

OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic
Meeting of the Radioactive Substances Committee (RSC)

Concerns on Floating and Submerged Nuclear Power Plants

Submitted by KIMO International and Greenpeace International

Recent developments in nuclear energy technology are concerning for the integrity of the marine environment in the OSPAR region. Recent activities in Russia and France are seeking to develop technologies that would move nuclear energy production plants from their conventional, established land-based locations to offshore marine environments greatly increasing risks from the nuclear energy industry. These developments have serious implications for the OSPAR region, and KIMO and Greenpeace International seek to highlight the issues to the RSC.

Background

1 Russia is in the final stages of constructing the first vessel in a new fleet being built to generate nuclear power in the Arctic Ocean. Work has been underway since contracts were drawn up in 2006 and the first floating nuclear power station (FNPS) is due for completion in early 2012.

2 The first \$400M vessel is part of a planned eight-strong fleet to be located off Russia's northern coastline to supply energy to onshore consumers. Each FNPS is estimated to be capable of producing enough heat and electricity for 45,000 homes and will be capable of remaining at sea for up to 12 years.

3 Rather than being spent nuclear material in transport that poses the risk of catastrophic impacts, these are functioning nuclear reactors whose presence is intended to be long-term. In the event that an accident did occur the scale of impacts could be vast.

4 The first vessel, the Academician Lomonosov is to be completed in the Port of St Petersburg and floated through the Baltic Sea and via the North Sea to the city of Murmansk for nuclear fuelling before being transported along the entire northern coast of Russia and through the Barents Sea to the remote Kamchatka peninsula to provide power. Criticisms of this plan highlight that current energy supply in the Kamchatka region already outstrips demand, and the lack of adequate infrastructure is a current issue, raising questions over the choice of location for the vessel, probably to be in close proximity for marketing to the booming Asian economy.

5 Should expansion of the fleet occur in the Arctic Ocean, considerable risks will be imposed on the OSPAR region. The transpolar ocean current moves south from the Arctic into the OSPAR region past the east coast of Greenland, if a nuclear accident involving an Arctic-based FNPS was to occur it is clear that the OSPAR region would be at significant risk of pollution. Moreover the Port of St Petersburg, where the first of the FNPS is currently undergoing construction works, may be used by the vessels for maintenance and refueling, thus resulting in nuclear reactors being transported by sea through OSPAR region.

6 The rate of accidents on-board nuclear vessels is a clear justification for being concerned about the development of FNPS. The reactors are based on the KLT-40 naval propulsion reactors that are used in

Russian icebreakers, and are similar to those used in Russian submarines, which have had 14 accidents involving the release of radiation.

7 Along with risks of the operation of this fleet of vessels, KIMO and Greenpeace International are also gravely concerned about the potential for them being produced for sale on the open market. If successful, these vessels may end up being exported to other nations throughout the world, with greater uncertainty and increased risk to marine environments, including the OSPAR region.

8 Parallel to these alarming developments in Russia, the French state-owned DCNS (Naval Defense Company) has commissioned work to investigate the potential of small and medium sub sea nuclear power generators to supply electricity to maritime nations.

9 The nuclear energy firm Areva has launched a study into the scope for producing 100MW-scale FlexBlue¹ nuclear reactors that would be submerged at depths of up to 100m on the sea floor. The 100-metre-long cylinders would be transported by special ship to their destination, a few kilometers offshore, be submerged and linked up to the shore by cable.

10 The firms involved in the study promote the concept as being less at risk of terrorist intervention given their sub sea location, reinforced by sensors and under-sea fencing capable of informing surface and onshore security of any risks or threats. They also suggest that since the installations are not mobile, they pose significantly fewer risks than those associated with nuclear submarines.

11 These small-scale installations aim to target the market for maritime nations seeking electricity supply of up to 50 to 250MW. The proposed technology does not require any onshore infrastructure other than to link up the onshore to the energy generated offshore.

Risks, Security and Emissions

12 The very fact that these types of systems are being considered is concerning. In the case of a catastrophic accident where the core was exposed to seawater the result would be a thermal explosion that would hugely increase the amount of radiation emitted both to the marine environment and atmosphere.

13 Both systems would be transported by sea to their destination, raising considerable safety issues about terrorism, piracy and accidents. This was recently highlighted with the hijacking of the Arctic Sea, which was boarded and taken over by masked men posing as Swedish Police, in the Baltic, in 2009.

14 Floating nuclear power plants would be refuelled at sea every three years with highly enriched fuel, which, apart from being a major proliferation risk, also increases the possibility of an accident. Then every 12 years the whole plant would need to be transported back to port, currently St Petersburg, for removal of radioactive waste. Tsunami or large storm events would also pose a threat to the plants whether in situ or whilst being transport especially in harsh environments like the Arctic.

15 Submerged plants would be at risk from fishing vessels and the anchors of larger vessels as well as terrorism despite the undersea fencing. In the case of an accident the DCNF states the reactor would flood with seawater potentially leading to emissions to the marine environment. Patrick Boissier, the President of DCNS, the engineering firm developing the project was quoted in *Le Figaro*², stating, "Water is a natural barrier to radiation".

¹ <http://en.dcnsgroup.com/presse/dcms-va-realiser-avec-areva-le-cea-et-edf-les-etudes-de-validation-de-son-concept-innovant-flexblue-2/>

² http://marches.lefigaro.fr/news/societes.html?OFFSET=1&ID_NEWS=174740069&

Action requested

16 Given the increased risks to the marine environment from the operation, transport and refuelling of these types of nuclear reactors RSC is requested to consider a ban on their use within the OSPAR Maritime region.