The UK and the European Atomic Energy Community (Euratom)

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This document provides background on Euratom and its functions in the UK. It highlights our concerns and recommendations for the future of the nuclear industry should the UK withdraw from Euratom.

To ensure a safe and secure future for nuclear energy production and research, if the UK withdraws from Euratom we recommend that the UK government:

- Ensures transitional arrangements for nuclear safeguarding, trade and funding are in place until the UK–EU negotiations are complete. These efforts should involve open discussion with the wider community, including industry.
- Establishes new UK safeguarding agreements that are in line with International Atomic Energy Agency (IAEA) conventions and standards so that trade of nuclear material, including medical radioisotopes, can continue without interruption.
- Retains membership of the European Observatory of medical radioisotopes and continues to work with Euratom and global partners to mitigate any future shortages of medical radioisotopes.
- Assembles new bilateral and multilateral cooperation agreements with Euratom and other key countries before the UK leaves Euratom.
- Guarantees funding for Euratom-related nuclear research projects, including the Joint European Torus and MAST-U, and continued UK involvement with ITER.

Background

The peaceful use of nuclear energy within the EU is governed by the 1957 treaty that established the European Atomic Energy Community (Euratom). While Euratom is a separate legal entity from the EU, it is governed by the EU's institutions: the European Commission deals with nuclear safety, nuclear safeguards and nuclear security. Currently, its only full members are EU countries. Euratom also has a range of bilateral and multilateral arrangements on nuclear R&D co-operation with other countries including Argentina, Canada, China, Japan and the USA.

According to the treaty, the specific tasks of Euratom are to:

- Promote research and ensure the dissemination of technical information.
- Establish uniform safety standards to protect the health of workers and of the general public, and ensure that they are applied.
- Facilitate investment and ensure the establishment of the basic installations necessary for the development of nuclear energy in the EU.
- Ensure that all users in the EU receive a regular and equitable supply of ores and nuclear fuels.

The treaty also established the Euratom Supply Agency (ESA),[1] which has legal personality and financial autonomy and is under the supervision of the European Commission. Euratom is the legal owner of all nuclear material,[2] and is the purchaser, certifier and guarantor of any nuclear materials and technologies that the UK acquires. This includes our nuclear trade with the nations outside Euratom.

UK withdrawal from Euratom

The intention for the UK to pull out of Euratom was set out in the explanatory notes that accompanied the Article 50 bill published by the UK government in late January and further details were provided in the white paper,[3] published in early February. The prime minister's letter to the President of the European Council Donald Tusk triggering Article 50 in March confirmed the intention to leave Euratom alongside the EU.[4]

Current impacts of UK membership of Euratom

Regulation and inspection

There are currently 15 power reactors for civilian nuclear facilities operating in the UK.[5] Euratom provides safeguarding inspections for all of these facilities, which currently provide approximately 21% of the UK's electricity.[6] The Office for Nuclear Regulation states that in total, more than 100 UK facilities (including non-power-producing nuclear facilities) are currently subject to Euratom safeguards.[7]

In 2014 this required some 220 inspections, involving 1,000 person-days of Euratom effort [8] conducted through an agreement with the IAEA.

The approval of investment in the Hinkley Point C reactor by the European Commission involved regulation from the Euratom Treaty and competition rules from the EU.[9]

The UK is a signatory of the nuclear non-proliferation treaty with the IAEA. If the UK were to leave Euratom, it would need to find a different way to comply with the non-proliferation treaty. This could be set up separately with the IAEA outside of Euratom. If so, this must be a matter of urgency to allow maximum time for an agreement to be made before any date at which the UK leaves the EU and Euratom. If an agreement is not reached in time, the UK will not be able to trade nuclear fuel with other countries.

If the UK starts the process of withdrawal from Euratom, the government must establish new UK safeguarding agreements that are in line with IAEA conventions and standards in order to comply with the non-proliferation treaty. This must be concluded before the UK leaves Euratom.

The government should guarantee that the new build, decommissioning and other programmes of work related to nuclear fission can continue without disruption during the negotiation period.

Supply of nuclear material

Uranium for nuclear fission

The ESA ensures a regular and equitable supply of nuclear fuels to EU users in line with the objectives of the Euratom treaty. To do this, the ESA applies a supply policy based on the principle of equal access of all users to ores and nuclear fuel. This includes monitoring the market to make sure the activities of individual users reflect the values of Euratom.

The ESA closes supply contracts for nuclear material and has a right to purchase nuclear materials produced in the member states. It also monitors transactions involving services in the nuclear fuel cycle and provides economic analysis of the EU market. The ESA produces an annual update on its activities, which informs on nuclear energy developments in the EU, the world nuclear market, supply and demand for fuel and security of supply.

The government must make alternative arrangements to ensure a secure supply of nuclear fuel, if the UK begins to operate outside of the ESA.

Medical radioisotopes

The ESA includes the European Observatory on the supply of medical radioisotopes,[10] which was established to examine the issues affecting short- and long-term reliability of supply, particularly of molybdenum-99 and its decay product technetium-99m, which are used for medical imaging purposes. The observatory has a mission to ensure security of supply of medical radioisotopes for all members of Euratom.

