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Abstract: On September 12th, 2020, the Turkish Ministry of Environment and Urban Planning issued a final approved version of an EIA (Environmental Impact Assessment) report for the Sinop (4,800 MWe) nuclear power plant and nuclear fuel fabrication complex project, located on Turkey’s Southern Black Sea coastline, in the Sinop Province, which will be built on a BOO (Build-Own-Operate) basis by an offshore company known as General Directorate of Electricity Generation Inc. (EUAS) International ICC, along with unknown shadowy partners and investors. This project violates the Convention on the Protection of the Black Sea against Pollution, namely, Bucharest’s Convention of 1992, and the Sofia Protocol of 2018 which are established to preserve the uniqueness of the Black Sea, sustain the fisheries, and protect marine life. The Black Sea is the largest anoxic water basin in the world with oxygen rich surface waters supporting marine life which constitute only about 13% of the Black Sea volume. For the rest of the entire Black Sea at a depth greater than 150-200 m, there is a permanent hydrogen sulphide zone devoid of life, the oxygen is completely absent after this level. This unique bio-hydrological characteristic has been regulating the preconditions of its following distinctive biodiversity for thousands of years. The biologically rich regions are only limited to only oxygen rich shelf zones, with depths of up to 50-100 m in the southern coastline, and in the northern Black Sea shallow-water areas with depths of up to 5-10 m. This water body, bordering the hydrogen sulphide zone, is approximately 200-300 m wide and averages 5-50 m deep, in which high concentrations of fish eggs and larvae strive, and circulate counterclockwise along 4340 km coastline of the Black Sea.

Key words: Bucharest convention, protection, Black Sea, nuclear power plant, pollution.

1. Introduction

This article is an open letter to Chairman K. Chyzhyk, the Commission on the Protection of the Black Sea against Pollution, Istanbul, Turkey, and the Commissioner V. Sinkecvitus Commissioner of EU Environment, Ocean and Fisheries, informing both organization of an obvious violation to the Syncious Bucharest Convention and Sofya Protocol 2018.

The basic objective of the Convention on the Protection of the Black Sea against Pollution, known as the Bucharest Convection 1992, is “To substantiate the general obligation of the Contracting Parties: Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine, to prevent, reduce and control the pollution in the Black Sea in order to protect and preserve the marine environment and to provide legal framework for co-operation and concerted actions to fulfil this obligation. In particular: To prevent pollution by hazardous substances or matter; Annex to the Convention. To prevent, reduce and control the pollution from land-based sources; Protocol to the Convention To prevent, reduce and control the pollution of the marine environment from vessels in accordance with the generally accepted rules and standards; To prevent, reduce and control the pollution.
of the marine environment resulting from emergency situations; Protocol to the Convention To prevent, reduce and control the pollution by dumping; Protocol to the Convention To prevent, reduce and control the pollution caused by or connected with activities on the continental shelf, including exploration and exploitation of natural resources; To prevent, reduce and control the pollution from or through the atmosphere; To protect the biodiversity and the marine living resources; Draft Protocol on the biodiversity To prevent the pollution from hazardous wastes in transboundary movement and the illegal traffic thereof; Draft Protocol to the Convention To provide framework for scientific and technical co-operation and monitoring activities” [1].

When complete, the Sinop nuclear site, such as the Akkuyu Nuclear Complex (which is being built in Mersin province located in the Northeastern shores of the Mediterranean Sea) will be the first and only nuclear power stations in the world under the control of an operator that is a subsidiary of a foreign, rather than sovereign State, from construction through to the end of an undetermined decommissioning process. Furthermore, both nuclear sites will also include the promising establishment of foreign owned and operated nuclear fuel cycle programs, more specifically nuclear fuel reprocessing and fuel fabrication facilities in Turkey. According to article 2 of the Turkish-Japanese agreement for Sinop project, signed on May 3rd, 2013: “Technology and equipment for Uranium enrichment, spent nuclear fuel reprocessing, conversion of Plutonium and production of material including those items listed in part C of Annex A, as well as Plutonium, may be transferred under this agreement only when this agreement is amended for that purpose, in accordance with paragraph 1 of Article 14” [2].

Within the framework of nuclear global view and, according to the latest The International Atomic Energy Agency’s relevant document, IAEA Environmental Impact Assessment for Construction and Operation in New Nuclear Power Programs, “The process of conducting an EIA for a nuclear power project is, in many respects, quite similar to other industry EIAs. This section examines the issues that are unique to the experience of an embarking State conducting such an assessment. Nuclear power technology possesses unique characteristics that affect the environment, such as routine and accidental radiological releases, principally into the air and water. Specialized techniques for modeling these potential releases have been developed, with particular methodologies for impact assessment. Radioactive waste and spent fuel management is also specific for a nuclear EIA, and would need to be addressed, despite the fact that separate EIA reports will also be required. As part of the baseline environmental data collection program, radiological measurements need to be made. Radiological monitoring is also required throughout operation and decommissioning” [3].

