• Springfields Fuels Limited is the site licence company for the Springfields site.

• Springfields has been safely making nuclear fuel since 1946 and has the facilities to manufacture fuel for most types of nuclear reactors.

• Springfields was the first plant in the world to make nuclear fuel for commercial power stations and has produced several million fuel elements, supplying products and services for reactors in 11 countries.

• Over 15% of the UK’s electricity comes from fuel manufactured at Springfields.

• Springfields was the first nuclear site in the UK to put a Biodiversity Action Plan in place to manage the site’s environmental areas, with the site containing two Biological Heritage Sites.

www.westinghousenuclear.com
Fuel for nuclear reactors (power stations) in the UK and overseas is made at our Springfields site, near Preston, in the UK. Fuel for Nuclear Reactors is made from uranium ore. The fuel is used in nuclear reactors to generate electricity. Currently on average, 15% of the world's electricity supply is generated by nuclear power.

Nuclear energy makes a significant contribution towards reducing greenhouse gas emissions. Globally, electricity supplied by nuclear power stations avoids the emission of around two billion tonnes of carbon dioxide annually.

The Manufacturing of Nuclear Fuels

The raw material used to make nuclear fuel in uranium rock that is mined all over the world. The ore that is taken contains about 1.5% uranium. To concentrate the uranium content, the ore is ground, treated and purified using chemical and physical processes. This results in a uranium ore concentrate which contains around 85% uranium.

The ore is then processed into Uranium Hexafluoride (UF6) before being converted into Uranium Dioxide (UO2).

How You Make Uranium Hexafluoride (Hex)

The UF6 is reacted with fluorine gas to produce a uranium hexafluoride (UF6) gas. The UF6 is then heated to between 95ºC and at this temperature, under pressure, the UF6 turns into a liquid. The liquid UF6 is then run into transport cylinders using remote handling equipment. The UF6 is then transported to enrichment organisations throughout the world.

Advanced Gas-cooled Reactors

The Advanced Gas-cooled Reactor (AGR) is unique to the UK and is the second type of nuclear reactor to be run in the UK. All 14 AGR reactors have been built and run in the UK since 1962. All of the UK’s AGR reactors are operated by a company called EDF Energy. AGR fuel is a type of oxide fuel and is made from uranium dioxide powder. An AGR fuel element is made up of uranium oxide pellets stacked inside stainless steel tubes. These tubes are then grouped together in a graphite ‘view-con’ to form a ‘fuel assembly’. An AGR assembly is made up of 36 stainless steel tubes, each containing 64 pellets.

How Do We Make AGR Fuel?

The isotope found in uranium which most readily splits (fission) in a nuclear reactor is U-235, but only 0.7% of naturally occurring uranium is U-235.

Enriching uranium can increase the U-235 content to around 3%. Enriched fuel can reach much higher quality of the fuel, we pack it ready to send to an AGR assembly. After it is thoroughly inspected to check the quality of the fuel, we pack it ready to send to an AGR reactor.

Light Water Reactors

Light Water Reactors (LWRs) are used worldwide, the fuel for Light Water Reactors is a type of oxide fuel. The fuel elements from these reactors are made up of uranium dioxide fuel pellets stacked inside zirconium alloy fuel tubes. We then group these tubes together to form a fuel assembly. For example, a typical LWR fuel assembly is made up of 234 zirconium alloy tubes, each containing about 372 pellets.

How Do We Make LWR Fuel?

LWR fuel uses the same manufacturing process as for AGR fuel. The fuel pellets (which are smaller than an AGR pellet) are then loaded inside zirconium alloy tubes, which are about three metres long. We then pressure and seal them and fit them inside a pre-assembled framework. We then inspect the assembly before we send it to the reactor.

Intermediate Products

As well as making nuclear fuel, we also produce intermediate uranium products such as enriched uranium dioxide powder, granules and pellets, whilst having the facilities to manufacture uranium hexafluoride.

Uranium Recovery

The processing of residues, which were created from past and present fuel manufacturing operations are also carried out by Springfields. These residues contain uranium which can be recycled into the fuel product for customers, or where this is not possible the uranium is consolidated into a stable form for interim storage.

Decommissioning

The landscape at Springfields is starting to change. Old plants and redundant buildings are being decommissioned and demolished as part of our ongoing decommissioning programme. Land has been returned to what it would have looked like prior to 1946; ponds have been re-excavated and hundreds of trees have been planted as part of our biodiversity action plan.

Components

As part of the fuel production process we have our own Component Manufacturing Plant on site. This plant manufactures all the AGR stainless steel cans and support grids used in fuel elements throughout the UK’s fleet of AGR reactors.

The plant has over 30 years experience in delivering and developing precision made nuclear components safety, to quality, on time and to cost. The plant works in a range of materials as required by the customer to meeting nuclear standards.

The landscape at Springfields is starting to change. Old plants and redundant buildings are being decommissioned and demolished as part of our ongoing decommissioning programme.

Land has been returned to what it would have looked like prior to 1946; ponds have been re-excavated and hundreds of trees have been planted as part of our biodiversity action plan.

Uranium Recovery

The processing of residues, which were created from past and present fuel manufacturing operations are also carried out by Springfields. These residues contain uranium which can be recycled into the fuel product for customers, or where this is not possible the uranium is consolidated into a stable form for interim storage.

Decommissioning

The landscape at Springfields is starting to change. Old plants and redundant buildings are being decommissioned and demolished as part of our ongoing decommissioning programme.

Land has been returned to what it would have looked like prior to 1946; ponds have been re-excavated and hundreds of trees have been planted as part of our biodiversity action plan.

Uranium Recovery

The processing of residues, which were created from past and present fuel manufacturing operations are also carried out by Springfields. These residues contain uranium which can be recycled into the fuel product for customers, or where this is not possible the uranium is consolidated into a stable form for interim storage.

Decommissioning

The landscape at Springfields is starting to change. Old plants and redundant buildings are being decommissioned and demolished as part of our ongoing decommissioning programme.

Land has been returned to what it would have looked like prior to 1946; ponds have been re-excavated and hundreds of trees have been planted as part of our biodiversity action plan.

Uranium Recovery

The processing of residues, which were created from past and present fuel manufacturing operations are also carried out by Springfields. These residues contain uranium which can be recycled into the fuel product for customers, or where this is not possible the uranium is consolidated into a stable form for interim storage.

Decommissioning

The landscape at Springfields is starting to change. Old plants and redundant buildings are being decommissioned and demolished as part of our ongoing decommissioning programme.

Land has been returned to what it would have looked like prior to 1946; ponds have been re-excavated and hundreds of trees have been planted as part of our biodiversity action plan.

Uranium Recovery

The processing of residues, which were created from past and present fuel manufacturing operations are also carried out by Springfields. These residues contain uranium which can be recycled into the fuel product for customers, or where this is not possible the uranium is consolidated into a stable form for interim storage.