a public hearing in Germany. The international treaties demand public participation without discrimination. The Ukrainian citizens have the right to have hearings. Then the German citizens should have the same right. This is agreed consensus in all treaties and protocols which are known to me. It should also be agreed consensus in an EIA PLEX.	The comment is not clear. Ukraine created all conditions for public participation (both Ukrainian public and affected parties public) during the EIA procedure for ZNPP and SUNPP. All necessary reporting materials are posted in the mass media and are available for their review and analysis, as well as all contact information on which they can submit comments and suggestions.	
Общие замечания / General remarks			
DE5	1. The translation of the documentation is not clear. There are several places where sentences are not clear such as the type of proposed activity from the notification. This needs to be improved.	The EIA was performed for each NPP site (ZNPP and SUNPP), taking into account all power units (accumulating effect). Due to the fact that ZNPP and SUNPP are operating facilities and are at a separate stage in the life cycle of the nuclear facility - "Operation", it is difficult to propose a definition of the proposed activity. However, the results of such an assessment will be used to further justify of safe operation of the power units before the next separate stage - "Decommissioning".	
DE6	2. There are a number of documents missing: given the coverage of the consultations (life-time extension for 9 nuclear reactors), there should be 9 full EIAs accompanied by non-technical summaries submitted to all parties, also to Germany in German language. Also, supporting documentation mentioned in the non-technical summaries, such as the periodic safety reviews, are not available. These documents must be forwarded in the extension of the submission period in order for the public to be able to provide comprehensive feedback. Furthermore, the	Please take into account following. The EIA of ZNPP and SUNPP is exclusively an initiative of Ukraine. No requirement of both Ukrainian and international law does not provide the EIA during the of life-time extension of the NPP's power units. Conducting an EIA for the existing power generating facility is an unprecedented event for Ukrainian and international nuclear power industries. Even at the 7th Meeting of the Parties (6-7 June 2017, Minsk), no appropriate decision was taken on the need to apply the Convention for life-time extension of the NPP's power units. Therefore, Ukraine does not link the conduct of the EIA for the ZNPP and SUNPP with the activities of life-time extension. However, the results of such EIA may be used when the relevant body takes an appropriate decision.	

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	documentation submitted by the Ukrainian government has been developed in 2015 and therefore must be considered outdated.	Procedural motives due to which the documentation has become outdated we do not comment. As for providing the complete EIA with annexes. The authorized body for Espoo Convention application in Ukraine has decided to grant only those documents for consultations with the affected Party. Question concerning PSRR report we find this demand excessive. PSRR is developed by internal procedures in origin language. However, separate chapters of this report (Safety Factor 14 "Environmental impact of power unit operation" and Chapter "Comprehensive Safety Analysis") are posted on the SUNPP website.	Within the Periodic Safety Review Report (PSRR) for each power unit 14 safety factors have been developed, which are grouped in accordance with the PSRR chapters and are presented as follows: Safety Factor 1"Power unit design"; Safety Factor 2 "Current technical condition of unit systems and elements"; Safety Factor 3 "Equipment qualification"; Safety Factor 4 "Ageing of safety-related facilities, systems and elements"; Safety Factor 5 "Deterministic analysis of power unit safety"; Safety Factor 6 "Probabilistic safety analysis"; Safety Factor 7 "Analysis of internal and external impacts on safety"; Safety Factor 8 "Operation safety indicators"; Safety Factor 9 "Application of other NPPs experience and results of new scientific achievements'; Safety Factor 10 "Organization of operation and management of production processes"; Safety Factor 11 "Operations documentation"; Safety Factor 12 "Human factor"; Safety Factor 13 "Emergency preparedness and planning"; Safety Factor 14 "Environmental impact of power unit operation". Based on the results of evaluation of all factors, comprehensive safety analysis has been performed for each power unit, which has been issued as separate reports. All documents have been subject to the Regulatory Authority's expertise and have been approved by the Regulator. Public hearings have been convened. Document "Comprehensive Safety Analysis" has summarized the results of analysis of all safety factors with the consideration of their mutual impact on the power unit safety. The document has been published of the Energoatom's web-site and is accessible for everybody.
DE7	3. According to the Aarhus Convention, art. 6(4), public participation (also transboundary public participation in an EIA) must take place when all options are open. In case of tiered decision processes, whereby public participation in earlier decisions did not take place, the decisions taken earlier should again be subject to public participation and be	The SE "NNEGC "Energoatom" acts in compliance with national legislation. The EIA procedure addresses environmental impact of SUNPP units operation. The decision to change the operation license for the plant units were made by regulatory authority and in compliance with national legislation. What will be the grounds for the decision to suspend reactor operations and who is supposed to make such a decision?	The SE "NNEGC "Energoatom" acts in compliance with national legislation. The EIA procedure addresses environmental impact of SUNPP units operation. The decision to change the operation license for the plant units were made by the regulatory authority and in compliance with national legislation. What will be the grounds for the decision to suspend reactor

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
		majority of European countries this practice is more effective, but the NNEGC "Energoatom" makes every effort to be more experienced.	