The EIA is a trans-boundary document recognized by the members of the Espoo Convention that is known as the United Nations Convention on EIA. Therefore, an international hearing procedure pursuant to the Espoo Convention must also be executed in connection with a given nuclear power plant, according to the Sinop-EIA procedure. Furthermore, according to the Espoo convention, “licensees/operators of the nuclear power plant are liable to compensate for damages caused by the nuclear event/accident at the nuclear facility, and are responsible for compensable trans-boundary damages in the neighboring countries, including but not limited to: personal injuries, damage to property, financial loss, and the costs of environmental restoration measures and, damage prevention measures” [4].

According to the Espoo Convention, the Convention was adopted in 1991 and entered into force on the 10th of September, in 1997. The Espoo Convention sets out the obligations of parties to assess the environmental impact of certain activities at an early stage and indeed, every stage of planning. It also lays down the general
obligation of states to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across boundaries, therefore the Environmental Impact Assessment is a Trans Boundary document. Ironically, the Turkish Government neither informed nor asked any members of the Bucharest Convention to participate in the public hearings.

In the view of the Convention on the Protection of the Black Sea against Pollution, Bucharest’s Convention of 1992 and the Sofia Protocol of 2018, the Sinop-EIA is a critical document which violates every aspect of these international conventions, as well as threatens livelihoods of all stakeholders in the Black Sea Basin. The Sinop-EIA report approved by the Turkish Government failed to provide a comprehensive assessment of establishing and clearly identifying with scientific integrity, the possible ecologic, socio-economic, geopolitics impacts of this project in the Black Sea region.

2. Environmental Concerns: Misleading Information about the Cooling Water’s Temporal and Chemical Effects on Black Sea Marine Life

Ecological effects of a nuclear power plant on local marine life as well as the long-term geopolitical consequences have been generally overlooked and the Turkish EIA for the Sinop Nuclear Power Plant Project is no exception to this. Every use of the sea and its coastal areas has the potential to affect the well-being of neighboring countries. Even point-source of pollution restricted to the vicinity of a nuclear power plant, may affect the economic development of another country by killing eggs, larva and juvenile fish which would have otherwise migrated to its coasts. Within 10 years, the Sinop nuclear power plant’s cooling system will severely deplete most of the marine life around the Black Sea Basin.

In addition to chronic radioactive gas released every day, enormous quantities of water (28 million m$^3$ per day) will be circulated throughout the Sinop nuclear complex destroying billions of larva/eggs and other marine creatures, including planktonic organisms. Discharge water will also increase the temperature and change the chemical composition of the Black Sea water. According to a detail United Nations report, “The biologically rich regions are only limited to only oxygen rich shelf zones, with depths of up to 50-100 m in the southern coast line, and in the northern Black Sea shallow-water areas with depths of up to 5-10 m. This water body, bordering the hydrogen sulphide zone, is approximately 200-300 m wide and averages 5-50 m deep, in which high concentrations of fish eggs and larvae strive, and circulate counter clock wise along 4,340 km coastline of the Black Sea. Moreover, in the Black Sea, a total of 3,774 species have been identified, including: 1,619 fungi, algae and higher plants; 1,983 species of invertebrates; 168 species of fish, and 4 species of mammal” [5].

According to Sinop-EAI report, the oxygen rich coastal surface water of (1,166,400 m$^3$/h) 28 million m$^3$ per day, will be withdrawn from the Black Sea and after about 20-30 min of complete circulation time through the nuclear complex as cooling water, it will be continuously discharged into the sea—about 2,000 m away from the nuclear complex. The Sinop nuclear power plant has 4 huge inlet pumps, (291,600 m$^3$/h each) each will suck the coastal surface water, containing whole marine organisms, in every shape and form, destroying them not only with heat-exchange but also whole cocktails of toxic chemicals injected into the cooling water system. Within 10 years local marine life will be destroyed.

The Sinop-EIA report has failed to identify and quantify any/all of the chemical substances that will be used in the cooling systems during the normal operation of a nuclear power plant. The EIA report did not provide vaporization rates of the toxic chemicals and adverse health hazards in the surrounding population. Boric acid is used as a neutron absorber in the primary coolant of the Pressurized Water Reactors

(PWR). It can be used in some support systems at the spent fuel pool storage areas. Hydrazine is used in the component intermediate cooling system for deoxidization and corrosion prevention. Ammonia is used in the feeding water system to control the pH value of the cooling water. Lithium hydroxide is also used in the primary circuit to control the pH value.