It is estimated that the UK undertakes 1.5% of the annual worldwide imaging procedures that require medical radioisotopes.[11] However, the UK does not produce its own molybdenum-99 or other medical radioisotopes, making it vulnerable to any problems with shipping and importation as well as global shortages. Molybdenum-99 is mostly produced by fission of highly enriched uranium targets in a few research reactors in Europe, Canada, South Africa and Australia. While these reactors meet current demand, most are approaching the end of their lifespan, which could affect supply in the near future.[12]

Furthermore, the OECD-NEA estimates that demand for molybdenum-99 and technetium-99m will continue to rise at approximately 0.5% per year,[13] which will exacerbate this issue. After the global shortage of molybdenum-99 and technetium-99m in 2008–10, the High-Level Group on the Security of Supply of Medical Radioisotopes was established and 14 countries, including the UK, signed a declaration committing to ensuring a secure supply.[14] This declaration is separate to the Euratom treaty, so the UK should remain committed to this.

The government should seek to remain part of the European Observatory of medical radioisotopes and continue to work with Euratom and global partners, including through the High-Level Group, to mitigate any future shortages of medical radioisotopes, in particular molybdenum-99 and its decay product technetium-99m.

Nuclear cooperation agreements

- **Bilateral**
  Nuclear trade between the UK and other Euratom members relies on Euratom safeguarding arrangements. Nuclear trade between the UK and other countries either relies on Euratom nuclear cooperation agreements (NCAs) or bilateral arrangements that the UK has. These bilateral arrangements are not always independent of Euratom as some rely specifically on UK participation in Euratom safeguards.

- **Multilateral**
  The ITER project is an example of a multilateral agreement in which Euratom, China, India, Japan, Korea, Russia and the USA collaborate. Switzerland is also part of this agreement, participating as a fully associated third state of Euratom.

  The government will need to arrange replacement NCAs with countries the UK conducts trade with[15] and negotiate involvement in multilateral agreements such as ITER.

- **IAEA**
  Euratom has a long-standing relationship with the IAEA, particularly with regard to safeguarding of nuclear materials, which it carries out and reports to IAEA. Euratom also participates in several committees of the IAEA, such as the International Fusion Research Council.[16] The UK will still be part of the IAEA after leaving Euratom and so government should seek continued involvement with these groups.

The UK must negotiate new nuclear cooperation agreements if the UK leaves Euratom. The government must ensure it has appropriate resources to conduct negotiations and allow sufficient time to agree and ratify them.

Large facilities

Fission

The European Commission Joint Research Centre (JRC) is funded by the Euratom Research and Training Programme,[17] which includes nuclear research campuses, such as Ispra in Italy.[18] The UK does not have any operational civil nuclear research sites[19] and as such takes the opportunity to participate in this work and access the results. The UK is also a member of the Jules Horowitz research reactor project in France, which is supported by Euratom and due to become operational by the end of the decade.[20]

Fusion

The UK is currently a world leader in nuclear fusion research.[21] JET, sited at the Culham Centre for Fusion Energy (CCFE), is one of Euratom's most important research facilities.[22] A €238 m operation contract signed between the European Commission and CCFE in July 2014 secures JET operation until 2018. Fusion projects at CCFE are funded jointly by Euratom and by the UK Engineering and Physical Sciences Research Council (EPSRC).

JET currently receives around €56 m/£48 m annually from Euratom[23] as part of the contract running until the end of 2018. Negotiations for an extension of funding to 2020 are ongoing, but if the UK leaves Euratom on a timescale of early 2019 it is likely to have a negative effect on these plans and this funding.

The Euratom research and training programme includes the "European Consortium for the Development of Fusion Energy", or Eurofusion. Eurofusion manages and funds European fusion research activities on behalf of the European Commission. Fusion research activities are funded in line with the roadmap to the realisation of fusion energy, which "outlines the most efficient way to realise fusion electricity by 2050."[24] The training component of the programme has resulted in strengthened training capability in nuclear and plasma physics/technology at UK institutions.

The Fusion Centre for Doctoral Training[25] at the universities of York, Durham, Liverpool, Manchester and Oxford is essential for the training of the next generation of leaders in the field and universities are a crucial component of the UK fusion effort. While their funding comes from the EPSRC, their success relies upon access to world-class fusion facilities, including JET, MAST-U and the Eurofusion education fund.[26]

JET is seen as a prototype for ITER, the reactor designed to validate controllable, long-term, power generating fusion. The experimental results and design studies performed by JET are consolidated to a large extent into the ITER design. Euratom provides 45% of the funding for ITER, which is currently being built in Cadarache, France. The other members of the consortium are China, India, Japan, Korea, Russia and the US.

DEMO, the next facility after ITER, is expected to be the first fusion plant to provide electricity to the grid. CCFE's experience in the design and operation of JET make it well-placed to be the leader in the partnership to design DEMO. The fusion roadmap relies on funding being available from the European Commission and the Euratom member states.[27] There is a risk that leaving Euratom might seriously undermine the stake of the UK in this future grid electricity generation technology, but there is room to be an international partner with the project.

The government should guarantee that it will make up any loss of funding from Euratom when the current JET contract expires in 2018.

The government must ensure that transitional arrangements for nuclear safeguarding and funding are in place until the UK–EU negotiations are complete. These efforts should involve open discussion with the wider community, including industry.

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