DE8	4. It is unclear why "operation site" was chosen to be an object of EIA (not a particular unit) and how much "operation site" includes all possible project-type activities (water reservoirs, electricity connections, etc.). In addition, there is a need to clarify whether the submitted EIAs will be subject to environmental expertise according to Ukrainian law and, if so, what are legal grounds for the process in Ukraine. This must be clarified and must be improved.	The EIA for ZNPP and SUNPP was started in 2014. There are no requirements for EIA for existing facilities in Ukraine. Therefore, conservative requirements established for new construction for this ZNPP were adopted. Such regulations require the EIA for the entire site on which the facility is located and to assess of all impact factors and to analyze of all environmental objects. After the development of the reporting materials in 2015, the EIA was sent to the Ministry of Ecology and Natural Resources of Ukraine for state ecology expertize. The Ministry has decided to conduct transboundary consultations and, according to their results, issue an expert decision.	
	5. Ukraine is already in breach of the Espoo convention by refusing notification before the decisions of lifetime extension of 6 reactors were made.	Ukraine did not violate any requirements of the Espoo Convention. Decision of 6th session of Meeting of the Parties in 2014 concerned solely the power units № 1 and № 2 Rivne NPP (paragraph 70 of decision ECE/MP.EIA/20/Add.1-ECE/MP.EIA/SEA/4/Add.1. The 7th session Meeting of the Parties to the Espoo Convention also did not take any decision regarding the violation of the Espoo Convention by Ukraine.	
DE9	6. I ask for a clear explanation of the decision-making process as a whole, meaning how the notifications feed into the decision-making process. Given that these documents have already been presented to the Ukranian public in 2015 and not disclosed to international public as well, there is a clear breach of the Espoo convention.	There is a legal conflict on this issue. National legislation does not require the needs of EIA results to be taken into account during life-time extension of the NPP's power units. This activity is possible when there are positive results of the nuclear and radiation safety expertise of the Periodic Safety Review Report (PSRR) of the power unit (not even the entire NPP site). One of the sections of the report on the periodic reassessment of the safety of the power unit is the section "Environmental Impact Assessment". The regulatory body (State Nuclear Regulatory Inspectorate of Ukraine) makes a decision on the life-time extension possibility on the basis of such examination results and public discussion of the draft decision. This is the world practice in nuclear energy and takes into account the IAEA recommendations. It is also not necessary to carry out an EIA during the life-time extension by an international act that Ukraine has signed and is compulsory for implementation. As for the private EIA for ZNPP and SUNPP. Based on the results of transboundary consultations, Ukraine will not take any decision on the extension, which is the illogicality of the application of the Espoo Convention to the life-time extension activities.	
DE10	7. Given that the Ukrainian legislation does not make any links between EIA and the lifetime extension decision-making legal framework, how can Ukraine ensure that any possible commitments it may take	In connection with the need to fulfill the commitments undertaken by Ukraine on international instruments, commitment to the priority of security (including environmental), openness it was decided to conduct an EIA for ZNPP and SUNPP. In addition, a new law of Ukraine "On Environmental Impact Assessment" was adopted. This law is developing the provisions of the Espoo Convention, the Aarhus Convention, However, this law also does not envisage carrying out an EIA during the activity	

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	during consultations will be actually reflected in the lifetime extension decision?	extension when certain criteria which are also set by the authorities are met.	
Уведомление			
DE11	8. The type of proposed activity is not clear: «The activities of Zaporizhzhya NPP (ZNPP) and South-Ukrainian NPP (SUNPP) at the stage of the life-time cycle of the nuclear installation "Operation"». The text includes no reference to the lifetime extension of the discussed nuclear reactors.	The EIA was made for power units that are operated in accordance with the permitted activity at a particular life cycle stage of the nuclear installation - the "Operation" stage. Life-time extension is activity within this stage.	
DE12	9. The scale of the proposed activity includes 9 nuclear reactors from 2 power plants. Each of these must be assessed separately meaning that 9 notifications and procedures of consultations ought to take place. Under the scope of the assessment (page 2) there is missing: independent technical expertise on the state of the 9 nuclear reactors, including the state of the reactor vessel; an assessment of alternatives to the lifetime extension of South Ukraine 3, Zaporizhzhya 3,4, 5 & 6 reactors. Consideration and assessment of the environmental impacts of prolonged use of nuclear fuel (by uranium mining, fuel production) and prolonged production of radioactive waste (low-, middle-, but above all high-level categories of radioactive waste, including spent fuel).	This comment is only a view of the author. However, the national legislation has adopted procedures, which have already been answered (see DE6, DE8, DE9).	