Sulphuric acid is used in demineralization as a recovery chemical of the ion exchangers. Sodium hydroxide is used as different solutions.

In addition, tons of gaseous chlorine are added to cooling water every day to prevent marine organisms developing in the cooling systems. According to the Sinop-EAI report, after injections of chlorine into cooling water, 74 tons of HOCl (Hypochlorous Acid) will be produced every day, which is the most toxic killing agent for all marine organisms, not only in the body of intake water, but also where the cooling water will be discharged in 70 m deep water into a poisonous, toxic and corrosive H₂S (Hydrogen Sulphide) zone of the Black Sea. As a result, if the water-balance boundary between lifeless hydrogen sulphide and biologically creative/productive regions of the Black Sea are disturbed and mixed, that will be the beginning of the end of marine life in the Southern shores of the Black Sea.

According to a California State official report, “Ironically, with all of the limitations and prohibitions placed on discharges, impingements and entrainment have essentially constituted a permitted fish kill for power plant intake systems”. “The reality is, however, that a power plant cooling system does not discriminate and instead causes mortality to all aquatic life in the intake water column” [6].

3. Lack of a Comprehensive Nuclear Waste Management Plan

A more specific description of the nuclear waste management program and that of a long-term sustainable and environmentally safe disposal of spent nuclear fuel must be ensued before a new nuclear power plant is to be built. The EIA of the Sinop Project does not include a clear description of the development of Sinop’s spent nuclear fuel management plans in general, and, does not include any assessment of the final disposal of spent nuclear fuel in particular.

In the Sinop complex, between refueling periods, about every two years, average solid waste generated from a 4,800 MWe PWR Plant will be: more than 180 tons of spent nuclear fuel and 200 tons of low-level radioactive waste, including personal protective equipment, spent resin beads and filters. The Sinop-EIA report/program includes very little information about how and how long the Turkish Government intends to treat and keep the spent nuclear fuel on the site. There is no clear plan on verifying the safety of interim storage and the final disposal of nuclear fuel. There is no regulatory limit for the duration for how long any highly radioactive material will be stored at Sinop site.

4. Open Violations of the Bucharest Convention and Sofia Protocol

We would hereby like to inform you and all the signatories of the Bucharest convention and Sofia protocol that numerous complaints will be filed against the Sinop-EIA, challenging the scientific integrity of the approved report, and further, cancelation of the Sinop Nuclear Power Plant project on the following grounds: the violation/breach of the Bucharest convention of 1994 and the Sofia Protocol of 2018, the misrepresentation of failure to specify the radioactive inventory and of the projected releases into the environment, incomplete information about the toxic chemicals which will be injected into the cooling system throughout the nuclear complex; misleading information about the cooling water’s temporal and chemical effects on Black Sea marine life; lack of details on an emergency evacuation plan; lack of a comprehensive nuclear waste management plan; unspecified insurance coverage for the nuclear

complex, noncompliance with third party liability requirements.

To have any legitimacy of an EIA, it must be prepared truthfully, transparently, independently and any issues that arise must be discussed openly and resolved in public meetings and approved by local communities before it is finalized. But local people living in the Sinop area who are opposed to the Akkuyu project were prevented by police from participating in the public hearings. A number of the local and national representatives of the NGO (Non-Governmental Organization) were arrested by police.

On the complaints side, the attorneys representing the Union of Turkish Bar Association, the UCTEA (Union of Chambers of Turkish Engineers and Architects), including twenty-four engineering disciplines, the Turkish Medical Association, and several NGOs will be presenting their case against the Sinop-EIA report, and thereby demand that the Turkish Government should suspend and cancel all permits, as they relate to the issuance of pre-construction permits and activities until an independent internationally recognized organization along with governments of the Black Sea region produces an environmentally just and scientifically sound option that is available.

This report must be one that includes the latest international safety standards and public input, as well as the criteria of the relevant conventions, explicitly the SPAMs (Specially Protected Areas of the Black Sea). It has been pointed out that, it is of paramount importance that the relevant governments, who are partners of the Bucharest Convention and their experts, carefully reassess all the documentation regarding the Sinop Nuclear Power Plant Project.

5. Conclusion

The Sinop nuclear complex, from the onset of the construction, during the operations and possible unforeseen accidents, will have adverse impact on ecology, biogeography, economy, and the livelihood of people who thrive on the marine ecosystem and tourism industry around the Black Sea. This ill-conceived project also ignores vigorous adherence to the Barcelona and Basel Convention as well as the Bucharest Convention and Sofia Protocol. We ask all the signatories of Bucharest convention and Sofia Protocol who do not consent to dangerous Sinop nuclear power plant and nuclear reprocessing complex, and do not consent to storage of forever deadly radioactive waste from Sinop Power plant, risking contamination to the Black Sea region wildlife, and people for thousands of years.

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References