Information Data Sheet

Category Explosives Factories

Description For centuries, there has been a requirement for explosives and ordnance manufacture in the UK. Gunpowder mills were established as early as the 16th century and developed over time to manufacture a range of other munitions and explosive products.

The Royal Gunpowder Factory at Waltham Abbey was established in the 1780s and by the beginning of the 19th century the government began to take control of most of the country's ordnance works to standardise production. Production of commercial explosives products also began in the 19th century. This included the manufacture of nitroglycerine, nitrocellulose, TNT and tetryl.

In WWI, when the demand for ordnance manufacture increased dramatically, National Explosives Factories and National Filling Factories were established across the UK. Provisions were also made for the manufacture of chemical munitions, such as phosgene and mustard gas.

Safety procedures were still fairly primitive during WWI and many explosives factories were located in heavily-urbanised areas. This made them vulnerable to enemy bombing and also increased the chances of fatal explosions and the dispersal of explosives residues.

In WWII, 44No. Royal Ordnance Factories (ROFs) were constructed in more remote areas to prevent a repeat of the factory disasters of WWI and to protect them against attack by raiding German aircraft. The ROFs manufactured a wide range of weapons and explosives, including developmental explosives such as RDX and HMX which had been invented in the 1930s.

In addition, a number of commercial facilities were converted to become government 'agency factories' during WWII. Chemical manufacturers, such as ICI, produced explosives products at several of their factories during WWII. Approximately 2,000No. such premises were licensed to store or manufacture small amounts of explosives by 1945.

Shell storage at a National Filling Factory during WWI

Post-WWII, several of the ROFs remained operational and eventually passed into private ownership. The majority of the 'agency factories' returned to commercial production, whilst some purpose-built explosives factories have been demolished and redeveloped.

Hazard Standard procedures of explosive/ordnance disposal through burial or burning means that explosive contamination and UXO hazards will be present in some areas of these establishments.
The potential hazard remaining at a former explosives factory depends on the type of historic production and the amount of subsequent remediation that has taken place at the site.
The table below provides an overview of the range of contaminants that may be present at former explosives factories.

Manufacturing Type	Potential Contaminants Found
Primary Explosives	• Metals and metal compounds (silver, lead, magnesium). • Inorganic compounds (nitrite, nitrate, sulphate ions). • Explosives (azides, lead styphnate, tetrazene).
Military Secondary Explosives	• Acids (nitric, sulphuric, acetic). • Organic solvents (acetone, ethanol, cyclohexanone). • Organic compounds (hexamine, toluene, phenol, glycerine, polymers). • Fuels (liquid hydrocarbons). • Inorganic compounds (ammonium nitrate, sodium nitrate, potassium nitrate). • Explosives (TNT, RDX, HMX, picric acid, tetryl, nitrogylcerine, nitrocellulose).
Commercial Secondary Explosives	• Organic compounds (mineral oils, dinitroluene, waxes). • Fuels (liquid hydrocarbons). • Inorganic compounds (ammonium nitrate, borax, sodium nitrate, potassium perchlorate). • Explosives (TNT, RDX, nitroglycol, nitrogylcerine, nitrocellulose).

Ground investigations are always advisable at former explosives factories to determine whether any significant concentrations of residue remain that may contaminate the ground. Typically, such contamination is not an explosives hazard but it may provide a toxic hazard to humans.

A UXB hazard may also exist in the vicinity of former explosives factories, which were targeted by enemy aircraft during WWI and WWII.

WWII explosives factory

Further reading: Department of the Environment, 'Chemical works: explosives, propellants and pyrotechnics manufacturing works', *Industry Profiles* (1995).