DE13	10. Rationale of the proposed activity: raising funds for decommissioning and waste management cannot be considered as the rationale behind lifetime extensions. These funds should have been raised during the 30 year life time of the reactors. That they were not, means that Energoatom as operator has so far sold electricity under cost price and should be kept fully responsible for this. Secondly, it is not at all guaranteed that further operation of ageing nuclear reactors will generate sufficient financial rewards, and most certainly not when electricity prices remain too low. Bad management of these NPPs may never be an argument in the justification for the environmental risk that these NPPs are causing during further	SE "NNEGC "Energoatom" cannot be declared as an bankrupt, since it is a state enterprise, moreover it has good financial indicators. In addition, SE "NNEGC "Energoatom" was established in 1996, when most nuclear power plants had already been operating. Energoatom does not influence on the tariff policy.	Certainly nobody will operate "dangerous" reactors. The power units are operated within the beyond-design period, only if the Operator fulfills all conditions of the Regulatory Authority and on the basis of the Periodic Safety Review Reports, developed in accordance with the requirements of IAEA "Periodic Safety Review for Nuclear Power Plants No. SSG-25. Specific Safety Guide", having proved the possibility of safe operation of a power unit.

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	operation.		
DE14	11. Expected environmental impact: The statement that an increase of the impact on the environment is not provided because the capacity and output of the reactors is not changing is false. The severest impacts of nuclear installations are after a severe accident with a substantive emission of radioactive substances. The risk for such an event is growing exponentially with the age of a nuclear reactor - based on degradation of the quality of essential non-replaceable parts like the reactor pressure vessel and others, the introduction of new parts and incompatibility problems, loss of knowledge and experience from the construction and other causes. The risk furthermore is depending on political and social stability, which has severely decreased in comparison with the time when the reactors were planned and constructed. For that reason, the potential impact of these nuclear power stations is not only a lot higher than when they were planned (and then they were arguably already unjustifiable), but they are also exponentially increasing. Furthermore, there is an increase in the use of uranium and therefore an increase in the nuclear waste. The C02 cycle of the further operation of the plans should be assessed under the expected environmental impacts.	The absence of an increase in the environmental impact during operation of power units is indicated, in particular, by the data of long-term radiation and geoecological monitoring. The full implementation of CCSUP measures, including system replacement and equipment upgrades at the very least will not worsen the current situation. The increase in emergency risks in a geometric progression is not supported by an analysis carried out according to the IAEA methodology and indicated in the PSRR.	Statement in the comment is false and not clear. Moreover, it pursues an object to take away from the subject of discussion. One should not confuse "increase of the impact" and "risk of the impact". These are different things. As for the risk, it is assessed based on the regulation and approached adopted within the industry. Corresponding safety analysis materials represent a prerequisite for obtaining the permission for operation extension. New components (individual elements, systems) are implemented with the consideration of surpassing reliability in comparison with the elements (systems), which are subject to replacement (reconstruction). New systems/elements possess a lower intensity and, thus, lower probability of failure within the period of operation or failure to perform a corresponding function. In case of implementation of different ergonomic systems, the operations personnel are trained at the full-scope simulator, subsequently confirming their qualification. Thus, increase of risk due to implementation of new equipment (components, systems), as well as due to the human factor ("loss of knowledge and experience") is groundless. Naturally, in the course of modernization, compatibility of the components is considered, and no problems can appear. Program for management of the equipment and pipelines ageing has been established within the industry. Impacts of various factors are regularly monitored in order to ensure timely repair, modernization or replacement of the required component. Information about geometric progression increase of the risk of the potential NPP impact due to deterioration of political and social stability is absurd, farfetched and scientifically unjustified
DE15	12. Input: there is further uranium use. Moreover, the operation of the power plants is undergoing massive safety improvements funded by the EBRD and Euratom including physical and non-physical improvements. I request the safety upgrade report.	All reporting information implementation of the Complex Consolidated Safety Upgrade Program for NPPs in Ukraine is accessible to the public by link http://www.energoatom.kiev.ua/en/actvts/integrated_security_program/.	
DE16	13. Transboundary impacts: Serious calculations using the FlexRISK model developed at the University of Vienna and the BOKU University in Vienna show that a severe accident with a source	An assessment of the spread of radioactive releases and the formation of radiation doses in the event of accidents of various types (design and heavy design) were performed for SUNPP reactors using PC COSYMA (National Radiological Protection	For all power units of ZNPP, assessment of radiological consequences of severe accidents with the consideration of the severe accident management strategy has been performed in accordance with the "Work Program for Analysis of Severe

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	term of 51.05 PBq of Cs-137 (20% of the inventory - the order of magnitude of emissions from the Fukushima NPP) in one of the Zaporizhzhya reactors in weather circumstances as took place on 05-01-1995 would be able to severely impact Romania, Slovakia and Poland. Other runs of this tool show potential severe impacts on Russia, Moldava, Turkey, Belarus, Georgia, Armenia, Poland, Lithuania, Hungary, Austria, Germany, Bulgaria, and Greece. When, as stated in the notification, "Calculations carried out and justified the absence of a transboundary radiation impact on the environment and the population of the consequences of discharges of radioactive substances from the South Ukraine NPP and the Zaporizhzhya NPP under normal and emergency event operation", this merely shows that the authors have not done sufficient research in the potential impacts of the NPPs. 14. Proposed mitigation measures: I request unlimited liabilities in case of an accident.	Board). In assessing the effective radiation doses, a conservative approach is used. However, in assessing the consequences of each accident, it is necessary to take into account the very low probability of such an event.	Accidents and Development of Severe Accident Management Guidelines" and the "Activity 29204 of Comprehensive Safety Updated Program for Power Units of Ukrainian NPPs". Analysis of radiological consequences has been performed for the following states of a power unit damage to be reached as a result of a severe accident management: - severe core damage with bypassing of the containment with the consideration of actions for reduction of release to the environment from the steam generator; - non-localization of the containment of actions for reduction of release to the environment from the containment; - containment failure to localize the melt within the reactor; - containment failure after the melt outflow from the reactor. The results of the radiological consequence assessments performed are compared with the results obtained in the frames of the power unit vulnerability analysis (without personnel actions) under the severe accident conditions. For the scenarios with the severe accident management actions, radiological consequences for the population have been mitigated to different extent. For the scenarios with the containment integrity maintaining, the severe accident management actions have allowed reducing of radiological consequence for the population up to the levels, at which no protective measures are required. At present, for the ZNPP power units the measures have been implemented, which promote preservation of the containment integrity in case of a beyond-design accident (prevention of early bypassing, discharge from the containment, passive autocatalytic recombiners, mobile pump stations). While reviewing the results of the radiological consequences analysis, it should be considered that the calculations have been performed for the worst weather conditions with the assumption of the low-altitude release. In case of the more favorable weather conditions (e.g. under the conditions of the atmospheric agitation, which correspond to Pasqual Category A), dozes and, accordingly, contamination density will be essentially lower. First of all, the performed severe accident analysis does not confirm the value of release declared by the author of the comment. Secondly, the calculation analyses performed with the application of the JRODOS code do not confirm the distance and degree of contamination declared by the author. For analysis, it is necessary to consider the principle of

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
			reasonable sufficiency, and not super-conservatism.
DE17	14. Proposed mitigation measures: I request unlimited liabilities in case of an accident.	We consider this proposal to be left without comment	
Нетехническое резюме ЮУАЭС			
DE18	1. Life-time extension of nuclear power plants is not an accepted strategy in a majority of countries as it is stated on page 4. A number of more progressive European countries such as Germany and Austria as well as critical political voices in all EU countries are opposing lifetime extension.	Nonetheless, almost half out of 441 reactors around the word are operated beyond their design life, and 112 are in the process of lifetime extension or in the preparation phase. This is a general trend. The singling out of Ukraine in this trend is not unsubstantiated.	When mentioning the majority of countries whose nuclear power development strategy provides for the extension of the operation of the existing NPP's power units, first of all they meant countries with developing economies in which there is a shortage of electricity due to lack or absence of other sources of its production. The lifetime extension of Ukrainian NPPs is stipulated by the "Energy Strategy of Ukraine for period until 2035" and the "Comprehensive Program of Work for Extension of the Operating Period of the NPP Units in Force". According to the "Energy Strategy of Ukraine for the period until 2035", measures implementation and decision-making on the lifetime extension should be ensured, subject to the positive results of the periodic reassessment of safety. The expediency of lifetime extension is due to the possibility of obtaining an economic effect by reducing the unit costs per unit of installed capacity by 9-10 times, in comparison with the introduction of new capacities, including safety level improving.
DE19	2. On page 4, the same assumption as in the notification is present on the absence of environmental impact: "Thereby, any environmental factor does not change, all the parameters of environmental impacts remain on the same level, and maybe, they will go down owing to upgraded processing components and implemented supplementary environmental protection actions." This assumption is false as described above.	This conclusion is based on several analysis results: analysis of the current state of the power unit based on the results of periodic safety reassessment, analysis of the level of environmental impact, probabilistic safety analysis, analysis of multi-year results of environmental, technical monitoring and forecasting. Such analyzes were presented and approved during the various missions of IAEA, WANO, European expert organizations in the field of nuclear energy (GRS, TUV, EDF, etc.).	
DE20	3. The information provided on page 12 is outdated as the government has already extended the lifetime of reactor 1 and 2 of South Ukraine NPP and reactors 1 and 2 of Zaporizhzhya NPP.	The EIA was launched in 2014 and completed in 2015. Then the report materials were submitted to the Ministry of Ecology and natural Resources. During 2016-2017 the examination of such materials was carried out.	

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
DE21	4. The document argues in several places that decommissioning of NPP is costly and Ukraine does not have the financial means to cover the process. The incapacity of the government and the state owned company that operated the NPPs to raise these funds in the future should be put under assessment and a thorough decommissioning plan must be set. I request information on the state of the decommissioning fund that Energoatom was responsible to set up as a condition for the financial support received from public funds of the EBRD and Euratom.	In accordance with the Law of Ukraine "On streamlining issues related to nuclear safety" in 2015 created a Financial Reserve for the decommissioning of nuclear facilities. In this law it is determined that the funds of the Financial Reserve should be accumulated in a special account opened in the State Treasury of Ukraine. The payer of contributions to this fund is SE "NNEGC "Energoatom", as the operator of all NPPs in Ukraine. According to the current legislation, before approval of the decommissioning project for a nuclear facility, the amount of deductions to the financial reserve is established on the concept of nuclear facility decommissioning. Until 31.12.2016 these contributions amounted to UAH 283.4 million per year. From 01.01.2017 there was increase in allocations to the Financial Reserve to UAH 785.4 million per year. The total amount of funds that have been transferred by SE "NNEGC "Energoatom" to the Financial Reserve since its creation until December 31, 2016 amounted to UAH 2,740.268 million. Control over the Financial Reserve is placed on the Supervisory Board, which was created by the Decision of the Cabinet of Ministers of Ukraine on January 22, 2014 № 21.	
DE22	5. At page 16, the paragraph "Handling with liquid and solid radioactive waste, their storage is realized according to the «Sanitary regulations of NPP design and operation». Under normal operation, design basis accidents and the most likely beyond design basis accidents it is practically excluded that these types of radioactive waste spread to the environment" fails to provide information on the nuclear waste storage. I request information on the total waste generated over the planned extended lifetime and plans for safety depositing it.	According information are presented in para 2.6 Nontechnical Summery. See also DE24.	
DE23	6. "On the whole the pollutants releases into the air consist of: 30% of sulfur dioxide, 20% of solids (carbon black, dust), 20% of non methane volatile organic compound. The rest of compound is nitrogen dioxide, carbon oxide and carbon dioxide, carbonic compounds, metal compounds, hydrogen sulfide, ammonia, chlorine etc." (page 17). This paragraph fails to provide information on the total life-cycle emissions. I request an assessment of total C02 equivalent emissions of the entire life-cycle of the nuclear power plant per year of extra operation.	It can be done. Regular emission accounting is carried out at all NPPs, the results are reflected in the annual reports, and these data are publicly available and not a secret. One of the annexes in the EIA - Annex I is dedicated to these aspects. During SUNPP operating period the potential emission of pollutants into the atmosphere is ~ 477.681183 tons/year (dust emissions - 18.05294 tons/year, gas-aerosol mixtures - 459.628243 tons/year). The potential amount of greenhouse gases is 331.87215 tons/year, including: carbon dioxide - 331.825 tons/year, methane - 0.027074 tons/year, nitrogen oxide (I) - 0.020076 tons/year.	
DE24	7. The chapter on radioactive nuclear waste fails to provide information on the total quantity of waste produced per year and as well as a detailed management plan including storage. The capacity of	**We want to draw the author's attention to the gross ignorance of the political life of Ukraine and Europe. In Ukraine there is no civil war in the east. There is the occupation by Russia of the Crimean peninsula and certain**	

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	the storage site at the NPP site is limited and shipping waste and used nuclear fuel to Russia has been stopped since the civil war erupted in east Ukraine. I request information about this.	**territories of the Donetsk and Lugansk regions. In this regard, there are relevant resolutions of the UN Security Council, the European Parliament. Please take this into account.** The following amounts of radioactive waste have been stored at the SUNPP of the end of 2016, in tonnes: low-level - 16980, medium level - 613, high-level - 16.2 (total 17609.2), in addition: the bottoms - 2775, filter materials - 427. The capacity of the industrial site is sufficient to store all radioactive waste that will be generated during further operation. Information on the quantity and handling of radioactive waste, including collection, processing, transportation, and storage, is set out in Sections 2.1-2.3 of the ZNPP EIA (book 2) and Sections 3.4 and 8.6 of the SUNPP EIA. Radioactive waste was not transported to Russia and is not planned. The information on the completion of SNF transportation to Russia is not true. The removal of WWER-440 spent nuclear fuel in 2014-2015 was carried out in accordance with the terms of the contract. The export of SNF of VVER-1000 is carried out annually. Reports of the State Enterprise "NAEC Energoatom" on the management of radioactive waste during the NPP operation over the past 4 years are available under the links: http://www.energoatom.kiev.ua/ua/actvts/nuclear/radioactive_waste/. They contain comprehensive information on the total amount of radioactive waste generated during the year, as well as a detailed plan for handling them, including processing, storage and disposal.	
DE25	8. At page 25, when assessing the radiation influence sources at South Ukraine NPP site, the assessment fails to provide information on the embrittlement of the reactor pressure vessel. The paper as a hole fails to provide any information on the state of the reactor vessel. Information should be requested on the condition of the reactor vessel and on other critical elements of the research. In this sense, I demand to publish the periodic safety reviews.	Technical characteristics and data on the state of the reactor vessel are given in PSRR (Safety Factor 4 "Ageing of safety-related facilities, systems and elements"). Data accepted by the regulatory body. In the PSRR (Safety Factor 2 "Current technical condition of unit systems and elements") are represented: - detailed description of the current state of non-replaceable elements of the power unit, including the reactor vessel, - indicating the parameters and characteristics to be controlled, their normalized and actual values obtained from the technical condition assessment; - a conclusion on the compliance of their current status with the design requirements and the conditions for further operation.	

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
DE26	9. The subchapter on "The potential trans-border radiation effects of South Ukraine NNP" from page 58 is based on the assumption that no accident can take place at South Ukraine NPP as argued above in paragraph 9 of the comments on the notification.	The assumption of the extremely low probability of such an accident does not exceed 10^{-9}.	
DE27	10. Overall, the non-technical summary fails to assess the impact of aging on any of the components of a nuclear reactor.	This is not EIA issue. The assessment was performed in accordance with national regulations (of Article 1 vii) of Espoo Convention). For reference: the evaluation of the influence of aging is considered in the PSRR (Safety Factor 4 "Ageing of safety-related facilities, systems and elements"). In this safety factor, the effects of aging and the mechanisms of degradation of the elements and structures of the power unit are considered, and measures are taken to mitigate their degradation during operation in the super-design period. In accordance with the "Typical Program for the Management of Aging of Elements and Constructions of the Nuclear Power Plant" a periodic assessment of the effectiveness of aging management is carried out on the 9 attributes recommended by the IAEA in SRS No. 82 "Ageing management for nuclear power plants: international generic aging learning lessons (IGALL)".	
DE28	11. In its conclusion on page 78, the assessment states that "Possible consequences from the potential different type design and beyond design basis accidents, modelling of number of cases regarding the assessment of accidental release impacts on the environment and population; it is demonstrated that under any accident scenario beyond buffer area the effective regulations will not be violated. In case of South Ukraine NPP power units lifetime extension the transboundary impacts potentially requiring a response are excluded." Such a conclusion comes in contradiction with the historical lessons of Chernobyl and Fukushima and with the existing scientific research as presented above with the FlexRISK model.	The conclusions are based on the results of "stress tests", analyses of the safety factors, and take into account the implementation of plans for improving reliability and safety.	

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
DE29	12. The chapter on transboundary impact fails to assess potential impact on water such as on the nearby rivers (Prut, Nistru) and on the Black See and Danube Delta. The chapter only assesses potential contamination by air.	We do not assume the impact on remote water objects that can be registered by modern equipment. We also exclude accident impacts by water because the rivers have different catchments. Only airborne transfer is possible in the event of accident.	
DE30	13. On page 58, chapter 6 on evaluation of transboundary impact, the lack of mentioning and assessing beyond design accidents and severe accidents with a substantial emission of radioactive substances caused by human failure, malevolent attack (incl. sabotage, terrorist attack and acts of war) is not acceptable. Events like Three Miles Island, Windscale, Mayak, Chernobyl, Fukushima and also a host of non-nuclear calamities (for example: Seveso, Bhopal, Banqiao Dam, Deepwater Horizon, Exxon Valdez) show that severe (incl. beyond design) accidents do happen in reality and need to be taken into account.	These issues are considered in the Periodic Safety Review Report (including "Comprehensive Safety Analysis"). General conclusions are given in the EIA.	Consideration and assessment of incidents at the NPP, including the worst case scenarios, have been covered with the Safety Analysis Reports, as well as in the frames of development of the Severe Accidents Management Guidelines. Deterministic and probabilistic analyses have been performed. The scenarios included analysis of the following events: internal events: fires, floods, toxic gases, explosions, fall of heavy objects, pipeline breaks, steaming, spraying; external events: flushes and floods, hurricanes and tornados, maximal and minimal temperatures, earthquakes, fall of aircrafts, explosions, toxic gases. The conclusions are included into the Periodic Safety Review for Units 1, 2 ZNPP (safety factors 5, 6, 7 and global assessment).
Нетехническое резюме ЗАЭС			
DE31	14. On page 5, the non-technical summary states that "Zaporizhzhya NPP is the largest power facility of Ukraine, the economic stability; safety and independence of country rely on its operation." This statement is false. Currently, unit 3 of the power plant is off as its licence expired and power supply in the region is stable. In reality, not even during harsh winters all 15 nuclear reactors are operating in the country.		If one unit is stopped the ZNPP still remains the largest NPP in Ukraine. The approval is not false due to the shutdown of one unit for repairs or life-time extension.
DE32	15. On page 6, the following paragraph is false, as argued in the previous pages: "Main points to be provided to public refer to the fact that currently and during subsequent work the operation of power units is not related to new construction, conversion, changes to the lines and processes, replacement of main equipment, etc. It is envisaged to replace certain additional mechanisms and their details with exhausted life time and/or those that are obsolete by new ones (their analogues or more updated), that provide increase of operational reliability and safety		New components (individual elements, systems) are implemented with the consideration of surpassing reliability in comparison with the elements (systems), which are subject to replacement (reconstruction). New systems/elements possess a lower intensity and, thus, lower probability of failure within the period of operation or failure to perform a corresponding function. In case of implementation of different ergonomic systems, the operations personnel are trained at the full-scope simulator, subsequently confirming their qualification. Thus, increase of risk due to implementation of new equipment (components, systems), as well as due to the human factor

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	levels of these mechanism as well as the overall plant. Therefore, any of the factors of environmental impact is not changed, all parameters of environmental impact shall be at the same level, and with the improvement of a number of engineering elements of production and due to the implementation of planned additional environmental protection activities their decrease shall be probably expected." The statement that an increase of the impact on the environment is not provided because the capacity and output of the reactors is not changing is false. The severest impacts of nuclear installations are after a severe accident with a substantive emission of radioactive substances. The risk for such an event is growing exponentially with the age of a nuclear reactor - based on degradation of the quality of essential non-replaceable parts like the reactor pressure vessel and others, the introduction of new parts and incompatibility problems, loss of knowledge and experience from the construction and other causes. The risk furthermore is depending on political and social stability, which has severely decreased in comparison with the time when the reactors were planned and constructed. For that reason, the potential impact of these nuclear power stations is not only a lot higher than when they were planned (and then they were arguably already unjustifiable), but they are also exponentially increasing. Furthermore, there is an increase in the use of uranium and therefore an increase in the nuclear waste. The C02 cycle of the further operation of the plans must be assessed under the expected environmental impacts.		("loss of knowledge and experience") is groundless. Naturally, in the course of modernization, compatibility of the components is considered, and no problems can appear. Program for management of the equipment and pipelines ageing has been established within the industry. Impacts of various factors are regularly monitored in order to ensure timely repair, modernization or replacement of the required component. Information about geometric progression increase of the risk of the potential NPP impact due to deterioration of political and social stability is absurd, farfetched and scientifically unjustified.
DE33	16. Similar to the summary of South Ukraine NPP, this document does not provide information on the total nuclear waste that will be produced over the extra years of operation, beyond the initial licence. Therefore, there is no information available to compare against the capacity of the disposal site at Zaporizhzhya from page 26. In the same time, there is no information on long-term plans for the disposal of the spent nuclear fuel.		Total volumes of operating waste accumulation at ZNPP by 2045 (with the account of commissioning of radwaste treatment facilities) are given in the table 4.2 of Book 5 EIA. The following storages are used for reception and storage of radwaste at ZNPP: Specialized building 1 storage; specialized building 2 storage, storage in the radwaste treatment building (in the storage unit). Lifetime of the radwaste processing and storage complex have been extended till 31.12.2035.

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
			Solid radioactive waste (SRW) in the ZNPP is collected at educational sites and sorted by activity categories. After that, high-level waste (HLW), the middle-level waste (MLW) are transported to storage facilities, and low-level waste (LLW) is transported for processing. The processing of low-level SRW is carried out in the RW incineration plant, in pressing unit and sorting installation. After processing, the waste is transported to SRW storage facilities, where they are temporarily stored. SRW is stored in specially equipped storage facilities located on the site of ZNPP. This buildings are ferroconcrete structures consisting of separate compartments for radioactive waste placement, depending on the category of activity. The compartments are equipped with a fire alarm system, an automatic fire extinguishing system and exhaust ventilation with air purification. Separate compartments are additionally equipped with a system for detecting and removing moisture.
DE34	17. The EIAS don't give any or insufficient attention to the next issues: • Multi-unit incidents and accidents (not assessed); • Problems caused by incidents or accidents in other units on the site (not assessed); • spreading of emissions from a severe accident with a substantive release of radioactive substances (insufficiently assessed); • Security - the risk and potential impacts of sabotage, terrorist attack and acts of war (not assessed); • Emergency preparedness and response (not assessed); • Problems with radioactive water after a severe accident (not assessed).		Calculation data (quantitative evaluation) for the cumulative impact on the environment and the population in case of damage to all 6 reactors is not available due to the absence of the requirements to provide it in the national regulatory documents. For all power units of ZNPP, assessment of radiological consequences of severe accidents with the consideration of the severe accident management strategy has been performed in accordance with the "Work Program for Analysis of Severe Accidents and Development of Severe Accident Management Guidelines" and the "Activity 29204 of Comprehensive Safety Improvement Program for Power Units of Ukrainian NPPs". Analysis of radiological consequences has been performed for the following states of a power unit damage to be reached as a result of a severe accident management: - severe core damage with bypassing of the containment with the consideration of actions for reduction of release to the environment from the steam generator; - non-localization of the containment of actions for reduction of release to the environment from the containment; - containment failure to localize the melt within the reactor; - containment failure after the melt outflow from the reactor. The results of the radiological consequence assessments performed are compared with the results obtained in the frames of the power unit vulnerability analysis (without personnel actions) under the severe accident conditions.

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
			For the scenarios with the severe accident management actions, radiological consequences for the population have been mitigated to different extent. For the scenarios with the containment integrity maintaining, the severe accident management actions have allowed reducing of radiological consequence for the population up to the levels, at which no protective measures are required. At present, for the ZNPP power units the measures have been implemented, which promote preservation of the containment integrity in case of a beyond-design accident (prevention of early bypassing, discharge from the containment, passive autocatalytic recombiners, mobile pump stations). While reviewing the results of the radiological consequences analysis, it should be considered that the calculations have been performed for the worst weather conditions with the assumption of the low-altitude release. In case of the more favorable weather conditions (e.g. under the conditions of the atmospheric agitation, which correspond to Pasqual Category A), dozes and, accordingly, contamination density will be essentially lower. Amount of radioactive water has been assessed in the report "Calculations for Definition of Specific Activity and Amount of Water Resulted from Beyond-Design Accident. Assessment of Radiological Impact on Environment in the Course of Beyond-Design Accident".
Другие замечания			
DE35	18. Background documentation such as the periodic safety reviews or their summaries containing important information on the technical state of the nuclear reactors is missing from the submitted documentation and data available in them. This is not in line with the Aarhus Convention, which states in art. 6(6): "Each Party shall require the competent public authorities to give the public concerned access for examination, upon request where so required under national law, free of charge and as soon as it becomes available, to all information relevant to the decision-making referred to in this article that is available at the time of the public participation procedure, without prejudice to the right of Parties to refuse to disclose certain information in accordance with article 4,	If this does not contradict paragraph 2 of Article 8 of Espoo Convention, PSRR report can be provided (in origin language), at least to the extent that consultation party is interested in.	Within the Periodic Safety Review Report (PSRR) for each power unit (Units 1 & 2) 14 safety factors have been developed, which are grouped in accordance with the PSRR chapters and are presented as follows: Safety Factor 1"Power unit design"; Safety Factor 2 "Current technical condition of unit systems and elements"; Safety Factor 3 "Equipment qualification"; Safety Factor 4 "Ageing of safety-related facilities, systems and elements"; Safety Factor 5 "Deterministic analysis of power unit safety"; Safety Factor 6 "Probabilistic safety analysis"; Safety Factor 7 "Analysis of internal and external impacts on safety"; Safety Factor 8 "Operation safety indicators"; Safety Factor 9 "Application of other NPPs experience and

№	Comment of Affected Party	SUNPP's answer to comment	ZNPP's answer to comment
	paragraphs 3 and 4." Concerning technical data the decision of the Aarhus Convention Compliance Committee in ACCC/C/2012/71, para 93, is: The Committee stresses, however, that if the permitting procedure were to continue and the public concerned was not provided with the opportunity to participate effectively in that stage, the Party concerned would be in non-compliance with article 6, paragraph 4, of the Convention. This should also be relevant in an upgrading lifetime extension procedure.		results of new scientific achievements'; Safety Factor 10 "Organization of operation and management of production processes"; Safety Factor 11 "Operations documentation"; Safety Factor 12 "Human factor"; Safety Factor 13 "Emergency preparedness and planning"; Safety Factor 14 "Environmental impact of power unit operation". Based on the results of evaluation of all factors, comprehensive safety analysis has been performed for each power unit (Units 1 & 2), which has been issued as separate reports. All documents have been subject to the Regulatory Authority's expertise and have been approved by the Regulator. Public hearings have been convened. The purpose of the document "Comprehensive Safety Analysis" for Units 1 & 2 is to summarize the results of analysis of all safety factors with the consideration of their mutual impact on the power unit safety. The document has been published of the Energoatom's web-site and is accessible for everybody. "Non-technical summary" of the PSRR was developed, which was not a document of a technological character, but contained general information for the general public.
DE36	19. The EIA for South Ukraine NPP fails to assess alternative scenarios for electricity supply in Ukraine including not only the options for increasing energy efficiency and the share of renewable energy but also options for limiting the lifetime extension to only the bare minimum necessary to ensure base load supply for upcoming years until other alternatives are put into place. The Ukrainian government is taking the decision-making process on lifetime extensions to the limit by wanting to extend the lifetime of all its nuclear reactors. Such a situation does not create the opportunity for the country to start looking into alternatives for its supply and demand side. Therefore, I demand that a comprehensive alternatives plan is elaborated for minimum in the upcoming decade.	Currently there are no realistic alternatives. The Energy strategy of Ukraine for the period until 2035 provides only the lifetime extension for the power units of the existing NPPs. The EIA considers the use of thermal power generating capacity and shows that the environmental performance indicators in this case will suffer considerably more. Other energy options (renewable alternatives) require time and investment that are not available.	